The Effects of Severe Global Deprivation on Language and Cognition

Lisa J Brown

Submitted for the degree of Ph.D

Department of Human Communication Sciences
University of Sheffield

Submitted July 2004

Research Summary

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The impetus for this research derives largely from the need to understand the course of human ontogenetic development in abnormal circumstances. The specific focus of the research is the emergence of language and cognition and social and communicative behaviour in children who have suffered extreme global deprivation at an early age. The crucial research issue, however, concerns the extent to which normal language acquisition is still possible given an initial environment that is largely language-less and lacking in social stimulation and interaction. In the early 1990s, thousands of cases of children brought up in the unprecedented neglect of Romanian childcare institutions were discovered. Many were internally adopted.

This thesis describes an in-depth, exploratory investigation of a small number of these children, whose development after adoption was monitored for two years. A range of research methods was used including interviews, observation, standardized tests and detailed qualitative analyses.

Some degree of developmental catch-up has been reported for previously institutionalised Romanian children who were adopted before the age of six months (Rutter et al., 1998). However, the children in this study were adopted around or after the age of 4 years, and it is suggested here that, even at this late age, developmental outcome is not fixed. The findings of this study are: 1.) extreme global deprivation appears to lead to global retardation, but, if the deprived environment is replaced by a stimulating one, then developmental gains can be achieved; 2.) the effects of extreme deprivation are neither permanent nor irreversible, and for example, the grammar of spontaneous speech and conversational ability develop apparently normally; 3.) the linguistic development of severely deprived children does not provide evidence of a critical period for first language acquisition; 4.) cases of severely deprived children do not provide evidence of a dissociation between language and non-verbal cognition.

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Chapter 1 The Effects of Severe Global Deprivation on Language and Cognition

1.1 Introduction

There has been an almost universal interest in the nature of human ontogeny after extreme deprivation in childhood. For centuries, philosophers such as Socrates and Aristotle have been curious about the origins of human knowledge and compelled to ask the questions that have fuelled the nature versus nurture debate. Is all human knowledge such as language innate and are we born with what we need to know about the world? Alternatively, do we arrive into this world as virtual tabula rasas – blank slates upon which experience is written? Throughout the seventeenth and eighteenth centuries, scholars such as Descartes, Locke and Kant continued to grapple with the questions related to the nature of human knowledge – issues that are still being debated today by post-structuralists such as Flusser, Derrida and Deleuze. Cases of feral and severely isolated children have also continued to fascinate researchers who raised the question as to whether there are time constraints or critical periods for human development. It has long been hoped by scientists that the study of such uniquely captivating cases would throw some light on the prognosis for human development in the face of extreme early social deprivation. Of particular interest has been the development of cognitive and linguistic capacities after such extreme privation (Curtiss, 1977). Also, cases of language delay after extreme social deprivation have caused linguists to ask whether there is a critical period for language acquisition.

1.2 Extreme Isolation in Childhood

1.2.1 Feral Children

Despite the above enquiries, however, there are few well-documented cases charting the effects of early environmental deprivation on later development and accounts of

the specific language development of a child after such adversity are even more limited. The first reputed attempt (reported by Herodotus)) to investigate the origins of human language was by the Egyptian King Psamtik I, around 2,700 years ago (Skuse, 1984b; Scovel, 1988). In his experiment, two newborns were socially isolated in a remote hut and reared in silence in order to discover which language they would speak. When one day the children uttered the Phrygian word "bekos" meaning bread, Psamtik speculated that the Phrygian Indo-European language was the true protolanguage of humans (Crystal, 1997a). After that there were, throughout the centuries, numerous reported cases of "feral" children who had apparently lived their formative years in the complete isolation of the wilderness and who had then been discovered with subsequent attempts to rehabilitate them into civilised society (A review of the cases of feral/wild children can be found in Favazzo 1977; Malson, 1972; McNeil et al. 1984; Candland 1993; Comrie, 2000 and Hoff, 2001).

The first most widely known scientific study of a feral child was that of the early French psychologist, Itard. Victor the "wild boy" was discovered in the woods of Aveyron in the early eighteenth century (Lane, 1976). There is also the intriguing case of Kaspar Hauser who mysteriously entered Copenhagen Society in 1828 with little or no speech, after having been socially isolated for the first seventeen years of his life (Clarke and Clarke, 1976, 2000; Simon, 1979). In addition there have been occasional reports of infants and young children allegedly reared by wild animals - most notably the well documented account of the wolf girls, Amala and Kamala of Midnapore who were allegedly discovered at the respective ages of two and seven huddling in a den with a family of wolves (Singh and Zing, 1939; Benzzaquen, 2001). The linguistic outcome of the above cases is mixed; Victor of Aveyron and the wolf girls never learned to speak, despite many hours of careful tuition, while Kaspar Hauser regaled polite Copenhagen society with his articulate language, kept poetic company with the aristocracy an even wrote his memoirs (Nicole, 1979). However, such cases have been discounted by scientists such as Bettelheim (1959) who prefer the alternative explanation that feral children were recently abandoned severely retarded, autistic or emotionally disturbed children who were deposited in wild and remote countryside (Clarke and Clarke, 1976). More modern accounts include cases of extreme childhood isolation documented in the United Kingdom by Skuse (1984a, 1984b) and

Fujinaga et al.'s (1990) report of the 1972 discovery in Japan, of two animal-like children aged 5 and 6 who had been forced to live in an outside shed since infancy.

The most well known scientific study of a severely deprived child is that of Genie who was discovered in America in 1970. She was extremely neglected from infancy to adolescence, permanently restrained and violently beaten by her psychotic father if she tried to speak. As Skuse (1984b) points out:

> "Having been beaten for making any noise she had learned to suppress almost all vocalization save a whimper" (p.545).

Curtiss (1977) documents Genie's developmental progress after an unprecedented history of deprivation and abuse in her book, 'Genie: A Study of a Modern-Day Wild Child.'

If a child is subjected to extreme deprivation during its early years, how will this affect its linguistic, cognitive, social and physical development? According to Clarke and Clarke (1976),

> "The most pervasive Western model for human development....is the view that the first few years of life necessarily have critical effects upon later development and adult characteristics" (p.4).

This view is echoed by Skuse (1984b) who states:

> "Those that believed in 'superenvironmentalism' held that early trauma or deprivation would have irreversible effects on later development" (p.544).

But to what extent is this so? Does deprived early experience affect a child's capacity to acquire and develop language and other skills in the normal way and set for it an irreversible path? The cases of Anna (Davis, 1940, 1947), Genie (Curtiss, 1977) and Mary (Skuse, 1984a) whose post-deprivation outcomes were relatively poor would appear to suggest this. For example, in her later reports (e.g., 1979, 1982), Curtiss claims that Genie never 'mastered' the morphology and syntax of English, that her speech was largely telegrammatic, uninflected and lacking in hierarchical complexity. These accounts also appear to suggest that Genie's language development plateaued

between the ages of 14;2 (June 1971) and 18;2 (June 1975) - between one and four years after she was rescued. However, Jones (1995) would dispute this commonly accepted description of Genie's language progress.

After a re-evaluation of Curtiss' (1977) detailed account of Genie, Jones concluded that there is some evidence to show that Genie was making considerable progress in her language acquisition. The key issue is that at the time of Curtiss' observations, Genie was *still* in the process of acquiring certain morphological and syntactic forms. Jones states that,

> "According to the (1977) account, Genie was able to acquire the morphology and syntax of English and *was still in the process of acquiring it when she was 18 years old*"(p.278).

Therefore, the idea that Genie's grammatical development plateaued at puberty cannot be substantiated. Genie's language learning process extended for at least five years after discovery at the age of 12 years and appears to have been interrupted as a result of traumatic life events - caused primarily by the scientists' treatment of her (Rymer, 1993; Jones, 1995). Thus the only conclusion that can be drawn is that science does not know how far Genie would have progressed in language if she had been in a stable and constant environment. In this context, it is possible that Genie may have developed far more than she actually did. Therefore, as to whether this case is an accurate portrayal of the path of language development after deprivation is equivocal.

According to Skuse (1984b), Clarke and Clarke (1976) have presented "compelling evidence" to suggest that the negative impact of extreme deprivation may, in fact, be reversible:

> "Reviewing the evidence for relevant early environmental influences, Clarke and Clarke (1976) comment there is new unequivocal evidence that an environment which improves in middle or even late childhood can lead to major gains in speech capacity" (p.557).

Clarke and Clarke (1976) – and later Clarke and Clarke (2000) - outline amongst other cases, the amazing progress of the Koluchova twins discovered in 1967, after having spent five and a half years in almost complete isolation (also see Koluchova, 1972; 1976; 1979). At the time of their rescue aged 7 years, the boys' spontaneous

speech was limited to only a few words, and they communicated using gestures and imitation. They could barely walk and fine motor coordination and play were severely retarded (Koluchova, 1991). Subsequently, the twins' progress was assessed yearly for 22 years using observation and standardized tests (e.g., Ravens Progressive Matrices). Three months after discovery, aged 7.3 years, their developmental level was estimated to be 3 years and they were given an extremely poor prognosis for recovery by paediatricians.

After spending a short time in a children's home, the twins were placed with a sympathetic foster family. Soon they showed, "an immense acceleration in development", (Clarke and Clarke, p.30), which coincided with the beneficial change in their environments. As the twins formed emotional ties, their speech developed rapidly (Koluchova, 1991). Aged 11 years, their expressive language – as assessed through observation- was judged to be, "quite normal both in form and content (Koluchova, 1991, p.24). By the age of 18 years, the boys' respective IQs of 114 and 112 (assessed by the Wechsler Intelligence Test) were within the normal range for their chronological ages. Twelve years later, aged 30 years, the twins had IQs above the national average, were married and had professional careers (i.e. tutor and technician). They were described as emotionally stable, with many friends and maintained a very close relationship with their adoptive family. The twins' cases are considered by Koluchova (1991, p. 27) to have "already proved the possibility of recovery from psychic deprivation and its durability."

There is also the early case of Isabelle (reported by Mason, 1942) who was discovered at 6;6 years after having been imprisoned since infancy in a darkened room with her "deaf mute" mother (Clarke and Clarke, 1976, p.41). When rescued, Isabelle could not walk or talk, but used non-verbal gestures (e.g., pointing, eye gaze, smiles, looks of horror) and showed curiosity in her surroundings (Mason, 1941). She also had malnutrition and could not play. Her performance on an unspecified psychological test was equivalent to a 3 year old. Isabelle received rehabilitative treatment from a speech and language therapist, who tried to teach single words such as "ring", "watch", "eye", "nose", "doll" using gesture and repetition. After several days, Isabelle appeared to comprehend these concepts but did not reproduce these orally. Testing established that she was not hearing impaired. It was dyadic play activities

that encouraged Isabelle's development of speech and after one week of this, she spoke her first word, "buh" [ba] for "ball." Other words were imitated such as "ah" for "car." Nouns were learned first and verbs were introduced by "action and dramatization" (Mason, 1941, p.301). Single words were produced first, followed by short formulaic phrases.

According to Mason, Isabelle's first language acquisition at the age of 6;6 years was like that of the much younger child aged between 1 and 2 years – except that it progressed much more rapidly than is found in the typical child. Isabelle was observed for two years and her language development recorded in diaries. By the age of 8 years, Isabelle had acquired a vocabulary of around 2000 words, and had also learned to speak in full sentences, use questions appropriately, sing and tell stories. She was also reported to be of "normal intelligence" (Skuse, 1984b, p.557). Summarizing Isabelle's emergence of speech, Clarke and Clarke state:

> "The case is sufficiently well documented to make it clear that one child showed substantial recovery to normality from a level of severe retardation. Moreover, deprivation of language experience during the normal period of development of this function did not prove to be critical" (p.29).

Other cases such as those of the twins, Alice and Beth (Douglas and Sutton, 1978), discovered at 4;11 years and Louise (Skuse, 1984a), discovered at 3;6 years demonstrate considerable, if not complete recovery of language functions after rescue from extremely depriving conditions. Alice and Beth's developmental outcome was assessed using standardized tests at least until the age of 6;4 years. By this age, their level of language was, according to the Reynell Developmental Language Scale, nearly age appropriate, while their verbal and performance IQs on the Wechsler Preschool and Primary Scale of Intelligence was within the normal range. Louise's development was documented until the age of 14;5, at which time, a school report described her expressive and receptive language as age appropriate (Skuse, 1984b).

The cases described above (the Koluchova and Douglas and Sutton twins, Isabelle and Louise) have in common extreme global deprivation until the age of 3;6 years and beyond. Upon discovery each child's gesture and spoken language was either extremely limited or absent. Yet, as Skuse (1984b, p.557) contends, once their

environments improved for the better, language developed rapidly and they "reached virtually age-appropriate levels within a few years." However, these case studies could be criticized on the grounds that (with the exception of the Koluchova twins) the children's outcome was not followed into adulthood, at which point some type of language impairment or developmental delay might have been present. This would have suggested that recovery after understimulation was not as complete as Skuse maintains. Nevertheless, what longitudinal evidence there is, suggests that the prognosis for recovery can be positive and, further, that post deprivation, there is a relationship between the rate at which language develops and the stimulating quality of the environment.

1.2.2 Children in Institutions

Other children whose development is germane to the present study are those who were raised in institutions. The effect of early institutionalisation on later behaviour was first studied longitudinally by Spitz (1945, 1946, 1949) Goldfarb (1943, 1944, 1945, 1947, 1955), Goldfarb and Klopper (1944) and Skeels (1936, 1937, 1938, 1940 1942, 1945, 1965), Skeels and Dye (1937), Skeels and Harms (1948) and Skodak and Skeels (1947, 1949). Goldlfarb, for example, followed previously institutionalised children until adolescence. He found that the effects of early-institutionalised care were both pervasive and long lasting. Abnormal development was shown in the areas of motor ability, social relatedness, personality, non-verbal intellect and language. More specifically, many adolescents were found to have poor motor and spatial coordination, inadequate relationships with peers, difficulty with emotional expression, a lack of abstract reasoning, an absence of "goal-directed behaviour" and "defective" speech (Goldfarb, 1943, p.216). In a later paper, Goldfarb, (1945) concluded that,

> "There is cumulative evidence that an extensive period of deprivation of babies in an infant institution is profoundly detrimental to their psychological growth. There is also evidence that the pernicious effects of the early experience persist even in the face of careful placement in selected foster homes" (p.32).

Goldfarb, thus, found that the "pernicious effects" of early institutionalisation were not mitigated even when the child was placed in new stimulating environments (i.e.

foster care, or "foundling homes" with improved conditions). Contrary to this finding are the longitudinal observations by Skeels (1966) that some children raised in orphanages, whose circumstances change for the better, can develop normally as adults.

Skeels studied the long-term progress of children who were placed in an over-crowded orphanage during infancy. There were very few staff members and limited individual attention. At the age of 1;6 years some of the children were transferred to a better-equipped institution. Here there was increased opportunity for emotional and intellectual motivation since there were many more carers. Each child was taken under the guardianship of one adult who was responsible for the child's social-emotional, intellectual and physical needs. The children were given the chance to selectively attach to a key caregiver. The improved changes in the children's circumstances led to improvements to many aspects of behaviour. They continued to make linear gains in cognitive ability throughout the childhood years and adulthood. Similarly their social adjustment considerably improved. When tested in their thirties, these subjects had reached socio-economic levels that were above the national average for the time (Gleitman, 1992). In contrast, the infants who remained in the impoverished orphanage were found to have IQ levels that dropped over the succeeding years and far below average levels of educational and occupational attainment as adults. Skeels (1966) concluded that the negative effects of institutionalisation could be overcome as long as there is a stimulating change to the environment. The positive effects of intervention and remediation within an orphanage setting have also been noted by Flint (1978). However, Provence and Lipton (1962), Dennis (1973) Batchelor, (1999) and Singh (2001) have, again observed that if infants reared in impoverished institutions do not experience a positive change in circumstance, the deleterious effects can persist into later life. For a review of early studies see Bender (2001).

The above longitudinal studies of the development of children from institutions collectively indicate that if there is an absence of relevantly stimulating experiences in early childhood, there is a risk that language and other cognitive abilities may be impaired in later life.

1.2.3 Extreme Isolation in Childhood: The Romanian Legacy

In 1989, with the execution of the maniac dictator Nicolai Ceaucescu, the world was exposed to Romania's previously hidden secrets. The most tragic of these was the appalling degradation that many thousands of children were found to have suffered in state-run 'child care' institutions. These children existed in unprecedented conditions of severe isolation, neglect and squalor in which no attempts were made to encourage their linguistic, social, cognitive, or physical development. Many of these children were internationally adopted and were described as being severely delayed in language and virtually all areas of development. Organizations such as the Parent Network for the Post-institutionalised child reported that many health-care professionals were unfamiliar with some of the complex problems the children appeared to have and thus, were unclear as to how to assess and treat them effectively.

To date, there has been little published work that focuses on the development of children adopted from Romanian "orphanages."[1] This includes a handful of journal articles which collectively provide a general overview of the developmental, behavioural and medical consequences of extreme deprivation (e.g. Macvei, 1986; Ames & Carter, 1992; Johnson et al., 1992; McMullan & Fisher, 1992; Rosenberg et al., 1992; Kaler & Freeman, 1994; Chisholm, 1995, 2000; Handleyderry et al., 1995; Morrison et al., 1995; Johnson, 2000; Carlson, 1997; Carlson and Felton, 2000; O'Connor et al., 2000; O'Connor and Rutter, 2000; Rutter, Kreppner and O'Connor, 2001; Croft et al, 2001; Chugani et al., 1998, 2001; Gunnar et al., 2001; Thompson, 2001; Groza and Ryan, 2002). There is only one, very brief, study by Hess and Thompson (1996) which is devoted specifically to language development. However, one study that is worthy of note is Rutter (1998).

In the mid-1990s, the Medical Research Council commissioned a large-scale study of 111 children adopted from Romanian orphanages before the age of 2 years and who were later assessed at the age of 4 years. Professor Sir Michael Rutter conducted this

[1] In many cases, children were placed in state run institutions, not because they were orphans, but because, their families could not afford to keep them. In this respect, "orphanages" is an inaccurate term.

longitudinal, quantitative research along with the English and Romanian Adoptees (ERA) study team. It was implemented in an attempt to address the relative lack of information concerning the post deprivation outcome of such children (adopted into the United Kingdom). In one 1998 paper, Rutter et al., reported that previously institutionalised Romanian children who were adopted before the age of six months into a nurturing environment showed catch-up with respect to physical and cognitive development that was "nearly complete" by the age of four years. Such catch-up was also "also impressive, but not complete" in children who were adopted after the age of 6 months (Rutter 1998 et al., abstract).

Rutter concluded that age of entry to the United Kingdom was a strong predictor of how the child would function cognitively at four years. He also suggested that it was psychological rather than nutritional neglect that was the most salient factor affecting later development. Although this study is interesting, it does not place any special emphasis on language development. It is also disappointing because it does not give qualitative information about progress after extreme global deprivation.

The studies cited above suggest that, after early neglect, there is considerable variability in developmental outcome. Some children appear to adapt quickly and successfully to their new social surroundings and show no or few residual signs of their deprived backgrounds. In contrast, others continue to show profound global deficits in ability even after prolonged intervention.

Detailed information about the fundamental impact that severe deprivation has on future development is generally limited. However, an investigation of the longitudinal progress of children adopted from Romanian 'orphanages' would provide some of this knowledge. This is because they were deprived of normal levels of experience during early childhood. Therefore, the purpose of the present research is to attempt to analyse what these previously institutionalised children can tell us about the potential for language, cognitive and social development in the face of extreme global deprivation. The following sections will begin to unravel some of the contentious issues – particularly concerning language - which such an exploration is likely to raise. These issues concern the nature/nurture argument, the relationship between

language and cognition and the concept of a critical period for first language acquisition (see Bateson and Martin (2001) for a general review of these issues).

1.3 Is Human Language Learned or Innate?

The development of extremely deprived children raises a central argument in language acquisition research that is a direct reflection of the nature vs. nurture debate:

I Is language ability innate (or biologically determined) and is there a critical period for the normal development of language (nativist and biological determinist models)?

versus

II Is normal language acquisition primarily facilitated by meaningful social interaction and/or cognitive development (social interactive, functionalist and cognitive based models)?

This raises important issues within the disciplines of psycholinguistics and neurolinguistics about the nature of language development.

1.3.1 Nativist Theories

It was the nativist Chomskian revolution in the 1950s that created considerable controversy over the true nature of language acquisition in humans. Chomsky (1957, 1965, 1975, 1980, 1981, 1986) argued that humans have a species-specific predisposition for language, an innate language faculty. The Language Acquisition Device (LAD) was thought to have a specific, although unspecified, neurological basis. Chomsky arrived at this view because he argued that the complex nature of human language presupposes that knowledge of its structure must be innate.

Chomsky made the distinction between the deep structure and surface structure of sentences and tried to validate his claim about the innateness of language by pointing

out that the underlying meaning or deep structure of sentences is not manifest in the surface structure of the sentences that children hear. Unless children already have some implicit knowledge of linguistic categories such as verb and object, it is impossible for them to work out the deep structures of the surface forms they are routinely exposed to in the linguistic environment. Knowledge of these syntactic principles constitutes Chomsky's conception of Universal Grammar (UG) that is part of the innate LAD.

An innate Universal Grammar (at a highly abstract level) could in Chomsky's view apply to all human languages since it places constraints on the number of hypotheses that children make about what sentences mean. The evidence that Chomsky uses in support of nativism includes the various phenomena of over-regularisation: the application of regular inflections to irregular past tense verbs and plural nouns. These creative morphological errors, in Chomsky's opinion, suggest that children are applying self-chosen rules, not merely repeating what they hear from adults.[2]

Connected with Chomsky's nativist view are advocates of biological determinist or biolinguistic theories such as Lenneberg (1964, 1967, 1968), Locke (1997, 1999) and Pinker (1984, 1989, 1994). These approaches presuppose that part of the human specialization for language involves species-specific brain mechanisms (presumed to be involved in the control of grammar) that are generally thought to reside within the left hemisphere of the brain. The neurobiological process whereby language is gradually lateralized to the left hemisphere is considered to be exclusive to humans – although there is disagreement as to when this occurs. Some theories suggest that it is as early as two years of age (Kinsbourne and Smith, 1974) whereas others have suggested that lateralization is complete by five or six years (Krashen and Harshman, 1972; Krashen, 1973, Locke, 1990, 1992, 1994, 1995, 1996). Still others have suggested that brain maturation and thus the lateralization of language to the left hemisphere is present at birth (Davis and Wada, 1977; Wada and Davis 1977).[3] According to Stromswold (1995),

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[2] It should be noted that claims about innateness and species specificity in linguistic disciplines, generally concern the grammar component.

[3] Others like Deacon (1999) argue that lateralization is nothing more than a diversion from the major arguments surrounding language acquisition.

> "the language areas of the human brain appear to be anatomically and functionally asymmetrical at or before birth. Anatomically, analyses of foetal brains reveal that the temporal plane is larger in the left hemisphere that in the right hemisphere (Wada, Clarke and Hamm, 1975). Development of the cortical regions that subserve language in the left hemisphere consistently lags behind the development of the homologous regions in the right hemisphere. The right temporal plane appears during the thirtieth gestational week, whereas the left temporal plane first appears approximately 7-10 days later (Chi, Dooling, and Gilles, 1977)" (p. 860).

Thus, language is posited as being the defining variable of human uniqueness. Part of this uniqueness involves the view that humans have evolved to be the only living creatures that possess a generative form of communication mediated by physical organs that are dedicated to language. These 'physical organs' involve Broca's and Wernicke's areas of the brain and the human vocal apparatus (Scovel, 1988).

1.3.2 Cognitive Functionalist and Social Interactive Theories

In opposition to nativist theories, Bates and MacWhinney (1979, 1982) and Bates and Goodman (1997), posit that language is primarily learned and that it is pragmatic factors that underlie the process of language acquisition. Social and communicative functions are seen as the basis for structural properties of language such as syntax. Their view is that language is an outgrowth of high-level cognitive principles acquired by observation of and participation with the environment. In addition, they postulate that there is no specific neurological device responsible for language and that acquisition or learning of linguistic forms only requires repeated exposure in meaningful contexts. Knowledge of grammatical consistencies occurs because the brain looks for patterns in the input.

The opinion that interaction with the (social) environment significantly influences and shapes language growth is also found in social-interactive approaches to language acquisition (Snow, 1972, 1977; Dore, 1974; Bruner, 1974, 1975, 1977). Philosophical debate concerning the functional origins of language (and the relationship between language and cognition) have been taken up by Vygotsky (1962).

1.4 Dissociations Between Language and Cognition

One vital issue associated with the above debate is the relationship between language and cognition. There are two questions that may be posited:

I Can language be wholly explained in terms of general non-linguistic cognitive, perceptual, and social/pragmatic features?

II In contrast, is language a unique independent, cognitive system (dissociable from other areas of cognition), involving task-specific or domain-specific mechanisms?

These enquiries reflect a theoretical dichotomy between two approaches. The first involves the former broader view that understanding of the principles governing language can only be gained through consideration of both linguistic and non-linguistic issues. The second concerns the latter narrower view that a perusal of specifically linguistic factors will lead to a better understanding of language. Clarification of the relationship between language and other intellectual functions may be fundamental to our increasing understanding of the cognitive principles necessary for or underlying language (Yamada, 1990).

1.4.1 The Cognition Hypothesis.

One school of thought that received widespread popularity throughout the twentieth century was the belief that cognition was primary in development. The most notable proponent of this view is Piaget (1926, 1951, 1954) who viewed language as part of a more general cognitive base, arising from sensorimotor intelligence. He also suggested that language is merely one component within the broader realms of semiotics (Yamada, 1990). The view that cognition can be defined as a general human predisposition upon which language is based is generally referred to as the Cognition Hypothesis (Bloom, 1970, 1973; Cromer, 1974, 1976, 1988, Bates and Snyder, 1987). According to Miller (1981),

> "The Cognition Hypothesis argues that a particular conceptual achievement, or mental age, is necessary to a related linguistic achievement…Cognitive development is seen as the major pacer of the development of communication skills. Experience, linguistic

> input, perceptual salience, already acquired forms, and reinforcing consequences all play their roles only within the limits set by the child's cognitive status"(pp 4-5).

The strong form of this hypothesis asserts that particular cognitive attainments are both essential and sufficient for language development. Bowerman (1973b, 1974), for example, has described some of the cognitive prerequisites assumed to be necessary for language acquisition which include the capacity to use symbols to signify events and objects that may not be perceptually salient, the ability to follow temporal and spatial order and the ability to categorize and form hierarchical relationships (Yamada, 1990).

The strong form of the Cognition Hypothesis predicts that retarded populations of children with sufficient linguistic experience and no physical speech control deficits will develop language consistent with their intellectual level. If this developmental view were correct, profiles where language development is in advance of intellectual level (or mental age) or is delayed relative to intellectual level would not be expected (Miller, 1981).

The more popular alternative form of the Cognition Hypothesis is the weak form that holds that cognitive abilities are at least necessary but not sufficient for language learning. This view accepts that there may be specifically linguistic skills in addition to general cognitive structures and capacities that may account for language acquisition (Cromer, 1976). If the weak version of the Cognition Hypothesis is correct, then the prediction would be that language development would be equivalent to or less than intellectual level in retarded populations (Miller, 1981).

A third view suggesting that cognitive and language structures are strongly associated is referred to as the Correlational Hypothesis (Brown, 1973; Bates et al., 1977, 1979; Miller, 1981). The hypothesis is that there are common underlying mechanisms or principles that govern the developmental sequences in both the linguistic and general cognitive domains (Yamada, 1990). It is these underlying mechanisms or principles controlling language and other areas of cognition that are seen as a requirement for language. The hypothesis also states that the linguistic reflections of these shared governing principles are just as likely as cognitive ones to develop first (Miller, 1981). The general abilities that exhibit themselves in language and in various other

cognitive domains may, for example, include classification, categorization, extraction or abduction of rules and the construction of hierarchies (Yamada, 1990; Maratsos and Chalkley, 1980). Maratsos and Chalkley (1980) also suggest that the learning of syntactic and morphological categories is similar to learning in other spheres such as the formation of concepts and the learning of social/pragmatic roles.

Bates et al. (1977) when discussing these shared features within the cognitive and linguistic domains use the term "local homologies" (or the Local Homologies Hypothesis) to refer to the idea that both language and cognition may derive from underlying principles that are biased towards neither. According to Miller (1981),

> "The Correlational Hypothesis is consistent with some, but not frequent, variation between language and cognitive levels in *either* direction" (p.5).

1.4.2 Modularity

Theories that advocate a strong association between cognitive and language mechanisms and operations such as the Cognition, and Correlational hypotheses represent but one end of the theoretical spectrum. The direct opposition to these views concern those who argue for a modular approach to the development of cognitive functioning that visualizes the various cognitive domains as interacting but discrete, self-governing spheres – a view popularly associated with Chomsky, (1965, 1981, 1986), and Fodor (1983). One of the principles of this approach is that language cannot be explained by using non-linguistic cognitive, social interaction or pragmatically based theories, but can be by using specifically linguistic approaches (Yamada, 1990).

In 1983, the publication of Fodor's book, 'Modularity of Mind' profoundly impacted the area of linguistic research with the claim that many of the processes involved in language comprehension were assumed by specialised brain mechanisms which Fodor termed modules. Within the modular framework, the facility for language was viewed as an input system comparable with sensory systems such as vision. The criteria that specify whether a system can be considered a module include domain specificity and the encapsulation of information. Also included in the criteria is that the module may

be subserved by highly specific neural architecture that may be subject to selective impairment. It is this specialised nature of the neural sites of the modules that is considered to be innate (Pinker, 1984, 1990, 1999; Fodor, 1983; Chomsky, 1965, 1986). However, for the past ten years or so, there has been controversy surrounding the possibility that domain specific and modular facets of language have a genetic basis (e.g. Karmiloff-Smith, 1999).

There can be two types of developmental dissociations. Firstly, dissociations within the language system itself occur when one aspect of the language system supposedly develops independently of another, as for example, when the lexicon develops independently of or separately from grammar (Locke, 1994; Clahsen and Almazan, 1998). If this view were accurate, then each area of language might be expected to have its own period of maximal development. The second kind of dissociation is between language and other areas of cognition such as memory and visuo-spatial ability. In this respect, language is viewed as an independent and dissociable cognitive system, "device" or "module" that is governed by its own (domain specific) autonomous rules and properties (Curtiss, 1981, 1982, 1988; Fodor, 1983). This type of dissociation is the one adhered to by 'nativist' theorists such as Chomsky (1975, 1980) and Lenneberg, (1964, 1967). At issue here is whether language is a specific and inbuilt human ability embedded in a specialised brain module or whether general cognitive systems lead to linguistic capability.

Some researchers have used single case and small group studies of developmentally impaired subjects to support the idea of language modularity and thus that language is dissociable from other areas of cognition or that there are dissociations within the language system itself. These studies involve Turner's syndrome females (Silbert, Wolff and Lilienthal, 1977; Yamada and Curtiss, 1981) children with Down's syndrome (Seagoe, 1965; Rondal, 1995; Fowler, 1988, 1990; Paterson, et al. 1999; Vicari, Caselli, and Tonucci, 2000; Jarrold, Baddeley and Phillips, 2001), children with William's syndrome (Thal, Bates and Bellugi, 1989; Bellugi, Marks, Bihrle and Sabo, 1993; Bellugi et al, 2001; Mills, et al, 2000; Atkinson et al, 2001; Volterra, Capirci & Caselli, 2001; Zukowski, 2001) children with hydrocephalus (Swisher and Pinsker, 1971; Tew, 1979; Cromer, 1988; O'Connor and Hermelin, 1991), children with specific language impairment (SLI) (van der Lely, 1997; van der Lely, Rosen

and McClelland, 1998) and subjects with unknown aetiologies (Curtiss, 1977, 1981, 1982, 1988, 1989; Curtiss and Yamada, 1981; Curtiss, Fromkin and Yamada, 1979;Yamada, 1990). Some have commented on the importance of acknowledging the modularity theory of cognition in language research with special populations and, for example, Fowler (1990) states:

> "One cannot conduct language research without at least acknowledging the hypothesis that language is acquired, processed, and represented independently of other cognitive domains" (p. 303).

Implicit in Fodor's genetic modularity hypothesis – and the theories routed in biological determinism - is the idea that the successful emergence of modular or specialized abilities is controlled by maturational factors, that is, they unfold within genetically coded windows of opportunity or critical periods. What is the nature of the critical period and from where did the concept originate? In order to address this, the complex origins of the critical period and the mixed findings of associated research are described in the following sections.

1.5 The Critical Period

1.5.1 Origins of the Critical Period

The concept of critical periods in development originated from a disparate range of scientific disciplines (Skuse, 1984). These most notably involve the following:

I. Ethological and neurobiological observations of animal behaviour (e.g. Lorenz, 1952, 1966, 1979; Tinbergen, 1952, but also see Scovel, 1988)

II. Psychological syntheses of the above conceptualisation such as attachment theory (Bowlby, 1951, 1969, 1973)

III. Biological determinist approaches to human behaviour (e.g. Penfield, 1959, 1963; Lenneberg, 1967, 1968; Chomsky, 1957, 1965; Pinker, 1994)

1.5.2 Animal Studies

Critical periods were first identified in ethology and experimental embryology, principally with the early work of Spalding (1873) who found that "chicks hatched in the absence of a hen were observed to follow any moving object to which they were exposed in the first few days after hatching, but not later" (Borstein, 1989). The later work of Stockard (1921), Child (1921) and Spermann (1938) within an offshoot of experimental embryological research known as teratology (Smart, 1991), brought attention to the idea that certain cells and cell masses were uniquely affected by external "noxious" stimuli (namely chemicals) during discrete periods of development but not others (Borstein, 1989).

The idea of a critical or sensitive period for behaviour originating from embryology was later used by ethologists investigating the aetiology of species-specific behaviour in animals (Bateson, 1979; Crystal, 1997). This includes Lorenz's (1952, 1966, 1979) most notable work on avian imprinting in baby greylag geese. Lorenz found that, in order for a gosling to become attached to or imprinted on its mother, it must occur within a few hours after hatching, that is, there is a critical period for imprinting. Other ethological studies examined the sensitive period effects on the development of ants' cocoon preferences (Jaisson and Fresneau, 1978), imprinting in ducks (Hess, 1973), socialization and reaction to handling in calves (Krohn, Jago, and Boivin, 2001), and language acquisition in humans (Lenneberg, 1967). Developmental neurophysiological studies that have provided evidence of specific critical period effects include cortical cell specificity in the vision of cats (Hubel and Wiesel, 1970), development of sociability in dogs (Scott and Marston, 1950; Scott, 1962), emotionality and attachment in monkeys (Harlow, Harlow and Suomi, 1971; Ziabreva, Schnabel and Braun, 2000), song ontogeny in birds (Marler, 1970; Zann, 1997; Nelson, 1997; and Brown and Farabaugh, 1997; White, 2001), (hormonal) arousal in mice (Denenberg and Bell, 1960, Denenberg, 1964) and the influence of enriched environments on rats' behaviour (Greenough, Withers and Anderson, 1992). For a review of some of these studies see Sanchez, Ladd and Plotsky (2001) and Boccia and Pedersen, (2001).

As the above suggests, researchers from a wide range of disciplines, have historically investigated the occurrences of critical periods by paying attention to the unique

influence of a specific phenomenon on a specific species or organism. This has lead to observations from a number of widely disparate sources and subsequently a certain amount of heterogeneity as regards the accurate definition of a critical period (Borstein 1989). Bateson (1979) notes that the term "critical period" is known by a number of different synonyms, including "sensitive phase", "optimal period" and "vulnerable point" that are taken to mean the same thing (p.470). But as Bateson points out, the general idea that these terms have in common is that,

> "an individual's characteristics can be more strongly influenced by a given event at one stage of development than at other stages" (p.470).

As one of the recurrent labels in the scientific literature appears to be "critical period", this is the term that shall be given preference in the present review.

1.5.3 Critical Periods Applied to Human Behaviour

The animal studies previewed above, are only part of research on critical periods that has been prominent in developmental neurobiology and neurophysiology for more than 30 years. This research has collectively indicated that if motor and sensory capacities are to develop normally, then the animal must have particular kinds of experience at specific periods during its developmental trajectory. Due to this proliferation of work with animals many researchers feel that a standard has been reached against which human performance can be measured (Scovel, 1988). Researchers in human sciences such as developmental psychology and linguistics extrapolate from the ethological and neurophysiological observations of animal behaviour to the behaviour of human infants. For example, the first person to suggest that time constraints in animal learning (in ethological studies), might be applied to human language learning was the prolific Canadian neurologist, Wilder Penfield (1959, 1963).

In his book, 'The Second Career' (1963), Penfield made the first publicised reference to a possibility of a neurological/maturational constraint on human language learning (Scovel, 1988). Penfield believed that children are born with a neurological "clean slate" for language learning and that the two human cerebral hemispheres are

structurally identical to each other (p. 117). However, these two assertions – it is claimed - have since proved to be erroneous, by the large amount of neurophysiological and neurolinguistic evidence. The work of Geschwind and Levitsky (1968), for example, established that the areas of the left hemisphere responsible for processing linguistic information tend to be slightly bigger than the analogous neural areas of the right hemisphere.

1.6 Language Critical Period Research

Over the past decades there have emerged a limited number of journal articles and a few books written on the concept of a critical period for human behaviour and language since Penfield's (1963) book. A selection of theoretical and empirical articles from the language critical period literature will now be previewed. The possibility of a critical period for second language acquisition will not be debated here. This is because the focus of the present study is on *first* language acquisition in exceptional circumstances.[4]

1.6.1 Theoretical Contributions

A number of researchers have reviewed the issues pertinent to an evaluation of a critical period concept for first language acquisition. These include Bortfield and Whitehurst (2001), Farran (2001), Bruer, (2001), Sabogal & Otero (1975), Kolata (1975), Snow, (1987) and Newport, (1991). Hurford (1991) offers an evolutionary explanation of the existence of critical developmental phases. Several papers attempt to clarify the concept of a critical period as applied to human development. For instance, Smart (1991), when referring to brain development, redefines the "critical period" as a "sensitive period" and notes that the two terms are often used interchangeably even though their connotations are somewhat dissimilar. He makes the following distinctions:

[4] Various discussions of sensitive/critical period issues within second language learning can be found in Flege, (1999), Oyama (1976); Snow and Hoefnagel (1977, 1978); Patkowski (1980); Genesse (1981); Chiang (1981); Prakash (1984); Wuillemin, Richardson and Lynch (1984); Johnson and Newport (1989, 1991); Ioup et al (1994); Obler and Hannigan (1996); and Davis and Kelly (1997).

> "The term 'sensitive period' will be..defined as 'a stage at which some aspect of development occurs with greatest ease'. The term 'critical period' has connotations of crisis and abruptness, which are appropriate only in certain instances. It is avoided or used only as a special class of sensitive period" (p.109).

Johnson and Newport (1996), distinguish between two different types of critical period model. The first of these, the 'exercise hypothesis' incorporates the idea that,

> "Early in life, humans have a superior capacity for acquiring languages. If the capacity is not exercised during this time, it will disappear or decline with maturation. If the capacity is exercised, however, further language learning abilities will remain intact throughout life" (p.251).

The second type, the 'maturational state hypothesis' proposes that,

> "Early in life, humans have a superior capacity for acquiring languages. This capacity disappears or declines with maturation" (p.251).

Although the two versions differ in character, the broad predictions they make with regard to first language acquisition are the same, that is, children will be better than adults at acquiring a first language. However, where these models do subtly differ is in the postulation of the exercise hypothesis that there *must* be relevant linguistic exposure in childhood in order for language to fully develop at a later date. If this exposure is lacking, it will not be possible for normal language acquisition to occur. The maturational state hypothesis, on the other hand, does not make this assumption, but suggests that the childhood advantage for language declines with maturation, "regardless of early linguistic experience" (p.251).

Moltz (1973), Oyama (1979) and Colombo (1982) also attempted conceptual refinements of the critical/sensitive period terms and phenomena. Other notable theoretical contributions to the field of critical period research include the biolinguistic approaches of Lenneberg (1967), and Locke (1990, 1992, 1994, 1995, 1997, 1999). According to Locke, there is a narrow critical phase for the development of the grammar component occurring between 2 and 3 years of age. Lenneberg, on the other hand hypothesizes that there is a critical period for language lateralization to the left hemisphere, which starts at two years and ends at puberty. In support of this, Komarova and Nowak (2001) argue that there is an evolutionary advantage to having a language acquisition period that continues until 13 years of age.

Scovel (1988) also agrees with the time frame of Lenneberg's critical period model (i.e. 2 to puberty). However, he makes the distinction between speech and language on the grounds that biological factors are more likely to constrain the former rather than the latter. To Scovel speech is:

> "the linear, oral-aural communication which we employ as members of a community" (p.14).

whereas language is defined as:

> "the abstract, hierarchical system of symbols which underlies speech writing and other forms of symbolic communication" (p. 14).

According to Scovel, it is far more logical for there to be a biological critical period for the physical articulation of speech sounds (speech performance) rather than for the learning of the symbolic aspects of language (linguistic competence). He therefore states,

> "a critical period is defensible only for phonological learning and cannot be expanded to include the learning of other linguistic skills, such as the acquisition of new words or new grammatical patterns" (p.59).

1.6.2 Empirical Studies

A selection of the *empirical* literature will now be briefly reviewed. Note that some of these studies use the term "sensitive period" rather then "critical period".

I Neurobiological Studies.

A number of neurobiological studies have attempted to search for the biological bases of critical period effects in language behaviour. Neville, Mills and Lawson, (1992) present neurophysiological evidence using event-related brain potentials (ERPs) that semantic and grammatical aspects of language develop independently of each other and have different sensitive periods. Rubin (1997) and Rubin and Schwartz (1999) review a number of experimental studies, including Neville et al.'s data, pertaining to critical/sensitive periods and concludes that components of language have different

developmental time frames with phonology developing until the 12th month of infancy, syntax until the age of 4 years and semantics until the age of 15 or 16 years. In summarizing the evidence for discrete linguistic critical/sensitive periods, Rubin concludes that,

> "the data indicate that there is a time dependent series of functions in sequence which is based on responsive adaptations made by the CNS to acoustic stimuli" (p.202).

Related studies that have attempted to examine the neurophysiological bases of developmental critical periods include, Kolb, Gibb and Gorny (2000) and Neville and Bruer (2001).

II Studies Focussing on Single Areas of Language

Other researchers have investigated the affects of critical periods on single areas of language, particularly phonological development. For example, Kuhl, Williams, Lacerda, Stevens, and Lindblom (1992) examine the critical period role in the development of phonetic perception and also the influence of linguistic experience. In a study of 6-month-old infants from the United States and Sweden, Kuhl et al., found that the infants' phonetic perception was altered within the first six months of life after exposure to a particular language. Also Eimas (1985) showed that the ability to perceive speech sounds involving phonetic contrasts (phonetic discrimination) is present in neonates, but suggested that this perceptual sensitivity declines within the first few months of life "through exposure to a restricted environment" (p.40).

III Studies Concerned with the First Acquisition of Sign Language

Several studies have also examined critical period effects on the acquisition of sign language by those who are "deaf" and hearing impaired (see Emmorey (2001) for a broad overview). Fitch et al. (1982) and Serbetcioglu (2001) examine how reduction of auditory stimuli during an early critical period can hinder a hearing impaired child's capacity to acquire a fully developed communications system. Marcotte and Morere, (1990) found evidence of a "developmental critical period" through their investigation of cerebral lateralization in a varied sample including normal, hearing

and congenitally deaf subjects. They tested the cerebral lateralization for speech in one group of right-handed normal hearing subjects and one group of deaf adolescents. Normal hearing subjects and subjects who acquired deafness after 3 years of age displayed cerebral dominance for speech production in the left hemisphere, whereas subjects with early-acquired deafness (6-36 months) showed "atypical, anomalous cerebral representation." Marcotte and Morere suggest that this evidence supports an early critical period for the cerebral lateralization of language to the left hemisphere.

This conclusion is reflected in a study by Mayberry and Eichen (1991), who examined whether there is a childhood critical period for sign language through their experiment with 49 deaf signers. Results showed that the advantage of spoken language acquisition in childhood could be applied to the early development and recognition of sign systems. A later review by Mayberry (1993) describes the findings of five experimental studies that tried to determine whether there was any "systematic relationship between the age at which sign language is first acquired by deaf individuals and their ability to process sign language in later adulthood" (p.62). The signs systems, of these individuals, that included American Sign Language (A.S.L.), were assessed using a variety of linguistic tasks. Results showed that the acquisition of sign language is inhibited by a critical period to the same extent, as is the acquisition of spoken language; the later the age that sign language was acquired, the less proficiency that was ultimately attained in adulthood. In this respect the effects of the critical period for language development are long-term, irrespective of modality.

Mayberry's (1993) opinion is echoed to some extent by Newport (1990, 1991) who argues that maturational constraints operating in early childhood actually aid language learning. She suggests that there is a linear decline in language performance that starts in childhood and plateaus in adulthood, due to maturational advances. Newport bases her claims on a number of experimental studies that examined American Sign Language competence in deaf subjects (aged 35 to 70 years old) who differed in their age of exposure to a first language (e.g., Newport and Supalla, 1990; Newport, Supalla, Singleton, Supalla and Coulter, 1990). The syntax and morphology of ASL was evaluated using a battery of linguistic tasks. Newport concluded that,

> "These results provide strong evidence for an effect of age of acquisition on control over a primary language; The later the language is learned, the less its use is native (with crisp and grammatically consistent forms) in character" (p.18).

Significantly, Newman et al. (2002) claim that the angular gyrus in the right hemisphere – considered to be responsible for processing sign systems such as American Sign Language (ASL) - is subject to a critical period extending to puberty. This is similar to the biological constraints controlling the acquisition of spoken language by the left hemisphere (Lenneberg, 1967).

Matthews (1993) presents the case of J. who was diagnosed as severely hearing impaired at the age of twelve. His subsequent slow development and understanding of English grammar support the possible existence of a critical period for first language acquisition. Grimshaw, Adelstein, Bryden and Mackinnon (1995) present a similar case of a young congenitally deaf male, E.M. who grew up in a Spanish rural area where he had no contact with the deaf community and received no formal education. He was discovered at the age of 15, and was subsequently fitted with hearing aids that corrected his hearing loss. His development after puberty of verbal Spanish, considered to be his first language, was studied over a four-year period. It was concluded that the severe impairments that E.M. demonstrated in his language comprehension and production support the critical period hypothesis. Finally, critical periods have also been implicated in the transmission of tactile information in populations of deaf, hearing impaired and blind children (Richardson and Wuillemin, 1981).

The above studies lend robust support to the idea that there is a critical period for first language acquisition. There is, however, research that opposes this idea.

1.6.3 Opposition to the Critical Period

The notion of a critical period for first language development has, over the years, come against some opposition. Scovel (1988) notes that those advocating a biological perspective on language learning would be criticized by academics who support non-

biological explanations for a language critical period. These most notably include the early papers of Krashen (1972, 1973) and Krashen and Harshman (1972). They argued against Lenneberg's (1967) hypothesis that language lateralization is completed by puberty. Their counter-argument is that language function is lateralized to the left hemisphere as early as five years and primarily influenced by the linguistic environment, rather than maturational factors. They also suggest that language-learning constraints *after* puberty are more likely to be caused by "cognitive maturity," rather than biological aspects (p.142).

Some clinical studies have found no evidence for the existence of critical periods. In one study by Chapman, Seung, Shwartz and Raining-Bird (1998) one group of 47 Down's syndrome subjects, aged 5 to 20 years were compared with one group of 47 control children aged 2-6 years, in order to evaluate the language production deficits in Down's syndrome children and adolescents. Chapman, et al., concluded the following:

> "Analyses of narrative language sample by age subgroup showed no evidence of a critical period for language ending at adolescence, nor of a "syntactic ceiling" at MLUs corresponding to simple sentences for the DS group" (Abstract).

As early as 1965, Alajouanine and Lhermitte were unable to demonstrate any critical period in their study of 37 children who sustained brain injury within the age range of 18 months to about 11 years. A later study by Morrell et al, (1995) examined the linguistic outcome of 14 children with Landau-Kleffner syndrome (LKS), acquired epileptic aphasia, who underwent corrective surgery for this. This form of acquired aphasia is associated with a generally weak prognosis for recovery of spoken language. This is thought to be the result of damage to the speech cortex during an early critical period for language. After surgery, however, 79% of the children recovered speech – an outcome that demonstrates that speech can be recovered after aphasia damage sustained during a developmental critical period.

Research by St. James-Roberts (1981) presents evidence that does not support the primary contention that language must be acquired early in life. He re-evaluated the data on post hemispherectomy patients, whose brain damage occurred at different ages, infancy, childhood or adulthood. He found no evidence to suggest that language

is *not* lateralized in the young brain and, indeed that language acquisition is more favourable during a critical period early in life. He states:

> "The findings fail to support the presupposition of the plasticity model: that the immature brain lacks functional asymmetry, that language acquisition must occur early in life, and that recovery from brain damage is facilitated by the brain's functional equivocality during an early, critical period" (Abstract).

This conclusion is also shared by VarghaKhadem, Carr, Isaacs, Brett, Adams and Mishkin (1997), who present the case study of Alex, a boy with Sturge-Weber Syndrome causing damage to the left hemisphere. He failed to develop speech throughout early childhood and continued to show inhibited comprehension of single words. However, after undergoing a hemispherectomy at the age of nine, Alex successfully recovered language. VarghaKhadem, et al. conclude:

> "Alex's achievements appear to challenge the widely held view that early childhood is a particularly critical period for acquisition of speech and language or any of their selective aspects, including phonology, grammar, prosody and semantics. It is concluded that clearly articulated, well structured and appropriate language can be acquired for the first time as late as age 9 years with the right hemisphere alone" (Abstract).

Vargha-Khadem, et al's study demonstrate the brain's ability to re-organize itself after trauma (i.e. the right hemisphere can take over the linguistic functions previously controlled by the left hemisphere). This finding is also supported by Boatman et al. (1999). They examined the post left hemispherectomy language abilities of 6 children aged 7-14 years. The authors concluded that,

> "Recovery of higher level receptive and, to a lesser extent, expressive language functions is attributed to plasticity of the right hemisphere, which appears to persist beyond the proposed critical period for language acquisition and lateralization" (Abstract).

The latter two studies (i.e. Vargha-Khadem, et al. 1997; and Boatman et al, 1999) might be criticized on the grounds that their findings are completely irrelevant to the question of whether there exists a critical period for language (Locke, 1997). This is because stating that "language can be acquired for the first time..with the right hemisphere alone." (VarghaKhadem, et al. 1997, abstract) does not refute the idea of a critical period for language. The accurate issue concerns whether or not it is possible

for the *left* hemisphere to still control or assume a major responsibility for the development of first language after the critical period. If a particular structure or behaviour typically associated with the left hemisphere was found to be still practicing, then, this, in part, would weaken the critical period argument. Another issue to be borne in mind is that atypical neurological profiles may be inappropriate for clarifying aspects of normal development.

1.7 Critical Period Model Tested by the Present Study

The above sections previewed some of the major studies that either support or contend the existence of a critical period for first language. The literature review now turns its attention to just one of these models, Locke's (1994, 1997) Developmental Neurolinguistic Theory. This approach is both comprehensive and detailed and thus it will be critically examined in the present thesis.

Consistent with Fodor's (1983) theory of modularity, Locke's biolinguistic approach presupposes that language or components of language are universal and independent of other areas of cognition. He suggests that the innate predisposition for language takes the form of an inherent grammar module, which operates within a genetically coded window of opportunity, or critical period. The theory fits comfortably within Johnson and Newport's (1996) exercise hypothesis (described in section 1.6.1). Locke's conceptualisation of the critical period is described in more detail below.

1.7.1 Locke's Developmental Neurolinguistic Theory (1994, 1997)

Locke's developmental neurolinguistic theory (1994, 1997) hypothesizes that language is a "developmentally time-locked phenomenon" (Mayberry, 1994, p.57). This biolinguistic model, takes a middle path that mixes the influences of biology and social interaction upon the child's acquisition of language. It also emphasises the child's active participation in the language learning process. In order to describe Locke's concept of a critical period, it is first necessary to provide a general overview of developmental neurolinguistic theory.

I Overview of the Theory

The theory basically states that "species typical" language development occurs in four critically timed over-lapping phases. Each phase accomplishes a unique function through the "allocation" of neural resources specific to each phase (Locke, p.608, 1994). These "phases" are outlined below:

Phase 1. Vocal learning. (Gestation to about one year of age). During the affective first phase, the infant is oriented to the caregiver's face and through learning to respond to the speech rhythm and prosody of the caregiver's voice, also learns about simple vocal characteristics. The child may mimic or reproduce these intonation patterns in appropriate social contexts.

Phase 2. Utterance Acquisition (begins around 5 months). This second phase is social and affective. The child begins to acquire under-analysed segments of language, in the form of formulaic utterances, using social cognition mechanisms located in the right hemisphere. The child learns to associate prosody (sounds/rhythm) with certain words or phrases, but cannot generate these prosodic patterns yet.

Phase 3. Analysis and Computation (20-35 months). The third phase function involves the analysis of the previously acquired store of utterances that are "decomposed" into component parts: segments and syllables (Locke, 1994, p.609). Thus, during the third phase, the child learns to put the unanalysed segments of language into their constituent parts (i.e. the child learns to separate utterances into segments and syllables). This process helps the child to discover the structural rules and regularities in language and is thereby responsible for the discovery (and acquisition) of grammar. This phase is active for a timed period only and is primarily controlled by specialized linguistic mechanisms in the left hemisphere that enable phonology, morphology and syntax – fully developed grammar.

Phase 4. Integration and Elaboration (3yrs + 1). During the fourth phase, the child learns to integrate and elaborate the functions accomplished via the previous phases, using linguistic resources in both cerebral hemispheres. The child is able to learn a vast repertoire of words and generate and reproduce them. As Locke (1994) notes:

> "With continued fine-tuning of grammatical rules and memorization of irregular forms, child speakers begin to sound more and more like the adults they are copying" (p.445).

A brief overview of the stages of neurolinguistic development has just been presented. The neurolinguistic concept of a critical period will now be described. This hypothesis will be tested to some extent in the study.

II Neurolinguistic Concept of the Critical Period

Developmental neurolinguistic theory proposes that there is a critical period for the development of grammar rather than for language per se, as Lenneberg (1967) suggests. This period starts within the first few months of life and may end around five or six (Locke, 1997). The crucial feature of the critical period concerns the *one-off* activation of a specialised grammatical mechanism involved in the control of language. Locke (1997) describes this as, "something that happens only once in the life of each individual"(p.304).

According to Locke (1995) the neural specialization for language, which he terms, The Grammatical Analysis Module or GAM is located in the left hemisphere. He describes the GAM as:

> "a coldly analytical and computational system of the type proposed by Fodor (1983). As modular as it may be, though, this second specialization is not *the* language module. Rather, it is, in effect, a grammatical analysis module (or GAM) The GAM deals in rules and representations" (p.295).

This grammatical module is operative during a genetically coded time span occurring between 20 and 36 months of age within the third phase of language acquisition, "analysis and computation" (Locke, 1997). It is activated by the pressures caused by an excess of previously stored under-analysed segments of language accrued during the second phase of Locke's theory, "utterance acquisition". The GAM is largely responsible for "analytical-computational capability", that is the perception of grammatical regularities and the correct production of morphological and syntactic forms (Locke, 1997). The most conspicuous evidence that the grammatical analysis module has been activated is shown at the morphological level when the child begins to overapply regular occurring (morphosyntactic) forms to irregular exceptions between 20 and 36 months of age (Locke, 1994, 1997; Pinker, 1999). Thus, the child

regularizes irregular past tense verbs, plural nouns or comparative and superlative adverbs and generates forms such as "comed", "childs" and "gooder". These overregularization errors occur despite the fact that the child may have previously produced these forms correctly as in "came", "children" and "better". Locke (1994), however, offers an explanation of these regressions:

> "These lapses signal that the children instead of merely reproducing what they have heard, are now "computing" words from word elements. Although it might seem that the children are regressing, they are really just surging happily forward. They have discovered and are applying the same rules the rest of us use to form the past tense or the plural…But this computational feat rests on the success of prior analytical feats through which children discover that their stored utterances consist of smaller units of speech" (p.444).

Thus, Locke, like Pinker (1994), implies that the occurrence of overregularizations is a maturationally timed event. This is because, according to neurolinguistic theory, the emergence of "analytical-computational" ability rests on a certain level of neuromaturation having been reached in conjunction with "pressures associated with an expanding vocabulary" (Locke, 1997, p.277).

Neurolinguistic theory predicts that acquiring a first language after the close of the critical period for the activation of the grammatical analysis module (between two and three years) involves using linguistic resources in the *right* hemisphere. These right hemisphere brain resources are non-specialized for language and consequently cause impaired linguistic ability. In this respect, Locke's prediction is similar to that of Lenneberg's (1967) critical period hypothesis. If language is acquired after the critical phase, the prognosis might be that language or specific aspects of language are likely to be permanently impaired. As regards future linguistic development, the ability to surmise regularities of syntax and morphology might be seriously impaired, since an awareness of structural rules was not acquired during the typical early language learning years. In contrast, the theory predicts that the ability to learn vocabulary should remain relatively open. According to neurolinguistic theory, the linguistic profile of a child who had learned language after the critical period would involve retarded grammatical abilities when compared to lexical and semantic areas of language.

III Support or Falsification of the Theory

What would support or falsify the predictions of Locke's critical period theory? Let's consider the hypothetical case of a socially deprived child who begins to acquire language after middle childhood or even after 4 years of age. According to Locke, this child has already missed the critical phase between 2 and 3 years for the switching on of an innately specialised grammar module (because of the deprivation). This means that the child's natural ability to perceive grammatical regularities and to produce these is damaged. This is likely to be permanent. What would support Locke's claims is if subsequent attempts to talk after the critical period reveal that the child has a selective morphosyntactic impairment that also persists over time. Cases of lexically delayed children who are later found to have specific impairments with inflectional morphology appear to support this contention (Locke, 1997; Smith-Lock, 1993). In addition, recall the developmental neurolinguistic idea that it is the emergence of grammar that is subject to biological constraints rather than lexical aspects. Thus, if standardized tests, for example, showed that grammatical development was retarded relative to vocabulary development, this would also support Locke's theory.

In terms of falsification of the theory, Locke (1997) himself provides a direct example of what would be needed to refute the developmental neurolinguistic prognosis for language after the critical period. He states:

> "For the present proposal, this would require evidence from a range of naturalistic behaviours and experimental tasks to indicate that analytical and computational capabilities are present, and that utterance analyses are taking place in the vicinity of the left perisylvian area" (p.309).

Recall, that according to Locke (1997), overregularizations such as "catched", "rided", "stoled", "mouses", "childs", "gooder" and "bestest", are perhaps the "most conspicuous form of internal evidence that an analyser is at work" (p. 274). In other words, the first production of overregularizations shows that the Grammatical Analysis Module (GAM) has been operated in the young child (between 2 and 3 years) and "analytical and computational capabilities are present" (p.309). It is also important to remember that the switching on of the GAM is considered to happen only once *early in childhood*. It is not flexible. It will not happen later in the life

span. This is the nature of a critical period. Therefore, if one wanted to falsify Locke's theory, all that one would have to do is find evidence of overregularization production in the child who did not begin to speak until after the age of four years, that is, after the close of the critical period for the activation of the GAM. If the socially deprived child at the ages of 6, 7,or 8, for example, says "writed" and "foots", s/he is demonstrating the perception and application of morphological regularities – like the younger child between 2 and 3 is supposed to do. This is not something that developmental neurolinguistic theory would predict. Thus the context of the child, severely deprived until after the age of 4 years (or beyond), later producing overregularization errors at 6 or 7 weakens the developmental neurolinguistic concept of a critical period.

1.8 Scope of the Present Study

As may be apparent from the preceding literature review, exploring the effects of extreme deprivation on language and cognition also means exploring the contentious side issues that are inextricably linked with this. It is almost impossible to avoid the nature/nurture debate, the relationship between language and cognition, and the question as to whether there exists a critical period for the development of a first language.

At the time of writing, there is very limited longitudinal evidence as to how human development is effected by extreme isolation and deprivation. This is because, fortunately, the cases of this have been extremely rare. However, in 1989, the tragic discovery of thousands of Romanian 'orphans' raised in conditions of institutional neglect presented researchers with the opportunity to investigate these issues in more depth. Such children also represented a natural test of the hypotheses connected with the critical period.

This thesis describes and examines the development of several children adopted from Romanian orphanages in order to explore three main areas. The primary focus involves the *general* effects of extreme deprivation on language, cognition and social and communicative behaviour. Two issues linked to this are, 1.) the relationship

between language and cognition, that is, whether these two areas are dissociated or closely linked and 2.) the existence of a critical period for *first* language acquisition.

1.8.1 Research Questions

Above, three broad areas of investigation were identified. The thesis will, therefore, address the following research questions:

I In these children, what are the effects of extreme global deprivation during infancy and the early childhood years on:

1 language development?
2 non-verbal cognitive development?
3 social and communicative behaviour?

II Does the linguistic development of such children constitute evidence for the existence of a critical period for language?

III Are case studies such as these able to shed some light on the relationship between language and cognition? More specifically, do such cases provide evidence of dissociations between language and cognition, or between different areas of linguistic and pragmatic competence?

In order to investigate these themes, the research adopts a 'mixed methods' approach, that is, a range of quantitative and qualitative analytical techniques are used. The issues identified are very complex and wide reaching and cannot be 'answered' in full within one thesis, but much can be addressed through the methodologies chosen.

1.8.2 Outline of Thesis

The cases of children with histories of extreme neglect will be explored in order to address the questions that were raised above (section 1.81). Chapter 2 illustrates the methods that were used in this study and describes its formal aims and objectives. In chapter three, sources of information derived from interviews with the parents, personal experience with the children and official reports (from schools, speech and

language therapists, and educational psychologists) will be used to help answer some questions concerning the children's early development. In chapter four, aspects of each child's social and communicative behaviour, as reflected in conversation is described. Chapters 5 and 6 concern an in depth examination of the children's language and non-verbal ability using a battery of standardized measures. It is Chapter 6 that specifically addresses the issue of modularity. In contrast to the use of tests, Chapters 7 and 8 describe the morphosyntax of S., G. and I.'s spontaneous spoken language in naturalistic contexts. Chapter 7 closely examines morphology in order to explore the critical period concept, while Chapter 8 looks at other aspects of grammatical sophistication such as the production of complex sentences. In the final Chapter 9, there is a discussion of the findings of the present research and an attempt to answer the research questions and clarify some of the issues that were raised in Chapter 1.

Chapter 2 Study Methodology

Chapter 1 described the background to the present research and the range of issues that an investigation of the effects of extreme childhood deprivation is likely to reveal. The research questions that the thesis will address were also set out. Chapter 2, outlines the research design, participants and methodologies used and also explains the aims and objectives of the research in more detail.

2.1 Research Aims

The present exploratory research involves a longitudinal, qualitative study of the language and cognitive development of a small group of children subjected to extreme deprivation until around or after four years of age. The general aim of the study is to shed some light on the nature of language and cognition in general by investigating language acquisition and cognitive development in abnormal circumstances. A second aim is to address the specific research questions set out at the end of Chapter 1.

2.2 Value of the study

The potential value of this study lies in providing detailed empirical information about and insight into the poorly understood processes of language and cognitive development in children with histories of extreme neglect. Valuable data will be obtained on this subject that appears to be lacking in the clinical literature. This fine-grained and observation-based study will act as a valuable support to present and future larger-scale, purely quantitative investigations of childhood deprivation (e.g., Rutter, 1998; O'Connor, Rutter, Beckett, Keaveney and Kreppner, 2000). It is hoped the following objectives will be achieved:

I inform the work of educational and clinical practitioners in the assessment of linguistic and cognitive abilities and potential, and in planning the most effective means of stimulating linguistic and cognitive growth in socially deprived children.

II help the adoptive parents and families to understand the children they are trying to raise and to focus their efforts in ways, which will be of most benefit to them.

III provide some small contribution to our knowledge of human linguistic potential and of the process of language acquisition.

2.3 Participants

2.3.1 Background.

The participants of the present research were drawn from the population of children adopted from Romanian "orphanages" or state childcare institutions who share an early history of extreme neglect and isolation. These children were placed in orphanages, termed "leagane", at or soon after birth during the totalitarian regime of Cecesceau before the revolution in 1989. The majority of these children experienced normal birth histories, but little or no attempt was made to encourage their linguistic or social development during the normal language learning years of early infancy and childhood. They were consigned to cribs with virtually no opportunity to interact with their peers and received little or no affection or stimulation from their caregivers.

In Romania, until the early 1990s, orphaned or abandoned children were medically and psychologically assessed at the age of 3 years and 7 years to determine their placement at one of three types of orphanage; the Prescolare for those who passed the assessment at three years and were judged to be developmentally normal, the Scoala Ajutatoare to which the Prescolare children were sent, provided they passed the assessments at 7 years, and the Camin Spital (Home Hospital) where the "nerecuperabili" or the incurables who "failed" the assessments either at 3 or 7 years were sent (Johnson, et al. 1992; Ralph, 1994). The label "nerecuperabili" was used to cover a broad range of minor and major medical and behavioural problems including medically correctable handicaps such as cleft palates and club-feet (Johnson and Groze, 1993). The Camin Spitals were the institutions that first attracted worldwide media attention in 1989. Here the ratio of children to caregivers was often sixty to one (Johnson, et al. 1992) and only minimum levels of food, clothing and shelter were

provided. There was no educational provision for these children and psychological stimulation was considered to be pointless. Many children were extremely malnourished and/or dystrophic and some died. Many of these previously institutionalised children were adopted and now reside in Great Britain, the Republic of Ireland and North America. There are a number of organisations providing support and information to adoptive parents and families in Britain, including Adoptive Romanian Children (ARC), the Parent Network for the Post-Institutionalised Child (PNPIC U.K.) and the Overseas Adoption Support and Information Service (OASIS U.K.).

2.3.2 Selection

The parents of the research subjects belong to a parent support agency called the Parent Network for the Post-Institutionalised Child (PNPIC U.K.). Informal contacts were established between the research team and this organization in 1996. During February of 1997, two of the researchers involved in the study (LJB and JLL) were invited by the P.N.P.I.C to give a presentation to its members as part of an officially organised, daylong event of lectures and seminars given by other professionals and clinicians. It was during the presentation that parents and members of the P.N.P.I.C. were fully informed about the research. Parents who expressed an interest in participating in the study were given a questionnaire after requesting one (see I, Appendix A). This requested some demographic information such as name and address and age and sex of child. To obtain details of the child's background, open-ended questions were used such as, "What can you tell us about your child's birth and health history?" Brief details about the research and pre-paid envelopes were circulated alongside the questionnaire. Based on the written information provided by parents, the specific criteria for selecting participants included the following:

I Type of birth history, for example, incidence of neonatal trauma, or whether infants were normal or experienced complications at birth.

II Length and type of institutionalised stay, and also level of care experienced by child in orphanage.

III Age of child when adopted and present age.

IV Previous and present language ability.

V Individual characteristics.

Criterion IV was measured using the parents' descriptions and their references to standardized tests scores.

In terms of selection, preference was given to children who had spent longer than three years in a Romanian institution, and who, to the parents' knowledge did not have a history of neonatal trauma or a known genetic disorder. The fact that data was to be analysed qualitatively necessitated a small sample size. Ultimately, six children (three verbal and three non-verbal) were selected to take part in the study. The children's parents were then invited to participate in the research, that is, they were mailed an information sheet and consent form (see II and III, Appendix A) and were requested to return these as soon as possible.

2.3.3 Romanian Adoptees

The children that were selected consisted of five girls: Sariah, Georgina, Ingrid, Eleanor, and Carrie and one boy, Tommy. Each child had resided in Romanian childcare institutions from birth to around the age of four years and beyond. None of the children had an innate neurological disorder, according to the parents' details and available documentary evidence.[1] Each child's biographical details are summarised in Table 2.1, below. This information concerns the children's dates of birth, age upon entry into the adoptive home and the date when this occurred.

The developmental progress of all six children was followed longitudinally and data was collected for all of them. Over 85 hours of continuous data was collected for the group as a whole. S., G. and I. were studied for a two-year duration, whereas T., E. and C. were studied for one year (see IV, Appendix A. for dates of when T., E. and C. were visited and their ages at each visit). This is because, after the first year of data collection, it became clear that conducting fine-grained descriptive analyses of each child's social, cognitive and linguistic behaviour (in a range of contexts with differing

[1] At the beginning of the study, the researcher had access to each child's developmental and medical reports. These did not yield any evidence of obvious innate neurological disorders or any other genetic anomaly.

people) over a two-year period was a massive undertaking. Therefore, it was decided that the focus of the study would be on the development of the three verbal children, S., G. and I.

Table 2.1 Dates of births, age and date when entered the adoptive home.

	Sariah	**Georgina**	**Ingrid**	**Tommy**	**Eleanor**	**Carrie**
Date of Birth	03.03.87	22.06.85	07.10.87	25.03.91	26.11.88	06.01.90
Date When Entered Adoptive Home	August 1994	October 1991	August 1991	December 1995	November 1995	November 1995
Age When Entered Adoptive Home	7.5	6.3	3.10	4.9	6.11	5.10

It was felt, that, as each of the girls appeared to have reached an adequate level of spoken language competence[2], their cases were appropriate for addressing the research questions, particularly those with a linguistic focus. For example, S., G. and I.'s morphosyntactic profiles could be tested against the predictions of the grammatical critical period models previewed in Chapter 1 (e.g., Locke, 1994, 1997). In contrast, the cases of the three non-verbal children would have been less amenable to grammatical/linguistic analyses, since their spoken language throughout their data collection period was virtually absent. Thus data collection for T., E and C. was discontinued after a year, while data collection for S., G. and I.'s continued for another year. Although, the remainder of this thesis will focus on S., G. and I., reference is again made to E., C. and T.'s cases in 9.8 of Chapter 9.

Description of Romanian Adoptees' Backgrounds and Developmental Histories

[2] By this, it is meant that the girls spoke in full sentences: their speech appeared to be hierarchically complex, morphosyntactically sophisticated and lexically diverse.

This section summarizes S., G. and I.'s adoptive family backgrounds and developmental histories.

I Adoptive Family Background.

S. and G. live near each other in a small rural village, while I lives in a rural town. S., has a younger (non-biological) brother, (3;9 years her junior), who was adopted from a Romanian orphanage aged 1 year. S. also has a sister (8 years older) who was adopted within the United Kingdom. G. has a brother (3 years younger) and a sister (9 years older) - neither of whom were adopted. I. has two older sisters, who are respectively four and six years her senior. G. and I.'s siblings are the natural children of their adoptive parents.

II Early Experience and Developmental Histories.

Sariah

S. was born on March 3rd 1987 and was adopted from a mainstream Romanian orphanage at the age of 7 years and 5 months. She was confined to a room with six or seven other children of the same age. There was no access to toys and the children were very rarely let outside. S.'s medical record, states that her body development was slow, that her language and speech were retarded and that she had "psychointellectual retardation".

When S. entered the United Kingdom, aged 7;5 years, her growth was stunted. She weighed 2 stone 8 pounds (i.e. 36 lb.) and was 3ft. and 3;5 inches tall. She was at the 3rd centile (-3 SD) for height. Co-ordination and spatial awareness were very poor. She had virtually no spoken language except for a few words of Romanian. However, her eye contact was very good and she communicated with a combination of manual gestures and facial expression.

Within two months and 14 days of her arrival (27.08.94 to 10.11.94), S. had grown 1.5 inches and gained 14lbs in weight (according to records). Within 3 months, her vocabulary had steadily increased and she was beginning to formulate short sentences.

She was generally able to communicate her needs by stringing words together. (e.g. “banana for school”, and “go in car”) - although her pronunciation was not always very clear. She was very motivated to learn and eager to communicate.

By August, 1998 the development of S.’s social behaviour, communication and academic skills had been dramatic. Aged 11;5, she attended a mainstream school, but was continuing to receive special help and was in a class with children who were around two years younger. She was extremely talkative and eager to participate in conversation. Reading, spelling and grammatical expression were judged to be at the 7 year level. S.’s comprehension and expression of language were approximately equal. Her linguistic abilities were commensurate with her other abilities.

Georgina

G. was born in June 1985. There was no evidence to suggest retardation or any physical abnormalities. G. was swaddled for the first two years of her life. Motor development and exploratory behaviour were restricted. At the age of 6 years G. was adopted from a Romanian orphanage for children with severe difficulties. Here the children were kept mostly in their cots and there was one staff member for every 40 children.

When G. entered her adoptive home, aged 6;3 years, she could not walk, or eat solid foods and was still in nappies. She had a productive vocabulary of ten English and Romanian words, (e.g. “helloa” and “Georgina”). She was physically similar in size to a healthy 18-month/2 year old child. However, over the coming months, Georgeta began to gain weight and develop new skills. Within six months, she learnt to walk and she was fully toilet trained after one year.

During her first two years in England, programs involving reading and picture games were used to stimulate linguistic progress. Soon G. began to acquire speech. She produced single words first, followed by two and three word phrases. She also made her needs known by pointing and grunting. At the age of 7;7, her language was described as telegrammatic, but functional and she was attempting to relate past, present and future events. Her vocabulary for verbs and nouns was growing almost

daily. At the age of 7;8 years, G.'s overall developmental level was placed at between 3;0 and 3;6 years old.

Aged nearly 12 years, G.'s level of intellectual functioning was estimated to fall within the 'Moderate Learning Disability' category. G.'s scores on a battery of psychometric tests revealed that she was functioning at a 6 to 7 year level. Socially, she preferred to play with children who were at a similar developmental age. She was educated in a school for children with special needs. There was no significant difference between her language and non-language cognitive abilities.

Ingrid

I. was born on 7 October 1987. She weighed 970 grams and was given a poor prognosis for recovery. A British family living in Romania adopted her at the age of 3 yrs 10 months from a Romanian institution for "irrecouperable" children. She had never been weaned, was still in nappies, could barely walk and was described as having no spoken language at all. Her developmental level was estimated to be equivalent to an infant aged nine or ten months.

I.'s first words emerged at the age of 4 and a half. She produced single words first, followed by two-word and three-word utterances. Her first words referred to names of familiar people and she later produced short phrases such as "Oh dear" and "All gone." She also imitated words. I. communicated both with gestures such as pointing and words that referred to everyday objects such as "ba" for "bath" and "ta" for "tap." Within a few months her acquisition of vocabulary rapidly increased.

In April, 1994, aged 6;6 I. began to attend a mainstream primary school. She displayed some unusual speech patterns that included constant, repetitive questioning and imitating the accents of her peers. At the age of 7.1, her social and academic abilities were judged to be at the 5 to 6 year level. She appeared to be following a normal sequence of development. At the age of 9.4 years, she was described as having word finding difficulties and very poor auditory short-term memory. There were growing concerns over her indiscriminately friendly behaviour.

At the age of 11 years, I. was extremely talkative and enjoyed conversation, but her verbal receptive language, reading, writing and numeracy skills were between 2;2 and 3;6 years behind her chronological age. It was suggested that she might have an Auditory Processing Disorder. She still attended a mainstream school and generally mixed with younger children who were at least two years younger than her. She had several long-standing friends. Her main interests were playing football and attending her local youth club. She still displayed socially inappropriate behaviour, although to a lesser degree than before.

2.3.4 Control Subjects

S., G. and I.'s performances on specific standardized tests were qualitatively compared with those of younger, normally developing control children between the ages 3;6 and 8;0. This was in order to establish whether or not some of S., G. and I.'s responses on these measures approximated those of younger normal children or were atypical of children at any age. Qualitative comparisons were made because it was noted that the Romanian adoptees produced some errors (on tests) that one might assume were unusual for their chronological age groups. For example, they gave responses such as 'foots', 'childs', and 'rided' which according to the normative literature is synonymous with the early stages of morphosyntactic development (Pinker, 1999). Therefore, it was considered useful to compare S., G. and I.'s incorrect responses with those of younger children of varying ages, in order to see if the pattern of errors was similar and/or characteristic of a particular age range. The children were randomly selected from two primary schools in Nottingham, in order to represent a typical group of children for their classes. Children who had received educational statements (or were known to have learning difficulties) or whose first language was not English were not included in the sample. Two groups of children were administered language measures and two were administered non-language measures. The number of children in each group, range of ages and means ages are presented in Table 2.2.

Table 2.2 Range of ages, means ages and number of children in each control group.[3]

[3] The control children in groups 1 and 2 were tested around the same time as S., G. and I. (March/April, 1999) and were part of a separate study which involved the standardization of two language measures.

Control children

	Group 1	Group 2	Group 3	Group 4
Number	20	10	37	2
Age Range	3;6-6;11	6;1-7;1	7;0-8;0	7;1-7;10
Mean Age	5;9	6;3	7;5	7;5
Test Administered	CELF-Preschool	CELF-3	Goodenough-Draw-A-Man Test	Ravens Progressive Matrices, Block Design

2.4 Research Procedure

2.4.1 Précis

Longitudinal studies of S., G. and I. were conducted over a two-year period. The girls' chronological ages at the commencement and finish of the data collection period are presented in Table 2.3.

Initially, a semi-structured interview with the parent/s was conducted in order to obtain an accurate description of S., G. and I.'s backgrounds (see V, Appendix A. for list of questions asked). In addition, and subject to parental consent, copies of any documents or assessments such as those completed by health care professionals and/or schools were examined, in order to gain a detailed account of the child's history since adoption. All information acquired was kept strictly confidential. Family contacts and personal visits were conducted (with prior arrangement) by the researcher (LJB) with the permission of the parents. This involved periodic, occasionally parentally supervised meetings with the children at pre-arranged times. This meant that S., G. and I.'s developmental progress, including verbal and non-verbal language ability could be continuously observed and monitored. All meetings with the children were non-invasive, and involved directly observing behaviour during familiar routines and/or recording spontaneous talk using audio or videotape. S., G. and I. were audio taped using radio microphones and a high quality Sony Walkman, while videotaping was achieved using a Sony Camcorder with Fuji or Sony

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The project entitled, 'The U.K. Standardization of CELF-Preschool and CELF-3', was jointly organized by the Universities of Manchester and Sheffield.

8mm video cassettes. Assessment of linguistic and cognitive behaviour involved the use of standardised tests. Data obtained were later transcribed and studied in depth. The following is a step-by-step procedure of how the study was carried out after the participants, S., G. and I. were selected.

Table 2.3. Chronological ages at the commencement and finish of the data collection period.

	Participants		
	Sariah	**Georgina**	**Ingrid**
Chronological Ages at Start of Data Collection	11;3	13;1	10;8
Chronological Ages at Finish of Data Collection	13;2	14;10.	12;7

2.4.2 Step-by-step Procedure

Stage 1: Preparation

Parents interested in participating in research were contacted by telephone or letter in order to arrange a first meeting. Arrangements were made to meet two weeks after the first point of contact.

Stage 2: Data Collection

I Meeting 1

One or both parents completed a semi-structured interview by the researcher (again see IV, Appendix A). This was so as to obtain a detailed description and personal account of the children's backgrounds and development since being adopted. Permission was requested to look at copies of any documents or assessments such as those completed by health care professionals or schools. This was to obtain a more objective report of the child's history both since birth and adoption. All information was kept strictly confidential. Permission was also sought to record each child's behaviour using audio and video equipment during future meetings.

II First six months

After the first visit, the child's language progress and other behaviour, were continuously monitored, during the latter half of 1998. The first six months of the study involved an intensive period of data collection during which each child was visited twice a month (by car). Each data collection visit lasted two to four hours and was conducted in the home environment. During these sessions the child was both video and audio taped while interacting naturally with the researcher, the parents or other people. This was so that the child could be observed in a range of contexts, in order to gain some idea of spontaneous language ability and social and communicative behaviour. Information was also obtained about the child's language and cognition using various measures – some psychometric. This involved listening to the child talk, asking questions during a game-like task or observing free play. Some of these measures were readministered after a year, in order to monitor each child's progress. The tapes of the meetings were studied later (in the Department of Human Communication Sciences, University of Sheffield). This involved watching the video recordings or listening to the audio tapes, transcribing the data and analysing this using a variety of methods (see 'Analysis of Data', below). Data was stored on computer disc.

III Next eighteen months

Over the next eighteen months, each child was visited once every three months on average. Each meeting lasted between two to four hours. Each child's spontaneous behaviour in naturalistic contexts and with a range of people was audio and video taped. Where appropriate standardized and psychometric tests of language and non-verbal cognition were administered or readministered. As above, data was transcribed and analysed at the University of Sheffield.

IV How many times was data collected for S., G. and I. and how much?

Data was collected for S., G. and I. between twelve and fourteen times over a two-year period (June/July 1998 to May 2000). The bulk of the data for the present study consists of diary notes that were kept for each visit, standardized tests scores and the

taped recordings of S., G. and I.'s spontaneous conversational and nonverbal behaviour and formal test performances. The tapes collectively comprise over forty-five hours of continuous data. The dates of the visits made to S., G. and I., their ages at the time, and the duration of the recordings made for each meeting are summarized in Table 2.4.

V With whom were S., G. and I. filmed?

During data collection, S., G. and I. were filmed during a range of activities involving numerous people familiar to them, which included their parents, siblings, peers and other familiar adults such as a teacher (in S.'s case). Many activities were recorded, but unobserved by the present researcher.

The first few data collection visits to S. (04.06.98, 07.08.98, 08.09.98) were at her home, where her younger brother was always present. In addition, her mother, father, or home tutor was sometimes present. During these early visits, S. was principally filmed interacting with her younger brother, her tutor or the researcher. Subsequently, S. was taped with G.

Table 2.4 Visits made to S., G. and I. and the duration of each recording: dates of visits, ages and the duration of the actual video and/or audio recordings taken for each visit.

Sariah			**Georgina**			**Ingrid**		
Date of Visit	*Age*	*Duration of Recording*	*Date of Visit*	*Age*	*Duration of Recording*	*Date of Visit*	*Age*	*Duration of Recording*
June 04.06.98	11;3	1 hour, 7 minutes	July 24.07.98	13;1	12 minutes	June 09.06.98	10;8	23 minutes
August 07.08.98	11;5	24 minutes	August 27.08.98	13;2	28 minutes	June 29.06.98	10;8	35 minutes
September 08.09.98	11;6	59 minutes	September 17.09.98	13;2	1 hour, 3 minutes	July 22.07.98	10;9	18 minutes
October 07.10.98	11;7	54 minutes	October 07.10.98	13;3	1 hour, 5 minutes	September 10.09.98	10;11	37 minutes
October 28.10.98	11;7	1 hour, 12 minutes	October 28.10.98	13;4	57 minutes	September 21.09.98	10;11	51 minutes
November 19.11.98	11;8	1 hour, 26 minutes	November 19.11.98	13;5	1 hour, 32 minutes	October 14.10.98	11;0	47 minutes
December	11;9	54	December	13;5	1 hour	November	11;1	1 hour, 25

09.12.98		minutes	09.12.98			11.11.98		minutes
March 11.03.99	12;0	1 hour, 20 minutes	March 11.03.99	13;8	1 hour, 46 minutes	December 02.12.98	11;1	54 minutes
April 24.04.99	12;1	2 hours, 29 minutes	April 24.0.04.99	13;9	1 hour, 45 minutes	December 14.12.98	11;2	1 hour, 32 minutes
October 16.10.99	12;7	1 hour, 20 minutes	October 16.10.99	14;4	1 hour, 45 minutes	March 10.03.99	11;5	1 hour, 59 minutes
March 18.03.00	13;0	1 hour, 30 minutes	March 18.03.00	14;9	1 hour, 17 minutes	April 13.04.99	11;6	1 hour, 27 minutes
May 20.05.00	13;2	1 hour, 20 minutes	May 20.05.00	14;10	1 hour, 46 minutes	October 18.10.99	12;0	1 hour, 34 minutes
N/A		N/A	N/A		N/A	December 17.12.99	12;2	1 hour
N/A		N/A	N/A		N/A	May 16.05.00	12;7	1 hour, 33 minutes
Number of visits = 12		*Duration of recordings = 14 hours, 27 minutes*	*Number of visits = 12*		*Duration of recordings = 15 hours, 45 minutes*	*Number of visits = 14*		*Duration of recordings = 15 hour, 45 minute*

During the first few occasions that G. was visited (27.07.98, 24.08.98, 19.09.98), she was sometimes filmed alone, with her parents or the researcher. On one occasion, G. was filmed interacting with her friend, who attends a mainstream school. After September, 1998, S. and G. were often filmed together (at G.'s home), while playing games or conversing. G.'s parents and/or the researcher were sometimes present. These visits (07.10.98, 28.10.98, 19.11.98, 09.12.98) were made at regular intervals (once or twice a month) until December 1998

I. was recorded while participating in various activities with members of her family or the researcher, during the first few data collection visits. I. was also filmed with two of her friends, (from mainstream schools) on two occasions (21.09.98 and 14.10.98).

Stage 3: Analyses of Data

A range of theoretical frameworks was applied to the analysis of the data, which was examined both quantitatively and qualitatively. This included:

I Detailed and systematic observation of verbal and non-verbal behaviour

II Descriptive procedures: linguistic frameworks to analyse, categorize and describe grammatical, and lexical properties of language. Categories borrowed

from Conversational Analysis were used to identify and describe facets of social communicative behaviour as reflected in conversation.

III Psychometric procedures: statistical measures such as percentile ranks, SDs and z-scores to compare standardized test performances with the general population.

2.5 Assessments

The following section, specifically describes the assessment measures used during the research after S., G. and I. were selected. As is indicated above, S., G and I.'s linguistic, non-linguistic abilities and patterns of communicative interaction with others, were assessed through formal testing, detailed informal observation of naturalistic behaviours, and quantitative and qualitative analysis of recorded data. An extensive number and range of tasks were administered to obtain a comprehensive idea of their intellectual, language and social abilities. Consequently an immense amount of data was collected. Detailed and intensive data collection was done over a protracted time in order to obtain as accurate a representation of S., G. and I.'s abilities as possible. Some standardized tests were readministered again in order to check progress after a year. Wherever possible, S., G. and I.'s responses on these tests were qualitatively compared with the two groups of younger, normally developing control children (see table 2.2 above) in order to see if there were similarities.

2.5.1 Description of Tests and Rationale for Use

The various standardized tests and methods of analysis that were applied to S., G. and I.'s cases (after selection) are described in the following sections. The rationale for the choice of some tests (i.e. those concerning non-verbal cognition) is also given.

I Language Assessment

Comprehension

S., G. and I.'s language comprehension was investigated through administration of the British Picture Vocabulary Scale (BPVS; Dunn, Dunn, Whetton, & Pintillie 1982), the Test for Reception of Grammar (TROG; Bishop, 1989), the Boehm Test of Basic Concepts (BTBC; Boehm, 1986). In addition, the receptive battery of sub-tests in the Clinical Evaluation of Language Fundamentals, Preschool (CELF-Preschool; Wiig, Secord, and Semel, 1992) and the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3; Semel, Wiig and Secord, 1995) were also used to test comprehension. CELF-Preschool assesses linguistic structures and features normally acquired by children up to the age of 6;11 years, whereas, CELF-3 is standardized for children and young adults between the ages of 6 and 21 years. Both these global measures evaluate aspects of syntax, derivational and inflectional morphology, relational and lexical semantics and verbal memory. Most of these measures were readministered after a year.

Production

S., G. and I.'s language production was assessed by performances on standardized tests as well as by informal analysis of aspects of their spontaneous conversational and elicited speech.

Standardized tests. The tests that were used to measure S., G., and I's productive language comprise the Action Picture Test (APT, Renfrew, 1988), The Bus Story Test of Continuous Speech (Renfrew, 1991), the Word Finding Vocabulary Scale (WFVS, Renfrew, 1992) and the Salford Sentence Reading Test. In addition, the expressive battery of sub-tests in the Clinical Evaluation of Language Fundamentals, Preschool (CELF-Preschool; Wiig, Secord, and Semel, 1992) and the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3; Semel, Wiig and Secord, 1995) was also used to test production. Many of these measures were readministered after a year.

Elicitation test. A past tense elicitation task adapted from Ullman (1993) was administered to assess some morphological aspects of S., G. and I.'s productive speech.

Spontaneous speech. Transcriptions of S., G. and I.'s spontaneous interactions with others provided a considerable sample of spontaneous speech. Qualitative analysis involved close attention to morphophonological and syntactic aspects of

productive language, and the type and range of the structures used. Quantitative measures of spontaneous productive speech included computing mean length of utterance (MLU) values using an adaptation of Brown's (1973) procedures suggested by Chapman, (1981). Grammatical analysis of morphological and syntactic forms using procedures set out by Miller (1981) and an analysis of complex sentence development using criteria adopted by Paul (1981) and Scott (1987) were also applied.

Verbal Memory

S., G. and I.'s memory for number sequences, novel single words and sentences was tested using the Recall of Digits Forward subtest of British Ability Scales, Second Edition (DF-BAS-II; Elliot, 1996), the Recalling Sentences subtest of Clinical Evaluation of Language Fundamentals, Third Edition (RS-CELF-3; Semel, Wiig and Secord, 1995) and The Children's Test of Nonword Repetition (CNRep; Gathercole and Baddeley, 1996) respectively. These measures particularly tap short-term memory capacity.

II Non-Verbal Cognitive Assessment

It was important to gain a relatively clear picture of S., G. and I.'s non-verbal cognitive level, since, formal assessments of these abilities had not been made at regular intervals prior to the present study. According to S. and I.'s developmental reports, a thorough official evaluation of their non-verbal cognitive levels had not been attempted – either by their schools, or educational psychologists - since their entry into the UK at the respective ages of 7;5 and 6;6. In G.'s case, her most recent psychological assessment was dated two years prior to the commencement of the present research. It was also crucial to obtain a realistic picture of the children's non-verbal abilities, in order to make accurate comparisons with their language abilities. It was also important to compare S, G. and I.'s test errors with those of the normal control children. This was to obtain some indication as to whether the Romanian adoptees' non-verbal cognitive abilities were typical or atypical of younger children. To this end, the following measures were administered:

Visio-spatial Skill

S., G. and I.'s visio-spatial ability was examined by the Block Design subtest of the Wechsler Intelligence Scale for Children – Third Edition, UK (BD-WISC-III; Wechsler, 1992). Limitations in spatial cognition have been found in retarded groups of children such as those with William's Syndrome (Bellugi, Marks, Bihrle, and Sabo, 1993). It has been suggested that there is a particular dissociation between spatial cognition and language in this population. It was considered important, therefore, to establish whether there were similar weaknesses in children with histories of extreme neglect.

Perceptual Awareness

It has been noted that some previously institutionalised children have problems with abstract thinking and the understanding of abstract concepts in later years (Goldfarb, 1943, 1944, 1945; Provence and Lipton, 1962; Flint, 1978). Part of this ability involves part to whole awareness and the capacity to reason by analogy. Thus the level of these perceptual skills in S., G. and I. were assessed using the Ravens Coloured Progressive Matrices (CPM; Raven, Court, Raven, 1978).

Representational Ability

S., G. and I.'s level of visual representational ability was evaluated through an analysis of their drawings using the Goodenough Draw-a-Man-Scale. Spatial orientation as reflected in drawing is reported to be selectively impaired in Williams Syndrome children (Jariabkova, Kosc, Bzduch, and Sustrova, 1999). An analysis of S., G. and I.'s pictures was carried out to establish whether they showed a comparable level of impairment to Williams Syndrome.

III Social and Communicative Behaviour Assessment

S., G. and I.'s social and communicative behaviour as reflected in conversation, was evaluated through informal observation and procedures used in Conversation Analysis

(Sacks, Schegloff and Jefferson, 1974; 1978; Taylor and Cameron, 1987; Psathas, 1995; Clark, 1996). S., G. and I.'s spontaneous conversation in a range of naturalistic contexts and with differing conversational partners was examined. Conversational interactions was transcribed and stored on computer disc for later use.

IIII Reliability

In order to evaluate the reliability of transcriptions, a second transcriptionist examined a small subset of conversational data, half an hour for each child. Five-minute speech samples were selected from the beginning, middle and end of the data collection period. For each transcript, the number of words agreed upon by both coders was divided by the total number of words (Balason and Dollaghan, 2002). The inter-rater agreement rate for each child is shown in table 2.5. The overall inter-rater agreement for all transcripts was 80%. The inter-rater agreement on particular morphosyntactic anomalies (e.g. omission of morphological forms) singled out for analysis was 78%. Areas of disagreement concerned the following;

Sariah: (08.09.98)
1 omission of contractible copula (*Now you_ much older*..).
(16.10.99)
1 omission of plural inflection /-s/ (*No more game_*).
(18.03.00)
1 overgeneralization of irregular verb in the third person singular present tense (*Sometime [du:z] cross country*).

Georgina: (11.03.99)
1 omission of contractible auxiliary (*You shouldn't butter in and eat bread while we_ talkin'*).

Ingrid: (09.06.98)
2 omissions of determiner /the/ (*St George came up and fighted _ dragon.; And then _ dragon came up*.).

However, inter-rater agreement on the morphosyntactic forms of particular relevance to this thesis, past tense overregularizations (e.g *fighted*, *gived*), was 100%. It should

be noted that inter-rater reliability might not have been as high as expected because the independent transcriptionist was non-resident to the United Kingdom (i.e. from the United States). This may have made it more difficult to accurately perceive dialectical variations of British English that may have been evident in S., G. and I.'s speech.

Table 2.5 Inter-rater agreement for each child.

Sariah	**Georgina**	**Ingrid**	**Overall Agreement Rate**
84%	73%	83%	80%

Next Chapter - Chapter 3 represents the first attempt by the thesis to address the questions at the end of Chapter 1. Using retrospective information, Chapter 3 broadly examines how extreme deprivation shapes development generally, that is, how the development of language, non-verbal cognition, physical capacity and social and communicative behaviour are influenced.

Chapter 3 Background and Developmental History

Chapter 3 uses descriptive developmental data to broadly address the following research question:

I In these children, what are the effects of extreme global deprivation during infancy and the early childhood years on:

1 language development?
2 non-verbal cognitive development?
3 physical development?
4 social and communicative behaviour?

Chapter 3 reports the findings of semi-structured interviews and qualitative analyses of developmental reports. The evidence consists of: 1.) primary sources; personal accounts gained through parental interview and 2.) secondary sources; official reports by health care professionals and teachers. The chapter is divided into three main sections describing the Romanian adoptees' background (3;4), stage of development at adoption (3;5) and subsequent progress after adoption (3;6). The aim of the chapter was three-fold: 1.) to chart each child's progress, 2.) to compare each child with herself where appropriate (intracomparison) and 3.) to compare the three children with each other where appropriate (intercomparisons).

3.1 Descriptive Developmental Data

The following section describes the sources of information that were used for this chapter.

3.1.1 Primary Sources: Semi-Structured Interviews with Parents

Semi-structured interviews were conducted with S., G. and I.'s parents during the early stages of the study. During these interviews, lasting around two hours, each parent described the Romanian orphanage setting and their child's early

developmental history. Each interview session was audio recorded and the tapes were later transcribed. Table 3.1 below gives the date of each parental interview (see IV, Appendix A. for the types of questions asked).

Table 3.1 Adoptive parent interviewed and date when interviewed.

Adoptive Parent Interviewed	**S.'s mother J.**	**G.'s mother K.**	**I.'s mother M.**
Date When Interviewed	7th August 1998	9th March 1996* 27th August 1998	22nd July 1998 + 10th September 1998

*This interview was conducted as part of a previous study.

3.1.2 Secondary Sources: Official Developmental Reports

Prior to data collection, parents consented for the researcher to examine any official documents pertaining to the child's developmental history and outcome since entering their adoptive homes. Subsequently, parents either mailed copies of the reports to the researcher or they were obtained during visits. The official documents consist of records of medical evaluations, written assessments by various health care professionals, school and educational reports and the parents' written statements. With the parent's permission, some reports were photocopied at the University of Sheffield and retained for future use. All information was kept strictly confidential.

3.2 The Early Years

The evidence presented in the following sections represents the first attempt by the thesis to shed some light on the effects of early deprivation on language, cognition and social behaviour. This is firstly achieved by piecing together S., G. and I.'s early histories, using the information given by parents, and developmental reports. Detailed accounts are given of each child's early life in the Romanian orphanage setting and their very early experiences in their adoptive environments. The first questions that one might ask are 1.) What is the exact nature of the environments from which these children came? and 2.) What were the children like when first adopted? If the parents' first hand accounts and the documentary evidence can answer these questions then this, in turn, will go some way to informing the reader as to how S., G. and I.'s

early circumstances impacted their behaviour. In addition, a baseline will be provided against which developmental level can be compared at the end of the thesis.

3.3 What is the Exact Nature of the Environment From Which These Children Came? - The Romanian Orphanage Setting

Details of each child's early life in a Romanian child care institution, based on the parent interviews, are presented below. The parents' experiences are either paraphrased or directly quoted where relevant.

3.3.1 Sariah

S. was born in an orphanage known as Sector 2, Bucuresti on March 3rd 1987. It is thought her mother abandoned her in the hospital. Although S's birth name and date and place of birth are known, there are no details about her birth history such as her weight or even if she was born prematurely or full term. Such a lack of official documentation was common in Romanian childcare institutions (Ralph, 1996). At some point, she was transferred to a home or "laegun" for 0 to 3 year olds. Around the age of 3 years, S. was then moved to a mainstream childcare institution or "Prescolare", where she resided until the age of 7;5 years. There is limited information about S.'s early life in the orphanage since the parents were never allowed access. What is known is that, S was daily confined to a room with six or seven other children of the same age. There was no access to toys and the children were very rarely let outside. S.'s adoptive mother, J. commented,

> "We asked the lawyer what he thought and he said that they were probably kept in a bedroom...or a room, all day, because there didn't seem to be a lot of time difference at all. I suppose..time just didn't mean anything to them. I think they were probably just stuck in a room and stayed there."

S. never received any schooling because it was considered that her developmental level was too far behind to benefit from this. J. described her first impressions of the orphanage where S. lived in June, 1994:

> "They were very careful not to let us go any where other than the office. Sariah was brought to us actually in the office where the Director was and, of course, as usual in

> Romania, there were loads of toys...in the cupboards! *(laughs).* The children weren't using them. So, in a sense, it was very artificial. The people just brought her in and that was it. I assume some toys were brought in by Western aid volunteers. There was one great, big doll, which we'd actually seen before. Our lawyer had taken a photograph of a few of the children, and they were all standing by this big doll. It was a very old fashioned doll, that was obviously their pride and joy *(laughs),* but the kids weren't allowed to play with it. Presumably, they were just stood by it, while they were actually having their photograph taken."

J. also described her first impression of S:

> "When we actually went there, we did take Sariah out into the garden, although she didn't look as if she'd been out very much at all. Her skin was very grey and wrinkled and..she was like a little old woman, I thought, or a wizened monkey *(laughs).* They wouldn't let them drink very much and it was really hot. So, she actually came out into the garden with us and we sat on this very rusty old swing and she was quite excited, so I don't think she'd been out very much really."

Of S.'s relationship with the other children, J. commented,

> "I don't know whether she actually had relationships with other children. I do know that she didn't form any attachments to the care workers, no, none at all. She probably wouldn't have had much opportunity to hear people talk either. There always seemed to be so many more children than there were helpers and the helpers just didn't seem to talk very much, not when the children were there. And she didn't get out and go anywhere. She would hear the other children, but a lot of them didn't talk either. They were just used to making sounds rather than actually talking."

3.3.2 Georgina

G. was born on 25th June 1985 at Constanta Hospital, Romania. There is no evidence to suggest that G. was retarded at birth or born with any physical abnormalities. Her natural mother gave a false name and address and abandoned her one-day after birth. G. remained at the hospital for 2;6 years. G. was fed only a liquid diet and was swaddled from early infancy until the age of two. Normal exploratory behaviour and gross motor development were restricted. She was then moved to an 'orphanage' for 1-3 year olds at Cernavoda, South Eastern Romania. She was kept in her cot for twenty-four hours a day and according to her Romanian paediatrician, "made no development". After eighteen months, because of her lack of progress, G. was again moved thirty miles away to an institution for "irrecuperables" at Negra Voda. Children with severe difficulties were relegated to this type of institution if their prognosis for further recovery was poor. During April 1991, G.'s adoptive mother K.

went to Romania as a Western aid volunteer and saw G. for the first time at the age of 5;9. K. describes her impression of the impoverished conditions in which G. lived:

> "I think I was well prepared for the state of the orphanage from all the media stuff that had come through, but the smell was the one thing I wasn't prepared for. You think you can imagine it, but you can't. The little children like G. were all sort of sat in pots..kept in their cots in their rooms. There were no other rooms to go to apart from the rooms where they slept. Their whole lives were spent in their rooms. The whole thing's difficult..seeing one hundred and forty kids in one building..and just the lack of attention. Even the women that were looking after them, were so obviously worn out with their own lives, they didn't have any energy to give to the job. All these toys came in from the West, but the Romanian women had to be taught how to play with them as well as the kids. They hadn't much idea. But the most disturbing thing was where the big children were kept down stairs and they really were ordered about like animals..and I found that very difficult. They were sleeping three or four in a bed..and lacked clothing because they'd never been used to clothing. They were given clothing by western volunteers but they didn't keep them on."

The children lived almost entirely in their cots and there was one staff member for every thirty children. During her time at the orphanage, G. had never been weaned and had lived on a liquid diet. K. reports that during her visit to the orphanage, G. was refused food. G. was in a room with six other children and a few cuddly toys that had been brought in by aid workers. She shared a large cot with another child. Bedding was not regularly changed. G. was rarely spoken to by the carers and thus the only opportunity for spoken language stimulation would have been from the other children that occupied the room. However, even this would have been unlikely, since the other children, like G., were only just beginning to talk. Describing G.'s appearance at the age of 5;9 years, K. says,

> "She was underweight and minute. I still couldn't believe her age, because at that time she was five. She just had a five-year-old size trunk with really spindly arms and legs. I supposed just like little sticks and not really able to bear her weight. She was beginning to pull herself up in the cot, but she was very easily tired..but she could sit up."

3.3.3 Ingrid

I. was born on 7 October 1987. She was born with suspected foetal alcohol syndrome (her mother drank large amounts of methol alcohol), at full term and weighed 970 grams. A Romanian paediatrician 'diagnosed' her as having numerous disabilities and gave her a poor prognosis for recovery. On 11th March 1998, five months after birth, I. was discharged from hospital and moved to an orphanage, where she lived for the first three years of her life. This institution functioned as a clearing house for children of varying abilities. At the age of three years the children received an assessment of their developmental level and based on this, they were permanently consigned to state institutions considered most appropriate for their abilities. I. was sent to an institution or "Camin Spital" for children who were deemed to be "irrecouperable" (Johnson, et al, 1992). Her adoptive mother, M, describes the orphanage system and the conditions, in which I. lived:

> "Contrary to popular belief, where I. lived was warm, dry and clean. In fact, it was very hot and stifling. It was quite bright, lots of windows, so physically the conditions weren't too bad. Some children were in a group of favourites. The orphanage was broken up into small units of fifty children of different ages. In each group of fifty, there was a smaller sub-group of perhaps eight children who were considered favourites. The care that they received was very good. They were always taken out of the cots. They were played with regularly. They were given extra tit-bits to eat. So they were quite chubby and well fed and developed reasonably normally on a physical level

I., however, was not regarded as a favourite due to her perceived disabilities and she and the other children were treated less favourably. According to I.'s mother M.:

> "The rest of the children were treated really in isolation. In the unit where I. lived, they were young children under three so most of them were still bottle-fed..still in nappies. They were given a bottle in the cot. The nappy was changed at the same time. In between the feeds, they were generally not played with or stimulated in any way."

I. experienced physical ailments, which included twice being afflicted with bronchopneumonia. She started walking in August 1990, at the age of 2;10. I.'s mother M. was a nurse working in Romania when she first met I. aged nearly 3 years in the orphanage. I. resembled an average one-year-old child; She weighed around 11 kilos, was still in nappies and had cropped brown hair. She became very frightened if she was lifted out of the cot. She had no productive language. She had never been weaned and could not chew, since she had always been fed "mush" from a bottle.

This is almost entirely accountable to the fact that in Romanian child care systems, there was very often a shortage of food, and it was standard orphanage practice to feed the children a mixture of what was available at the time; locally farmed produce that was liquidized to a mush and fed to the children in a bottle with a teat at the end (Fisher, Ames, Chisholm, & Savoie, 1997).

3.3.4 Romanian Orphanage Setting: Further Evidence?

The argument could be raised that, in the absence of 'direct' evidence verifying the nature of the girls' early environment, the extent of the social neglect that they experienced rests on conjecture. What further evidence is there (in addition to parental interviews and developmental reports) that S., G. and I. came from early environments that were truly socially deprived? There are two lines of evidence – direct and indirect - that may help to substantiate the exact nature of S., G. and I.'s early circumstances and therefore the extent of their early social deprivation.

Indirect evidence in the form of contemporary retrospective literature strongly supports the possibility that S., G. and I. existed in conditions of extreme neglect – unprecedented by Western European standards. The following section provides evidence from empirical studies and theoretical reviews of the socio-political and organizational structures that led to the Romanian orphanage conditions.

I Indirect Evidence

According to their parents, G. and I. were adopted from state childcare institutions known as Camin Spitals where conditions - even by Romanian standards - were known to be extremely poor. It was to these Camin Spitals that children labelled as "nerecuperabili" or "incurables" were sent (Ralph, 1994). These were children who had 'failed' developmental assessments (at 3 and 7 years) for a broad range of medical and behavioural reasons and who were thought to have no potential and, therefore, little or no chance of recovery. According to Vigilante (1993),

> "Children with mild deformities such as learning disabilities, visual or hearing impairments, cleft palates or even those who merely resided in the lower percentiles for height and weight were condemned to these inhuman facilities (p.138)."

There were around 100,000 of these "secret" children who were effectively stigmatised and obscured from the Romanian society tightly controlled by Ceaucescu (Serbin, 1997). Several empirical studies have documented the organization and infrastructure of Romanian child-care institutions in general. According to Ames and Carter (1994),

> "Most orphanages were colourless and quiet and provided little visual or auditory stimulation" (quoted by Groze and Ileana, 1996).

Also The Children's Health Care Collaborative Study Group observed in 1993 that,

> "Care for children in Romanian institutions, particularly dystrophic centres, function as custodial care rather than meeting health, social, emotional and developmental needs. Care of this type has detrimental health and psychological effects" (p.294).

Cernak (1994) found that in some of the better orphanages, children aged between 12 and 24 months within these "best of circumstances" had no idea of play. Correspondingly, they had no idea of language. She also found that "staff rarely interacted with or talked to the children" (p.6). S., G. and I. was each adopted during the early 1990s before 1993. As Groze and Ileana (1996) confirm,

> "for children adopted in 1990 to 1993, the conditions of their lives in institutions was abysmal" (p.546).

In the following section, several explanations are proposed as to why it is extremely unlikely that children such as G. and I. who resided in Camin Spitals would have received linguistic and social stimulation from their carers.

1.) Unusually high child-to-caregiver ratios. One reason why S., G. and I. would not have been routinely spoken to is the unusually high child-to-caregiver ratios that were evident in Romanian child care institutions, particularly Camin Spitals. McMullan and Fisher (1992) note that,

> "As in early American institutions, children in Romanian institutions were assigned in large numbers to few staff" (quoted by Groze and Ileana, 1996).

Child to caregiver ratios ranging from 8:1 to 35:1 precluded the children receiving individual attention (McMullan and Fisher, 1992). Ames (1992) reports that in some 'orphanages' there was one caregiver for every 60 children. Such figures suggest that institutionalised children in Camin Spitals were extremely unlikely to receive one-to-one linguistic or social stimulation. Too few staff made this impractical and "allowed for very minimal personal interaction" (McMullan and Fisher, 1992, quoted by Groze and Ileana, 1996). Although by 1992, child to caregiver ratios had improved, nursing assistants would still have had between 9 and 10 children under their care. Thus as Stephenson et al., (1992) state:

> "Obviously this is a heavy direct care assignment that would leave even the most highly skilled worker little time to do more than general custodial care" (p.232).

Caregivers/nursing staff had little enough time to feed let alone talk to children who had "propped bottles supplying their only feeding experience and nutrition" (Serbin, 1997, p.83). This suggests, then that the opportunities for institutionalised Romanian infants and children like S., G. and I. to be involved in meaningful social interaction were either extremely limited or non-existent.

2.) Lack of training and structured care programmes. The lack of structured care programmes, absence of qualifications and/or relevant experience and low job motivation meant that there was little incentive for childcare staff to talk to the children and to interact with them in socially meaningful ways. In 1991, it was noted by the Children's Health Care Collaborative Study Group that,

> "Due to a lack of equipment and appropriate staff training, children have limited opportunities to develop fully gross-motor coordination, fine motor skills, social skills and language" (quoted by Stephenson et al., 1992, p.224).

According to Stephenson et al., (1992) most childcare workers or infirmiera (nursing assistants) lacked adequate training,

> "the bulk of the primary care-giving (was) provided by women with low educational attainment and little, if any training (the infirmiera)" (p.232).

Childcare staff even lacked the basic knowledge that should have been a "minimum requirement for employment." This included,

> "basic child development, basic stimulation techniques…and basic concepts surrounding working with handicapped children" (p.232).

As Stephenson et al. point out,

> "A critical problem is the lack of highly skilled teachers, educators, physical therapists, speech therapists, social workers and early childhood developmental specialists. Further, some people currently employed in these positions do not have adequate education or training in that speciality area" (p. 232).

Stephenson et al note that there was "no educational programme in Romania to prepare specialists in early childhood education" (pp. 225-226). It was difficult to obtain relevant training in paediatric health care professions (such as occupational therapy and psychology) because Ceaucescu closed down many of the universities and abolished professional training programmes during his totalitarian regime.

Confirming the above, Groze and Ileana (1996) note that child-care staff in institutions typically possessed no formal qualifications and were often ignorant and even disinterested in interacting with infants and young children – particularly those with special needs such as the "nerecuperabili." In addition, there was virtually no structured programming in state-run child-care institutions and thus, "children were left to their own devices for stimulation" (Groze and Ileana, 1996, p. 545). There were no nurses, occupational therapists, psychologists, social workers or teachers. Consequently, children had no remedial or educational input and did not attend schools. Employment satisfaction was either poor or considered irrelevant and lack of job descriptions and rewards for dedication meant that staff were even more disinclined or discouraged from interacting meaningfully or talking to the children. Their jobs did not depend on them giving children individual attention.

Medication was a common form of controlling children's behaviour. After visiting state run child-care institutions (Camin Spital and Home Hospital) in Gradinari, Romania, Ralph (1994) observed that,

> "Staff in charge had little or no concept of needs beyond clothing the children and providing them with basic medical care. In many instances this meant wanting sedatives to maintain docile behaviour in the most disturbed" (p.37).

Thus, even on the rare occasions when carers might have spoken to the children, the latter would not have been receptive/responsive to this because of the 'dampening down' effects of the sedatives. Consistent with the observations of many other researchers, Ralph (1994) also noted that

> "In the Home Hospital situation, children too weak to feed themselves simply starve to death. Most terrible of all is the way that lonely and neglected children, unused to contact are unable to play with, or even look at each other. They have never learned how to.." (p.37).

The above observations suggest that children or 'irrecuperables' in the severest state institutions (Camin Spitals and Home Hospitals) were either non-responsive because of sedation or non-responsive because they had learned that no one would come even if they did cry. This created a recursive cycle; Child-care staff typically did not interact with children because amongst other things, time was taken up with the basic medical and health care needs of too many children. The incremental effects of being ignored and sedated meant that children were less likely to cry out. As the children had 'forgotton' how to cry and play and so on, the carers were less likely to pay attention to them in the first place. Thus beyond the administration of basic health care, the evidence of research literature suggests that children in Camin Spital, at least, were systematically ignored by staff at the social level.

3.) Social stigmatisation of children deemed "irrecuperables." Child-care givers were not encouraged to nurture children in institutions like Camin Spitals, because of the lack of value these children had in the wider Romanian society. (Johnson and Groze, 1993). Stephenson et al. (1992, p.223-224) note that due to the older special needs child's age and "chronic medical problems", care staff felt little or no motivation to meet "social-emotional health and educational needs" or encourage language potential. This was because such an 'at risk' child would be considered by the institution and wider community as having little chance of adoption. Therefore,

"custodial type care, with little in the way of individualized programming was the norm" (Stephenson et al., 1992, p.223-224).

It was the traditional attitudes of childcare staff, that is nursing assistants (or 'infirmiera'), to disability which contributed to the lack of individualized care. If children had an obvious disability, this lowered their status because their potential for future progress was considered to be limited or nonexistent. This meant that caregivers were even more discouraged from promoting the children's linguistic and social growth. It was not perceived that talking to the children would make any difference to their developmental outcome. In fact, the status of 'irrecuperable' children like G. and I. (i.e. institutionalised or unwanted children with disabilities in Camin Spital) was considered to be similar to that of non-human animals. According to Johnson and Groze (1993, p.50),

> "Quickly the primary caregivers attached labels to children, classifying them as either human beings or 'animals'. If a child could not communicate, feed itself, or walk, then it was an "animal". Animals do not need the same care as human beings, so care was rationed out."

Such a belief system adopted by childcare workers was the product of societal oppression engendered by Ceaucescu's Communist dictatorship. Such a regime – closed from the rest of Europe - generated a mass belief analogous to Nazi propaganda that 'handicapped' or special needs children were somehow 'inferior' or 'defective'. As Johnson and Groze (1993, p.49) state,

> "..the explicit or implicit pressure was to "hide them away"; usually the facilities housing "handicapped" children were located in rural areas to support the official policy of "no handicapped children" in Romania."

A situation that compounded the children's situations and their right to basic health care was a lack of official documentation as to their family backgrounds. Thus Johnson and Groze (1193, p. 51) state,

> "Hospitals also were reluctant to treat children who had no official family identity, a situation that contributed to the view that these children were non-persons."

Confirming the above, Ralph (1994, p.40) points out,

> "During the period of the Ceaucescu regime in Romania, education legislation made almost no reference to those who were physically and mentally handicapped. The last special needs teacher was trained in 1978. The system was supposed to be perfect so its citizens had to be so too."

Ralph (1994) describes the work of a charity, Muzika, with Romanian 'orphans' during the early 1990s. Muzika members were primarily teachers and music therapists "experienced in working with profoundly handicapped children" (p.35). Commenting upon her contact with Government officials, Ralph states,

> "They regarded our wish to work with "irrecuperables" as misplaced, however, because they regarded them as totally without hope of recovery, and, because they are parentless, also without rights" (p. 37).

According to Ralph, such flagrant disregard of the rights of children deemed "irrecuperable" is due to the "conditioned perceptions" of Romanian society that they are the "dregs of society" (p.44). This, an "inbuilt attitude" is endemic in Romanian culture/tradition and is the ideological residue of life under the old Communist regime. Thus changing how "irrecuperable" or special needs children are treated involves changing Romanian society as a whole.

II Direct Evidence

Supporting the observations of the researchers above, there exists for G. and I. direct video evidence of the overcrowded orphanage conditions in which they - and other "irrecuperables" - spent their early lives. A video recording for G. lasting around 45 minutes shows her being spoken to by a Western aid volunteer in the orphanage. G. was aged 3.8 years at this time. The room in which G. is filmed is large and filthy. There are rows of rusty cots with iron railings. In one scene, G. can be seen lying on a dirty, moulding mattress in her cot. She wears nothing on her spindly, emaciated legs. It is quite clear that G. cannot walk. For example, in one scene, G. can be seen pulling herself along the floor by her arms. Another scene shows children languishing in cots with severe leg and arm deformities. They do not talk or interact with each other, but lie quietly and passively. The children that can stand can be seen quietly rocking from side to side showing typical stereotyped behaviour. The Aid worker who speaks to G. can be heard repeatedly saying G.'s name and the word "helloa". G.'s response is to copy the Aid worker by saying "Georgina" and "helloa" several

times. Although her eye contact is appropriate, G. does not speak other than these two words – suggesting that productive language (either Romanian or English) is largely absent. This is substantiated by early developmental reports.

The video data for I. lasts for about 90 minutes. It is more than clear from this footage that, at the age of nearly four, she did not possess any productive speech. A range of scenes in and out of the orphanage show I. with her prospective adoptive family who lived in Romania at the time. These scenes (spaced over several days) show that I did not talk, that is, her only vocalization is a dry wail. In this respect, she was unequivocally preverbal. It is also obvious that she could barely walk and that she was not toilet trained since (at the age of nearly four years) she wore a nappy. The institutional environment in which I. lived is similar to the one shown in the video for G. Rows and rows of rusting and paint-peeling cots, house children that either lie passively or stand on moulding mattresses and exhibit self-stimulatory behaviours (e.g., jumping up and down or rocking from side to side).

One scene shows I. being less than delicately handled by a Romanian care worker. I. is deftly undressed, and then wrapped in a cotton 'nappy' and placed in terry-towelling pink pyjamas. The efficiency with which the woman works suggests that she has many children in her care that she must change in this way. This scene continues for about three minutes, but the care worker does not speak one word to I. I.'s adoptive mother, M.P. worked for several months as a nurse in Romanian child-care institutions. M.P. knew I. before she was adopted and stated in an interview that I. would have received virtually nothing in the way of linguistic input and/or social interaction from Romanian care workers. This observation is also supported by the report of a paediatrician who worked in Romania and assessed I. before her entry to the United Kingdom.

The above evidence/data suggests that it is extremely unlikely that S., G. or I would have received even minimal linguistic stimulation on a daily basis. However, the 'evidence' of empirical studies still might be considered circumstantial and the video data only snapshots of the children's lives in the orphanages. For these reasons, it cannot be unequivocally ruled out that S., G. and I. might have been played with and spoken to occasionally. This issue is touched upon in Chapter 7 and discussed in more detail in Chapter 9.

3.3.5 Summary: Romanian Orphanage Setting

The parents' testimonies above, show that S., G. and I. all experienced unprecedented levels of neglect during their early childhood years. This was characterized by deprivation of food, language and intellectual stimulation and socio-emotional experience. As is particularly evident in G.'s case, motor development and exploratory play were also severely restricted.

It might be argued that one can only conjecture as to the extent of the social deprivation that S., G. and I. experienced and that the linguistic and social neglect can only be inferred. However, the published literature suggests that there are a number of reasons why the opportunities for S., G. and I. to receive individual attention – and therefore language and social stimulation - would have been extremely limited. These include 1.) Unusually high child-to-caregiver ratios, 2.) Lack of training and structured care programmes, 3.) Social stigmatisation of children deemed "irrecuperables". In G. and I.'s cases early video recordings substantiate the extreme neglect and overcrowded conditions in Camin Spitals observed by other researchers.

3.4 What Were the Children Like When First Adopted? - Stage of Development Shortly Before And Shortly After the Adoption Process

S., G. and I.'s developmental levels after years of extreme neglect in Romanian child care institutions are described below, using both the parents' personal accounts and the evidence of official reports. The primary and secondary sources of information are either paraphrased or directly quoted where relevant.

3.4.1 Sariah

On March 8th 1994, six months before she came to the United Kingdom, S. received a medical and psychological evaluation from a Romanian paediatrician. Aged 7;0 years, S. was described as being in a "satisfactory state of health" and not having any known

allergies or illnesses. It was reported that physically (and neurologically), S. had a "good general appearance" and was developing satisfactorily, but that cognitively, she had "psycho intellectual retardation." An assessment of her language comprehension and production concluded that, "Both of them are made with difficulty." S.'s medical record recommended that she would need specific follow-up treatment to,

> "remedy the educational deficiencies, logopedic examination and treatment, to stimulate the speech development."

Her adoptive mother J. saw S.'s hidden potential when they met for the first time in the orphanage in June 1994. In an early report, J. wrote:

> "When we first met her in the orphanage…we were impressed with the eye contact and general behaviour and felt that she would respond very well to stimulation, love and the attention of a family."

S. was adopted at the age of 7 years 5 months. At the time of leaving the orphanage, her growth was stunted and she was extremely malnourished. She weighed 2 stone 8 pounds (i.e. 36 lbs) and was 3ft. and 3;5 inches tall. She was at the 3rd Centile (-3 SD). Her co-ordination and spatial awareness were very poor and she had no concept of the outside world. S. was extremely dehydrated. Her skin which was dry, wrinkled and putty in colour indicated this. S. could barely walk. J. described S.'s appearance at this stage:

> "She was a mess. She was very grey, wizened, looking very, very anxious. When we first picked her up, her jaw was really prominent, really sticking out and her eyes were sort of always screwed up and there were these dark rings under her eyes, as if she was really worried and anxious the whole time. Sore. Her hands were absolutely covered in sores. Her hands were a real mess. Every time she touched anything, almost the skin came off. It was horrible. And she had spots on her face and under her nose. I think she'd probably got scabies as well because we all got it afterwards when we came home."

S. emerged from orphanage life with a near absence of speech, although her eye contact was well established and she could communicate with a combination of manual gestures and facial expression. J. described S.'s early language ability:

> "We think she probably knew about..fifteen, twenty Romanian words, when she came out of the orphanage. Quite a few people think that she was bright enough to have realised that there was no point in learning to talk, because no-body was going

> to take any notice of her anyway. But, she just didn't talk. She made weird noises and sounds and pointed at things. Certainly when we came home, she would point at things and grunt (*makes grunting noise*), just sounds and that's what she would do all the time, but point at things as well.
>
> "I think the first English word she used was "Look". When we picked her up to bring her back to Bucharest, we had a three hour car journey and she stood up the whole time and we kept saying, "Ooh, look Sariah, there's a stork", or "Look, Sarah, there's a.." and she was so excited because the Romanian for "look" is, "usher, usher"...but she didn't use that, she used the English word, "Look". She picked that up in a few minutes because we kept saying, "Ooh, look Sariah.." and so, she learned that quite quickly. Actually, she didn't need encouraging because she wanted to talk. She wanted to come out with words and she was really quite interested in that sort of thing. She was motivated."

Within the first few days of S.'s arrival to her new adoptive family, it soon became apparent that S.'s treatment in the orphanage had impacted on virtually every area of behaviour. As J. says, "She hadn't a clue about anything." Developmentally, she was similar to a child aged 3 or 4 years. Her lack of spatial coordination meant that she was very unsteady on her feet and fell over furniture or knocked into things. S. had to be held up for the majority of the time. She did not know how to play or pretend like typically developing children and the concept of tactile affection was also unfamiliar to her. According to J,

> "..if we tried to get her to sit on our knee, it was almost like a sort of stick or piece of wood. You almost had to bend her in the middle to get her to sit on your knee. It was really quite strange. You'd bend her and sit her on your knee and she'd sort of sit there, but she didn't really know how to behave or what to do."

S.'s reactions to new people were also unusual and she could not distinguish between strangers and family members.

> "She just wanted to touch them and hold their hand. Well, sort of friendly, but sidling up to people and then holding their hand, but not wanting to get too close."

S. exhibited other atypical social behaviours involving occasional aggressiveness towards other children, extreme withdrawal from group situations, emotional displays such as crying and some stereotyped behaviours.

It was also noted that S. ate ravenously and always finished the food on her plate. She devoured her meals as quickly as possible, almost as if she expected them to be

snatched away at any moment. In the institution, S. had been deprived of water for long periods and drank by "cupping her hands under a tap or running water" which she continued to do. For almost three weeks, she clutched a cup for hours at a time and asked for water whenever she saw a tap. In contrast, she was frightened of water when it came to baths or showers. "Red, festering sores" covered large areas of her skin and she was prone to rashes.

She demonstrated limited real world knowledge. S. had never seen a television before and many everyday household objects were completely unfamiliar to her, although she displayed no interest in these. She could not recognize objects that were represented by drawings and she held books upside down and started looking at the pages from the back.

3.4.2 Georgina

At the age of 5;2 (August, 1990), G. was visited in the Romanian orphanage by her adoptive father, M., who reported that, G. possessed no productive speech. Yet, even in this pre-verbal state, she exhibited "very good eye contact". Six months before her adoption, G.'s developmental level, at the age of 5;9 was estimated by her adoptive mother K., to be below that of a child aged 18 months. G. could not walk and used her arms to pull herself around on the floor. She could not eat solid foods due to her unwillingness to chew. G. was not toilet trained and wore disposable nappies. Her productive speech consisted of "helloa", "bye", her name "Georgina" and two Romanian words that she had learnt from Western aid volunteers. K. described G.'s early language ability in the orphanage:

> "I think she had about five words when we first went to see her, but she very quickly was learning words all the time and copying sounds. She looked as though she was..going to be able to..learn fairly quickly just given the stimulation. At the time I gave her eighteen months to two but looking back I don't think she was as far on as that really. She was beginning to speak words. Like when there was a..big, soft dog there, she'd go, "woof, woof, woof", and she sussed it very quickly that the dog said, "woof, woof", and she'd copy the "woof, woof", so like a baby learning to talk really. She'd copy sounds you made to her. She tried to say the whole word like you were saying it. She was trying to learn to talk all the time."

G. appeared to prefer one to one interaction, rather than joining in with groups. She took little notice of the other children. Although, G. did not demand attention, she was

responsive when this was given. This was evident in her non-verbal reactions, since she would establish and maintain eye contact with anyone who was attentive to her and smile at them. She was also reported to use gestures such as pointing to some degree. It was this aspect of G.'s behaviour that was first noticed by K:

> "It was the very strong eye-contact that attracted us to her..right from the very first time we saw her. She would just sit in the corner of the cot and watch the world go by-just watch everything."

In October 1991, G., came to England to live with K. and her husband M. and was adopted by them under British law in July 1992. Then aged 6;3, she still could not walk unaided, or eat solid foods and was still in nappies. She was extremely malnourished and physically similar in size to a healthy 18 month to 2-year-old child. Productive language was virtually absent, except for an expressive vocabulary of ten English and Romanian words. G. had only a very simple and emergent capacity for play.

3.4.3 Ingrid

Aged nearly 3 years, I.'s developmental level was estimated to be equivalent to an infant aged nine or ten months. At this stage, she still resided in the orphanage. I. did not talk and could not walk unaided. Similar to S. and G., I. also exhibited stereotyped behaviours which included rocking backwards and forwards and bouncing up and down while holding onto the cot rails.

In November 1990, aged 3;1, I. was examined by a British paediatrician living in Romania. It was found that, while I was "a healthy but pale and small child", her gross and fine motor skills, social and cognitive skills were retarded. The cause of this, in the doctor's opinion, was that I. had microcephaly, various handicaps (with 'spastic tendencies'), and other physical characteristics consistent with Foetal Alcohol Syndrome. Also, commenting on I.'s speech and language, the medical report states that,

> "Both expressive and comprehension language were severely delayed. With the language difficulties it was not possible to test her formally but she had no expressive

> language in either Romanian or English though she did make some meaningful grunts."

I. could not dress or undress herself and was not toilet trained. Her fine motor control was also inhibited due to mild muscle hypotonia. Her weight was 9.4 kilos, and head circumference was 43.5 cms. Her height of 82.5 cms indicated that she was of a short stature. Although, I.'s development was "grossly delayed", she showed interest in play activities and the potential for learning new concepts. The report concluded that I.'s linguistic ability was the most significantly delayed area of development.

Soon M. began adoption proceedings and in September 1991, at the age of 3;10, I. went to live with her new adoptive family, who were living in Romania. Also in September, 1991, I. was re-examined by the same paediatrician as a year previously. The report from this time states that I. still manifested stereotyped, repetitive behaviours, but that her gross and fine motor skills (which were one of I.'s "best areas") had improved significantly. Her social and cognitive skills had also progressed. She could now dress and undress her self. She demonstrated increasing interest in explorative and imaginative play. She appeared to recognize some people with whom she interacted regularly and could now display some emotional reactions such as pleasure at seeing someone. I.'s speech and language appeared to be developing at a slower rate. The medical record states that,

> "I. showed severe expressive and comprehensive language retardation. She had no words, but is more attentive to others talking and was beginning to develop some listening skills."

I.'s weight had increased to 10.4 kilos, while her head circumference had increased to 44.5 cms. She had gained almost 7cms in height (89cms), but was still considerably below the third centile for her age for European children. The paediatricians conclusion was that while I. had "shown excellent improvement of her developmental skills and has good capacity for learning", her acquisition of speech was still very retarded. The point is made that as I. was unable to form an attachment to a primary care giver during the first two years of her life, "she will have some emotional stress which may affect her development." Most tellingly, however, the comment is made that,

> "Some of the the damaging effect of the lack of stimulation and support in the vital and formative first few years will be permanent."

This observation appeared to have been confirmed when by the age of 4 years, I. still had not spoken her first words. As I.'s adoptive mother M. says:

> "She had no speech at all at four. She cried occasionally, but not much when she came to us because there was no need really. It wasn't something she did for attention. She cried if she was scared or something frightened her that she didn't understand. She cried when you tried to make her eat or drink from a cup or showed her a spoon; things that were associated with behaviour from the orphanage. We understood a little while later that an edict had gone out that all the children over three must be spoon fed and if they didn't respond to the spoon they were held down and force fed..and so you only had to give her a spoon and she would really scream. It was horrible. So, they were the only verbal noises really. She did giggle as well to games like 'peek-a-boo' or teddies, particularly (play) with teddies and tickling her because she was quite ticklish. That was nice because that was the more normal sort of ..reaction..*(Laughs)"*

3.4.4 Summary: Stage of Development Shortly Before And After the Adoption Process

The three accounts above, show that when S., G. and I. entered their respective adoptive homes, they did not have chronological age appropriate skills. In each case, global developmental retardation was evident. This was characterized by inhibited motor and physical capacity and concomitantly poor cognitive and social abilities. Therefore, this suggests that, initially, the effects of extreme deprivation on language, cognition and social and communicative behaviour are that the development of these areas is either discontinued or radically slowed down. In short, the interview and documentary evidence collectively imply that if a child is subjected to a global environmental deficit, then the expectation will be that he or she will have a global developmental one.

3.5 Did the Children Show any Signs of Progress? – Rate of Improvement After Adoption

Was S., G. and I.'s severely retarded development permanent and irreversible or was it temporary and subject to change? In other words, would they learn to talk, walk and socialize or would they always remain speechless, unable to walk, and isolated?

One way this question could be answered was to find out whether S., G. or I.'s behaviour changed with the change in their environment. In the girls' cases, retarded developmental levels (characterized by lack of speech, stunted growth, malnutrition etc) coincided with *decreased* exposure to meaningful experiences (i.e. the deprived context). It might, then, be reasonable to assume that developmental gains coincide with increased exposure to meaningful experiences (i.e. the family context). Therefore, if S., G. and I. were found to have made significant developmental progress or catch-up soon after adoption, this indirectly shows that a) they were very receptive to their environments, increasing the likelihood that it was the extreme deprivation of experience that primarily contributed to their retarded rates of development and b) they were less likely to have disorders of an innate or genetic aetiology, since developmental catch-up coinciding with change of environment is not usually evident in children with organic difficulties (Skuse, 1984b).

Over the following sections, evidence from the parent interviews and the formal reports is used to examine whether or not S., G. or I. made any significant progress after adoption. Again details are either paraphrased or directly quoted where relevant. Accounts are given of each child's motor and physical, cognitive, language[1] and socio-emotional development. Although it is recognized that these areas are interrelated, they are treated separately in order to make comparisons. Tables are also given of the various standardized/psychometric measures administered to S., G. and I over the years.

3.5.1 Sariah

Table 3.2 summarizes the formal tests administered to S. by health care professionals since entering the United Kingdom.

Table 3.2 Sariah - Standardized tests administered since entering adoptive home.

Test Given	**Age When Given**	**Date When Given**	**Results** Test age equivalent scores or percentile

[1] In terms of S., G. and I.'s language development, both their language structure i.e. phonology, morphology, syntax and the lexicon and their use of language i.e. communication and conversation is described.

			ranks
Wechsler Pre-School and Primary Scale of Intelligence – Revised UK Edition	7;8	December, 1994	Peformance subtests = 3;6 –3;9 yrs Arithmetic subtest = 3;4 yrs*
Goodenough Draw-A-Man Scale	8;9	December, 1995	5+ yrs
Action Picture Test	9;8	November, 1996	Information Score = 8;5 yrs Grammar Score = 6;0-6;5 yrs
British Picture Vocabulary Scale	9;9	December, 1996	4;0 yrs
Neale Analysis (a reading test)	9;9	December, 1996	5;4 yrs
Test for Reception of Grammar	10;8	November, 1997	7 yrs (percentile rank = 5-10)
Edinburgh Articulation Assessment	10;8	November, 1997	"articulated all English speech sounds correctly"
Action Picture Test	10;8	November, 1997	Information Score = 8;5 yrs Grammar Score = 8;5 yrs
Action Picture Test	11;7	October 1998	Information Score = 8;5 yrs Grammar Score = 8;5 yrs

**Note: Verbal subtests were not administered*

I S.'s Language Development

When S. left the orphanage her productive vocabulary consisted of less than twenty words. However, several weeks after her adoption, S.'s language began to develop in response to new experiences. It quickly became apparent that, S. displayed a "natural cautious curiosity" about her environment and that she was very motivated to speak. At first, S. learned single words such as "bye-bye", "food", "drink" and "toilet". She could not say her name, although she responded to both the English and Romanian version of this, "Sariah" and "Nicoletta." Commenting on S.'s emergence of language, J. says:

> "It was just the odd words to start with. It certainly wasn't sentences. It would just be the odd word, but enough of the word to know what she was talking about, what she wanted. It was long time before we actually got sentences. Sarah could actually understand sentences, but she didn't actually use them for a long time. Well, she always did understand a lot more than she could actually say, but it was never the

> biggest problem, I thought it was going to be; the fact that she couldn't understand English. It was as almost as if she did anyway. I suppose we just signed and that sort of thing."

Within 3 months, her vocabulary had steadily increased and she was beginning to formulate short sentences such as "I've done it", "No, you stay over there". She was generally able to communicate her needs by stringing words together. For example, "banana for school", and "go in car", although her pronunciation wasn't always very clear. At this stage, her comprehension of English was ahead of production. She was described as being very motivated to learn, eager to communicate and would get very frustrated if she was not understood straight away. She established eye contact with those who talked to her and if she did not understand what was said, she tried to "work it out by actions."

Four months post adoption, S., aged 7;8 years received an evaluation from an educational psychologist (December, 1994). The following observation is made concerning S.'s emergent language:

> "Sariah's expressive language as used in class, has improved from a few single words and two word utterances accompanied by noises with speech like intonation, to a greatly increased vocabulary of single nouns, many familiar phrases and creative use of word combination. Sarah now verbalises to herself as she does tasks. She continues to enjoy looking at books, naming pictures and repeating new words and phrases. She asks questions and for help with tasks when appropriate. She uses her still limited vocabulary and language structure to good effect when trying to communicate an idea as yet more complex than it can easily handle Sarah's language comprehension also appears to have greatly increased over the two months I have known her. She acts on familiar classroom instruction and simple explanation without difficulty, comprehension certainly appearing adequate for her current classroom situation".

Nearly a year later, a parental report dated, 27th November 1995, states that S.'s reading and writing skills were cause for concern. S. could "read a sentence much better than isolated words." Her verbal communication had improved and while she liked to acquire new words, she did not always speak in sentences.

In December 1995, a speech and language therapist assessed S., aged 8;9. According to the report (dated 07.12.95.), S. enjoyed conversation, but was unable to express complex ideas linguistically. She produced basic grammatical forms but her emphasis

was on communicating rather than using correct language. On 21st November 1996, a speech and language therapist tested S.'s expressive language using the Action Picture Test (APT; Renfrew, 1988).[2] S.'s score for information was at the 8;5 years level, while her grammar score was at the 6;0 to 6;5 year level. It was reported that S. needed to work on past tense verb forms (*lifted*, *caught*), present participles (*jumping*, *riding*) and object pronouns (*them*). S produced "clear, connected speech" of 5 to 6 words in length and produced all speech sounds correctly.

On 5th December 1996, a learning support teacher assessed S's language and reading development, at the age of 9;9. S.'s verbal receptive language as measured by the British Picture Vocabulary Scale (BPVS) was at the 4 year level, while her reading age as measured by the Neale Analysis was at the level of a 5;4 year-old.

On 10th November 1997, a speech and language therapist reported that S's language ability – at the age of 10;8 - would continue to mature and develop. An assessment revealed that S.'s receptive language as measured by the Test for Reception of Grammar was at the 7-year level (percentile rank = 5-10). She "articulated all English speech sounds correctly." S.'s expressive language as measured by the Action Picture Test was at the 8;5 year level. It was reported that S. did not yet use auxiliaries such as "is", "has", "was"[3] or passive constructions. S. produced irregular past tense errors such as "catched" and needed practice with subordinating conjunctions such as "because", "so (that)" and relative pronouns such as "that", "which", "who." S. found it difficult to understand complex sentences with postmodified subjects such as "The cow chasing the cat is brown." and negatives such as "The box but not the chair is red."

By August 1998 S.'s comprehension and expression of language were described by an annual school report as being approximately equal. Her reading and spelling were at the 7-year level. There was still a noticeable discrepancy between her chronological

[2] The annual Action Picture Test assessments were the sole means by which S.'s language development was clinically monitored for over three years (1995 to 1998). This was the only information used to inform S.'s special needs program at school.

[3] This observation by the speech therapist was, in fact, untrue since S. *did* use auxiliaries in her spontaneous conversational speech. This may lead one to question many of the official statements of S.'s language ability that were made in the past.

age and her linguistic attainment. J. who was interviewed in August 1998, describes S.'s language ability at this point:

> "..we're only just beginning to get a full sentence now..When she's writing she doesn't sort of write or doesn't seem to think it in sentences, but now she's actually talking, she very often will talk in a sentence..She's really got quite a grasp of English now and understands a lot. She will say, also, "I've been to school, I have." and she's often got the extra two words at the end, so she'll repeat herself..or say, "I spilt my milk, I did." *(laughs).* So again, that sort of picks her out as being different because when she says that to the other children, they'll say, "Yeah, you've just said that." I haven't actually heard other children do it. She'll automatically add the extra words."

On 13th October 1998, aged 11;7. S. received her last formal speech and language therapy assessment. The Action Picture Test was again used to measure S.'s productive speech. Many of the structures that were identified as missing from S.'s expressive language a year previously (10.11.97) were now used correctly. She now used auxiliaries, passives, subordinating conjunctions and relative pronouns, although it was noted that,

> "She still needs to practice with past tense irregular verbs e.g. catched /caught (Sariah used "catched")."

Also her understanding of sentences containing postmodified subjects (i.e. "4 word level instructions") had improved over the year. In the speech therapist's opinion, S.'s language development was not clinically impaired since,

> "Sariah's speech and language are commensurate with her general abilities."

S. was, thus, permanently discharged from speech and language therapy.[4]

II S.'s Non-Verbal Cognitive Development

At the age of 7;0 years, S. was described as having "psycho intellectual retardation" by a Romanian paediatrician. When S. was officially adopted, aged 7;5, her spatial

[4] The results of S.'s speech and language therapy reports for 1996, 1997 and 1998 suggest, that, although S. was making progress, some of the grammatical problems reported by the speech therapist early on were still evident for S.'s most recent performance on the APT, 18.03.00 and that some of these difficulties (e.g. irregular past tense verb errors or overregularizations) had persisted for well over three years.

awareness and representational skills were very poor, and for example, she found it difficult to judge the distance of furniture and could not recognize objects that were represented by drawings.[5] Yet, despite S.'s inhibited (non-language) cognitive skills, she was very inquisitive of her surroundings. One month later, S. began to attend a local mainstream primary school.

After S. had been in her new home for four months, her mother J. wrote about S.'s intellectual potential:

> "We feel that she is an intelligent little girl who has lots of potential. She has achieved so much in such a short time that we are confident that with the right help, attention and stimulation she could well catch up with those of her biological years who have not had her bad start to life. But to have a chance of doing this, she needs help now (as does the school) so that the excitement of discovery and learning new things can be channelled in the right direction."

Around the same time (December, 1994), S., then aged 7;8 years, received an evaluation from an educational psychologist. The corresponding report dated 14.12.94 states that on 2 of the 3 performance subtests of the Wechsler Pre-School and Primary Scale of Intelligence - Revised UK Edition, S. was able to achieve scores equivalent to a test age between 3 year 6 months to 3 years 9 months. On the Arithmetic subtest, she achieved a test age score of 3 years 4 months. The clinical psychological report implies that S began to "catch-up" at an accelerated almost as soon as she entered a nurturing family environment:

> "Although her abilities are still very delayed in terms of her age, the progress she is making daily strongly suggests that this delay is probably largely environmentally created, due to lack of opportunity and stimulation. Whilst it cannot yet be confirmed by standardised measures, it seems probable that Sariah's intellectual functioning will in time, be within the normal range[6]"

Clearly the psychologist's opinion was that, S.'s intellectual delay - at least in the early stages of her development - was not due to an organic disorder, or innate

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[5] The latter was also observed in the case of Kaspar Hauser, (Nicole, 1979) – a so-called 'feral child' whom, during the 18th century, was socially isolated from birth until the age of 17 years.

[6] However, for the next five years it is not known whether the educational psychologist's original prognosis was correct, since an official follow-up psychological assessment of S.'s abilities was never again attempted. Between 1994 and 1999 there remains a huge gap in the information concerning the progress of S.'s intellectual and non-verbal reasoning abilities. Much of the information that does exist is impressionistic.

learning difficulties but to environmental causes and the effects of years of neglect and under stimulation in the Romanian orphanage. Thus the recommendation was made that,

> "Daily individual teaching instruction in basic early reading, writing and number skills is needed to enable Sariah to progress academically at the accelerated rate which she shows signs of being ready for."

S.'s cognitive abilities continued to improve over the next year. In an annual school review dated 27.11.95, it was noted that S., aged 8;8 years, had made progress in all areas of the school curriculum. S.'s academic skills were at the 5 to 6 years level according to her teachers. It was also reported that:

> "..very often it is felt that she does not fully understand the task in hand or aim of the task due to lack of understanding. She will need assistance for a long period to acquire all the skills, knowledge and understanding that children develop in these areas when they arrive in school."

Also S. appeared to have a better understanding of concrete as opposed to abstract concepts. This was particularly evident in subjects that required some level of abstract thinking,

> "There are still many concepts, ideas which she finds difficult to understand due to her early upbringing. Areas such as science history and geography are very hard for her."

The school review for this time concluded that, S., with extra help, would continue to make progress.

In a parental review for November 1995, S.'s parents expressed their worry concerning her grasp of general knowledge and "reasoning skills." It was also reported that S. needed to learn to think independently, and to generalize from experience.

In December 1995, a speech and language therapist reported that S. then aged 8;9, had weak spatial/ observation skills. She found it very difficult to piece together jigsaw puzzles and had no awareness of the shapes. S.'s problem-solving strategies involved the trial and error processes of a younger child. S.'s nonverbal cognitive ability was

assessed using the Goodenough "Draw a Man" scale for which a 'mental age' can be derived according to the level of symbolic representation. On this measure, S. drew a figure with head, body, arms, legs and some facial features. Hair, hands, feet were absent and the drawing, according to the speech therapist, indicated a 5+ developmental level.

S.'s annual school report for November 1996 states that her attention frequently had to be redirected when she was required to work on her own. S. experienced most difficulty with understanding abstract concepts:

> "Her main areas of lack of understanding come in subjects such as geography, history and science. A good example is science, when the last topic was Humans. This she understood and enjoyed because she could relate to the subjects discussed, as they were tangible. This terms topic of Sound and Light is much more difficult for her to grasp the basic concepts."

S. found using money extremely difficult and was struggling with the concept of the value of 2p and 5p coins. Her counting skills were not well established. She also confused concepts of quantity such as "more" and "less", unless she was working with concrete materials.

By the age of 10;2, S. attended the same classes as children who were three years younger. She continued to receive additional tuition during daily small group sessions, but there was still unease over her ability to concentrate for long periods and work independently and understand basic mathematical concepts.

By August 1998, S. had made significant academic progress. Aged 11;5, S. was in a class with children who were two, rather three years younger. S. was a conscientious pupil. In her school report for summer 1998, she consistently scored As or Bs for "Attitude and application to work", although she still found "abstract" subjects such as maths and science difficult to understand. S.'s mother J. who was interviewed at this time summarized S.'s academic progress:

> "They say she's a miracle child at school. They can't believe where she's come from, what she was like when she came to their school. They say it's incredible, absolutely incredible. The other thing, they say, is, she's so determined. She wants to get things right. She's desperate to learn. I mean, she's like blotting paper: she just

absorbs everything and she really sticks at things. She really wants to understand why things work or why things don't work. She'll sit for hours looking at her reading and her books and doing her maths probes. She's up to her seven times table now which is quite good."

III S.'s Physical and Motor Development

Recall that at the time of leaving the orphanage, S.'s growth at the age of 7;5 years, was stunted and she was extremely malnourished. She weighed 2 stone 8 pounds (i.e. 36 lbs) and was 3ft. and 3;5 inches tall. She was at the 3rd Centile (-3 SD) for height. However, according to her adoptive mother J., S. had grown 1.5 inches and gained 14lbs in weight, within two months and 14 days of her arrival to the United Kingdom (27.08.94 to 10.11.94).

In November 1994, aged 7;8 S. received a series of medical evaluations. In a confidential report, dated 12.12.94, it is mentioned that S.'s vision was 6/6 6/6, her hearing was "clinically satisfactory" and that she had passed the audiometry. Her co-ordination was reported to be immature. S. was described as a healthy child, but with "some signs of developmental delay probably due to lack of stimulation." She walked with her feet everted L>R and she was described as being of a small stature, still under the 3rd centile (-3SD). It was also apparent that S. was a natural left-hander, "but in Romania this was not allowed."

According to a parental report dated, 27th November 1995, S.'s physical growth, in terms of height and weight appeared to be slowing down after a rapid acceleration. She was smaller and lighter than the average 7 to 8 year old child. Nearly a year later, an annual school review (November, 1996) stated that S. had a tendency to switch from left to right-handedness.

S.'s onset of puberty began around 10 years of age. By the age of 10;2, S.'s gross and fine motor coordination had developed to the point where she could now throw a ball into net from a distance of at least 10ft., kick and bounce a football in a controlled way, and catch a ball when it was thrown to her.

IV S.'s Socio-Emotional and Communicative Development

When S., was adopted at the age of 7;5, her social awareness was extremely impoverished. Unlike typically developing children, S. had no idea of how to participate in play and pretend activities or to respond when affection was given.

Less than one month after arriving in the United Kingdom, S., aged 7;6, was placed in the reception class of her local primary school. She mixed with other preschoolers and was in the same class as her brother, N. aged 3;10. who was also adopted from Romania at the age of one. After a few days in her new school environment, S.'s unusual social behaviours were noticed by the head teacher, who wrote in a school report:

> "Sariah..is unable to communicate with her peer group…Sariah plays in a solitary manner. At break time she does not play with the other children and frequently goes back into school…Sariah displays aggressive behaviour towards objects and sometimes towards other children. She burst into tears frequently. She addresses the class teacher only as "mummy". She shouts in a repetitive and incoherent manner in the classroom and plays with water. She tends to fall asleep in the classroom."

S.'s constant need for physical affection and stimulation, together with her "extreme developmental delay", meant that she was excessively demanding in both the home and school context. She continually sought the individual attention of adults and initiated physical affection by being overly tactile. At times, S. found group activity overtly distressing and she would hide under furniture.

In December, 1994, when S., was aged 7;8, an educational psychologist reported that S.'s social behaviour and communication skills at school had dramatically improved during the previous month and that she had been extremely responsive to her new environment:

> "She generally appears calmer, happier, more able to concentrate and much more socially conforming than she did when I first met her...she is now keen to join in activities with the other children. She has learnt to sit with them, wait or put up a hand for attention in a class group situation and to respond to simple class directed instruction. She no longer seeks prolonged physical contact with her teacher. She now responds to admonishment to behave in a more conforming manner. Sariah is now playing and interacting more with other children both in the class and play-ground."

Three months later, in March 1995, S.'s parents observed that she was calmer, and enjoyed being able to communicate. She gradually lost her anxious, worried look and became more relaxed. As J. says:

> "She lost that…awful..worried look on her face and..stopped screwing her eyes up and, instead, she had these lovely big, open eyes when she looked at you."

S. liked the freedom provided by her adoptive family and responded well to routines. She was described as a determined child, who liked her own way, but who responded to explanations. She occasionally got upset and cried. Some degree of pretend play had emerged and she liked to play "dolls going to bed" games. She sucked her thumb at night and occasionally during the day. S. now related well to the family pets, whereas before she had been afraid of them. It was remarked that she was disappointed when it was not a school day, since she enjoyed the learning and stimulation. Of her relationship with her younger brother, S.'s parents wrote:

> "She relates well with her brother (3 and three quarters her junior) and in many ways they are like twins! He has played an important part in her adjustment to her new lifestyle."

The significant changes in S.'s early social behaviour preceded a pattern of steady progress that continued for another eight months. When S. was aged 8;7, it was reported that she integrated well with other children, both in her class and throughout the school. During play times she would choose to play with children either from her chronological age group or younger. S.'s social level was estimated by her parents and teacher to be equivalent to a child aged 5 to 6 years. According to a school report (dated, 27.11.95):

> "She can now express most of her needs, feelings and converses happily with the children and staff…She is very eager to please and "get things right…Sariah now appears to be a contented, friendly child who mixes well and is happy to participate fully in the events of a lower school."

The head teacher felt that mixing with younger children would give S the opportunity to practice basic social skills with differing members of her peer group.

At the age of 9;8, S. still predominantly mixed with younger children who were two to three years behind her chronological age group. Her popularity and confidence during social situations had increased, and her ability to verbalise her thoughts and feelings had grown. The annual school review for S., dated 10.11.96, states that:

> "Sariah is always eager to please and tends to be upset if she feels she has "failed". She is generally helpful, cheerful and now quite talkative! She moves confidently around the school and can be relied upon to carry messages and undertake a task."

Soon, S. began to show some emotional responses to her early life in the Romanian orphanage. In November 1996, S.'s parents wrote:

> "During the last 2/3 weeks Sariah has become upset and cried about memories of the orphanage in Romania. We feel this is good because she is behaving more normally and we can talk about her worries and memories regarding what has happened to her. It is difficult to know if memories have been triggered off by photographs we took when we first saw her or her own memories. On the whole though, her early memories are hazy. Possibly this is because there are not many things to remember."

S. was described as a "happy" and "settled" child, who enjoyed new challenges and was "able to relate these experiences to other things." S. did not appear to be aware that she was behind her chronological age group.

By August 1998, S, aged 11;5, was still attending a mainstream school, and was in a class with children who were around two years younger. S. had matured socially, and was very motivated and enthusiastic to do well at school. She was extremely talkative and eager to participate in conversation and she had made advances in displaying social behaviour more appropriate to her chronological age group. She no longer called out, held onto teachers' clothing or made inappropriate comments. She was becoming more integrated with her peer group and was more socially accepted by them.

The onset of puberty was also evident and S was displaying "almost normal" emotional reactions: on one occasion, S. became very upset when her adoptive mother J. spent a brief period in hospital. J., who was interviewed in August 1998 describes this:

> "The night I came home, she actually disappeared up stairs for quite a while and then she came into the bedroom and she'd written just loads and loads-all terribly disjointed, just little bits of ideas and really poured her heart out. I sat there and looked at it and said, "Ooh, Sariah, this is lovely." and she looked at me and just burst into tears and she cried and cried and cried...really sobbed and I was absolutely over the moon because, I thought, "Great, that's the first time, she's actually shown *real* emotion, that's she's just part of us." Oh, it was lovely *(laughs)*, it really was."

S. continued to have a close sibling relationship with her younger brother N. as J. said:

> "They depend on each other quite a lot actually, although..they're totally different..in looks and in personality and character…if one's invited out and the other's not, they do really miss each other. It's quite strange really."

S. was described as an engaging, facially expressive child, who knew how to "sort of smile at people" and who "really caught their imagination." J. summarised the progress of S.'s social and communicative development in the following way:

> "I think for the first time, we feel really that we're getting somewhere *(laughs)*. Up until now, there's always been things-a bit peculiar, like the way she was talking or making noises or talking to herself -just certain types of behaviour which were peculiar. But, in the last..few months, she just suddenly seems to have..blossomed and she can talk like any little girl. We'll have a chat and then she'll come into the bedroom. Or if I'm sitting down, she'll come and sit beside me and just *chat away* like any little child would do, whereas at one time, she wouldn't have done that, or she just comes up for a cuddle or comes and sits on my knee or often says to me, 'Would you like a cup of tea?' *(laughs)*.

V Summary: Sariah's Rate of Progress

Within several months of first being adopted, S. had made considerable gains in her physical, language and socio-emotional development. After an initial catch-up, S.'s rate of progress continued at a slower, steady rate for the next several years. By the age of 11;7, S.'s speech and language were equal to her other abilities. Standardized tests scores suggested that she had not closed the gap between her general developmental level and chronological age. With regard to non-verbal cognitive ability, S. continued to have residual problems with abstract concepts such as maths, and spatial tasks.

3.5.2 Georgina

Table 3.3 summarizes the formal tests administered to G. by healthcare professionals since entering the United Kingdom.

I G.'s Language Development

Her adoptive mother K gives the following account of G.'s post adoption language acquisition:

> "She came knowing about twenty odd words, just like single words. She knew the word for, "going out", and she knew, "here" and she knew some that were Romanian and some that were English but as soon as she came to live with us, she very quickly started stringing..two words together. She started saying words, before she ever made any sentences. When she first came, she used to make a lot of strange, demanding noises to get what she wanted. For example, if she wanted something to eat, she'd point at what she wanted and make a noise *(points and grunts)*. Then if you told her what it was, she'd try and say the word. One of the first things we taught her to say was, "Oh dear", and anything was, "Oh dear" *(laughs)*. She would put it into all sorts of different situations, but appropriately, yeah. She used her language very appropriately, just like a baby learning language."

Aspects of G.'s early language acquisition appeared to be typical of very young children. For example, there was evidence that G could communicate in a prosodically flexible way despite her extremely limited vocabulary and language skills. The opinion of an educational psychologist was that,

> "Even in June 1992, she could use single words with different emphasis and intonation in order to achieve different meanings".

Over the next few years, G. seemed to have little problem with articulating words and there appeared to be no difficulty with pronunciation, according to her reports.

In June 1992, aged 7 years, G. started to attend a nursery for one day a week. Here G. mixed with children who were aged 4 years or below. The school reported that, G. "internalised" her language and "conversed" with her dolls.

In February 1993, a head teacher described G.'s language as telegrammatic but functional. Although, her linguistic ability was limited, she was attempting to relate

past, present and future events. It was also reported that some of G.'s syntactic errors, e.g. "off coat", were reminiscent of speakers who have acquired English as a second language.

G.'s vocabulary for verbs and nouns was growing almost daily, according to a speech and language therapy report for 2nd February, 1993. Aged 7;7, she understood the prepositions "on", "under", "in" and she could name all the colours and count to 5. G. was able to select objects by their function and was beginning to understand and use concepts of time, yesterday/later/tomorrow. She was also able to respond to verbal instructions containing two information- carrying words, such as "Give book to teddy." One area of difficulty was in understanding words that mean size, such as "big" and "little." G.'s acquisition of vocabulary paralleled the "nominalizing" tendency of normal children in that she first learned mainly nouns (Curtiss, p.189, 1977).

Table 3.3 Georgina - Standardized/psychometric tests administered since entering adoptive home.

Test Given	**Age When Given**	**Date When Given**	**Results** Test age equivalent scores, percentile ranks or IQ scores
Action Picture Test	8;11	June 1994	Information Score = 5 yrs Grammar Score = 3 yrs
Wechsler Intelligence Scale for Children-UK, Third Edition	9;11	May 1995	Verbal Scale IQ = 55 Performance Scale IQ = 46 Full Scale IQ = 45
Wechsler Objective Reading Dimensions Test	9;11	May 1995	Failed to obtain score.
Reynell Developmental Language Scales	9;11	June 1995	Comprehension = 4;6 yrs.
Action Picture Test	9;11	June 1995	Information Score = 6 yrs Grammar Score = 3;5-4 yrs

Test for Reception of Grammar	10;3	September 1995	4;9 yrs
Action Picture Test	10;3	September 1995	Information Score = 5;6 yrs Grammar Score = 4;0 yrs
Boehm Test of Basic Concepts	10;3	September 1995	Failed to understand: 'between', 'few', 'whole', 'second', 'after', 'behind'.
Reynell Developmental Language Scales	11;11	May 1997	Verbal Comprehension Scale = 7 yrs
Ravens Coloured Progressive Matrices	11;11	May 1997	6;5 yrs
Wechsler Intelligence Scale for Children-UK, Third Edition	11;11	May 1997	Verbal Scale IQ = 46-59 Performance Scale IQ = 44-60 Full Scale IQ = 42-53
British Ability Scales	11;11	May 1997	6;0 yrs

G.'s speech and language therapy report (for 02.02.93) also noted that, aged 7;7, she produced mainly three-word utterances, although, she occasionally used up to five words in a sentence. Often G. omitted morphological inflections such as prepositions, auxiliaries and determiners. At this time, she was eager to talk and to use her language skills to recount past events, issue interrogatives, make comments and communicate some of her needs. She also loved singing, stories and joining in with nursery rhymes. The report also states that G. had no difficulty with producing certain sounds and occasional problems were due to immaturity. It was concluded that,

> "G. continues to make good progress in her speech and language skills, following the normal developmental pattern."

This was also confirmed by a psychological report (26th March 1993) reporting that G.'s language skills were developing rapidly.

A speech and language report dated 7th June 1994, states that G., aged 8;11 years, was now able to respond to WH-type questions and comprehend complex sentences of up to four or five key words such as, "put the <u>little</u> <u>dog</u> <u>behind</u> the <u>red brick</u>." She had also recently started to understand and use tenses in her speech. She had made some

progress in terms of appropriate inclusion of morphological forms such as possessive 's, the auxiliary verbs, "has", "is" and the determiners "the", "a". G.'s score on the Action Picture Test, had improved over a year, but she continued to have some difficulty with spontaneous sentence structure; She would often know what to say, but get confused in how to express it.

In May 1995, G was again tested by an educational psychologist, who reported that her spelling and reading abilities were at a six-year level. G. failed to achieve a score on the Wechsler Objective Reading Dimensions Test. Her speech tended to be "telegrammatic" and her replies to questions were limited to single-word or two-word replies, for example:

Q. "What is an umbrella?"
A. "For raining". "For pouring".

In June 1995, a speech and language therapist again tested G., aged 9;11. She was reported to have made some improvement in guessing true/untrue concepts, understanding before/after concepts, and story telling activities using pictures. When tested with the Reynell Developmental Language Scales, it was noted that G. found it difficult to assimilate longer instructions of four or more key words. This tended to suggest some limitations on auditory short-term memory.

It was also reported that G.'s ability to use past tense inflections and plural endings was grammatically immature, but generally her expressive language had improved significantly. She was using sentences that were well constructed. Thus, "word order in sentences tends to conform more to the norm." There were no specific "speech sounds" that needed attention and her intonation patterns followed normal lines. It was concluded that G. had made reasonable progress over the year and that her overall speech and language skills were the equivalent age level of a 4;5 to 5 year old.

Three months later on 29th September 1995, G.'s speech and language development were formally re-assessed using the Test of Reception of Grammar (TROG), the Renfrew Action Picture Test and Boehm Test of Concepts. These suggested that G.'s level of expressive and receptive language ability was between 4;6 and 6;2 years

behind her chronological age of 10;2. The assessment results showed G. had difficulty understanding concepts such as, "between", "few", "whole", "second ", "after", "behind". G. also had problems in expressing and understanding syntactic structures such as, singular/plural compared (dog vs. dogs), and comparative adjectives (older than, bigger than). She also had difficulty in using verb tenses and exhibited the tendency to speak mostly in the present tense and to omit auxiliaries. As a result she was encouraged to use the auxiliaries "are" and "is" when speaking in subsequent language teaching sessions.

Aged nearly 12;0 years (May 1997) G. was formally tested by a clinical psychologist, using a battery of psychometric tests that included the Verbal Comprehension Scale of the Reynell Developmental Language Scales. On this measure, G. obtained a test age equivalent of 7 years. G. also scored particularly poorly on a digit span test (Recall of Digits sub-scale of the British Ability Scales) suggesting that auditory short-term memory was inhibited. G.'s speech was described, as "monotonic" and she tended to inappropriately use phrases that she heard others use. Understanding routine commands were no problem for her, although there were concerns that she did not appear to comprehend complex instructions as easily. However, G. was reported to have "a good working vocabulary", and was adept at communicating verbally.

II G.'s Non-Verbal Cognitive Development

As with language, G.'s non-language cognitive development was facilitated by the stimulation that she received in the home and nursery environments. Eight months after adoption, G.'s parents noted that she was easily distracted and had a short attention span. By the age of 7;8 years, G.'s general (including non-language cognitive) development appeared to be following a typical path, according to an educational psychologist's report:

> "The picture since Georgina came to her new family has been one of steady and most encouraging progress which has followed a very 'normal' pattern, and which has been much greater than might have been expected given her age, history, and level of development at the time she left Romania."

In the psychologist's opinion, G. had shown some degree of "catch-up" in her cognitive development:

> "Georgina is functioning at a nursery level, several years delayed for her age, but having shown not just progress but some degree of 'catch-up' i.e. though still very delayed, the degree of delay is less than before."

It was concluded that G. was not an inherently slow learner and, in fact, her rate of learning over the past 18 months had been extremely rapid.

By November 1993, the pervasive effects of G.'s early neglect were becoming more apparent. For example, she could not understand the meaning of some pictures and their relation to reality and this testifies to the length of her deprivation. Thus was reported in an early educational review dated 29th November 1993. In a silly/sensible game where G had to be able to negate an untrue sentence, the following was concluded, "This is particularly difficult for G. who tends to take every statement as the truth". Thus, when G. was asked, "Can cows fly?" her reply was "Yes". She had no sense of the incongruous and so attempts were made to develop her sense of humour. G.'s thinking was very routed in the "here and now", and, therefore activities were created in order to develop her imagination.

In April 1994, aged 8;9, G. was moved into the reception class of a main stream school (with a full-time helper) where the age range of the children was 5 to 9 years old. After several months, G. also began to attend a school for children with moderate learning difficulties on a part-time basis. Here G. was in a small class of Year 3/4 children. In this context, it was noted that G. was highly observant, but distractible. In November 1994, a school report expressed worry that after rapid early progress, G. could 'plateau' her development.

On 22nd May 1995, G., aged 9;11 was assessed by an educational psychologist using the Wechsler Intelligence Scale For Children. G.'s performance indicated that she was functioning at a level where severe learning difficulties were to be expected. The results were as follows:

Performance Scale	46
Full Scale	45

G.'s responses to the various test items suggested a maturity of 4;5 years to 5;5 years at a chronological age of 9;11.[7] It was found that she appeared to lack "listening focus" in that she had poor concentration and a short attention span. In June 1995, G.'s lack of real world knowledge, was reported by a speech and language therapist:

> "She can still display great gaps in her general knowledge, i.e. she was not sure why a picture was particularly funny, as she tends to accept anything as being possibly true."

In the same month, a school report noted that mathematical concepts were particularly hard for G. to understand.

By the age of 10;8, G. attended the moderate learning disability school full-time. She mixed with children who were around two years younger. G. was much better at understanding concrete factual information rather than abstract concepts. In contrast to her early rapid development, G.'s rate of progress had now slowed down. Although her educational attainment was moving at a slow but steady rate, it was unclear as to how much further she would advance.

In May 1997, a clinical psychologist, using a battery of psychometric tests, formally assessed G. aged 11;11. years. G.'s level of intellectual ability as measured by the Wechsler Intelligence Scale for Children-UK, Third Edition was as follows:

Verbal Scale IQ	46-59
Performance Scale	44-60
Full Scale	42-53

G.'s performances on the Raven's Coloured Progressive Matrices, and the British Ability Scales were similar to those of a child aged 6 to 7 years. It appeared that G. had most difficulty with understanding highly abstract or non-meaningful visual-

[7]However, the educational psychologist also admitted that, "The notion of "age equivalence" should be regarded cautiously."

spatial tasks. She found it easier to relate to concrete material. G. also scored poorly on tests of working memory including a visual recall measure (Recall of Designs subscale BAS). G.'s general level of intellectual functioning was estimated to fall within the 'Moderate Learning Disability' category. The psychologist concluded that,

> "Georgina has a fairly consistent pattern of skills with *no marked discrepancies* between her verbal and non-verbal abilities."

III G.'s Physical and Motor Development

During G.'s first two years in England, she was taught to walk with the aid of physiotherapists and swimming hydrotherapy and was introduced to solid food and toilet trained. G. began to gain weight and develop new skills. Within six months, she learned to walk and she was fully toilet trained after one year.

Seventeen months after adoption, on 11th March 1993, G. received a medical evaluation. It was reported that G.'s weight and height were increasing rapidly. From having been considerably below the 3rd centile, she was now much nearer the 3rd centile in height and at slightly below the 50th centile for weight. It was also reported that an early X-ray had indicated significantly delayed bone age that was associated with severe malnutrition. G.'s hearing was tested and found to be satisfactory. Her overall developmental level was placed at between 3;0 and 3;6 years old at a chronological age of 7;8 years.

A psychological report also for March 1993 stated that G.'s gross motor skills were very immature and her fine motor coordination needed to be refined. G. still would not chew and preferred to eat liquidized food.

IV G.'s Socio-Emotional and Communicative Development

Eight months after she was adopted, G., aged 7 years obtained a part-time placement at a nursery. Here G. was encouraged to integrate with younger children who were aged 4 years and below. The school reported that G.'s friendships were slow to

emerge because of her delayed language. By December 1992, a range of unusual social behaviours had emerged that was thought to be related to her previous deprivation. According to her parents, G. showed some stereotyped behaviours (e.g., looking at her poised fingers with a fixated right-hand gaze) and found it difficult to express her emotions or to tell them when she was hurt. There were "irritating obsessions" involving her toys and clothes and she made perseverative requests "beyond the normal length of time a child would do."

During March 1993, G. was examined by a paediatrician who described her as a,

> "happy, alert and friendly child who is eager to explore her environment and to communicate with those around her."

In the same month, G. was also assessed by an educational psychologist, who described her as having a lively and forceful personality. She was reported to be sociable and outgoing, but was *not* indiscriminately friendly and she could recognize the difference between close family members and those who were merely friends or acquaintances of the family. G. even displayed a certain wariness of those whom she did not know. At this stage, G.'s emotional status was considered to be "remarkably normal" given her early circumstances. It was hypothesized that, although the other children in the orphanage were just as retarded and deprived as G. herself was, the minimal contact that she had with them, "may have been sufficient to provide some basic emotional protection."

In September 1994, aged 9;3, G. obtained a part-time placement at a school for children with moderate learning difficulties (MLD). G. quickly established a close relationship with the class teacher, whom described her as a happy, friendly child. It took longer for G to fully interrelate with the children. G. also continued to attend the mainstream lower school, where, at the age of 9;4, she was placed with Year 1 children.

A school report for June 1995 stated that there was growing concern regarding G.'s socio-emotional development. She still found it difficult to express her emotions and would make comments such as "Do I say sorry now?" G.'s play skills appeared to be

still in the process of maturing. She did not actively initiate or join in play with other children, rather she played alongside them. She gravitated towards peers who were of a similar developmental level to herself. G. did not appear to have any close friends, although she was liked and accepted by other children.

At the age of 10;8, G. attended the moderate learning disability school full-time and was in a class with children whose average age was 8 years. G. was described as "going through a very awkward phase," by her mother K. who was interviewed at the time (March 1996) and says:

> "She relates well to other people. She's always quite a friendly child and willing to talk to other people and very keen to admire their clothes and their shoes and their possessions *(laughs).* Buts she's also very skilled at the moment in the use of the negative and opposite. That's the sort of stage of development she's at."

G. sometimes disrupted the conversations of others, particularly those involving her adoptive mother. When this occurred, G. interrupted certain questions and answers with her own comments.

As G. matured her socio-emotional development was a source of increasing disquiet. G.'s parents often found it difficult to gain her cooperation and to get her to comply with their requests. She could be argumentative and it was not easy to reason with her. It was not clear whether these reactions were due to a limited capacity to understand instructions. It was felt that professional guidance would help.

Aged 11;11 years, G. was formally tested by a clinical psychologist who found that tasks requiring "social awareness or understanding of the implications of actions" were very difficult for G. The psychologist reports that G preferred to play with children who were at similar developmental level to herself. She had several friends outside school. Her favourite interests included playing with her 'Barbie' dolls, skipping and riding her bicycle. She preferred routinized activities and displayed "some preference for sameness". She was described as a "strong-willed" child, who found emotional expression difficult. Planned intervention strategies involved individual work with G. to encourage her to communicate her emotions effectively.

V Summary: Georgina's Rate of Progress

Similar to S., G made considerable gains in her physical and language development, within several months of first being adopted. After an initial catch-up in these two developmental areas, G.'s rate of progress continued at a slower, steadier rate for the next several years. By the age of 11;11 years, G.'s speech and language were equal to her other abilities. Standardized tests scores suggested that she had not closed the gap between her general developmental level and chronological age. G. continued to have socio-emotional problems. Although, she did not display the 'indiscriminate friendliness' of other Romanian adoptees (Chisholm et al. 1995; Chisholm, 1998), G. found it difficult to express her emotions and with adults, she had various behavioural problems. Like S., G. continued to have residual difficulties with abstract concepts such as maths, and "highly abstract or non-meaningful visual-spatial tasks."

3.5.3 Ingrid

Table 3.4 summarizes the formal tests administered to I. by health care professionals since entering the United Kingdom.

I I.'s Language Development

Recall that when I. aged 3;10 left a Romanian child institution, she had no speech and was given a very poor prognosis for language development by a paediatrician. However, after eight months in her new stimulating, foster environment, I. spoke her first words around the age of 4;6. She produced single words first, followed by two-word and three-word utterances. Her first words referred to names of familiar people such as "Mummy", "Daddy" and "Becca" and she later produced two word utterances such as "Oh dear" and "All gone". She also imitated words. I.'s adoptive mother, M., gives the following account of I.'s early language acquisition:

> "I think she was about four and a half when she said her first words. We had her in August, so, it was about eight months after she came to us. She would say, 'Beck'...and 'Han', and, 'Mumma' and 'Dadda'. She noticed all the names of people that were in her immediate circle. Yes, a fairly normal start for speech, really. Well, she understood a lot. Before she started her speech she knew what we wanted...with

> language rather than gestures. We treated her like we would have done any other toddler of a year or eighteen months. There was always somebody with her, talking to her or playing with her. I should imagine her language..was a fairly normal progression. I mean she didn't start off with sentences. No, no...she didn't just copy a sentence. She first used words."

I.'s adoptive mother, M. kept a diary of I.'s early word production during April, June and July 1992. The diary entries suggest that I's acquisition of vocabulary was rapid and that she was able to remember people's names "really well". Two months after I.'s onset of first words, the following was written:

> "Your language development is really coming on now. You have quite a big vocabulary but are not very good on pronouncing things - but we usually know what you mean. You are quite vocal and it is lovely to hear you when you got to bed at night and lie and chatter away, going through all out names; "Dada", "Nana", "Mama", "yoyo", "Be-pa", "gr- and grrpp" for "gran" and "granpa". Sometimes you go through a phase of pointing to everything."

Table 3.4 Ingrid - Standardized/psychometric tests administered since entering adoptive home.

Test Given	**Age When Given**	**Date When Given**	**Results** Test age equivalent scores, percentile ranks or IQ scores
The Bury Infant Check	6;8	June 1994	"identified delay in language, number skills and visual discrimination."
McCarthy Scale of Children's Abilities.	7;1	November, 1995	Performance subtests = 4 – 7 yrs
British Picture Vocabulary Scale	7;1 9;4 10;3	November, 1995 February, 1997 February, 1998	No score was given. 6;11 yrs (percentile rank = 8) 8;2 yrs (percentile rank = 14)
Aston Index Vocabulary Scale *(tests ability to define words)*	10;3	February, 1998	7;6 yrs
MacMillan Individual Reading Analysis (Form Z)	9;4 10;3	February, 1997 February, 1998	Accuracy Range = 5;5 yrs Comprehension Range = 5;5 yrs Accuracy Range = 7;7 yrs Comprehension Range = 7;1 yrs
Youngs Parallel Spelling	9;4 10;3	February, 1997 February, 1998	6;7 yrs 6;10 yrs

	10;11	September, 1998	7;6 yrs
Quest Diagnostic Reading Test *(tests auditory sequential memory)*	7;3 9;4 10;3 10;11	February, 1995 February, 1997 February, 1998 September, 1998	Numeral scores on this measure never given, but comments suggest that I.'s auditory sequential memory remained persistently weak over a 3.6 year period.
Wechsler Objective Reading Dimensions Assessment	7;1 11;0	November, 1995 October, 1998	7;6 yrs. (2nd centile)

At the age of 4;8, I communicated using a combination of manual gestures, such as pointing and words that referred to everyday objects (e.g. "ba-th" for "bath", "sha-her" for "shower" and "wa-sh" for "wash") "usually with the end syllable pronounced." Occasionally pronounciation involved final consonant or consonant cluster deletion and, for example, I. would say, "ba" for bath, "ta" for "tap" and "so" for "soap. I. also knew "door", "window", "chair", "floor", "duck", "water", and "hole."

Two years later at the age of 6;6 years (June, 1994), I. started to attend a mainstream primary school in the United Kingdom. Aged 6;8, I. was assessed using the Bury Infant Check, which indicated a "delay" in language. I. also exhibited some unusual speech patterns which included constant, repetitive questioning (according to a head teacher's report). I. had a talent for imitating her friends and could mimic regional accents precisely including "the same little phrases and lisps." On one occasion, I. even returned home talking in a broad Yorkshire accent after playing with one of her school friends!

Aged 7;1, I. was administered the British Picture Vocabulary Scale by an educational psychologist. No score was given, but the comment was made that,

> "I. enjoyed this task and did well at it, showing understanding of quite complex concepts e.g., "disagreement", "accident."

The psychologist predicted that I. would continue to have residual difficulties with reading and spelling. I. was first seen by a speech and language therapist in January 1995 and was assessed annually only until 1997. No reports or written details of the

speech therapist's evaluations were available. According to M. the clinical opinion in 1997, was that, at the age of 9 years, I. had an understanding and use of language that was equivalent to a 7;6 year old. Commenting on this, M. said:

> "It was..certainly encouraging for me to say, "Oh that's really good." because I. didn't start to talk until she was four and a half. If she was already up to the average seven and a half year old, that meant within four and a half years, she gained seven and a half years of speech which was…pretty good.

On 17th February 1997, when I. was aged 9;4 years she was informally tested by her school. Her receptive vocabulary as measured by the BPVS was equivalent to a child aged 6;11 with a percentile rank of 8. The unofficial assessment report states:

> "Progress in understanding of spoken language is roughly in line with chronological age, but is still an area which needs development."

Her accuracy range on a reading measure was at the 4;8 to 6;2. year level, while her performance on a spelling measure approximated that of a child aged 6;7. I. was able to spell consonant-vowel-consonant words, although she occasionally included the wrong middle vowel. She could spell some high frequency words. Another assessment indicated that there were limitations on auditory short-term memory and her ability to memorise sequential information in the right order. Thus:

> "Ingrid still has difficulty with auditory sequential memory. She was only able to remember two words in order. There is a little improvement on last year's score."

With regard to I.'s phonological skills, she could blend sounds together in c-v-c words, knew most initial consonant clusters (or blends) such as "sh", "ch" and "th" and could read some simple words with these.

Between 1994 and 1998, some aspects of I.'s language development demonstrably improved each year, according to standardized tests. In particular, between February 1997 and February 1998 (between the ages of 9;4 and 10;3) I.'s verbal receptive language increased by 15 months, reading accuracy increased by 26 months and reading comprehension increased by 20 months. However, auditory sequential memory remained "very weak" and her ability to define the meaning of words (Aston

Index Vocabulary Scale) was 2;9 years behind her chronological age of 10;3. During some reading exercises, she demonstrated some confusion with initial consonant clusters such as "gl" and "cl". Spelling activities showed that I. confused "ch" and "sh" and had difficulty with final consonant clusters such as "ck" and "sk". The school test report for February 1998 states:

> "Ingrid has made good progress this year. However, there is still a mis-match between attainment and chronological age so she continues to need close monitoring of progress."

During the summer of 1998, M reported that I. had subtle word finding difficulties e.g., "tooth club" for "youth club" and that she occasionally made word order errors, e.g., "cloth-table" for "table-cloth."

I.'s parents, were particularly worried that she might have an Auditory Processing Disorder, which according to international adoption agencies such as the PNPIC[8], is characteristic of children who were globally under stimulated in early life. I.'s mother pointed out that a standardized measure (i.e. Quest Diagnostic Reading Test) indicated a continuing "auditory sequential problem" and that I. found verbal instructions difficult to process due to the demands these placed on sequential memory. I. could only assimilate small amounts of information. Other difficulties that concerned M. were I.'s under-developed verbal receptive language, reading, and writing skills that were between 2;2 and 3;6 years behind her chronological age.

At the age of 11 years, I. was assessed by an educational psychologist on 23rd October 1998. It was confirmed that I. still showed a general language delay relative to her chronological age; her reading skills were at the 7;6 year level or 2nd centile as measured by the Wechsler Objective Reading Dimensions Assessment. Her spelling and writing skills were at a similar level to her reading skill. On a verbal reasoning task (pointing out why two items are similar), her scores were at a low average level for her age. It was also noted that I.:

[8] The Parent Network for the Post-Institutionalised Child.

> "can find it difficult to process verbal instructions. These need to be broken down into simple instructions, given one at a time. Any verbal information needs to be presented in small chunks to enable Ingrid to process this."

II I.'s Non-Verbal Cognitive Development

After 2;8 years with her adoptive family, I. aged 6;6 was found to have a "delay" in number skills and visual discrimination. In addition, I. had difficulties with concentration and the ability to work without constant adult supervision.

In November 1995, I. aged 7;1, was briefly assessed by an educational psychologist. At this stage, I. was in a class a year behind her chronological age. The psychologist reported that I was highly distractible, but was curious to experiment with test toys and books. Her attention occasionally had to be redirected. I.'s nonverbal abilities were assessed using the McCarthy Scale of Children's Abilities. I performances on the various sub-tests indicated that she was "at a level between the typical 4 – 7 levels." The conclusion of the report was:

> "All these assessments broadly concur with the picture of a child making rapid progress from a very delayed starting point, progress that is normal in sequence and form. She is at present functioning much like a very ordinary child of between 5 and 6."

It was predicted, however, that I. would continue to have residual difficulties with mathematics.

On 17th February 1997, a school assessment of I,'s mathematical ability showed that, while her skill in this area was not age appropriate, she had made noticeable progress over a year. An educational reports states that I.'s general developmental (including non-verbal cognitive) level, when compared with her chronological age of 9;4, was retarded by at least three years.

Over the next year, I.'s general mathematical level continued to be underdeveloped for her chronological age. A school report for February 1998 states:

> "Ingrid has made good progress this year. However, there is still a mis-match between attainment and chronological age so she continues to need..close monitoring of progress."

By June 1998, I.'s parents were becoming increasingly concerned about I.'s under-developed numeracy skills, which according to a later report (dated 20th October, 1998) were between 2;2 and 3;6 years behind her chronological age.

In October 1998, I., aged 11 years was assessed by an educational psychologist who confirmed that I. still showed a general developmental delay relative to her chronological age. Despite this, I. had made progress in acquiring mathematical concepts. I. was still distractible and found it difficult to concentrate within a classroom setting. The psychologist commented that,

> "The combination of her distractibility and her underdeveloped educational attainment limit her ability to function as an independent learner."

Importantly, the report concluded that I.'s history of extreme deprivation was largely responsible for her learning difficulties:

> "Ingrid is an 11 year old who had a very delayed start in life due to living in a Romanian orphanage. A number of current areas of difficulty are likely to be explained in large part by the particular deprivations she experienced. She has made steady progress in acquiring basic literacy and numeracy skills. These are now around a 7-7.6 year level, still significantly below her age level."

III I.'s Physical and Motor Development

When I. entered her adoptive home at the age of 3;10. years, her physical development was globally retarded. However, within several months, I. made rapid progress with walking and self-help skills (according to a psychological report, 16.02.98). I. learnt to eat and chew after repeated attempts by M. to encourage I. to take solid foods. By the time she was 7;1 years, I. had shown considerable advancement in her gross motor ability, so much so, that an educational psychologist commented:

> "I understand that in..gross skills like swimming, gymnastics, she is well up to age-level."

In October 1994, I. received an audiogram indicating that her hearing was satisfactory. She had no history of ear problems and continued to hear well. I. attended the optician regularly and was prescribed glasses.

By the age of 10;5 years, there were aspects of I.'s fine motor and visual perceptual development that worried her parents. According to an occupational therapist's report for March 1998, I.'s low muscle tone (hypotonia) meant she found it difficult to control a pen or pencil for long periods - a situation for which there was no cure. She also was unable to perceive diagonal lines both on an abstract or concrete level and continued to have difficulty with hand dominance.

However, it was I.'s participation in numerous sporting activities that improved her coordination and gross motor skills. Sport was, in fact, I.'s favourite subject at school. By the summer of 1998, I. was the only female member of her local football team. She represented her school in swimming trials. She was also skilled at playing rounders, cricket and bowling. I.'s mother M., who was interviewed in July 1998, commented:

> "The football has impacted on her skills because now, she's quite good at heading and catching and she plays rounders and she's just started at cricket in the summer term and she's really good at bowling apparently. So, those things..are coming on in leaps and bounds."

In terms, of growth rate, a medical report for 20th October 1998, when I. was aged 11;0 years, stated that,

> "Her general health is good. She is growing well and her height is now average for her age."

It was also reported that I. was approaching puberty. I.'s gross motor skill was well developed and she continued to be enthusiastic about any type of sporting or physical activity. This is substantiated by an educational psychologist's report, dated 23rd October 1998, which states:

> "Ingrid greatly enjoys a range of physical activities and is physically agile. She told me she particularly likes football, PE, gym, basketball and netball. She is independent in all self-help skills. Her fine motor skills have developed though she told me she still has trouble writing in a straight line, unless she has lines to write on."

By, November 1998, I.'s fine motor skills (concerning hand dominance) and perceptual ability (concerning diagonal lines) had noticeably improved. In a paediatric occupational therapist's report (dated, 5th November, 1998), it was concluded that,

> "Over the past year, Ingrid has made progress in all these areas and it is felt that this development will continue of its own accord with experience."

It was decided that after October, I. would no longer require occupational therapy because of the progress she had made.

IV I.'s Socio-Emotional and Communicative Development

At the age of 3;10, a paediatrician predicted that, as I. had not bonded with a primary caretaker early in life, this would negatively impact on her subsequent socio-emotional development. Presumably, it was meant by this, that, I. would find it very difficult to form social relationships with others, particularly children.

The first opportunity that I. had to mix with her peers was when she was placed in a Romanian day nursery or "gradanitza." at the age of 5 years- 14 months after she was adopted. Here, I. interacted with children, whose average age was 5 years (range: 3 to 7 years). She learned important play skills and everyday rituals such as washing hands and hanging up towels. I. enjoyed play activities with other children and joining in with their games. By the age of 6 years, it was found that I. related better to children younger than herself, and thus, attended a class with a younger age group, two years behind her chronological age.

At the age of 6;6 years, I. started to attend a mainstream primary school in the United Kingdom. I. mixed with children who were a year younger than herself. A teacher reported that I. was "prone to mimic her peers' more undesirable actions." I.'s progress was monitored at regular intervals by the learning support teacher.

When I. was aged 7;1 an educational psychologist, reported that she interacted well with her peers and, "is accepted as a full and ordinary member of the class." She was described as a "delightful child, eager to relate to others and to learn", which was "a very good foundation for future progress." During her interview with the psychologist, I. constantly asked questions, made comments or laughed and shared jokes. The psychologist noted that I.'s social behaviour was normal but consistent with a chronologically younger child aged five or six.

Over three years later, I., aged 10;6 was described by her child minder, who wrote:

> "Watching Ingrid play with the other children, it is very noticeable that she feels more comfortable playing with children younger than herself, mainly between the ages of six and eight. I've also noticed that Ingrid is easily led into situations that she knows are wrong…socially she is below average for her ten and a half years."

By June 1998, I.'s parents were becoming increasingly worried about her social behaviour, particularly her lack of discrimination between familiar and unfamiliar adults. I. appeared unable to differentiate between those that she should touch, hug and trust implicitly and those that she should not. In a parental report dated, 20th October 1998, which required a description of I.'s social skills, I.'s parents stated:

> "Social skills development remains a major concern for us, particularly as she approaches her transfer to secondary education. The concern centres around problems such as indiscriminate friendliness and delay in the development of age appropriate behaviour...This represents our main concerns for Ingrid. Appropriate social skill building has been a problem for the past four years or so. She is very impressionable and gullible and goes with anyone who may request her to do so. She has made some progress with her touching of other people and playing with their clothing, however, this does remain, and as she approaches puberty is a major concern."

A later report by a clinical medical officer, dated 20th October 1998 stated that I.,

> "prefers the company of younger children but is being encouraged to make older friendships. She has not yet progressed from the close contact behaviour of younger children, e.g. playing with jewellery which adults are wearing. Now that she is approaching puberty it is important that she learns the socially acceptable boundaries."

On 23rd October 1998, I. aged 11 years, was again assessed by an educational psychologist. It was reported that I. tended to depend on other children for help with

organizing herself and her belongings. However, I. remained unperturbed by these setbacks and retained a positive self-image. She appeared to be aware of her strengths and weaknesses. Her main interest was various types of sports, particularly football. She also attended a youth club and was a member of the school choir. I. was most confident when interacting with a younger peer group. She had several long-standing friends and often played football with boys in her garden. The educational psychologist's report again voiced concerns about I.'s indiscriminately friendly behaviour with unfamiliar adults outside the home and school environment. Although, within school she was now able to differentiate between appropriate and inappropriate social behaviour with adults, there were worries that I. was, "most likely to behave in an over-familiar manner with acquaintances." I.'s first and final formal assessment report by an educational psychologist concluded by identifying strategies to meet I.'s special educational needs.

V Summary: Ingrid's Rate of Progress

Within several months if not weeks of her adoption, I.'s physical and language abilities had radically improved. Afterwards, I.'s rate of progress in these two developmental areas, continued at a slower, steadier rate for the next several years. I. continued to have residual problems with muscle laxity referred to as hypotonia and visual perception. The former fine motor difficulty was considered to be permanent and irreversible. By the age of 11 years, there was still a mis-match between attainment and chronological age. I.'s socio-emotional development was considered to be seriously affected by her early neglect. She showed persistent indiscriminately friendly behaviour considered to be typical trait of children adopted from Romanian orphanages (Chisholm et al. 1995; Chisholm, 1998). Like both S., and G., I. continued to find abstract subjects such as maths difficult to understand.

3.6 Improvement After Adoption: Common Characteristics Concerning Progress

According to the parent interviews and developmental reports, S., G. and I. each made rapid progress, soon after entering their adoptive homes. There are now two questions

that might be asked: Firstly, are there any key similarities in the way that particular areas of development progressed? Secondly, were aspects of S., G. and I.'s developmental progression similar to that of normally developing children *without* histories of extreme neglect? The sections following, attempt to answer these questions.

3.6.1 Language Development

When S., G. and I. each entered their adoptive environments they either had no productive language or a repertoire of less than twenty words. In each case, however, within a few weeks or months, their expressive lexicons had rapidly increased. Each child's early word use involved names of objects or familiar people and was accompanied by non-verbal behaviours such as pointing and shared eye-gaze. S., G. and I.'s rapid acquisition of vocabulary between the age range 4;6 (the age of I.'s early word onset) to 7;8 (the age of S.'s early word onset), is characteristic of the early word explosion of normally developing children up to the age of 24 months (Locke, 1997). Also G. and I.'s acquisition of new words appeared to parallel the "nominalizing" tendency of typically developing children, in that they first learned mainly nouns (Curtiss, 1977, p.89). S., G. and I. produced single words first, followed by two-three word utterances (e.g. "banana for school"), which is according to Crystal (1997) similar to the language development of younger children.

Within two years post adoption, each child was speaking in full sentences of up five or six words. Within the same time scale, S., G. and I. were also using tenses to some degree. Characteristic of S. and G.'s early grammatical development was the frequent omission of morphological forms such as auxiliaries, determiners and past tense inflections. Inconsistent usage of obligatory morphological constructions is typical of the language production of younger children up to the age of 5 years (Brown, 1973; Peters, 1995), but particularly between the ages of 2 and 3 years (Locke, 1997). In the cases of S. and G., variability in the use of particular bound and free morphemes continued for at least four years post adoption until the age of 10 years and beyond. Alongside this, S. and G. also overregularized irregular past tense forms such as "catched" which is extremely typical of the overregularization errors of preschool

children between the ages of 2 and 3 years (Pinker, 1999; Locke, 1997). Auditory short-term memory problems persisted over time.

3.6.2 Non-Verbal Cognitive Development

When S., G. and I. entered their respective adoptive homes, their developmental trajectories were globally retarded. This included non-language cognition. However, within the first several years of their adoption, S., G. and I. made significant academic progress at school. S., G. and I. were each assessed by educational psychologists within four years of being in the United Kingdom. In S. and I.'s cases, the performances scales of standardized were used. According to these official reports, each child displayed considerable learning potential and was making rapid progress from a very 'delayed' start. 'Intellectual' development was following typical lines, consistent with that of younger children, and for example, S. at the age of 8;9, was described as having the trial and error problem solving strategies of a younger child aged 5 years. In each girl's case, the psychologists suggested that 'delayed' intellectual functioning appeared to be "largely environmentally created" rather than being entirely due to innate learning disabilities.

Some non-verbal cognitive difficulties persisted, whereas others apparently did not. Initially, S. and G. had difficulty with symbolic representation (i.e. recognizing objects that were represented by drawings) and with tasks that required some depth of imagination and hypothetical reasoning. However, there was no reference to these anomalies in later developmental reports. Early worries concerned S., G. and I.'s ability to concentrate for long periods and to work independently. They had short attention spans and were highly distractible. S. and G. made noticeable improvements in this area, whereas I.'s progress was subtler.

S., G. and I. were similar in that they were much better at understanding concrete factual information as opposed to abstract concepts. According to official reports each child found subjects requiring some level of abstract thinking particularly difficult to grasp. This included topics such as geography, sciences and especially maths. In the latter case, S., G. and I. struggled with any activities involving numbers or numerical values. Both S. and G. were reported to have weak visio-spatial skills and for

example, they found it difficult to piece together jigsaw puzzles or to understand "non-meaningful visio-spatial tasks." The problems concerning abstract reasoning and visio-spatial tasks persisted over several years. S. and G. continued to display gaps in their general knowledge. Health care professionals reported that, several years post adoption, S., G. and I.'s non-language cognition was commensurate with their language.

3.6.3 Physical and Motor Development

S., G. and I.'s developmental histories suggest that, it is in the physical domain, that the effects of severe global deprivation are likely to be permanent. Each child entered her respective adoptive home with the negative impact of under nutrition and lack of gross and fine motor stimulation already present. Frequently, S. and I could not walk unaided. G. could not walk at all. Neither G. nor I. could chew solid foods. All three girls were extremely underweight and of short stature (at or under the 3rd centile). However, within several months of adoption, each child's weight and height were increasing rapidly. S. and I. even showed growth spurts, for example, S. grew 1.5 inches and gained 14lbs in weight, within 2 ½ months of her arrival to the United Kingdom (according to her adoptive mother). After six months, each child had learned to walk properly and in G. and I.'s cases, could now chew. Physical catch-up paralleled the gains in cognitive development and continued for at least two years post adoption. After this time, the rate of physical progress appeared to flatten out and continue at a slower, steadier rate.

Despite the improvements that S., G. and I. made, their prior deprivation appeared to have long-term negative effects on their physical development. At the age of 7;8 years, G. was found to have a considerably delayed bone age, which was associated with severe malnutrition. This was also the case for S. as she continued to be of a short stature (although this is unconfirmed by medical reports). By the age of 10;5 years, I. was found to have visual perceptual and fine motor difficulties. She could not perceive diagonal lines, hand dominance was still not established and she could not hold a pen for long periods due to muscle laxity (hypotonia). I's inhibited fine motor skill was considered to be irreversible by an occupational therapist. It is interesting to note that, although, S., G. and I. experienced early malnutrition and

physical deprivation, (to the researcher's knowledge) they each had a typical onset of puberty which started between 10 and 12 years of age.

3.6.4 Socio-Emotional and Communicative Development

According to developmental reports, both G. and I. were confined to cots for the first two or three years of life. S. was apparently kept in one room. In these unresponsive contexts, access to social experiences such as exploratory play was restricted and S., G. and I. had little opportunity to learn relevant social skills or how to relate to other children. But, although, S., G. and I. each experienced socio-emotional neglect during early childhood, this did not diminish the curiosity in their surroundings. Despite, G. and I.'s extremely limited social and communicative skills upon adoption, they were responsive when given attention (although they did not demand this). G., for example, would share eye-gaze with those who were attentive to her and smile at them. Also, when I. was given individual attention, she smiled and established eye contact, during shared routines such as 'peek-a-boo' games. S. similar to G., communicated with others using eye-gaze, grunts and pointing gestures during the first few weeks of her adoption. These affective responses are similar to those displayed by infants and toddlers within the first two years of life (Locke, 1997). That S., G. and I. showed interest in others, demonstrates that, for some children, early socio-emotional deprivation does not damage the ability to be socially responsive at a basic level. Such children can use non-verbal gestures to communicate with or respond to others, even when speech is lacking. These behaviours may even be prognostic of successful language and social development in the future, as S., G. and I.'s cases, in fact suggest.

When adopted, S., G. and I. were similar in that, they were fundamentally socially responsive, but had little or no idea of how to play or interact with others, particularly children on an everyday level. They also showed some stereotyped behaviours that were thought to originate from their orphanage experiences. This situation was slowly to change. Through repeated exposure to shared routines in the family environment and to younger peers in the nursery context, S., G. and I. eventually learned some appropriate patterns of social behaviour in dyadic, group and play situations.

G. and I.'s cases suggest that socio-emotional deprivation leads to some residual behavioural problems. For example, I. continued to show indiscriminately friendly behaviour – an apparently typical trait of previously institutionalised children (Chisholm et al, 1995, Chisholm, 1998) – and G. displayed persistent difficulty with expressing her emotions. However, S., G. and I.'s cases also suggest that some facets of social ability can actually improve with time. This is particularly evident in the case of S. who changed from being withdrawn or aggressive in social contexts to being a popular member of her school. Ultimately, each of the girls was able to develop positive social relationships (to some extent) with others, including adult family members and other children. S., in particular, formed a selective attachment to her younger brother, and G. and I. were always eager for their younger friends' company. This suggests that younger companions (i.e. peers and siblings) facilitated S., G. and I.'s social recovery from neglectful early childhoods. This is congruent with Bolger, Patterson and Kupersmidt (1998)'s observation that friendships can have an ameliorating effect on the ability of some neglected children to overcome their early deprived back-grounds.

S., G. and I.'s cases suggest that interaction patterns can be learned with the help of younger social role models, even if there is early parental deprivation. This might explain why, by the start of the present study S., G. and I. had developed a range of appropriate social and communicative behaviours, for example, they could have conversations and could use language to achieve a variety of functions. It is Chapter 4, which reveals these interaction patterns in more detail.

3.7 Conclusion: The Effects of Extreme Deprivation on General Development According To Parents' Personal Accounts and Developmental Reports

The evidence from primary (parent interviews) and secondary (developmental reports) sources of information suggests that the effects of deprivation on language, non-language cognition, physical growth and social-emotional behaviour are mixed. Language, it would seem, is relatively resilient against the effects of deprivation as long as there is a positive change in the environment. In this context, language

development rapidly unfolds in a way similar to that of younger children without histories of extreme neglect. This accelerated development of language after severe deprivation is in keeping with other cases such as Isabelle, (Mason, 1942) the Koluchova twins (Koluchova, 1972, 1976, 1979) and Louise (Skuse, 1984a). The effects of severe deprivation on socio-emotional development are varied. It is possible to develop some appropriate patterns of social interaction as all of the cases suggest (see Chapter 4, next). S., G. and I. each were able to form positive social relationships with others. However, persistent behavioural problems such as 'indiscriminate friendliness' (Chisholm, 1998) and difficulty with expressing emotions may be two of the negative impacts of early socio-emotional neglect.

The impact of early extreme neglect on physical development is, again, mixed. It is possible to make rapid gains in height, weight and even gross motor skills like walking and chewing, once there is a positive environmental change. However, some of the damaging effects of global deprivation on physical growth and fine motor capacity may be permanent, although (interestingly) the typical onset of puberty does not appear to be compromised. The long-term outcome of early deprivation on non-language cognitive development appears to be, persistent difficulties with abstract reasoning and visuo-spatial ability. The development of non-verbal cognition accelerates like the development of language and physical capacity once an impoverished environment becomes a stimulating one. Non-verbal cognition seems to develop in parallel to language since after several years, the level of each ability is commensurate.

Next Chapter - Chapter 4, uses Conversation Analysis to investigate the effects of social deprivation on social and communicative behaviour as reflected in conversation.

Chapter 4 Social and Communicative Behaviour

The following chapter will attempt to address the question below:

1. What are the effects of extreme global isolation during infancy and the early childhood years on social and communicative behaviour?

The following chapter describes S., G. and I.'s social and communicative behaviour as reflected in conversation. One of the aims is to address the gap that exists in the literature concerning the conversational behaviour of previously institutionalised children. Little attention appears to have been paid to the social development of extremely deprived children as reflected in conversation. S., G. and I.'s spontaneous social and communicative behaviour was observed during a two-year period. Features of conversation often targeted in Conversation Analysis (CA) were explored. It was found that in a variety of contexts, S., G. and I. gave the impression of being "good conversationalists", that is they showed adult-like patterns of conversation and used a range of appropriate social devices and non-verbal behaviours of interest to Conversation Analysts.

In summary, S., G. and I. showed well-developed turn-taking skills (since they did not interrupt unduly), asked and answered questions (Wh-type, AUX-inverted, intonated and tag), and could continue and maintain a topic. They could repair conversational breakdowns through a number of strategies including requests for clarification. Non-verbal behaviours included the use of eye contact, manual gestures and facial expression to accentuate speech. Some individual differences were evident, in the choice of strategy used to relate to particular conversational partners. For example, in certain contexts, S.'s strategy for continuing a conversation was to ask questions concerning the interlocutor's life experience, whereas G.'s was to ask questions concerning her own life experience. The capacity of S., G. and I. to adapt to and overcome, to some extent, their early social isolation suggests considerable plasticity as regards the successful development of social behaviour (in the face of early adversity). This is in contrast to other children with histories of extreme neglect such as Genie (Curtiss, 1977).

4.1 Introduction

The more recent literature pertaining to the social development of institutionalised children makes no specific reference to the emergence of conversational skills. Although various facets of social, communicative and/or pragmatic[1] behaviour are mentioned, a detailed description of such behaviours is rarely attempted. To the present researcher's knowledge there exist no articles that provide detailed qualitative descriptions of Romanian adoptees' spontaneous conversational behaviour in naturalistic contexts. Most of the studies examining the behaviour of children adopted from Romanian orphanages assess social development quantatively. This might involve the use of questionnaires, checklists, parent report forms, or contrived (or semi-contrived) play settings rather than in-depth (longitudinal) observation of naturalistic behaviours using single case studies or small groups of children. For example, in a questionnaire study by Thompson (2001), it was established that,

> "Institutionalised Romanian orphans scored more poorly on measures of social skills and had higher numbers of problems with social interactions. Social problems were correlated with the length of time spent in orphanage, the age and income of the parents, and I.Q. Difficulty with social skills and social problems were related to attachment and to extreme indiscriminately friendly behaviour" (abstract).

The children in Thompson's study were not observed longitudinally, nor were their social interactions described in much detail. In another investigation, Kreppner et al. (1999) studied the "pretend and social role play" of 104 Romanian children adopted before the age of two years, using a short "semi-structured play session." It was found that these adoptees had lower frequencies of "pretend play, role play and referencing mental states (abstract)" than a control group of fifty children adopted in the United Kingdom before the age of 6 months. In a related quantitive study, Rutter et al. (1999) found that a sizeable minority of Romanian adoptees exhibit atypical social behaviours consistent with autism. In a later paper, Rutter, Kreppner and O'Connor, (2001) conclude that, "quasi-autistic patterns constitute institutional privation

[1] It should be noted that, at present the study of pragmatics or language in use is a distinctly incoherent area of research. There is no uniform agreement as to how this linguistic field should be defined or studied. As Crystal (1997) points out, "Pragmatics is not at present a coherent field of study. A large number of factors govern the choice of language in social interaction, and it is not yet clear what they all are, how they are best interrelated, and how best to distinguish them from other recognized areas of linguistic enquiry." (p. 120)

patterns." Another general theme in the literature is that children adopted from institutions are at risk of "social deficits" (Chugani, et al, 2001) or delays in socio-emotional development (Johnson, 2000). Thus the recent literature paints a more or less bleak picture as regards successful social development after extreme early privation.

An early, detailed case study of a severely deprived child that is of relevance to the present chapter is that of Genie, who was socially isolated until the age of 13 years (Curtiss, 1977). Genie's social and communicative behaviour after discovery is described in detail and when referring to the development of conversational skill, Curtiss concludes the following:

> "in total, Genie performs few normal or appropriate acts and, in large measure, appears to be *conversationally incompetent*. Verbal interaction with Genie consists mainly of someone's asking Genie a question repeatedly until Genie answers, or of Genie's making a comment and someone else's responding to it in some way" (p.233).

Thus, Genie displayed few of the appropriate acts seen in everyday conversation (Curtiss, 1977). Curtiss commented that prior social and psychological deprivation might account for this:

> "It is not surprising, I think, that Genie displays incompetence in this area. Her failure to perform many of the behaviours requisite for successful conversational interaction is most probably a result of her social and psychological deprivation. Genie grew up in an environment devoid of verbal interaction. Never or practically never having witnessed the performance of these sociolinguistic behaviours, she did not develop them" (p.233).

Curtiss further states that "individuals with developmental social and psychological disturbance" might be expected to "display general and pervasive impairment in the social and communicative functions of language." (p.233). Therefore, consistent with the more recent quantitative research, Curtiss' earlier qualitative case study suggests that severe early privation has an adverse impact on the typical development of social and conversational behaviour.

Like Genie and the children in Rutter, Kreppner and O'Connor's (2001) study, S., G. and I. experienced extremely impoverished social environments for the first several

years of their lives and, therefore, missed out on the normal exposure to the early patterns of socio-emotional interaction between child and primary carer. These are considered to be a prerequisite for the successful development of social (and conversational) skills in late childhood and adulthood (Bowlby, 1951, 1969; Locke, 1995). When S., G. and I. entered their adoptive homes (at the respective ages of 7;5, 6;3 and 3;10.), they did not talk. Each child's productive speech was limited to a small repertoire of fewer than ten single words (which, in G. and I.'s cases, is substantiated by early video evidence). However, within a few years of living in their new environments, S., G. and I. had developed - at atypically late ages - adult-like competence in many areas of conversation. For example, S. learned appropriate repair and question strategies - some quite sophisticated - within 5 years of having been adopted. Furthermore, S., G. and I. did not have rigid conversational styles, since they were able to adapt their behaviour to suit changes of context or conversational partner. S., G. and I.'s social development as reflected in conversation did not appear to be noticeably negatively impacted by early socio-emotional isolation/deprivation. In order to illustrate this point, the following chapter presents examples of S., G. and I.'s conversational behaviour during the study.

Chapter 4 focuses on the girls' use of specific conversational devices such as requests for clarification – often targeted in Conversation Analysis - and particular syntactically defined structures, such as aux-inverted versus WH-type, questions. Methodologically, aspects of conversation are looked at in a more eclectic way than is found in mainstream CA, which looks at sequential patterns in minute detail. However, as this chapter presents social and communicative behaviours that Conversation Analysts would find worthy of note, a brief outline of the mainstream CA approach is presented for the interested reader.

4.2 Conversation Analysis

According to Psathas (1997), the basic premise of Conversation Analysis (CA) is that,

> "social actions are meaningful for those who produce them and that they have natural organization that can be discovered and analysed by close examination. Its interest is in finding the machinery, the rules, the structures that produce and constitute that orderliness. It requires the avoidance of preformulated theoretical or

> conceptual categories and the adoption of an open-mindedness and willingness to be led by the phenomena of study" (p.2).

The practice of CA involves recording, transcribing and analysing, in minute detail, incidences of spontaneous conversation. Its approach is largely based on the work of sociologists such as Sacks, Schegloff and Jefferson (1974, 1978) and grew from the developments of phenomenology, ethnomethodology and common language philosophy (Psathas, 1997).

CA involves the descriptive analysis of naturally occurring conversational phenomena without relying on abstract, often arbitrary, decontextualized concepts and theoretical formulations. It is, therefore, a useful framework to adopt in qualitative research, because it is non-reductionist in theory, and flexible in practice: It does not attempt to fit observed behaviour into a finite set of preconceived categories. The focus of interest is not just the syntactic, morphological and phonological aspects of spoken language, but the:

> "communicative acts in discourse that are not part of conventional languages –eye gaze, gestures, nods, smiles and manifest actions (Clark, 1996., p.57)."

Thus, all the ways and strategies that conversationalists use in order to communicate (e.g., vocal gestures, non-verbal behaviour such as eye gaze, facial expression and hand movements) are of concern. This allows for an unbiased examination of exactly how children, for example, interact with the people in their environment. CA can shed light on the interactional strategies unique to a particular child such as patterns of turn taking, repair and social routines.

As regards the details of conversational organization, the most widely discussed features in the literature are "the turn-taking system" and "adjacency pairs" (Taylor and Cameron, 1987).[2] These aspects of S., G. and I.'s conversational behaviour, amongst others, will be described in the following chapter. However, analyses of S., G. and I.'s conversational behaviour have been grouped under the following headings: topic initiation and maintenance (production and comprehension of questions,

[2] A detailed discussion of the methodology used in Conversation Analysis can be found in Psathas, (1995), Taylor and Cameron (1987) and Clark (1996) and so will not be described further here.

statements), repair and clarification, social routines (politeness markers, greeting and parting adjacency pairs) and adaptability.

4.3 Method

Rather than paying minute attention to small pieces of dialogue, this Chapter describes and examines broad areas of conversational behaviour often targeted in Conversation Analysis. Throughout the Chapter, the examples of conversational behaviour that are featured were transcribed either directly from videotape or audiotape. All transcriptions were done by the researcher. Audiotapes were transcribed using an automatic transcriber or a high quality Sony cassette recorder and headphones. In the latter case, utterances were first written down (in pen or pencil) and were then typed and saved on computer disc. Videotapes were transcribed using video recorders located in the Phillippa Cottam Clinic, Department of Human Communication Sciences, University of Sheffield. Verbal and nonverbal behaviours were first written down (in pen or pencil) and subsequently typed and saved on floppy discs. The conventions that were used when transcribing conversation can be found in Appendix B.

The aspects of S., G. and I.'s conversational behaviour featured in this chapter (such as topic initiation and maintenance, and repair and clarification) were presented because they have been of interest to many Conversation Analysts (e.g. Sacks, Schegloff and Jefferson, 1974, 1978; Taylor and Cameron, 1987; Clark, 1996; Psathas, 1997; Whitworth, Perkins, and Lesser, 1997) and also linguists (e.g. Curtiss, 1977; Crystal, 1987). Examples of these conversational behaviours frequently occurred in the 45 hours of (verbal and nonverbal) data collected for S., G. and I. The extracts throughout Chapter 4 were chosen for presentation either at random (from a collection of similar examples) or because they were thought to be of specific interest to the reader. For example some scenes were selected because of their humorous content (e.g. S. and G., 16.10.99, under *II Question Style: Similarities and Differences*). Generally, however, scenes were selected for presentation because they were considered to most clearly exemplify the social and communicative behaviours of interest to many Conversation Analysts and/or linguists. The extracts are representative of the Romanian adoptees' language overall.

4.4 Social and Communicative Behaviour

The following section presents examples of S., G. and I.'s social and communicative behaviour from selected visits during a two-year period. Where appropriate, S., G. and I.'s conversational behaviours are compared to those of Genie (Curtiss, 1977), since this case study is unusual for the detail that it gives.

4.4.1 Turn-Taking: Topic Initiation and Maintenance

I Questions (Production)

One of S.,G. and I.'s most common strategies for initiating a conversation and keeping it going was to ask questions. They employed a range of syntactically marked question types including aux-inverted, WH-type, tag and intonated forms. WH-type question structures were often utilized as a conversational device for selecting the next speaker or requesting clarification of the conversational partner's previous turn. S., G. and I. could also maintain a topic through the use of questions relevant to the conversational partner's previous turn. S., G. and I. used questions to initiate their own topics or to maintain one introduced by the interlocutor. In contrast, Genie's attempts at conversation were noticeable for the absence of syntactically marked questions (either WH-type or subject-auxiliary inversion) according to Curtiss, (1977), who states:

> "Genie has never asked a syntactically marked question. Her attempts to construct questions (in attempts to teach her to do so) have led to the most ill-formed, least English-like structures she has produced (e.g. *Where is may I have a penny?; Where is tomorrow Mrs. L?; I where is graham cracker on top shelf?*). She can decode the linguistic structure of questions and appears to know the constituent structure of WH-question word she hears…but is unable to produce spontaneous interrogatives" (p.191).

The following examples illustrate S., G. and I's ability to use questions to initiate and maintain conversation or to join in with others' discussions.

S: (16.10.99, aged 12;7)

Scene: S., G. and L. have been talking in the sitting room. There is a brief lapse in the conversation. S. initiates a new topic.

T1	S:	Have you got a g-boyfriend?
	L:	*{nods}*
T2	S:	Who?
T3	L:	His name's James.
T4	S:	James? *{looks confused as if she has never come across this name before.}*
T5	S:	D'you like him?
T6	L:	Ye:s he's nice=
T7	S:	=What does he look like?
T8	L:	Well, he's tall.

S: (20.05.00, aged 13;2)

Scene: L. has just administered a standardized test (CD-CELF-3) to S. After a brief pause, S. initiates a conversation.

T1	S:	D'you have to do this to somebody else now or?
T2	L:	Yeah=
T3	S:	=Do you? Who? Who d'ya have to do?
T4	L:	Well actually no I don't I don't have to do it to anybody else now
T5	S:	Don't ya? I thought ya did
T6	L:	No I already did it to somebody else earlier on in the week
T7	S:	Why? Who was it?
T8	L:	e:rm Another child who I'm (.) visiting like I'm visiting you
T9	S:	Who is that child's name?
T10	L:	Her name is Ingrid
T11	S:	Who?
T12	L:	Ingrid
T13	S:	That's _ strange name
T14	L:	Well she's Rom-She's from Romania as well

G: (17.09.98, aged 13;2)

Scene: Unobserved conversation between G. and slightly younger friend D. from a mainstream school. After a brief pause, G. starts a new topic.

T1	G:	So what did y do in school today?
		{pause: A. is licking her lolly.}
T2	D:	Lots of things
T3	G:	Work?
T4	D:	mm: (…) loads of boring stuff
T5	G:	Oh, movin' round, goin' to different teachers?
T6	D:	mm:
T7	G:	Yep, that's what we did (.) tsk! Well, that was a bit boring (..) Work is borin' init? and school (..) Definitely is

G: (16.10.99, aged 14;4)

Scene: G. is styling L.'s hair. After a brief pause, G. initiates a conversation.

T1	G:	D'ya want to know what I want for Christmas then?
T2	L:	e:rm [[You tell me then
T3	G:	[[Reebok Classic Trainers
T4	L:	Are they nice them Reebok Classic Trainers?
T5	G:	Yea:h I'm getting some new ones actually (.) then I'll have a Groovy Chick wash bag
T6	L:	A Groovy Chick wash bag?
T7	G:	Yeah!
T8	L:	What d'you do with them then?
T9	G:	You put your things in there

I: (02.12.98, aged 11;1)

1. Scene: I. is playing with her yo-yo and asks L. about the other children in the study.

T1	I:	Who else d'you see?
T2	L:	Who else do I see?
T3	I:	Yea:h=
T4	L:	=As in which of the children do I see?
T5	I:	Pardon?

T6 L: As in what other children do I see?

T7 I: Yea:h.

{Slight pause}

T8 L: A few others

T9 I: What're their names?

T10 L: Sariah Georgina Carrie Eleanor Tommy Terrie and Nicholas

T11 I: And me

T12 L: Yeah

T13 I: What-What's the matter with them? Why d'ya need to see them?

T14 L: Because they're like you They were all born in Romania and came to England..like you did

T15 I: Do they all come from Romania?

T16 L: Yep (.) yeah

2. *Scene: I. is eating dinner with her family. The conversation has just changed topic to the subject of vegetarianism. L. has just said that she likes to eat some types of vegetarian food. I. tries to be included in the conversation.*

T1 I: Are you a vegetarian?

T2 L: Yeah

T3 I: Why?

T4 L: I just don't like eating meat very much

T5 I: D'ya like chickens?

T6 L: I used to like chicken yeah.

T7 M: mm:

T8 L: I'm not strictly vegetarian though I eat fish but I never used to eat fish before

T9 I: I don't like fish very much

In addition to using questions to elicit information from their conversational partners, S., G. and I. also used the interrogative form to achieve a variety of other social and communicative functions such as to make requests for things, extend invitations, and even to tell jokes (even if the punch-lines were not always clear). This is illustrated by the following examples.

Request

S: (08.09.98, aged 11;6)

Scene: S. and her teacher M.are playing cards.

T1	S:	*{stands up and then goes into kitchen}* Am I allowed to have a biscuit?
	M:	*{does not directly answer S. because is talking to her brother N.}*
T2	S:	*{comes back into dining room and stands in front of M.}* 'Scuse me am I allowed to have a biscuit?
T3	M:	Yes I think so=
T4	S:	=Thank you *{S. then bounds into kitchen and opens biscuit tin and takes out a biscuit.}*

Invitation

G: (17.09.98, aged 13;2)

Scene: D. and G. are sat facing the camera, noisily slurping ice-lollies. G. initiates a conversation.

T1	G:	*{turns and looks at D.}* Would you like to come to my school barbecue on Friday next week?
T2	D:	e:rm-
T3	G:	D'ya like barbecues?-burgers roll e:rm (..) D'ya like barbecue food? *{gazes up at D.}*
T4	D:	er e:rm yeah
T5	G:	Good! *{nods simultaneously}* Would ya like to come? Are ya doing anythink on Friday?
T6	D:	I don't know yet (..) What time d' it start? *{slight pause}*
T7	G:	Well I('ve) not had the letter. I've no idea (.) mm:
T8	D:	*{starts a role playing game}* Right (.) now children you are going to have a test *{lowers voice}* Pretend you all say "O:::h!"

Joke

I: (13.04.99, aged 11;6)

Scene: I. and L. are sitting in the study, talking.

T1 I: What's an-What's an elephant up a tree? [[It's stuck

T2 L: [[I don't know

{slight pause}

T3 I: Hm D'you get it? It's too fat to get in a tree [[D'you get it?

T4 L: [[O:h yeah (..) yeah *{L. laughs.}* That's good

II Question Style: Similarities and Differences

In some situations, S. and G. were similar, in that they bombarded their conversational partners with questions, particularly during dyadic discussions. However, their motivations appeared to differ. S. was always very curious about the lives and experiences of others and thus, often used open-ended WH-type questions to enquire about a range of issues from cyber-pets to marriage. G. on the other hand, was noted to frequently use Yes/No (aux-inverted) questions when ascertaining the specific preferences of same age or younger peers. Note the following examples.

S: (28.10.98, aged 11;7)

On one occasion (28.10.98.), during an exchange with G.'s adoptive mother, K., S. asked fifteen questions in 30 seconds. This unobserved conversation, presented below, occurred while S. and K. were alone in the kitchen and is considered to be representative of the probing communicative style S. adopted with adults during the early stages of the study.

Scene: S. and K. (adoptive mother to G.) have been cooking together in the kitchen. Suddenly, S. sees some school exam material belonging to K.'s son, J.

T1 S: What-Who's gonna learn these?

T2 K: Pardon?

T3 S: Who's gonna learn this?

T4 K: Jamie

T5 S: Why?

T6 K: ‘Cuz he’s doing-‘Cuz he’s taking an exam They have to know all about the body=

T7 S: =Does he know it?

T8 K: No, not ye:t *{switches on food mixer}*

T9 S: Did he used to?

K: *{doesn’t hear S.’s previous question, so switches of food mixer}*

T10 S: Did he used to though?

T11 K: No he doesn’t know it That’s the trouble why he needs to learn it

T12 S: And what ‘appens if he still can’t learn it?

T13 K: mm:?=Well he won’t pass the exam If he can’t learn it he won’t pass the exam

T14 S: And what would he do then?

T15 K: He’ll fail it That will be that

T16 S: And then what [[stay at home?

T17 K: [[mm: No: oh no he wouldn’t stay at home

T18 S: [[What would he do then?

T19 K: [[He’s got to go out to work and get a job (…) [[an’ earn some money

T20 S: [[What ‘appens if he can’t get it?

T21 K: Huh?

T22 S: What ‘appens if he can’t get a job?

T23 K: He will get a job doin’ something

G: (17.09.98, aged 13;2)

One afternoon, G.’s social behaviour with D. (aged 11;10), a younger friend from a mainstream school was observed. Most of G.’s conversational turns with D. involved questions and, seemingly, a much higher proportion when compared to her social interaction with adults. This took the form of auxiliary inverted questions such as “Would you like to keep one of these bouncy balls?” or WH-type questions such as, “Which one do you like the best?”. G.’s dialogue with D. is striking for the sheer number of such interrogatives and most of G.’s turns involved questioning D. about

what she wanted to take home with her.[3] The following extract is typical of such behaviour.

Scene: G. and D. talking in the bedroom. No one else is present.

T1 G: D'ya wanna keep that 'Lypsol'?

T2 D: mm:

T3 G: Would ya like to keep that doggy-here?

T4 D: No it's all right I've got thousands of them

{pause: G. shows D.. some animal stickers in a book.}

T5 D: [[A:h!

T6 G: [[D'ya want that one or that one?

T7 D*: {D. looks at G. and then points to a picture.}*

T8 G: What that one?

T9 D: [[Yeah

T10 G: [[Would ya like to keep that one? *{turns to look at D.}* Well if I cut it out for you [[yeah?

T11 D: [[No s'all right don't wanna keep (..) that.

T12 G: e:rm What d'ya wanna keep then? *{clears throat}* I'm not-not- I'm not forcin' you I'm not shouting at you *{simultaneously raises hands in supplication and then smiles and then lets out a breath}*

T13 D: *{does not look at G. but giggles}*

T14 G: *{leans forward}* So what would you like to keep then? D'ya wanna keep anything-anything of here: or?

{slight pause: D. ignores G.'s previous question and examines posters on the wall}

It was during group discussions that the differences between S. and G.'s question style, with adults were particularly evident. For example, on one occasion (16th October 1999), S., aged 12;7 and G. aged 14;4, interrogated the researcher, L. about her friend, J. Although, G. asked questions during the conversation, these repeatedly concerned her own interests. She asked questions that she could relate back to her own personal experiences rather than to those of the conversational partner and sometimes persisted with the same topic, even when the interlocutor attempted to

[3] G. offered so many of her possessions to D., that this became a source of increasing concern to G.'s adoptive mother, K.

change the subject. Note, for example, turns 3, 7, 9 and 11. In contrast, S.'s responses involved polite inquiries about the experiences of her conversational partner and several shifts of topic at appropriate points. Note, for instance, turns 1 and 5. The following is an extract of the conversation:

S. and G: (16.10.99, aged 12;7 and 14;4)

Scene: G., S. and the present researcher L. have been conversing together in the sitting room. G. and S. then begin to question L. about her friend.

T1 S: =Does he look sexy or not (.)[[or handsome?

T2 L: [[Yea:h *{starts to laugh.}* He does yeah

T3 G: What does he wear sports clothes like me then?

T4 L: [[yeah

T5 S [[Does he live with you *{points to L.}* or d'ya live separate?

T6 L: No sometimes we live together and sometimes we don't I-I live in my own place an' he's got his own house an' I sometimes go and see him

T7 G: *{slurps noisily on her lolly}* Has he got Kickers then Puma?

T8 L: Has he got?

T9 G: Has he got Reebok Classic trainers then?

T10 L: e:rm *{L. considers}*

T11 G: Nike Ellesse

T12 L: I'm not sure if he has got Reebok Classic Trainers to be honest=

T13 G: =Tsk Oh you must know he's y- (.) you've got-You must know it's y-You must know he's your boyfriend *{sighs}*

T14 L: Well he's probably got just some (.) normal trainers but he hasn't got Reebok ones

T15 G: He hasn't got any make?

T16 L: No: [[he's not into that

T17 G: [[Oh well that's a bit-[[Guess he must be stupid then in't he?

T18 S: [[No *{comments on L.'s previous statement.}*

T19 L: He doesn't like that kind of thing=

T20 G: =He's horrible then I hate 'im

III Atypical Production of Questions?

The above examples illustrate S., G. and I.'s ability to ask questions in a range of contexts. The girls were consistent in such behaviours, although on rare occasions the production of some question types was anomalous for purely grammatical reasons. Note, for example, G.'s use of auxiliary inversion (with a slightly younger peer) below:

G: (17.09.98, aged 13;2)

Scene: G. is taking to her friend, D. in the playroom.

T1	G:	Do I be nice to you?
T2	D:	mm:
T3	G:	Good

IV Questions: Comprehension

Genie appeared to comprehend WH-type questions in real-life contexts but not in formal testing. According to Curtiss (1977),

> "In contrast to the formal test, Genie responds to WH-questions of the object almost 100% correctly in real life, as often and as consistently as with WH-questioning of the subject. She does not demonstrate any difficulty in understanding the transformed word order with *who*, *what*, *when*, *where*, *how*, or *why* questions." (p. 140)

Similar to Genie, S., G. and I. appeared to have no problem with comprehending questions, including WH-type ones in real-life situations, although the girls were never formally tested. The following extracts illustrate S., G. and I.'s ability to comprehend and respond appropriately to WH-type, AUX-inverted and intonated questions.

S: (08.09.98, aged 11;6)

S.'s replies to questions could be very detailed. Her lengthy reply, below, shows that she comprehends the prosody of intonated questions.

Scene: S. and L. talking in the conservatory.

T1 L: You get detention if you do something wrong?

T2 S: Well if you don't- *{proceeds to speak more slowly.}* If you don't do your homework in time cuz like Jenny Ross sez "I'm goin' ou:t" and then Miss Dow('ll) say "You've got to do homework by tomorrow" (an' I <u>say</u>) "I can't Mi:ss" (.) that an'-then she'll say"You'll-You'll have detention" *{Intonation rises at end of word.}* Yeah cuz Jenny Ross got detention an' she got gold certificate

G: (07.10.98, aged 13;3)

G.'s responses to questions were never as verbose or descriptive as S.'s. However, G. generally answered questions appropriately, including those containing relative pronouns as shown below.

Scene: G. has just finished a bowl of 'Weetabix'. L. initiates conversation by asking about one of G.'s acquaintances.

T1 L: So who's Taylor?

T2 G: Tsk O:hh Sariah's friend who goes to Wetherby

I: (10.09.98, aged 10;11)

I.'s response below, shows that she comprehends Yes/No questions.

Scene: I. and L. talk about I.'s father, J. and his interest in walking

T1 L: Does he do lots of walking then?

T2 I: No: I like walking though

S., G. and I. appeared to understand the causal nature of *Why* and *How* questions and always responded aptly to these. This is significant since, according to Crystal (1987), full comprehension of *because* (in answer to *Why* questions) is not acquired until the age of 8 years and beyond in typically developing children. He states:

> "Children have often been observed to use structures without fully comprehending them - a point which is felt not to be surprising in the learning of vocabulary, but which is often neglected in relation to grammar. A well-studied example is children's use of because, encountered as a connective from around age three, but

not fully comprehended until age eight and after, as shown by examples such as *My father never got sick because he catches cold* and *Why do wolves bite? Because they are from Little Red Riding Hood*" (p. 106).

The following examples demonstrate S., G. and I.'s apposite use of *because* to answer *Why* and *How* questions:

S:	**(08.09.98, aged 11;6)**	T1	L:	Why's she better than you?
		T2	S:	'Cuz she 'ad more practice than me (.) sometime
G:	**(27.07.98, aged 13;2)**	T1	L:	Why is Ruth with Phil?
		T2	G:	'Cuz she loves him She wants to kiss him
I:	**(22.07.98, aged 10;9)**	T1	L:	How do you know Sue?
		T2	I:	Because coz er (..) my mum met her

V Atypical Comprehension of Questions?

In naturalistic contexts, S., G. and I. were generally consistent in their capacity to comprehend and respond appropriately to WH-type, Yes/No and intonated questions. However, (as with question production), there was the odd occasion when S., G. or I.'s response to a question appeared to indicate (possible) difficulty with comprehension. There were some instances where the girls appeared to have misinterpreted a WH-type question. Note the following examples for S. and I.:

S. (18.03.00, aged 13;0)

Scene: S. and L. are talking in the dining room. G. is also present.

T1	L:	D'you ever walk the dog?
T2	S:	Yea:h hh. {*Nods*}
T3	L:	Where d'you go?
		{3 second pause: S. looks at L. in a perplexed way, then looks out of the window. She seems to be having difficulty in answering L.'s question.}
T4	S:	Only sometimes

I. (19.10.99, aged 12;0) Note turns 4 and 6

Scene: I. and L. talk in the study. After counting to ten in French, I. begins to count in Spanish.

T1	L:	Where did you learn that?
T2	I:	Not telling' ya
T3	L:	{*Chuckles*}
T4	I:	Mrs Rill (..) this lady what I know
T5	L:	{*Mishears I.'s previous turn*}Well aren't you gonna tell me?
T6	I:	I told you! [[Mrs Rill
T7	L:	[[I asked 'Where did you learn it?'
		{*L. realises that I. has misunderstood the question "Where did you learn that?" treating it as a "Who..?" question*.}
T8	I:	Pardon?
T9	L:	Where did you learn it?
T10	I:	Mrs Rill (..)[[in school time
T11	L:	[[mm

In G.'s case, very occasionally, her responses to questions (including WH-type ones) were completely unrelated to the information contained in the conversational partner's previous turn. For example, G. would not answer a specific question directed to her, but instead would ask the interlocutor another non-related question. Note the following:

G. (24.04.99, aged 13;9)

Scene: G. is standing alone in the dining room when S.'s father R.. enters the room.

T1	R:	Where's Nicholas gone? D'you want to go upstairs and find him?
		{2 second pause}
T2	G:	D'you like my hair?

As mentioned earlier, in many conversational settings, S liked to ask lots of questions – particularly WH-ones (see "*II Question Style: Similarities and Differences)*. Worthy of note, however, is that when required to *answer* open-ended WH-questions

S. occasionally gave one-word, highly elliptic answers. This is reminiscent of the minimal responses given by Genie to WH-questions during her early years of rehabilitation (Curtiss, et al., 1975.). Note the following example (taken from a larger transcript in Curtiss et al, 1975., p.147.):

> "Marilyn and Genie: 2-19-75
> M: What does Marsha do in class?
> G: Draw.
> M: What does Marsha draw?
> G: Sun."

Examples like the above occurred during the early stages of S.'s post deprivation language acquisition (three years after being adopted). Consider, for example the following:

S: (17.05.97, aged 10;2)

1. *Scene: S., and her brother N. are engaged in a colouring activity in the lounge. Their mother J., who is filming them, asks S. about an art lesson at school.*

T1 J.H.: mm: What other flowers did you do?

T2 S: Daisy

2. *Scene: Her adoptive mother J. talks to S. in the garden. S.'s brother N. is also present.*

T1 J: Now (..) What do you like about the Isle of Mann?

T2 S: Beach (..) [[Collectin' shells

T3 J: [[And the beach (..) collecting shells yeah an' you fell over Yep

Instances such as the above also occasionally occurred during the early stages of the data collection period. In one conversational exchange between S. and G.'s adoptive parents, all twelve of S.'s turns consisted of questions (WH-type, auxiliary-inverted and tag). In exasperation, G.'s father M. decided to ask S. an open-ended question back. Note her response in turn 2.

S: (28.10.98, aged 11;7)

Scene: S. and G.'s adoptive parents K. and M are talking in the kitchen. No one else is present.

T1	M:	What happens when you run out of questions?
T2	S:	Quiet
T3	M:	You go quiet do you?
T4	S:	Yeah No

It is important to note that the examples above where, S., G. or I. appeared to have misinterpreted questions or given unusual responses may have been due to factors other than atypical comprehension. There might have been momentary lapses of attention, possible issues concerning the syntactic complexity of the question and/or the extralinguistic context.

VI Statements

Another way that S., G. and I. opened or maintained conversational topics (introduced by themselves and others) was to give statements, that is, they liked to talk about their experiences, relay anecdotes, volunteer information, express their views, opinions, likes and dislikes and give descriptions or explanations. For example, S. sometimes liked to talk about her school activities or friends, while I. was quite effective at explaining unfamiliar activities or objects to her conversational partners, if they requested her to do so. Even G. enjoyed expressing her likes and dislikes and giving her opinions, particularly concerning clothes.[4] In the following examples, S. describes events that took place at her school, G. gives her views on fashion and I. describes a leisure centre, and gives a step-by-step explanation of an unfamiliar school activity.

School anecdotes

S: (11.03.99, aged 12;0) Note turn 1

Scene: S., G. and her adoptive mother K, are in the kitchen, talking. G. has just told K. that she has some maths homework to do. S., addressing K., continues the topic of

[4] Both S. and I. were typically more chatty than G. across a range of contexts.

Maths by describing a Maths exam at school, which took place several days previously.

T1 S: On Tuesday we had a difficult questions up to twenty-eight and we had a tape Mr Godfrey who's our Maths teacher gave us all a sheet and then he told us about it (..) then lady on the tape say "If you get stuck put a cross on it"

{2 second pause: S. looks at K. expectantly}

T2 S: an' then-an' I got one out of twenty-eight (…)[[and that's not good.

T3 K: [[And what's- You got one out of twenty [[eight?=Is it called SATS?

T4 S: [[*{giggly breath}*

{3 second pause}

T5 S: [[Well it's only a practice [[It was a practice one-

T6 K: [[It sounds like- [[Practicing-practicing for the SATS?

T7 S: -before before May

S: (20.05.00, aged 13;2) Note turn 5

Scene: L. has been talking about her school days to S.

T1 S: Did you get in trouble in middle school (..)[[or in high school?

T2 L: [[Sometimes yeah I got detention

T3 S: I've got a detention this Monday (.) [[for not signing my diary

T4 L: [[Did you? (….) Did you? *{sounds surprised.}* We:ll

T5 S: Well I-I'm-I'm getting that one this Monday (.) but uhuhh *{voice trails off}* Well it's a mistake I had one tic-ticket for English (.) for interrupting class and I had erm (…) yeah and I got some late tickets

Describes Ambitions, and Expresses Likes and Dislikes.

G: (24.04.99, aged 13;9) Note turns 4, 6 and 10

Scene: During test administration. G. and L. sit and talk in the conservatory at S.'s parents' house.

T1 L: Would you like to be a weather lady?

T2 G: No! *{said abruptly}* [[Don't be silly

T3 L: [[Why not?

T4 G: I want to be a (.) a gym-a gym-a gym-a gym teacher an' a sports-an work in a sports shop

T5 L: Do ya?

T6 G: Ye-e-es! Plus- (…) That is my favourite thing doin' spo:rt (..) mm:

T7 L: Is that your favourite subject at school?

T8 G: Spo:rt?

T9 L: Yeah

T10 G: S'all right=I don't like P.E. but I like doin' sport

Makes Comment and Gives Opinion

G: (24.04.99, aged 13;9)

1. *Scene: L. checks the video camera, before administering a standardized language test, while G. observes. G. then initiates a new topic.*

T1 G: I bet ya haven't got a bright orange nail varnish (.) I bet ya haven't got a bright pink or a bri- or a bright orange nail varnish I('ve) got a bright orange

{slight pause}

T3 L: You know Georgina I haven't actually got any nail varnish at all because really I don't use it [[I don't wear-

T4 G: [[That's cuz your fingers are-Your nails are too short (..) an' mine are as well

2. **Note turns 2 and 4**

Scene: L. and G. talk about clothes. G. maintains the topic of the conversation by giving her views on fashion.

T1 L: You don't like my jacket?

T2 G: No it's no-your trousers are not fashion_ your top's not an' your (.) jacket's not.

T3 L: So (..) what are (.) the latest fashions then Georgina?

T4 G: e:r Well I thi:nk (..) we:ll I think (.) hipsters are fashion hipsters with skirts and (..) combat jeans

Offers Description.

I: (22.07.98, aged 10;9)

Scene: L and I. talking in the study.

T1 L: I didn't know there was an ice skating place in Doncaster

T2 I: 'The Dome'! You can get all sorts there You can get bowlin' and you c- Yeah you can get bowlin' at another place but I didn't go You can get swimmin' with 'The Dome' ice skating and all sorts of games and you can get tea there as well

Gives Explanation.

I: (10.09.98, aged 10;11) Note turns 2 and 4

Scene: L. and I. are sitting in the study, talking about I.'s choice of subjects at school. L. asks for clarification of a subject activity called Maps.

T1 L: What do you have to do in maps?

T2 I: Yeah okay We at school- I'm quite good because I've done it in class It's like (..) you have to look in a map okay?

T3 L: A map of anywhere?

T4 I: Yeah like in a country somewhere and if you wanted to go you're there *{points}* aren't ya?

T5 L: mm:

T6 I: If you wanted to go on the other side you go in the car that way *{points}* don't ya or something?

T7 L: Yeah

T8 I: Well you turn or something=

T9 L: =Yeah=

T10 I: =and you keep going on and there's a corner what says "Shrewsbury" You turn that way

T11 L: Right Shrewsbury

T12 I: And then (..) I wanna get to the other side to Wales right I turn to Shrewsbury Right you keep goin' on (.) Oh I need to turn back cuz I've

gone in the wrong place (..) Then you keep goin' on (.) and then there's this place what's called (…) Ya keep goin' on and there's this corner you have to turn at That's what maps are

T13 L: O:h! *{L. finally understands}* So you have to sort of find your directions to [[it-to a place?

T14 I: [[Yea:h.

S., G. or I.'s ability to use statements to open and maintain conversation in differing contexts remained a consistent feature of their social and communicative behaviour through out the two-year duration of the study.

4.4.2 Repair and Clarification

Observations of S., G. and I.'s social behaviour during a two-year period, revealed that they were able to use a variety of repair devices when faced with possible breakdowns in conversations. This is particularly important since as Whitworth, Perkins, and Lesser (1997) note:

> "An immense variety of trouble sources can arise…in interactions that provide an obstacle to the production of a sequentially implicated next turn. The organization of repair provides a mechanism to deal with such trouble sources. It is the self-righting mechanism for the organization of language use in social interaction. Repair organization is a particularly important device for the communication disordered population given the variety of potential trouble sources that may impede the progression of conversation (Milroy and Perkins, 1992)."

I Repair Through Request for Clarification

During discussions, S., G. and I. displayed what Whitworth, Perkins and Lesser (1997) term the "ability to initiate repair on conversational partner's turn." This involved requests for clarification. For example, at points of overlap where S and her conversational partner would start to speak at the same time, resulting in false starts, S. would ask for clarification of her conversational partner's unfinished turn. Turn 5, in example 1 and turn 4 in example 2 illustrate this:

S: (08.09.98, aged 11;6)

1 *Scene: S. and L. are sat at the table talking.*

T1 L: When are ya seeing Georgina again?

T2 S: I'm not sure (..) I don' know

T3 L: [[When was the la-

T4 S: [[In-

{slight pause: 2 seconds}

T5 S: What?=

T6 L: =When-when was the last time you saw Georgina?=

T7 S: =I don' know (..) Look at that (.) Keep it Keep it

2. *Scene: S. and L. resume talking after a brief pause in the conversation.*

T1 L: [[I sometime-

T2 S: [[Sometimes I colour (..) pictures

T3 L: Do you?

T4 S: mm: What was yous gunna-yous gunna say?

T5 L: I sometimes sit down and I draw pictures occasionally (.) but then I kind of erm (.) lose patience and it gets a bit boring but I-I used to like it at school.

S. also used requests for clarification to repair potential breakdowns if the interlocutor did not complete his or her previous turn, perhaps due to a shift of attention. This is illustrated by turn 2 in the following example:

S: (16.10.99, aged 12;7)

Scene: S has just awakened from her sleep and walks into the lounge where L. is sitting.

T1 L: What's your favourite erm *{voice trails off as L. picks up something from the floor}*

T2 S: And what?

T3 L: What's your favourite swimming (..)[[position?

T4 S: [[I like all of them really

S., G. and I. were also able to issue direct requests for clarification if they had not understood or misheard some aspect of their conversational partner's previous turn.

The following exchange for S. demonstrates that she knew how to ask for an explanation of a word or sentence if she had not understood it. Note turns 6 and 8.

S: (08.09.98, aged 11;6)

Scene: M. and S. are sat at the table facing each other, playing a game of cards. Soon S. asks for clarification of a word meaning (p.2):

T1	S:	*{sighs}*
T2	M.:	Well you've won some more
T3	S:	Mostly ca:rds
T4	M:	Oh dear [[you're never satisfie:d!
T5	S:	[[blah blah blah
		{slight pause: S. and M. continue to play cards for 4-5 seconds}
T6	S:	What's that sa-sa-What's-what's that mean 'sa-sa-fied'? hh
T7	M:	Satisfied?
T8	S:	[[Yeah, what's that mean?
T9	M:	[[You always want mo:re (.) of something else
T10	S:	(I think)
T11	L:	Don't you know what "satisfied" means Sariah?
T12	S:	No *{puts thumb in mouth}* I want more *{blows a raspberry}* thank you

The following examples for G. and I. show that they were capable of using requests for clarification to encourage their conversational partners to repeat themselves if they were misheard.

G: (16.10.99, aged 14;4)

1. Scene: G. and L. talk during a game of 'hairdressers'.

T1	L:	When was the last time you did a picture?
T2	G:	Wha:t?
T3	L:	When was the last time you did a picture?

2. Scene: G. asks L. for clarification of S.'s previous turn .

T1	G:	What?=What did she say?
		{brief exchange between S. and L.}
T2	G:	What's she said?

T3 L: She asked if I worked with old people

T4 G: O:h right

G: (20.05.00, aged 14;10)

Scene: G. has just said that she doesn't like a sweet because L. gave it to her.

T1 L: Well that's not very nice is it?

T2 G: Sorry?

T3 L: Would you say you didn't like it if Sariah'd given you the sweet?

T4 G: Hm:?

T5 L: Would you say you didn't like it if Sariah'd given you the sweet?

T6 G: What? What d'you say? What d'you mean?

I: (29.06.98, aged 10;8)

Scene: Family meal. I.'s sisters, H. and B., mother, M. and researcher L are present. M. makes a comment about the date.

T1 M: It's July tomorrow (..) eight or nine Yeah, I'm not sure

T2 I: *{looks sharply at M.}* What did you say?

T3 M: It's July tomorrow

I: (14.10.98, aged 11;0)

Scene: I. and S. are sat on the bed, out of camera range still playing with the computerized spelling game. S. then moves into camera range.

T1 C: Right come on We'll do them a dance there

T2 I: What did you say?

T3 C: *{C. talks to the camera}* We are going to do you a dance

II Repair Through Completion of Conversational Partner's Previous Unfinished Turn

Another repair device that S. and G. used, when faced with a potential breakdown in the conversation involved completing their conversational partners' previously unfinished turns. This demonstrated S. and G.'s ability to predict what the other speaker was likely to say based on the preceding utterance. This is exemplified by the following examples.

S: (08.09.98, aged 11;6) Note turn 3

Scene: S. and L. are sat in the conservatory and have been reading S.'s school report together.

T1 S: *{maintains eye contact with L.}* D'you still like art?

T2 L: *(ponders for a couple of seconds)* No: I don't like art any more I think it's a bit erm (...)

T3 S: boring? *(supplies L. with the word she is looking for)*

T4 L: Yea:h Do you find it boring?

T5 S: *{shrugs}* I don't mind it

S: (16.10.99, aged 12;7) Note turn 2

Scene: S. is sitting on the sofa, and conversing with L. about "diets".

T1 L: I don't eat much chocolate though anyway because (..)[[erm

T2 S: [[It makes ya fat?

T3 L: Yeah

G: (16.10.99, aged 14;4) Note turn 4

1. *Scene: G. styles L. hair, while they both talk.*

T1 L: Let's play a game

T2 G: What game?

T3 L: We're goin' to play (…) *{L.'s voice trails off as she thinks}*

T4 G: 'Truth or Dare' okay *(supplies L. with a likely alternative}*

2. **Note turn 5**

Scene: L. is just about to administer the British Picture Vocabulary Scale (BPVS).

T1	G:	Well this is a bit of a boring game
T2	L:	No it's not
T3	G:	It is
T4	L:	Well if you concentrate then it'll be (…) *{voice trails off}*
T5	G:	even more boringish

3. **Note turn 2**

Scene: L. and G. talk before the administration of a digit span test (Digits Forward, BAS).

T1	L:	Oh before you go Georgina there's one (…) *{voice trails off)*
T2	G:	one what?
T3	L:	test=
T4	G:	*={yawns heavily and slumps against the sofa, sighs then giggles}*

III Repair Of Conversational Misunderstandings Through Questioning And Cross-Checking

According to Crystal (1997),

> "In everyday conversation, misunderstandings often take place as speakers make assumptions about what their listeners know, or need to know, that turn out to be wrong. At such points, the conversation can break down and may need to be 'repaired', with the participants questioning, clarifying, and cross-checking…But it is quite common for participants not to realize that there has been a breakdown, and to continue conversing at cross purposes" (p. 117).

Like normal speakers, S. and I. did not always make their communicative intention clear when speaking, which occasionally resulted in conversational misunderstandings. They would, however, attempt to clarify these mix-ups when they occurred. The following dialogues are examples of this and show that S. and I. could repair conversational breakdowns that arise when there has been a misunderstanding of the speaker's intention. This is shown by turns 6 and 10 in the first example (for S) and by turns 10 and 13 in the second example (for I.):

S: (08.09.98, aged 11;6) Note turns 6 and 10

Scene: S. and L. are talking about S.'s school in the conservatory, while being filmed by S.'s teacher M. There is then a pause in the conversation and S., initiates a new topic.

T1	S:	Has Georgina changed a lot (..) 'cuz I haven't seen her for _ long time
T2	L:	Has she changed a lot?
	{pause}	
T3	L:	When was the last time you saw her?
T4	S:	*{looks at L.}* Mm? What?
T5	L:	When was the last time you saw Georgina?
T6	S:	Yeah erm I'm asking you has Georgina changed a lot (.) or not?
T7	L:	*{looks confused}* Well from when? 'cuz I don't=
T8	S:	=Before
T9	L:	Before when? When was the last time you saw her? ('cuz I-)
T10	S:	No you-you saw her. You went to see her, didn't you? *{Points to L.}*
T11	L:	I went to see her (..) about three months ago [[and then-
T12	S:	[[Yeah but-
T13	L:	I went to see her a couple of weeks ago and she hadn't *{shakes head}* she didn't change in the few weeks that I saw her
T14	S:	I haven't changed have I?
T15	L:	No you haven't changed no

I: (10.09.98, aged 10;11) Note turns 10 and 13

Scene: I. and L. talk about I.'s father, J. and his interest in walking

T1	L:	Does he do lots of walking then?
T2	I:	No: I like walking though
T3	L:	Where do you [[normally go?
T4	I:	[[I packed in it now.[5]
	{slight pause}	
T5	L:	Who?
T6	I:	He doesn't like doing it anymore

[5] In turn 4., I.'s utterance, "I packed in it now." includes a word order error in which the verb particle "in", incorrectly precedes the object of the sentence "it". In conventional English, "packed in" would be classified as a phrasal verb. According to Crystal (1997) when a pronoun such as "it" follows the

T7	L:	What's that?
T8	I:	He sort o' packed in it He just did it in the Winter [[I think.
T9	L:	[[Pat Dinnit?
T10	I:	D'you know pack You packed your bag?
T12	L:	Oh yeah
T13	I:	Pack in He packed in it
T14	L:	O:h *{L. finally understands what I. is talking about}*

IV Other Initiated Self-Repair (Whitworth, Perkins and Lesser, 1997)

Sometimes S., G. or I.'s turns were misunderstood by their conversational partner. When this occurred, in S. and I.'s cases, they usually attempted to repair these communicative breakdowns, by rephrasing their previous utterances. This is illustrated by the examples (i.e. turns 4) below, where S. and I. each responds effectively to their interlocutor's indirect request for clarification.

S: (08.09.98, aged 11;6) Note turn 4

Scene: S. and L. conversing about what G. did during a previous visit.

T1	L:	e:rm She played with my shoes She likes shoes a lot
T2	S:	Yeah Does she come in shoe erm shop or not?
T3	L:	*{looks confused}* Does she go in a shoe shop?
T4	*S:*	*{laughs self-consciously}* She hhh *{breathy giggle}* Does she- Does she want to work at the shoe shop or?
	{slight pause}	
T5	L:	I think she likes a shoe shop called "Shoe Express" actually

I: (11.11.98, aged 11;1) Note turn 4

Scene: I. is drawing a picture and L. has to guess what it is.

T1	L:	e:rm (..) Is it an animal?
T2	I:	e:rm *{mumbles}* Sort of (..) Somebody dressed up That's a clue
T3	L:	Somebody dressed up that's a clown?

---

verb, "it occurs before the particle in a phrasal verb." (p.83). The result of this is that L. mishears I.'s utterance, thinking that she said a name, "Pat Dinit."

T4 I: No I said it's a clue:!

T5 L: Right I'd better get my hearing sorted out

I: (21.09.98, aged 10;11) Note turns 2 and 5

Scene: L. and I are waiting for I.'s friend, R. I. is facing the camera.

T1 I: She_ maybe gone to somebody's friends *{omits contractible AUX causing L. to mishear}*

T2 L: She made you what?

T3 I: She_ maybe gone to somebody else's friend

T4 L: She made you go to somebody else's friend? *{L. still mishears what I. said}*

T5 I: No She's maybe gone to her friend's. Friend? Y'know children (.) as your friends?

T6 L: Oh yeah

With regard to G., her utterances were often misheard due either to dysfluency or her habit of mumbling. This resulted in her conversational partners having to make frequent requests for clarification. G. generally responded appropriately to these, by repeating herself and thus showed the ability to self-repair her turn. The following examples illustrate this.

G: (17.09.98, aged 13;2)

1. Scene: G. and her friend, D. talk unobserved, in the playroom.

T1 G: Are ya glad it's the weekend?

T2 D: Hm?

T3 G: Are ya glad it's the day off on Saturday?

2. Scene: G. and her friend, D. talk while unobserved by L.

T1 G: I bought a clock.

T2 D: Huh?

T3 G: I bought a new clock.

3. Scene: L. and G. talk during administration of a non-verbal measure (Block Design-WISC).

T1 G: I don't think it's the right shape?

T2 L: Sorry?

T3 G: That's the right shape innit?

Throughout the two-year duration of the study, S., G. or I. were consistent in their capacity to use a range of repair devices when faced with possible communicative breakdowns in conversation.

4.4.3 Social Routines

I Politeness (e.g. use of "please" and "thank you")

Throughout the two-year period of data collection, S., G. and I. demonstrated their awareness of the social factors that direct successful conversation such as conventional markers of politeness like "please" and "thank you." These skills largely develop between the ages of 3 and 5 years in normally developing children (Crystal, 1997). In S.'s case, markers of politeness such as "please", "thank you" and "pardon" appeared to be a fixed part of her social and communicative behaviour. During conversation, S was extremely vigilant of other people's manners – even adults - since she would notice if they had not used a politeness marker and would explicitly request that they did so. For example, she would instruct someone to say "please" or "pardon" if these were not used where they were conventionally required. She would, thus, be in the position of modelling adult behaviour.[6] The following conversational extracts demonstrate S.'s spontaneous use of "please" and "thank you."

S: (08.09.98, aged 11;6)

Scene: S. is in the lounge with her teacher. M. and asks if she can have some biscuits.

T1 S: Am I allowed to 'ave two pi-two biscuits?

T2 M: Well I don't know about that!

T3 S: Plea:se! *{puts hands together pleadingly}*

[6] This suggests that S. learned the use of politeness markers as a system of conventions or social "rules."

S: (07.10.98, aged 11;7) Note turn 2

Scene: S., G., K. and L. watch television in the lounge. G. then comments on K.'s new hairstyle).

T1 G: It looks ugly on you

T2 S: Just watch (a) video please *{points to T.V.}*

S: (16.10.99, aged 12;7) Note turn 2

1. *Scene: S., G. and L. in the lounge talking.*

T1 L: *{speaks to G., then offers S. some chocolate Maltesers}*

T2 S: No: I don't want your sweets thanks Thank you for your permission though

T3 L: That's okay Don't worry about it

T4 S: I'm not worrying about it Just don't want any sweets

2. **Note turn 4**

Scene: L. is about to leave G.'s house, but first offers S. and G. some chocolate.

T1 L: Maltesers chocolate

T2 G: Ugh!

T3 L: They're all right for you Sariah because erm they haven't got any calories

T4 S: No I won't have any thank you

I., similar to S., was characteristically polite when interacting with both children and adults. She nearly always used politeness markers in situations where these are typically required. For example, she remembered to say "please" when making requests and "thank you" when in the position of receiving something. Turn 8 in the following example is characteristic of I.'s courteous request behaviour.

I: (29.06.98, aged 10;8) Note turn 8

Scene: I. eats dinner with her family; sisters, H. and B., and mother, M. The researcher L. is also present. The conversation revolves around the subject of football.

T1 L: Is there anybody tipped to win tonight?

T2 I: *{speaks in sing-song voice}* E:ngla:nd!

T3 M: *(looks at I. and makes a surprised sound)* Oh!

T4 H: Probably Argentina I'm afraid

T5 M: [[Well Argentina-

T6 I: [[Na:::

T7 M: They're five to four favourites aren't they Argentina?

T8 I: *{I. suddenly reaches out with her left hand and wriggles her fingers towards a bowl containing cheese}*
Beth, can you pass that cheese, please?

H: *{passes the cheese to I.}*

Unlike S. and I., G. usually had to be encouraged to use politeness markers such as "please" and "thank you," when with adults. But with same age or slightly younger peers, G. used these unreservedly. Note the following exchanges.

G: (17.09.98, aged 13;2)

1. *Scene: G. and her friend, D. talk with L. in the playroom.*
{slight pause: G. takes a drink from a bottle of pop and passes it over to D.)

T1 G: You can have the [[rest

T2 D: [[mm:
Thank you

{slight pause: D. and L. talk briefly and then D. passes the drink over to G.}

T3 G: Thank you

2. *Scene: G. and her friend, A. talk while unobserved in G.'s bedroom.*

T1 D: *{turns to G. and offers her her lolly wrapper}* Have you got a bin?

T2 G: A bin? *{gets up and takes D.'s proffered lolly wrapper}* Thank you *{throws wrapper in the bin, then sits back down on the bed}* Right. Wha' shall we talk about?

II Greeting and Leave-taking Adjacency Pairs

S., G. and I. showed appropriate greeting behaviour, that is, the ability to respond civilly to greetings such as "hello" that were directed to them and also to issue salutations themselves. S. and I. were characteristically polite when greeting their conversational partners and they often used formulaic phrases such as "How are you?" S. and I.'s leave-taking behaviour also followed conventional lines. Convivial responses such as the following were observed on many occasions.

S: (07.10.98, aged 11;7)

Scene: S., G., K. and L. watch television in the lounge. Suddenly there is the sound of the front door slamming as G.'s father M enters the house. M. then comes into lounge and S. and G. turn round abruptly.

T1	S:	Hello
T2	M:	*{walks further into room}* How ya doin'? [[All right? Hi *{speaks to L.}*
T3	L:	[[Hi Hi
T4	S:	Hello (..) Have you had a good day at work?
T5	M:	Yeah busy

S: (16.10.99, aged 12;7)

1. *Scene: S. has just awoken from her afternoon sleep and after talking to G. and K. for a few seconds walks into the lounge where L. is waiting.*

T1	S:	Hello
T2	L:	Hi Have you been asleep?
T3	S:	mm: *{simultaneously sips her drink and goes to sit on the sofa}*
T4	L:	Are you ready to play a game then?
T5	S:	Yeah.

2. *Scene: L. has just finished administering some tests to S. After a brief conversation, S. is ready to leave.*

T1	S:	I'm gonna go *{gets up from sofa and walks out of camera range}* What ya doin'?

{3 second pause}

T2 L: I'm goin' to leave now

T3 S: Bye bye then (..) Nice seein' you again

T4 L: Okay Sarah it was nice seein' you too See you again soon

T5 S: Yeah *{walks into the kitchen to speak to G. and K.}*

I: (02.12.98, aged 11;1)

Scene: I.'s mother M., has just arrived home from work and I. greets her.

T1 I: Hi Mum

T2 M: *{Has just walked through door}* Hi:!

T3 I: How are you?

T4 M: I'm fine How are you?

T5 I: Oh we're upstairs

T6 M: Are you? Right I'll make you a cup o' tea

In contrast to S. and I., G. did not habitually use greetings or partings with adults or respond to these spontaneously. Often G. had to be encouraged to reply to "hello" or "goodbye" and sometimes she did not reciprocate at all, but looked at the interlocutor sullenly. Conversely, G.'s greeting and leave-taking behaviour was, it appears, always very polite when in the company of her peers. (This suggests that when G. exhibited greeting behaviour was dependent on the context and/or conversational partner.) G.'s courteous greeting and parting routines with peers is illustrated by the following examples:

G: (17.09.98, aged 13;2)

Scene: Unobserved conversation between G. and her friend, D. They have been playing a game where they pretend to be at school and describe imaginary holidays. L. suddenly enters the room.

{L. knocks on door and enters room}

T1 G: Oh hello *{speaks in a pleasant, conciliatory manner}*

T2 L: Hi how's everythin' going?

T3 G: [[fine

T4 D: [[okay

T5 L: Sorry I didn't mean to interrupt

T6 G: That's all right *{speaks in the same pleasant manner as before}*

T7 L: Sorry *{turns to leave room}*

T8 G: That's [[okay

T9 D: [[okay

T10 G: *{continues with her imaginary holiday story}*

G: (19.11.98, aged 13;5)

Scene: S. has just arrived outside G.'s house. G.'s adoptive mother K., opens the door to let S. in and G. sees another friend, T. outside.

T1 G: Hello Taylor

{pause and several voices overlap}

T2 S: *{enters the house and addresses K. and G.}* Hello Hello

{pause: T. then walks down the drive to her mother who is parked outside}

T3 S: See you tomorrow Taylor

(slight pause: voices overlap)

T4 S: Good bye Taylor

T5 G: Bye Taylor

In the first example, below G. and her friend D. aged 11;10. (from a main stream school) are asked to have a five-minute conversation by L. In the second, G. and D. are engaged in a game of pretence. Although these discussions are contrived, G.'s turns show that, in structured situations and pretend play with peers, she had knowledge of appropriate social routines even if she did not always use these spontaneously with adults.

G: (17.09.98, aged 13;2)

1. Scene: G. and D. are sat talking in bedroom with L. present.

T1 G: Hello

T2 D: Hello

T3 G: How are you?

T4 D: Fine thank you how are you?

T5 G: Fine thank you *{smiles and lets breath in and out sharply, while rubbing her hands together}*

2. *Scene: Unobserved conversation between G. and her friend, D. They play a pretend game called "Shops."*

T1 D: Right (.) Right and you come-you come in and buy something Just pretend you bought something=

T2 G: =Hello: Mi:ss *{puts on a 'plummy' accent}*

T3 D: Hello:

T4 G: Can I buy a actually a doll-a Shellie one please? *{G. holds up a doll}*

T5 D: *{D. takes the doll of G.}* Let me see now

4.4.4 Adaptability

It should already be clear to the reader from the examples above, that S., G and I. did not have rigid conversational styles, since their communicative behaviour appeared to change with different conversational partners and/or contexts. In the next section S., G. and I.'s conversational abilities in varying contexts are compared.

I Georgina

G. was more likely to talk at length or describe her experiences when interacting with peers rather than with adults. Generally, G.'s behaviour with familiar adults (such as her adoptive parents or the present researcher), was either monosyllabic or argumentative, whereas with same age or slightly younger peers, she was more conciliatory and even deferential (see discussion with S. below). According to her adoptive mother, K., G. was eager for and enjoyed the company of other children, preferring to be with them rather than with adult family members. In the next two examples, G.'s conversational behaviour with S.'s adoptive father, R - a familiar adult, and a slightly younger friend D. are compared.

Conversation with familiar adult.

G: (24.04.99, aged 13;9) Note turns 3, 5, 7 and 9

Scene: G. has been playing a board game with S.'s brother N. S.'s father, R. comes into the lounge to observe G. and N.'s game.

T1 R: Have you played this before Georgina?

T2 G: No. *{speaks rather abruptly and does not look at R.}*

T3 R: No?

G: *{wipes hand across forehead self-consciously}*

{brief exchange between N. and R.}

T4 R: What games d'you play at home Georgina?

T5 G: *{looks at R.}* Nothink

T6 R: You don't play any games?

T7 G: No!

T8 R: No board games?

T9 G: No!

T10 R: What d'you do all the time then?

T11 G: *{sits back, looks away from R. and mumbles}* Play outside with my friends That's all *{looks down at table, still not maintaining eye-contact with R.}*

T12 R: At nights when it's dark?

T13 G: Yeah! *{turns to looks at R..}* No! *{smiles self-consciously}*

T14 R: What d'you do when it's dark? *{humorous undertones in voice}*

T15 G: e:rm (..) *{turns head to look out of the window}*

T16 N: Go to sleep *{supplies G.'s answer for her}*

T17 G: No *{looks up at ceiling}* Mess about *{Smiles self-consciously}*

T18 R: What in the house?

T19 G: *{looks at R. and smiles shyly}* Yep!

T20 R: D'you watch television a lot?

T21 G: Nope!

{slight pause: R. is visibly trying to think of something else to say}

Conversation with peer aged 11;10

G: (17.09.98, aged 13;2) Note turns 1, 5, 11, and 14

Scene: G. and friend D., play a game of pretence, where they describe imaginary holiday experiences. G.'s anecdote, however, is actually based on a real holiday that

occurred a year previously. Their conversational behaviour is unobserved by any one else.

T1 G: I went to-I went to Devon and look what I bought today (.) in Devon *{reaches behind her and picks up a small doll to show D.}* a Shellie doll just to show

T2 D: A:w that's ni:ce *{lowers voice conspiratorially}* Pretend the erm teacher's pulling a face because he wore that on top *{refers to a hat}* *{pause: G. gazes at D. for a few seconds}*

T3 G: Shall I take it back home?

T4 D: O:h no: You do what ever you want with it It's yours Georgina

T5 G: And when after that when we went doin' we sun bathe on the beach and erm after-Just pretend I bought you photographs and leaflet okay? Just pretend Shall we pretend?

T6 D: *{whispers}* Oh thank you Georgina

T7 G: I bought a clock

T9 D: Huh?

T10 G: I bought a new clock *{pause: D. whispers inaudibly and touches the clock that G. is holding. G. then puts the clock on the shelf.}*

T11 G: And after that when I was in Devon I had restaurant I had lasagne erm and I had apple-apple pie and custard [[and black currant-

T12 D: [[*{Coughs}* *{pause: G. looks up at D.'s face}*

T13 D: Yea:h?

T14 G: mm: *{nods simultaneously}* And then we went to be:d then I shared bedrooms with (..) just a friend-just me and erm when I went-and I did *all {simultaneously waves arms around to emphasise "all"}* those holidays everythink That's it now

T15 D: Well done Georgi:na

T16 G: It's you that('s) got to tell me about your holiday

In the first example, where G. interacts with a familiar adult, R., her natural conversational behaviour is rather diffident. R.'s repeated attempts to elicit conversation from G. are met with abrupt or monosyllabic responses. Most of G.'s turns in the above exchange (e.g. 15, 17, 19, 21, 23) consist of minimal replies and

these, together with her non-verbal behaviour, that is, lack of eye contact, sighs and fidgety movements involving wiping hand across brow, suggest that she is self-conscious while talking to R. and finds discussion with him an altogether uncomfortable experience. Also note that throughout the exchange G. does not reciprocate R.'s initiations with questions of her own.

In the second example, G.'s conversation with a friend during a game of pretence is 'chatty' and her turns quite lengthy and descriptive. Thus her communicative style is noticeably different to that with the adult R. above. G. is more talkative and animated than with R. and she appears to enjoy the activity of narrating imaginary holiday scenes (although based on previous experience). G. maintains the conversational topic by asking questions and giving statements. She even responds appropriately to D.'s request for clarification in turn 9. Also aspects of G.'s non-verbal behaviour also differ when she interacts with D. G. is much more demonstrative than with R. Her use of symbolic gestures (such as shrugging) appear to increase and she uses these to accentuate her speech, that is, she often uses hand gestures while simultaneously vocalizing in order to emphasize a point that she is making. Also G. establishes and maintains eye contact with D. when taking her turns or gazes endearingly at D. when she is talking. The effective eye contact that G. demonstrates with D, is lacking during her dialogue with R. above. In addition, G. also modulates the prosody of her voice and sometimes elongates vowel sounds as in "a:ll" (T14).[7]

As the above indicates, G.'s communicative style during naturalistic conversation with adults was different to that during narrative or pretend play activities with peers - demonstrating that her social behaviour changed with context and conversational partner.

II Sariah

S.'s communicative behaviour also appeared to change according to the situation or person to whom she was talking. For instance, S., could be voluble and domineering with quieter children such as G., but tended to be more reserved with family members

like her boisterous younger brother N. It was during the early stages of the study that S.'s social interaction with N. was observed in detail. N. was both very talkative and competitive and would frequently try and overshadow S. with his chatter. Thus, when N. was with S. and their adoptive mother J., he often vied for J.'s attention by interrupting S.'s turns or dominating the conversational floor with his lively speeches. S., however, often deferred to N. by pausing patiently in order for him to complete his turn. Rather than show irritation or impatience with N., S. politely tolerated his disruptions. This was indicated by S.'s facial expression which was usually neutral or involved a smile. Such deference did not appear to be exclusive to N., however, as S. was also very respectful towards her mother, J.

It was also noted that S. emulated aspects of N.'s behaviour including his vocal characteristics and non-verbal gestures. On many occasions, S appeared to closely monitor N.'s actions, in order to predict what he was likely to do next. Generally, S was acquiescent to N., who, extrovert and vivacious in character, frequently assumed the lead role in conversation. The next conversational extracts show S.'s turn-taking behaviour with N. The first two examples illustrate the way that N. would interrupt S.'s turns and she would pause patiently while he spoke.

Conversation with younger brother aged 6;6

1 S and N: (12.05.97, aged 10;2) Note turns 4 and 5

Scene: N. and S. are engaged in a game of football in the garden. Their parents J. and R. are filming them. J. calls S. over.

T1	J:	What are we goin' to do next week-half term?
T2	S:	erm We_ not at school.
T3	J:	mhm:
T4	S:	We:=
T5	N:	=So we're goin' to a park=Oh one with a safari park or a zoo
T6	D:	Let me ask Sariah
T7	J:	Yeah and what else are we gonna do Sariah?
T8	S:	And (..) on Wednesday we're gonna see Georgina

[7] G. also pronounced words such as "no" in a northern accent as observations of further dialogue

T9 J: mhm: (..) And who's Georgina?

T10 S: Kay

2 S and N: (07.08.98, aged 10;2 and 6;6) Note turns 1, 2 and 5

Scene: L. is filming S. and N. having a story telling game in the playroom. S. is describing to L. how she first met her friend G.

T1 S: mm: First of all I met Georgina at her house or she comes round my house (…) and=-

T2 N: =Sariah you tell a story not repeating (things) *{suddenly gets up and stands directly in front of S., who draws back in surprise. N. put hands up in frustration to emphasise point}*

T3 L: No I wanted to hear about this actually Nicholas Sariah tell me

T4 S: and (…) and then (..) we met friends and then we played together=

T5 N: =We met friends?

T6 S: Yea:h *{smiles shyly}*

In the third example, below, N. attempts to dominate the conversational floor by talking almost incessantly in order to drown out what S. and J. are saying. He even explicitly requests that S. "be quiet". In contrast to N.'s forceful and direct behaviour, S. is quieter and takes her turns almost hesitantly.[8]

between G. and D. revealed.

[8] Examples for May 1997 correspond to video-data taken by S.'s parents before the study began.

S and N: (17.05.97, 10;2 and 6;6) Note turns 3, 4, 10 and 16

Scene: J. attempts to talk to S. about some pattern and colouring activities. However, N. tries to compete for J.'s attention by presenting his own patterns to the camera.

T1 J: D'you prefer doin' your colouring?

T2 S: Yes

T3 N: And I did this [[one How do you think I make that one? [[I-I put a (fan) [[and er cut shapes in it y'see Sariah be quiet when I'm talking-

T4 S: [[erm o:h Mum I-

T5 J: [[(Y- You can come to the pool with us)

T6 S: [[I can do th-I can do those two the same

T7 J: That's right

T8 S: So

T9 J: [[(Nicholas Nicholas (.) That'll do

T10 N: [[And and I did that one and I did that one and I did that one and I did that one and (..) I did that one and I did er *{whispers}* which one? And I did the mask one *{growls}*

T11 J: [[Yes it looks like a mask that one

T12 S: [[Yes

T13 N: [[Does it?

T14 J: mhm

T15 N: And I did this one Lots

T16 S: Can I tell= *{puts hand up}*

T17 N: =And I did this one

In contrast to her compliant, almost passive conversational behaviour with N., S. was more proactive, even domineering and forceful with quieter children such as G. S. often took the 'centre-stage' in that she dominated the conversational floor with her animated turns, whereas, G., often argumentative with adults, was deferential in S.'s presence. Particularly during role playing games, it was observed that S. often interrupted G.'s turns with her own verbose opinions and ideas or instructed G. on what to say next. The majority of G.'s turns consisted of one word replies or comments controlled by S., and incomplete sentences (due to S.'s disruptions). The following example (07.10.98), typical of the exchanges between S. and G., occurred

when they were respectively aged 11;7 and 13;3. and occupied in a pretend play activity involving the acting out of imaginary scenes from school. It illustrates S.'s dictatorial behaviour during conversation with G., that is, she instructed or 'directed' G. on the content or form of her utterances and took over the conversational floor with her lengthy turns. Note in particular turns 1, 3 ands 9.

Conversation with older peer, aged 13;3, with similar background

S: (07.10.98, aged 11;7) Note turns 1, 3, 7 and 9

Scene: S. and G. have been playing 'schools' in the sitting room. After a brief interruption by G.'s brother, J., S. resumes the game

T1 S: *(starts to sing to herself)* Then we got ho-at school an' then I said "Sorry I 'aven't done my homework 'cuz I've got my colouring"=Pretend you was a teacher an'-l-l-look *{holds up her coloured picture in front of G.}* an' then you said "O:h look at- Mi:ss I've done my colouring" then ya saying- Then don't shout just whisper like I'm talking *{looks at G. to emphasize her point and gestures simultaneously}* Pretend "Miss I've done my colouring" (..) You say "Detention" *{looks expectantly at G.}*

T2 G: *{G. has been looking at S. rather blankly, throughout her monologue}*Detention

T3 S: O::h Mi::ss *{then raises voice}* But I love detention a::h de-dah-dah-dah Then I'm um-m-m-m *{gestures to herself}* an' then-an' then (.) an' then you-an' then I went in your room an'-an' then you: had to say (.) say "Why did you get detention?"

T4 G: Why did ya get detention?

T5 S: 'Cuz I didn't-I didn't know the colour of my picture so pip squea:k! You do the colouring [[Boring I wish I could (hold)

T6 G: [[I know but you('ve) got to do it

T7 S: *{pretends to cry}* scribbly scribbly nah nah nah-nah nah [[Oh Then w-then we went home but er sister "I got detention I love homework" an' then you told it to my Mum

T8 G: [[Well scribble on the-
Mum

T9 S: N-no you *{points at G.}* (..) I say it to you 'cuz you pretend you're my mum yeah [[You're everything like you'll pretend you're teacher an' mum an' friends yeah?

T10 G: [[Mm: *{nods simultaneously}*
mm: *{nods blankly then turns back to her colouring}*

T11 S: Sister (..) erm Mu:m I got detention

T12 G: Why:?

T13 S: 'Cuz I('m) want to get detentio:n

III Ingrid

Similar to both S. and G., I.'s social and communicative behaviour subtly differed according to the situation and/or conversational partner. This was most evident when I.'s conversational interactions with her adoptive mother M. and peers were compared. When I. and her mother M. were together, M. often controlled their conversational exchanges. She frequently told I. what to say, or introduced specific conversational topics, which she maintained by constantly asking questions to which I. answered rather tentatively. I. rarely asked questions or initiated topics herself. In these contexts, I. appeared to be quite shy and self-conscious. This impression was reinforced by her non-verbal behaviour: She often did not establish direct eye contact with M., choosing, instead, to look down at her hands. In addition, I. spoke very quietly – almost inaudibly. The following (early) example is representative of I. and M.'s conversations throughout the study. Note, for example, that nearly all of M.'s turns consist of questions and virtually all of I.'s turns the answers to these. I. does not ask any questions at all. Also of interest is the way that M. instructs I. on her next response in turn 18.

Conversation with adoptive mother

I: (09.06.98, aged 10;8)

Scene: I. is sitting on her mother M.'s lap. M. asks I. about a previous football experience.

T1 M: How many matches did you play?

T2 I: Three

T3 M: And who..who scored the goals?

T4 I: Sam Wright

T5 M: mm: Is he a good player?

T6 I: Nearly (.) scored it

T7 M: Nearly scored it?

T8 I: Yeah=

T9 M: =Well, who actually scored it?

T10 I: *{speaks very quietly}* Don't know who actually scored it Lars- Lars G- Oh don't know I forgot

T11 M: Who scored the first goal?

{pause}

T12 I: They got ten We got one

T13 M: Mm:?

{pause and I: does not answer}

T14 M: What about (.) the class play that you did?

T15 I: Oh I was in the da-dragon

T16 M: And what was the play called?

T17 I: George? St. George and the dragon

T18 M: Well tell me the story about St. George and the Dragon

{pause}

T19 I: St. George came up and fighted dragon

I. was much more outgoing with her friends than she was her adoptive mother. I. was particularly effective at using questions to initiate conversation with peers (who were shy or quieter than herself) – which was something she did not do as often with her mother. On one occasion (10.10.98), I. aged 11;0 was filmed with her friend, C. aged 10;9, who was observed to be noticeably quieter than I. and quite reserved in the researcher's presence. I. and C. were filmed talking while eating their dinner for a period of thirty minutes. I.'s mother M. was present for the first few minutes, after which I. and C. were left by themselves.

Observations of the video data revealed that C.'s behaviour was frequently noncommunicative, that is, she did not pay much attention to I. and, instead, looked down at her dinner plate, while eating quietly. However, I. appeared to adapt herself to C.'s relative quietness by employing a range of communicative devices in order to

draw her in to the conversation. One strategy that I. used (in order to engage her friend, C) was topic initiation. I. broke the long silences by introducing different conversational topics – through the use of questions - and maintaining these, again through asking questions or making statements. I. also showed sustained eye-gaze during her turns, and appeared to pause at relevant points in order to allow her friend a turn in the conversation. This is illustrated by the following extracts:

Conversation with slightly younger peer aged 10 years

I and C: (14.10.98, aged 11;0)

1. **Note turns 3, 5, and 6.**

Scene: I and C. have been talking about C.'s sister, L. There is then a long pause while I. and S. carry on eating. Following this, I. continues again with the same topic.

T1 I: Y'know your sister?

T2 C: Yeah

T3 I: She wan't there She weren't in year six very long O:h then when we helped (.) Mr Sloan put all the stuff in the van and he gave us a lolly=

T4 C: =Yea:h

T5 I: Yeah y'know Class 3 they jus-Y'know Class 3 they just went in just ignorin' the stuff just takin' their own bag and go straight home didn't they?

{C. Nods}

T6 I: An' then-An' then we should have gone to Rounders with Louise A bit late for Rounders weren't we?

T7 C: Yeah

2. **Note turns 1 to 3**

Scene: Short pause, then I. begins to talk about the joint serving of drinks during the dinner hour at school.

T1 I: D'ya know know the partner you do drinks on?

{2 second pause: I. leans towards C. slightly, looking at her face. C nods without looking at I., and glances around kitchen}

T2 I: You're not allowed to swap it

{2 second pause: I. gazes at C, who looks down at her plate, while eating}

T3 I: I wanna be with you

{2 second pause: I. looks at C., waiting for her response. However, C. still does not return I.'s eye-gaze, but smiles and carries on eating}

T4 I: You're not allowed to swap it

{2 second pause}

T5 C: Yvette nearly always asks to do it wi' me an' I don't like it

T6 I: Yeah I know You're not even allowed to swap You have to keep to that partner *{I. is looking at C. who nods slightly but does not establish eye contact with I.}* She nearly does it with every one

3. Scene: End of meal. Long pause then I. introduces completely different topic. M. is again present.

T1 I: D'ya like it when if you do hard work Mr. Rowe goes [["Yeah!" *(stretches out hand towards S. in a thumbs up sign)* It's funny int it? He always does it to me when (he says) "Are you going to football match?" and I goes "Yeah" *{again waves hand up and down in thumbs up sign}*

T2 C: [[*{Nods}*

Yeah

The above exchanges illustrate I.'s ability to initiate and maintain conversation with a peer, C. I. achieved this by introducing new topics or continuing with old ones. I. asked questions, relayed anecdotes or made comments concerning her conversational partner's previous turn. When taking her turns, I. tried to establish eye contact with C. and often accentuated her speech with other non-verbal gestures such as hand movements. I., who did not habitually ask questions or initiate topics when conversing with her adoptive mother, used these strategies to encourage the quieter C. to participate in a discussion. I thus adapted her conversational behaviour to C.

4.5 Summary: S., G. and I.'s Social and Communicative Behaviour as Analysed by an Adaptation of Conversation Analysis

S., G. and I.'s case studies suggest that if a socially neglected child is placed within a nurturing environment between the ages of 4 and 7 years (the age range during which S., G. and I. were adopted), he or she can go on to develop appropriate social and communicative skills as reflected in conversation. In this chapter, S., G. and I.'s social and communicative during a two-year period was examined in detail. Features of conversation that Conversation Analysts focus upon were described. Particular syntactically defined structures (e.g. aux-inverted versus WH-type questions) were also illustrated. It was found that S., G. and I. were adept conversationalists, that is, they were skilled in making use of all the communicative strategies generally found in adult conversation.

Generally, S., G. and I.'s turn taking during conversation was appropriate; they did not persistently interrupt, could ask questions (i.e. enquire about the view of others, make requests, issue invitations) and answer questions, express opinions such as likes and dislikes and, in some contexts, they could relay brief anecdotes or describe their experiences. This shows that, S., G. and I. were aware that conversation follows a sequential order whereby, speakers take turns, and usually (in English conversation) one person speaks at a time (Whitworth, Perkins and Lesser, 1997). S., G. and I. could also repair conversational breakdowns through a number of devices such as requests for clarification (i.e. "What did you say?" I, aged 11;0). Social routines involved the effective use of politeness markers (i.e. "please" and "thank you") and greeting and parting adjacency pairs (i.e. "hello" and "goodbye"). The girls demonstrated effectual non-verbal behaviours during conversation, which included eye contact, manual and facial gestures, intonation and prosody. Importantly, S., G. and I. did not exhibit rigid conversational styles since their communicative behaviour appeared to change according to the context and/or conversational partner. S., G. and I.'s social and communicative behaviours were unlike those of children with disorders from the autistic continuum and were not comparable to the "quasi-autistic patterns" noted for other previously institutionalised children by Rutter et al (1999) and Rutter, Kreppner and O'Connor, (2001).[9] Thus, S., G. and I.'s cases suggest that social deprivation in

[9] Furthermore, it has been noted that, in other children with histories of extreme neglect, initial autistic tendencies have actually disappeared with time (Skuse, 1984).

the early years, does not preclude the development of sophisticated social and communicative skills and awareness, as reflected in conversation, that is, as long as there is a beneficial change to the child's neglectful environment.

Next Chapter – In contrast to this chapter's focus on the observation and description of spontaneous conversational behaviour, Chapter 5 concentrates on the measurement of elicited linguistic behaviour using standardized tests.

Chapter 5 Language Development

The following chapter using quantitative, psychometric data addresses the following research question:

1. What are the effects of extreme global isolation during infancy and the early childhood years on linguistic development?

Chapter 5, reports the results of standardized language tests. S., G. and I.'s language development was investigated during a two year period between June 1998 and May 2000, when S. and G. were in their early teens and when I. was just about to approach her teenage years. Aspects of language ability are subsumed under the umbrella terms, "Semantics", "Grammar", "Morphology", "Reading" and "Narrative".[1] Generally, S., G. and I.'s quantitative test results were extremely poor, given their chronological ages, suggesting that they were experiencing global language difficulties. Was this due to linguistic immaturity, that is, language skills that were still in the process of emerging or innate learning difficulties? To help address this, S., G. and I.'s responses on some standardized tests were qualitatively compared with two groups of chronologically younger normal controls aged 6 to 7 years. It was found that responses were similar. In other words, S., G. and I.'s test responses were more like those of much younger children than those from similar chronological age groups. Thus, the effects of extreme early deprivation on language, according to the psychometric data, is that, by late childhood, its development is globally delayed relative to chronological age, but not to general learning capacity.

5.1 Standardized Tests

During the present study, S., G. and I.'s language development was assessed using a battery of standardized tests of language during a two-year-period. The tests

[1] Phonological aspects of S., G. and I.'s language ability were not examined in any detail and this oversight is recognized.

comprised two global[2] assessments of language, the Clinical Evaluation of Language Fundamentals Third Edition (CELF-3) and CELF-Preschool and eight individual standardized measures. Most of these tests were re-administered after a year (see Table C.1, Appendix C. for a summary of S., G. and I.'s results and the ages and dates that they were tested). First of all, the reader is reminded of the biographical details concerning S., G. and I.'s early histories which are presented in Table 5.1, below. This information concerns the children's dates of birth, age on entry into the adoptive home and the date when this occurred. Also included are S., G. and I.'s ages at the start and finish of data collection.

Table 5.1 Dates of births, age and date when entered the adoptive home, age when data collection started and finished.

	Sariah	**Georgina**	**Ingrid**
Date of Birth.	03.03.87	22.06.85	07.10.87
Date When Entered Adoptive Home.	August 1994	October 1991	August 1991
Age When Entered Adoptive Home.	7;5	6;3	3;10
Age When Data Collection Started.	11;3	13;1	10;8
Age When Data Collection Finished	13;2	14;10	12;7

5.1.1 Behaviour During Testing

Observations of S., G. and I. during formal test administration, revealed that they displayed varying profiles of behaviour. The following section describes S., G. and I.'s general behaviour in the task-oriented context.

[2] The term, "global" is used to describe a general linguistic test that measures more than one aspect of language. Thus, in the case of CELF-3, morphology, syntax, semantics *and* memory are assessed. This is in contrast to standardized tests that are specifically designed to examine one area of language such as phonology.

I Sariah

S. was always cooperative and would view the task-oriented session as an interesting challenge to overcome. S. was usually eager to perform well on tasks, even on ones that proved difficult for her and she would be disappointed or concerned if she thought that her responses were incorrect. Despite the fact that she wanted to do well on these tasks, she often appeared to be very unsure of her abilities. Even if she were given lavish amounts of praise for a particularly successful test performance or for continued effort, she would always deny this and say that she had not done very well. This was perhaps indicative of very low self-esteem or lack of belief in her abilities. S. was always alert and showed sustained concentration during formal tasks, although her behaviour could be overly dominant or abrupt at times. Generally S. could be relied upon to give responses without constant prompting and her enthusiasm for the testing situation meant that little encouragement was needed to keep her motivated. Her test performances remained consistent throughout the duration of the study.

II Georgina

G.'s behaviour during the administration of standardized tests was rather reserved at times and, unlike, S. she displayed little enthusiasm for these tasks. Generally, however, G. was a willing participant during test sessions and would remain quiet and introspective during these activities. Occasionally G.'s behaviour would become challenging, but at other times, she appeared to want to do well on tasks. She would be eager for her parents to know that she had performed successfully and even questioned the present researcher about her progress, e.g. "Was I tryin' hard then?" (16.10.99). G. could concentrate for long periods although, occasionally her attention would wander and she would have to be redirected back to the task in hand. G. could be very patient when games became monotonous and would choose to stay quiet rather than complain. This can be compared with the responses of much younger, normally developing children, whose attention may have needed to be constantly redirected. Similar to S., G. appeared to be uncertain of her abilities and even if she had performed successfully on a task she would often deny that she had.

III Ingrid

I.'s conduct in task-oriented sessions was often extremely 'chatty'. This was exasperating if one were trying to explain the rules of a game. I. would get excited about some of the activities and would laugh, giggle or tell school jokes. I.'s behaviour could be described as animated, cooperative and charming, but, occasionally, she was over-friendly. For example, I would touch the jewellery, clothes or hair of the researcher and would talk incessantly. This sociability meant that she did not always concentrate on the tasks. Often I. was easily distracted (normally by the urge to tell an anecdote or make comments about some aspect of the task setting) and her attention had to be redirected to the test games. On several occasions, I.'s actions were so exuberant, that her mother M. had to reprimand her. However after I.'s excitability abated, she was generally able to sustain her concentration during test administrations.

5.2. Performances On Global Language Measures

In the following section S., G. and I.'s performances on the two global measures of language ability, CELF-Preschool and CELF-3 are reported. A summary of S., G. and I.'s scores on CELF-Preschool and CELF-3 are presented in Table 5.2 below.

5.2.1 CELF-Preschool

S. and G were administered The Clinical Evaluation of Language Fundamentals, Preschool (Wiig, Secord, Semel, 1992) once on 11th March 1999. They were respectively aged 12 and 13;8 years at the time. It was not administered to I.[3] It was given to S. and G. as a preliminary to testing on CELF-3 which is standardized for their chronological ages. A group of 20 younger control children aged between 3.10 and 6.7 years (mean age = 5.9) were also tested on CELF-Preschool. The oldest age range for which CELF-Preschool is designed is 6;6 to 6;11 years. S. and G.'s (age equivalent) scores when compared to the norms were –1.26 and –1.53 from the mean of children in this age group. S. and G.'s test age equivalent scores were 4;7 and 4;5 respectively. The percentile ranks were 10 and 6. Worthy of note is that some of S.

[3] This is because the CELF-Preschool measure was not available on the day that I. was visited.

and G.'s 'errors' on one subtest, Formulating Labels – which is a referential naming task - were similar to those of the younger control children (see Section 5.2.3 on "Romanian Adoptees Qualitatively Compared With Younger Control Children.").

Table 5.2 Results: S., G. and I.'s scores on global language tests: date and chronological age when tested, test age equivalents, deviation from the mean and percentile ranks.

	Sariah		**Georgina**		**Ingrid**	
CELF-Preschool						
Date When Tested	11.03.99		11.03.99			
Chronological Age	12;0		13;8		N/A	
Percentile Rank	10*		6*			
Test Age Equivalent	4;7		4;5			
Distance From The Mean	-1.26*		-1.53*			
CELF-3						
Date When Tested	24.04.99	20.05.00	24.04.99	20.05.00	10.03.99	6.05.00
Chronological Age	12;1	13;2	13;9	14;10	11;5	12;7
Percentile Rank	1	1	1	1	1	1
Test Age Equivalent	5;0	5;0	5;0	5;0	5;0	5;0
Distance From The Mean	-3	-3	-3	-3	-3	-3

*Percentile ranks (and deviations from the mean) when compared with the scores obtained by children aged 6;6 – 6;11.

5.2.2 CELF-3

The Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3, Semel, Wiig, & Secord, 1995) was first administered to S., G. and I. (March, April, 1999) when they were aged 12;1, 13;9 and 11;5 respectively and again one year later (May 2000) when they were aged 13;2, 14;10 and 12;7. A group of 9 younger control children aged between 6;0 to 6;11 years (mean aged = 6;5) were also tested on CELF-3. Below is a brief description of the CELF-3 and its sub-tests.

I Brief Description of CELF-3

CELF-3 is a clinical measure for the identification, analysis and follow-up assessment of deficits in language ability. It is similar in organization to CELF-Preschool, except

that it is designed for use with older children, adolescents and young adults between the ages of 6 years 0 months through to 21 years 11 months. It consists of 11 subtests, each of which assesses the areas of morphology, syntax, semantics and memory. Each subtest raw score can be converted into standard scores and percentile ranks. The subtest scores can be used to compute Receptive Language, Expressive Language and Total Language scores. CELF-3 also gives age equivalents. The Receptive Language subtests comprise: Concepts and Directions, Word Classes, and Semantic Relationships. The Expressive Language subtests comprise: Formulated Sentences, Recalling Sentences and Sentence Assembly. S., G. and I were administered all six core subtests and two additional supplementary measures, Word Structure and Sentence Structure which are standardized for younger children up to the age of 8;0-8;11.

II Results: Performances on CELF-3 for 1999 and 2000

Scores on Individual Subtests

CELF-3 subtest raw scores can be converted to standard scores.[4] A standard score of 10 represents the typical performance of a subject of any given age. S., G. and I.'s standard scores for the six core subtests were between 3 and 6 for both times that they were tested. These scores corresponded, on average to percentile ranks of 1 and were about –2.3 SD from the mean of children of S., G. and I.'s chronological age groups. According to Semel, Wiig, & Secord (1995), +1 or –1 standard deviation from the mean is considered to be within the normal range of any given age group. Test performances that deviate by as much as –2.3 SDs below the mean indicate clinical 'delays' of certain abilities (Semel, Wiig, & Secord, 1995). As the girls' scores on the core subtests deviated by as much as –2.3 SDs from the mean of their age groups, the indication is that their language ability was globally 'delayed' for their chronological ages.

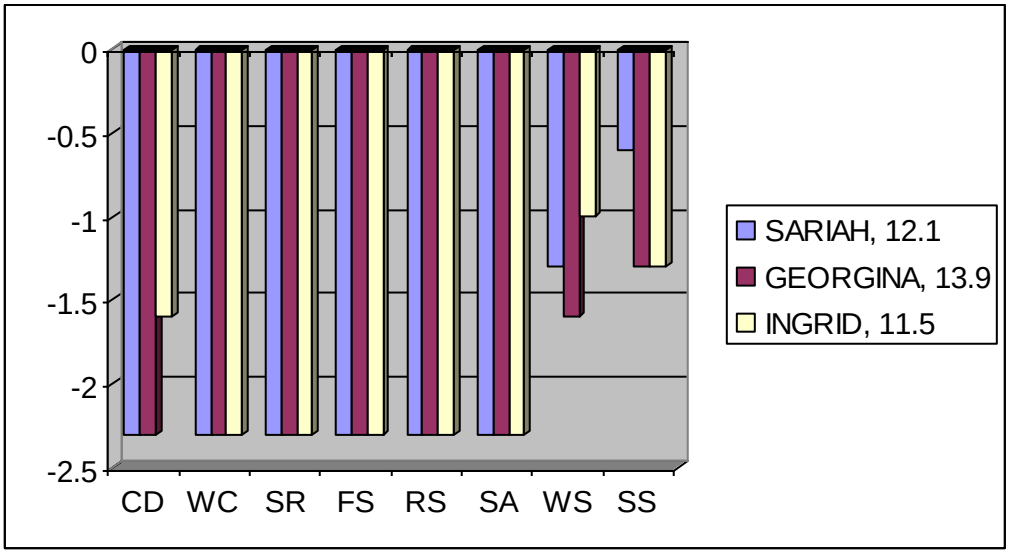
[4] According to the CELF-3 manual, standard scores provide a means of comparing the subject's performance to the normative data. The standard score scale that CELF-3 uses has a mean of 10 and a standard deviation (SD) of 3. A standard score of 10 represents the typical performance of a subject of any given age. About two thirds of all normally developing subjects (with typical language ability) will obtain standard scores between 7 and 13 – considered to be the normal range (Semel, Wiig and Secord, 1995).

The percentile ranks and deviations from the mean remained virtually the same for S., G. and I. when they were retested 13 – 14 months later - although there were subtle indications of progress concerning S. and I.'s scores on the Concepts and Directions, Word Classes and Formulated Sentences subtests. S., G. and I.'s scores on the two supplementary subtests (Word Structure and Sentence Structure) were compared with the norms for children aged 8;0 – 8;11. S. and G.'s scores on Word Structure deviated by as much as –1.66 from the mean of children in this age group, whereas I.'s most recent score (16.05.00) was the average for children of this age. Scores on Word Structure only slightly improved over a year. S., G. and I. gave their best performances on Sentence Structure. Their most recent scores on the Sentence Structure subtest were between 0 and +1.66 from the mean of children aged 8;0 – 8;11, that is S. and G.'s scores were superior to those obtained by the average child in this age range, whereas I.'s score was equivalent to an average ability child in this age range (see Table C.2, Appendix C. for the raw scores, standard scores, and percentile ranks corresponding to S., G. and I.'s performances on all the CELF-3 subtests). The distances from the mean of S., G. and I.'s subtest (standard) scores for 1999 and 2000 are depicted in Figures 5.1 and 5.2. These give some idea as to how far below the average performance most of S., G. and I.'s subtest scores deviated. Note that 0 on the histograms represents the average performance (of a subject of any given age).

As can be seen, their (standard) scores on the CELF-3 subtests were an average of –2.3 standard deviations from the mean of children in their chronological age

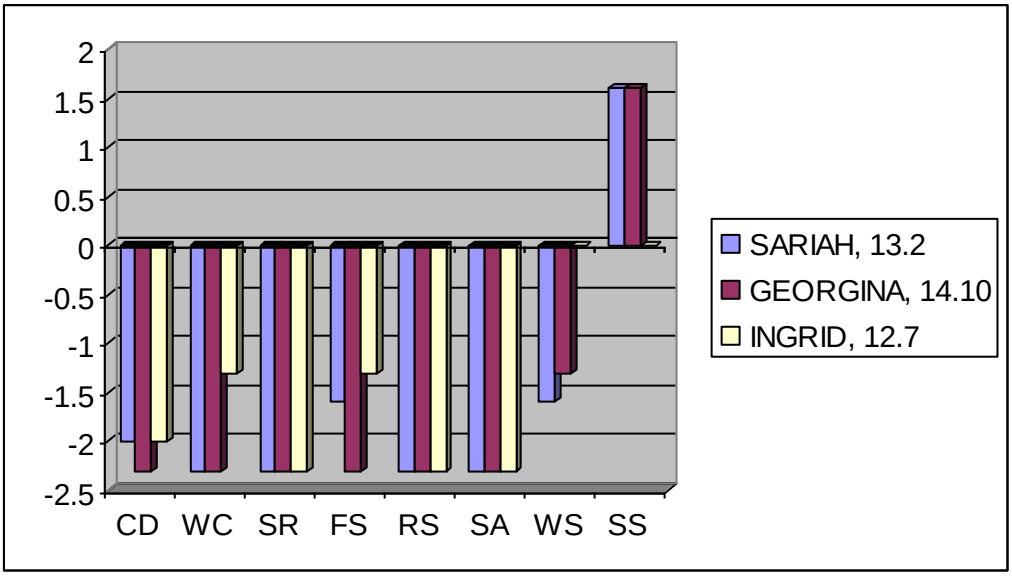
groups. There was only a slight increase to these scores when the girls were tested 13 to 14 months later.

Figure 5.2 Standard deviations from the mean corresponding to S., G. and I.'s CELF-3 subtest scores for March-April 1999.



Subtests: C.D.= Concepts and Directions; W.C. = Word Classes; S.R. = Semantic Relationships; F.S. = Formulated Sentences; R.S. = Recalling Sentences; S.A. = Sentence Assembly; W.S. = Word Structure; S.S. = Sentence Structure.

Figure 5.2 Standard deviations from the mean corresponding to S., G. and I.'s CELF-3 subtest scores for May 2000.



Subtests: C.D.= Concepts and Directions; W.C. = Word Classes; S.R. = Semantic Relationships; F.S. = Formulated Sentences; R.S. = Recalling Sentences; S.A. = Sentence Assembly; W.S. = Word Structure; S.S. = Sentence Structure.

Receptive Language, Expressive Language and Total Language Scores [5]

CELF-3 subtest standard scores can be used to compute a Receptive Language Score (RLS) and Expressive Language Score (ELS). These scores can be compared with each other in order to ascertain whether a child has primarily a receptive or expressive language difficulty or both. When these two scores are added together, the total converts to a standard score which comprises the Total Language Score. This gives an indication of the subject's overall performance on CELF-3. S., G. and I.'s Receptive, Expressive and Total Language Scores are presented in Table 5.3.

As can be seen from table 5.3, S. and G.'s Receptive, Expressive and Total language standard scores for April 1999 and May 2000 were all 50. I.'s standard scores ranged from 50 to 57. A standard score of 100 represents an average performance (Semel, Wiig, & Secord, 1995). Thus, S., G. and I.'s (composite) scores were considerably below the average range of children from their chronological age groups. There appeared to be no difference between S., G. and I.'s receptive and expressive language ability as indexed by the Expressive Language or Receptive Language scores for either 1999 or 2000, that is S., G. and I.'s poor scores were generalized across both receptive and expressive tasks. All of S., G. and I.'s composite scores corresponded to percentile ranks of 1 and were about –3 SD below the mean of children of similar chronological ages. This means that around 99% of children from S., G. and I.'s chronological age groups would be expected to acquire higher scores. S., G. and I.'s standard scores for March-April, 1999 remained virtually the same when they were retested 14 months later during May 2000.

Table 5.3 Year when tested, chronological ages at the time of testing, CELF-3 Receptive, Expressive and Total Language Scores (TLS), percentile ranks, standard deviations from the mean and age equivalents.

[5] The Receptive, Expressive and Total Language scores have a mean of 100 and a standard deviation of 15. A standard score of 100 represents the typical performance of a subject of any given age. About two thirds of all subjects with normal linguistic ability, obtain standard scores of 85 to 115 – considered to be within normal limits.

	Sariah		**Georgina**		**Ingrid**	
Year When Tested	April 1999	May 2000	April 1999	May 2000	March 1999	May 2000
Chronological Age	12;1	13;2	13;9	14;10	11;5	12;7
Receptive Language: Standard Score	50	50	50	50	53	57
Percentile Rank	1	1	1	1	1	1
SDs from the Mean	-3.3	-3.3	-3.3	-3.3	-3.1	-2.8
Expressive Language: Standard Score	50	50	50	50	50	53
Percentile Rank	1	1	1	1	1	1
SDs from the Mean	-3.3	-3.3	-3.3	-3.3	-3.3	-3.1
Total Language: Standard Score	50	50	50	50	50	52
Percentile Rank	1	1	1	1	1	1
SDs from the Mean:	-3.3	-3.3	-3.3	-3.3	-3.3	-3.3
Sum of Six Sub-test Raw Scores	54	86	59	62	75	99
Test Age Equivalent	5;0	5;0	5;0	5;0	5;0	5;7

The only noticeable change to S., G. and I.'s CELF-3 test performances over time appears to have been in the increase of their raw[6] (not standard) scores. S., G. and I.'s respective raw score totals (i.e. the total of six subtest raw scores) of 54, 59 and 75 for 1999 increased to 86, 62 and 99 by 2000. Even though, G.'s score had barely increased, S.'s 32-point increase and I.'s 24-point increase indicated that some progress had taken place. The raw scores of the six CELF-3 core sub-tests when totalled convert to an age equivalent. CELF-3 norms only specify exact test age equivalents for raw score totals of 93 and above and any figure below this corresponds to a test age equivalent of 5;0. Thus, even though, S. and G.'s raw scores

had increased, their scores for both times that they were tested were still below 93 and thus, were only equivalent to normally developing children aged 5;0 years. This is not the case for I. Although her raw score total of 75 for 1999 corresponded to a child aged 5;0 years, by May 2000, one year later, her test age equivalent had risen by seven months to 5;7 (according to CELF-3 norms).

5.2.3 Romanian Adoptees Compared With Younger Control Children

One may assume that S., G. and I.'s performances on global standardized tests such as CELF-Preschool and CELF-3 were not appropriate for their chronological age groups. Were S., G. and I.'s test responses similar to those that younger children would give? In order to investigate this (somewhat) S., G. and I.'s responses were compared qualitatively (where appropriate) to those of two groups of younger normally developing control children, aged between 3;6 and 6;11. These children were administered the same two global measures as S., G. and I. The first group consisted of 20 children of 7 age ranges; 3;6 to 3;11 (*n = 1*), 4;0 to 4;5 (*n = 4*), 4;6 to 4;11 (*n = 3*), 5;0 to 5;5 (*n = 3*), 5;6 to 5;11 (*n = 4*), 6;0. to 6;5 (*n = 4)* and 6;6 to 6;11 (*n = 1*). The mean age of the group as a whole was 5;9. They were administered CELF-Preschool. The second group consisted of 10 children aged between 6;0 and 6;11. The mean age of the group was 6;5. They were administered CELF-3. Both groups of control children attended a primary school in Nottingham.

I Expressive Vocabulary

The control children's responses on a referential naming subtest of CELF-Preschool (Formulating Labels) were similar to S. and G.'s on the test. They displayed uncertainty over the same items. For example, in response to a picture of a peacock, four children said "bird" just as S. had done and five children could not think of a name at all. S. had difficulty naming a picture of an arrow, although she tried to describe its function ("Is it whippin'?"). This is similar to the response of five of the control children who either could not name the picture at all or who tried to describe it

[6] A raw score is simply the number of items that are scored correctly on a test. For many standardized tests, raw scores can be converted to standard scores that allow one to compare the subject's performance to the average performance for that age group.

by its function; “It comes from a gun.”, “Thing that sticks in ya.” Five of the children referred to a globe (i.e. *an atlas*) as a “world”, just as S. had done, while G. described the same picture as, “a planet in the sky.” Similar to S. and G., some children showed difficulty with naming a picture of a thermometer. Five children, like G., could not think of its name, including one child who said, “I haven’t seen them and I don’t know what their name is.” Five other children tried to describe “thermometer” using synonyms such as “timer” or “up and down thing”. One child aged 5;0 even said, “temperature” which is the same response given by S. This indicates that, S. and G.’s responses on a referential naming test were qualitatively similar to younger children.

S.’s and the control children’s use of the generic label “bird” to describe a picture of a peacock might be described by some (e.g., Crystal, 1997) as a semantic overextension which is typical of younger children (usually below the age of 6-years).[7] This involves over-extending a word from a superordinate category to items that, though sharing similar semantic features, older children (around the age of nine) would refer to more specifically (Crystal, 1997). The word “peacock” is a hyponym of the superordinate category, “bird”, but when S. was shown a picture of a peacock, she, like some of the younger normal controls, over-extended the word “bird” to an item, which, though sharing the same bird-like features, older children might have specifically referred to as “peacock”. To some, this might be taken as evidence of immature referential naming ability. However, another reason why S. and some of the control children referred to a peacock as “bird” is that they were simply unaware of what they should have said (since “bird” and “peacock” are the same thing) and thus is evidence of very little.

II Syntax

[7]S. and the control children’s use of “world” to refer to an atlas might also be described as a semantic overextension.

Some of S., G. and I.'s most recent responses on a sentence formulation task, the Formulated Sentences subtest of CELF-3, (obtained May 2000) were noted to be similar to those of a group of 9 normally developing control children (mean age = 6;5), whereas others were not. Several of the children showed difficulty in constructing complex sentences with subordinate clauses. They produced sentences with only one clause like "Until I said that." and "While I am baking." when required to make sentences from subordinating conjunctions such as "while" or "until" and conjunctive adverbs such as "otherwise" or "however." In contrast, S. and I. formulated two clause sentences such as "I mix this flour *while* he puts the milk on." and "*Until* I go home I play with my friends." in response to the same items.

On the other hand, some of G. and I.'s responses were very similar in form to those of the control children; when using subordinating conjunctions, they produced only one-clause sentences such as "*While* the boy is stirring.", "*Otherwise* the teacher might give them some money" and "*Because* I cross on the zebra crossing." – just as the control children did.[8] Generally, S., G. and I. did not appear to find it easy to produce novel well-formed (complex) sentences in response to task demands. Many of the sentences that the girls gave seemed to be syntactically or semantically amiss in some way. Similarly, the control children as a group generally did not appear to find it an easy task to formulate specific sentence types during an artificial test situation. Why S., G. and I. *and* a group of younger children should find it difficult to formulate sentences in response to task demands was considered to be worthy of further investigation. This is because; it was considered a possibility that Formulated Sentences and similar tests actually measure something other than true grammatical ability per se. Consequently, this issue is explored in further detail in Chapter 8.

III Morphology

Some of S., G. and I.'s responses on the expressive morphology subtests (Word Structure, CELF-Preschool, Word Structure, CELF-3) for 1999 were qualitatively

[8] This is despite the fact that subordinate conjunctions introduce dependent clauses and typically express relationships between *two* clauses.

similar to those given by the two groups of control children (respective mean ages = 5;9 and 6;5). A few of S., G. and I.'s morphological 'errors' involved overregularizations of irregular forms of plurals, past tense verbs and comparative and superlative adverbs, such as, "childs/childrens", "foots/feets", "throwed" "writed", "drawed/drawned", "gooder" and "goodest," which others have described as being a typical stage of language development (i.e. Cazden, 1968; Brown, 1973, Pinker, 1999). Similarly, the younger control children produced forms such as "foots", "childs", "drawed", "writed", "throwed", "rided", "catched", "gooder" and "goodest", on the same test items. S. and G. still produced these types of errors –although to a lesser extent – when retested with the Word Structure (CELF-3) subtest a year later, May 2000 (aged 13;2 and 14;10.).

5.2.4 Performances on Global Language Measures: Summary

S., G. and I. were twice administered CELF-3. They were tested in March/April 1999 and retested 13/14 months later in May 2000. According to CELF-3 criteria, S., G. and I.'s language ability was equivalent to normally developing five year olds, that is, to children less than half their chronological ages. If clinical labels are attached, they appeared to be experiencing severe, global language 'delays' with no discernible differences between receptive and expressive ability. This was the case as recently as May 2000 when S., G. and I., respectively aged 13;2, 14;10. and 12;7. were retested. Furthermore, the level of language delay relative to chronological age had remained the same throughout the 13-14 month period since S., G. and I. were first tested during March, April, 1999. In other words, as they got older, although the level of delay became slightly less, the gap between their chronological ages and language ages remained (grossly) the same; S., G. and I.'s performances still remained around –3 SD below the mean of their chronological age groups according to the CELF-3 norms. This means that their 'language ages' were still less than half their chronological ages. However, it should be noted that in terms of raw scores (and corresponding test age equivalents), S., G. and I's performances on individual CELF-3 sub-tests improved very gradually as they got older (although G.'s performance improved the least). Thus, based on this observation, the prediction may well be, that S., G. and I.'s overall language ability as indexed by CELF-3 will continue to

progress - albeit slowly - over the next few years which at the present rate of progress will be by a few months for each year they are tested. What is unclear is whether the gap between attainment and chronological age will remain as adulthood approaches.

Some of S., G. and I.'s test responses were qualitatively similar to those of 29 younger control children aged between 3;6 and 6;11. This was on expressive measures of naming ability, sentence formulation and morphological production. S., G. and I showed some difficulty with producing labels such "thermometer" and "peacock" and produced morphological overregularizations ("rided," "childs") like the younger controls. G. and I. produced one-clause sentences when required to formulate complex sentences with subordinate/dependent clauses similar to some of the younger controls. The expressive measures were most recently administered to S., G. and I. at the respective ages of 13;2, 14;10. and 12;7. Yet some of their responses approximated those of younger control children nearly half their chronological ages. This meant that either S., G. and I.'s language ability was genuinely retarded for their chronological ages or that their responses on standardized tests were misleading and not an accurate portrayal of their true linguistic capacity. It could also be argued that S., G. and I.'s performed poorly because test situations are not representative of real life.

5.3 Performances on Battery of Individual Measures

In addition to the global language measures, S., G. and I. were also administered a battery of individual standardized tests. It is difficult to present all of S., G. and I.'s test results graphically since the measures do not yield information in the same way; Some tests provide age equivalents whereas others might only give percentile ranks. However, for a summary of all of S., G. and I.'s test performances, see Table C.1 in Appendix C. Firstly, S., G. and I.'s results on measures that evaluate semantic aspects of language are discussed.

5.4 Semantics

In the following section, S., G. and I.'s performances on tests of receptive and expressive vocabulary, and conceptual awareness are reported. The measures used and a summary of S., G. and I.'s test results are presented in Table 5.4.

5.4.1 Receptive Vocabulary

I British Picture Vocabulary Scale (BPVS)

S., G. and I.'s receptive vocabulary was tested using the British Picture Vocabulary Scale (BPVS, Dunn, Dunn, Whetton, and Pintilie 1982) which was administered twice; first of all, when S., G. and I. were aged 11;5, 13;2 and 10;8 and then over a year later when the girls were aged 12;7, 14;4 and 12;0. The BPVS is standardized for students up to the age of 21 years and can be used to assess preschoolers, school age children, teenagers and young adults. The maximum raw score that can be obtained is 32. For this measure the experimenter says a word such as "nostril" or "collision" and the child is required to point to one of four pictures that best matches the word.

Results

S., G. and I.'s levels of verbal receptive language as indexed by the BPVS were not age appropriate. The percentile ranks corresponding to S., G. and I.'s scores (for both test administrations) were between 2 and 30. The distances from the mean of their chronological age groups ranged from –0.93 to –2.06 SDs. S. and I.'s scores actually declined over a year, whereas, G.'s did not

Table 5.4 Results: S., G. and I.'s scores on standardized tests of vocabulary and concept awareness; date and chronological age when tested, test age equivalents or deviation from the mean and percentile ranks.

	Sariah		**Georgina**		**Ingrid**	
British Picture Vocabulary Scale						
Date When Tested	07.08.98	16.10.99	24.04.98	16.10.99	29.06.98	18.10.99
Chronological Age	11;5	12;7	13;2	14;4	10;8	12;0
Raw Score	20	18	18	21	20	19

Standard Score	86	71	69	79	92	78
Percentile Rank	18	3	2	8	30	7
Test Age Equivalent	9;6	8;3	8;3	10;2	9;6	8;11
Distance From The Mean	-0.93	-1.93	-2.06	-1.4	-0.53	-1.46
***Word Finding Vocabulary Scale**						
Date When Tested	18.03.00		18.03.00		13.04.99	
Chronological Age	13;0		14;9		11;6	
Raw Score	34		37		37	
Test Age Equivalent	5;4-5.		5;9		5;9	
***Boehm Test of Basic Concepts**						
Date When Tested	09.12.98		09.12.98		14.12.98	
Chronological Age	11;9		13;5		11;2	
Raw Score	41		33		48	
Percentile Rank	3*		1*		50*	

***Note*: Boehm Test of Basic Concepts, percentile ranks of 3, 1 and 50 when compared with the scores of second graders; Word Finding Vocabulary Scale, test age equivalents derived by comparing S., G. and I.'s scores with those obtained by children aged 8;6.**

5.4.2 Expressive Vocabulary

S., G. and I.'s expressive lexicon was assessed using the following measure standardized for younger children:

I Word Finding Vocabulary Scale (WFVS)

The Word Finding Vocabulary Scale (WFVS, Renfrew, 1992) is standardized for younger children up to the age of 8;6. It does not give normed scores such as percentile ranks or standard scores, only test age equivalents. The maximum raw score that can be obtained on the WFVS is 50. For this measure, the child has to name pictures of objects such as "squirrel", or "buckle." It was administered once to S., G. and I. when they were respectively aged 13;0, 14;9 and 11;6.

Results

S., G. and I.'s raw scores on the Word Finding Vocabulary Scale were between 34 and 37 which meant that over 25% of their responses were scored incorrectly. S., G.

and I.'s raw scores corresponded to test age equivalents of between 5;4-5. and 5;9. A typically developing child of 8;6 would be expected to score virtually all of the items correctly (according to the normed information). In contrast, S., G. and I. only scored three quarters of the items correctly at the respective ages of 13;0, 14;9 and 11;6.

Table 5.4 suggests that there was a discrepancy between S., G. and I.'s receptive and expressive vocabulary with the latter noticeably worse. However, this interpretation should be made with caution. The difference may appear bigger than it actually is because the BPVS expresses test age equivalent scores up to 20 years, whereas the WFVS has a ceiling of 8;6 years.

5.4.3 Conceptual Awareness

The measures described above, British Picture Vocabulary Scale and Word Finding Vocabulary Scale, primarily involved assessing referential naming skill, that is, the ability to label (concrete) objects and/or actions. The following measure, The Boehm Test of Basic Concepts (BTBC) that is standardized for younger children largely evaluates knowledge of (basic) abstract relational concepts; that is words that refer to the abstract notions of space and location, quantity, time and so on.

I The Boehm Test of Basic Concepts (BTBC)

S., G. and I.'s knowledge of basic, relational concepts was tested using form A (booklets 1 and 2) of the Boehm Test of Basic Concepts (BTBC; Boehm, 1986) which was administered early in the study when S. and G. were respectively aged 11;9 and 13;5 and when I. was aged 11;2. The BTBC is standardized for younger children up to the second grade in school (although norms are also given for children in kindergarten and the first grade). It assesses young children's knowledge of frequently used concepts such as those related to space/location (*above, between, nearest*), quantity (*several, few, medium-sized*) and time (*beginning, after, third*). The maximum raw score that can be obtained is 50.

Results

On the Boehm Test of Basic Concepts, S. and G. respectively scored 41 (82%) and 33 (66%) of the items correctly, while nearly all (96%) of I.'s responses were correct. When S., G. and I.'s performances were compared with the norms for second graders, the percentile ranks were about 3., 1 and 50. This means that between 50% and 99% of children in the second grade might be expected to perform better on this measure than S., G. or I. did at the respective ages of 11;9, 13;5 and 11;2. (according to the BTBC normed information). S., G. and I.'s performances were more like those of younger children in kindergarten and the beginning of first grade than of second graders. Boehm (1986) notes that most normally developing children by the beginning of the second grade will have learned the majority of the items on the BTBC. However, S., G. and I.'s performances on this test indicated that, at the respective ages of 11;9, 13;5 and 11;2 – between 4 to 7 years after they entered their adoptive homes - they found some basic relational concepts difficult to grasp in a test situation. For example, concepts of location (*nearest, right*), quantity (*several, other, medium-sized, equal*) and time (*almost, beginning, third*). Children acquire many of these concepts by the second grade (Boehm, 1986).

5.5 Grammar

In the following section, aspects of S., G. and I.'s receptive and expressive grammatical development are evaluated using standardized tests. The measures administered and S., G. and I.'s test results are summarized in Table 5.5.

Table 5.5 Results: S., G. and I.'s scores on standardized tests of grammar; date and chronological age when tested, test age equivalents or deviation from the mean and percentile ranks.

	Sariah		**Georgina***		**Ingrid**	
Test For Reception of Grammar						
Date When Tested	28.10.98	16.10.99	28.10.98	16.10.99	11.11.98	18.10.99
Chronological Age	11;7	12;7	13;2	14;4	11;1	12;0
Total Blocks Passed	13	13	12	13	15	14
Standard Score	73	67	63	67	81	71
Percentile Rank	1-5	1-5	1	1-5	10	1-5
Test Age Equivalent	6;0	6;0	5;9	6;0	8;0	7;0
Distance From The Mean	-1.8	-2.2	-2.46	-2.2	-1.26	-1.93

Action Picture Test						
Date When Tested	09.12.98	18.03.00	09.12.98	18.03.00	02.12.98	18.10.99
Chronological Age	11;9	13;0	13;5	14;9	11;1	12;0
Raw Score:						
Grammar	22	27	19	27	26	29
Information	37	37	35.5	34.5	30	35
Test Age Equivalent:						
Grammar	5;0	6;6	4;0-4;5	6;0-6;6	6;0-6;5	7;0-7;5
Information	8;5	8;5	7;0-7;5	6;6-6;11	5;0-5;5	7;0-7;5

Note: *Distances from the mean derived for G. by comparing her scores with those obtained by children aged 12;0 – 12;11. Action Picture Test, test age equivalents derived by comparing S., G. and I.'s scores with those obtained by children aged 8;5

5.5.1 Receptive Grammar

S., G. and I.'s understanding of grammatical structures was tested using the following measure:

I Test for Reception of Grammar (TROG)

S., G. and I.'s grammatical comprehension was first assessed using the Test for Reception of Grammar (TROG, Bishop, 1989). This measure is designed for children between the ages of 4 and 12 years and consists of twenty blocks of four items. Each block taps a particular grammatical contrast such as reversible passives and embedded sentences. The maximum number of blocks that can be passed on this task is 20. For this measure the experimenter produces a test item such as "The girl is pushing the horse." and the child is required to point to one of four pictures that match the target item. Test age equivalents and percentile ranks are given based on the number of blocks passed. The TROG measure was administered to S., G. and I. twice; when they were respectively aged 11;7, 13;2 and 11;1 and a year later when aged 12;7, 14;4 and 12;0.

Results

At the first time of testing, S., G. and I.'s understanding of grammatical structures appeared to be at levels several years behind their chronological ages. When they were assessed a year later, (at the respective ages of 12;7, 14;4 and 12;0) the

percentile ranks and test age equivalents did not significantly improve, suggesting that no progress had taken place.[9] The percentile ranks corresponding to S., G. and I.'s scores (for both test administrations) were between 1 and 10 (90% to 99% of children of similar chronological ages would be expected to obtain higher scores). The distances from the mean of their chronological age groups ranged from –1.26 to -2.46 SDs. S.'s test age equivalents and corresponding percentile ranks over a year did not change and thus her reception of grammar remained at the six year level, according to TROG. G.'s percentile rank of 1 and test age equivalent of 5;9. increased slightly when she was retested in 1999. I.'s test age equivalent of 8.0. and percentile rank of 10 obtained in 1998 actually decreased when the test was re-administered to her in 1999. S. and G.'s scores on the TROG suggest that between the respective ages of 11;7 and 12;7 and 13;4 and 14;4, their level of grammatical comprehension was roughly equivalent to or less than half their chronological ages. I.'s understanding of certain grammatical structures (as indexed by the TROG) between the ages of 11;1 and 12;0, was at a level that was 3 to 5 years behind her chronological age.

5.5.2 Expressive Grammar

S., G. and I.'s expressive grammatical abilities was assessed using the following measure:

I Action Picture Test

S., G. and I.'s production of grammatical structures was first tested using the Action Picture Test (APT, Renfrew, 1988). The APT is a simple test standardized for ages up to eight years. It is designed to elicit "samples of spoken language that could be

[9] One reason why S., G. and I.'s test age equivalents remained virtually unchanged over a year (or, in I.'s case, declined) is that TROG is not a particularly sensitive measure in terms of corresponding test age equivalent scores. According to TROG norms, if thirteen blocks are passed then this corresponds to a test age equivalent of six years which was S.'s score. Each subsequent block after this, that is scored correctly represents one year's increase in age equivalent scores, thus fourteen blocks corresponds to a seven year old child, fifteen blocks corresponds to an eight year old and so on. However, in order for a block to be passed, all four items (that comprise that block) have to be scored correctly, making no allowances for momentary lapses in concentration. This means that it only takes one item failure for an entire block to be failed resulting in a loss of one year from the corresponding test age equivalent score. This appeared to be the case with S.'s test scores. For example, she scored three out of four items correctly on the reversible passives block Yet this one item failure – probably due to a brief lapse of

evaluated in terms of information given and the grammatical structures used" (Renfrew, 1988). These include use of tense, simple and complex sentences, information carrying words (i.e. prepositions, adverbs), passive voice and irregular versions of plural nouns and past tense verbs. The APT consists of ten black and white card pictures depicting various actions or states, for example, a horse jumping over a fence or a dog tied to a post. The child is asked a question about each action picture shown, such as "What has happened to the girl?" or "What has been done to the dog?" and the child's response is written down verbatim. The amount of information the child supplies and the type of grammatical constructions used constitute the Information Score (maximum = 36) and Grammar Score (maximum = 30). S., G. and I. were assessed twice on the APT.

Results

Information Scores

The oldest age range for which the Action Picture Test is standardized is 8;0 – 8;5. In terms of information given, S.'s score was equivalent to this age range (i.e. 8;0 to 8;5) for both times that she was tested. G.'s information score decreased slightly by 2000 which meant that the corresponding test age equivalent decreased from 7;0-7;5 to 6;6-6;11. The test age equivalent corresponding to I.'s information score rose from 5;0-5;5 in 1998 to 7;0-7;5 ten months later, in 1999.

Grammar Scores

S., G. and I.'s grammar score all increased over a year; S.'s test age equivalent increased by 1;6 years in fifteen months, G.'s by 2;1 years in fifteen months and I.'s by 1 year in ten months. S., G. and I.'s responses included some immature grammatical forms, for example, "catched", "mouses", "mices", "it_ been tied round." S., G. and I. lost points because they either did not include certain (pre-identified) grammatical elements or did not include them correctly and this was the case for both times that they were tested.

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attention - resulted in the failure of an entire block which, in turn, resulted in one year's difference in her test age equivalent score.

5.6 Other Measures

5.6.1 Narrative Ability

I Bus Story Test of Continuous Speech

S., G. and I.'s narrative skill was assessed using the Bus Story Test of Continuous Speech (Renfrew, 1991). Narrative discourse or the ability to tell stories was examined because it involves the contribution of a number of language and other cognitive areas, for example, memory for events, the ability to relate the temporal order of actions and to express these linguistically (Renfrew, 1991; van der Lely, 1997). The Bus Story is standardized for children between the ages of three and eight. It is a "screening test of verbal expression" and measures narrative discourse and "the ability to give a coherent description of a continuous series of events." (Renfrew, 1991, p.4). Narrative ability is evaluated in terms of the amount of information given, sentence length and sentence complexity (i.e. number of subordinate clauses). These three areas are scored separately: Information Score (I.F.), Sentence Length (S.L.) and Subordinate Clauses (S.C.). The test does not give percentile ranks only test age equivalents and score means, although standard deviations are provided for Information Scores. S., G. and I. were administered the Bus Story Test twice. S., G. and I.'s scores on the Bus Story Test for both test administrations are in Table 5.6 (also see III, Appendix C. for S., G. and I.'s verbatim narrative responses).

Results

S., G. and I.'s results on the Bus Story Test of Continuous Speech were quite difficult to interpret meaningfully. According to this measure, both the grammatical structure and semantic content of S., G. and I.'s spoken narratives were generally below what would be expected of average ability children aged 8 years. In other words, according to the norms, S., G. and I.'s scores were not comparable to the oldest age range for which the Bus Story is standardized. I.'s scores were either equivalent to or below that of 8;5 year old children. Following is a brief summary of the girls' Bus Story scores

over a year. Note that S., G. and I.'s poor test age equivalents are not considered to be necessarily indicative of their true narrative abilities at the time.

Table 5.6 Results: S., G. and I.'s scores on the Bus Story Test of Continuous Speech.

	Sariah		**Georgina**		**Ingrid**	
Bus Story Test of Continuous Speech						
Date When Tested	09.12.98	18.03.00	09.12.98	18.03.00	14.12.98	17.12.99
Chronological Age	11;9	13;0	13;5	14;9	11;2	12;2
Information:						
Raw Score	15	29	13	20	23	39
Test Age Equivalent	4;0-4;5	6;0-6;5	3;9-3;11	4;6-4;11	5;0-5;5	8;5+
No. Subordinate Clauses**:**						
Raw Score	1	1	1	3	8	5
Test Age Equivalent	4;0-4;5	4;0-4;5	4;0-4;5	5;1-5;11	8;5+	7;6-7;11
Sentence Length**:**						
Raw Score	8.2	9.8	4.4	9.0	10	10
Test Age Equivalent	4;1-4;11	5;1-5;11	3;9-3;11	5;1-5;11	6;0-6;5	6;0-6;5
Distances From the Mean for Information Score	-0.47	0	-0.30	-0.37	-0.25	+0.30

Information Scores

S., G. and I.'s Information Scores all increased over a year. During both test administrations, S. and G.'s scores were slightly below or within the average range of children in the younger age groups below 8;5. For example, S.'s first Information Score was within the average range of children aged between 4;0 and 4;5 and within the average range of children aged 6;0 to 6;5, over a year later. I.'s Information Score improved significantly over a year and her most recent score was at the level of children aged 8;5 and above.

Sentence Length Scores

S. and G.'s Sentence Length scores (i.e. total number of words in five longest sentences divided by five) on the Bus Story also increased over a year, whereas I.'s remained the same. S.'s sentence length increased from 8;2 to 9;8, G.'s from 7;4 to 9;0. I.'s sentence length of 10 did not change when retested a year later. S., G. and I.'s

Sentence Length scores were within the average range of younger age groups of children aged 6;5 and under.

Subordinate Clause Scores

S. and G.'s Subordinate Clause scores did not noticeably improve over a year. According to the Bus Story norms, such a low frequency of subordinate clauses is equivalent to that of children aged between 4;0 years and 5;11 years. I.'s production of subordinate clauses during administration of the Bus Story Test decreased slightly over a year. Her most recent score was comparable to those of average ability children aged 7;6 to 7;11.

5.6.2 Reading

I Salford Sentence Reading Test

S., G. and I.'s reading ability was assessed once using form B. of the Salford Sentence Reading Test, which is designed for chronologically younger children. It requires the capacity to read sentences of varying length and complexity such as "Come and play ball." and "Everyone had a wonderful time at Janet's fantastic party." The measure does not give percentile ranks only test age equivalents. S., G. and I. were tested once on this measure. S., G. and I.'s test age equivalents on the Salford Sentence Reading Test are presented in Table 5.7.

Table 5.7 Results: S., G. and I.'s scores on Salford Sentence Reading Test.

	Sariah	**Georgina**	**Ingrid**
Date When Tested	20.05.00	20.05.00	16.05.00
Chronological Age	13;2	14;10	12;7
Age Equivalent	8;1	7;5	7;5

S. and G.'s reading ages were discovered to be 8;1 and 7;5 respectively and I.'s reading age was found to be 7;5. S. and G.'s reading ability was 6-7 years behind their chronological ages. Actually, G.'s level of reading skill was equivalent to that of

a normally developing child less than half her chronological age. I.'s reading ability was 5;2 years behind her chronological age.[10]

5.6.3 Auditory Memory

In the following section, auditory memory is assessed using standardized tests. Auditory short-term memory delays have previously been reported for other children adopted from Romanian orphanages. Chugani et al. (1998), for example, discovered "impaired verbal working memory" in the eight Romanian adoptees that they studied. In the normative data, there have also been reported links between the level of phonological working memory in early childhood and the complexity of speech production later on. For example, Adams and Gathercole (1995) examined the speech data from preschool children (age = 3;7 years) who - based on their ability to memorize nonword items - were assigned to either a "high" or "low" phonological memory capacity group (abstract). The children's spontaneous speech during a structured play session was analysed using both quantitative and qualitative measures. The authors found that children with adequate phonological memory abilities produced language that was more grammatically complex and included longer and more sophisticated utterances than children with poor phonological memory abilities. Inadequate auditory short-term memory may account, in part, for S., G. and I.'s problems with grammatical comprehension indicated by their poor scores on standardised tests like the Test for Reception of Grammar (TROG) and CELF-3. The measures administered to S., G. and I and their test results are summarized in Table 5.8.

Table 5.8 Results: S., G. and I.'s scores on standardized tests of auditory memory; date and chronological age when tested, test age equivalents or deviation from the mean and percentile ranks.

	Sariah	**Georgina**	**Ingrid***
Recall of Digits Forward (BAS) Date When Tested	19.11.98 16.10.99	19.11.98 16.10.99	19.10.99

[10] S., G. and I.'s writing skill was, unfortunately, not examined in any systematic way. It is recognised that this is one of the limitations of this study.

Chronological Age	11;8	12;7	13;4	14;4	12;0	
Raw Score	14	15	12	11	19	
Ability Score	105	111	94	88	131	
Percentile Rank	1	2	1	1	14	
Test Age Equivalent	4;4	5;7	4;4	4;1	6;10	
Recalling Sentences (CELF-3)						
Date When Tested	24.04.99	20.05.00	24.04.99	20.05.00	10.3.99	16.05.00
Chronological Age	12;1	13;2	13;9	14;10	11;5	12;7
Raw Score	15	17	23	26	20	24
Standard Score	3	3	3	3	2	3
Percentile Rank	1	1	1	1	1	1
Distance From The Mean	-2.3	-2.3	-2.3	-2.3	-2.3	-2.3
The Children's Test of Nonword Repetition (CNRep)						
Date When Tested	18.03.00		18.03.00		17.12.99	
Chronological Age	13;0		14;8		12;2	
Raw Score	21		23		19	
Percentile Rank	<10		<10		<10	
Test Age Equivalent	5-5;11		5-6;11		4-4;11	

I Recall of Digits Forward (BAS-II)

The Recall of Digits Forward is one of the sub-tests of the British Ability Scales, Third Edition (BAS-III, Elliott, 1996). For this measure the child is required to repeat a spoken series of numbers. The total raw score that is achieved-up to a maximum of 36- can be converted to an ability score. It was administered once to I. (aged 12;0) and twice to S (aged 11;8 and 12;7) and G. (aged 13;4 and 14;4).

Results

S., G. and I.'s test performances on the Recall of Digits Forward subtest**,** indicated that their digit spans were four numbers. They experienced some difficulty with memorising a series of five or six numbers. S.'s scores on the measure slightly

increased over, whereas G.'s slightly declined.[11] S., G. and I. test performances for 1999 corresponded to test age equivalents of between 4;1 years and 6;10. years. This was considerably at odds with their respective chronological ages at the time of 12;7, 14;4 and 12;0. Percentile ranks ranged from 1 to 14 which means that around 86% to 99% of normally developing children of similar chronological ages (i.e. between 12 and 14 years) would have been expected to perform better than S., G. or I. did on this measure. It appears that S., G. and I.'s ability to repeat an orally presented series of numbers was comparable to children aged between five and ten years their junior.

II Recalling Sentences (CELF-3)

This expressive language measure is one of the sub-tests comprising the Clinical Evaluation of Language Fundamentals, Third Edition (CELF 3) that was described previously. The Recalling Sentences sub-scale is standardised for young people between the ages of 6 and 21 years, and assesses the ability to recall and repeat sentences of increasing length and syntactic complexity. It consists of 26 items and the maximum raw score that can be obtained is 78. The Recalling Sentences also forms part of the Total Language score for CELF-3. S., G. and I. were administered this test twice, first at the respective ages of 12;1 13;9 and 11;5 and then a year later aged, 13;2, 14;10. and 12;7.

Results

S., G., and I.'s performance on the Recalling Sentences subscale during May 2000 showed no significant improvement, since the first time they were tested 12 to 14 months before, during March and April of 1999. The percentile ranks of 1 and standard deviations below the mean of –2.3 remained the same for all the children from time 1 to time 2. The poor scores on this particular sub-test indicate that S., G. and I. may have a problem with verbal short-term memory, which may interfere with their ability to immediately recall spoken language. This has implications for performing classroom tasks adequately. For example, taking notes, copying from the blackboard and remembering the instructions of the teacher.

[11] It should be noted that this measure was administered to G. towards the end of a test session and

III The Children's Test of Nonword Repetition (CNRep)

The Children's Test of Nonword Repetition (CNRep) was designed by Gathercole and Baddeley (1996) as a test of phonological short-term memory for use with main-stream school children between the ages of four and eight years. The oldest age range that the CNRep is standardised for is 8;00 to 8;11. According to Gathercole and Baddeley (1996), children with inadequate short-term memory have problems with the recall of spoken instructions and on closer inspection have a particular difficulty with learning the sounds of novel words, which can impact on the development of their vocabulary knowledge. Poor short-term memory can also hamper the early stages of a child's reading acquisition, since s/he must be able to blend and reproduce the component phonemes of new words. Delays in the child's ability to adopt this strategy can lead to associated problems with attaining appropriate levels of literacy.

The CNRep consists of 40 non-words such as "perplisteronk" and "loddernapish" each of which is presented on an audiocassette tape. Immediately after the spoken presentation of the word, there is a silent interval and the child is required to repeat the word during this pause. Each repetition attempt is scored as correct or incorrect and the number of correct responses is totalled constituting the raw score, which can then be converted to a standard score. The maximum raw score that can be achieved is 40. I. was administered the CNRep when she was aged 12.2. and S. and G. when they were aged, 13;0 and 14;8 respectively.

Results

S., G. and I. obtained raw scores on the CNRep of 21, 23 and 19. When these scores were compared to the norms for children aged 8;00 to 8;11, the corresponding percentile ranks were 10 or below (i.e. 0 to 10). According to the CNRep norms, S., G. and I.'s raw scores were similar to the mean raw scores of much younger children. It may be inferred, therefore, that, not only were, S., G. and I.'s phonological working memory abilities below the level of children aged 8 – 8.11, (according to the CNRep)

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thus, she was probably tired. This may account for the decline in her score.

but that they were similar to normally developing children less than half their chronological ages.

S., G. and I. appeared to have great difficulty with repeating some of the longer non-word items consisting of 4 or 5 syllables and on several occasions they actually said that they found the repetitions difficult or failed to respond to some items at all (see IIII., Appendix C. for lists of S., G., and I.'s incorrect responses on the CNRep). According to Gathercole and Baddeley (1996), this is indicative of limitations on auditory short-term (or working) memory. In fact, I.'s score on the CNRep was much poorer than her other test performances and the indication is that she may have a specific phonological working memory deficit rather than a delay in this area.[12] Short-term memory problems have also been reported for S., G. and I. in the past. For example, I.'s adoptive mother, M. reported during April 1999 that I. might have a problem with memory and recall of words. Also according to a psychologist's report for 1997, G. also had depressed scores – relative to her other test performances - on two standardised tests of visual and auditory memory.[13] This suggests that general memory constraints affecting both auditory and visual short-term memory may be evident in S., G. and I.'s cases.

5.7 Performances on Individual Tests Compared: Dissociation Between Grammar And Vocabulary?

S., G. and I. performed very poorly on all the individual measures that were administered and no scores were chronological age appropriate. However, when S., G. and I.'s test performances were first compared, it appeared that there was some

[12]However, another issue that should be explored is whether S., G. and I.'s low scores on the Children's Test of Nonword Repetition were caused, not by poor short term memory, but by a problem with phonological perception or discrimination. An explanation of this, however, is beyond the scope of this study, since, phonological perception was, unfortunately not tested for and this oversight is recognised.

[13] G. was tested by a clinical psychologist using the British Ability Scales, 15.07.97. According to this report, G.'s test age equivalents-for *most* of the sub-scales suggested that she was functioning around the 6-year level. However, G. achieved very low scores on the Recall of Digits sub-scale and only achieved a test age equivalent of 3 years and 3 months, which suggests that G.'s serial memory or ability to memorise a series of numbers was particularly poor. Also G.'s score on *another* test of memory, Recall of Designs (BAS)- administered at the same time- which assesses visual memory was below the floor of the test (less than 5 years 6 months) and so this further indicates that G.'s general memory capacity-effecting both auditory and visual memory was inhibited.

discrepancy between their rate of acquisition of vocabulary and grammar; they seemed to have better vocabulary skills when compared to their grammatical/structural ability. This was indicated by their differing test age equivalent scores on two of the standardized tests; the British Picture Vocabulary Scale (BPVS) which assesses receptive vocabulary and the Test for Reception of Grammar (TROG) which evaluates receptive grammar. When S., G. and I. were first administered the BPVS, their test age equivalents noticeably exceeded their test age equivalents on the TROG, (obtained around the same time). There was a difference of between 1;6 and 4;2 years between S., G. and I.'s level of (sentence) grammatical comprehension and level of (single word) vocabulary comprehension. It appeared, therefore, that S., G. and I.'s grammatical skill, as measured by a standardised test such as TROG, had remained significantly behind their vocabulary skill, as measured by a standardized test such as BPVS. This is if comparisons between standardized measures are made using test age equivalents.

However, a closer inspection of S., G. and I.'s performances on TROG and BPVS and on other tests revealed a more complicated profile that made this situation less clear. Interpretation of standardized test results based on test age equivalents has been criticized by Howlin and Cross (1994) and also Bishop (1989, p.12) who states:

> "The use of age-equivalents is not recommended, as this can give a misleading impression of the severity of a comprehension problem. A score that is substantially below chronological age level is not always statistically abnormal. Furthermore, the abnormality of a score that is a given amount below chronological age level varies from one test to another, and within the same test, may vary from age to age (Bishop, 1989)."

Therefore, it was considered useful to make statistical comparisons between S., G. and I.'s performances on the Test for Reception of Grammar (TROG) and the British Picture Vocabulary Scale (BPVS). In order to do this, z-scores (or standard scores) were computed. Statistical measures such as z-scores express how many standard deviations a performance is from the mean (Gleitman, 1992). In other words, the use of z-scores made it possible to compare how far S., G. and I.'s TROG and BPVS performances were from the average range. The z-scores - together with the

percentile ranks - corresponding to S., G. and I.'s performances on the TROG and BPVS for the years 1998 and 1999 are presented in Table 5.9.

According to the data, the most noticeable difference between TROG and BPVS scores was for S. and I.'s first test performances (1998) and G.'s second (1999). In these cases the difference between the TROG and BPVS scores was almost 1 standard deviation. There was no significant difference between S. and I.'s second test performances or G.'s first. In S. and I.'s cases the appreciable differences between the two scores disappeared after a year. In G.'s case, her BPVS scores noticeably increased over a year, while her TROG scores remained virtually the same which created the discrepancy between her scores. The implication of this is that, at some point during the study, there was a small, but noticeable disparity between the abilities these measures (that is, the BPVS and TROG) supposedly assess. However, although the discrepancies between S., G. and I.'s z-scores of -0.87, -0.8 and –0.73, may suggest a trend towards there being a slight disparity between two abilities, they are not statistically significant, that is, the differences between S., G. and I.'s TROG and BPVS z-scores are too small to implicate a statistically significant dissociation between grammar and vocabulary. A difference of at least –1.64 on the z-score scale would reach significance (Szczerbinski, personal communication, July 2001). S., G. and I. did poorly on both TROG and on the BPVS, but their performances on TROG were disproportionately poor. This tendency has also been found for language disordered but otherwise normally developing children (Bishop, 1979).

Table 5.9 Results: percentile ranks and z-scores on TROG and BPVS and difference between z-scores for both tests.

	Sariah		**Georgina**		**Ingrid**	
Years When Tested	1998	1999	1998	1999	1998	1999
TROG Percentile Ranks	1-5	1-5	1	1-5	10	1-5
BPVS Percentile Ranks	18	3	2	8	30	7
TROG z-scores	-1.8	-2.2	-2.46	-2.2	-1.26	-1.93
BPVS z-scores	-0.93	-1.93	-2.06	-1.4	-0.53	-0.47
Difference	-0.87	-0.27	-0.4	-0.8	-0.73	-0.47

Below, S., G. I.'s TROG and BPVS z-scores are depicted graphically in Figures 5.3 and 5.4. The graphs clearly show that S., G. and I.'s scores for 1998 and 1999 were significantly below the average performance.

Figure 5.3 S., G. and I.'s BPVS scores for 1998 and 1999: standard deviations from the mean.

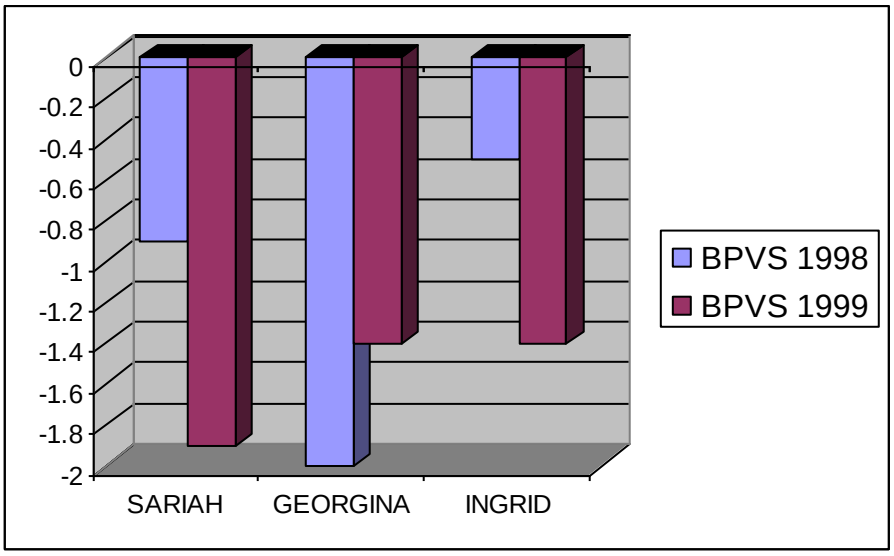
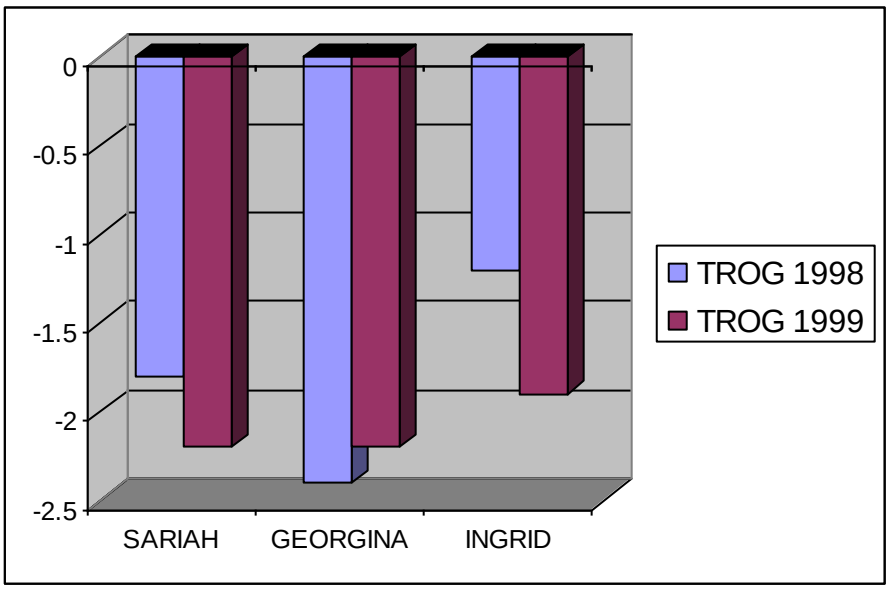


Figure 5.4 S., G. and I.'s TROG scores for 1998 and 1999: standard deviations from the mean.



S., G. and I.'s performances on TROG and BPVS were also compared with their other standardized test performances. It soon became apparent that S., G. and I.'s low scores on TROG – a test of receptive grammar - were similar to their retarded scores

on several other measures (i.e. the Boehm Test of Basic Concepts, Linguistic Concepts and Basic Concepts subtests of CELF-Preschool) that assessed their understanding of basic, relational concepts. Similarly, S., G. and I.'s relatively high scores on a test of receptive vocabulary, the British Picture Vocabulary Scale, paralleled their enhanced scores on a grammatical measure, the Sentence Structure subtest of CELF-3, which evaluates the comprehension of syntactic rules at the spoken sentence level. Thus extending the range of tests administered to S., G. and I. extended the plausibility of the idea that semantic/conceptual areas of language are just as likely to be affected as syntactic/morphological areas of language for S., G. and I.

The original idea that there was a distinct disparity between S., G. and I.'s receptive vocabulary ability and grammatical skill was inaccurate. If S., G. and I.'s performance on a *range* of standardized tests is examined (rather than just one or two), it transpires that their grammatical/syntactic ability (as measured by standardized tests) is not noticeably behind their other abilities, particularly lexical-semantic ability. S., G. and I.'s performances on a range of individual standardized assessments collectively suggest that grammatical development is at a similar level to lexical-semantic development.

5.8 Performances on Individual Measures: Summary

S., G. and I. were administered a battery of standardized language measures during a two-year-period, but did not obtain age appropriate scores on any of these. Even when retested a year later, using some of the measures, the girls had made no discernible progress. S., G. and I. obtained their highest test age equivalents on a measure of receptive vocabulary ability (the British Picture Vocabulary Scale, BPVS). S., G. and I.'s performances on other linguistic tests (i.e. Renfrew Word Finding Scale, Boehm Test of Basic Concepts, Action Picture Test and Bus Story Test of Continuous Speech), standardized for younger children, implied that, in some cases, they were functioning at levels that were approximately half their chronological ages. Percentile ranks where available were <10. Disproportionately poor scores on a receptive grammar measure, The Test for Reception of Grammar, relative to the scores on the receptive vocabulary measure, the BPVS, at first, suggested a subtle

disparity between (receptive) vocabulary and grammar. However, when tested statistically using z-scores, the difference did not appear to be significant.

Verbal memory was also assessed using a variety of standardized memory assessments that involved the recall of digits, novel words and complex sentences. S., G. and I.'s memory ability, as indexed by these measures, appeared to be significantly delayed for their chronological ages. Test age equivalents indicated that in some cases, the children were performing at levels half their chronological ages. Percentile ranks where available were generally, <10. This delay remained the same even, in some cases, when the children were retested a year later. Verbal short-term memory delays have also been reported for other children adopted from Romanian orphanages (Chugani, et al., 1998)

5.9 General Language Learning Difficulties: Innate or Environmental Factors?

Both in clinical and educational terms, S., G. and I. would be described as having general language learning difficulties or a general language learning delay relative to chronological age. This is because: 1.) they were unable to perform adequately on psychometric measures (that is, obtain scores within 1 standard deviation of the mean of their chronological age groups) and 2.) their general educational level is clearly not commensurate with their chronological ages, according to the national curriculum. One might suggest that this is indicative of S., G. and I. each having some underlying innate disorder (perhaps due to undisclosed birth trauma), rather than of the prolonged effects of early linguistic deprivation. However, there are several lines of evidence that challenge the idea that S., G. and I.'s perceived language learning difficulties were caused by inherent factors rather than environmental ones.

5.9.1 Catch-up and Developmental Progress

According to Skuse (1984b), if a severely deprived child makes rapid progress relatively soon after rescue, this is a sign of the possibility that s/he will eventually

recover to more or less age appropriate levels. The child's development is unlikely to be affected by "constitutional limitations" or "some organic dysfunction" (p.565). Skuse states:

> "Following removal from deprivation, the evidence suggests that if recovery of normal ability in a particular faculty is going to occur, rapid progress is the rule; for instance…the extraordinary rapidity with which Isabelle (Mason, 1942; Davis, 1947) came to understand the meaning and function of spoken language" (p.564).

He further comments:

> "There is good evidence from the cases reviewed that if normal language is going to be achieved, progress is virtually exponential" (p.564-5).

Some degree of developmental catch-up has been documented in cases of extreme deprivation such as Isabelle (Mason 1942), the Koluchova twins (Koluchova, 1972, 1976, 1979) and Louise (Skuse, 1984a). Each of these children experienced extreme deprivation during the early language learning years, was discovered after the age of four years, and after rescue, showed an "immense acceleration in development." (Clarke and Clarke, (1976, p.30). These cases can be contrasted with children from similar backgrounds such as Victor of Aveyron (Lane, 1976), Anna (Davis, 1940) and Mary (Skuse, 1984a) whose severe retardation remained relatively unchanged, despite continued attempts at rehabilitation spanning several years. Bettelheim (1959) has suggested that some of the cases of extremely deprived children such as Victor actually had an unspecified genetic disorder, which would account for their very slow recoveries (characterized by continued lack of speech and persistent extreme withdrawal). Therefore, one might not expect to see accelerated progress or rapid catch-up in the recovery patterns of children with innate learning difficulties. It might be assumed that recovery would be much slower in children who had experienced irreversible birth trauma, for example.

Like some of the more successful cases above, S., G. and I. showed not only progress, but also accelerated progress, once their environments changed. When S., G. and I. first entered their respective adoptive homes, their development was globally and severely retarded. For instance, their productive language, both English and Romanian was virtually absent. Also their heights were stunted, they were extremely

malnourished and could barely walk. However, as Chapter 3 showed, it is clear from developmental reports that S., G. and I reacted favourably to their new adoptive homes and began to improve physically and develop some degree of language almost as soon as they were exposed to a nutritionally and linguistically stimulating environment. All three girls exhibited growth spurts and varying degrees of cognitive catch-up (which is substantiated by reports).

S., G. and I. also made rapid gains in their expressive and receptive lexicons according to observation and a standardized measure, The British Picture Vocabulary Scale, BPVS. S. showed the most obvious gain in receptive vocabulary, since between the ages of 9;9 (05.12.96) and 11;6 (07.08.98), her test age equivalent on the BPVS increased from 4 years to 8yrs 10 months – an increase of 4;8 years in only 1;8 years. Also, according to S.'s adoptive mother, her early rapid gain in height appeared to parallel a rapid gain in the acquisition of expressive vocabulary within the first three months of her new life in the UK. Similarly, I.'s receptive vocabulary level (as measured by the BPVS) increased by 2;7 years between the ages of 9;4 and 10;9 – a period of 1;5 years. Also, I.'s early word production developed at an accelerated rate during the first few months of her adoption. She used words that referred to everyday objects (e.g., *bath*, *shower*, *tap*). G.'s early receptive lexicon was not tested formally using the BPVS, but developmental reports for February 1993, when G. was aged 7;7 years (1.4 years after she came to the UK) state that her vocabulary for verbs and nouns was growing almost daily. In this respect, G.'s growth of receptive vocabulary appeared to be as rapid as that of S. and I. after adoption. The girls also progressed grammatically and in S. and G.'s cases, there is evidence that they were producing morphosyntactic forms within 2 to 3 years of their adoption.

Thus, it appears that S., G. and I.'s linguistic catch-up, coincided with their rapid gains in other areas such as height, weight, spatial coordination and gross motor skills like walking. That such recoveries were made in a relatively short period of time is evidence of progress. In turn, that S., G. and I. made such accelerated progress early on, perhaps, goes against the idea that they have innate and irreversible, general learning difficulties or unspecified genetic disorders. However, why didn't S., G. and I. obtain age appropriate scores on the tests that were administered? It may be that the standardized test situation requires a particular skill such as language awareness, that

was still in the process of emerging when S., G. and I. were assessed (an issue which is discussed in more detail in Chapter 8). If this were the case, then the girls might be described as language delayed for their chronological ages, but not for their general learning potential. In other words, the Romanian adoptees' level of language development reflected amount of time since being adopted not amount of time since birth. Some linguistic skills develop only with time and language experience (Crystal, 1997). Therefore, it might be unrealistic to expect S., for example, who was adopted at 7;5 and first tested at 12;1, to catch-up on 12 years of language experience in only 5 years. Although, many aspects of language are firmly established before the age of 5 years, others continue to grow beyond middle and late childhood and even as far as the teenage and adult years. Crystal (1997) supports this view and states:

> "The evidence of normal language acquisition…is mixed. Aspects of phonological and grammatical acquisition do continue until around puberty…and some linguistic skills (in semantics and pragmatics) are still developing in teenage children and young adults" (p.265).

Therefore, it is perhaps unsurprising that children with histories of extreme linguistic neglect, do not reach age-appropriate levels on standardized language tests. In line with this, children such as S., G. and I. might be expected to give test responses highly typical of much younger children rather than ones from their own chronological age groups. And so they do, as section 5.2.3 shows. According to a qualitative comparison, some of S., G. and I.'s responses on CELF-Preschool and CELF-3 were very characteristic of control children aged between 3;6 and 6;11 This certainly suggests that, at the time of testing, S., G. and I.'s language development, rather than deviant or disordered, was merely immature (or delayed) for their chronological ages, but normal for children of younger age groups.

5.10 Performances On Global and Individual Language Measures: General Conclusion

At first, S., G. and I.'s scores on a range of standardized tests, gave a bleak indication of their linguistic abilities. During a two-year period, S. (aged 11;3 to 13;2), G. (aged 13;1 to 14;10.) and I. (aged 10;8 to 12;7) were tested on a variety of receptive and expressive language measures that assess lexical-semantic, morphosyntactic,

narrative, reading and verbal memory ability. S., G. and I.'s standardized test/retest results suggested that their expressive and comprehensive language ability was globally depressed. During the period of data collection, they maintained some progress although this was subtle (e.g., raw scores on CELF-3 slightly improved over a year). In both clinical and educational terms, the girls would be described as having general language learning difficulties – according to their performances on the standardized tests. This could either be due to innate, organic factors or environmental ones. However, that S., G. and I. showed accelerated progress after rescue from their deprived circumstances questions the hypothesis that they have learning deficits of genetic origin. Also, S., G. and I.' s responses were qualitatively similar to those of a control group of 6 to 7 year olds. This suggests that the Romanian adoptees' language development was only delayed and not disordered for their chronological ages. Chapter 5, therefore, concludes that the effects of extreme early deprivation on language, is that, by late childhood, its development is globally delayed relative to chronological age.

Next Chapter - Chapter 6 continues the exploration of S., G. and I.'s development using standardized tests by examining non-verbal cognition.

Chapter 6 Non-Verbal Cognition

Chapter 6 using psychometric data, explores the following research questions:

1. What are the effects of extreme global isolation during infancy and the early childhood years on the development of non-verbal cognition?

2 Are case studies such as these able to shed some light on the relationship between language and other cognitive areas. More specifically, do they provide evidence of dissociations between language and other areas of cognition?

In the previous Chapter 5, it was established that the Romanian adoptees had language-learning difficulties according to standardized tests. Following on from this, Chapter 6, discusses 1) whether early deprivation also has an impact on non-verbal cognitive ability and 2) whether there is dissociation between this and language in S., G. and I.'s cases. A number of standardized measures was used to assess S., G. and I.'s non-verbal cognitive capacity. These were administered between November 1998 and May 2000. The abilities that were assessed involved spatial cognition, perceptual awareness and visual representation (i.e. drawing). As much of the evidence for developmental dissociations arises from studies of special populations such as Williams Syndrome subjects, S., G. and I.'s cases were contrasted with reports of children with this genetic disorder. Qualitative comparisons were also made with younger typically developing children. This was in order to establish whether the Romanian adoptees' responses were characteristic of disordered or normally developing children.

S., G. and I. did not score the equivalent of their chronological ages on any of the measures administered. These tests suggested that they were functioning at levels that were half or several years behind their chronological ages. S., G. and I.'s non-verbal abilities were just as depressed as their verbal ones. There was no evidence to suggest that language was dissociable from other areas of cognition. It could be argued that these findings lend support to either the weak form of the Cognition Hypothesis or the

Correlational Hypothesis – both mentioned in Chapter 1. In fact, qualitative analyses revealed that S., G. and I.'s incorrect test responses were unlike those of children with genetic disorders such as Williams Syndrome, and more like those of younger children with typical developmental histories. This suggested that S., G. and I.'s non-verbal cognition was delayed rather than deviant or disordered. Thus, extreme environmental deprivation on a global scale does not lead to developmental disparities of the type found in Williams and Downs Syndrome. Moreover, the present case studies do not support the idea of Chomsky (1965, 1981, 1986) and Fodor (1983) that language is a specialised cognitive module that is independent of or dissociable from other areas of cognition.

6.1 Introduction

A claim largely associated with nativists such as Chomsky (1965; 1981; 1986) is that language is a modular ability separable from other cognitive abilities. The view is that language is an innate mental ability encapsulated within a specialized brain module, which Chomsky popularly referred to as the Language Acquisition Device (L.A.D.). Fodor (1983) later expanded this view of modularity in his book, "The Modularity of Mind". According to some, evidence that language is dissociable from other areas of cognition can be found in cases of exceptional language acquisition in children. For example, Curtiss, et al (1975) suggested that there was evidence for the dissociation of language and other cognitive areas in the Genie case study, stating,

> "The independence of cognitive development from linguistic development seems to be clearly shown" (p.152).

Similarly, dissociations of the kind separating computational (i.e. grammatical and phonological) areas of language and general cognitive capacity has been reported for Downs Syndrome subjects (Rondal, 1995; Fowler, 1988, 1990, Chapman, et al., 1998; Vicari, Caselli, and Tonucci (2000), and even children with specific language impairment (SLI). (Leonard and Brown, 1984; Leonard, 1985).[1] In addition, dissociations between visuo-spatial ability (specifically concerning part to whole

[1] That developmental dissociations exist in Down Syndrome has recently been challenged by Bates and Goodman, (2002)

awareness) and expressive language and face processing have been reported for Williams Syndrome subjects (Bates, Dale & Thal, 1995; Birle et al., 1989; Bellugi, et al., 1992; Bellugi et al, 1993; Karmiloff-Smith & Grant, 1993; Bellugi and Wang, 1996; Bellugi et al, 2001; Mills, et al, 2000; Atkinson et al, 2001; Volterra, Capirci & Caselli, 2001; Zukowski, 2001). However, the use of 'dissociation' in Williams Syndrome to strengthen the modularity hypothesis has been challenged by Karmiloff-Smith (1992), and Thomas et al, (2001).

As regards the present case studies, evidence will be presented that no such dissociations between language and other areas of cognition exist for children with histories of extreme neglect such as S., G. and I. Furthermore, and more importantly, the indirect argument could be made that as language and other (non-verbal) cognitive skills were equally retarded in S., G. and I., language can not have its own time frame or critical period for development, since it would have been selectively impaired relative to non-verbal cognitive ability, rather than have a similar degree of delay as other cognitive areas.

6.2 Non-verbal Cognitive Ability

The following section reports S., G. and I.'s performances on non-verbal measures of visuo-spatial cognition, perceptual awareness and drawing. The measures administered and S., G. and I.'s test results are summarized in Table 6.1.

6.2.3 Visuo-spatial skill (spatial cognition)

I The Block Design subtest of the Wechsler Intelligence Scale for Children – Third Edition, UK (WISC-III)

The Block Design subtest of the Wechsler Intelligence Scale for Children – Third Edition, UK (WISC-III, Wechsler, 1992)[2] measures spatial cognition. Williams Syndrome children's performances on this test appear to indicate a selective

[2] The WISC-III is a well standardised and widely used test that assesses the intelligence of children aged 6-17 years. It assesses Verbal and Performance (non-verbal) ability through the use of a series of sub-tests (comprising the scale) that purportedly measure several facets of "intelligence".

impairment of spatial cognition when compared to expressive language skill (Bellugi, Marks, Bihrle, and Sabo, 1993). It was questioned as to whether S., G. and I., performances would mirror a similar dissociation between these abilities; Could the findings from Williams Syndrome children be generalized to the Block Design test performances of severely deprived children?

The primary reason for wanting to compare globally deprived children's psychological test performances (e.g. WISC Block Design) to those reported for William Syndrome children was to further explore (and ultimately to weaken) the idea that learning disorders of a genetic aetiology might account for S., G. and I.'s delayed language development -discussed in Chapter 5. As mentioned above, certain heritable developmental disorders such as Williams Syndrome, Down Syndrome, Turner Syndrome and even Specific Language Impairment (SLI) appear to involve some cognitive dissociation. During later childhood, particular skills concerning, for example, grammar and face processing seem to be selectively impaired or enhanced.[3]

S., G. and I. might each also have had an undiagnosed but subtle, genetic deficit with characteristics revealed as dissociations between particular cognitive abilities that emerged later in childhood. If so, it would have been reasonable to assume that S., G. and I. – like Williams Syndrome children – had non-verbal cognitive ability (e.g., some aspects of spatial awareness) that was significantly impaired relative to language ability (e.g., expressive grammar) or vice versa. Such a dissociation, possibly, would have had more to do with atypical cognitive (or learning) styles as have been suggested for autism (Happé 1999) and Williams Syndrome (Karmiloff-Smith, 2001) than the effects of extreme, early deprivation. However, what if S., G. and I.'s non-verbal cognition level were found to be as retarded as their language level? This would have made it less likely that they had inherent learning difficulties that eventually result in selective impairments of the type found in other genetic profiles.

[3] It should be noted, however, that evidence of dissociations or modular abilities in later childhood does not necessarily indicate the existence of *prespecified* or *innate* cognitive modules present at birth (Karmiloff-Smith, 1999, 2001). Chapter 9 discusses this issue in more detail.

In order to help examine these issues, the Block Design subtest was administered to S., G. and I. once, to I. when she was 12;0 and to S. and G., when they were aged respectively aged 14;4 and 12;7. The Block Design is a timed sub-test for which the child is shown a red and white geometric design from a stimulus manual and is asked to copy the design manually using wooden blocks. The child is required to replicate two, four and nine-block patterns within certain time limits. There are three trial items and nine test items and the maximum score is 69 points. WISC subtest scores can be given as Scaled Scores where the average Scaled Score is 10.

Results

S., G. and I.'s spatial abilities as measured by the Block Design, were no more retarded than other abilities such as language. In contrast to the reported findings concerning Williams Syndrome children, the fractionation of spatial cognitive function was *not* seen in S., G. and I.'s cases. Their scores on the WISC Block Design were between –2.3 and –3 standard deviations below the mean of children in their chronological age groups. This is virtually the same as their Expressive Language Score on CELF-3. I.'s performance on the test was better than either S. or G.'s, who both scored below the floor of the test. I.'s scaled score of 3 exceeded the score of only 1 obtained by both G. and S. and her raw score of 19 corresponded to a test age equivalent of 6;10 which was the same as that also obtained by I. on the Recall of Digits Forward (BAS-II) sub-test (see Chapter 5). It appeared, that I.'s performance on the Block Design was, again, similar to that of children 5 years behind her chronological age. S. and G.'s raw scores, on the other hand, fell below the floor of the test and both corresponded to test-age equivalents of 6;2. It may be inferred, therefore, that S. and G.'s performance on the Block Design was similar to that of children below 6;2 years.

S. and G. showed great difficulty with copying the designs (beyond the trial items) in the stimulus manual using the wooden blocks. Several times they seemed uncertain as to whether their block designs matched the picture or not or expressed their inability to complete the items in the first place. Although, I. was able to perform well on the

easier items, she too, like S. and G. began to have problems copying the designs when the items became more difficult.

Table 6.1 Results: S., G. and I.'s scores on standardized tests of non-verbal cognition; date and chronological age when tested, test age equivalents or deviation from the mean and percentile ranks on these standardized tests.

	Sariah	**Georgina**	**Ingrid**
Block Design (WISC-III)			
Date When Tested	16.10.99	16.10.99	19.10.99
Chronological Age	12;7	14;4	12;0
Raw Score	6	9	19
Percentile Rank	1	1	1
Test Age Equivalent	<6;2	<6;2	6;10
Distance From The Mean	-3	-3	-2.3
Ravens Coloured Progressive Matrices			
Date When Tested	16.10.99	16.10.99	19.10.99
Chronological Age	12;7	14;4	12;0
Raw Score	15	19	24
Percentile Rank	<5	<5	<10
Test Age Equivalent	5;6	7;3	8;6
Grade	V, "intellectually impaired."	V, "intellectually impaired."	IV-, "definitely below average in intellectual capacity"
Goodenough Draw-A-Man Test			
Date When Tested	19.11.98	19.11.98	11.11.98, 13.04.99, 17.12.99
Chronological Age	11;7	13;4	11;1, 11;6, 12;2
Raw Score (Out of 50)	17	22	26, 35, 29
Test Age Equivalent	6;6	8;0	9;0, 11;0, 10;0

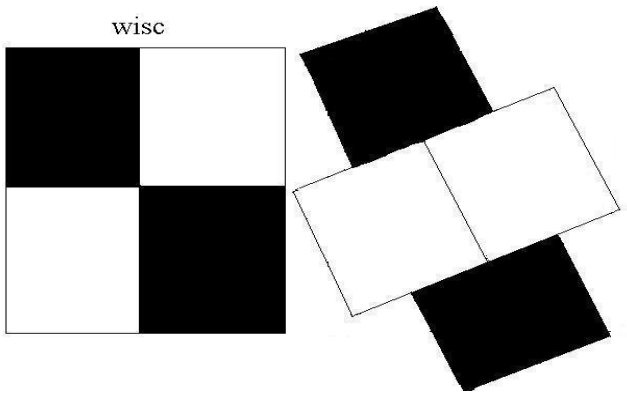
S., G. and I.'s Responses on the Block Design Compared With Those of Williams Syndrome Children

S., G. and I.'s erroneous responses on the Block Design were not qualitatively like those of Williams Syndrome. According to Bellugi and Wang (1996, p.2) there are differences between how Williams and Downs Syndrome subjects perform on the Block Design,

> "On a task of Block Design, both Williams and Down subjects are markedly impaired; however, the process by which they arrive at their depressed scores is very different. Down subjects typically fail on internal detail of the block design task, while Williams subjects fail to achieve the overall configuration of the blocks…Williams performance is characterized by selective attention to details of a configuration at the expense of the whole, while Down subjects show the opposite pattern."

As the above suggests, Williams Syndrome children's block designs are characterized by idiosyncratic attention to detail rather than focus on the overall arrangement of the blocks. Based on data presented by Bellugi and Wang (1996), a typical Williams Syndrome design might look like the one in Figure 6.1.

Figure 6.1 A typical Williams Syndrome response (right) on the Block Design subtest based on Bellugi and Wang (1996).

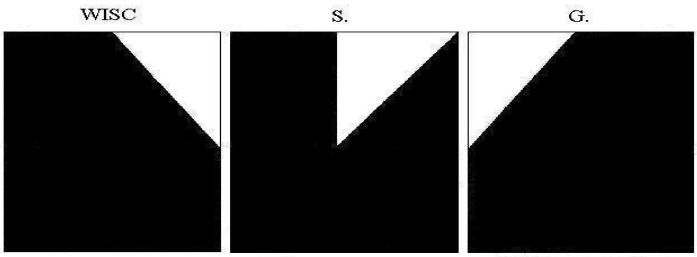


Examples of S., G. and I.'s Block Designs

S., G. and I.'s incorrect responses were quite different from the one above. Following are examples of S. G. and I.'s incorrect responses to test items. The WISC block pattern that the girls were required to copy is on the far left and their incorrect responses are to the right Note that Figure 6.2 corresponds to S. and G. only, while Figure 6.3 compares the responses of all three children on two test items.

Figure 6.2 S. and G.'s responses compared for items 4 and 5 of Block Design

item 4



item 5

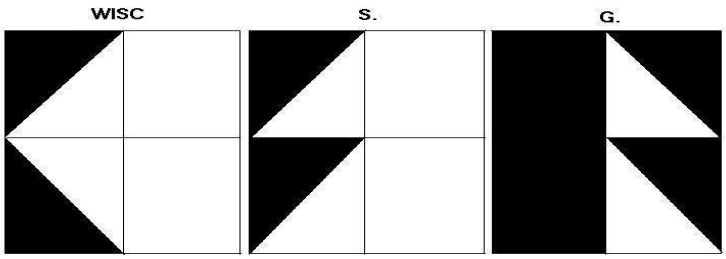
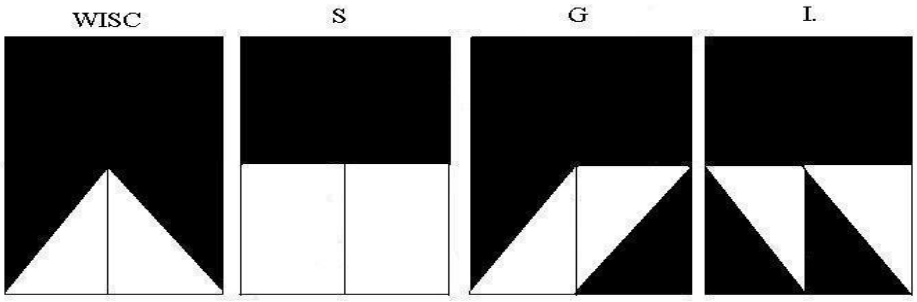
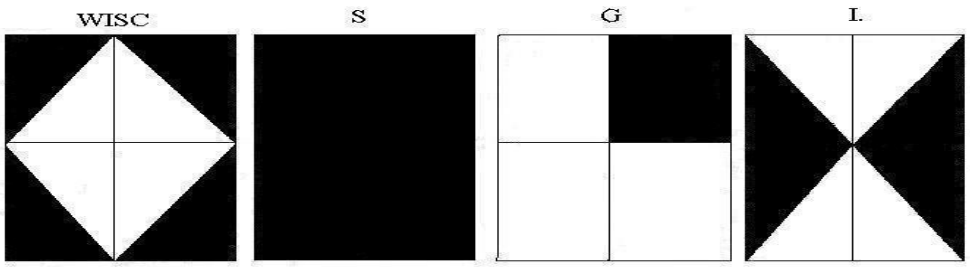


Figure 6.3 All three girls' responses compared for items 6 and 7 of Block Design.

item 6



item 7



It is important to note that a Performance sub-test score such as that of the Block Design may underestimate S., G. and I.'s level of non-verbal reasoning abilities due to the fact that it is timed. Therefore a low score is suggestive of a slow completion/reaction time rather than an inability to perform the task. S., G. and I. knew that they were being timed and this may have caused them to feel under pressure. Also towards the end of the test sessions, S., G. and I. may have felt tired and less able to concentrate which may partly account for their incorrect responses on the more difficult items. However, an important point is that, in some cases, S., G. and I. were unable to tell the difference between their own incorrect block design and the pattern that they were required to copy/match. Even when the patterns were placed side by side and S., G. or I. were specifically asked whether these designs matched, they replied that they thought they were the same. This suggests, therefore, that rather than their errors being indicative of a slow reaction time, a more likely reason why S., G and I did not perform very well on this visuo-spatial test, is that they really could not, accurately perceive the differences between two geometric designs or, in fact, replicate the designs themselves.

Past references have also been made to S. and G.'s visuo-spatial skill in their developmental reports. The Block Design was administered to G. by a clinical psychologist in July 1997 and back then she also scored below the floor of the test. This means that between July 1997 and October, 1999 G.'s Scaled Score of 1 – and corresponding test age equivalent on this measure - remained unchanged. The clinical psychologist also reported that G. had difficulty with spatial tasks in general. Also, S.'s weak spatial/observation skills were reported as early as 6.11.95 in a school report which mentioned that S. aged 8;8 years, found it difficult to do matching exercises or jigsaw puzzles.

6.2.4 Perceptual Awareness

I Ravens Coloured Progressive Matrices (CPM)

S., G. and I.'s perceptual skills were assessed using the Ravens Coloured Progressive Matrices (CPM, Raven, Court & Raven, 1978), which are standardized for children up to the age of 11;6. There is also an adult version of this test. S. and G. were aged 12;7 and 14;4 and I. was aged 12;0 when they were administered the CPM, but as they performed poorly on this measure, it was not considered necessary to administer the adult form of the Ravens Progressive Matrices. The CPM is a standardised test in which the child is shown a coloured stimulus picture containing a set of geometric patterns. One section of the pattern is missing. The child is required to complete the pattern by correctly pointing to one of a set of 6-8 possible sections. There are three parts of the CPM to complete; A, Ab and B and as the items become more advanced, the child has to be able to work out how the patterns would look if the missing piece were filled in. Through doing this, it can be inferred which is the correct missing piece. To some extent this mental operation involves the ability to reason by analogy and part to whole awareness. This is what the CPM can be used to measure and, by extension of this, the capacity for abstract thought (Raven 1960; Raven, Court & Raven, 1978). The CPM does not give age equivalents but percentile ranks, and assigns grades based on performance ranging from V "intellectually above average" to IV "definitely below average in intellectual capacity." The maximum raw score that can be obtained is 36.

Results

Performances on the CPM, similar to those on the Block Design were very poor. S., G. and I.'s raw scores on the CPM were 15, 19, and 24 respectively. When their performances were compared to normally developing children of 11½ (range 11;3 to 11;8), the oldest age the CPM is standardised for, the corresponding percentile ranks were between 5 and 10. This means that between 90% and 95% of children aged 11;3 to 11;8 would be expected to obtain scores higher than those of S., G. and I. Furthermore, it may be assumed that S., G. and I.'s scores were *below* the 10th

percentile for their chronological age groups. Recall that the CPM also assigns grades to percentile scores ranging from I, "intellectually superior" to V, "intellectually impaired". Thus according to CPM criteria, a grade of V or "intellectually impaired" can be assigned to S. and G.'s scores and a grade of IV., or "definitely below average in intellectual capacity" to I.'s, since such scores lie at or below the 10th percentile for their age groups.

According to the CPM norms, S., G. and I.'s raw scores of 15, 19 and 24 actually fall within the 50th percentile (or "intellectually average" range) for much younger normally developing groups of children with ages ranging from 5;3 to 8;8. Thus, although, S. and G. were "intellectually impaired" for their ages and I. was "definitely below average in intellectual capacity" for her age on the CPM, their performances were very similar to younger, normally developing children 3½ to 7 years behind their chronological ages. S. and G.'s (but not I.'s) scores on the CPM are comparable to their age equivalent scores and percentile scores on the Block Design (WISC), CNrep, Recalling Sentences (CELF 3) and Recall of Digits Forward (BAS-II) measures. I.'s perceptual awareness, as indexed by the CPM was slightly better than either her visuo-spatial or memory abilities In addition, the erroneous choices that S. made on the CPM, according to the test manual, were typical of the pattern of errors that a much younger child would make.

6.2.5 Visual Representation

I Goodenough Draw-A-Man Test

Spatial orientation as reflected in drawings is reported to be deficient in Williams Syndrome individuals, who find it extremely difficult to draw objects such as faces accurately (Bellugi, Marks, Bihrle, and Sabo, 1993; Bellugi, Lai, and Wang, 1997). This finding is also used to support the idea that visuo-spatial ability is selectively impaired in Williams Syndrome children. For example, Bertrand and Mervis' (1996) longitudinal examination involved studying William Syndrome children's drawings of geometric figures and everyday objects at the ages of 9, 10, 12, and 14 years. The

authors concluded that WS subjects were “extremely delayed in drawing skills” and had,

> “serious difficulty with tasks involving visuospatial constructive cognition, and that the difference is greater than would be expected given the Ss' verbal abilities” (abstract).

In addition, Jariabkova, Kosc, Bzduch, and Sustrova (1999), even found that WS children showed “severe impairment” in the capacity to copy figures. The children’s scores on a copy task were below the 10th percentile, deemed to be within the "defective range" (abstract). Baldus (2000) documented the close relationship between spatial skill and drawing skill in typically developing children, concluding that,

> “artistic abilities are both influenced by and can influence spatial abilities”(abstract).

As the above suggest, there appears to be a close association between drawing aptitude and spatial awareness. It was, therefore, considered important to establish whether S., G. and I.’s visuo-spatial representation as reflected in drawing was selectively impaired as appears to be the case with inherent disorders like Williams Syndrome.

S, G. and I.’s drawings or visual representation skills were assessed, using the Goodenough Draw-A-Man test that is a sub-scale of the Aston Index (1976).[4] As set out by the test instructions, the child is required to draw a picture of a person and from this a “mental age” can be derived according to the level of symbolic representation. All the features that are portrayed such as correct number of fingers, ears and legs are counted and converted into a score that corresponds to a mental age equivalent. The more features that are present, the higher the mark that can be attained. Points are also given if, for example, facial features are drawn symmetrically or the head is in correct proportion to the body and so on. S.’s drawings were assessed when she was aged 11;7, G.’s when she was 13;4. and I.’s when she was aged 11;1, 11;6 and 12;2.

[4] It is important to make clear that this measure was used merely as an informal attempt to apply standardized test norms to S., G. and I.’s drawings, which is in keeping with the present chapter. The test was, in fact, difficult to score and interpret meaningfully and the girls’ drawings could have been evaluated without it.

Results

S., G. and I.'s pictures were not similar in form to those of Williams Syndrome children, who on drawing tasks:

> "show specific attention to parts of an object, but parts may be placed on a page with no integration into coherent whole" (Bellugi and Wang, 1996, p.3).

In contrast, S., G. and I.'s drawings were spaced symmetrically with attention paid to both internal detail and the organized whole of the figures. This shows that S., G. and I. were reasonably competent at representing objects and people in drawings – though, possibly these were quite immature for the girls' respective chronological ages. S., G. and I.'s visual representation and spatial cognition (as reflected in drawing) were not particularly impaired relative to other abilities as is found in Williams Syndrome (Bellugi and Wang, 1996). However, a more accurate interpretation of S., G. and I.'s drawing abilities was possible when they were compared to younger normally developing control children (see "6.3 Similarities To Younger Children"). The girls' drawings are presented consecutively in Figures 6.4 to 6.9.

As can be seen in Figures 6.4 and 6.5, S. produced figures with disproportionate heads, (which were drawn by using a roll of sellotape as a guide) attached to a trunk with the bodily appendages such as arms, hands, legs and feet absent. However, facial features such as eyes, nose, nostrils, mouth, teeth, ears and hair are included. The ears and eyes are symmetrical and the facial features correctly aligned and well proportioned on the head. S. achieved a score of 17 out of a possible total of 50 points and her drawings indicated a 6;6 year developmental level.

Figure 6.4 Drawing by S. aged 11;7

Figure 6.5 Drawing by S. aged 11;7

As indicated by G.'s self-portrait in Figure 6.6, she produced a figure with disproportionate head and legs. Nearly all bodily features are included such as facial features, hair, ears, trunk, clothes, fingers, nails and even teeth. The feet are absent,

but the ears and eyes are symmetrical and the facial features correctly aligned and well proportioned on the head. G. achieved a score of 22 out of a possible total of 50 points and her drawing indicated an 8-year developmental level.

Figure 6.6 Drawing by G. aged 13;4

Three of I.'s drawings (Figures 6.7, 6.8 and 6.9) were assessed. Figure 6.7 is representative of I.'s drawings at the age of 11.1. It is a self-portrait that shows a head with facial features and hair, trunk, arms and fingers, but no legs or feet. This drawing indicated a 9-year developmental level. A picture drawn 4 months later (Figure 6.8) is more sophisticated, since it depicts a clothed figure with legs, feet and even shoes present. Thus some of the major bodily features that were excluded four months previously were now included. This picture indicated an 11-year developmental level. I.'s most recent drawing obtained at the age of 12;2 is a diminutive self-portrait. All major bodily features such as arms, hands, legs, head, hair and facial features are represented and correctly aligned and/or symmetrical. Note that that the trousers are transparent which is a characteristic often seen in the

pictures of younger normally developing children. I. obtained a score of 29 out of 50 points that was consistent with 10-year developmental level.[5]

Figure 6.7 Drawing by I. aged 11;1

Figure 6.8 Drawing by I. aged 11;6

[5] It should be noted that obtaining consistent scores with the Goodenough Draw-a-Man scale was extremely difficult This was particularly evident in I.'s case, since three separate drawings spaced over a year indicated three different developmental levels of 9, 10 and 11 years. Therefore the mental age equivalent scores obtained for S., G. and I. should be treated with caution since the validity of measuring a child's overall non-verbal reasoning ability using a drawing paradigm is questionable. In fact, Raven (1960), has questioned the concept of "mental age" all together.

Figure 6.9 Drawing by I. aged 12;2

6.2.6 Non-Verbal Cognitive Ability: Summary

S., G. and I. scored very poorly on psychometric tests of spatial cognition, perceptual awareness and drawing. Test age equivalents indicated that in some cases, the children were performing at levels that were half their chronological ages. Percentile scores were below 10. S. and G.'s (but not I.'s) scores on the CPM and Block Design (WISC) are comparable to their age equivalent scores and percentile rankings on measures of memory; CNrep, Recalling Sentences (CELF 3) and Recall of Digits Forward (BAS-II).[6] I.'s perceptual awareness, as indexed by the CPM was slightly better than either her visio-spatial or memory abilities. However, S., G. and I.'s Block Design and drawing responses were qualitatively dissimilar to those of children with Williams Syndrome. This made it less likely that S., G. and I's poor scores on the standardized tests could be accounted for purely in terms of disorders of genetic aetiology.

6.3 Similarities To Younger Children?

Qualitatively, S., G. and I.'s Block Design and drawing responses were *not* characteristic of children with genetic profiles such as Williams Syndrome. If so, were the girls' responses more similar in content and form to those of younger, normally developing children? In order to answer this question, S., G. and I.'s responses on the Block Design and Draw-A-Man test were qualitatively compared to those of control children aged 7 to 8 years.

Prior to testing, S., G., and I.'s non-verbal cognitive level was hypothesized to be within the 7 to 8 year age range. This was based on developmental/school reports and anecdotal evidence, since the girls had not received regular psychometric evaluations in the past.[7]Thus, two normally developing children aged 7 to 8 years were tested (5th

[6] See Chapter 5.

[7] As regards S, it had been difficult to judge the level of her non-verbal cognitive ability since an educational psychologist had not attempted an official assessment of this since August 1994 (See Chapter 3, "Background and Early Histories"). Therefore, even in S.'s official reports, there is a gap in the information regarding her non-verbal cognitive abilities – despite the fact that S. had had a statement of her special educational needs as early as 1995. S.'s special needs tutor, who was contacted on 7th July 1999, estimated that S.'s intellectual ability *may* be at the level of a 7 to 8 year old. This was a year ahead of her reading age, which at the time was judged to be 6 to 7. Even here, there was

October, 1999) on the Coloured Progressive Matrices and the Block Design previous to the time that the Romanian adoptees were tested (see Appendix D. for test results). The two control children, one boy (P.R.), aged 7;10 and one girl (L.H.) aged 7.1. attended a primary school in the Nottingham area. They were selected so that one represented the top range of ability for his class and the other, the mid-average range of ability for her class. In addition, a group of 37 school children aged 7 to 8 years was asked to draw pictures of people, so that these could be compared to the drawings of S., G. and I.

6.3.1 Comparisons Between Romanian Adoptees And Controls. Qualitative Observations

I Block Design subtest of WISC

S., G. and I.'s errors on the Block Design subtest of WISC were qualitatively compared to those of the two control children, P.R. and L.H. This was in order to establish whether the Romanian adoptees erroneous responses were characteristic or atypical of younger children. It was found that there were, indeed similarities between G. and S.'s errors on this measure and the ones made by L.H on the same items. These are compared in Figures 6.10 and 6.11 below. The WISC block pattern that G., S. or L.H. were required to copy is on the left and their incorrect responses are to the right (G. or S. = right; L.H. = extreme right.).

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no indication as to S.'s *precise* reading age, since, again, no formal As regards S, it had been difficult to judge the level of her non-verbal cognitive ability since an educational psychologist had not attempted an official assessment of this since August 1994 (See Chapter 3, "Background and Early Histories"). Therefore, even in S.'s official reports, there is a gap in the information regarding her non-verbal cognitive abilities – despite the fact that S. had had a statement of her special educational needs as early as 1995. S.'s special needs tutor, who was contacted on 7th July 1999, estimated that S.'s intellectual ability *may* be at the level of a 7 to 8 year old. This was a year ahead of her reading age, which at the time was judged to be 6 to 7. Even here, there was no indication as to S.'s *precise* reading age, since, again, no formal

Figure 6.10 G.'s block design compared to that of control child, L.H.

Item 4.

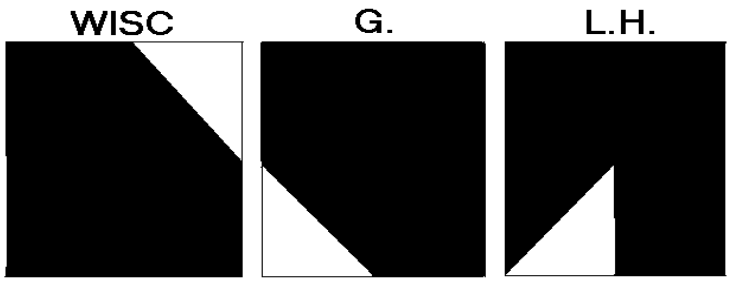
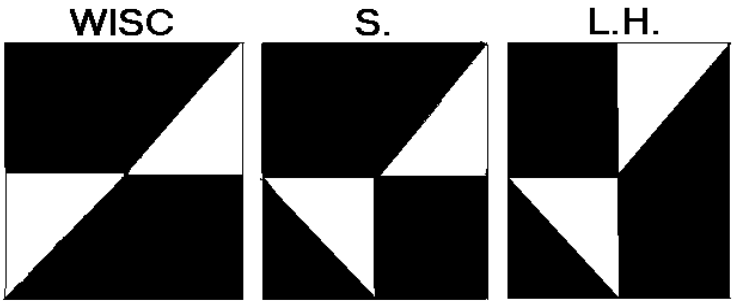


Figure 6.11 S.'s block design compared to that of control child, L.H.

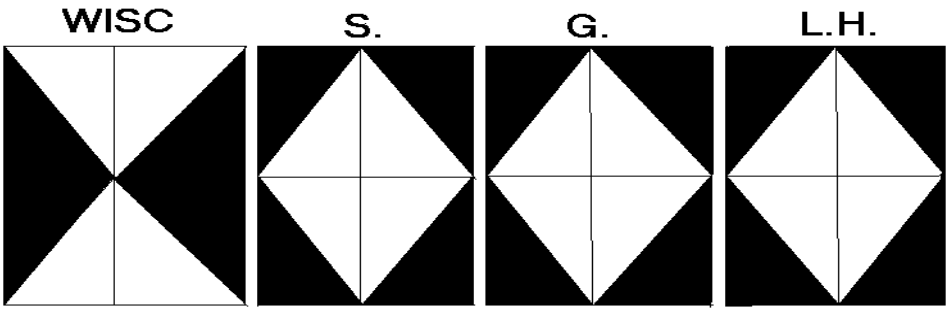
Item 8.



Both S. and G. made the same error as the control child L.H. in response to one of the more difficult test items. These are presented in Figure 6.12 below. Again, the WISC block pattern that G., S. and L.H. were required to copy is on the left and their incorrect responses are to the right (G. and S. = right; L.H. = extreme right.).

Figure 6.12 S. and G.'s block designs compared to that of control child, L.H.

Item 9.

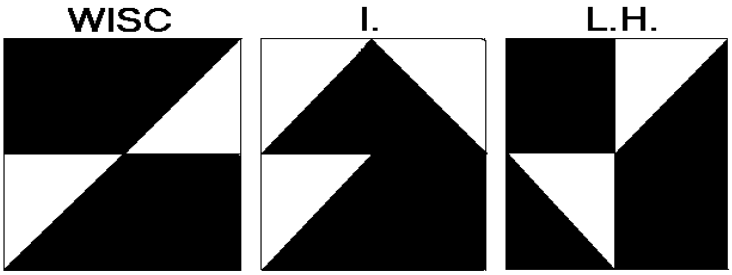


As can be seen, S. and G.'s responses to particular items (4, 8, 9) were very similar to those of the younger control child, L.H. This, in turn, suggests that the Romanian adoptees and the contol child's level of visio-spatial ability was similar. This is particularly indicated by the identical responses to item 9.

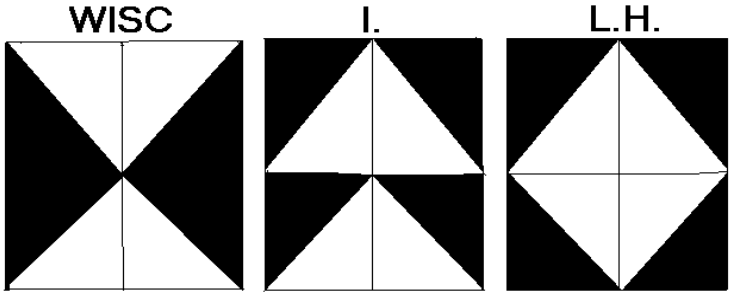
L.H's errors on the Block Design qualitatively resembled the ones made by both G. and S. on the same items (i.e. item 9), but they were *not* similar to those made by I. The errors that L.H., the control child, made on items 8 and 9 are compared to those made by I. in Figure 6.13 below.

Figure 6.13 I.'s block designs compared to that of control child, L.H. for items 8 and 9.

Item 8.



Item 9



II Goodenough Draw-A-Man Test

S. G. and I.'s drawings were also compared to those of younger control children in order to establish whether they were similar in form. A class of 37 primary school children aged between 7 and 8 years were asked to draw a picture of a person (March 2001). Three randomly chosen pictures were assessed using the Goodenough Draw-A-Man test and compared with S., G. and I.'s drawings. According to the test criteria, the developmental level of each control child was respectively 7;6 years, 9;0 years and 10;9 years. These drawings are presented in Figures 6.14 to 6.16.

The artistic abilities of each control child varied, as can be seen from the randomly chosen pictures. The accuracy with which the pictures were drawn differs. For example, the person represented in Figure 1 is quite rudimentary compared to Figure

3 and the disproportionately large head in Figure 2 is similar to G.'s self-portrait. However, what the control children's drawings and those of the Romanian adoptees have in common is that both the detail and the overall gestalt of the figures are depicted. In this respect, S., G. and I.'s visual representation ability was similar to that of typically developing younger children.

Figure 6.14 Drawing by control child, E. aged 8 years. Developmental level = 7;6 years

Figure 6.15 Drawing by control child, A. aged 7 years. Developmental level = 9;0 years

Figure 6.16 Drawing by control child, C. aged 7 years. Developmental level = 10;9 years

6.3.2 Similarities To Younger Children: Summary

Prior to testing, S., G. and I's level of non-verbal cognitive ability was, according to anecdotal observations and documentary evidence, initially estimated to be at about 7 to 8 years. Therefore, S., G. and I.'s tests responses were qualitatively compared to those of control children in this age group. It was found that some of S., and G.'s

incorrect responses on the Block Design test were comparable to those of a younger control child aged 7;1 Also, S., G. and I.'s figure drawings were similar in form and content to the randomly picked drawings of three younger control children aged 7 to 8 years. This suggests that S. and G.'s level of spatial cognition was similar to that of younger children. Rather than being disordered, it appears that S., G. and I.'s spatial abilities were immature or delayed for their chronological ages.

6.4 Summary Discussion and Conclusion

S., G. and I.'s spatial cognitive ability, perceptual awareness and drawing skill were tested using a range of standardized assessments. S., G. or I. did not obtain age appropriate scores on any of these measures. S., G. and I.'s test age equivalent scores, on average, corresponded to much younger children aged around five to seven years (i.e. S. = 5 years or below; G. = 5 to 6 years; I = around 6 to 7 years). Percentile ranks corresponding to S., G. and I.'s test scores ranged from 1 to 14 (i.e. I. = 1 to 14; S. and G. = 1. to 5). S. and G.'s test performances were fairly consistent and indicated that their level of perceptual awareness was *equivalent* to their visio-spatial ability. In contrast, I.'s test performances appeared to be mildly inconsistent across tasks. Her perceptual awareness, as indexed by the CPM was slightly *better* than her visio-spatial ability.

A central finding is that, overall, S., G. and I.'s performances on tests of non-language cognition paralleled their performances on measures of language ability. In particular a close association was found between their spatial cognitive ability as measured by the Block Design subtest of WISC and their linguistic ability as measured by the Clinical Evaluation of Language Fundamentals- Third Edition (CELF-3); S., G. and I.'s scores on both these measures were -3 SDs from the mean of their chronological age groups. This is the opposite to what is found in special populations of children such as those with William's Syndrome (WS). For example, Bellugi, Marks, Bihrle, and Sabo, (1993) found that there were marked disparities between William's

Syndrome subjects' performances on the Block Design and a verbal description task. Bellugi, et al., concluded that this was due to selective impairments in spatial cognition relative to expressive language ability.

Also S., G. and I.'s general symmetry in drawing was in stark contrast to children with Williams Syndrome, who uniformly show extreme difficulty with representing objects in pictures, particularly the accurate portrayal of the human face (Stoyanovich, personal communication, July 1999). Bellugi, Marks, Bihrle, and Sabo, (1993) found that even copying a bicycle properly, presented real problems to children with WS. One of the significant observations concerning S., G. and I.'s drawings was that not only were they able to depict the general gestalt of the figures, but that they paid specific attention to the parts of the figures also. Thus, part to whole awareness did not appear to be impaired in the present three participants. Similarly, S., G. and I.'s errors on the Block Design subtest indicated that they were able to distinguish the overall gestalt of the block patterns they had to copy and were able to incorporate their own blocks into coherent wholes, even if some of their responses were errors. There was no unusual or idiosyncratic attention to detail. These findings do not support a fractionation of higher cognitive functioning relating to spatial cognition as is reputedly found in William's Syndrome and Down's Syndrome (Bellugi and Wang, 1996).

Rather then S., G. and I.'s non-verbal cognitive development being disordered or following a deviant path, it appeared to be delayed for their chronological ages. Some evidence pointing to this was found when the girls' test performances were qualitatively compared to those of controls aged 7 to 8 years. These comparisons were made, in order to establish whether the Romanian adoptees' responses were characteristic or atypical of younger children. Firstly, responses on the WISC Block Design were examined more closely. It was found that some of the item errors that S. and G. made were qualitatively analogous to those of one of the control children (L.H., aged 7;1). In fact S., G. and the control child gave identical responses to one item. As mentioned previously, S., G. and I. were able to achieve reasonable approximations of the overall configurations of the block design. This is also found to be the case with Down's Syndrome (DS) children who complete the Block Design subtest (Bellugi and Wang, 1996). However, as S. and G.'s responses were either

extremely similar or identical to those of the younger control child L.H, the indication is that their errors were probably due to underdeveloped visuo-spatial cognitive awareness and not to deviant response sets (of the type reported for DS children).

With regard to S., G. and I.'s figure drawings, when these were compared to the sketches of three control subjects also aged 7 to 8 years, the differences related only to the accuracy with which the normal controls were able to draw a figure; that is the normal children drew more accurate and sophisticated representations of a figure than the Romanian adoptees. The impression was that S., G. and I.'s drawings were not unusual, but were immature for their chronological (but not developmental) ages. This further suggests that S., G. and I.'s non-verbal abilities were delayed rather than disordered.

The data[8] suggest that the level of delay for non-verbal reasoning was similar to the level of delay for language with neither being age appropriate (or ahead of the other) but, in I.'s case, at least five years behind her chronological age and in the cases of S., and G. approximately half their chronological ages. Language ability did not appear to exceed or be ahead of non-verbal cognitive ability or vice versa. The test age equivalent scores, percentile ranks and standard deviations from the mean of standardised tests appeared to be virtually the same for language and non-language cognition. This is illustrated by Table 6.2 which presents test results (for verbal and non-verbal cognition) and compares either percentile ranks or standard deviations from the mean where given. Note that the language measures, CELF-3, BPVS and TROG were administered twice and thus, two sets of scores are presented.

In general, the impression was that S., G. and I. were experiencing severe, global developmental delays which affected language and non-language cognition almost equally. Generally, there was no readily perceivable dissociation between language and other areas of cognition suggested by the data. This was also supported in S. and G.'s cases, by prior developmental reports. A report by a clinical psychologist for G., who was then aged 11;11. years states:

[8] With the exclusion of the results of the Goodenough Draw-A-Man test, since the quantitative scores were difficult to interpret meaningful.

> "Georgina has a fairly consistent pattern of skills with no marked discrepancies between her verbal and non-verbal abilities."

Similarly, S.'s most recent speech and language therapy report (for when she was aged 11;7) concludes that,

> "Sariah's speech and language are commensurate with her general abilities."

In clinical terms this means that there was no specific impairment with language.
It could be argued that the findings of Chapter 6 provide support for the weak form of the Cognition Hypothesis – described in Chapter 1 - positing that particular non-verbal cognitive abilities are at least necessary but not sufficient for the development of language. This approach suggests that in addition to non-verbal cognitive abilities, there may be specifically linguistic capacities that account for language acquisition (Cromer, 1976). One prediction of the Cognition Hypothesis in its weak form is that language development would be equivalent to other cognitive levels in developmentally delayed populations of children (Miller, 1981). This is what the data indicates is the case for S., G. and I. (e.g. spatial cognition as measured by the Block Design and expressive and receptive language as assessed by CELF-3 were both –3 SDs below the mean).

An alternative interpretation is that S., G. and I.'s test results are congruent with the Correlational Hypothesis (Bates et al., 1977, 1979) – also mentioned in Chapter 1. This incorporates the idea that "common maturational or cognitive factors" motivate or govern the developmental trajectories of both the linguistic and general cognitive spheres (Miller, 1981, p.5). It is these shared cognitive mechanisms that are seen as a requirement for language (Yamada, 1990). The Correlational Hypothesis suggests that in some, but not all situations, language can develop ahead of non-verbal (or general) cognitive capacity or vice versa (Miller, 1981). This, again, is consistent with aspects of S., G. and I.'s data (e.g. scores on BPVS slightly ahead of scores on standardized measures of non-verbal cognition).

In Chapter 5, it was suggested that S., G. and I. have environmentally induced rather than innately caused developmental language delays relative to chronological age. It appears, then, that the effect that extreme global deprivation during early childhood has on non-verbal cognition is to delay its developmental trajectory and to the same degree as language. Although S., G. and I. appeared to have made subtle but steady progress throughout the duration of the study, in absolute terms, the gap between their chronological ages and developmental ages appeared to remain constant even as they grew older. As to whether these gaps will close with further development is unclear at the present time.

Table 6.2 Results: Comparisons between scores on language tests and non-verbal cognition tests: percentile ranks and standard deviations from the mean.

	Sariah		**Georgina**		**Ingrid**	
Block Design						
Percentile Rank	1		1		1	
Distance From The Mean	-3		-3		-2.3	
Ravens Coloured Progressive Matrices						
Percentile Rank	<5		<5		<10	
CELF-3						
Receptive Language Score:						
Percentile Rank	1	1	1	1	1	1
Distance From The Mean	-3.3	-3.3	-3.3	-3.3	-3.1	-2.8
CELF-3						
Expressive Language Score:						
Percentile Rank	1	1	1	1	1	1
Distance From The Mean	-3.3	-3.3	-3.3	-3.3	-3.3	-3.1
British Picture Vocabulary Scale						
Percentile Rank	18	3	2	8	30	7
Distance From The Mean	-0.93	-1.93	-2.06	-1.4	-0.53	-1.46
Test For Reception of Grammar						
Percentile Rank	1-5	1-5	1	1-5	10	1-5
Distance From The Mean	-1.8	-2.2	-2.46	-2.2	-1.26	-1.93

Next Chapter – Chapter 7, critically examines the concept of a critical period for first language acquisition by looking at the morphosyntactic patterns in S., G. and I.'s spontaneous spoken language and in response to elicitation tasks.

Chapter 7 Morphosyntactic Patterns in Spontaneous Speech

In Chapter 5, S., G. and I.'s language ability as measured by standardized tests was described. In contrast, the data used in Chapter 7 concerns the transcripts of S., G. and I.'s spontaneous spoken language in naturalistic contexts. The girls were filmed in a variety of situations with differing conversational partners. The form of their spoken utterances was analysed both quantitatively and qualitatively. First of all, some of the general morphosyntactic patterns evident in S., G. and I.'s speech are described. Secondly, a detailed discussion is presented of one of the significant characteristics of S., G. and I.'s morphological production, that of overregularization. A detailed examination of naturalistic speech was undertaken in order to address the following research question:

I Does the linguistic development of children adopted from Romanian 'orphanages' constitute evidence for the existence of a critical period for language?

The primary aims of this chapter is to critically examine the general idea that during the first four years of life there is a fixed critical (or maturational) period for the development of an innate modular-like system for grammar (Chomsky, 1959; Pinker, 1991, 1999; Locke, 1994, 1997). The morphosyntactic evidence that this chapter uses is that of morphosyntactic inconsistency and overregularizations, the overapplication of regular patterns to irregular exceptions. According to Pinker (1991, p.48.), the past tense rule, for example, develops "on a schedule not timed by environmental input." This implies that some aspects of morphosyntax are innate and emerge within a genetically coded period of time – regardless of experiential factors. However, Chapter 7 attempts to weaken this argument by showing that the quality of the linguistic environment does, indeed, play a part in determining when particular grammatical rules emerge. This raises questions about the concept of an early critical period for grammar altogether. Chapter 7, in fact, concludes that the linguistic development of children adopted from Romanian 'orphanages', does not constitute evidence for the existence of critical period for language.

7.1 Introduction

7.1.1 Brown's (1973) Emergence of Grammatical Morphemes

One of the first systematic studies of the acquisition of grammatical morphemes was carried out by Roger Brown and his associates (e.g. Cazden, 1968; Brown, 1973). Using the naturalistic data from three very young children, Adam, Eve and Sarah, Brown (1973), investigated the children's production of 14 bound and free morphemes. It was found that some morphological forms such as the present progressive –ing, prepositions *on* and *in* and regular plural and possessive inflections were produced early on in the acquisition process (between 27 and 30 months), but that consistent usage of these morphemes did not occur for many months (until around 41 to 46 months). Other grammatical morphemes such as the third person singular emerged later (between 39 and 42 months) and were acquired more slowly – usually by the age of 5 years (Cazden, 1968; Wolf-Nelson, 1993; Peters, 1995). The order in which the 14 morphemes were found to emerge can be seen in (7.i) below:

(7.i) Morphological acquisition: Brown's (1973) order of emergence of 14 grammatical morphemes.

-ing	1
in, on	2-3
plural	4
past irregular	5
possessive	6
(uncontractible copula)	7
articles	8
past regular	9
(third regular)	10
(third irregular)	11
(contractible auxiliary)	12
contractible copula	13
contractible auxiliary	14

Brown (1973) noted that the children's structural language growth was characterised by periods of "distinct developmental achievements" (Miller, 1981, p. 25) which Brown somewhat arbitrarily, termed "stages". Brown devised a measure, the mean

length of utterance (MLU), in order to quantify the child's stage of growth. MLU values were then assigned to these qualitatively differing stages of structural development and, thus, in this scheme, a child's stage assignment is defined by his or her MLU. These stages apparently correlate with the morphemic structures that one would expect to be present in a child's productive language. Brown's stages of structural development are summarised in Table 7.1 below.

Table 7.1 Brown's (1973) stages of structural development: Stages I to V+, expected MLU for each stage and predicted chronological ages.

Brown's stage	Expected MLU	Age (Predicted)
Early Stage I	1.01.- 1.49	19 – 23 months
Late Stage I	1.50 – 1.99	23 – 26 months
Stage II	2.00 – 2.49	27 – 30 months
Stage III	2.50 – 2.99	31 – 34 months
Early Stage IV	3.00 – 3.49	35 – 38 months
Late Stage IV – Early Stage V	3.50 – 3.99	39 – 42 months
Late Stage V	4.00 – 4.49	43 – 46 months
Post Stage V	4.50+	47 – 58 months

Mean Length of Utterance (MLU) (Brown, 1973).

7.1.2 Mean Length of Utterance (MLU)

Computing mean length of utterance in morphemes has been a popular method used by researchers and clinicians alike for analysing the speech of developmentally disabled children (Miller, 1981). The MLU is a quantitative measure that can provide a general index of syntactic complexity in a child's speech at least up to the age of five years (Stage V; MLU = 4;0). It was, therefore, considered useful to apply this measure to S., G. and I.'s spontaneous speech transcripts. The procedures for computing mean length of utterance in morphemes were adapted from Brown (1973) using Chapman's (1981) conventions. Chapman's method for computing MLU differs from Brown's in that only 50 rather than 100 utterances are used. S., G. and I.'s speech was segmented into utterances or communication units using Loban's (1976) method and were taken from the middle of the transcript rather than from the first few pages. An additional criterion borrowed from Bloom (1970, 1973) is that self-repetitions were excluded. The MLU is calculated by dividing the total number of

morphemes by the total number of utterances counted. Transcripts of S., G. and I.'s spontaneous speech were selected from the beginning, middle and closing stages of the data collection periods which spanned around 22 to 23 months. These transcripts involved a variety of contexts and conversational partners. S., G. and I.'s results are below in Table 7.2.

Table 7.2 Mean length of utterance in morphemes computed for S., G. and I. for selected visits within a two-year data collection period between June 1998 and May 2000 (using Chapman's 1981 criteria).

	Date of Visit	**Age**	**Mean Length of Utterance**
Sariah	04.06.98	11;3	5.18
	11.03.99	12;0	6.24
	20.05.00	13;2	5.68
Georgina	17.09.98	13;2	7.08
	16.10.99	14;4	5.60
	18.03.00	14;9	6.01
Ingrid	09.06.98	10;8	5.74
	13.04.99	11;6	6.28
	16.05.00	12;7	5.14

As can be seen, S., G. and I.'s MLU values from selected visits over a period of 22 - 23 months exceeded an MLU of 4.50. According to Brown (1973), an MLU of 4.50+ corresponds to Post Stage V of language development and a predicted chronological age of 47 + months (range 47 to 58 months). It may be inferred from this, that the level of complexity of S., G. and I.'s productive language (as indexed by the MLUm measure) was either equivalent to or beyond that of children aged 4 to 5 years.

Lengthy analyses of S., G. and I.'s grammatical production using a clinical procedure such as the Language Assessment, Remediation and Screening Procedure (LARSP; Crystal, Fletcher and Garman, 1976; Crystal, 1979), which is designed for children between the ages of 22 months and 5 years, was considered inappropriate at this stage. This is because the MLU measure indicated that the overall level of complexity of S., G. and I.'s productive speech was probably beyond the oldest age range for which LARSP is targeted. Another consideration is that LARSP is designed to identify areas of continuing grammatical difficulty and unusual constructions in relatively small samples of speech, around 100-200 utterances (Miller, 1981), rather than larger data

sets such as 45 hours of audio and video recordings. Instead, it was considered more useful to check for particular, theoretically significant speech patterns that emerged in the raw language data as a whole. The result of many hours of listening to tapes and transcribing dialogue was the observation that there were several trends that were evident in S., G. and I.'s productive language. Examples of some of these morphosyntactic patterns occurring within the verbal and nominal systems are classified and presented over the following pages.

7.2 General Morphosyntactic Patterns and Peculiarities in Spontaneous Speech

S., G. and I. spontaneously produced some interesting constructions in verb and nouns phrases that might be considered unusual for their chronological age groups, but are perhaps typical of younger children. These are classified as follows:

7.2.1 Verbal System

1) Subject-verb agreement

a) singular subject with plural (or uninflected) verb form

Sariah:	(12.05.97)	No, he *do* a different one.
	(04.06.98)	This *have* to be by Monday, phew!
Georgina:	(24.04.99)	*{G.'s response to test item}*
		While the boy *are* cooking (..) the boy.

b) plural subject with singular verb form

Georgina:	(18.03.00)	What *is* his names?

2) Use of auxiliary verb

Sariah:	(27.05.97)	My yellow *didn't* be my favourite colour.

	(24.04.99)	That were meant to be that, *should*n't it?
Georgina:	(18.09.98)	*Do* I be nice to you?
	(16.10.99)	*Will* you think Sariah('d) be havin' her sleep by now?
Ingrid**:**	(11.03.99)	O:h, I know what you were gonna do. You were gonna do that *don't* ya?

3) Distribution of tense in auxiliary-main verb and verbal complement structures

a) Tensed auxiliary + tensed main verb (same tense) instead of non-finite form.

Sariah:	(08.09.98)	Just as well you *didn't brought* me a proper one.
	(20.05.00)	*Did* I *got* half of that?
	(11.03.99)	*Is* that battery *works*?
Georgina:	(24.04.99)	Why *did* ya *came* to Sariah_ house to play games with me and Sariah?
	(24.04.99)	When *did* Lisa *came*? (..) So when *did* Lisa *came*?
Ingrid:	(11.11.98)	And I di:d some shopping. I *did got* some red nail varnish.

b) Tensed auxiliary + tensed main verb (not same tense) instead of non-finite form.

Sariah:	(04.06.98)	Oh wish I *can watched* it.
Georgina:	(18.09.98)	*Can* you *sent* her out, please?
	(11.03.99)	*{G. picks up her doll}* She'*ll came* and throw honey at you.
Ingrid:	(21.09.98)	*Shall* we *stood* up?
	(02.12.98)	You *could* have *came* with us.

c) Finite verb + tensed verb complement structures instead of non finite form

Sariah:	(19.11.98)	Ah yeah but you *saw* me *went* on the floor, didn't you as well?

Ingrid: (11.03.99) I'm tryin' to press that one. The one what ya *told* me to *pressed.*

d) Use of tense (i.e. use of non-finite instead of tensed form)

Sariah: (07.10.98) I *be* a baby if I'm a teen-teenager huhh hahh.
(20.05.00) He *known* him when he was at lower school.
Georgina: (18.09.98) *{G. tells her friend, D. about a holiday}*
I went to-I went to Devon and look what I bought today (..) in Devon (..) a Shellie doll, just to show *(pause)* - and when after that when we went doin'-we *sun bathe* on the beach..
(28.10.98) I hope you *be* dead tomorrow.
Ingrid: (14.12.98) I liked the ending, but I *hate* the beginning.
(11.03.99) I *be* Ingrid. My name's called Ingrid.

e) Use of non-finite forms (i.e. use of infinitive instead of participle forms)

Sariah: (09.12.98) Well then, have you *write* it down?
Ingrid: (13.04.99) I an't *hold* one for ages.

7.2.2 Nominal System

a) singular determiner with plural or invariable[1] noun (e.g. *scissors*, *jeans*, *clothes*)

[1] This term is adopted from Crystal (1997) and Thomson and Martinet (1986).

Sariah: (18.03.00) D'you wanna have *a play times*?

Georgina: (16.03.96) {*L. asking G. what she is going to get for her birthday}*

L: What else are ya gonna get?

G: (…) *A clothes and shoes*.

b) singular determiner with non-count noun

Sariah: (08.09.98) Oh yeah, well had *a fruit* y'know. I've already had *a fruit* this morning.

(20.05.00) Why ya got *a sand* in there?

Ingrid: (16.05.00) Is it-Need *a* paper.

c) no overt plural inflection in plural nouns (although determiners are inflected)

Georgina: (19.11.98) *Those metal ball_*, look there. They come off.

Sariah: (09.12.98) I'm lookin' at *these box_*

Ingrid: (02.12.98) *I.'s response to item of expressive grammar task.*

L: Tell me what the man is doing.

I: He's climbing up *some ladder_* and getting' a cat down.

d) singular determiner with inflected plural noun

Georgina: (24.04.99) Let's play these cards (..) Let's play *this cards* here-there.[2]

e) singular pronoun/noun referring to more than one thing

[2] Variability of use.

Sariah: (18.03.00) *{S. and L. talking during test administration}.*

L: I haven't got any trainers but I do like Georgina's Reebok Classic Trainers. Do you?

S: Yes *it's* very nice.

Georgina: (11.03.99) *{G. talking with her adoptive mother K}.*

G: D'ya like *our new beds* Mummy what we brought from the D.F.S.?

K: Mm very nice.

G: We brought *it* with our money yesterday.

f) "failure to observe co-occurrence restrictions between determiners and nouns (e.g., much bricks..)" (Scott, 1988)

Sariah: (08.09.98) I'm getting' mostly cards. Look you've got that *mu:ch*.

(28.10.98) Not very much now is there? Not very *much* eggs; you've taken them all.[3]

Ingrid: (02.12.98) How *much* things are you going to play?

g) no agreement in number between (object) complement and corresponding subject

Sariah: (20.05.00) *That's* long sentences.

Ingrid: (17.12.99) You had some pictures and you asked me to (..) say things and *it was* so easy things.

1) Case in pronouns

a) genitive unmarked

Sariah: (04.06.98) *Who* turn was it

[3] A few seconds previously, S. said, "How *many* eggs have you had?"

Georgina: (11.03.99) *{G. talks about her doll}* Just-Who could it be?=What name can ya tell me could this be Mummy?=Can you tell me *who* name could this be?

As the above examples show, a range of morphosyntactic idiosyncrasies were evident in S., G. and I.'s spoken language throughout the study. These were occasional rather than frequent. Sometimes S., G., and I. used the correct morphosyntactic forms and sometimes they did not. This indicated some variability in the production of particular constructions. Within the verbal system there was sometimes no subject-verb agreement, non-finite forms were used instead of finite forms or the wrong tense form was produced. Within the nominal system, S., G. and I.'s occasional 'errors' ranged from omission of plural inflections to lack of number agreement between determiner and noun. Some of the noun phrase forms that S., G. and I. produced have been reported in the speech of normally developing pre-adolescents. According to Scott (1988, p.65), these error types include the "failure to observe co-occurrence restrictions between determiners and nouns" as in "How *much* things are you going to play?" (I., aged 11.1). It was observed that S., G. and I. alternated between a correct (verbal or nominal) morphosyntactic structure and an unusual version of this over several months or within the same visit. Sometimes variability of production even occurred within the same turn.

According to Crystal (1997), such inconsistency represents a stage of productive growth in the acquisition of a grammatical structure. This process is still evident after the age of 9 years (Scott, 1988). Thus as Crystal states:

> "The study of errors is important, because they show children breaking fresh grammatical ground. They provide the main evidence of how children go about actively learning new constructions" (p.245).

Some of the above noun and verb phrase peculiarities that S., G. and I. used were evidence that their language systems were in a state of flux and continuing on the path towards adult competence.

7.2.3 Regularity in the Inconsistency

Despite the appearance of unsystematic variation within the auxiliary – main verb system, there were some interesting regularities to be observed. Consider, for example, the cases reported under (3a) which involved tensed auxiliary plus tensed main verb such as the following noted in S's speech:

Sariah:	(08.09.98)	Just as well you *didn't brought* me a proper one.
	(07.10.98)	I *did had* 'Aliens' tamagotchi but that broke.
	(07.10.98)	*Did* ya *got* some toys?
	(28.10.98)	Why *did* you *went* like that?
	(28.10.98)	Yeah she's askin', "What *did* Sariah *did*?"
	(19.11.98)	*Did* ya *saw* that?

The above sentences each contain do-support and an irregular past tense verb. The errors involve an apparent 'agreement' in tense between auxiliary and irregular main verb, where the adult model would require a non-finite main verb form.[4] However, this 'agreement' did not occur when the auxiliary preceded a regular main verb, that is, incidences such as "*Did* ya *liked* that?" and "I *did walked* in the park yesterday" did not arise.

According to Crystal (1997), errors such as "*Did* ya *got* some toys?" and "Why *did* you *went* like that?" indicate the complexity of using tense in question formation, problems with which can be seen in the speech of 2-year olds. Crystal uses the example "What *did* you *bought*?" to illustrate this point. However, the above data suggest that there is a more general issue at stake, to do with the combination of auxiliary and irregular main verbs in all sentence types and not just in questions. In fact, Crystal's own examples also involve irregular main verbs. It may be, therefore, that these patterns are evidence of the complexities involved in learning the different morphosyntactic behaviours of regular and irregular verbs when combined with auxiliaries.

[4] However, as was characteristic of S., she often produced sentences with past tense do-support and an irregular verb correctly as in "*Did* you *get* that?" and "What *did* she *say*?" During the most recent visit to S. (in May 2000, aged 13.2) she said "*Did* you *get* in trouble in middle school..?" but then a few minutes later said, "*Did* I *got* half of that?" – indicating variability in her production of these forms.

It is also important to note that errors concerning the use of tensed and/or non-finite forms like the ones made by S., G. and I under (3b), i.e. "*Can* you *sent* her out, please?" and "You *could* have *came* with us." can also be observed in the spontaneous speech of typically developing children. For example, during a recorded play activity, the following forms were produced by I.'s friend R. aged 9 years, who attends a main stream school:

R: (21.09.98) 1. Think she's just *came* up-Are you *came* upstai:rs?
2. Have you *came* upstairs?

These two examples involve the use of a tensed main verb instead of a non-finite form. This suggests that some of the tense forms that S., G. and I. produced were not atypical for normally developing children in middle childhood.

7.3 Specific Morphosyntactic Pattern of Special Significance to the Present Study

One feature of S., G. and I.'s morphosyntactic production is of particular significance to this study. This involves the generalization of commonly occurring or regular inflections to irregular exceptions. This morphosyntactic pattern has been observed in the speech output of normally developing children (e.g., Pinker, 1999; Miller, 1981). S., G. and I. produced overgeneralization or overregularization errors throughout the duration of the study. Evidence of these is described in detail in the following sections.

7.4 Overregularizations

7.4.1 Evidence of Innate Language Ability? The General Consensus.

The acquisition of certain types of grammatical morpheme is considered to be one of the most noticeable developments during the earliest years of language learning (MacWhinney, 1995). One aspect of this area of child language acquisition which has

fascinated linguists and psychologists alike for many years is the occurrence of over-regularizations, that is, over-extending regular inflections to irregular past tense verbs, irregular plural nouns and other irregular forms (Marcus, 1995). This phenomenon is first apparent in normally developing children from the age of two and a half (Pinker, 1999), and errors such as *goed, mouses* and *gooder* are often produced. These morphological overregularizations, characteristic of early language development are also viewed as perhaps being one of the distinguishing features of baby talk (Menn and Stoel-Gammon, 1995).

The study of overregularization errors, has, for the last ten years, been the source of a theoretical battleground between researchers who, on the one hand, use these errors to support connectionist or "associationist" theories of language acquisition (e.g. Plunkett, 1995; Rumelhart and McClelland, 1986) and, who, on the other, use overregularizations as evidence for symbolic or "rule and representation" models of language and cognition (e.g. Marcus, et al, 1992). As regards language and cognition on a broader scale, some rule theories suggest that the brain is comprised of a system of computational modules, whose organisation is largely genetically coded and one of which is language (Pinker, 1991). Chomsky (1959) and Lenneberg (1964), used the occurrence of overregularizations to support their argument that language is innate. More specifically, they believed that language is acquired by an innate rule-forming device in the child's mind and used children's capacity to generalize structures such as the regular past tense to support their theory (Pinker, 1999). Similarly, Pinker (1991) used a rule-based system to account for past tense errors and concluded that,

> "Focusing on a single rule of grammar, we find evidence for a system that is modular, independent of real-world meaning, nonassociative (unaffected by frequency and similarity), sensitive to abstract formal distinctions (for example, root versus derived, noun versus verb), more sophisticated than the kinds of "rules" that are explicitly taught, developing on a schedule not timed by environmental input, organized by principles that could not have been learned, possibly with a distinct neural substrate and genetic basis" (p. 482).

This view is shared by others such as Stromswold, (1995) and Locke (1994, 1997) who view language abilities as innate and "likely to be functionally and anatomically autonomous or modular with respect to other abilities and the trait may be heritable."

(Stromwold, 1995, p. 855). The characteristic of an innate ability is that it is typically present in all normal humans. With respect to acquisition, this tends to be consistent and automatic with all normal children passing through the same developmental stages at the same ages without having to be specifically taught. Such abilities may have their own critical period for successful development (Stromswold, 1995). Thus the ability to generalize regular forms or "rules" to irregular exceptions is generally considered to have all the hallmarks of innateness; overregularization errors occur in all children at around the same ages and are generally thought to develop in a U-shaped curve (Marcus et al., 1992). In addition, it has also been pointed out that when children produce overregularizations, they are not merely using the forms that they have heard their parents use, since parents do not say "sayed", "heared" and "mices" (Pinker, 1989; Stromswold, 1995). Overregularization errors thus confirm that children are using language productively and are not repeating back what they have heard others say. Also the rule-like processes that underlie the production of overregularizations can be acquired without explicit instruction (allegedly one of the hallmarks of innateness). These types of creative errors often occur when a child cannot recall or has not learned the correct irregular form. Thus, errors such as "thinked", "drawed" and "comed" are viewed as creative attempts by the child to get to grips with unfamiliar forms that are not predictable or orderly like regular or often heard forms (Pinker, 1999).

The general consensus in the child language acquisition literature, then, is that overgeneralization of a morphological "rule" to cases where it does not apply (e.g. constructions such as "bited", "mans" and [du:z]) is characteristic of actual rule learning (Menn and Stoel-Gammon, 1995), and thus a stage of growth in the development of the linguistic system – a stage that is considered to develop within a fixed time schedule (Pinker, 1991). If an innate learning mechanism (Stromswold, 1995) allows for the generalization of often occurring constructions (or rules) to irregular or less familiar exceptions, then such an ability – often viewed as modular - might be subject to a period of maximal sensitivity. If, as Pinker (1991) suggests, grammatical development is naturally complete by age four, then a likely candidate for the critical period for successful morphological development would be early childhood. Pinker (1999) argues that the ability to generalise rules has a fixed

developmental schedule that occurs within the first four years of life, is modular and innately specified with a distinct neural base. He states that,

> "I suspected that at least some of the timing of language development, including the past tense rule, is controlled by a maturational clock. Children may begin to acquire a rule at a certain age for the same reason they grow hair or teeth or breasts at certain ages" (p.203).

However, what are the implications for children, such as those with histories of extreme isolation, who miss this uniform developmental phase? An approach that makes a specific prediction about this is Developmental Neurolinguistic Theory (Locke, 1997).

7.4.2 Neurolinguistic Prognosis for Language After the Critical Period

The reader may recall the developmental neurolinguistic concept of the critical period (Locke, 1997) described in section 1.7 of Chapter 1, which states that there is a critical phase between 2 and 3 years of age during which a Grammatical Analysis Mechanism (or GAM) must be 'switched on'. This happens *only* if the child has built up a sufficient store of lexical material (or formulaic phrases) acquired through previous linguistic experience. The physical maturation of the brain also helps the process. The GAM is responsible for the child's emerging "analytical-computational" capability, that is, the ability to perceive and use grammatical regularities or 'rules' (Locke, 1997, p.309). The most obvious sign that this is at work is when the child begins to use words such as "mouses" and "drawed", that is, the child begins to overapply regular patterns to irregular exceptions. The activation of the GAM is timed and fated to occur only once, early in childhood and as Locke states:

> "analytical and computational functions appear to engage in a relatively narrow time window" (p.273).

Developmental neurolinguistic theory predicts that if first language acquisition begins after the close of the critical phase for the activation of the GAM (i.e. after 3 years), then the result is permanent morphosyntactic deficits. Inflectional morphology may be particularly impaired (Locke, 1997; Smith-Lock, 1993). If the activation of the GAM is truly a one-off event, then it would not be expected to turn on in the relatively

mature brain of the older child, aged 6. 7 or 8 who was lexically deprived during the first fours years of life. Correspondingly, one would not expect systematic overregularizations to occur in the spontaneous speech of such a child. This is because the appearance of overregularizations is "the most conspicuous form of internal evidence" that the GAM is at work (Locke, 1997, p.272).

If the first language acquisition of the older socially deprived child involved the use of overregularizations, the implications are two-fold: the timing of the neurolinguistic critical period would be disconfirmed and 2.) in turn, the general idea accepted by others that there is an early critical period for grammar (e.g. Pinker, 1991, 1999, Stromswold, 1995) would be called into question. This chapter now turns to presenting the evidence.

7.5 Overregularizations in the Speech of Socially Deprived Children

The Romanian adoptees' spontaneous spoken language during a two-year period (June 1998 to May 2000) was studied. S., G. and I. were recorded in a range of naturalistic contexts with different people. The video and audio recordings comprise around 45 hours of data. During data collection, all three girls were observed to be going through puberty. At the same time, overregularization errors occurred in S., G. and I.'s speech, that is, they overgeneralized regular patterns to irregular exceptions like younger children. These occurred during both spontaneous speech and test conditions. The complete lists of overregularizations, the date and context of when these occurred are presented in Appendix E. Overregularizations occurring in the speech transcripts were analysed both quantitatively and qualitatively. First of all, an attempt was made to establish how often S., G. and I. overregularized irregular past tense verbs.

7.5.1 Rates of Verb Overregularization

Marcus et al, (1992), studied spontaneous speech transcripts of eighty-three children (obtained from the CHILDES computer database, MacWhinney, and Snow, 1985,

1990), and examined the irregular past tense forms contained in 11, 500 utterances. When calculating the rates of overregularization for these children, Marcus et al counted the number of past tense errors (such as *comed* and *broked*) and divided this by the number of correct past irregulars (such as *came* and *broke*) plus the number of overregularization errors that occurred. It was found that the mean overregularization rate across the sample of children was only 4.2 percent. This meant that over 95 percent of the time, the children used the correct past tense version of an irregular verb (such as *broke*) and not an overregularized form such as *breaked* or *broked*.

Marcus et al.'s formula was applied to S., G. and I.'s speech transcripts in order to calculate a mean overregularization rate for each child. Of the Romanian adoptees, S. produced the most irregular past tense errors (30 in total) and, thus four transcripts were examined, spanning a period of three years and corresponding to the dates 12.05.97; 09.12.98; 24.04.99 and 20.05.00 - when S. was aged 10;2 to 13;2. It was found that for these transcripts, the mean error rate was 4.5 percent. This suggests that, S.'s irregular past tense overregularizations were rare. G. produced overregularized forms less frequently than S. and, thus only two of G.'s transcripts were studied. These transcripts dated 28.10.98 and 20.05.00 - for when G. was aged 13;4 to 14;10 – relate to the beginning and end of the study. G.'s combined rate of overregularization for these transcripts was 3.66 percent. With regard to I., three of her speech transcripts were examined dated 09.06.98, 18.10.99 and 16.05.00 covering a two-year period for when I. was aged 10;8 to 12;7. These were taken from the beginning, middle and end of the data collection period. I.'s mean overregularization rate for these transcripts was 3.33 percent.

Quantitative analyses revealed that past tense errors were rare in S., G. and I.'s spoken language, that is, the proportion of past tense verb forms that the girls overregularized did not appear to be above 4.5 percent (the rate for S.). This is comparable to the results obtained by Marcus et al, for normally developing children. More than 95 percent of the time, S., G. and I. each used the correct past tense version of an irregular verb rather than an overregularized form.

7.5.2 Types of Overregularizations

Following is a qualitative discussion of the *types* of overregularization that S., G. and I. produced. The following examples in which irregular past tense verbs have been overregularized with the regular /-ed/ suffix (pronounced as /-d/, /-t/ or /-id/) occurred during spontaneous speech and test administration (see Appendix E. for a full list of examples for each child).[5]

Sariah:	(17.05.97)	You **driv*ed*** in the car first.
	(07.10.98)	Why-Why is this **tear*ed***? Hey why is this **tear*ed***? Why was it **tear*ed***?
	(24.04.99)	Catty: Catty:! Somebody **draw*ed*** look! Now somebody's **draw*ed*** a cat
	(20.05.00)	*{S.'s response to test item}.*
		L: Tom saw Peter. David saw Frank. Who was seen; Tom, David, Peter or Frank?
		S: Tom **see*d*** Peter (..) and Dave saw Frank.
Georgina:	(28.10.98)	*{G. states to her adoptive mother, K. that her microphone is broken.}*
		I just **brok*ed*** it mum (…) I **brok*ed*** it
	(09.12.98)	*{Part of G.'s response on a narrative task}.*
		He **blow*ed*** a whistle.
	(20.05.00)	*{G.'s response to test item}.*
		L: The student did not know the teacher who taught year five last year.
		G: E:rm The student didn't know (..) know e:rm her who **teach*ed*** them last year.
Ingrid:	(09.06.98)	St George came up and **fight*ed*** dragon.
	(19.10.99)	I've **hid*ed*** those Smarties.
	(16.05.00)	*{I.'s response to test item}.*

[5] According to Curtiss (1977), **Genie** only over-regularised once (in the Autumn of 1973) when she applied the regular past tense morpheme to the verb ***break*** to get [**brekt**]. In fact this was the only time that Genie used the /ed/ past tense morpheme throughout Curtis's data and so it was concluded that the past regular had not been acquired. It was also apparent that Genie did not comprehend past tense. (Curtis, 1977, p. 171)

L: *{Shows I. a picture of a street scene.}* Can you make a sentence out of this picture using the word "if"?

I: If I get **runn*ed*** over I'll get told over-off I meant.

Similar to younger children, S., G. and I. appeared to be indiscriminate in the forms that they chose to regularize (Pinker, 1999); they applied /ed/ not only to irregular stems as in "fighted", "bited", "blowed", "throwed", "heared" and "teared" (as the examples of irregular verb overregularizations show above), but also on irregular past tense forms as in "broked", "stoled" (S., aged, 11;9 and 13;2), and "chosed", "wroted" (I. aged, 10;11 and 12;7). G., S. and I. also applied /-ed/ to their own neologisms such as "magicked" and "rehearsalled" (14.12.98., I. aged, 12;2). G. and I. even applied /ed/ to irregular past tense verbs that already had a suffix such as "drawned", (G., aged, 14;10.), "throwned", (I. aged 10;11) and "brokened" (I. aged 11;0). In addition, I. was noted to overgeneralize the past participle/perfect /-n/ suffix to irregular past tense forms as in "tooken" and "wroten"[6]. She even used the /-n/ ending to overgeneralize an already overgeneralized form as in the unusual "brokeden", below:

Ingrid: (10.09.98) *{I. suddenly declares that her detachable microphone is not working}.*
Don't think it's workin' (…) I've **brokeden** the thing.

Further evidence that S. and G. were (un-consciously) overapplying linguistic rules (in this case relating to past tense) occurred when they repeated the correct past form of an irregular verb during a sentence repetition task (Recalling Sentences subtest of CELF-3), and produced an overregularization, despite hearing the correct past form only seconds before. The following examples show this:

Sariah: (20.05.00) L: The fielder caught the ball and the crowd cheered loudly.

[6] Although, the above errors are not /-ed/ overregularizations in themselves, they are relevant because I. is again over-generalising morphological endings to forms that do not use them, that is, in the above examples, I. generalizes the /-n/ participle to irregular past forms.

S: "The fielder **catch*ed*-**caught the ball and the erm e:r (…) and the people cheered."

Georgina: (20.05.00) L: The student did not know the teacher who taught year five last year.

G: E:rm The student didn't know *{pause: G. sighs}* know e:rm her who **teach*ed*** them last year.

As can be seen from the above, S. and G. used the overregularized forms "catched" and "teached" - despite hearing the correct forms "caught" and "taught" only seconds before.

7.5.3 Other Sources of Irregularity

There are other sources of irregularity in English apart from the past tense and, therefore, other opportunities for children to generalise regular patterns (Pinker, 1999). Alongside overregularistion errors such as *singed* and *goed*, normally developing children from the age of two (Marcus, 1995) will frequently overegularize irregular plural nouns with an /-s/ suffix. S., G. and I. also adopted this (overgeneralization) pattern as the following examples of plural errors produced during spontaneous speech (and test conditions) show:

Sariah: (04.06.98) Hello gentlemen-gentle**mans** and the ladies and welcome to the show.

(24.04.99) *{S.'s responses to test item}.*

L: Here is one foot. Here are two:?

S: **Feets**!

(18.03.00) I'm not good with **childs** toddlers huhh (..) or babies.

Georgina: (24.04.99) *{G.'s responses to test item}.*

L: Here is one foot. Here are two:?

G: **Foots**

	(24.04.99)	*{G.'s responses to test item}*	
		L:	Here is one child. Here are three?
		G:	**Childs**
	(20.05.00)	*{G.'s responses to test item}*	
		L:	Here is one child. Here are [[three-
		G:	[[Three **childrens**.
Ingrid:	(02.12.98)	L:	*{Shows I. a picture of a cat catching some mice}* What has the cat just done?
		I:	Killed some **mices** (...) Getting some **mices**.
	(10.03.99)	*{I.'s response to test item}*	
		L:	Here is one child. Here are three...?
		I:	**Childs** (...) children.
	(19.10.99)	*{I.'s response to test item}.*	
		L:	The elephant is pushed by the boy.
		I:	*{Points)* Number two. The **tooths** are pushing.

G. even occasionally over-generalised plural /-s/ to non-count nouns as the following examples show:

Georgina:	(18.09.98)	Who is it? Is he the one with ginger **hairs**?
	(28.10.98)	I nearly finished my **homeworks** now.

Irregular verbs and irregular plural nouns were, again, not the only source of S., G. and I.'s overregulariation errors. There are three verbs, *have, do* and *be*, which are clearly irregular in the third person singular present tense and normally developing children overgeneralise /–s/ to all three (Pinker, 1999). S. and G. (although not I.) produced similar errors for at least one of these verbs, *do*, as the following examples show:

Sariah:	(18.03.00)	*{S. answers a question about her sports activities at school.}*

mm: *{Shrugs}* Football netball (..) mm: dunno (..) tennis. Dunno what else. (..) Sometime_ [**du:z]** cross country.

Georgina: (24.04.99) Well me an' Sariah can play a game while Nicholas [**du:z]** this.

In English, comparative and superlative forms can be derived from many adjectives using the /-er/ and /-est/ suffixes. However, this rule also has its exceptions and many children will overgeneralize comparative and superlative inflections to forms that cannot take them and that have to be retrieved from memory (Pinker, 1995). For example, the comparative and superlative derivatives of the adjective *good* are the irregular forms *better* and *best*, but normally developing children will often overgeneralize the /-er/ and /-est/ suffixes thus creating the regularized forms, *gooder* and *goodest*. This was observed for S. and G. during test and spontaneous speech situations:

Sariah: (09.12.98) *{S. speaks just after test administration}*
I'm **wors*er*** than Georgina. I'm **wors*er*** than you.
(20.05.00) *{S.'s responses to test items}*
L: This picture is good, but his picture is eve:n?
S: **Good*er***
L: and this picture is the?
S: **Good*est***

Georgina: (24.04.99) *{G.'s responses to test items}.*
L: This picture is good, but his picture is even?
G: Bad-Badder-**Good*er*** (…) Good

Normally developing children also have the tendency to overgeneralize these regular derivative suffixes to adverbs with two or more syllables such as "beautifullest" and this was noted for I. who, for example, said "boringest" (aged 11.2).

The above errors concerning irregular third-person singular present verb forms (i.e. [du:z]) and irregular comparative and superlative derivatives (i.e. "gooder", "boringest") parallel the over-regularisation of irregular past tense verbs with an /-ed/ inflection and the overregularization of irregular noun plurals with an /-s/ suffix. This is further evidence to suggest that S., G. and I. tended to over-apply, or over-generalize morphosyntactic rules in general, in fact, just as normally developing children do (Pinker 1994).

7.5.4 Overregularizations by Normally Developing Peers and Siblings

Overregularisation errors were also noted in the data for S., G. and I.'s peers or siblings. G's same age friend, D. overregularised an irregular no change verb on one occasion:

D: (18.09.98) {A. picks up a "cyber pet" and comments on it}
O:h It's been **reset*ed***.

Similarly, I.'s same age (10;9) friend, Z., who attends a mainstream school, twice produced verb overregularisation errors ("telled" and "singed") during one visit:

Z: (14.10.98) We **telled** somethin' about some people outside as well.
(14.10.98) We **singed** a song as well.[7]

The fact that D. and Z. produced such overregularizations, indicates that they still occur in normally developing children at least until the age of 10 years and beyond.

S.'s younger brother N, himself adopted from Romania aged 1 year, also overregularized the past tense of *catch* twice. On both occasions, N. was speaking to his mother, J:

[7] I. also said "singed" ("Yeah and we *singed* loads of things.") during her next turn after Z. The fact that I. makes exactly the same error as her same age, normally developing peer, suggests that I.'s overregularizations may, in fact, be more typical of her age group than previously thought.

N: (27.05.97) Hi I-I see you've **catch*ed*** me again, haven't you, yes?

(27.05.97) Hello: You **catch*ed*** me didn't you?

7.5.5 Overregularizations in Standardized Test Conditions

The above data show that S. G. and I. produced overregularizations similar to those of younger, normally developing children in their spontaneous speech (Pinker, 1999). However, they also produced overregularizations in response to particular items on formal languages tests. It was considered interesting to discover, therefore, whether S. G. and I.'s morphological peculiarities elicited by structured test items paralleled the responses of normal children. In other words, would younger normally developing children overregularize the same standardized test items that S., G. and I. did under the same conditions?

In order to establish this, S. G. and I.'s responses on the Word Structure sub-test of CELF-3 were compared with those of a younger control group of children aged between 6;1 and 7;1 (mean age of 6;5). They were selected from a primary school in Nottingham. It was hypothesized that the chronological age range of these children was similar to the developmental level of S., G. and I. The controls were tested around the same time (March - April, 1999) that S, G. and I.(aged 12;1, 13;9. and 11;5 respectively) were tested. It was found that the Romanian adoptees' overregularizations such as "foots", "childs", "drawed", "gooder" and "goodest" did, indeed, parallel the errors of most of the control children. This suggested that the pattern of S., G. and I.'s errors at the respective ages of 12;1 , 13;9 and 11;5 were qualitatively similar to those of children aged 6 to 7 years (mean age = 6;5) on standardized tests.

S.,G. and I. were again tested on the Word Structure subtest over one year later during May 2000 (when they were aged 13;2, 14;10 and 12;7 respectively) and their responses compared with four of the control children (mean age 7;6) who were also retested at the same time. It was found that, while I. did not produce any errors comparable with the previous year, S. and G. were still overregularizing the irregular plural items, even after a year. S. and G. both said, "childrens", G., said "foots", and S said, "gooder" and "goodest". This again was comparable to the responses of the

control children; most of who demonstrated some difficulty with retrieving the correct irregular plural forms and two of whom had also overregularized the same items at the first time of testing on 24.04.99. However, there were some signs of progress concerning S.'s grasp of the irregular past tense system. During the first time of testing, S. said "drawed", when required to produce the irregular past tense of *draw*. However, 13 months later, this error, at least had been reconciled, since when given the same item, S. responded correctly with "drew".

In all, the data suggest that the previously isolated children in this study and some normally developing 6 to 7 year olds were making similar errors on standardised tests, that is, they were automatically applying regular inflections to irregular past tense verbs, plural nouns and comparative and superlative forms.

7.5.6 Variability of Rule Generalization.

Similar to younger, normally developing children, there were some indications from the data that in both spontaneous speech and test situations there was some variability in terms of whether S., G. or I would consistently overregularise a form or not. Many of the verbs that were overregularized once or twice early in the study were never overegularized again in the data. Errors such as "drived", "hurted", "comed", "heared", "choosed", "brokened", and "thinked" were superseded by the correct past tense forms of these irregular verbs which were noted for later visits. There appeared to be a similar pattern for irregular plural nouns; the overregularized form "mouses" was replaced by "mice" towards the end of the study. Sometimes, the occurrence of an overregularization was preceded by the correct past form of an irregular verb or the correct form of an irregular plural as in "knew/knowed" and "feet/feets" noted for S. According to Pinker (1999),

> "A striking feature of children's past-tense errors is that they appear, sometimes suddenly, after long stretches in which the children use the past tense correctly when they use it all (p.193)."

This seemed to be indicated in S.'s case, as she sometimes alternated between an overregularization and its correct form over several months as in "fell/falled/fell", "children/childs/childrens" and "mans/men". Occasionally verb overregularizations

and their correct forms were used during the same visit. For example, on 13.04.99, I. (aged, 11;6) swapped between "sticked/stuck", while during a visit dated 07.10.98, S. (aged 11;5), alternated between "broked/broke", and "torn/teared", On the latter occasion, S. also freely alternated between the plural overregularization "mans" and the correct irregular form "men" during conversation. Note turns 2 and 6 in the following piece of spontaneous dialogue;

(07.10.98) *{S. and G. talking just before a colouring game.}*

T1	G:	You can sit here (..) right?
T2	S:	*(Talks to the camera)* Hello: Ladies and Gentle**men** (...) There's Georgina and me and Lisa here today (...) and we gonna-
T3	G:	[[do colouring
T4	S:	[[do colouring He::lp! Let me put this on *{Refers to her detachable microphone.}*
T5	G:	Give (her a chance) Mada:m
T6	S:	Thank you Ladies and Gentle**mans**.

At times, S. G. and I. alternated between the correct and overregularized forms of the same verb or plural noun within a few sentences or words of each other (rather than over a matter of weeks). This pattern has been documented for younger children by Pinker, (1995) who notes:

> "Once again, it looks as though overregularization is fairly haphazard from one moment to another. In fact, children can use the correct and overregularized version of the same verb in quick succession" (p.116).

This is illustrated by the following example, involving a test situation, where S. was required to supply the irregular past tense form *threw* and uses "threw, throwed, threw" in "quick succession" (Pinker, 1995, p.116).

Sariah:	(11.03.99)	L:	This is a bubble. Yesterday he blew the bubble. *{Points}* This is a ball. Yesterday he?"

S: Threw (..) **Throw*ed*** He threw (.) He rolled the ball.

Similarly, while conversing with her mother (29.06.98, aged 10;8), I. said "thinked" and "thought" within a few sentences of each other. On other occasions, overregularization errors were self-corrected almost immediately as illustrated by the following example, again for I.:

Ingrid: (10.03.99) *{I.'s response to test item}*
L: Here is one child. Here are three:?
I: **Childs** (..) children

S. even 'experimented' with some past tense forms that were unfamiliar to her. Note S,.'s response in the following example, a testing situation, where she was required to say "wrote".

Sariah: (24.04.99)
L: The boy is writing a letter. This is the letter the bo:y *{points to picture of boy writing}*?
S: Writ-wri:ten-writ or whatever.
L: Or we could say "This boy *is* writing a letter This is the letter the [[bo:y?"
S: [[boy *did* (..) written-wrid[8]-**writ*ed***

In this example, it is almost as if S. is playing a 'morphological experiment' when she is not sure of the correct past irregular for *write* (i.e. *wrote*) and subsequently decides to try all the other variations first, including an overregularised form.

This gives an insight into an internal process normally hidden from our senses. When S. was given the same test item a year later, she still demonstrated some uncertainty over the verb *wrote*, but eventually recalled it from memory, since she said, "wr-wro-wrote."

[8] S. applied a trill rather than an approximant.

There have also been variations (similar to the above) noted for phonology in the child language acquisition literature. For example, Fey and Gandour (1981) documented the case of a 21 - month old boy called Lasan who had trouble saying the word "pig" with a voiced velar stop. In one brief conversational exchange, which the authors called "The Pig Dialogue", Lasan "experimented" with 14 phonological variations of this word "pig" which involved alternating with forms that were voiced or voiceless, nasal or oral and aspirated and non-aspirated.

The above examples of I.'s self-corrections and S.'s experimentation (with word forms) imply a dynamic language learning process. In other words, their language proficiency was undergoing a change, whereby they were developing the command of irregular verbs and irregular noun plurals, though occasionally using the incorrect overregularized forms, but had the competence to correct these errors themselves by spontaneously replacing the incorrect overregularized forms with the correct irregular verb or plural noun. These examples are also important because the mere act of self–correction or experimentation indicates some metalinguistic knowledge as to how a word should sound and suggests a competence that exceeds performance (Menn and Stoel-Gammon 1995).

7.5.7 Experimental Procedure: Past Tense Elicitation Task (Ullman, 1993)

In addition to analyses of their overregularization of irregular past tense verbs in spontaneous speech S., G. and I.'s regular and irregular past tense formation was investigated more systematically using a past tense elicitation task (or wug test) adapted from Ullman, (1993). This was administered to I., 17.12.99 when she was aged 12;2 years and to S. and G., 18.03.00 when they were aged 14;8 and 13;0 respectively. The test items consisted of 16 existing regular verbs (*scowl, tug, flush, mar, chop, flap, stalk, scour, slam, cross, rush, rob, drop, look, stir, soar*); 14 existing irregular verbs (*swim, dig, swing, wring, bend, bite, feed, make, give, think, stand, keep, drive, send*); 12 novel (non-rhyming) verbs (*spuff, dotch, stoff, cug, trab, crog, vask, satch, grush, plam, scur*); and 14 novel (rhyming) irregular verbs (*strink/strunk, frink/frunk, strise/strose, crive/crove, shrell/shrelt, vurn/vurnt, steeze/stoze, shrim/shram, cleed/cled, sheel/shelt, blide/blid, prend/prent, shreep/shrept, drite/drit*).

The same experimental method was used by Clahsen and Almazan (1998) who studied the elicited past tense responses of four William's Syndrome (W.S.) subjects and compared them with two subgroups of younger normally developing children who had similar chronological ages (5;4 to 5;7 and 7;1 to 7;6.) to the "mental ages" of the W.S. children. A group of subjects with specific language impairment (SLI) aged between 9;3 to 12;10 were also used for comparison (This data was taken from a study by van der Lely and Ullman, 1996). S., G. and I.'s elicited past tense responses were compared with the responses of one subgroup of the normally developing control children (age 7;1 to 7;6) and the subjects with Williams Syndrome and Specific Language Impairment on the same task.. S., G., and I.'s results along with Clahsen and Almazan's (1998) data are summarized in Table 7.3. Note that the numbers indicate the percentage of correct responses given by each subject or group.

As can be seen, on the existing regular items (e.g., *scowl, tug, chop*), S., and I. applied the /ed/ past tense marker correctly to most of the verbs. The rest of the items were left unmarked - as was the case with I. (12.5%) or were not administered. (The 16 existing regular verbs were not administered to G.) The control children and the W.S. subjects also did very well in producing the past tense of regular verbs (WS = 90.6%, CTR = 95.6%). The SLI children differed significantly from S. and I. and the other subjects, since they applied the /ed/ marker to only 22.2% of the verbs, while 68.2% were left unmarked.

I. did very well on the existing irregular items (e.g., *swim, feed, make*), since she scored 85% of them correctly and only overregularized two items, which were less familiar words, *wringed* and *sented*. G. and S., however, did less well. G. responded correctly to only half of the items and applied /ed/ to the rest, while S. supplied the correct past irregular for only one item, *swam* and either overregularized the rest of the items (50%) or repeated the bare stem 42.8% of the time. The normal control group, in contrast to S. and G., produced irregular past tense forms most of the time (88.5%). The WS. Subjects, like G., applied irregular patterns only about half the time. The SLI children's responses to the existing irregular items were similar to S. and G.'s; they very rarely supplied the correct irregular past forms and left the majority (71.5%) of the verbs unmarked. However, unlike S. and G., they did not

overregularize many verbs and only applied the regular /ed/ marker to 7.9 % of the items.

For the novel, non-rhyming verbs (e.g., *spuff*, *dotch*, *trab*), G. appropriately generalized /ed/ to most of the items (83.3%) while I. did to all of them (100%). S., on the other hand, appeared to be less certain about applying the /-ed/ marker and did so only 50% of the time, leaving the remaining items unmarked. Similar to G. and I., the control group and WS subjects had no difficulty in producing the regular past tense forms of most of the verbs. It was a different picture for the SLI subjects, though, who again elected to leave the majority (72.7%) of the verbs unmarked.

Table 7.3 Results: S., G. and I.'s performance on past tense elicitation task compared to normal controls and children with William's Syndrome and Specific Language Impairment. (*Data taken from Clahsen and Almazan, 1998.)

Verb type	**Child's response (%)**					
	S.	**G.**	**I.**	**SLI**	**WS**	**CTR**
Existing regulars	*	*	*			
Regular	75.0	N/A	75.0	22.2	90.6	95.6
Irregular	0		6.2	0	9	0
Bare stem.	0		12.5	68.2	9.4	4.3
Existing irregulars						
Irregular	7.1	50	85.7	17.6	57.2	88.5
Regular	50	50	14.2	7.9	29.0	1.4
Bare stem	42.8	0	0	71.5	7.0	10.1
Novel rhymes						
Irregular	0	21.4	7.1	3.9	3.6	75.0
Regular	50	78.5	85.7	9.7	64.3	18.6
Bare stem.	50	0	7.1	75.3	28.6	5.7
Non-rhymes		*				
Regular	50	83.3	100	6.8	100	94.2
Irregular	0	0	0	1.5	0	0
Bare stem	33.3	8.3	0	72.7	0	5.8

S. = Sariah, G. = Georgina, I. = Ingrid, SLI = Specific Language Impairment subjects/chronological age 9;3 to 12;10.; WS 7 = William Syndrome subjects/mental age 7 years; CTR-7 = Control group children/chronological age 7 years. *S. 4 items not administered. * I. 1 item not administered *G. Existing regular items not administered to G.

The most revealing evidence that S., G., and I. tended to overgeneralize the /-ed/ marker was found in their responses to the novel irregular verbs (e.g., *strink/strunk*,

strise/strose, *prend/prent*). Even though these verbs had stems that rhymed with existing irregulars, S., G., and I.'s preferred response was to apply /ed/ between 50% and 85% of the time to the required past forms of these verbs. (Although, S., again, left half of the items unmarked.) In comparison, the control children produced irregular past forms of these verbs 75% of the time. The WS subjects, like S., G. and I., showed an opposite pattern to the control children and only produced irregular past forms 3.6% of the time, while regularizing 64.3% of the other items. Similar to S., G. and I. and the WS subjects, the SLI children appeared to have problems with applying irregular patterns to novel verbs and they did so only 3.9% of the time. However unlike, S., G. and I. and the WS subjects, the children with SLI, again, demonstrated great difficulty with applying the regular past tense marker /-ed/. They regularized only 9.7% of the items. A similarity between S. and the SLI group (but not the WS group) was that they both left a high proportion of the novel irregular verb forms unmarked. For S., 50% of the items were unmarked, and the SLI group, 75.3% of the items were unmarked.

In summary, S., G., I. achieved relatively high production scores when the appropriate response was to produce regular past tense forms (as for the existing regular and novel, non-rhyming verbs), which was also the same for the control children and WS subjects. This contrasted with the SLI children, who did not routinely inflect these verbs with the appropriate regular marker, but instead chose to leave the majority of these items unmarked. When it came to applying irregular past tense patterns, there were some similarities between S.'s responses and those of the SLI group and clearer differences started to emerge between the Romanian adoptees and the WS and control children. S., like the SLI children left a large proportion of the existing irregular and novel rhyming verbs unmarked and showed great difficulty with producing irregular past tense forms. However, unlike, the SLI group, S. regularized 50% of the existing irregular verbs and 50% of the novel rhyming verbs, thus showing no particular difficulty with applying the /ed/ past tense marker.

S., G. (but not I) and the SLI group did worse than the control children and the W.S. subjects when inflecting the past tense forms of existing irregular verbs. However, when S., G. and I. were required to produce the past tense of novel irregular verbs, their tendency to overuse the /-ed/ marker (they regularized 50% - 85% of the items)

was unlike the responses of the control children and SLI group, but very similar to those of the WS subjects. S., G. and I. like the WS children extensively overapplied the regular /ed/ suffix to the past tense of novel irregular verbs that normal children did not overregularize or that SLI children left uninflected. This is not to say, that S., G., and I.'s overregularization errors are similar to WS children, even though, as Clahsen and Almazan, concluded, they,

> "do indeed massively overapply inflectional rules, even in cases in which unimpaired control children would not overregularize" (p. 179).

The above past tense elicitation task was administered to S., G. and I. in order to examine whether under experimental/elicited conditions, they would show the same tendency to overapply the /ed/ past tense marker to irregular verbs as they did in their spontaneous speech. The results suggest that they do. Even though, as already mentioned, S., G., and I.'s past tense overregularizations were both qualitatively and quantitatively similar to younger children, on elicitation tasks, they overregularized items that control children did not. This is the difference between the Romanian adoptees and normally developing children and, at this stage, is the only interpretation that will be drawn from the experimental data above.

7.5.8 Summary: Overregularizations

In summary, the following observations concerning S., G. and I.'s overregularization production were made during the present study:

1 S., G. and I. generalized regular patterns to irregular forms in spontaneous, conversational speech. This involved: 1.) generalizing the regular past tense /ed/ inflection to irregular verbs stems such as "fighted", "heared", "teached"; 2.) generalizing /ed/ to the *past tense* of irregular verbs such as "wroted", "chosed", "stoled"; 3) generalizing /ed/ to their own neologisms such as "rehearsalled", "magicked"; 4) generalizing regular plural /-s/ inflection to irregular plural nouns such as "mans", "mices", "childs"; 5) overregularizing third person present singular forms of verbs such as [du:z]; 6)

overregularizing (or overapplying) irregular comparative and superlative forms such as “gooder”, “goodest.”

2 When S., G. and I.’s overregularization rates were calculated, the figures of 4.5% or below were comparable to that obtained by Marcus et al. (1992) as the overregularization rate for the 83 children that they studied. This suggests that S., G. and I.’s overregularizations when they occurred were rare, that is, they did not overregularize an irregular form at every opportunity. This is similar to the rate at which younger children overregularize (Marcus et al. 1992; Pinker, 1999) .

3 S., G. and I.’s production of overregularizations was variable: Sometimes they would overregularize a form and sometimes they would not. S., G. and I. occasionally alternated between an overregularization and its correct form (e.g., “mans/men”, “sticked/stuck”) over several words, sentences or even months.

4 This variability, together with the type and frequency of S., G. and I.’s errors have also been documented for much younger, normally developing children up to the age of six as noted by Pinker (1999). Thus, during adolescence, the Romanian adoptees overgeneralized *acquired* or *learned* syntactic rules to irregular exceptions in the same way that much younger children, without histories of extreme neglect, do (Marcus et al., 1992).

5 S., G., and I. also overregularized specific test items in a similar way to a small sample of control children with a mean age of 6.5 years. Similar errors were made on the same test items a year later (e.g. “childrens”, “foots”, “gooder”), while other forms that had been overregularized the previous year, were produced correctly the second time around (e.g., “drawed” became “drew”).

6.) Overregularization errors in spontaneous speech similar to S., G. and I.’s were also noted for two of their slightly younger peers, aged 10 and 11 years. (e.g., “singed”, “resetted”, “catched”).

7.) S., G. and I. also overregularized the past tense inflection -ed to irregular or unfamiliar past-tense verb forms during an experimental task (Ullman, 1993; Clahsen and Almazan, 1998). It was found that S., G. and I. overregularized items that control children did not. This is one example of how the Romanian adoptees' production of overregularizations differed from that of younger normally developing children.

8.) Although, S., G. and I. continued to produce overregularizations throughout the duration of the study, some forms did actually improve over time such as the irregular verb "drawed/drew" and the irregular plural "mans/men" for S. and the irregular plural "child/childrens" for I. This showed that some movement was going on in the children's language development.

7.6 Were Overregularizations Evidence of Language Progress or Plateau?

In the preceding sections, it was shown that older socially deprived children do, indeed, overregularize, that is, they overapply regular patterns to irregular exceptions. They do so in a way similar to that of younger children. But what did this mean? In fact, overregularizations in the speech of S., G. and I. - children with histories of extreme language deprivation - suggested a simple dichotomy:

1 It could be that the occurrence of overregularizations indicated some kind of movement going on in S., G. and I.'s language whereby they were coming to grips with these grammatical structures and were progressing to a more advanced stage of language acquisition.

2 Alternatively, the occurrence of overregularizations, at such late ages meant that S., G. and I. were stuck at this particular phase of grammatical development and possibly would not progress any further. This, in theory, meant that they could still be overregularizing irregular forms well into adult-hood.

The data as a whole, however, lends support to the first hypothesis. Although the pattern of S., G., and I.'s overegularizations appeared to be both qualitatively and quantitatively similar to that of younger children, some forms appeared to change over the two years that S., G., and I.'s were studied. The evidence tentatively suggests that some progress was taking place, since, while some forms continued to be overregularized over time, others were not. For example, between 19.11.98 and 24.04.99, in the researcher's presence, S. consistently produced "drawed" in her spontaneous speech. She even used this overregularization in response to a test item and generally appeared uncertain as to the correct past tense form of the verb, *draw*. However, when S. was readministered the same test item over a year later (20.05.00), she unhesitatingly responded with "drew". Thus, some time between 24.04.99 and 20.05.00, S. had progressed to the point where she could automatically retrieve the correct past irregular from memory.

In a similar testing situation (24.04.99), S. was required to say the past tense of *write*, but said instead, "writ-wri:ten-writ or whatever" and then "written-wrid-writed." Clearly, S. did not know the form *wrote* and, instead, supplied several alternatives including the overregularization, *writed*. However, when given the same test item a year later (20.05.00), S. demonstrated that she had learned the verb *wrote* and could correctly recall it from memory since she said, "wr-wro-wrote." This shows that over a year (April 1999 to May 2000), S.'s uncertain use of *writed* (amongst other forms) had changed to *wrote*. A similar observation was noted for I.; She overregularized an irregular plural test item by saying "childs" (10.03.99), but when tested over one year later on the same item (16.05.00), responded promptly with the correct irregular plural "children". Thus the use of *childs* in response to a task item had evolved to *children* during a year.

The data indicate that some movement was going on in the children's linguistic development during the period of study. Like children with typical developmental histories, S., G. and I. produced random overregularizations that preceded a stage of consistent usage. That is, some irregular forms that were overregularized early in the study as in "drived", "thinked" "comed" and "broked" were never overregularized again. Such haphazard 'errors' also appear in the speech output of younger children

until the correct forms are used with any consistency (Pinker, 1999). This implies that at the beginning or at some point in the duration of the study S., G., and I. were starting to use the correct past irregular forms of certain verbs with some consistency. Moving on from a period of haphazardness to one of productive regularity suggests growth in a child's grammatical system (Brown, 1973). Another sign that S, and I. (but not G.) were advancing linguistically is their spontaneous self-corrections of overregularized forms which showed that they had acquired the knowledge of a correct form, even if they did not always use it. For example, in response to standardized test items, I. said "childs (..) children" (10.03.99, aged 11;5) and S. said "catched-caught" (20.05.00, aged 13;2).

Another important fact is that overregularization errors similar to S., G. and I.'s were also noted in the data for a control group of primary school children (mean age = 6;5 years) and two of G. and I.'s peers, aged 10 to 11 years. This indicates that the overgeneralization of linguistic rules is not a phenomenon unique to preschool children but can also apply to children between the ages of 6 and 8 (at least in response to test items) and children in later childhood, aged 10 to 11. This suggests that, although the rate of overregularization may peak during early childhood (normally between 2 and 5 years), it is a pattern that can continue beyond the early language learning years. Also, the fact that overregularization errors were noted for S., G. and I.'s peers suggests that, such occurrences, although rare are representative of the wider, normative population.

7.7 Conclusion: Overregularizations in the Speech of Socially Deprived Children - Implications for the Critical Period Concept

The preceding chapter showed that during the present study, S., G. and I. produced the same creative errors that are characteristic of the growth of language in much younger children. Furthermore, these types of productive errors signified the same level of progress in S., G. and I.'s language. Pinker's (1991, 1999) and Locke's (1994, 1997) contention is that the acquisition of some grammatical rules in English (specifically the past tense rule) follow an innately specified time schedule, uniformly

occurring within the first few years of life, and controlled by a "maturational clock" (Pinker, 1999, p. 203). Overregularization errors that typically occur within the first four years of life are generally accepted as evidence that the child has learned a grammatical rule (Menn and Stoel-Gammon, 1995). Overregularizations are also considered to be the expression of an innate computational ability (Pinker, 1999; Stromswold, 1995; Chomsky, 1957; Locke, 1997). As Pinker (1991) contends that most aspects of grammatical development are innately timed and acquired by the age four, it follows that a critical period for the successful acquisition of the past tense rule is likely to be around this time.

S., G. and I. are children, who experienced a chronic level of linguistic neglect in a Romanian orphanage, during the period when the past tense rule is thought to emerge in young children learning English. Primary and secondary documentary evidence suggests that when S., G. and I. left their respective orphanages at the ages of 7;5, 6;3 and 3;10. their productive language was virtually absent and they had minimal or no knowledge of Romanian words and, therefore non-existent morphology. However, during the present study (between the respective ages of 11;3 and 13;2. 13;1 and 14;10, 10;8 and 12;7) S., G. and I. produced overregularization errors that were qualitatively and quantitatively similar to those that are normally present in the speech output of very young children. This suggests that S., G. and I.'s ability to apply grammatical rules to irregular exceptions was due to post-adoption experience and not to the institutionalised early years of their development. The fact that the type and frequency of S., G. and I.'s errors during puberty paralleled those that uniformly occur within the first four years of life (and later), would appear to confound Pinker's hypothesis that some grammatical rules develop "on a schedule not timed by environmental input." (p.482). If this were the case, such a theory would not predict the type of phenomenon seen in S., G. and I., several years after it is innately timed or expected to happen.

The fact that overregularization errors were present in the speech of atypically developing older children with histories of extreme linguistic neglect, (whose first onset of words were well after the age of two), suggests that the fixed "schedule" of the acquisition of the past tense rule is not so fixed after all. It is capable of occurring at a much later chronological age than the first four years of life. Firstly, this in some

small way compromises the general critical period view of Pinker (1991, 1999), Stromswold (1995), Chomsky (1957) and others. Secondly, the specific developmental neurolinguistic prediction for language after the grammar critical period, suggested by Locke (1997), is, in part, disconfirmed. Chapter 7 concludes that the grammatical development of children adopted from Romanian 'orphanages' does not constitute evidence for the existence of a critical period for grammar. On the contrary, the specific (English) grammatical outcomes of S., G. and I. altogether confound the idea that there are early maturational constraints on first language learning. How can there be, if a severely deprived child like S., for example, can naturally acquire language for the first time after the age of 7;5 years? However, it has also to be accepted – as was pointed out in Chapter 3 (pp. 71-72) - the view that S., G. and I each did *not* receive enough social input in the orphanage for language development to have taken place before adoption is equivocal. It remains conceivable that S., G. and I. actually had more linguistic awareness and, therefore, knowledge of morphological rules than the documentary and video evidence suggest. The above questions and the issues that this chapter raises concerning the developmental neurolinguistic concept of the critical period are dealt with more fully in Chapter 9.

Next Chapter - Chapter 8 re-examines the effects of extreme global deprivation on language development by investigating and describing the complexity and structure of S., G. and I.'s spontaneous speech.

Chapter 8 Grammatical Complexity of Spontaneous Speech

This chapter continues the exploration of S., G. and I.'s spontaneous spoken language. The previous chapter (7: "Morphosyntactic Patterns in Spontaneous Speech") described the morphological aspects of S., G. and I.'s conversational speech. In contrast, Chapter 8 examines the complexity of S., G. and I.'s speech as reflected in complex sentences. Specifically, the production of conjoined and embedded complex sentences was studied. These are largely "characterized by the fact that they contain more than one main verb" (Paul, 1981, p.36). The first type involves two or more full clauses connected by words like *and, but* or *so,* to form one complete sentence. The second type of complex sentence contains one or more clauses, that is, "a sentence-like segment that contains a main verb within a larger sentence" (Paul, 1981, p.36). The use of grammatical constructions and discourse markers at the phrase and clause level are also described. Comparisons were also made with the normative literature. Chapter 8 tries to address the same research question as Chapter 5, but applies descriptive linguistic procedures, rather than standardized tests:

I What are the effects of extreme global isolation during infancy and the early childhood years on linguistic development?

Recall S., G. and I.'s poor results on the standardized tests of language reported in Chapter 5. Descriptive analyses of the structure of S., G. and I.'s complex sentences revealed a level of grammatical sophistication that was not evident from their scores on these tests. Not only did S., G. and I. produce complex sentence structures similar to those of children aged 2 to 6;11 years, but also of children within the 9 through to 14 age range according to Scott (1988). S., G. and I. used some of the later developing structures typically associated with (subtle) syntactic growth. This suggests that their linguistic progress was continuing during their preadolescent and adolescent years and had not plateaued at puberty. According to Crystal (1997) and Scott (1988), this represents the typical course of first language acquisition that continues throughout middle and late childhood - and even throughout the teen years. This also appeared to

be the case with the socially deprived child Genie (Curtiss, 1977), who, as Jones (1995) maintains, was still developing language at the age of 18 years.

Recall that S., G. and I. were adopted near to or after the age of 4 years. Language after this age, despite an initial catch-up, developed over several years. It did not stop but continued to grow in subtle ways. This suggests that language development is not a developmentally time-locked phenomenon, as some believe (i.e. Pinker, 1999). It is not dramatically completed within the first few years of life, but continues steadily over a long period of time. This is congruent with the findings of Chapter 7 and these indicated that: 1.) a first language can be acquired naturally after the age 4 years and even after the age of 7 years; and 2) the development of a first language after the age of 4 years is extremely similar to the development of a first language before this age. Therefore, Chapter 8 concludes that extreme deprivation during the first four years of life - and even possibly up to the first seven (as S.'s case suggests) – does not have a perceptibly negative impact on the development of spontaneous spoken language. It can develop normally later in life, as long as there is a positive change in the environment

8.1 Introduction

8.1.1 Standardized Tests as a Measure of Language Development

In Chapter 5, it was reported that S., G., and I. performed extremely poorly on a battery of standardized tests of language. The girls did not obtain the equivalent of their chronological age groups on any of the measures administered. In fact, some of their test performances were comparable to younger children less than half their chronological ages. For example on the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3), S., G. and I. each obtained test age equivalents of 5 years or below. In terms of deviations from the mean, each girl's Total Language Score (TLS) was –3SD. Generally, S., G. and I. seemed to find standardized language tests difficult to complete. Their level of language ability as measured by the tests appeared to be very retarded.

8.1.2 Elicited Complex Sentences

Performances on a sentence formulation task, the Formulated Sentences subtest of CELF-3 (see, 5.2.3 in Chapter 5) were of particular interest. This is because, some of the 'incorrect' sentence types that were elicited from S., G. and I. on this test were produced accurately in spontaneous conversation. This, therefore, suggested a discrepancy between the ability to use language in structured tests and in naturalistic contexts. For example, I. produced the one clause utterance "Because I cross on the zebra crossing." (16.05.00) when requested to make a sentence using the reason adverbial *because* (which introduces a dependent/subordinate clause).[1] However, spontaneous sentences such as "I put them in the bin *because* it's all about maths." which I. produced the same day (16.05.00), show that she was quite capable of correctly generating *because* adverbial clauses in spontaneous speech.

G. gave similar one-clause responses on the Formulated Sentences measure. She said, "Because they are crossing the road." (24.04.99) when asked to make a sentence using, *because*, but like I., G. later produced this sentence type appropriately during spontaneous conversation: "Can I go outside then (..) *because* I need some fresh air?" This is a semantically appropriate and grammatically correct sentence, which contains a dependent adverbial clause expressing reason. When required to produce a sentence using the conditional subordinator *if*, G. said, "If the boy was playing" – which, again, does not contain the required dependent clause. Yet earlier in the afternoon, G. had asked, "Will she be pleased with me then, *if* I did well?" which consists of a main sentence and a dependent adverbial clause signalled by *if*. Also previous visits showed that G. spontaneously used conditional *if* in sentences as in, "*If* I don't finish it at school (..) I'll probably get detention" (07.10.98).

S. also appeared to find it difficult to incorporate subordinating conjunctions into sentences when specifically asked to do so. For example, S. said "The boy and girl was making while-while they forgot to put milk in" (24.04.99) when requested to formulate a sentence using the temporal subordinator *while*. S.'s response is

[1] One clause utterances such as "Because I cross on the zebra crossing." (I., 16.05.00) often occur in response to questions and are a perfectly acceptable part of everyday conversation. However, in the context of tests such as Formulated Sentences, they are scored as 'ungrammatical' because the child is required to make up a full sentence with a main and dependent clause such as "The cars stop *because* I

semantically anomalous and her hesitancy suggested that she was uncertain as to the use of time adverbials (signified by *while*) in sentences. Yet a few minutes before, S. was noted to use this structure correctly and without hesitation during a conversation with E., her sister, who asked, "What d'you do when you go to K's house?" In reply, S. said, "Usually um have a drink an' then play a game with L *while* Georgina is with her mum playin' a different game?" This automatic response showed that S. was able to devise complex sentences with adverbial clauses signified by the time adverb *while* without the tentativeness that she displayed during the standardized test. Also when S. was asked to make a complex conditional sentence using the subordinator *if*, she said, "The girl and the boy was playing with the girl if (..) they was at home." This response is structurally sound, since it consists of a main sentence with a dependent clause signalled by *if*, but the meaning of the sentence is unclear. However, during conversation, S. produced sentences such as, "You need to use it carefully *if* you gonna use felt tips (..) not too hard" (07.10.98), which is a syntactically accurate and semantically appropriate complex conditional sentence containing an *if* adverbial clause.

8.1.3 Metalinguistic Awareness?

Why were S., G. and I. able to produce certain types of complex sentence in their conversational speech but not in response to a standardized test? One answer may be that syntactic measures such as Formulated Sentences more accurately test metalinguistic attentiveness and the conscious reflection on what these structures are supposed to sound like (when elicited) rather than grammatical competence per se. As shown, S., G. and I. were quite capable of producing syntactically and semantically correct complex sentences in spontaneous speech. However, as G. and I., in some cases, were unable to construct such sentences in response to task demands, and S. found this problematic, this possibly suggests a lack of metalinguistic awareness. According to Crystal (1997),

> "There is an important connection between children's awareness of the technical "metalanguage" of literacy and their subsequent performance in reading and writing" (p.254).

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cross on the zebra crossing." In other words the child is being asked to formulate or construct a full sentence outside the context of a conversation.

He also notes that,

> "There is little doubt that children need to have developed control over several metalinguistic notions before they are 'ready' to read and write" (p.254).

One could, therefore, supposed that there is an "important connection" between the metalinguistic ability to perceive the grammaticality of a sentence and to 'know' what a sentence actually is and "subsequent performance" on a sentence generation task.

8.1.4 Comparison With Control Children

S., G. and I.'s performances on the Formulated Sentences (FS) measure were compared to those of 10 normally developing control children, aged 6 to 7 (mean age = 6;5), who were also administered the subtest during March and April 1999 (see previous chapter). The control children's results showed that 60% of them scored at the 50th centile or above for their age group (i.e. their performances were within or above the average range). When the individual scores of the control children were looked at in more detail, it appeared that 8/10 of the children had FS subtest scores that were related to their overall performances - or Total Language Scores (TLS) – on CELF-3, that is the children whose scores on the FS were average or above (percentile rank 63 to 99) also had TLSs that were average or above (percentile rank 55 to 99), while the children who obtained below average scores on the FS (percentile rank 25) also obtained below average TLSs (percentile rank 37 and below). This suggests that the skills needed to complete the sentence formulation task were associated with the general level of language ability.

Some of the children who scored highly on the FS were able to devise grammatically correct sentences in response to the test items that G. and I. – twice the age of the controls – failed. These sentences included, "The traffic warden is stopping all the traffic *because* there's people crossing the road." (B.H aged 6;10.) and "*Until* you play, why don't you do something else?" (S.W. aged 6;10.). Conversely some of these children also failed some of the items that G. and I. scored incorrectly. They gave one-clause responses in the same way that G. and I. did when required to use subordinating conjunctions in sentences. Responses were given such as "*While* the

children were making a cake." "*However*, this is yellow and this is purple." (N.M. aged 6;6) and "*Because* there's a traffic jam." "*Until* I go home." (D.H, aged, 6;1). Also children who scored poorly on the FS produced 'ungrammatical' one-clause responses similar to G. and I.'s. For example, one child aged 6;9, whose F.S. score corresponded to a percentile rank of 25, said "*Before* she paid." and "*If* the bus stopped." In addition to these types of sentences, the control children also gave responses that were grammatically or semantically 'odd' in other ways. For example, two of the children who scored comparatively well on the Formulated Sentences test produced the sentences, "Whenever the teacher is out they always be noisy." (M.A., aged 6;6) and "These two are talking but if these two talked it would be girls and boys." (N.M., aged 6;10.). The performances of the children who scored particularly poorly on the FS measure were characterized by non-responses to many items.

The general indication was that children in the 6;1 to 7;1 age group, whose abilities (prior to testing) were thought to be within the average range, found aspects of the sentence formulation task difficult - irrespective of whether their performances were above or below average for their ages. This suggests that the level of skill or knowledge needed to perform adequately on this test is still emerging between the ages of 6 and 7 years and may possibly continue to reach a level of maturity beyond this age range.

8.1.5 Grammaticality Judgement

As some normally developing 6 to 7 year olds, similar to G. and I. (and to some extent S.) were unable to construct some complex sentences, particularly those involving subordinating conjunctions (*because, before, while*) and conjunctive adverbs (*otherwise, instead, however*), this suggests that *both* normally developing children and the Romanian adoptees found it difficult to discriminate and detect the grammaticality of some sentences during a standardized task. This is also supported in the latter case by the observation that S., G. or I. was unable to spot the ungrammaticality of their 'incorrect' responses when these were repeated back to them or even when specifically asked. For example when G., aged 14.10. was required to produce sentences using the subordinator *unless* and the correlative conjunction *or*, she gave the one clause responses, "*Unless* the boy is doing his

homework." and "*Or* they're buying some apples." These sentences were scored as incorrect according to the FS guidelines and then repeated back to G. She did not appear to perceive that these one-clause responses were incongruous for the testing situation. In contrast, G. produced sentences such as " 'Ave I done one *or* 'ave I done two?" (20.05.00, aged 14;10) fluidly in conversational settings.

Also when G. was requested to use the correlative conjunction *either* in a sentence, she said, "The lady's either (..) helping them." G. was specifically asked, "Is this a sentence Georgina?" to which she replied, "mm: Yeah." There is no reason why G. should have understood the word "sentence." but her response indicated uncertainty as to when a sentence 'sounds' right or not. That G. apparently was not aware that her sentences were ungrammatical might indicate poor metalinguistic awareness. However, S. showed metalinguistic awareness to some degree. In response to one Formulated Sentences item (20.05.00), S. was required to use the subordinating conjunction "whenever" and said, "Whenever I copy out the book I read the book." S. recognized that some aspect of this response sounded strange, since she said, "Sounds wrong really, doesn't it?"

It should be noted that the processes that allow for the production of complex sentences during spontaneous conversational speech are possibly different from those that allow for the formulation of sentence types in artificial test conditions. Therefore, it is probable that the structured requirements of syntactic tasks such as Formulated Sentences interrupt the spontaneous and unconscious ability to produce complex sentences and S., G. and I.'s ungrammatical responses were one reflection of this. It may be that metalinguistic awareness plays an important role in the ability to successfully put together sentences on a formal test.

8.1.6 A Later Developing Skill?

It is worth noting that a separate study by Scott and Rush (1985, cited by Scott, 1988) indicated that in a testing situation, children aged around 9 years also find it difficult to generate sentences incorporating conjunctive adverbs that also function as subordinating conjunctions such as *however,* and *otherwise*. Scott and Rush give the

anecdote of a 9 year old, who when asked to produce a sentence containing *however*, said, "I can play today, however, today is Saturday." They concluded that normally developing 9-year-olds find it problematic to incorporate some adverbs or subordinators into either syntactically or semantically appropriate novel sentences just as S., G. and I. did. This means that the lack of ability to generate sentences correctly in response to test demands is not just associated with previously institutionalised Romanian adoptees, but is also characteristic of children without histories of extreme neglect. Scott and Rush (1985) also report that a 13-year-old had much more success on the sentence generation task than younger children. Presumably then, the ability to judge the appropriateness of sentences containing certain types of conjunctive adverbs or subordinators is a later developing skill – one that continues to grow throughout middle and late childhood and may be associated with exposure to the explicit metalanguage of literacy as Crystal (1997) suggests.

8.2 Descriptive Analyses of Complex Sentences in Spontaneous Speech

The above section showed that standardized tests can give a distorted picture of a child's grammatical competence. This was the reason for turning to more sensitive language procedures that could describe, more realistically, S., G. and I.'s true linguistic ability and possibility for further growth. These descriptive linguistic procedures, described over the following pages, were applied to S., G. and I.'s production of complex sentences in conversation rather than in the artificial task setting.

8.3 S., G. and I.'s Complex Sentences Compared to Those of Children Aged 2 – 6;11

S., G. and I.'s complex sentence production was, first of all, compared with Paul's (1981) complex sentence development charts that "outline some milestones in development of complex sentence production" (p.36). These charts are based on the conversational data obtained from 59 normally developing children aged between 2;5

and 6;11 who were filmed interacting with their mothers during 15 minute free-play sessions. These conversations were transcribed and the children were grouped according to their MLU values that ranged from 3.00 to 5.01 and beyond. Each child's spontaneous speech transcript was examined for the presence of "various forms of embedding, conjoining, and individual conjunctions" (p.36). The percentage of subjects within each MLU range that produced each construction more than once was then computed. It was this information that Paul used to form the complex sentence development charts and that indicate which structures were used by 50% to 90% of children within a MLU grouping. The charts can be used to place the complex sentence structures appearing in a child's speech to one of several developmental 'stages'.[2] These are summarized in Table 8.1, together with the MLU, age range and ratio of 'true' complex sentences (in a speech sample lasting 15 minutes) that would be expected for each stage.

The reason why these stages start at Early IV is that, stages I, II, and III are classified as a period during which only simple sentences (e.g., "This my dollie" and "They is playing") are formed as opposed to complex ones (Chapman, 1981). It may be recalled from Chapter 7 (table 7.2) that S., G. and I.'s MLU values over a period of nearly two years exceeded an MLU of 4.50. According to the table above, this would place S., G. and I in the later stages of Paul's complex sentence development charts, that is, stages V+ and V++ (predicted age = 47+ months). In other words, S., G. and I.'s complex sentence production was, throughout the duration of data collection, apparently beyond the level of 4-year-old children. In order to examine this observation further, S., G. and I.'s spontaneous speech transcripts were compared against the charts in more detail and Paul's criteria for defining complex sentence types also used. This was in order to find out if the form and frequency of S., G. and I.'s complex sentence production really was beyond the 4-year-level.

Table 8.1 Paul's (1981) stages of complex sentence development: Stages IV to V++, expected MLU for each stage and predicted chronological ages.

[2] Paul's (1981) categorization of complex sentence structures into 'stages' follows Brown's (1973) convention for placing children's morphological growth into 'stages' characterised by periods of "distinct developmental achievements" (Miller 1981, p. 25).

Paul's Stage	Expected Mean Length of Utterance (MLU)	Age (Predicted)	Proportion of 'True' Complex Sentences *
Early IV	3.00-3.50	34-37 months	1-10%
Late IV to Early V	3.51-4.00	38–42 months	1-10%
Late V	4.01-4.50	43-46 months	10-20%
V+	4.51-5.00	47+ months	10-20%
V++	5.01 and above	47+months	20% and above

*In her developmental charts, Paul (1981), gives for each stage "the percentage of TRUE complex sentences" that would be expected in a child's 15-minute free speech sample.

8.4 Quantitative Analysis

According to Paul (1981), catenatives or semi-auxiliary forms such as *gonna*, *wanna*, *gotta* are not defined as 'true' complex sentences because they are not considered as being or introducing subordinate clauses. These forms (i.e. *gonna, wanna*) are excluded as independent main verbs because they "appear to function as unanalysed wholes" and are more accurately described as simple sentences (p.37). The ratio of S., G. and I.'s "true" complex sentences (that is, those that did not contain forms like *wanna, gonna, gotta* functioning as main verbs) in spontaneous speech samples was calculated in order to discover which of the stages was most clearly representative of S., G. and I.'s spoken complex sentences. For this purpose, speech transcripts were organised into communication units or C-Units (Loban, 1976) since S., G. and I.'s average MLUs during the study exceeded 5.0. As Miller (1981) states:

> "MLUs computed greater then 5.0 may signal the need to turn to other utterance measures better designed to reflect increased grammatical sophistication in the child. The best of these appears to be the…communication unit (Loban, 1976) count" (p.25).

The communication unit, also known as a T-Unit,[3] is a procedure for segmenting discourse which has been employed in several studies of preadolescent and adolescent children's written and spoken language (e.g. O'Donnell, Griffin and Norris, 1967; Scott, 1984b). A C-Unit consists of any utterance that can function as an independent unit of meaning. This might involve a main sentence and all the subordinate clauses and phrasal elements contained within, or a nonclausal one word response such as "yes" in answer to a question. An adaptation of Loban's (1976) criteria for defining

C-Units (see I, Appendix F.) was applied to S., G. and I.'s speech transcripts. The proportion of true complex sentences was calculated (using Paul's method) by dividing the number of complex sentences in the C-Unit sample by the overall number of C-Units. The selected transcripts corresponded to spontaneous conversations (rather than narratives) that took place in the early stages and towards the end of the study. The speech samples lasted roughly 15 minutes. The percentage of S., G. and I.'s complex sentences - along with the MLU values - for each C-Unit sample are presented in Table 8.2.

Table 8.2 Percentage of complex sentences for selected C-Unit samples, along with MLU values.

	Date of C-Unit Sample	**Age**	**Mean Length of Utterance**	**Percentage of Complex Sentences**
S.	07.10.98	11;7	6.78	31%
	20.05.00	13;2	5.68	21%
G.	07.10.98	13;3	5.18	21%
	16.10.99	14;4	5.60	27%
I.	09.06.98	10;8	5.74	22%
	16.05.00	12;7	5.14	28%

According to Paul's developmental charts, S., G. and I.'s results were similar to a child in late Stage V++ (the latest stage assignment) with a corresponding MLU of 5.01.and above (aged beyond 47 months) whose 15 minute spoken language sample would be expected to contain over 20% of 'true' complex sentences. Thus the proportion of S., G. and I.'s complex sentences at the commencement of and throughout the duration of the study was equivalent to if not beyond the Stage V++, the latest stage in Paul's developmental charts. This is also what would be expected from their MLUs, since these were above 5.01. Based on the available data, it appears that the percentage of the girls' complex sentences in spontaneous speech was beyond the level of 4-year-old children.

8.5 Qualitative Analysis

[3] The terms "C-Units" and "T-Units" stand for the same thing. This Chapter uses the term C-Unit, although some other studies use the term T-Unit after Loban (1976).

Next S., G. and I.'s complex sentences were qualitatively compared to Paul's developmental charts in order to: 1.) establish whether the structures that they used were as diverse as those used by normally developing children (aged 2 to 6;11 years) and 2.) find out whether the types of constructions used by S., G. and I. were characteristic of any particular developmental stage.

8.5.1 Conjoined Sentences

Paul (1981) describes two classes of complex sentences. The first consists of conjoined sentences which are composed of two of more main clauses (usually) connected by a conjunction such as *and, but, or.* According to Brown (1973) and Miller (1981), in the early stages of language acquisition, some children may connect two full clauses without using any conjunction simply by juxtaposing them within the same utterance. It is not until a later stage – around 34-37 months of age (Brown's early IV Stage[4]) – that children recognizably conjoin two clauses within the same utterance using coordinating conjunctions like *and.* Paul's complex sentence development charts show that 50% to 90% of children in her lower MLU groups 3.00 – 3.50 produced conjoined sentences containing *and.* However, it was only in the higher MLU groups of 4.51 – 5.00+ that over 90% of the children produced these. This indicates that *and* in conjoined sentences is a later developing form that is not used by most children until Paul's Stage V+ (predicted age = 47+ months, MLU = 4.51 - 5.00) of complex sentence development.

S., G. and I. produced conjoined sentences throughout the duration of the study. The following examples show this:

S: (04.06.98) You mustn't break it..because you'll have to pay a lot of money for it *and* you 'aven't got much money for that, 'ave you?

(24.04.99) This is my right *and* this is my left

(20.05.00) You said, "I want to play a game" *and* I said "I want doesn't get."

[4] See Section 7.1.1 in Chapter 7.

G: (22.07.98) "He'll have a pint *and* I'll have an orange juice.
(24.04.99) Your nails are too short *and* mine are as well.
(20.05.00) The boy is stirring *and* the other one's pouring the milk.

I: (09.06.98) One's called Black Beauty *and* one's called Maria.
(13.04.99) You put an arrow like that..*and* you just ignore that one.
(16.05.00) I've got erm five pounds *and* I'm so poor.

In addition to *and*, S., G. and I. also used the coordinator *but* which "expresses a contrast in meaning" (Crystal, 1997, p. 204), in their conjoined sentences:

S: (16.10.99) I don't go out with him, though *but* I just fancy him.
G: (16.10.99) You'll 'ave to sit there *but* turn your back to me (..) so I can comb your hair properly, not.
I: (17.12.99) He used to say "Let's do that." *but* I didn't know what he said (..) because he went too fast.

The above examples of conjoined sentences linked together by coordinating conjunctions (*and, but*) suggest that throughout the duration of the study, S., G. and I. were all beyond Brown's Stage IV of conjoined sentence development; that is, their production of conjoined sentences was beyond the level of children aged 3 years (Brown, 1973; Miller, 1981). In addition, S., G. and I.'s production of conjoined sentences appeared to be beyond the highest stages of Paul's (1981) complex sentence development charts, (i.e. Stages V+ and V++), that is, above the level of 4 year-old children.

8.5.2 Embedded Sentences

The second class of complex sentence, according to Paul (1981), is the embedded sentence which:

> "contains a clause, that is, a sentence-like segment that contains a main verb, within a larger sentence. In embedded sentences, the clause is not independent, but serves as a constituent part of the main, or matrix, sentence" (p.36).

The clause may function as the subject (e.g., "What I'm making is a hat."), or the direct object (e.g., "You can hear what I'm saying.") or as an adverbial (e.g. "The woman used her umbrella because it was raining."). Paul describes nine types of embedding.[5] These are listed below. Paul's definition for each type of embedding is given followed by examples of these from S., G. and I.'s spontaneous speech:

1 Simple infinitive clauses with equivalent subjects:

I Paul's (1981) definition:

> "These include clauses marked by *to* in which the subject of the clause is the same as that of the main sentence. The subject of the clause does not usually appear, because it would be redundant. (This category does *not* include the catenative, or the semi-auxiliary forms gonna, gotta, wanna, hafta, or s'posedta, which appear to function as unanalysed wholes) (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (11.03.99) [I got in] I wanted to ask the questions, didn't I?
G: (18.03.00) Yep! But I don't-can't be bothered to show you
I: (09.06.98) Are you allowed to get the guinea pigs out?

2 Full propositional complements

I Paul's (1981) definition:

> "These clauses contain a complete surface sentence. They usually follow a verb such as *know, wonder, guess, think, pretend, forget, say, mean, tell, remember,* or *wish.* The clause may or may not begin with *that,* but does not begin with a Wh-word. (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (16.10.99) I wish I could sleep again.

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[5] Paul also describes "clause introducers" such as *let's* and *let me*, but these "appear to operate somewhat as unanalysed catenatives do" (p.36) and so are not used here.

G: (24.04.99) I think that my mum is here.

I: (16.05.00) I said we've got right bossy dinner ladies.

3 Simple non-infinitive WH-clauses

I Paul's (1981) definition:

> "These clauses begin with a Wh-word such as *when, what, where, why, how, if* , or *like*. They do not contain the infinitive marker *to*. (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (20.05.00) He known him when he was at lower school.

G: (24.04.99) I don't know what you mean.

I: (10.03.99) It's only where I kept it.

4 Infinitive clauses with different subjects

I Paul's (1981) definition:

> "The subject of the infinitive clause is not the same as that of the main sentence. The subject of the clause usually does appear. (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (18.03.00) (She) carried the small boy to put-post the letter.

G: (16.10.99) I don't want Sarah to hear.

I: (17.12.99) He got this builder to pull it out.

5 Relative clauses

I Paul's (1981) definition:

> "These modify nouns. They can be marked by *which, who, that,* or *what* in child speech, but often do not contain any relative pronoun at all. (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (1103.99) Put the ones who haven't got glasses down?

G: (24.04.99) That's the only girls I know.

I: (19.10.99) I know a friend who does athletics.

6 Gerund clauses (i.e. non-finite verb clauses)

I Paul's (1981) definition:

> "These contain –ing verbs. The –ing form must be part of a noun clause. The –ing adjectives, as in *Let's play with the stacking cups*, are not considered instances of gerund clauses for the purpose of this analysis. (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (20.05.00) I had one ticket for English for interrupting class.

G: (24.04.99) That's like me playing basketball.

I: (22.07.98) Imagine me being on the water flume.

7 Unmarked infinitive clauses

I Paul's (1981) definition:

> "These do not contain *to* in the surface sentence and are usually headed by *make*, *help*, *watch* or *let*. (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (20.05.00) Let me work this out please, young lady.

G: (24.04.99) You could let Sarah play this game.

I: (09.06.98) Let me put it back on.

8 WH-infinitive clauses

I Paul's (1981) definition:

> "These are marked by both a *Wh-word* and *to*. (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (16.10.99) I don't know what to do.
G: (16.10.99) I don't know how to make it.
I: (17.12.99) Don't know how to say that.

9 Double embeddings

I Paul's (1981) definition:

> "An embedded clause is contained within another embedded clause, which is in turn embedded in a matrix sentence. One of these clauses may include a catenative. (p.37)"

II Examples of these in S., G. and I.'s speech:

S: (20.05.00) I know it'd be nice to see his friends and my friends.
G: (24.04.99) I thought Sarah said she was goin' outside.
I: (17.12.99) That's what I didn't know what she said.

Compound-complex Sentences

It was also considered interesting to find examples of sentences containing both a conjoined and an embedded clause. Some of these are as follows:

S: (16.10.99) I said I was gonna be a vet then I changed my mind.

G: (16.10.99) Shall I tell you what sweets I had today and then you tell me what sweets you got, shall I?

I: (10.03.99) When I 'aven't got anyone to play with I always talk to myself and (..) people get a bit annoyed.

8.5.3 S., G. and I.'s Embedded Sentences Were Representative of Which Developmental Stage?

The above examples show that according to Paul's (1981) criteria, S., G. and I. were capable of producing, in spontaneous speech, a variety of embedded complex sentences ranging from simple infinitives to double embeddings. S., G. and I. produced all of the structures that were used by 50% - 90% of the children in all of the MLU groupings of Paul's sample, that is, they produced constructions consistent with all of the developmental stages (Early IV, Late IV-Early V, Late V, V+ and V++) in Paul's charts. S., G. and I. used early acquired forms such as simple infinitive clauses (not catenatives), full propositional complements and simple non-infinitive Wh-clauses which according to the developmental charts were produced by 50% to 90% of children with MLUs of 3.00 to 3.50 corresponding to early Stage IV (predicted age of 34 – 37 months).

S., G. and I. also produced forms that appear at later developmental stages such as sentences containing more than one embedding which do not reach consistent usage until late Stage V, non-finite verb (or gerund *ing*) clauses and the conjunction *because* which do not emerge until Stage V+. Other late emerging structures produced were the conjunction *if*, and sentences containing both a conjoined and embedded clause. The use of these forms was reached by over 90% of children in the highest MLU group of 5.01 and above, corresponding to Stage V++. These structures together with the appearance of subordinating conjunctions such as *when* and *so* (which S., G. and I. also used) are, according to Paul (1981), indicative of syntactic growth. Note that examples of S., G. and I.'s sentences containing the subordinate conjunctions *so*, *when* and *because* are given in section 8.6.3 concerning adverbial clauses.

Thus, throughout the study, S., G. and I. produced all of the complex sentence structures that correspond to all of the stages of Paul's developmental charts and that

were used by 59 normally developing children aged 2.5 to 6.11 with MLUs of 3.00 to 5.01+. However, the types of complex sentences that S., G. and I. produced were most characteristic of Stage V++ corresponding to an MLU of 5.01 and above and predicted chronological age of 47+ months, that is, at the commencement of the study and certainly throughout its duration, S., G. and I. produced complex sentence types that were characteristic of the language structure usually acquired after the age of 4 years.

8.6 S., G. and I.'s Spoken Language Compared to Children in Later Childhood and Adolescence

Although S., G. and I. appeared to use structures consistent with the 2.5 to 6.11 age range, the next stage was to ascertain whether S., G. or I. used structures that are observed in the spontaneous speech of children beyond the age of 7 years. According to the normative literature (e.g. Scott, 1988; Karmiloff-Smith, 1976), there are particular aspects of language development such as noun and verb phrase elaboration that continue to grow throughout middle and late childhood. That the development of a first language continues for many years beyond early childhood appears to also apply in atypical circumstances. Genie, for example was apparently still in the process of acquiring particular morphological and syntactic forms as late as 18 years (Jones, 1995). Also Crystal (1997), notes that "more advanced grammatical constructions," continue to emerge throughout childhood. He states:

> "A popular impression of grammatical learning is that it is complete by age 5; but recent studies have shown that the acquisition of several types of construction is still taking place as children approach 10 or 11" (p. 245).

Thus, evidence of linguistic growth was checked for in S., G. and I.'s speech transcripts.

8.6.1 Noun Phrases

Between the ages of 9 and 19, noun phrase elaboration involving a range of constructions undergoes a significant amount of change. According to Scott, (1988),

> "noun phrase postmodification via prepositional phrases, relative clauses, non-finite clauses…and appositive constructions...are particularly active growth areas." (p.63).

I Prepositional Phrases

An increase in the use of prepositional phrases to postmodify nouns continues until the age of 13 (O'Donnell, et al., 1967). Scott, (1988 citing Scott, 1987) gives some examples of these constructions:

I "The leather made him think of a sail *on a ship*. (p. 64)"
II "and they talked about the food chains *in the desert*. (p.64)"

Postmodification through prepositional phrases was evident in S., G. and I.'s spontaneous speech as the following examples illustrate:

S: (08.09.98) Hello ladies and gentlemen, we're gonna have a race *to the bike.*
G: (24.04.99) Looks a bit like me *in my summer top*.
I: (13.04.99) What's a elephant *up a tree*?

II Non-finite Clauses

Non-finite clauses can also postmodify nouns and the use of these constructions also undergoes some growth towards and during the early teen years (Scott, 1988; O'Donnell, et al., 1967). Scott (1988, citing Scott, 1987) gives some of these examples below:

I "The desert has one main tree *called the soursos*. (p. 64)"
II "and he had a machine *controlling his brain*. (p.64)"

Following are examples of S., G. and I.'s noun phrase elaboration via non-finite clauses:

S: (16.10.99) He's got another girl friend *called Kyle Gregory*.

G: (18.03.00) L: What's this? {*shows picture of man in a diving helmet}*

G: A head *blowing a bubble.*

I: (13.04.99) I don't like people *copying me.*

Other examples of non-finite verb clauses as qualifiers in postmodifying prepositional phrases are:

S: (07.10.98) Yes so what's the point *of arguing*?

G: (07.10.98) Just scribble on your work and forget the idea *of colouring*.

I: (10.09.98) My dad's got a really good map (..) *for walking*.

III Appositive Constructions

The use of apposition to postmodify noun phrases is as Scott (1988) says, an area of linguistic growth during late childhood and the early teens. She gives the following examples (citing Scott, 1987):

I "it's about Jennifer *the girl* she starts a recycling project.(p. 64)"

II "Mr Spoon, the village policeman he's not very pleased with them finding out. (p.64)"

S., G. and I.'s noun phrase postmodification also involved the use of appositive constructions as the following examples illustrate:

S: (16.10.99) Are you goin' to sleep or are you goin' to see your friend, *Patrick*?

(18.03.00) S: I see 'Lizabeth (..) just walking in the house.

L: You've just seen who, sorry?

S: Elizabeth, *my sister*.

G: (24.04.99) That's a bit like me and my mum and Deborah, *my sister*, having dinner.

I: (22.07.98) Yeah, d'you know, we did a trick on Sue, *my friend*.

The above are examples of S., G. and I.'s noun phrase postmodification through prepositional phrases, non-finite clauses and appositive structures. Scott (1988), reports that these three areas continue to develop during the preadolescent and adolescent years. According to (Perera, 1984), the use of these structures in spoken language does not reach an adult level of competence until the age of 15 or 16. As S., G. and I. used all these forms of noun phrase postmodification in their spontaneous speech, this indicated that a certain amount of syntactic growth had already taken place and/or was still in the process of emerging (if reference is made to the normative literature).

According to Scott (1988), noun phrase errors in the speech of preadolescents are uncommon, but one error type that does occur is the "failure to observe co-occurrence restrictions between determiners and nouns" (Scott, 1988, p.65) as in "much eggs" (S., 28.10.98, aged 11.7). This type of noun phrase error was occasionally noted for S., G. and I. as the following examples (for S. and I.) show:

S: (28.10.98) Not very *much* eggs; you've taken them all.
I: (02.12.98) How *much* things are you going to play?

8.6.2 Verb Phrases

With regard to verb phrase development, the appearance or increase of several types of construction represent syntactic growth (Hunt, 1965; Loban, 1976; Scott, 1988).

I Non-finite Verb Forms

Loban (1976) suggested that non-finite verb forms that occur only in subordinate clauses indicate syntactic progress between late childhood and the early teen years. According to Scott (1988),

> "[Loban] argued that non-finite verbs allow for a more direct expression of subordinate thought because subjects are optionally deleted and auxiliary verbs carrying tense and number are always deleted." (p.66)

S., G. and I. all produced non-finite verb forms within subordinate adverbial clauses in their spontaneous speech as the following examples show:

S: (16.10.99) No, I was asleep *dreamin'* about my lovely boyfriend.
G: (24.04.99) Actually it's a little bit silly *pretending being* a T.V. lady.
I: (14.12.98) And he got *fed-up of going* on the..road.

II Modal Auxiliaries

Hunt (1965) found a significant increase in the use of modal auxiliaries such as "will", "shall", "should" and "might" in the language samples of American children between eighth and twelfth grades (Scott, 1988). Similarly Scott (1984b) reported the increased production of "could" and "would" in the spoken narratives of children between the ages of 8 and 12. Throughout the duration of the study, S., G. and I. used modal auxiliaries to "talk about the possibilities for action as well as the facts of action" in the same way that children from the age of 10 have been noted to do (Scott, 1988, p.66). This is illustrated by the following examples:

S: (16.10.99) I wish I *could* go out with him but I can't.
G: (20.05.00) Well I *should* 'ave really 'ave worn my glasses really.
I: (19.10.99) I *would* hate to be chased by a horse.

Scott (1988) citing Perera (1984), reports that occasional modal errors involving the use of *would* for hypothetical expression have occurred in the speech of children aged 10 years. Such errors also continue in written language until 14 years of age. Similarly, modal errors in hypothetical sentences have also been noted in the speech of S., G. and I. In the next three examples (for S. and G.), the incorrect tense forms of modals are used to express hypothetical situations:

S: (07.10.98) Yeah I wish I *can* leave school.
(07.10.98) S: (..) what happens if you lived your own?= You would *{pretends to cry loudly}* "I want my Mummy."
G: No I wouldn't.

S: I bet you *will*.

G: (24.04.99) *Will* she be pleased with me then, if I did well?

As mentioned above, according to Scott (1988), the above modal errors involved in the expression of hypothetical thought occur occasionally in normal children in the middle to late school years (i.e. 9+). This may indicate that the correct use of modals to express hypothetical intentions is a later emerging ability – and one that appeared to be still in the process of developing for S., G. and I. during the present study.

III Perfect Aspect

Other features of the verb phrase that continue to develop include greater production of the perfect aspect (have + past participle) which steadily increased between the fourth and twelfth grades in Hunt's (1965) sample of children. The perfect aspect is principally used to express an action or state of being continuing up to the present moment (Crystal, 1997; Quirk et al, 1985). Thus there is a subtle semantic difference between the meaning of "current relevance" and the meaning of past tense (Crystal 1997, p.96). According to Scott (1988), appreciation of the perfect aspect may be a later emerging skill. S., G. and I. were all noted to use the perfect aspect in their speech. The following examples of the present perfective[6] appeared late in the study.

S: (16.10.99) You *have*n't *seen* Nathaniel for a long time, have you?

G: (16.10.99) What, *has* my hair *grown* long then?

I: (21.09.98) Some people *have had* their tooth *tooken* out in our school before.

(13.04.99) I'*ve done* a bit of Spanish with Mrs Right.

8.6.3 Syntactic Growth at the Clause Level

According to Scott (1988), a wide range of clause types are used by children by the time they reach school age. These are variants of the five basic sentence elements in English; subject, verb, object, complement and adverbial, but, "only a few of these

[6] This term is used by Crystal (1997).

clauses occur frequently." (p.68). These include, SVO, SVOA and SVA clause types (O'Donnell et al., 1967). Over 90% of subordinate clauses spoken by a 9-year old will be one of the three main clause categories: nominal, adverbial and relative (O'Donnell, et al., 1967; Scott, 1988). Adverbial and nominal clauses together, account for 80% of subordination, while relative clauses occur less frequently and comprise around 24 to 34 % of the subordinate clauses used by a 9-year old in conversational discourse (O'Donnell, et al., 1967; Scott, 1984b, 1988; Loban, 1976).

I Nominal Clauses

Nominal clauses, containing either non-finite or finite verbs, can function as various grammatical elements such as object, subject, or adverbial (Crystal, 1997). The majority of nominal clauses serve the role of direct object as in propositional complements (Paul, 1981) or *that* or Wh-clauses such as "I think that this is great." and to-infinitive clauses such as "She wanted to drive home." These clause types are extremely common throughout childhood and the adult years during spoken conversations when statements or views are offered and during narrative activities (Scott, 1988). As revealed earlier (when Paul's (1981) criteria for complex sentences was used), nominal clauses functioning as direct objects frequently occurred in S., G. and I.'s spoken language. They used to-infinitive clauses such as:

S: (07.10.98) I don't really want to do colouring.
G: (16.10.99) You need to do your hair again.
I: (14.12.98) You're not even allowed to watch the play.

and *that* or Wh-clauses such as:

S: (20.05.00) Some people say that George is small.
G: (24.04.99) She'll say that-that jacket doesn't even look like fashion_ at all. She'll say that's-that's from Marks and Spencers.
I: (10.09.98) Don't know which one I'm in.
(10.03.99) I don't know what "weary" looks like.

Constructions with nominal clauses functioning as direct objects are very common in the spoken and written discourse of children and teenagers in the 9 to 19 age range

(Scott, 1988) and were also very common in S., G. and I.'s speech. However, nominal clauses that fill the slot of grammatical subjects are rare. Hunt (1965, cited by Scott, 1988) studied the written samples of 13 years olds and found that only 3.6% of the nominal clauses acted as subject elements. The use of subject nominal clauses was noted for S and G.

S:	(07.10.98)	Just because I'm doin' something, doesn't mean that you have to know.
	(24.04.99)	Just because somebody was around our house doesn't mean distraction.
G:	(16.10.99)	Whoever [du:z] the better, yeah [can 'ave the prize] can have a prize.

II Adverbial Clauses

Throughout later childhood and the teenage years (9 to 19), high-frequency adverbials such as those headed by the time adverb *when* and the reason adverb *because*, make up around 75% of all adverbial clauses produced (Loban, 1976; Scott, 1988). These also commonly occurred in S., G. and I.'s conversations as the following examples illustrate:

Because

S:	(08.09.98)	I don't like her, Mrs Peters *because* she's winnin'.
G:	(16.10.99)	Can I go outside then (..) *because* I need some fresh air?
I:	(09.06.98)	I don't know which branch *because* I don't know how it happened.

When

S:	(24.04.99)		Have you done this before *when* you was little?
G:	(16.10.99)		*When* I'm older I'm gonna have my second holes done.
I:	(09.06.98)	I:	Can you do handstands?
		L:	[[I used to-
		I:	[[*When* you used to be little, I mean?

Increases in the production of less frequently occurring adverbials such as the conditional *if* and purpose (in order) *to* reach a developmental peak by the elementary school years (Scott, 1988). Scott (1984b) studied the spoken narratives of children aged between 6 years and 12 years and found that reason (*because*), time (*when*) and purpose (*to*) adverbial clauses comprised the majority of the adverbial subordination, while the conditional *if* was virtually absent. However, *if* clauses have been reported to increase in frequency when the discourse type involves children's written game instructions rather than spoken narratives (Perera, 1984; Scott, 1988). Adverbial clauses headed by *if* occurred comparatively often in S., G. and I.'s spontaneous conversation as the following examples show:

S:	(19.10.99)	Why am I-*If* I'm pointin' (at) the right one, why d'ya n-need to say that?
G:	(07.10.98)	*{Talks to her adoptive mother} If* you're gonna be nasty to me, I'll just tell my friends in the street (..) you're really ugly.
I:	(10.09.98)	*If* you want to know what I'm doing, I'm colouring this out.

A sign of linguistic maturity - and one often found in the speech of adolescents - is the use of *if* clauses to express hypothetical situations. This indicates awareness of the fact that the same syntactic structure can be used to encode several different meanings (Scott, 1988; Perera, 1984). Preschoolers commonly use *if* clauses to express real situations occurring in the immediate context such as "*If* I get dollie, we can play a game." However, it may take several years, usually by preadolescence, before *if* is used to encode imaginary situations or those occurring outside the 'here and now.' As the following examples demonstrate, S., G. and I. did use *if* adverbials to talk about hypothetical situations suggesting that they possessed a facet of linguistic maturity normally reached by late childhood, that is, before the teen years begin.

S:	(20.05.00)	*{S. is shown a picture of a boy falling off a fence.}* That's funny. Imagine *if* I fell off; I'd laugh.
	(20.05.00)	*If* you'd have done it a bit slower then I (would've) probably have got it.

G: (16.10.99) *If* I went to a party with my boyfriend I('d) hit your boyfriend. That's what I'd do.

I: (14.12.98) *{Talks about telling a story on a bus}* I('d) laugh *if* we did it on a real, real bus. *{Few seconds later}* I would. I'd laugh my head off.

Some of the most frequently occurring adverbial clauses in S, G. and I.'s spoken language were headed by *if*, *when* and *because*. The production of high and mid-frequency adverbials such as *if* and *because*, however, may actually decrease during the preadolescent and adolescent years to be replaced by a greater diversity of adverbials. These may include some of the less common subordinating conjunctions such as the conditional adverbs *unless* and *although* (Scott, 1988), which were rare in the data for S., G. and I. The following is an example of S.'s use of *although*, which occurred early in the study.

S: (071.0.98) That's s'posed to be white *although* I dunno.

There is a range of comparatively uncommon adverbials that occur infrequently, but whose presence is considered to be indicative of syntactic growth (Scott, 1988). Included in this group of low-frequency adverbials are concessional subordinators such as, *even if*, *though*, adverbs of manner like *as*, some of the rarer conditional adverbs such as *unless*, *supposing* and *in case* and adverbs of time such as *since*, which has been noted to occur in the speech of 14-year-olds. According to Scott (1988),

> "These particular adverbials tend to be used more often by high-ability groups than by low-ability groups of students (Loban, 1976), and therefore may be more sensitive indicators of syntactic development during the 9-through-19 age range than some of the more common adverbials"(p.71).

Some of these more sophisticated, later developing adverbials were used by S., G. and I. at least once in the data as the following examples show.

S: (07.10.98) Then don't shout just whisper *like* I'm talking.

(24.04.99) D'you need the loo by the way, *in case* you do that?

	(20.05.00)	Take as long *as* you like.
G:	(24.04.99)	*Even if* that's right, is that a problem?
I:	(09.06.98)	I have-I have cheese in sandwiches *though* I don't have the..actual thing on the side.
	(22.07.98)	I've known him *since* I were little and he used to be naughty as well.
	(14.12.98)	*Even if* it were somebody else, I wouldn't believe everything.
	(13.04.99)	You always do keep-fit *though* outside we do something else.

S., G. and I. also used a range of other subordinating conjunctions such as adverbials of time (*after, before, while*), preference (*better than, rather than*), comparison (*as if*), result (*so, so that*), and similarity (*like*). Note that the purpose adverbial *to*, which develops early, was also used. Examples of these adverbial clause types are presented below.

S:	(07.10.98)	What would you like to do *while* we colouring?
	(24.04.99)	I think that school is *better than* doing this.
	(24.04.99)	Why 'ave you just stuck pictures down *rather than* draw 'em?
	(18.03.00)	You sound *as if* you (.) gonna be stress_
G:	(24.04.99)	Well me and Sariah can play a game *while* Nicholas [du:z] this.
	(16.10.99)	When can I meet him just *so that* I can be horrible to him, yeah?
	(16.10.99)	I want to know what sweets they are *before* I like 'em.
I:	(22.07.98)	It's *like* turning a steering (.) really (.) wheel.
	(13.03.99)	Right and you just ignore that one and then you put an arrow on it (..) *to* show that it goes down or up.
	(19.10.99)	They're tryin' to knock your bone, aren't they, *to* see if you got any nerves or something?

Another subtle indicator of syntactic growth may be non-finite verb forms in adverbial clauses (Scott, 1988; Perera, 1984). Following are examples of these later

emerging types of adverbial clauses in S., G. and I.'s spontaneous conversational speech.

S:	(08.09.98)	Are you *a bit bored of doing that or not?*
	(08.09.98)	Georgeta looks happy (..) *playin' with Daniel.*
	(16.10.99)	Do you wish you could rest (..) all day (..) *thinking about your boyfriend (..) whether* you want to live with him or not?
	(18.03.00)	I see 'Lizabeth (..) *just walking in the house*.
	(20.05.00)	I've got detention this Monday (..) *for not signing my diary.*
	(20.05.00)	I know it'd be nice *to see his friends and my friends.*
G:	(07.10.98)	[It's for-] It's *for making a decoration (..) to do.*
	(18.03.00)	It's silly *going to school*.
	(20.05.00)	I'm no good *at reading at all today*.
I:	(02.12.98)	I went to see what sort of rides there were down there (…) and I went, right, and there weren't even enough *to choose from.*
	(16.05.00)	But it's not hygienic *to do that.*

III Evidence of Linguistic Growth?

Some of the adverbial forms (e.g. low frequency subordinators, and non-finite verb clauses) that according to Scott (1988) are indicative of syntactic growth were already present in S., G. and I.'s spoken language at the commencement of the study. This suggests that prior to the start of data collection, a significant amount of syntactic development had already taken place – development that was steadily moving towards an approximation of adult competence. For S. such a level of syntactic maturity had emerged within 4;10 years, for G. within 6;9 years and for I. within 6;2 years since entry to their respective adoptive homes. Non-finite adverbial clauses occurred more often in the data corresponding to later visits than earlier ones, possibly suggesting that some syntactic growth had taken place during the study itself. This was particularly evident in S.'s case. When her C-Unit sample for 07.10.98 was studied in detail, it was found that there were several adverbial clauses headed by the subordinating conjunctions *if, because* and *when* (forms that were very common in S., G. and I.'s spontaneous, conversational speech), but that there were no adverbial

clauses containing non-finite verb forms. However, 19 months later, S.'s C-Unit sample for 20.05.00, contained several incidences of non-finite adverbial clauses that according to Scott (1988) indicate increasing syntactic maturity. These adverbials were:

S: (20.05.00) I've got a detention this Monday (..) *for not signing my diary*.

(20.05.00) I had one tic-ticket for English *for interrupting class*.

(20.05.00) I know it'd be nice *to see his friends and my friends* (..) *hm*.

IV Relative Clauses

Although relative clauses are less common than either nominal or adverbial clauses, their occurrence is significant with regard to syntactic development (Scott, 1988; Hunt, 1965; Loban, 1976). Two studies examined the presence of relative clauses in the spoken and written language samples of school age children. Loban (1976, cited by Scott, 1988) suggested that greater production of spoken relative clauses was associated with children who had above average language ability, while Hunt (1965) found that the frequency with which relative clauses were produced in written samples steadily increased through to twelfth grade. In addition O'Donnell et al. (1967) established, through the study of third, fifth and seventh grade children's written/spoken language samples, that "relative clause frequency" increased the older children became (Scott, 1988, p.72). Collectively, these studies suggest that the stable or increased production of relative clauses is characteristic of syntactic maturity.

According to some studies, the majority of relatives follow object, adverbial or complement nouns, that is they are right embedded and are rarely centre-embedded, (i.e. that they postmodify the subject). For example, Scott, (1984b), found that centre-embedded relative clauses were rare in the spoken language of children in early adolescence. Citing the work of Romaine (1984), Scott (1988) states that,

> "Romaine found that some centre-embedded relatives appeared in spoken language by the age of 10 and suggested that by that age children have better control of true embedding operations as opposed to conjunction operations" (p.73).

The occurrence of this type of relative clause was noted in S.'s speech:

S: (10.03.99) Mr Geoffrey, *who*'s our Maths teacher, gave us all a sheet.

Relative clauses most frequently postmodify object nouns where the relative pronoun, *who(m)*, *whose*, *which*, *that*, or *what*, functions as the subject of the embedded clause (Scott, 1988). Often, however, the relative pronoun does not appear at all (Crystal, 1997; Paul, 1981). The majority of S., G. and I.'s relative clauses in spoken language postmodifed complement or object nouns and were marked by *that* or *what*, although these pronouns were frequently absent. The relative pronoun *who* was also used to

introduce relative clauses, though this occurred infrequently. *Who* was most often used for direct or indirect WH-questions or to mark nominal clauses functioning as direct objects such as "I know who my boyfriend is." (G, 16.10.99). The occurrence of *which* and *whose* marking a relative clause was rare and *whom* nonexistent. The following are a selection of the relative clause like structures (following the object or complement noun) that occurred in S., G. and I.'s conversational speech.

S:	(08.09.98)	This is all cards *you gave me*.
	(24.04.99)	That's a play station *they've got (..) maybe.*
	(16.10.99)	Is that the last one *you said?*
G:	(17.09.98)	It's you *that's got to tell me about your holiday*.
	(24.04.99)	And is that all the sentence(s) *we've gotta do then?*
	(16.10.99)	Well, I'm just doin' the things *I made up, okay?*
I:	(02.12.98)	Did they like my test (..) *who you showed?*
	(10.03.99)	Oh I forgot that word *you said erm*.
	(17.12.99)	That's another one *I found funny*.

Two of the examples above contain non-finite verb forms (i.e. "That's a play station they've *got* (..) maybe*"* (S., 24.04.99) and "And is that all the sentence(s) we've gotta *do* then?" (G., 24.04.99)). According to Perera, (1984) and Scott, (1988) these are indicative of syntactic maturity. Although the following examples are not all strictly relative clauses, they illustrate S., G. and I.'s use of non-finite forms of the verb (in this case the *-ing* and *–ed* participles) in subject or object complement position.

S:	(08.09.98)	There's a person *standing there* (..) with that pointing at her.
	(08.09.98)	That's my sister *riding a bike*.
G:	(17.09.98)	Did ya see them two *sittin' next together on Sunday?*
	(18.03.00)	There was a man *driving a bus*.
I:	(02.12.98)	I know a girl *called Carrie* and she's from Romania.

Another relative clause structure that emerges late is the non-restrictive type that follows the subject as in, *Mr Jarvis, who is sitting at the back, has ordered* (Perera, 1984; Scott, 1988). According to Crystal (1997) this relative clause type: "provides

optional, extra information which could be omitted without affecting the noun's identity"(p.142). S. occasionally used a non-restrictive relative clause to postmodify a subject as in "Mr Geoffrey, *who*'s our Maths teacher, gave us all a sheet." (11.03.99).

V Frequency of Relative Clauses in Speech

Although a qualitative inspection of S., G. and I.'s spoken language revealed that they produced relative clauses, the frequency with which these were produced compared to other syntactic structures (such as adverbial clauses) appeared to be comparatively low. However, this is congruent with the observation that, generally, relative clauses occur less often than nominal or adverbial clauses in the language of normally developing children and adolescents (Scott, 1988). Citing the work of O'Donnell, Griffin and Norris (1967), Scott (1988) mentions that in this study the frequency of relative clauses per 100 C-Units was calculated and that,

> "relative clause frequency increased from 1.0 to 3.4 per 100 T-Units in the written samples of third-, fifth-, and seventh-grade students; comparable figures for spoken language samples were 2.6, 3.3 and 3.9." (p.72).

The frequency of relative clauses per 100 Communication Units was calculated for samples of S. G. and I.'s language. The results are summarized in Table 8.3.

Table 8.3 Percentage of complex sentences for selected C-Unit samples.

	Date of C-Unit Sample	**Age**	**Relative Clauses Per 100 Communication Units**
S.	07.10.98 20.05.00	11;7 13;2	4 2
G.	07.10.98 16.10.99	13;3 14;4	0 0
I.	09.06.98	10;8	1

	16.05.00	12;7	0

It was found that for S., 4 relatives occurred in her C-Unit sample for October 1999 and 2 for May 2000, while for G., there were no relative clauses found in either of her C-Unit samples for October 1999 or October 2000 –although in the latter case, a relative pronoun was used to introduce a nominal clause; "I know *who* my boy friend is; lovely and-lovely and handsome." Although relative clauses did not occur in G.'s two C-Unit samples, they appeared elsewhere in her speech transcripts as in:

G: (07.10.98) L: So, who's Dana?
G: O:hh. Sky Hall's friend *who goes to {name of school}*

In I.'s case, only one relative clause was present in her C-Unit sample for June 1998. Nearly two years later, I.'s C-Unit sample for May 2000 contained no relatives at all.

During the early part of the study, there were signs that S. sometimes found relative clauses difficult to produce accurately. The following example indicates that, at the age of 11.7, S. occasionally stumbled over the construction of these complex sentence types.

S: (08.09.98) *{S. talking to her teacher M. during a game of cards}*
S: Ah, we're not doing very well are we?
M: No, you're not concentrating.
S: I a:m. You the not-you the no:t (.) one who concentrating *{laughs self-consciously}*

Similar difficulty with the production of negation in relative clauses was evident six months later in March 1999 when S. was aged 12 years.

S: (11.03.99) *{S. and L. talking about a game}*
L: D'you know how to play that then?
S: Yeah, "Guess Who." Y'gotta try and answer questions say, "Have you got..erm glasses." and they say, "No",

then you get all (..) the ones who got glasses=The ones *not* got glasses on

8.6.4 Conjunctive Adverbs

Conjunctive adverbs (Semel, Wiig, and Secord, 1995) also referred to as "adverbial conjuncts" by Scott, (1988) are a group of adverbials such as *anyway* and *so* whose purpose is to relate or join together independent segments of discourse, that is, they "cause the sentence sequence to 'cohere'" (Crystal, 1997, p.119). Adverbial conjuncts convey a range of meanings and often are used as important links between the clauses and sentences of a conversation or narrative (Scott, 1988; Crystal, 1997). An example of a sentence containing an adverbial conjunct is, "I can't remember how to play *though.*" (G., 24.04.99, aged 13.9). A study by Scott (1984a) showed that by the age of 10, children are using around 4 conjuncts per 100 utterances with only a narrow range of conjuncts such as *though* and *then* being expressed (Scott, 1988). A further finding was that children's use of adverbial conjuncts is more frequent during peer interaction than the dyadic context of adult-child interview. By the age of 12 the diversity of the adverbial conjuncts used increases slightly to include forms such as *instead*, *only* and *otherwise*. Scott's (1984a) study suggested that the use of adverbial conjuncts continues to progress beyond the age of 12 and is thus, another linguistic area that develops during the preadolescent and adolescent years.

S., G. and I.'s production of adverbial conjuncts was first of all analysed by counting the number of these per 100 utterances, since this was the procedure used by Scott in her (1984a) study. Transcripts were selected from the beginning and towards the end of the study in order to ascertain whether there was any change to S., G. and I.'s conjunct use over time.

As noted previously, children by the age of 10 years are using 4 conjuncts per 100 utterances (Scott, 1984a). As Table 8.4 indicates, the number of adverbial conjuncts that S., G. and I.'s produced in conversational speech steadily increased during the study and was either roughly equivalent to or beyond that of 10-year-old children. S., G. and I. used several types of adverbial conjunct (in their conversational speech),

which have been reported to occur in the speech of children aged 10 to 14 (Scott, 1982, 1988).

Table 8.4 Number and type of adverbial conjuncts per 100 utterances.

	Date of Transcript	Age	No. of adverbial conjuncts per 100 utterances	Type of adverbial conjunct used
Sariah	07.10.98	11.7	7	then, so, really, now, though
	16.10.99	12.7	5	really, though
	20.05.00	13.2	10	well, just, or something, then, so, at all.
Georgina	07.10.98	13.3	12	then, well, so, by the way, actually,
	16.10.99	14.4	20	anyway though, anyway, then, well, actually, so, really
Ingrid	09.06.98	10.8	3	though, actually
	17.12.99	12.2	9	so, though, and everything, or something, and that.

The following examples illustrate S., G. and I.'s spontaneous use of a small range of conjuncts which includes "inferential" *then,* and "concessive" *though,* and *anyway* (Scott, 1988, pp74-75). Note that in some cases these function as sentence connectives:

S: (24.04.99) Are you sure that's right (..) *then*?

(24.04.99) I can't remember how to play *anyway*.

(16.10.99) I don't go out with him *though* but I just fancy him.

(16.10.99) That wasn't a stripey one, uhuhh e:r er number two: Tsk! looked at the stripey one *instead*.

(16.10.99) L: You wanted to be a professional hairdresser, didn't you?

G: mm:

S: Come on *then*, do your professional hair dressin' *then*.

G: (24.04.99) Can I go outside and then Sarah plays the game *then*?

(24.04.99) I have no idea what game you're playing (..) *anyway*.

(24.04.99) L: I haven't actually got any nail varnish at all because really I don't use it.

G: That's because your..nails are too short..and *so* are mine as well.

(16.10.99) L: Can you make yours like that?

G: How ya s'posed to *though* with these-these bricks *then*?

I: (10.09.98) L: Does he do lots of walking then?

I: No: I like walking *though*.

(14.10.98) Who'll be at home *then*?

(19.10.99) There's not a goblet on that (..) *so* how do I know?

I Changes to the Use of Adverbial Conjuncts Over Time

There appeared to be a number of changes to S., G. and I.'s use of adverbial conjuncts during their adolescent and preadolescent years. At the start of data collection, when S., G. and I. were respectively aged 11.3, 113.1 and 10.8, they already used conjuncts in their spoken language. However, a small number of common adverbs including *though, then* and *so* as in, "How ya s'posed to *though* with these-these bricks *then*?" (G., 16.10.99, aged 14.4) appeared to increase in frequency. S.'s use of the conjunct, *though* seemed to increase with later visits and was particularly noticeable on 16.10.99, when aged 12.7. as in, "It looks good *though*."

During the same visit, G.'s speech contained a much higher proportion of adverbial conjuncts when compared to data collected during earlier visits. Two types, *then* and *though* were used often and, in fact, the appearance of the conjunct *then* within and at the end of utterances was rather perseverative as the following examples illustrate,

G: (16.10.99) What shall I do *then*, tip it out *then*?

(16.10.99) What, was I messin' about *then* or not *then*?

Other types of adverbial conjunct that S., G. and I. produced throughout the study were *anyway* noted for all three girls, *by the way* and *all of a sudden* noted for G and *just as well* used only by S. Adverbial disjuncts such as *actually* and *really* also regularly occurred in the speech of S., G. and I. as the following examples show:

S: (08.09.98) This-This is like a spoon *really*.
(24.04.99) I did quite enjoy this game *actually*.
G: (24.04.99) *Actually*, it is a little bit silly pretendin' bein' a T.V. lady.
(16.10.99) I-I think I'm playin' a nice little game here, *actually*.
I: (22.07.98) L: Don't you fall over when you're going ice-skating.
I: Sometimes, it's quite funny, *actually*.
(13.04.99) Ooh the date is (..) hm. What's the date? Thirteenth. No, it's not *really*.

The occurrence of *well* at the beginning of sentences as in, "*Well*, I-I'm gettin' that one this Monday" (S, aged 13.2, 20.05.00) increased towards the end of the study when S. and G. were in their early teens and I. was approaching her teens. Adverbial conjuncts that were noted to occur in later visits but not during earlier ones included *instead* and *at all*. Interestingly, one change that characterized S. and I.'s later use of conjuncts involved the emergence of colloquial (or dialectal) phrases at the end of sentences such as *and everything, or something* and *and that.* These forms are very common in teenage and adult informal spoken conversation and may identify regional variations in the speech of others (Crystal, 1997). The examples below demonstrate S. and I.'s use of these forms at the respective ages of 13.2 and 12.2

S: (20.05.00) You said, "I want to play a game." *or somethin'*.
I (17.12.99) It was a blue game. You had-It had a folder *and that*.

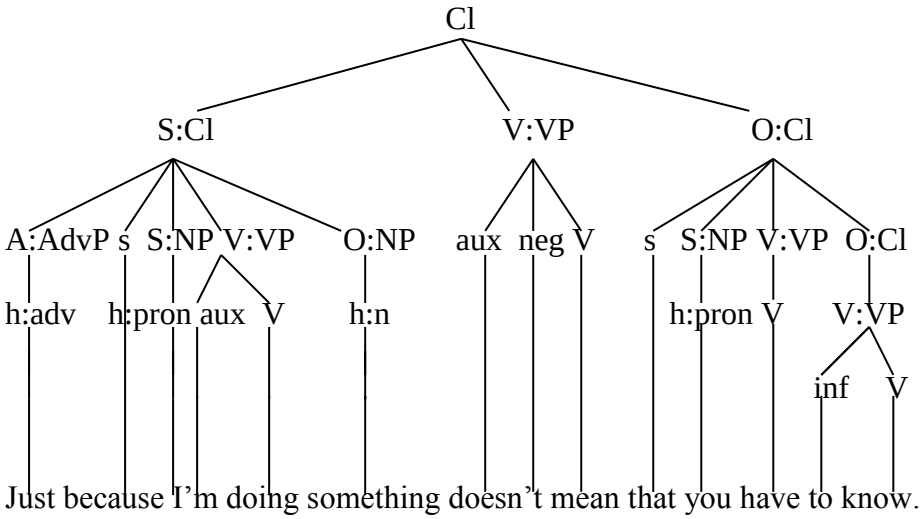
8.7 Grammatical Analysis Of Example Sentences

The above examples should demonstrate the structural complexity of S., G. and I.'s spoken language at the clause and phrase level. A variety of forms such as appositive

constructions, modal auxiliaries and non-finite verb clauses were used for noun or verb phrase expansion in addition to the use of adverbial conjuncts functioning as sentence connectives. At the level of the clause, S., G. and I.'s sentences often contained several instances of coordination or subordination or else these occurred simultaneously in utterances which Crystal (1997) terms "compound-complex" sentences. In order to convey the level of sophistication of S., G. and I,'s spontaneous speech more clearly, example sentences were selected for parsing, that is, their grammatical elements were analysed and labelled. The following examples of grammatically parsed sentences (based on Perkins' (1999) method of syntactic analysis) illustrate the hierarchical complexity of S., G. and I.'s spoken language at the clause and phrase levels. Each example utterance contains a construction considered to be indicative of syntactic growth (Scott, 1988).

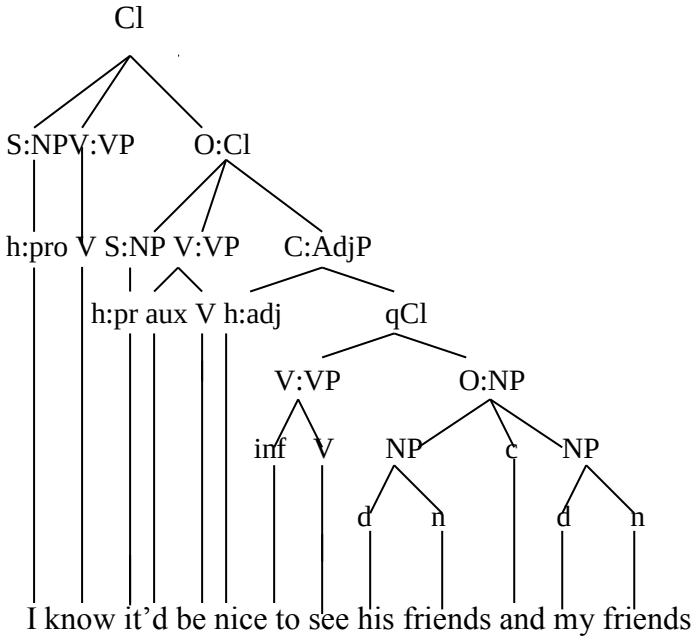
8.7.1 Same level subordination. Sentence in which two subordinate clauses occur "at the same level." (Crystal, 1997, p. 195).

S., aged 11;7 (07.10.98)



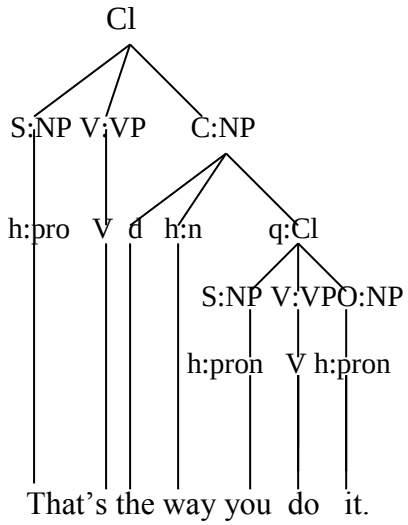
8.7.2 Double embedding. This is defined by Paul (1981, p.37) as, "An embedded clause..contained within another embedded clause, which is in turn embedded in a matrix sentence."

S., aged 13;2 (20.05.00)



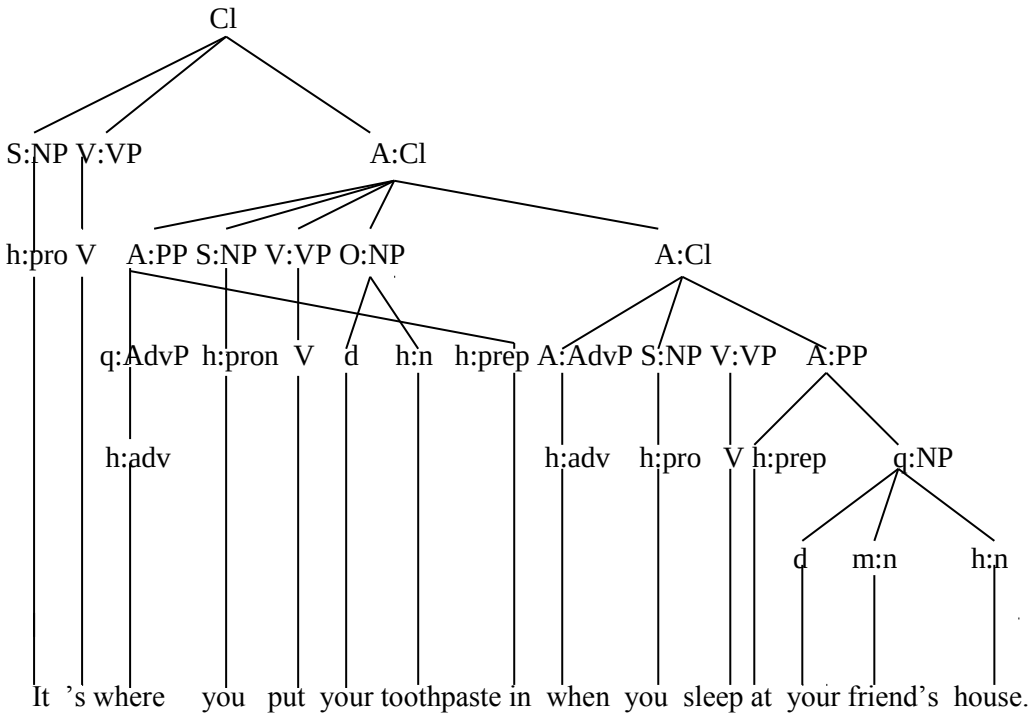
8.7.3 Noun phrase postmodfication via appositive clause.

G., aged 13;3 (07.10.98)



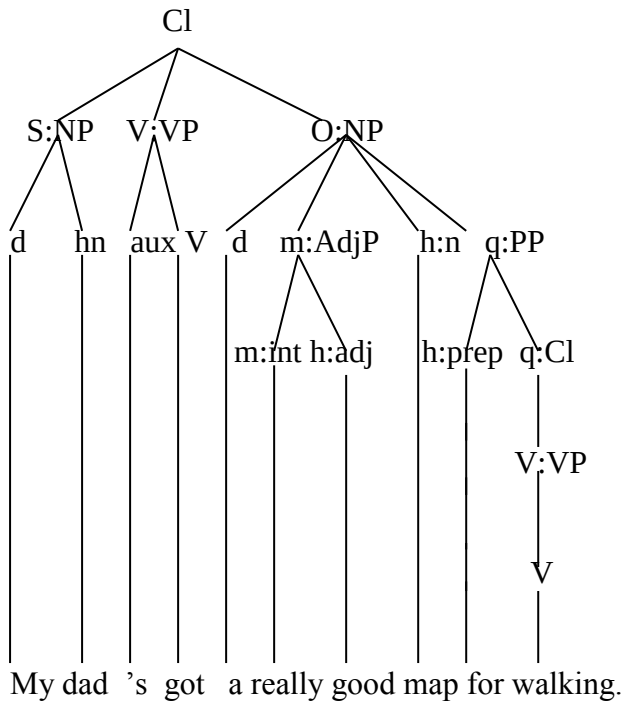
8.7.4 Sentence containing Wh-adverbial clauses.

G., aged 14;4 (16.10.99)



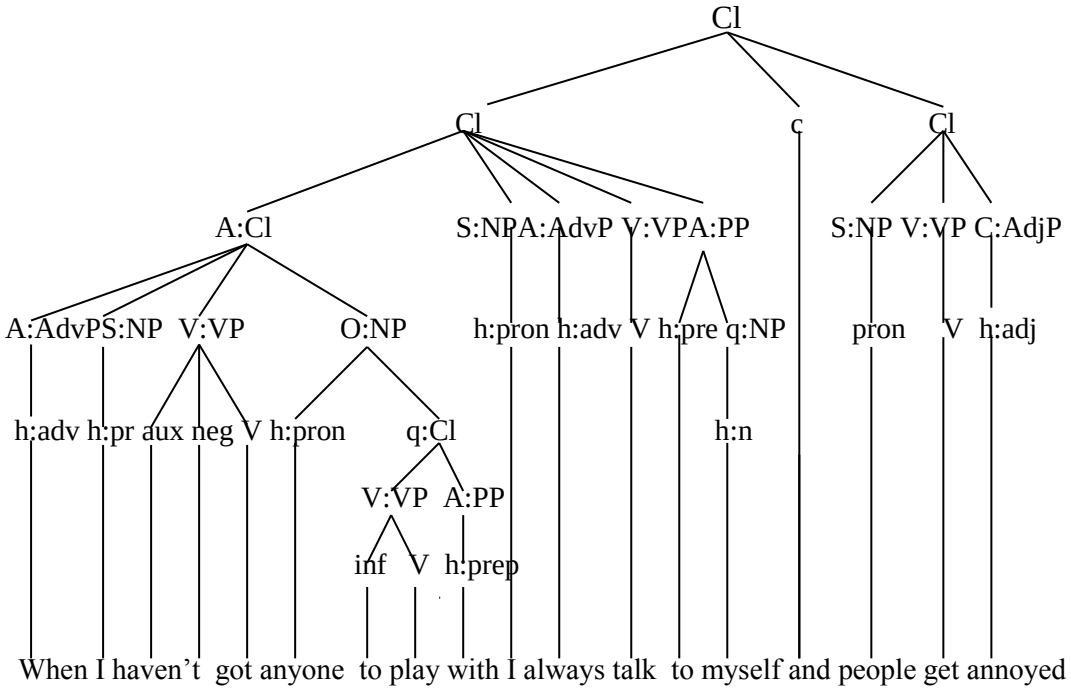
8.7.5 Noun phrase elaboration via pre-modifying adjective phrase and postmodifying prepositional complement containing non-finite verb clause.

I., aged 10;11 (10.09.98)



8.7.6 Compound-complex sentence. Sentence containing both an embedded and coordinated clause.

I., aged 11;5 (10.03.99)



8.8 Summary and Conclusion: Descriptive Analyses of Complex Sentences in Spontaneous Speech

Analyses of S., G. and I.'s spontaneous speech revealed a level of grammatical competence that was not in evidence during their performances on standardized tests of syntax and morphology. This suggested a discrepancy between the ability to use language in structured tests and in naturalistic contexts. S., G. and I. were able to produce complex sentence structures during spontaneous conversation, yet either could not construct or were uncertain about the same sentence types on standardized tests. This suggests that they lacked some awareness about the form these structures should take – a metalinguistic ability that is evidently still emerging in some 6-7 year olds (according to the control children's responses). G. and I. were generally unable to perceive the grammaticality of the sentences they produced in response to test demands. This did not effect S. to the same degree, since she appeared to be more aware of 'strange-sounding' sentences. The issue here is that some standardized tests, particularly if they are used in isolation, may present a disorted picture of a child's

linguistic competence. It is only when a different methodology is used, perhaps a tool for description, that the child's true potential is unravelled. Chapter 8 hopefully showed this.

Examination of S., G. and I.'s noun and verb phrase elaboration and use of clause types (nominal, adverbial and relative) revealed hierarchical complexity at both the clause and phrase level. Qualitative and quantitative analyses of S., G. and I.'s complex (coordinated and embedded) sentence production showed that they used a variety of forms (ranging from simple infinitives to double embeddings) of the type and frequency that one would expect to find in the speech of 2 to 7-year-olds (Paul, 1981). S., G. and I. *also* used structures such as low frequency subordinating conjunctions (*even if, though, while*) marking adverbials clauses, non-finite verb forms (That's my sister *riding a bike*. S., aged 11;6) and adverbial conjuncts (*then, so, anyway*) which are associated with syntactic growth in the late childhood and teenage years. Some of the structures that frequently occurred in S., G. and I.'s speech also frequently occur in the speech of normally developing children and teenagers. For example, nominal clauses functioning as objects (marked by *that* or the infinitive form of the verb) or adverbial clauses headed by mid-to high frequency adverbials such as *if, because, when* and *to* were very common in S., G. and I.'s conversational speech. According to Scott (1988), these forms also frequently occur in the spoken language of children and teenagers in the 9 to 19-age range.

Some of the structures (e.g. low frequency subordinators, and non-finite verb clauses) considered to be indicative of syntactic growth in later childhood (Scott, 1988) were already present in S., G. and I.'s conversational speech at the commencement of the study. This suggests that prior to the start of data collection, a significant amount of syntactic development had already taken place since S., G. and I. entered their respective adoptive homes, that is, within a time span of between 4;10. and 6;9 years. Furthermore, there were subtle indications that language development and thus syntactic growth was still taking place during the study: the use of conjunctive adverbs appeared to steadily increase (as is reported for normally developing children up to the age of 12 years and beyond) and (at least for S.) non-finite adverbial clauses occurred more often in the data corresponding to later visits than earlier ones. Also all three girls appeared to be still in the process of developing some of the less

common adverbial clause types (e.g. *although*, *unless*, *since*), whose presence is considered to mark the growth of language during the preadolescent and adolescent years.

The impression was that, at the start of the study and most likely throughout its duration, S., G. and I. were at the threshold of a new stage of language development – one that traverses the path to adult competence. This suggests that first language acquisition in extremely socially deprived children takes many years to unfold as it does in typically developing children (Crystal, 1997; Scott, 1988). Recall that S., G. and I. were each adopted around or after the age of 4 years. The chapter concludes that extreme deprivation until the age of 4 years (and possibly as late as 7 years) has no harmful effect on the development of spontaneous spoken language ability, as long as there is a positive change to the neglectful environment.

Next Chapter - Chapter 9 draws together the findings of all the previous chapters.

Chapter 9 Discussion

In the preceding chapters, the effects of severe social deprivation on language and cognition were investigated in three Romanian children. S., G. and I. were adopted from Romanian childcare institutions or 'orphanages' near to or after the age of four years. A 'mixed-methods' approach was adopted, in that a range of quantitative and qualitative techniques was used to collect and analyse data. S., G. and I.'s social and communicative, language and nonverbal cognitive abilities were described.

9.1 Which Model of Development is Characteristic of S., G. and I.'s Cases?

One of the themes inevitably encountered when investigating the effects of extreme childhood deprivation is the nature versus nurture debate, mentioned in Chapter 1. This is, however, a false dichotomy because, nowadays, scientists acknowledge that it is a combination of both nature (i.e. genes) and nurture (i.e. environment) that influences development (Karmiloff-Smith, 1998). However, there is disagreement over the ways in which each is considered to contribute to developmental outcome. Connected with this, Chapter 1 outlined two differing theoretical approaches to the study of development. The difference between the perspectives concerns the degree of emphasis each places on the role of genes and the role of environment. Firstly the various forms of the Cognition Hypothesis posit that there is a strong correlation between language and non-language cognition. Thus both areas develop in tandem. The brain is seen as a highly effective general processing mechanism that is shaped by the social and physical environment. This idea is linked to the empiricist approach. Secondly, modularity theory – within the nativist school of thought - suggests that human cognition is comprised of independent modules and correspondingly that language and nonlanguage areas are dissociated. Thus language might develop ahead of some nonlanguage areas or it might be retarded relative to other abilities, that is, it might be selectively impaired. The most contentious aspect of modularity is the belief that modules are prespecified and that the environment merely acts as a trigger for the outward realisation of these blueprints (Karmiloff-Smith, 1998). Which of these models is most congruent with the developmental outcomes of S., G. and I.? Before

this question is answered directly, the observations from all the preceding chapters will be drawn together. This is so that the reader is reminded of the research questions that the thesis aimed to explore and how each chapter addressed these. In so doing, the contributions of different methodologies can also be described.

9.2 The Research Questions

The thesis addresses three research questions (see 1.8.1, Chapter 1):

1 What are the effects of extreme global deprivation during infancy and the early childhood years on:

   1 language development?
   2 non-verbal cognitive development?
   3 social and communicative behaviour?

2 Does the linguistic development of such children constitute evidence for the existence of a critical period for language?

3 Are case studies such as these able to shed some light on the relationship between language and cognition? More specifically, do such cases provide evidence of dissociations between these two areas?

9.3 The Effects of Extreme Deprivation

Research question 1 was addressed in varying degrees by Chapters 3, 4, 5 and 6. Three methodologies were used in an attempt to answer the question. These involved interviews, observation and standardized/psychometric tests. How did the various methodologies and types of data in each chapter address the question?

9.3.1 The Question

2. *What are the effects of extreme global deprivation during infancy and the early childhood years on:*

   1 *language development?*
   2 *non-verbal cognitive development?*
   3 *social and communicative development?*

9.3.2 The Method: Interviews, Qualitative Analysis of Retrospective Reports

First of all, chapter 3 used data that involved the parents' subjective experiences and the retrospective written accounts of various people who came into contact with each child. Conducting semi-structured interviews with the parents and examining developmental reports in detail provided a means of charting the life history of each child, from birth to the point that they began to take part in the study. In other words, they were a way of accessing previous experiences.

The data showed that S., G. and I. came from backgrounds of unprecedented neglect and deprivation. When the girls entered their respective adoptive homes, they each had global developmental retardation characterized by inhibited motor and physical capacity and concomitantly poor cognitive and social abilities. Chapter 3 asked whether this was largely caused by genetic or experiential factors.

S., G. and I.'s retarded levels of development (characterized by lack of speech, stunted growth, malnutrition etc.) could have been due to innate learning difficulties or some kind of organic dysfunction. This might have been why the girls' impoverished developmental abilities coincided with impoverished social, intellectual and physical environments. On the other hand, it could be argued that S., G. and I.'s retarded developmental levels were largely due to years of neglect and understimulation.

S., G. and I. did not leave their respective institutions talking like children of their chronological age groups. They did not talk at all, either in Romanian or English – except to utter a handful of single words taught to them by Western aid volunteers. It appears that their impoverished physical and intellectual circumstances mirrored the

impoverished circumstances into which they had been placed since birth. This suggests that experiential and environmental factors have significant effects on development.

If S., G. and I had genetic disorders that accounted for their lack of speech or motor skills, for example, then lack of such skill might be expected to continue, even with a change in environment. One would not expect a Romanian adoptee who could not talk due to a suspected genetic or complex developmental disorder to suddenly spontaneously attempt to use words or phrases because s/he was repeatedly spoken to. Instead linguistic development might be expected to slowly unfold over several years – if such progress took place at all – rather than to catch up within several months or even weeks of adoption as have been demonstrated in other cases of extreme deprivation (Skuse, 1984b). In fact, lack of significant linguistic progress even after prolonged intervention was evident for three Romanian adoptees, C., E and T. for whom data was collected during the study. In their cases, speech failed to develop even around 4 years post adoption.[1]

9.3.3 The Results

Retrospective accounts suggest that S., G. and I. were soon responsive to the care and attention they received when first entering their respective adoptive homes. Social involvement with (foster) family members such as parents, and siblings appeared to facilitate this process. Also each child was reported to react favourably to the clinical and medical input of various health care professionals such as speech and language therapists, clinical psychologists and physical therapists. The girls would not have been expected to make the noticeable developmental gains that they did, relatively quickly in response to new stimulating environments, if their learning potential was truly constrained by some type of intrinsic or biological dysfunction.

Therefore, Chapter 3 concluded that the initial effects of global extreme deprivation during early childhood on S., G. and I.'s language, non-verbal cognition and social

[1] This was in the absence of any known hearing impairments or neurobiological or neuroanatomical anomalies.

and communicative behaviour was that the development of these abilities was either discontinued or severely retarded up to the point when each child was adopted. Then when the girls' environments changed for the better, their developmental levels also changed.

I Progress

The girls' development unfolded in the following ways according to the parent interviews and developmental reports:

Language development

Non-verbal behaviours such as eye-gaze, pointing and facial expression preceded and appeared to anticipate speech, since the acquisition of single words (e.g., *doggie, dada, bath*) and short formulaic phrases (e.g., *oh dear!*) rapidly followed. This was followed by the production of two to three word utterances. Full sentences were used within 2 to 3 years post adoption. In some respects, aspects of S., G. and I.'s morphosyntactic development were similar to that of younger children (Brown, 1973; Peters, 1995; Pinker, 1999; Locke, 1997), in that they sometimes overregularized irregular past tense forms (*catched*) and omitted morphological inflections (*a, the*). These two patterns continued for at least four years post adoption. There continued to be a significant mismatch between S., G. and I.'s linguistic attainment as measured by standardized tests and their chronological ages.

Non-Verbal Cognition

Initial problems included distractibility, short attention spans, and difficulty with representational, spatial and visual memory ability and lack of general knowledge. School reports indicated that acceleration in intellectual development coincided with repeated exposure to educational and family contexts. For example, improvements were made in the ability to concentrate for long periods. Some problems such as difficulty with abstract reasoning tasks persisted over time. Several years post adoption, S., G. and I.'s non-verbal cognitive capacity was commensurate with their language capacity.

Social and Communicative Development

At first, S., G. and I.'s social and functional use of language involved using prosody and other non-verbal or affective devices such as, grunting, eye-gaze, pointing, and facial expressions such as smiling. Apparently, through repeated opportunities to mix with younger peers and family members, S., G. and I. learned some appropriate interaction patterns in dyadic and group settings. Gradually, social and communicative behaviour developed to the point where the girls could hold conversations with others, and could use language to achieve a variety of social and pragmatic functions, e.g. to make requests. Play capacities progressed to the point where each child could take part in quite complex pretend play or theatrical activities such as acting out imaginary scenes from a soap opera. Each child went on to develop positive relationships with significant others, despite experiencing early parental neglect. However, some residual socio-emotional problems such as a tendency towards indiscriminate friendliness and difficulty with expressing emotions appeared to persist over time.

9.3.4 The Implications

Cases of extreme deprivation like S., G. and I. suggest that 1.) global deprivation results in global developmental retardation and, 2.) if the deprived environment is replaced by a stimulating one, then rapid developmental gains can be achieved. New skills can develop with repeated exposure to the right environmental input. Initial developmental retardation caused by severe early neglect is not irreversible. The way that S., G. and I.'s physical and psychological growth accelerated soon (or relatively soon) after adoption substantiates this. However, what did an investigation of these issues using other methodologies reveal?

9.4 Examining the Effects of Extreme Deprivation Using Other Methodologies

Chapter 3 provided a retrospective account of S., G. and I.'s development until the point they took part in the present study. Subsequent chapters then turned their

attention to the first-hand data collected by the researcher. The thesis divided research question 1 into separate areas, each of which was addressed in turn by Chapters 4, 5, 6, and 8. Chapter 4 dealt with social and communicative behaviour, chapters 5 and 8 with language development and chapter 6 with non-verbal cognitive development. The information that the differing methodologies contributed to the thesis and each chapter's answer to the separate strands of the research question are described in the following sections.

9.4.1 Extreme Deprivation and the Development of Social and Communicative Behaviour

I The Question

What are the effects of extreme global deprivation during infancy and the early childhood years on social and communicative development?

II The Method: Qualitative Observation Techniques

Chapter 4, described S., G. and I.'s social and communicative behaviour as reflected in naturalistic conversation which was filmed and observed during a two-year period. This was in order to find out if global deprivation had a serious impacted on social development. One of the study's aims was to describe the Romanian adoptees' strategies for relating to others in real world situations as opposed to artificial task settings. A method that allowed for this was unstructured qualitative observation of verbal and non-verbal behaviour during familiar routines and with a variety or people. The strength of observation as a technique is that it involves watching people behave, rather than inferring what they have done from, say, their responses to tests or questionnaires.

Since the children were filmed in naturalistic and not contrived settings, their responses were considered to be representative of the times when the researcher was absent. In other words, observing events in the place where they would normally happen had more ecological validity than studying social and communicative behaviour in the confines of a laboratory (Buchanan, Anand, Joffe & Thomas, 2002). As S., G. or I. was each observed for around 15 hours (45 in total), this meant that a

comprehensive and accurate profile of the girls' spontaneous conversational abilities could be put together.

Capturing S., G. and I.'s dialogue on audio and videotape was only the first stage in the research process. The second stage was to analyse the many hours of behavioural data that the conversational (audio and video) tapes yielded. This involved an inductive approach, in that there was no attempt to fit observed behaviours to the predictions of pre-formulated theories. This meant that the data could be qualitatively studied in a theory-neutral way, in order to find recurrent patterns or themes. Particular taxonomies borrowed from Conversation Analysis were then used, only after many incidences of a certain type of behaviour were observed.

III The Results

As Chapter 4 revealed, by the start of data collection (and when they were approaching or going through adolescence), S., G. and I. each had developed normal conversational skills. This is in contrast to their lack of awareness of play, conversational and many other (social) routines when first adopted (see Chapter 3). Generally, there was nothing unusual about turn taking; the girls did not persistently interrupt, they could initiate new conversational topics or continue with ones introduced by another speaker, ask and answer questions, express opinions such as likes and dislikes and relay brief anecdotes or describe, for example, their experiences at school. S., G. and I. could use language for countless other social and functional uses such as to make requests, give invitations or to make jokes. They could also repair conversational breakdowns when these occurred. Non-verbal gestures, such as eye-gaze, prosody, facial expression, and hand movements were also used effectively to accentuate speech. Furthermore, their conversational style depended on the context and conversational partner. S., G. and I's social and communicative behaviour (both verbal and nonverbal) changed in subtle ways when they were with siblings, peers or certain adults. This suggested that each child, rather than having a rigid conversational style, could adapt herself to changes in the person or setting. Generally, S., G. and I.'s social and communicative behaviours as reflected in conversation were not like those of children with disorders from the autistic continuum. Furthermore, the girls' profiles

were not comparable to the "quasi-autistic patterns" noted for other previously institutionalised children (Rutter et al., 1999; Rutter, Kreppner and O'Connor, 2001).

IV The Implications

Following on from Chapter 3, Chapter 4 concluded that initially, extreme deprivation severely delays the development of social and communicative behaviour (as reflected in conversation). If the child stays in the deprived environment, then the development of particular shared routines, knowledge or practices may be severely retarded. For example, intersubjective awareness and turn taking skills may be impacted. However, once there is a beneficial change to the environment, conversational awareness and ability can develop to a sophisticated and adult-like level of competence. Thus the effects of early global deprivation on social development are neither permanent nor irreversible. S., G. and I.'s cases suggest considerable plasticity in the ability of humans to recover from early adversity and develop appropriate social and communicative behaviour. It is important to note also, that socially deprived children like S., G. and I. can go on to develop appropriate interaction patterns in later life, even when denied the opportunity to form a selective attachment to a primary caregiver in early life. Early parental deprivation does not preclude the learning of effective conversational routines later on. This questions the deterministic idea – central particularly to psychodynamic thinking – that 1.) very early childhood is a critical time for the formation of social behaviours and 2.) that attachments must be formed first of all to a parent if "normal social relationships are to be possible later" (Bowlby, 1969, 189).

9.4.2 Extreme Deprivation and the Development of Language

I The Question

What are the effects of extreme global deprivation during infancy and the early childhood years on language development?

During the study, two methodologies (quantitative and qualitative) were applied in order to address this question. This involved the use of standardized tests - primarily

quantitative - reported in Chapter 5 and description of aspects of naturalistic spoken language - primarily qualitative – outlined in Chapter 8.

II Method 1: Standardized Tests

Moving away from conversational skills and the functional use of language, Chapter 5 focussed on S., G. and I.'s structural use of language as measured by standardized tests. During a two-year period, S. (aged 11.3 to 13.2), G. (aged 13.1 to 14.10.) and I. (aged 10.8 to 12.7) were tested on a variety of receptive and expressive language measures that assess lexical-semantic, morpho-syntactic, narrative, reading and verbal memory ability. The aim was *not* to study naturally occurring linguistic phenomena (as the previous chapter did, but looking at language function), but to reduce language to a set of variables for comparison with the wider population. Standardized tests provided a means of comparing S., G. and I.'s level of ability with the average of their chronological age groups. In other words, the Romanian adoptees' tests scores could be statistically contrasted with those of children without histories of extreme neglect. Why was this important? It was considered necessary to establish if S., G. and I.'s structural language ability – as measured by the tests - was equivalent or significantly retarded for their chronological ages. S., G. and I.'s test responses were also qualitatively compared to those of younger controls aged between 3.6. and 7.1 years. This was in order to see if S., G. and I.'s errors were typical or deviant of younger children. This procedure is in contrast to chapter 4 which attempted to describe observable abilities, rather than to compare these with controls or the general population.

III The Results

As Chapter 5, showed, S., G. and I. did extremely poorly on a battery of standardized language tests. They did not obtain the equivalent of their chronological ages on any of the measures administered. On some measures, the children obtained scores that were two to three years behind their chronological ages, whereas other tests indicated that the children were functioning at levels that were around half their chronological ages. Percentile ranks were <10 and the distance from the mean of some of the measures was as much as –3SDs. Scores only slightly improved after a year. On the basis of such results, the girls would be described (both in clinical and educational

terms) as having general language learning difficulties or global language learning delays relative to chronological age. Chapter 5 considered whether this was due to linguistic immaturity or innate learning disorders. The former alternative was considered to be the more likely possibility. There were two reasons for this: 1.) S., G. and I.'s pattern of errors on the tests were qualitatively similar to those of younger control children and 2.) the girls acquired new skills fairly rapidly soon after adoption and such accelerated progress is not normally apparent in socially deprived children with suspected genetic or developmental disorders as Skuse (1984a) shows. Chapter 5, therefore, concluded that the (long-term) effect of extreme early deprivation on language development, according to standardized tests, is a global delay by late childhood with a mis-match between level of attainment and chronological age that continues for several years post-adoption. However, it could be argued that performance on standardized tests gives a misleading picture of language development per se.

IV The Implications

Standardized tests gave a very bleak indication of S., G. and I.'s linguistic capacity. CELF-3, for example, suggested that at the respective ages of 13.2, 14.10. and 12.7, their language development was at the 5 year-old level. However, the issue here, is what do standardized language tests actually assess? CELF-3 like most of the other tests administered to S., G. and I. are used to measure the formal structure of language, its content and form. They do not capture functional language. Thus, Semel, Wiig, and Secord, (1995, p.1) state:

> "CELF-3 was designed to identify individuals…who lack the basic foundations of content and form that characterize mature language use: word meanings (semantics), word and sentence structure (morphology and syntax), as well as the recall and retrieval of spoken language (memory)."

As Chapter 4, indicated, S., G. and I. did not appear to have an obvious problem with the functional use of language in any aspect of conversation. In contrast, the standardized test results presented in Chapter 5 indicated that the Romanian adoptees had a structural language 'deficit', that is, on the surface they appeared to have difficulty with the structure not the function of language. The point is that in clinical

settings, an opinion of the individual's overall level of language ability should not be based solely on standardized tests of linguistic structure. This is because important observations of communicative and functional capacity may be omitted. This view is espoused by Semel, Wiig, and Secord, (1995, p.3) who suggest:

> "It is important to remember that, for an overall evaluation of a student's language ability, the results of CELF-3 should be complemented by administration of other formal and informal measures, such as…behavioural observations and evaluations of pragmatic and interpersonal communication abilities."

It should be acknowledged that heavy work loads, lack of resources, and time constraints, sometimes mean that there is little choice but to rely on one measure – usually a test of structure – for a general assessment of an individual's language (and communicative) capacity. This was, in fact, evident in the case of S., whose annual assessment (by a speech and language therapist) for a period of three years consisted of a single measure, the Action Picture Test. The thesis merely cautions that researchers (and clinicians) should be open to the idea that an individual's 'identified' weaknesses may be at the expense of unidentified strengths.

V Method 2: Descriptive Analyses of Spontaneous Speech

Standardized test results (in Chapter 5) implied that S., G. and I.'s structural language ability was severely retarded or impaired for their chronological ages. In particular, performances on measures of expressive grammar reinforced this impression. Reliance on standardized test results alone might lead one to conclude that one of the effects of extreme deprivation on language development is that grammatical ability is impaired. Is this a realistic assumption? A completely different picture may emerge when one impartially observes the structure of spontaneous spoken language. This was the subject of Chapter 8.

S., G. and I.'s free speech in naturalistic contexts was recorded and transcribed during a two-year period (June 1998 to May 2000). The girls were respectively aged 11.3, 13.1 and 10.8 at the start of data collection and 13.2, 14.10. and 12.7 at its end. Many hours of speech transcripts were qualitatively examined with the emphasis on describing the linguistic structures already present in S, G. and I.'s spontaneous,

conversational speech. The primary aim was to establish the level of grammatical sophistication that was evident. One or two quantitative measures were applied (e.g., mean length of utterance), and then detailed qualitative comparisons were made between the Romanian adoptees' naturalistic speech data and that of children without histories of extreme neglect (obtained from the normative literature). Importantly, this was in order to establish whether S., G. and I. used structures that are considered to be signs of linguistic growth in first language acquisition. It was the combination of qualitative observation and descriptive linguistic procedures (e.g., grammatical parsing) that revealed the important information about S., G. and I.'s language development that the standardized tests missed out.

VI The Results

Qualitative examination of S., G. and I.'s spontaneous speech showed this to be remarkably sophisticated considering the extent of their previous linguistic deprivation and the level of linguistic attainment at adoption. Examination of S., G. and I.'s use of syntactic structures revealed hierarchical complexity at both the clause and phrase level. S., G. and I. used complex sentence types (coordinated and embedded) that routinely appear in the speech of children aged 2 to 6.11 years (Paul, 1981). But they also often used sentence or clause types that are characteristic of syntactic growth in the 9 to 19-age range (Scott, 1988).

The syntactic complexity of S., G. and I.'s spoken language was already evident at the start of the study. Indicators of syntactic growth in later childhood (Scott, 1988) such as noun phrase postmodification via appositive structures, non-finite verb clauses, and low frequency subordinators were present. This suggests that a significant amount of grammatical development had already taken place prior to the commencement of data collection and since S., G. and I. entered their respective adoptive homes. There were also subtle indications that language growth was still taking place during the study and while the girls were going through puberty. At least for S., non-finite adverbial clauses occurred more often in the data corresponding to later visits than earlier ones. All three girls used, at least once, some of the less common adverbial clause types (e.g. *although, even if, since*), whose presence according to Scott (1988) is considered to mark the growth of language during the late childhood and teenage years.

Also the occurrence of conjunctive adverbs (Semel, Wiig, and Secord, 1995) or adverbial conjuncts[2] (Scott, (1988), such as *though*, *anyway*, *then* and *so*, that, in S., G. and I.'s spontaneous spoken language (e.g., "I can't remember how to play *anyway*." S., aged 12.1) appeared to steadily increase in frequency towards the end of the study. Such growth has been reported for normally developing children up to the age of 12 years and beyond (Scott, 1988). In this light, S., G. and I. were still developing language during puberty.

Therefore, based on the specific research evidence, Chapter 8 concluded that if extreme deprivation during the usual early language learning years is curtailed between the ages of 4 and 7 and a half years (the age range during which S., G. and I. were adopted), spontaneous spoken language can develop to a very advanced and grammatically sophisticated level. S.'s case, in particular, indicates that a first language can be successfully acquired even at the age of 7 years.

VII The Implications

To some, the most important aspects of grammatical capacity (e.g., rule learning) develop within the first 4 years of the child's life (Pinker, 1999; Stromswold, 1998). By the age of five, children are considered to have 'mastered' the sentence structure of their language (Rees 1974, cited by Scott, 1988; Paul, 1987). These assumptions create the impression that the development of the grammar of a first language is complete by age 5 years. This has implications for the attitude one adopts to the language development of socially deprived children. The temptation might be to assume that such children can recover language very quickly once they are 'immersed' in a linguistically stimulating environment. After all, doesn't language acquisition unfold very quickly in normal children? In particular, evidence of accelerated progress, or 'catch-up' after adoption adds to this impression. Parents who already have high expectations of their child's language potential, may assume, that he or she can 'bounce back' once entering the adoptive home (Parent Network for the

[2] Although these serve no formal grammatical purpose (as prescriptive grammarians would maintain), they appear to function as ways of joining pieces of information together (Crystal, 1997).

Post-Institutionalised Child). Some health care professionals, and educators may also be lulled into thinking that age appropriate linguistic skill should be reached very quickly. This could explain why considerable pressure is placed on these children to meet unrealistic curriculum targets.[3] It may also account for why lack of age equivalent scores on standardized tests might be interpreted as meaning that the child is 'not doing so well'.

According to Karmiloff-Smith (1979), Crystal (1997), Scott, (1988) and Paul (1987), grammatical elaboration continues beyond the age of 5 years, throughout the childhood and teenage years. In this sense, grammatical development in normally developing children is relatively incomplete by 5 years of age. More complex syntactic constructions are gradually learned over many years. MacDonald (1997), for example, suggests that,

> "while children may be able to use function words early on to help figure out language structure, specialized processing of function words is not present from birth. Rather, it develops with time, not reaching adult levels until the teenage years"(p.221).

If it is realistic to posit that typical language, or more specifically grammar, continues to grow in complexity until at least the age of 12 years, then this observation should be generalizable to children who acquire a first language later than usual. In S., G. and I.'s cases, grammar did not begin to emerge until two to three years post adoption. S., for example, was aged between 9 and 10 years at this stage. If it is reasonable to assume that the first language development of socially deprived children follows the same time course as that of typically developing children, then S.'s grammatical skills should continue to grow well into her mid teens, if not beyond. In fact, this was supported by Chapter 8 which indicated to some degree that all three girls were in the process of learning "more advanced grammatical constructions" (Crystal, 1997). First language acquisition in socially deprived children may take years to develop as it does in typically developing children. Thus, allowances should be made for this in educational and clinical settings. Intervention programs should take advantage of the

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[3] This might also clarify why some children with apparently retarded language abilities receive limited help in British mainstream schools, or are placed in classes appropriate for their chronological ages rather than developmental level. These occurrences were evident in S. and I.'s cases; S. received very limited assessment and lack of intervention in I.'s case resulted in her parents instigating court proceedings against the Local Education Authority.

cumulative progress made in language development and should avoid unrealistic expectations which place pressure on the child to 'go through' the stages of language before he or she is ready.

9.4.3 Extreme Deprivation and the Development of Non-Verbal Cognition

I The Question

What are the effects of extreme global deprivation during infancy and the early childhood years on non-verbal cognitive development?

II The Method: Psychometric Tests

In a similar vein to Chapter 5, Chapter 6 explored S., G. and I.'s non-verbal cognitive potential using the results of psychological tests. These tests were used so that the girls' level of nonverbal cognition could be compared firstly with their level of language and secondly with the average from the population. Visuo-spatial skill (part to whole awareness), perceptual awareness and drawing ability were examined. It was considered important to find out if early deprivation has an impact on non-verbal cognitive and reasoning ability. If there was also a delay in non-verbal cognition, then language was not specifically impaired. In this context, psychometric tests as a method had a distinct advantage over very time consuming qualitative observation techniques (of the type used in Chapter 4 and Chapter 8) because they were relatively quick to administer. In addition, S., G. and I.'s test performances were qualitatively compared with those of younger controls and children with genetic disorders such as Williams Syndrome in order to further explore whether the Romanian adoptees' performances were delayed or disordered.

III The Results

S., G. and I.'s poor test scores appeared to suggest that non-verbal cognitive ability, like language, was generally delayed. They did not obtain age appropriate scores on any of the measures administered. S., G. and I.'s test performances indicated that they were functioning at levels that were around half their chronological ages. This

suggests that their ability to perform adequately on standardized non-verbal cognitive tasks was just as retarded as their ability to perform successfully on linguistic ones. In clinical terms, S., G. and I. would not be labelled as having a specific impairment with language. They would be described as having general learning difficulties. Qualitative comparisons suggested that S., G. and I.'s test performances were more like those of younger typically developing children rather than those of children with genetic anomalies such as Williams Syndrome. This further indicated that S., G. and I.'s non-verbal cognitive development was delayed and not disordered for their chronological ages. Chapter 6 concluded that the effect that extreme global deprivation during early childhood has on non-verbal cognition is to delay its developmental trajectory (relative to chronological age) and to a similar degree as language.

IV The Implications

There are two issues arising from S., G. and I.'s poor test scores. Firstly, if their non-verbal cognitive development had been assessed another way, other than by formal testing, a different profile might have emerged. For example their reactions to specific stimuli in real-world situations could have been observed in more detail. Thus it is recognized that standardized tests have their limitations and should not be used in isolation; the results one obtains on these measures may not be representative of the child subject's true developmental potential. Secondly, it could be argued that S., G. and I. may have had general learning difficulties regardless of the deprivation that would account for their poor test scores. It is difficult to answer this unequivocally without the benefit of material data such as MRI scans, or exact details of the child's genetic profile, birth or family history. It is sufficient to say that S., G. and I. may or may not have limited potential compared to children without histories of neglect. However, as Chapters 3 and 5 argued, this is not consistent with the rapid developmental gains they made soon after adoption (Skuse, 1984b). Thus, the effects of deprivation rather than innate or genetic learning difficulties appear to better account for the Romanian adoptees' non-verbal and verbal delays. Nevertheless, this suggestion is made with caution. This is because it is unclear as to how far children with genetic disorders such as Williams Syndrome for example would have

progressed if they, too, had experienced early extreme deprivation. The rate of catch-up might have been comparable to that of the Romanian adoptees. However, a way of addressing this issue in the future, might involve a study of children with innate learning difficulties who had experienced early severe neglect.

9.4.4 Conclusion: The Effects of Extreme Deprivation

Collectively, the individual conclusions of Chapters 3, 4, 5, 6 and 8 suggest that the effects of extreme deprivation are that social, linguistic and non-verbal cognitive development are delayed but proceed along a path and at a rate which is very similar to normal development. What these chapters also make clear is the advantage of using a range of methodologies when investigating the abilities of exceptional children. It is preferable to form of an opinion of a socially deprived child's overall potential based on the results of a variety of methods rather than just one.

9.5 Critical Period for Language

9.5.1 The Question

The second research question that the thesis tried to address was:

> *Does the linguistic development of such children constitute evidence for the existence of a critical period for language?*

It is Chapter 7 that attempted to investigate this area. One of the aims of the present study was to test the predictions of one detailed model of the language critical period, that incorporated in developmental neurolinguistic theory (Locke, 1994, 1997) described in detail in 1.7.1, Chapter 1. The development of previously institutionalised Romanian children represents a natural test of this hypothesis because they were linguistically deprived during the early language learning years.

9.5.2 The Method: Descriptive Analyses of Naturalistic Speech

The primary method used to try and answer the above question, involved descriptive analyses of spontaneous speech in naturalistic contexts, the results of which were reported in Chapter 7. But the qualitative examinations of retrospective reports and parent interview transcripts (Chapter 3) and standardized tests responses (Chapter 5) also helped in addressing the question. Using the various sources of data – but, primarily recordings of naturalistic speech - the following section will attempt to clarify some issues concerning the neurolinguistic concept of a critical period for language. Firstly, for convenience, the reader is briefly reminded of this.

9.5.3 Neurolinguistic Concept of the Critical Period

According to developmental neurolinguistic theory, a critical period concept for language involves the one-off activation of specialised linguistic resources in the left hemisphere of the brain, during early childhood. More specifically, during the third phase ("analysis and computation") of language acquisition, between 20 - 35 months of age, an innate grammatical analysis module, or GAM, is 'switched-on' in response to two factors:

1.) the physical maturation of the brain
2.) the build-up provided by an adequate store of words and 'formulaic phrases' acquired during the second phase, 'utterance acquisition' of neurolinguistic development (Locke, 1995).

The GAM when activated is responsible for specialised "analytical and computational" ability (Locke, 1997) that helps the child perceive and use grammatical rules. Creative errors such as "drawed", "mans", and "gooder" are considered to be the most obvious sign that a grammatical analysis system is at work. What is important to the proceeding discussion is that the GAM's activation (in the left hemisphere) is timed in early childhood and is considered to occur "only once in the lifetime of an individual." (Locke, 1997, p.304).

However, evidence of overregularizations occurring at a later age in the naturalistic spontaneous speech of children who were linguistically deprived in early childhood, should, in part, falsify the timing of the neurolinguistic critical period model.

9.5.4 The Results: Falsification of the Timing of the Neurolinguistic Critical Period

Chapter 7 presented behavioural data that is inconsistent with Locke's (1997) theory of a critical period for grammar. In summary, the type of creative 'errors' or overregularizations that supposedly signify the activation of a specialised grammar module during the neurolinguistic critical period between 20 and 36 months were noted, in the present study, for S., G. and I. The key point is that the girls were much older children who were linguistically deprived during the normal early language learning years. These overregularization patterns – considered by Locke (1997), to be expressions of innate analytical computational ability - could only have been due to post-adoptive experience, since the girls did not have access to linguistic stimuli before adoption. This indicates that the events that precede the onset of the grammar critical period in early life also occur in later childhood and appear to be primarily influenced by environmental factors rather than biological ones.

9.5.5 The Expression of Analytical-Computational Ability in Adolescent Children With Histories of Extreme Linguistic Neglect

The following sections present a more detailed argument as to why the behavioural data of Chapter 7 (and possibly Chapter 3) constitutes evidence against the existence of a critical period for grammar.

I Overregularizations During Early Language Development

S., G. and I. entered their adoptive homes with no knowledge of the morphological system of any language, including either English or Romanian. Their expressive and receptive lexicons were either non-existent or extremely limited.[4] However, overregularizations were noted to occur in S. and G.'s, speech 2 to 3 years after they

[4] This can be contrasted with typically developing children who by the age of two years may have up to 300 words in their expressive vocabulary with a receptive lexicon that may run to several thousand words (Locke, 1997).

were adopted.[5] For example, S., aged 9.8 said "catched" in a testing situation with a speech and language therapist and at the age of 10.2, she said "drived" while filmed by her adoptive mother. A report for G. when she was 10 years old, noted that: "Immature past tense forms and plural endings tend to pull down her grammar score." This implies that G. was overapplying inflectional endings to irregular forms. S. and G.'s early overregularizations are significant because according to neurolinguistic theory they are an expression of innate computational ability. Like normally developing 2 to 3 year-olds, the Romanian adoptees in late childhood showed that they were able to perceive regularities in the spoken language they heard.

II Overregularizations During Study

As Chapter 7 described, S., G. and I. continued to overregularize during the present longitudinal research (and while approaching or going through adolescence). They used forms such as "childs", "mouses", "fighted", "thinked", "gooder" and [du:z] in spontaneous conversational speech and in response to standardized and elicitation tasks.

The type and frequency of S., G. and I.'s overregularizations appeared to be the result of a systematic tendency to over-apply acquired linguistic rules to any forms that are exceptions to these rules. This implies a linguistic creativity, whereby often heard, commonly occurring - or other wise known as "regular" patterns were applied to idiosyncratic - other wise known as "irregular" forms and mirrors the systematicity reported for younger children from the age of 2 years (Pinker, 1999; Locke, 1997; Marcus et al., 1992). This could only have been due to post adoption linguistic experience.

III The 'Grammatical Analysis Mechanism' Can Be Activated in Late Childhood

The fact that children such as S., G. and I. can be linguistically deprived during the first 4 years of life (and beyond), be exposed to language at atypically late ages and

[5] No specific reference is made in any of I.'s early developmental reports to the production of

still make overregularization errors similar to younger children between the ages of 2 and 3 years, is, thus, directly relevant to the timing of the neurolinguistic critical period. It appears, that the events that lead to the activation between 20-36 months of a specialised grammatical analyizer or GAM, are possible at a later age. If the GAM controls "analytical and computational" ability (Locke, 1997), then the present data suggest that, it is not critical for this capacity to develop in early childhood. It can develop certainly as late as 9 or 10 years of age, in response to a specific set of environmental circumstances.

This seriously questions the neurolinguistic critical period concept (Locke, 1994, 1997) and the view held by others (e.g., Pinker, 1999; Stromswold, 1995; Lenneberg, 1964; Chomsky 1959), that certain linguistic abilities, such as awareness of the past tense rule, are genetically coded to be acquired during early childhood rather than later and develop "on a schedule not timed by environmental input." (Pinker, 1991, p.48.). Therefore, the implication of this, is that the "innate learning mechanisms" (Stromswold, 1995) that allow for the acquisition of grammatical rules in early childhood are also operative at puberty and slightly beyond. The fact that S., G. and I were able to generalize a regular rule to irregular forms at such atypically late ages, demonstrates considerable plasticity in the brain's ability to acquire a linguistic rule during first language acquisition.

IV Was the Close of the Critical Period Delayed?

The suggestion might be made that, as S., G. and I. were denied normal levels of linguistic input during early childhood, coupled with the fact that they were also nutritionally and psychologically deprived, this may have been enough to delay the point at which normal language mechanisms typically start to develop. Thus the offset of the critical or sensitive period for the successful acquisition of grammatical rules could be described as extending later than age four, possibly as far as puberty and even beyond. An analogous situation can be found for the development of sensory systems in animals. For example, as regards visual development in animals, deprivation of any visual experience (by dark-rearing or eyelid closure) can delay the

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overregularization errors.

offset of the sensitive period for visual experience with regard to development of binocular vision (Greenough, personal communication, 2001).

The issue as regards language would be whether the lack of exposure to any spoken language (in combination with an absence of nutrition and social stimulation) delayed the close of the critical period for those skills that are normally highly age-dependent, such as the development of grammatical awareness, according to developmental neurolinguistic theory. If this were possible then it might be hypothesized that the reason why S., G. and I. developed grammatically at all (despite early years of neglect) after adoption, is they were still within the critical period for the development of this ability. However, what age marks the close of this extended critical period? This is difficult to answer because the question is quite an arbitrary one. Although onset of puberty is a maturationally timed event, S., G., and I. were making the types of morphological errors that are not predicted to consistently occur at this age (if one were to use nativist theories). This makes the likelihood that sexual maturity *is* a biological timed event but successful acquisition of grammatical rules *not*, more plausible. If this hypothesis (i.e. that the development of grammatical rules, such as the past tense formation is *not* subject to time constraints) is correct, then looking for the ideal age that would qualify for the offset of an extended critical period becomes an arbitrary pursuit. This is because the plasticity that allows for the successful emergence of analytical-computational ability during puberty may also continue beyond puberty and even throughout life.

Finally, the assumption that S., G. and I.'s overregularizations in a first language were controlled predominantly by the left hemisphere should be treated with some caution. This is because there is no definitive anatomical (i.e. brain imaging) data to support this. The behavioural data is left to stand alone. However, what can be stated unequivocally, and what the present data suggest (at least as regards spontaneous overregularization) is that a child can be deprived of virtually all linguistic – and therefore morphological - experience at least until the age of four and still retain the ability to be able to perceive morphological regularities, when exposed to language at a much later than usual time in the life cycle. This demonstrates considerable behavioural plasticity in the sense that novel morphological forms (i.e.

overregularizations) can be produced in response to relevant stimuli, even after prolonged lack of exposure to such forms.

The above conclusion, however, needs to be tempered in recognition of the possibility – as some may argue - that S., G. and I. *could* have engaged in sufficient linguistic and social interaction for language to develop despite early childhoods that were most probably socially deprived. Given the nature of the life circumstances of the children, it is not certain that their social and linguistic environments were continuously and uniformly impoverished to the extent described in Chapter 3. Also based on her observations of some Romanian care institutions (while working with a charity, Musika), Ralph (1994) describes a subset of children in each orphanage who had not only survived but also showed remarkable resilience in the face of appalling degradation and neglect. Ralph states the following,

> "Although, on our first encounter they had no sense of identity or grasp of language, they responded rapidly and with relative ease to the variety of activities we presented to them. These children speedily acquired language from our interpreters such was their desire to learn and participate. Staff suggested that the "immunity" of some children to psychological disorders was due to special environmental circumstances created by, for example, "the child's attractiveness or personal appeal to one or more institutional workers" (cf Prosser, 1962)" (p.42).

The above appears to describe G. and most probably S. at the time of their adoption. According to available documentary evidence, both children were curious and receptive to social attention from others demonstrating a noticeable capacity to learn. For example, G., aged nearly 4 years, responded rapidly to repeated individual attention from Western Aid workers and could say her name and several other single words – as the video evidence clearly shows. S., at the age of 7;5 years apparently learned the word "look" within the first few hours of being with her adoptive family. It might be assumed, then, that S. and G. were similar to the subset of orphanage children described by Ralph (1994, p. 42) in having some resilience and "immunity" against the devastating effects of early extreme deprivation.

It is possible that the same characteristics that singled the girls out for attention from their prospective adoptive parents also attracted the individual perusal of one or two Romanian care workers. In this light, it cannot be said with any guarantee that S., G.

or I were *never* spoken to during their time in the institutions. It may be the case, then, that the amount of spoken conversation to which one or more of the girls were exposed has been underestimated. It is this observation, some would argue, that suggests the extent of the social neglect that the girls experienced rests on supposition. For these reasons, it should be acknowledged, even if it seems most unlikely, that the girls' linguistic development after adoption may have been conditioned and prepared by linguistic input to which they were exposed in early childhood. However, as discussed in Chapter 3, there is good evidence to think that these interactions were very few in number and extremely limited in scope and quality. Indeed, the available evidence suggests that interactions were limited to the management of rudimentary bodily functions and that, in particular, virtually no normal linguistic interaction took place at all.

Some researchers suggest that it is not possible in principle (cf Bishop and Mogford, 1993) to properly define or exactly quantify the linguistic input necessary for normal language development – although according to some scholars, 'normal' language development can be quantified and defined. Locke's (1997), developmental neurolinguistic theory, for example, states that by the age of two years, a child must have a receptive lexicon of around several thousand words and an expressive vocabulary of up to 300 words in order for 'species typical' language/grammatical development to emerge. As such the implication is that the child would need to have been exposed to myriad linguistic utterances (formulas, words, sentence strings) in a stimulating and/or social environment characterized by the recurrent attention of significant others. This scenario, in fact, describes the early social milieu of many Western European children, who even in poorer or economically deprived areas would have access to minimal amounts of social care and attention. In this sense, then, it is possible to quantify and define the linguistic input necessary for 'typical' language development as a product that is all encompassing and continuous.

However, one question that is of relevance, here, is whether the environmental conditions necessary for language are different from those necessary for grammar. The term "language" might be considered to incorporate a variety of communicative abilities ranging from auditory short-term memory to the perception of non-verbal cues (Crystal, 1997), whereas "grammar" in this instance refers, specifically, to

syntax and morphology (Locke, 1997). It should be reiterated that according to developmental neurolinguistic theory, it is the development of grammar that is likely to be compromised by lack of environmental opportunity. Consider now the (English and Romanian) language/grammar abilities of S., G. and I. shortly before adoption.

The early video data for G. clearly shows her interacting with Romanian Aid volunteers in the orphanage where she resided. The conditions of extraordinary global neglect that she must have experienced are clearly depicted. At this time, she could say about five words. These had been taught to her by the charity workers whom she had known only for a few days. Admittedly, then, G. knew a handful of single words at the age of nearly four. In this sense some language production could be said to have developed. However, even if G. could produce five words by the age of 4 years, this is still not indicative of 'normal' (or 'species typical') grammatical development according to Locke (1997). It is possible that G. knew more than she could say, although it is extremely unlikely that she had a receptive vocabulary comprising several thousand words – as developmental neurolinguistic theory suggests should be the case. In this respect, as both G.'s receptive and expressive lexicon were extremely limited, she could *not* have received enough social or linguistic interaction for grammatical development to have taken place. If she had, she would have been talking rather more than she was actually observed to.

I.'s video data shows her, aged nearly 4 years, in a range of settings in and out of the orphanage. During these (sometimes quite lengthy) scenes, I. does not speak any words or produce any vocalizations except for a dry, tearless wail and the occasional giggle. Also during interpersonal exchanges, several communicative devices are in evidence including shared eye-gaze and facial expression. According to these criteria, I. displayed non-verbal aspects of language. However, she appeared to be preverbal, since her productive lexicon was absent. This makes it increasingly unlikely that, at that stage, she understood enough words (either English or Romanian) for grammar (i.e. syntax and morphology), to emerge typically, that is, within Locke's (1997) framework of linguistic development. As neurolinguistic theory suggests that a child needs to have been exposed to enough linguistic material in order for her to produce up to 300 words and comprehend around several thousand, I.'s interpersonal stimulation must have fallen far short of this. In other words, if one works backwards,

I.'s lack of productive (and most probably receptive) language must mean that she was continuously and severely socially deprived.

Perhaps S.'s case involves the most inference since there is no video evidence of her early orphanage life. Also her adoptive parents were not allowed much access to the institution from where she was adopted. However, the documentary evidence paints a very convincing picture of extremely limited language use (in either English or Romanian) or at the age of 7;5 years. Even if S. was at the single word stage, she did not display the grammatical skills that one would expect of children in her chronological age group who had not experienced extreme neglect. According to neurolinguistic theory, the impoverished production of speech during middle childhood is not suggestive of 'normal' or 'species typical' grammatical development. Thus, S., in the same way as, G. and I. could not have been exposed to sufficient linguistic and social stimuli that Locke (1997) suggests is so imperative for grammatical development to occur.

It is acknowledged that S., G. and I. may each have received sufficient social input for language in *general* terms (i.e. non-verbal communication, single words, the occasional phrase) to emerge. However, if one looks specifically at grammar, the perception and expression of morphology and syntax, it is less probable that S., G. and I. received enough input in either Romanian or English for this ability to emerge – not if developmental neurolinguistic criteria are used. It remains feasible, although unlikely, that each of the girls knew several thousand words but produced only a handful. This means that the level of S., G. and I.'s *comprehension* of language cannot be vouched for in any specific way. Because, of this, it is accepted that the nature and extent of the children's early social and linguistic neglect cannot be substantiated precisely. Therefore, the conclusion about the validity of the developmental neurolinguistic critical period for language/grammar must, of course, be qualified in light of this view.

9.5.6 Conclusion: Is There Evidence for the Existence of a Critical Period for Grammar?

Based on the above reasons, Chapter 7 concluded that the linguistic development of socially deprived children such as S., G. and I. does not constitute evidence for the existence of a critical period for grammar. This conclusion, however, needs to be qualified with the acknowledgement that the depth and the continuity of the social neglect that S., G. and I. experienced cannot be substantiated unequivocally.

9.6 Modularity

9.6.1 The Question

The third research question that the thesis investigated was:

> *Modularity: Are case studies such as these able to shed some light on the relationship between language and cognition? More specifically, do such cases provide evidence of dissociations between language and cognition?*

This question was explicitly addressed by Chapter 6 and less directly by Chapter 8. Again, a combination of two methodologies, tests and descriptive observation was used in this investigation. As special populations of children have often been used to sustain the modularity hypothesis (e.g., Rondal, 1995 Bellugi, et al.1993), it was considered interesting to find out if the developmental profiles of socially deprived children lent similar support to this idea. Was there a dissociation between non-verbal cognition and language in S., G. and I.'s cases?

9.6.2 The Results: Language and Non-Verbal Cognition are Linked

Psychological tests revealed that there was no dissociation between language and non-language cognition in S., G. and I.'s cases. On the contrary, evidence suggested that both of these areas were linked. In general, the girls' performances on tests of non-language cognition were just as retarded as their performances on measures of language ability. None of the abilities (e.g. perceptual awareness, visio-spatial skill and drawing) that were assessed appeared to be selectively impaired or enhanced.

In particular a close association was found between spatial cognition and expressive language ability; S., G. and I.'s scores on the Block Design test (WISC-III) and their Expressive Language Score (ELS) on the Clinical Evaluation of Language Fundamentals- Third Edition (CELF-3) were both -3 SDs from the mean of their chronological age groups. This is the converse of what is found in Williams Syndrome where a marked dissociation has reputedly been established between spatial cognition and expressive language ability (Bellugi, Marks, Bihrle, and Sabo, 1993). Thus, the findings of the present study do not support a selective sparing or impairment of non-verbal cognitive abilities when compared to language, as is reputedly found in William's Syndrome and Down's Syndrome (Bellugi and Wang, 1996). This suggests that the development of non-verbal cognitive abilities can be depressed by deprivation of experience much in the way that linguistic abilities can.

The data obtained from standardized tests regarding S., G. and I.'s non-verbal cognition do not, therefore, support the existence of a specific language module (Chomsky, 1965, 1981, 1986). Chapter 6 concluded that cases of social deprivation like S., G. and I. do not provide evidence of dissociations between language and cognition. This is if comparisons are made between standardized test results. However, if a comparison is made between the ability to perform adequately on standardized tests per se and the ability to respond in real world situations, is there a difference there?

9.6.3 Dissociation Between Standardized Test Performance and Naturalistic 'Real World' Behaviour?

Chapter 8 showed that there appeared to be a disparity or dissociation between S., G. and I.'s ability to produce language spontaneously and in response to standardized tests. Analyses of the structure of S., G. and I.'s conversational speech revealed a level of grammatical sophistication that was not evident from their scores on standardized tests of productive grammar. More specifically, on a sentence generation task, the Formulated Sentences subtest of CELF-3, S., G. and I. found it difficult to construct certain sentence types when asked to do so, yet produced these perfectly adequately in their spontaneous conversation.

Why were S., G. and I. able to produce certain types of complex sentence in their conversational speech but not in response to test item? The first interpretation that might be made is that S., G. and I.'s low scores on the Formulated Sentences task indicate impaired syntactic ability. However, this explanation becomes increasingly unsatisfactory when one considers that the Formulated Sentences subtest is more accurately an "off-line metalinguistic task", requiring conscious reflection of what a sentence 'should' sound like rather than an "on-line" task tapping automatic (or unconscious) grammatical processes per se (Karmiloff-Smith, 1999, p.559). Thus, in this light, the test measures the "explicit awareness of linguistic structures" rather than routine grammatical performance (Menn and Stoel-Gammon, 1995).[6] S., G. and I.'s poor scores on the test, then, were not necessarily indicative of "supposedly damaged syntax" (Karmiloff-Smith, 1999, p.559), but of possible gaps in metalinguistic awareness.

9.6.4 Metalinguistic Awareness

Metalinguistic awareness is defined by Menn and Stoel-Gammon (1995), as "the ability to think about language as an object" (p.349). Thus it is a non-verbal ability, which involves being able to reflect upon a particular language form and to make linguistic judgements about it. That S., G. and I.'s low scores on a test of productive grammar such as Formulated Sentences were possibly due to a lack of explicit or conscious awareness of particular linguistic structures (in this case, complex sentence types) rather than impaired syntactic ability is of importance to the present discussion. This is because, 'evidence' for a supposedly clear-cut dissociation between grammar and other developmental areas such as spatial ability or semantics, has, in the past, been based on the poor scores on grammatical tasks of various populations of subjects e.g., those with acquired brain lesions (Caramazza, Berndt and Basili, 1983) and Williams Syndrome (Bellugi, Wang, and Jernigan, 1994). However, what, at first, appears to be a grammatical impairment can turn out to be a difficulty with a non-verbal skill such as metalinguistic awareness. If this is not recognised, then mistaken assumptions can be made regarding the depth of disparity that exists between grammar and other abilities. In particular, such inaccurate contentions might arise if

[6]Alternatively, Formulated Sentences could be described as a test of language without the

one is studying the language of individuals with developmental disorders or histories of extreme neglect, since data from these groups have been used by some to lend support to the modularity argument (Karmiloff-Smith, 1999). It may be, then, that "dissociations" could arise as a function of the particular tasks that are used. Varying the measures or controlling for factors that might interfere with the skills one wants to test can limit the chance that one will see clear-cut dissociations.

If S., G. and I.'s poor scores on the Formulated Sentences measure were due to difficulties with metalinguistic awareness rather than syntax, does this mean that the former was impaired or merely underdeveloped? If one were to use developmental neurolinguistic theory (Locke, 1997), then the suggestion might be made that S., G. and I.'s metalinguistic abilities are permanently damaged. This is one of the repercussions of acquiring language after the critical period (normally between 25-36 months) for the development of sensitivity to grammar.

According to Locke, (1997), if language is acquired after this critical phase, then the metaphonological and metalinguistic abilities to distinguish sounds and syllables will remain retarded. This is because specialised analytical and computational capability has not been developed. At the syntactic level, this might be indicated by difficulty with making grammatical judgements or recognizing the grammaticality of sentences (Locke, personal communication, 1996).[7] The observation that G. and I. were generally unable to perceive the ungrammaticality of the sentences they produced in response to the Formulated Sentences subtest would appear to support this idea. However, another interpretation that might be drawn from S., G. and I's poor test scores is that their conscious awareness of language and thus particular linguistic forms was still developing (rather than impaired) at the time they were assessed. Menn and Stoel-Gammon (1995), note that in normally developing children, metalinguistic awareness:

> "develops gradually during childhood and is not fully in place until the age of eight or nine years. Young children generally tend to view language as a means of

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communicative function.

[7] According to Locke (1997), problems with metaphonological operations have also been reported for other clinical populations of children such as those with dyslexia (e.g., Pennington, et al., 1990) and lexically delayed children (e.g., Scarborough & Dobrich, 1990).

> communication with primary focus on content and use rather than the form of an utterance"(p.349-350).

They further note that,

> "Metalinguistic tasks which require an explicit awareness of linguistic structures have proven to be…difficult. In the phonological domain, assessment of conscious awareness typically centers around tasks involving segmentation of words into syllables and phonemes; success on some of these tasks is not achieved until the age of six or seven" (p.350).

Thus, as Menn and Stoel-Gammon suggest, language awareness is a skill that continues to develop throughout early and middle childhood and that does not reach a full level of competence until 8 or 9 years. Furthermore, success on tasks that require this ability – at least in the "phonological domain" is not obtained until 6 or 7 years. If the latter observation can be generalized to grammar, then it is perhaps unsurprising that S., G. and I. scored poorly on a task that requires metalinguistic awareness in the syntactic domain. In other words, if adequate performance on a task requiring phonological awareness is not achieved until 6 or 7 years, then, it is likely that success on a task requiring syntactic awareness would not be obtained until around the same age or later. It may be that the capacity to perform competently on sentence generation tasks such as Formulated Sentences increases with age and is, perhaps, obtained much later than 6 or 7 years. Thus it is possible that S., G. and I. had not yet developed the level of syntactic awareness required for successful performance on the Formulated Sentences subtest of CELF-3 at the time they were tested. Their poor test scores, therefore, indicated that their level of metalingtuistic ability had yet to develop further – as might be seen in typically developing children - rather than that it was impaired due to the adverse effects of missing the neurolinguistic critical period for the perception of grammar.

9.6.5 Conclusion: Modularity and the Relationship Between Language and Non-Language Cognition

The combined observations and findings of chapters 6 and 8 do not lend support to Chomsky's (1965; 1981; 1986) notion that language is independent of or dissociable from other areas of cognition. No evidence was found to confirm the idea that there is

an autonomous 'language' module. In addition, some tasks that supposedly show that grammar is impaired, may in reality show that metalinguistic awareness, a nonverbal skill is undeveloped. This points to very close links between language and non-language cognition.

9.7 Which Developmental Model Broadly Characterizes S., G. and I.'s Developmental Outcome?

9.7.1 Cognition Hypothesis (Empiricism) Versus Modularity (Nativism)

Now that the observations and conclusions of all of the chapters have been brought together, which developmental model, modularity or the cognition hypothesis, appears to be the most characteristic of S., G. and I.'s outcomes? The answer to this is that both positions might be interpreted as being compatible to some extent. Take, for example, the findings of Chapter 3. It was reported that up until the point of adoption, S., G. and I. displayed virtually no receptive or expressive language. To an empiricist, this might be evidence of the direct influence that the environment has in structuring or shaping behaviour, since it was lack of environmental input that seemingly led to the lack of language ability. Correspondingly, S., G. and I.'s language development unfolded fairly rapidly along with other cognitive and social skills (e.g., play, turn-taking) only after entering a stimulating environment. The sensitivity that language has to direct experience is suggested here and particularly supports the empiricist stance and its "focus on general processing efficiency and learning." (Karmiloff-Smith, 1998, p396).[8]

Conversely, that language began to emerge relatively soon after adoption (within the first several weeks or months rather than years) and the progression similar in all three girls suggests a resilience and uniformity that nativists would argue is due to some primarily genetic influence. More specifically, nativists might posit that the linguistic input that S., G. and I. received (in their adoptive homes) merely acted as a trigger for

[8] However, even the most extreme nativist would consider some exposure to language a necessary condition for language development.

the realization of an ability controlled by an innately specified language module. In this case, modularity might be said to apply.

Other chapters appear to support either one of the perspectives. Chapter 4 showed that despite early years of socio-emotional neglect, S., G. and I. each developed into quite sophisticated conversationalists. Each child also formed meaningful social relationships with others to some degree. A nativist might argue that this was due to an innate module for social cognition in human primates, that had an evolutionary advantage for the forming of social networks (Tooby and Cosmides, 1992). Alternatively, empiricists might argue that the development of S., G. and I.'s social and communicative skills was largely shaped by the external social world and the repeated opportunities for interaction that this afforded. Chapters 5 and 6 showed that according to standardized tests, there was no dissociation between language and non-language cognition, but that they were linked. This backed up the cognition hypothesis, thereby lending no support to the idea that there is an innate and autonomous language module of the type proposed by Fodor (1983). Chapter 7 questioned the timing of the period during which a grammar module is considered to operate (Locke, 1997), thus raising doubt about the existence of such a mechanism. However, in Chapter 8, there was an indication of a disparity or dissociation between behavioural responses in structured test situations and in unstructured real world contexts. More specifically, S.,G. and I. found it difficult to perform competently on a standardized test of language structure, but during naturalistic, familiar routines, they produced structurally sophisticated speech effortlessly. It could be argued that such dissociation supports modularity in some form.

That the research findings can be interpreted as supporting both the modularity approach and cognition hypothesis to some degree was pointed out because this reflects the generally atheoretical ethos of the study. The two positions – opposite ends of a theoretical spectrum – are, however, not the only alternatives. There is another perspective, neuroconstructivism, which may, in principle, more accurately fit with S., G. and I.'s developmental paths.

9.7.2 Neuroconstructivism

An approach which appears to draw the influences of nature and nurture together is that of neuroconstructivism which suggests that specialized abilities may be acquired via the developmental process rather than be present at birth. In this respect, genes and the environment have a reciprocal relationship: both continually interact, affecting each other. Neither operates in isolation. This idea has been put forward by Karmiloff-Smith (1999), who suggests that specific skills are formed as a function of "gradual specialization" rather than "prespecification" (p.559). She states:

> "While there may be prespecification at the cellular level, this does not seem to hold for synaptogenesis at the cortical level. Specialized circuitry, i.e., the rich network of connections between cells, appears to develop as a function of experience, which challenges the notion of prespecified modules" (p.559)

Although the adult brain may appear to house various "modular-like structures" (p. 559), these do not have to be inborn or genetically determined as Fodorians maintain. It could be that the kind of specialized and relatively independent abilities of the adult are the result of a long and steady developmental process involving the complex interaction of genes with the environment, rather than the precondition for development. As Karmiloff-Smith (1999) suggests;

> "A different way to conceive of modularity might, therefore, be to adopt a truly developmental perspective and acknowledge that the structure of minds could emerge from dynamically developing brains, whether normal or abnormal, in interaction with the environment. The long period of human postnatal cortical development, and the considerable plasticity it displays suggest that progressive modularisation may arise simply as a consequence of the developmental process…there is no need to invoke innate knowledge or representations to account for resulting specialization." (p.560)

Put simply, through development the human brain structures itself in response to environmental demands. It is this process that produces the neural substrate for a particular specialization or 'module' of ability rather than some purely genetic predisposition. This is consistent with the data obtained for S., G. and I.; prolonged global deprivation of (social, psychological, linguistic and physical) experience led, in part, to global retardation of development. If the genome was the only crucial factor in their development, S., G. and I. each might have left orphanage life rather more developed than they actually were.

When S., G. and I. entered their adoptive homes, each had height and weight and social, cognitive and motor skills that were extremely retarded. However, significant gains were found in all areas of development after several months spent in a stimulating environment. Such favourable outcomes could only have been obtained through the capacity of each child to react to specific types of information in her new environment. If after several years the child was found to have skills that were not as well developed as others this need not mean that this is a permanent consequence of early deprivation nor does it provide evidence that the critical period for this skill has been missed. Instead, the opportunity may not yet have arisen for that skill to be cultivated through relevant experience. Consequently, the brain would not yet have had the chance to become progressively specialized for this ability. This could explain why, for example, S., G. and I. had poor auditory short-term memory capacity, particularly for lengthy complex sentences (like those included in the TROG); they had not yet been exposed to the types of environmental circumstances that would promote this ability. If the girls were not frequently required to memorize this type of information in everyday contexts, then short-term memory skill would not have become progressively specialized (Karmiloff-Smith, 1999).

In contrast, S., G. and I.'s ability to use language spontaneously had become specialized. This is because, with the change in their environments, that is, from impoverished orphanage to nurturing adoptive home, they were encouraged to communicate. S., G. and I. were afforded numerous opportunities to talk and to meet the demands of their new social environments. Thus the ability to talk was promoted through relevant experience. This is possibly why their spontaneous spoken language was so sophisticated given their histories of extreme neglect and compared to their standardized test performances. Karmiloff-Smith terms the process by which a capacity becomes gradually specialized as, "progressive modularisation. (p.560)"

If neuroconstructivism were applied to S., G. and I.'s poor standardized test performances, it could be reasoned that the skill needed to perform adequately on the tests had yet to become specialized with repeated exposure to relevant experience. This might involve reading, rhyming and nonsense word games or other opportunities to cultivate the metalinguistic awareness required for some standardized assessments. When tested during the study, S., G. and I were probably still continuing with this

(learning) process, hence the deflated scores. Unfortunately, the lack of an ability to be become specialized or "modularised" might be mistaken for the 'slow-down' effects of the deprivation or of missing so-called developmental critical periods. In particular this hasty conclusion might be drawn if one is studying children with histories of extreme neglect. However, the evidence suggests that S., G. and I. will continue to develop in a number of areas, albeit at unusually advanced ages. Therefore, the further implication of Karmiloff's argument is that "progressive modularisation" can occur at any point in the life span.

9.8 A Final Note on the Critical Period and Modularity – Could the Conclusions be Reassessed?

In section 2.3.3 of Chapter 2, it was mentioned that during the study, longitudinal data had also been collected for three non-verbal children, E., C. and T. However, it was decided that the thesis would focus on the development of the three verbal children S., G. and I. This is because it was felt that as each of the girls appeared to have reached an adequate level of spoken language competence, their case studies were particularly suitable for addressing the research questions with a linguistic focus (i.e. concerning the critical period and the relationship between language and non-verbal areas of cognition). In contrast, the spoken language of E., C. and T. was virtually absent during the data collection period. This meant that their cases were less amenable to grammatical/linguistic analyses. However, what if the developmental trajectories of S., G. and I. had been compared to that of E., C. and T.? Would such a comparison have thrown a different light onto the conclusions made in 9.5.6 and 9.6.5? In order to answer these questions it was considered important to comment on the relationship between the language and non-language cognition of the three non-verbal children, E., C. and T. in order to reassess the conclusions that have so far been made in this thesis (concerning the critical period and modularity).

9.8.1 The Relationship Between the Language and Non-language Cognition of the Three Non-Verbal Children, E., C. and T.

Using documentary evidence, the following section describes some aspects of the nonverbal children's level of functioning after adoption. E., C. and T. were each adopted at the respective ages of 6;11, 5;10 and 4;9 years. According to developmental reports, each child entered the United Kingdom with the effects of global understimulation already evident. It is reported that E. and C. "were functioning as no more than toddlers." They were only just walking and had no speech or awareness of play. In addition, they were not toilet trained and were unable to eat solid food. T., too, was extremely developmentally delayed. He did not talk, had only a rudimentary ability to play and he was unable to walk due to suspected polio. Similar to E. and C., T. was unable to chew solid foods and, aged 4;9 years, was still wearing a nappy. All three children were below the 3rd centile for height, weight and head circumference. Each child's spoken language remained virtually absent throughout the period of study observation.

At the respective ages of 8;4 and 7;3 years, E. and C. were assessed at the Maudsley Hospital, London (within the Department of Child and Adolescent Psychiatry) by Professor Sir Michael Rutter. The results of these assessments ascertained that both girls' non-verbal cognitive abilities were noticeably ahead of their language. E.'s report, for example, notes that,

> "On the Vineland Adaptive Behaviour Scales…her communication and socialization skills were well below the two-year level and clearly much more impaired than her non-verbal skills. She showed that she could discriminate between shapes, solve simple interlocking puzzles, and understand the relationship between component parts and the whole."

Recommendations were also made for her schooling,

> "…she needs schooling that can be responsive to her distinctive pattern of abilities in which her non-language skills are substantially in advance of her language."

With regard to C., it was reported that,

> "The Vineland Adaptive Behaviour Scales were completed…and it was evident that her communication and socialization skills were all well below the 2 year level, that is, substantially behind her non-language cognitive skills."

The same recommendation concerning schooling was also made for C. based on the observation that non-verbal cognitive abilities were significantly ahead of linguistic

ones. It was reported for both E. and C. that there were also within language differences with comprehension apparently exceeding production. It was, for instance, written for C. that,

> "At the present time, her spoken language has scarcely begun, although her understanding of language appears rather better."

Reference was also made to the girls' production of bird-like trills and other animal noises such as hissing.

With regard to T., there is no explicit reference made in any of his reports concerning the difference between language and non-language areas of cognition. Inferences can only be made about such a relationship. Earlier reports suggest that, possibly, T.'s nonverbal skills were developing at the expense of language skills. A Speech and Language Therapist reported (in a document dated 25th October 1996), for example, that in terms of comprehension,

> "He is certainly developing situational understanding…and responds appropriately to simple requests e.g. "do you want a drink". I am not sure how much T. relies on gesture to make sense of language. He would certainly appear to have severe difficulties processing language."

Concerning expressive language, it was reported that T aged 5;7

> "…has shaken and/or nodded his head appropriately to indicate "yes" or "no"…T. continues to vocalise a variety of sounds – especially when sitting or crawling."

However, the therapist also states that,

> "T. is now mobile and viewing his world from a different perspective. It is not surprising therefore that attempts at speech and language have taken a back seat at present."

Despite the above comment, an 'Annual Review Summary' for a year later reports that T.'s spoken language – at the age of 6;7 years – was progressing,

> "His vocalising is developing and clear speech sounds for Please "ease", Swing "ing" as well as repeated animal sounds have all been clearly heard and repeated."

The emphasis post-adoption was on encouraging T. to communicate with both signs (i.e. Makaton Sign Language) and spoken words. More recent documents indicate that, generally, T.'s nonverbal and language abilities were developing in tandem. A Speech and Language Therapy report dated 2nd February, 1998, for example, describes the uniform progress that T., aged 6;10 was making in attention, listening, play and the comprehension and expression of language. Under 'Comprehension', it was reported that,

> "T's understanding of language has not been formally assessed. However, comprehension of single words spoken in conjunction with Makaton signs, is evident during 'making choices' activities."

With respect to 'Expression' it was noted that,

> "T. is seen to use spoken words, often combined with Makaton signs or natural gesture, to indicate a choice between two items. He uses these in a delayed imitation and sometimes spontaneously, particularly for items which he finds motivating e.g. he says 'oo' and blows when he wants to play a balloon."

Reference was also made to T.'s developing phonological skills,

> "T. is developing a range of vowel sounds and a limited number of consonant sounds. He uses sounds consistently to represent the adult spoken word."

Recommendations were made for ensuring T.'s continued improvement with attention, pretend play and communication skills (the combination of signs and spoken words)

The most recent reports imply that while nonverbal areas such as problem solving, concentration, turn-taking (during games) and exploratory skills were improving, there were less perceptible gains noted for the comprehension and production of language. In one report, for example, by an Educational Psychologist, it was observed that T., aged 7;1,

> "…shows no verbal intent to communicate (although his eye contact is much better."

In contrast, there were,

> "…noted improvements in his approach to 'problem-solving' or 'sorting out' what to do in tasks, making choices, maintaining his position in a group and following any activity from beginning to end."

Tellingly, the Educational Psychologist further concluded that T.,

> "…as yet, does not realise the power of using verbal language to communicate."

The developmental reports of all three nonverbal children, E., C. and T., make some comment that extreme developmental delay was likely to be due to the effects of early childhood deprivation rather than constitutional factors. E.'s report from Maudsley Hospital, London notes, for instance, that,

> "It is clear that her retardation is a consequence of her very severe and prolonged early deprivation while being reared in Romanian institutions."

In T.'s case, the Educational Psychologist wrote when he was 7;1 years,

> "I am…increasingly picking up a picture of a little boy who is using normal problem solving but from a low base of experience."

9.8.2 Comparisons Between S., G. and I. and the Three Non-Verbal Children E., C. and T.

As Chapter 3 reported, the early development of the verbal children, S., G. and I., post adoption, suggested that nonverbal and language areas of cognition were closely linked. This was verified by standardized testing during the period of study - as Chapter 6 showed. In contrast, as section 9.8.1, above, suggests, there were differences between the language and nonverbal cognition of the three nonverbal children E., C. and T. This is according to their developmental reports. By the respective ages of 8;4 and 7;3 years (17 months post adoption), E. and C. displayed nonverbal cognitive abilities that were appreciably ahead of language abilities. The situation in T.'s case is less equivocal. However, the inference is that at certain stages during the first few years after his adoption, nonverbal skills were somewhat better than his spoken language.

Initially it would seem that E., C. and T.'s cases do *not* support the argument made in Section 9.6.2 that nonverbal and language aspects of cognition are closely linked. Correspondingly, these children provide evidence that is apparently congruent with the modularity theory (described in more detail in section 1.4.2 of Chapter 1). Also the post-adoption language outcome of each child might also be taken to support the predictions of developmental neurolinguistic theory (Locke, 1997). As each child was globally deprived until after the age of 4 years, s/he would have missed the critical period for the developmental of grammar. Despite being adopted into stimulating environments, E., C. and T. failed to acquire spoken language even several years after adoption. In contrast, S., G. and I. developed speech relatively quickly after entering nurturing homes. That E., C. and T's verbal abilities remained extremely limited, it could be argued, provides evidence of the adverse consequences of being linguistically understimulated during a critical period early in life. The conclusions (Sections 9.5.6 and 9.6.5) concerning modularity and the critical period, thus, could be reassessed in light of this. However, E., C. and T.'s cases also support the argument for neurocontructivism made in Section 9.7.2.

9.8.3 Neurocontructivism Applied to the Cases of the Three Non-Verbal Children E., C. and T.

According to Karmiloff-Smith (1999), specialized abilities are a consequence of the developmental process during which environmental stimuli interacts with genotype, that is genetic influences (Toates, 2002). What if this contention were applied to the case studies of E., C. and T.? These children were adopted from understimulating environments to the social milieu of their adoptive homes. Nonverbal cognitive abilities may have been cultivated through particular activities or environmental demands. As each child developed and matured (both cognitively and physically) these capacities would have become increasingly specialized. For example, the more that T. was engaged in game-like tasks, the more his attention improved. Similarly, consistent encouragement to complete matching and sorting puzzles, meant that E. and C.'s ability to discriminate between shapes and colours steadily progressed. In the adoptive home, E., C. and T. were each exposed to a cacophony of sounds and repeated attempts by significant others to engage them in conversation - as S., G. and

I were. However, why is it that spoken language did not develop and become specialized in the former cohort of children? There may be several reasons for this.

I Hearing Loss

Both E. and C. (although not T.) were reported to have hearing impairments.[9] E. was known to have a conductive hearing loss (small build-up of fluid in the left ear) that necessitated the use of 'grommets' and in 1996, C. was diagnosed with "a bilateral severe hearing loss, said to be of the order of 60 decibels." Such hearing impairments would have placed some constraint on their ability to acquire speech (Crystal, 1997). Viewed another way, hearing loss represented a physical barrier that precluded specialized spoken language abilities. This was acknowledged in C's report by Professor Michael Rutter, Maudsley Hospital,

> "..there is the added complication of C.'s hearing impairment…given everything else, I think it is probably playing a contributory role, perhaps especially in relation to language development."

It might be assumed that E. and C. used gestures to compensate for their difficulty with talking. However, the use of sign language – and even natural gestures - was firmly discouraged within their adoptive home. It was felt that communicating

[9] It is worth also noting that E. and C. had problems with visual acuity. It is reported that each child had a squint that in E.'s case required corrective surgery. Glasses were prescribed to correct E.'s long-sightedness and C.'s short-sightedness.

with manual sign systems (e.g. Paget-Gorman, Makaton) would inhibit E. and C.'s attempts to speak. Therefore lack of environmental opportunity meant that the girls' capacity to commune other than through verbal means also did not become specialized.

II Developmental Disorder

It is possible that E., C. and T. each had an unspecified developmental disorder – either environmentally induced or innate in origin - that contributed to their inability (or unwillingness) to communicate verbally. All three children reputedly displayed 'autistic tendencies' and that Rutter et al. (1998) describe for a subset of children in their longitudinal studies of previously institutionalised Romanian adoptees (described in Section 1.2.3, Chapter 2.). Both E. and C., for example, exhibited "disturbed" and stereotyped behaviours (e.g. excessive hand-flapping) and lack of reciprocal eye contact, pretend and cooperative play and general curiosity about people and objects – in addition to an absence of spoken language. Concerning play, for instance, an Educational Psychologist noted the following for C. aged 6;7 years,

> "Her play is solitary and she shows little awareness of the other children around her."

With respect to E. aged 7;9,

> "Her play tends to be solitary and is an area of concern."

Also when E. and C. were together, it was observed that they did not play with each other. As written by the Educational Psychologist,

> "Left to their own devices, without adult intervention, they do not explore the environment and are very passive or become fixed into repetitive actions."

There is some evidence that the girl's ability to use and respond to non-verbal cues was fairly impoverished. This was particularly the case for E. at the age of 7;9 years. The Educational Psychologist reports that nine months post adoption,

> "E…makes little use of gesture or pointing…She shows little sign of recognising (*mother's name*). E. is reluctant to make eye contact."

A later report by a Speech and Language therapist notes that E. aged 9;5 years,

> "…at times appears to interpret little of what she sees. She has difficulty interpreting facial expression.."

Significantly, it is recurrently reported that E. and C. seldom initiated interpersonal contact. For example, the Educational Psychologist reported the following for E. aged 7;9 years,

> "She shows little initiative and appears to lack curiosity about the world around her. She…rarely seeks human contact."

> "E. shows little attachment to her sisters or to (*mother's name*)…E. displays little motivation to communicate and is very passive."

> "E….is uninterested in other children or adults."

In his report for E., aged 8;4 years, Michael Rutter states,

> "…she has seemed quite resistant to engagement with the family."

> "..she does not pay attention to others during mealtimes and does not participate in family interactions while eating."

> "…social engagement…remains limited and she lacks normal greeting behaviour."

Over one year later, the Speech and Language therapist reported for E. aged 9;5 years that,

> "…in the realms of meaningful communication she appears to be stuck a the pre-language stage. She tends to be a passive bystander needing to be led to areas where she can perform – she seldom intiates interaction herself."

Similar observations were made for C., aged 6;7 years. The Educational Psychologist wrote the following,

> "She does not interact with others unless prompted to do so. C. is very self-preoccupied."

With respect to T., there are continued references in his developmental reports to behaviours characteristic of those described for E. and C. A Speech and Language therapist, for example, wrote the following, for T. aged 5; 7 years,

> "T.'s interaction skills continue to show signs of disorders. Eye contact is not good…T.'s attempts at communication tend to be on his terms. He will resist attempts at interaction."

Similarly, an Occupational Therapist reported (around the same time) that,

> "He enjoys going to nursery but mostly ignores the other children, even when they try and talk to him."

A later school report for T. aged 7;1 years noted that,

> "In some instances, T. does not seem to differentiate between people and objects."

Significantly, around the same time a paediatrician reported that,

> "His attention span was very short and there were some features of his behaviour which looked autistic…"

In their case documents, specific references were also made to E., C. and T.'s 'obsessional', rigid or repetitive behaviours and narrow range of interests – consistent with autistic traits (Wing and Gould, 1979). When C. was aged 6;7 years, for example, it was observed by a Speech and Language therapist that,

> "Her behaviour is at times repetitive and disturbed. She will spend a long time repeating actions, such as putting things in and out of a container, occasionally flapping her arms, holding her breath and grinding her teeth while making strange non-verbal noises. She appears to be very tense."

Similarly, the following was written in a Speech and Language therapy report for T., aged 5;7 years,

> "T. can pay rigid attention to an activity of his choosing. It can be difficult to divert him from his chosen task."

In children *without* histories of extreme neglect, E., C. and T.'s reputed social apathy and withdrawal, and rigid traits might be considered behavioural symptoms

suggestive of autistic spectrum disorders or ASDs (Roth, 2002). E. C. and T.'s impoverished verbal communication appears to be a strong indicator of this. In support of this, the American Psychiatric Association (2000, DSM-IV-TR, p.75), states that diagnostic criteria for 'classic' autism – subsumed under the term 'autistic spectrum disorders' - includes,

> "(a) Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative means of communication such as gesture or mine)" (quoted by Roth, 2002, p 252).

An important point is that E. and C. have an older biological sister J. who was adopted from a Romanian orphanage by the same family in June 1991. During early childhood, J. had been globally deprived (physically, cognitively, socially) to the same extent as both E. and C. All three girls had resided in the same institution. Although, J.'s case was not featured in the present thesis, it is interesting to compare her post-adoption progress with that of E. and C.

When first entering the United Kingdom, J., aged nearly 4 years, was "extremely developmentally delayed and unable to engage in play". She did not talk. However, J. made "very considerable progress" in all areas of development. Her spoken language rapidly developed much in the way that S., G. and I.'s did. By the age of 7 years, J. was in a mainstream school. She could tell the time and her reading level, for example, was one and a half years behind her chronological age. Similar to S., G. and I., in naturalistic contexts, J.'s spontaneous conversational ability was sophisticated. E., C. and J. *all* came from early environments characterized by severe nutritional, cognitive and social impoverishment. Subsequently, *all* three girls were placed in nurturing surroundings with the *same* adoptive family. Yet, J. went on to speedily acquire speech, whereas, E. and C. did not. This suggests the possibility that inherent factors more so than environmental ones contributed to E. and C.'s continued lack of verbal expression. Such 'inherent factors' might involve a developmental disorder such as an Autistic Spectrum Disorder, mentioned earlier. According to Wootton (1997), characteristic of many children with ASDs or autism is "their radical avoidance of interactional contact with other people" (p.92). Wootton also notes that,

> "Their overall levels of communicative speech initiation towards other people are very low by comparison with normal children (p.92)."

What the above suggests is that a child with supposed 'autistic tendencies' might be pre-disposed to avoid social situations that would be optimal for cultivating spoken language skills. This fits with the argument made for neuroconstructivism: In E. and C.'s cases, withdrawal from relevant environmental opportunities and limited practice with communicative patterns (such as request behaviours) post adoption, meant that their capacity for speech did not become specialized. This can be contrasted with S., G. and I.'s apparent eagerness to engage with the world around them. In their post-adoption environments the three verbal children generally did not shy away from shared contact with adults or children, were extremely inquisitive about their surroundings and used a variety of 'manoeuvres', such as eye-contact, facial expression, pointing and verbalizations, to communicate with and gain the attention of others. Showing the intent to initiate and respond to the spoken interactions of others may be one of the reasons why S., G. and I.'s verbal abilities became specialized whereas E., C. and T.'s did not.

III Elective Mutism

Another possibility that may account for E., C. and T.'s continued absence of verbal communication is psychogenic in nature and concerns elective mutism. This can be defined as,

> "a selective refusal to speak that can occur in children with average intelligence without neurological impairment and which first is observed when the child is separated from the family, usually at the time of entering kindergarten" (Elson, et al., 1965, cited by Hadley, 1994, p 2.)

It is possible that E., C. and T. may have experienced forms of sexual and physical abuse, in addition to extreme neglect, whilst in their respective orphanages. When C. was aged 6;7 years, for example, an Educational Psychologist reported that,

> "Some of her play with dolls was disturbing, for example, picking them up by the ankles and examining their bottom or biting their toes, and may have reflected her orphanage experiences."

Although, it is not certain, all three of the children are thought to be of Hungarian traveller descent. In Romanian society, they would have been considered as 'gypsy' children and subject to prejudice and intolerance (Ralph, 1994). As Michael Rutter reports for E. and C.,

> "They are said to be gypsy children and, on the whole, such children received less satisfactory care in Romanian institutions, even within the context of almost all children receiving very poor care."

Similarly, an Educational Psychologist notes that,

> "…their traveller origins, are likely to have resulted in negative discrimination and their deprivation may have been even worse than for other children as reported by Margaret Ralph (DECP 1994)."

It remains feasible, then, than the level of squalor, neglect and abuse may have been worse for E., C. and T. than many other institutionalised Romanian children such as S., G. and I. whose perceived backgrounds would not have instigated the added problem of racial bigotry. Electing not to speak may have been E., C. and T.'s response to childhood psychological trauma. Not speaking may have had several functions such as to exert some control over their environment or to reduce distress caused by traumatic memories. In the former case, elective mutism and emitting animal-like noises may have been used, particularly by E. and C, as strategies for 'coping with' or 'resisting' social situations. Alternatively, the "act of silence" may have been the process by which each child minimized feelings of fear and anxiety relating to a stressful childhood (Hadley, 1994, p. 4). However, Friedman and Karagan (1973, cited by Hadley, 1994, p.2) point out that elective mutism should be defined through exclusion of,

> "(1) a physical defect of the speech mechanism, (2) a speech and language disorder, (3) mental defect and (4) evidence of physical or psychological trauma."

As all of the above variables *may* apply to E., C and T.'s cases, elective mutism as an explanation for their verbal silence becomes less likely.

9.8.4 Summary: A Final Note on the Critical Period and Modularity – Could the Conclusions be Reassessed?

E., C. and T.'s absence of speech in the face of enhanced non-verbal cognitive abilities after adoption would appear to support modularity theory (i.e. that language and non-language areas of cognition are separate modules that mature independently of each other) and the predictions of developmental neurolinguistic theory (i.e. linguistic impairment will be evident if a child does not begin to talk until after the offset of the critical period for grammar). However, the non-verbal children's post-adoption outcomes could also be considered to support the argument made for neuroconstructivism (i.e. that specialized abilities are not necessarily innate but arise via the developmental process and the interaction of genetic predisposition with the environment). Neurocontructivism could account for why E., C. and T.'s non-verbal cognitive abilities were enhanced relative to their spoken language abilities. It could be argued that E., C. and T. did not develop spoken language because even after rescue from a deprived environment, they lacked experience of the types of environmental demands that promote this ability (i.e. listening to others' conversations, turn-taking, formulating communicative responses).

This meant that the capacity for speech did not have the chance to become specialized through repeated practice and maturational processes. There may be several reasons for this encompassing both physical and psychosocial factors that include 1.) hearing loss representing a physical barrier to the perception of sound; 2.) a developmental disorder (either innate or acquired) limiting the chances to socially engage in reciprocal verbal communication (Wooton 1997); and 3.) elective mutism as a response to early childhood trauma involving possible physical and sexual abuse in addition to extreme neglect (Hadley, 1994). These variables did not apply to S., G. and I.'s cases. In each case, there was no evidence of hearing loss, or an avoidance of social situations that is reminiscent of many children with autistic spectrum disorders (ASDs). Although the girls experienced severe deprivation during early childhood, there is no indication that they were abused and that might have resulted in disturbed behaviours such as electing not to talk. This meant that S., G. and I. were able to exploit the social situations that aided the specialization of verbal communication during the post-adoption developmental process. It is proposed that this explanation - congruent with neuroconstuctivism - can account for why S., G. and I. developed speech post adoption, but E., C. and T. did not. In light of this, the conclusions made concerning the critical period and modularity still stand.

9.9 General Conclusions

Chapter 9 attempted to draw together the observations and conclusions of each of the previous chapters. This allows for the following general research conclusions that have implications for both theory and practice.

9.9.1 Practical Implications

I Methodology

The assessment of special needs children should not be undertaken using one method. If, for example, one were to base their opinion of S. G. and I.'s prognosis and potential for further social and intellectual growth entirely on standardised measures, then their futures would look bleak indeed. However, if one were to make judgements of their ability based on information from interviews or observations of behaviour as well as detailed qualitative analyses, then one would have a quite different picture of their potential. Each child's positive personal characteristics would also be revealed, for example, S.'s natural curiosity to know about things, her alertness, and determination to learn. There are implications here for the way that educational and clinical practitioners assess socially deprived children and plan intervention and remediation measures based on this assessment.

The mixed method approach adopted by this study shows that it is crucially important that children with unusual histories like S., G. and I. are monitored through a combination of techniques such as interviews, observation and appropriate standardised tests. Also – as should now be clear - the use of standardised measures should not be the sole means by which such children are assessed. This is because many (non-measurable) signs of their potential for further growth would be missed or excluded. Another point to bear in mind is that some tests may actually assess skills other than the ones that they purport to measure. For example, sentence formulation tasks may actually test metalinguistic awareness, rather than grammatical performance per se. This might only be revealed through a detailed description of the

grammar of spontaneous speech. Therefore, extending the range of methods used to assess the special needs child extends the possibility that the results will be representative of his or her true potential.

Romanian adoptees with histories of extreme neglect are quite exceptional children and it is through the in-depth, qualitative study of their development that new ways of sensitively categorising and indexing their emerging social, language and non-language cognitive abilities may be found. Finding exceptional ways to assess children with exceptional histories may better inform methods of intervention and remediation, which could even be applied to typically developing children. In doing this, the research objectives (set out in Chapter 2) will, hopefully be achieved.

9.9.2 Theoretical Implications

I The Effects of Extreme Deprivation

The effects of extreme deprivation on developmental outcome are complex and all encompassing. In S., G. and I.'s cases, impoverished environments appeared to lead to globally retarded developmental levels. Stimulating environments produced developmental gains. This suggests that the environment – or rather its quality – has a significant role in impeding or encouraging physical and intellectual growth. Based on S., G. and I.'s cases, the study concludes that the initial effect that extreme deprivation has on development is to severely delay it. This applies to all abilities – social and communicative, physical, linguistic and non-verbal cognitive. However, this situation can change when there is a positive change in the environment. Improvements in diet lead to improvements in physical health and growth. The family context, and exposure to peers facilitates the socialization process, leading to increasing skill, for example, in the areas of social relatedness, conversation and play. Similarly, the repeated opportunities that the child has to share talk with others, encourages the social, functional and structural use of language. The school environment may act as a setting in which the child can practice and cultivate certain nonverbal cognitive skills such as, concentration, attention, abstract reasoning and even visio-spatial capacity.

S., G. and I.'s cases suggest that a child can experience unprecedented levels of neglect during early infancy and childhood and yet still go to develop apparently normally in many areas. Some abilities like conversation and spontaneous grammar appear to reach adult levels of competence. Residual problems may remain and with S., G. and I., it is too early to estimate whether these are likely to be permanent. However, it is tentatively suggested that (with the exclusion of the physical domain) most of the effects of extreme deprivation are not irreversible as long as the environment continues to be a minimally stimulating one. The implication of this is that some theories of development (e.g., Bowlby, 1951, 1969; Locke, 1997) that state that it is critical for certain abilities to be acquired in early childhood may be overstating the case. Human nature may be more resilient than is commonly thought.

II The Critical Period

A detailed examination of S., G. and I.'s spontaneous spoken language provided no direct evidence to support the existence of a critical period for grammar (Locke, 1994; 1997). The Romanian adoptees' cases show that children who experience extreme language deprivation in early childhood, up to the age of 4 years and beyond, can still go on to develop a very sophisticated level of language/grammatical ability. A first language can even be acquired after the age of 7 years, as S.'s case suggests and even continue during puberty as all of the cases suggest. Some aspects of morphosyntax can still be acquired with any consistency at this age. Therefore, S., G. and I.'s cases suggest that it is not crucial that a first language develop in early childhood. The development of language does not appear to be rigidly time constrained biologically (although, conversely, height and sexual maturation do). Language can be acquired for the first time later in life, but can still develop in a way typical of younger children.

However, the above conclusion needs to be tempered in light of the view that the unprecedented extent of the social and linguistic neglect that S., G. and I. each experienced cannot be validated unequivocally. Although unlikely, it is acknowledged that the children *may* have received enough interpersonal stimulation from particular caregivers, for some aspects of *language* development to have taken place before adoption (e.g. non-verbal communication, some single words). Nevertheless, the

evidence strongly suggests that, initially, S., G. and I. each had no awareness of the syntax and morphology of either English or Romanian suggesting that early deprivation in some form had severely inhibited the development of *grammar* before adoption. Yet, when the girls entered new, stimulating environments (i.e. the adoptive homes) they went on to develop sophisticated levels of grammatical ability, albeit at atypically late ages according to developmental neurolinguistic theory (Locke, 1997).

What may account for this is the human cerebrum's (innate) general capacity to adapt itself to the changing demands of the environment. The longitudinal research findings for S., G. and I. allow for the possibility that such neuroplasticity does not decline during a maturationally timed window of opportunity but is present throughout the lifespan. This allows the brain to operate efficiently in response to the demands of a changing environment. Whether, this finding can be generalized to the normative population is, at the present time, unclear.

III Developmental Models

Cases of extremely deprived children like, S., G. and I.'s could be interpreted as supporting two seemingly opposing developmental approaches, the cognition hypothesis (allied to empiricism) and modularity (allied to nativism). For example, standardized tests showed that the development of language was closely linked to the development of non-verbal cognition. In this light, language appeared to be somewhat dependent on, rather than independent of non-verbal cognition – thus supporting the cognition hypothesis.

In contrast, the way that S., G. and I.'s language development unfolded in a similar way after adoption could be interpreted as supporting the modularity contention that language is an innately specialized or modular ability with a stage-like emergence that is the same for all children. Similarly, S., G. and I.'s poor use of language in some standardized test situations (low scores on sentence formulation task involving metalinguistic skill) but sophisticated production of speech in spontaneous real world contexts (complex sentences produced effortlessly in naturalistic conversation), suggests an apparent behavioural dissociation that is consistent with modularity -

although does *not* necessarily indicate two independently functioning or separate 'modules.'

The cognition hypothesis versus the modularity argument is like the nature versus nurture debate: one is tempted to adopt an either/or view. However, this is a false dichotomy because in reality, a combination of both of the perspectives may have more explanatory power in accounting for developmental outcome. Genes and the environment may be linked in intricate and dynamic ways. This idea is incorporated in neuroconstructivism. This views the process of development as a two-way street in that genotype – representing a kind of information guide – together with the 'immediate' (cellular) and external (socio-cultural and physical) environment determine individual structure and behaviour (Toates, 2002; Karmiloff-Smith, 1999). In turn, the way that an organism acts upon its environment may influence internal biological events (Toates, 2002). Therefore the debate realistically concerns questioning as to how nature and nurture interact to influence behaviour.

It is accepted here that, as Karmiloff-Smith (1999, p.560) points out, specialized abilities may arise in individuals "whether normal or abnormal" as a consequence of the developmental process and the complex interaction of genes with the environment. Thus "modular-like structures" are acquired, rather than innately specified and present at birth as Fodorians maintain. Gradual specialization as a function of gene-environment interaction is an account of development that appears to fit with S., G. and I.'s post adoption outcomes. Therefore the thesis concludes that neuroconstructivism is a particularly useful developmental model that can be used in research with severely deprived children.

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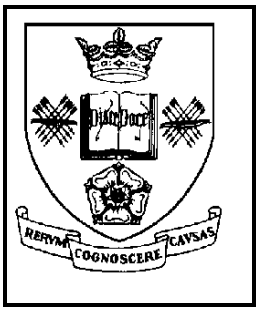
Appendix A: Chapter 2

(I) Questionnaire for Recruiting Research Participants



The University of Sheffield

Department of Human Communication Sciences

LANGUAGE DEVELOPMENT OF PREVIOUSLY INSTITUTIONALIZED CHILDREN

Please supply the information requested below, which will be kept confidential.

Your name:_____

Address:_____

Telephone: Day:_____Evening:_____

Name of child: _____ Sex of child:_____

Age when adopted:_____years_____months

Present age:_____years_____months

Length of time in orphanage: :___years___months

Please describe the language and communicative ability of your child **at the time of adoption:**

_____
_____

Please describe your child's **present** language and communicative ability:

_____
_____

What can you tell us about your child's birth and health history prior to adoption?

_____
_____
_____

(II) Information Sheet Mailed to Parents at the Beginning of the Study

INFORMATION SHEET

The Effects of Extreme Social Deprivation on Language and Cognition.

What is the purpose of the study?

This study is to be conducted by Lisa Jane Brown, a postgraduate student, as part of a joint research programme between the University of Sheffield and Sheffield Hallam University. The purpose of the research is to examine how early extreme isolation in childhood affects later development. We will be studying the behaviour of previously institutionalised children from Romania, who were adopted by British and American families. We will be looking at the progress of language and thinking and also social development. We are hopeful that we will acquire information that may contribute to the education of such children in the future.

What will be involved if we agree to take part in this study?

One or both parents will be required to complete an initial questionnaire and a semi-structured interview may be carried out. This is so that we have background information about the child to be studied. If it is possible, we would like to look at copies of any documents or assessments such as those completed by health care professionals or schools, so that we can gain a detailed account of the child's history since being adopted. All information given to us will be kept strictly confidential. With your agreement, we would also like to assess your child within the home environment. This would involve monthly (more if you agree) meetings with him/her for the next few months. This is so that I may observe the child in order to gain some idea of his/her language ability. If you agree, arrangements may also be made for you to visit the Phillippa Cottam Communication Centre at the University of Sheffield. All meetings will be entirely at your convenience.

Can I withdraw from the study at any time?

Yes. You are free to withdraw from this research at any time or cancel any meetings that may be inconvenient for you.

When and where will the meetings take place?

As mentioned above, we could arrange for you to visit the Phillippa Cottam Communication Centre at the University of Sheffield for an initial informal assessment of the child. If this is inconvenient, then we could see you and your child at home which would involve periodical meetings at times suitable for you. After the first visit, we would continue to monitor the child's language progress and other behaviour.

What other information will be collected in the study?

With your permission, we would like to video (or audio) record your child while interacting naturally with you and I. These tapes will be studied later. We will also obtain information about your child's language using various language measures. This will involve listening to your child talk, asking her or him questions during a game-like task or observing free play.

Will the information I give in the study be confidential?

Yes. Any details that we obtain about the circumstances of you or your child shall be confidential. This means that no-one else will have access to your records besides the project co-ordinators listed over the page and qualified research staff from the department of Human Communication Sciences, University of Sheffield who are directly involved in the study. Strictly no information shall be revealed or shared with anyone else unless we have your consent first. In addition, your name will not be mentioned in any reports on these data and care will be taken so that individuals cannot be identified from the details given in the study.

Will anyone else be told that I or my child is taking part in this study?

With your permission, we may at some point need to *directly* contact any health care professionals who might have already assessed your child such as a speech therapist or teacher. This will only be done if we require additional information that we feel will be helpful for our research.

What happens if I have cause to complain about the way in which this study has been carried out?

If you have *any* reason to complain about *any* aspect of the way in which this research has been conducted, then the usual Sheffield University complaints procedures are available to you. The quality of service is not compromised in any way because you have participated in a University research programme.

If you have any complaints or queries please contact the project co-ordinators *(details given).*

Otherwise you can use the official complaints procedure dealt with in the first instance by the Registrar's and Secretary's Office, University of Sheffield and contact *(details given).*

What if I am harmed?

This study is designed to be completely non-invasive. If , however, by participating in this study you feel that you or your child have been harmed, there are no special arrangements for compensation. You may have a basis for legal action if you are harmed by someone's lack of care.

(III) Consent Form Mailed to Parents at the Beginning of the Study

RESEARCH CONSENT FORM	
TITLE OF PROJECT: THE EFFECTS OF SEVERE GLOBAL DEPRIVATION ON LANGUAGE AND COGNITION	
The parent(s) should complete the whole of this sheet himself/herself (themselves)	Please Delete As Necessary
Have you read the Information Sheet?	YES/NO
Have you had an opportunity to ask questions and discuss this study?	YES/NO
Have you received adequate answers to all of your questions?	YES/NO
Have you received enough information about the study?	YES/NO
Who have you spoken to? Prof./Dr./Mr./Miss.	
Do you understand that you are free to withdraw from the study: • **at any time** • **without having to give an explanation** • **and without affecting your statutory rights or your future standing with the Phillippa Cottam Communication Centre, University of Sheffield**	YES/NO
Do you agree to participate in this study? **Do you agree to your child participating in this study?**	YES/NO YES/NO
Signed.....Date..... **(NAME IN BLOCK LETTERS).....……**	
Signature of Witness.....	

(IV) Details of Data Collected for Three Other Participants, T., E. and C.

Table A.1: T. E. C.'s ages when data collection visits were made and dates of these.

Tommy		**Eleanor**		**Carrie**	
Date of Visit	*Age*	*Date of Visit*	*Age*	*Date of Visit*	*Age*
25.06.98	7.3	18.06.98	9.6	18.06.98	8.5
15.07.98	7.3	11.07.98	9.7	11.07.98	8.6
17.08.98	7.4	20.08.98	9.8	20.08.98	8.7
15.09.98	7.5	09.09.98	9.9	09.09.98	8.8
13.10.98	7.6	30.09.98	9.10	30.09.98	8.8
03.11.98	7.7	27.10.98	9.11	27.10.98	8.9
23.11.98	7.7	23.11.98	9.11	23.11.98	8.10
10.12.98	7.8	16.12.98	10.0	16.12.98	8.11
20.04.99	8.0	14.04.99	10.3	14.04.99	9.0
		26.06.99	10.7	26.06.99	9.5
Age at Start	7.3	Age at Start	9.6	Age at Start	8.5
Age at Finish	8.0	Age at Finish	10.7	Age at Finish	9.5

(V) Questions Used in Semi-Structured Interviews with Parents.

(i) Background

1. Did you ever visit the Romanian institution where *(name)* stayed?
2. Can you describe to me the conditions in which *(name)* and the other children lived?
3. What were the caregivers attitudes to the children? What treatment did the children receive?
4. Can you describe to me in your own words (not based on clinical assessments), the condition that *(name)* was in when you first adopted her/him?
5. What developmental age would you have given him/her?
6. What types of behaviour did s/he display?
7. In your own words, can you describe *(name)*'s early language ability (if there was any) and social behaviour?

8. Did s/he, in your opinion, have any language or social skills at all when you first adopted her?
9. As a parent, what concerned you most about *(name)*'s condition/behaviour when you first adopted her/him?
10. In the early days after her/his adoption, what action did you and your family take in order to stimulate *(name)*'s development and encourage progress?
11. What types of routines did you have that helped *(name)*'s developmental progress? For example, did you talk to her/him a lot and encourage her/him participate in lots of new experiences?
12. Could you outline to me, the type of education *(name)* has had right from her/his adoption until now?

(ii) Present

1. In your opinion, what is *(name)*'s development/behaviour like at present?
2. How would you describe her/his language ability and social skills at present?
3. In what ways do you think she has progressed from when you first saw her/him?
4. In your opinion, what factors have helped *(name)*'s developmental progress since her adoption?
5. In particular, could you describe how *(name)*'s language emerged since you first saw her/him? For example, did she start with one-word sentences, then on to two-word utterances? Alternatively did s/he imitate people a lot or keep repeating particular words and phrases?
6. Could you describe to me *(name)*'s relationship with her/his siblings and peers?
7. Do you think that they have in any way influenced *(name)*'s development?
8. What aspect of *(name)*'s condition/behaviour concerns you most at present?

Appendix B: Chapter 4

(I) Transcription Conventions For Conversational Data

Based on Clark (1996), Whitworth, Perkins & Lesser (1997) and Wootton (1997)

{ } Non-verbal activity indicated in italics between brackets.

( ) Single brackets indicate utterances of which the transcriber is unclear.

[[Denotes overlapping speech or point where two speakers simultaneously start a conversation.

__ Underlining indicates stress on particular syllables or words.

_ Indicates a possible grammatical omission.

= = Utterances that are latched with no gap (on either side of the = symbol).

: Denotes that vowel is elongated (e.g., "u:m").

hh Audible exhalation of breath.

- Marks an interruption, sound cut-off or false start (e.g., "I thi-").

- - Indicates repetition or dysfluent speech as in "I'm not-not-I'm not-."

(.) Micropause mid-turn

(..) Indicates length of pause in seconds mid-turn.

{pause:} Marks a break in the conversation or pause between turns and includes information about the context as in *{pause: A. is licking her lolly.}*

Appendix C: Chapter 5

(I) Summary of Results on Standardized Measures

Table C.1(i) Results: S., G. and I.'s scores on standardized tests; date and chronological age when tested, test age equivalents or deviation from the mean and percentile ranks on these standardized tests

	Sariah		**Georgina**		**Ingrid**	
CELF-Preschool						
Date When Tested	11.03.99		11.03.99			
Chronological Age	12.0		13.8		Was not	
Percentile Rank	10*		6*		administered to I.	
Age Equivalent	4.7		4.5			
Distance From The Mean	-1.26*		-1.53*			
CELF-3						
Date When Tested	24.04.99	20.05.00	24.04.99	20.05.00	10.03.99	16.05.00
Chronological Age	12.1	13.2	13.9	14.10	11.5	12.7
Percentile Rank	1	1	1	1	1	1
Age Equivalent	5.0	5.0	5.0	5.0	5.0	5.0
Distance From The Mean	-3	-3	-3	-3	-3	-3
British Picture Vocabulary Scale						
Date When Tested	07.08.98	16.10.99	24.04.98	16.10.99	29.06.98	18.10.99
Chronological Age	11.5	12.7	13.2	14.4	10.8	12.0
Percentile Rank	18	3	2	8	30	7
Age Equivalent	9.6	8.3	8.3	10.2	9.6	8.11
Distance From The Mean	-0.93	-1.93	-2.06	-1.4	-0.53	-1.46
Test For Reception of Grammar						
Date When Tested	28.10.98	16.10.99	28.10.98	16.10.99	11.11.98	18.10.99
Chronological Age	11.7	12.7	13.2	14.4	11.1	12.0
Percentile Rank	1-5	1-5	1	1-5	10	1-5
Age Equivalent	6.0	6.0	5.9	6.0	8.0	7.0
Distance From The Mean	-1.8	-2.2	-2.46	-2.2	-1.26	-1.93
Action Picture Test						
Date When Tested	09.12.98	18.03.00	09.12.98	18.03.00	02.12.98	18.10.99
Chronological Age	11.9	13.0	13.5	14.9	11.1	12.0
Age Equivalent:						
Grammar	5.0	6.6	4.0-4.5	6.0-6.6	6.0-6.5	7.0-7.5
Information	8.5	8.5	7.0-7.5	6.6-6.11	5.0-5.5	7.0-7.5

Note. *CELF-Preschool, Percentile ranks (and deviations from the mean) when compared with the scores obtained by children aged 6.6 – 6.11.

Table C.1(ii) Results: S., G. and I.'s scores on standardized tests; date and chronological age when tested, test age equivalents or deviation from the mean and percentile ranks on these standardized tests

	Sariah		**Georgina**		**Ingrid**	
The Bus Story Test of Continuous Speech						
Date When Testing	09.12.98	18.03.00	09.12.98	18.03.00	14.12.98	17.12.99
Chronological Age	11.9	13.0	13.5	14.9	11.2	12.2
Age Equivalent:						
Information	4.0-4.5	6.0-6.5	3.9-3.11	4.6-4.11	5.0-5.5	8.5+
Subordinate Clause	4.0-4.5	4.0-4.5	4.0-4.5	5.1-5.11	8.5+	7.6-7.11
Sentence Length	4.1-4.11	5.1-5.11	3.9-3.11	5.1-5.11	6.0-6.5	6.0-6.5
Boehm Test of Basic Concepts						
Date When Tested	09.12.98		09.12.98		14.12.98	
Chronological Age	11.9		13.5		11.2	
Percentile Rank	3*		1*		50*	
Word Finding Vocabulary Scale						
Date When Tested	18.03.00		18.03.00		13.04.99	
Chronological Age	13.0		14.9		11.6	
Age Equivalent	5.4-5*		5.9*		5.9*	
Salford Sentence Reading Test						
Date When Tested	20.05.00		20.05.00		16.05.00	
Chronological Age	13.2		14.10		12.7	
Age Equivalent	8.1		7.5		7.5	
Recall of Digits Forward (BAS)						
Date When Tested	19.11.98	16.10.99	19.11.98	16.10.99	19.10.99	
Chronological Age	11.8	12.7	13.4	14.4	12.0	
Raw Score	14	15	12	11	19	
Ability Score	105	111	94	88	131	
Percentile Rank	1	2	1	1	14	
Age Equivalent	4.4	5.7	4.4	4.1	6.10	
The Children's Test of Nonword Repetition (CNRep)						
Date When Tested	18.03.00		18.03.00		17.12.99	
Chronological Age	13.0		14.8		12.2	
Raw Score	21		23		19	
Age Equivalent	5-5.11		5-6.11		4-4.11	
Percentile Rank	<10		<10		<10	

Note. *Boehm Test of Basic Concepts, Percentile ranks when compared with the scores obtained by second graders; *Word Finding Vocabulary Scale, Test age equivalent obtained by comparing S., G. and I.'s scores with the norms for children aged up to 8.6 years.

(II) Summary of Scores on Global Measure, CELF-3: Subtest Scores

Table C.2 (i) Results. S., G. and I.'s subtest scores on CELF-3 for 1999 and 2000; chronological ages at the time of testing, raw scores, standard scores, percentile ranks and standard deviations from the mean.

	Sariah		**Georgina**		**Ingrid**	
Years When Tested	April 1999	May 2000	April 1999	May 2000	March 1999	May 2000
Chronological Age	12.1	13.2	13.9	14.10	11.5	12.7
Concepts and Directions:						
Raw Score	7	21	7	8	19	18
Standard Score	3	4	3	3	5	4
Percentile Rank	1	2	1	1	5	2
Distance From The Mean (SDs):	-2.3	-2	-2.3	-2.3	-1.6	-2
Word Classes:						
Raw Score	9	14	12	15	15	22
Standard Score	3	3	3	3	3	6
Percentile Rank	1	1	1	1	1	9
Distance From The Mean (SDs):	-2.3	-2.3	-2.3	-2.3	-2.3	-1.3
Semantic Relationships:						
Raw Score	2	2	5	1	4	4
Standard Score	3	3	3	3	3	3
Percentile Rank	1	1	1	1	1	1
Distance From The Mean (SDs):	-2.3	-2.3	-2.3	-2.3	-2.3	-2.3
Formulated Sentences:						
Raw Score	20	28	14	13	16	28
Standard Score	3	5	3	3	3	6
Percentile Rank	1	5	1	1	1	9
Distance From The Mean (SDs)	-2.3	-1.6	-2.3	-2.3	-2.3	-1.3

Recalling Sentences:						
Raw Score	15	17	20	26	20	24
Standard Score	3	3	3	3	2	3
Percentile Rank	1	1	1	1	1	1
Distance From The Mean (SDs)	-2.3	-2.3	-2.3	-2.3	-2.3	-2.3
Sentence Assembly:						
Raw Score	1	4	2	0	1	3
Standard Score	3	3	3	3	3	3
Percentile Rank	1	1	1	1	1	1
Distance From The Mean (SDs)	-2.3	-2.3	-2.3	-2.3	-2.3	-2.3
Word* Structure:						
Raw Score	19	18	17	18	22	27
Standard Score	6	5	5	6	7	10
Percentile Rank	9	5	5	5	16	50
Distance From The Mean (SDs)	-1.33*	-1.66*	-1.66*	-1.33*	-1*	0*
Sentence* Structure:						
Raw Score	17	20	15	19	15	18
Standard Score	8	15	6	11	6	10
Percentile Rank	25	95	9	63	9	50
Distance From The Mean (SDs)	-0.66*	+1.66*	-1.33*	+1.66*	-1.33*	0*

Table C.2 (ii) Results. S., G. and I.'s subtest scores on CELF-3 for 1999 and 2000.

Note: *SDs = Standard Deviations, *Word Structure and Sentence Structure subtests; Standard scores, percentile ranks and distances from the mean derived by comparing S., G. and I.'s scores with those obtained by children aged 8.0 – 8.11.

(III) Responses on the Bus Story Test of Continuous Speech (BSTCS)

S., G. and I.'s most recent Bus Story narrative responses are presented verbatim below:

Sariah 13:0, March 2000

1. (Once upon a time, there was) a naughty bus.
1. and the man was tryin' to fix a bus
1. but the bus wanted to run away
1. and the bus run away
1. and then they pull funny faces
1. and they're tryin' to race against each other
1. and then the bus-the police blow the whistle
1. and the bus erm didn't pay any attention
1. erm the-the bus was on the countryside
1. and got fed up of riding on the road
1. and went-went over the fence
1. and he saw a cow
1. and the cow said, "Moo!"
1. the bus was goin' too fast
1. and he couldn't stop
1. then he fell in the muddy water
1. and then-and then he-and then-dunno-fi-fixed the bus.

No. subordinate clauses: 4

Sentence length (5 longest sentences ÷ 5): 9.8

Georgina 14:9, March 2000

1. e:rm there was a man driving a bus
1. and then e:rm e:rm he got on the bus
1. and there was nothing-there was no-one driving the bus
1. that's all
1. there's a man behind it

1. that's all
1. and there's the train
1. and there's a bus
1. trains are driving
1. and there's a bus with a funny face
1. e:rm there-there-there's-there's some people
1. and there's a policeman say-blowin his whistle(s) to say, "Stop."
1. and then he was driving the bus
1. and the bus went over the fence
1. and then the cow said, "Moo!"
1. well and then the bus was squelching down the hill
1. and then the man fell into a pond
1. and stuck in the mud
1. and then and there was a man in-inside the bus

No. subordinate clauses: 3

Sentence length (5 longest sentences ÷ 5): 9.0

Ingrid 12:2, December 1999

1. Once upon a time, there was a very naughty bus
1. a man tried to mend it
1. but it ran away down the road
1. it met this train
1. and they kept pulling funny faces at each other
1. and they had a race
1. and then-and then he had to go alone because the train went under the tunnel
1. but the policeman whistle-blew his whistle
1. and sez "Stop!"
1. and he just ignored him
1. then he just kept going up
1. and then he got fed-up with the road
1. so he jumped over the fence

1. and he was in a field
1. and this cow went, “Moo! He couldn’t believe his eyes.”
1. he went down this hill
1. and he saw this pond
1. and he didn’t know how to stop his brakes
1. and he fell in the water
1. so he got this builder to pull it out
1. then when the man found him, he got back into the van
1. and he went driving off.

No. subordinate clauses: 5

Sentence length (5 longest sentences ÷ 5): 10.0

(IIII) Responses on The Children’s Test of Nonword Repetition, (CNRep)

Below are some of S., G. or I.’s incorrect non-word repetition attempts along with the test items that they were required to repeat.

Sariah

CNRep Non-words	**S.’s Repetition Attempt**.
PERPLISTERONK	PER..RISTERONG
SEPRETENNIAL	STEPUTENNIAL
FRESCOVENT	FRE..FRESWISTY
WOOGALAMIC	WOOGANAMIC
PRISTORACTIONAL	PISRINACTIONAL
UNDERBRANTUAND	UNDERBRANSTINAND
COMMEECITATE	COMMINCITATE
LODDERNAPISH	LOD..LOD..MERNAPISH
EMPLIFORVENT	EMPLAFORMENT
VOLTULARITY	VOLTURALITY
VERSATRATIONIST	VERSHATRASADIST
BRASTERER	BASERER
SKITICULT	SKITILCULT

Georgina

CNRep Nonwords	G.'s Repetition Attempt.
DOPELATE	DOPER..
DEFERMICATION	DEFERMINCATION
CONTRAMPONIST	NO RESPONSE
REUTTERPATION	REUTTOPATION
PERPLISTERONK	NO RESPONSE
BLONTERSTAPING	BLONTERSTAKING
SEPRETENNIAL	NO RESPONSE
GLISTOW	GLISTER
FRESCOVENT	NO RESPONSE
WOOGALAMIC	WOOGANANIC
BALLOP	BANNET
UNDERBRANTUAND	UNDERBRANTIONAL
COMMEECITATE	COMMICITATE
LODDERNAPISH	LODDERPATISH
VERSATRATIONIST	VERSATRA..
SKITICULT	SKITACULT

Ingrid

CNRep Nonwords	I.'s Repetition Attempt.
CONTRAMPONIST	COMTRAMPONIS
REUTTERPATION	REATTERPATIENT
PERPLISTERONK	POMPLESIBLONT
BLONTERSTAPING	POMPER STATION
SEPRETENNIAL	SEPERTENUAL
DETRATAPILLIC	DETARPATILLIC
FRESCOVENT	PRESCOVENT
WOOGALAMIC	WIGGLEMANIC
CONFRANTUALLY	CONFRANTRICALLY
FENNERISER	BENNERISER
ALTUPATORY	ALTUPAINTUALLY
PRISTORACTIONAL	PISTERACTUALLY
UNDERBRANTUAND	ANTABANTRISS-TREE
TRUMPETINE	TRUMPINTINE
LODDERNAPISH	LOBBENTATION
EMPLIFORVENT	EMPLIFORMENT
THICKERY	BICKERY
VOLTULARITY	OLCHAVALERTRY
VERSATRATIONIST	VERSATATIONIS
SKITICULT	SKITACULT

Appendix D: Chapter 6

(I) Results on Non-Verbal Cognition Tests: Romanian Adoptees Compared with Two Normally Developing Controls

Table D.1 Results: S., G. and I.'s scores on the CPM and Block Design subtest of WISC-III compared to the scores of 2 control children, R.R and L.H.: chronological ages at the time of testing and raw scores, test age equivalents and distances from the mean for Block Design and raw scores, percentile ranks and grades for the CPM.

	Subjects				
	S.	**G.**	**I.**	**P.R.**	**L.H.**
Chronological age	12.7	14.4	12.0	7.10.	7.1.
BD-WISC					
Raw Score:	6	9	19	44	21
Equiv. Age:	<6.2.	<6.2	6.10	10.10.	7.2.
Scaled Score:	1.	1.	3	15	10
Standard Deviations From the Mean:	-3	-3	-2.3	+1.66	0
CPM					
Raw Score:	15	19	24	32	23
Percentile Rank	<5	<5	<10	95	75+
Grade:	V, "intellect-ually impaired"	V, "intellect-ually impaired"	IV-, "definitely below average in intellectual capacity"	I, "intellect-ually superior"	II, "definitely above the average in intellectual capacity"

Note: BD-WISC = Block Design sub-test, Wechsler Intelligence Scale For Children – Third Edition UK. CPM = Ravens Coloured Progressive Matrices.

As can be seen from the above, the normal controls scored very well on the WISC Block Design with P.R. achieving a test score equivalent to a child three years *above* his chronological age and L.H. achieving a test score that was age appropriate or slightly above. On the CPM, P.R. and L.H. were intellectually, well above average in ability, since their total raw scores lie at or above the 75th percentile for children of that age group.

Appendix E: Chapter 7

(I) Overregularizations that occurred for each child throughout the two-year duration of data collection

1 Sariah's Overregularizations

S: Irregular past tense verbs

(17.05.97) You **driv*ed*** in the car first

(27.05.97) Kurt (...) You **hurt*ed*** yourself.

(04.06.98) Oh erm thingy's **com*ed***...thingy's **com*ed***..

(04.06.98) Oh, I just **hear*ed*** a click!...

(07.10.98) What happened with that?=**brok*ed*** it *{points to TV}*

(07.10.98) Why-why is this **tear*ed***?=Hey why is this **tear*ed***?=Why was it **tear*ed***?

(19.11.98) We **draw*ed*** picture yesterday

(19.11.98) How come you **throw*ed***-How come you've thrown this away?

(19.11.98) Just-It **shin*ed*** up

(09.12.98) *{S. and G. talking in front of the camera}*

G: Where's your yo-yo?

S: erm Mine **brok*ed*** It **brok*ed*** yesterday

(09.12.98) *{Response to Bus Story}*

and then a man **blow*ed*** a whistle.

(11.03.99) *{S.'s response to test item}*

L: This is a bubble Yesterday he blew the bubble *{Points}* This is a ball. Yesterday he:?

S: Threw (..) **throw*ed*** He threw (..) He rolled the ball.

(11.03.99) S:o **knowed** I've got exactly same game as her

(24.04.99) *{S.'s response to test item}*

L: Can you make a sentence out this picture using the word, instead? *{Holds up picture}*

S: The boy (..) **choos*ed*** a book instead of dinosaur book.

(24.04.99) Look this has falled off agai:n *{refers to her detachable microphone}*

(24.04.99) *{S.'s response to test item}*

L: The boy is writing a letter This is the letter the bo:y?"

S: Writ-wri:ten-writ or whatever.

L: Or we could say "This boy *is* writing a letter This is the letter the [[bo:y?"

S: [[boy *did* (..) written-wrid-**writ*ed***

(24.04.99) Catty: catty:! Somebody **draw*ed*** look! Now somebody's **draw*ed*** a cat

(24.04.99) *S.'s response to test item (WS-CELF-3).*

L: "The boy is drawing a cat. This is the cat the boy...?"

S: **draw*ed***.

(18.03.00) *S.'s response to test item (APT).*

L: What has the cat just done?

S: **Catch*ed*** two mice.

L: What as that again? I didn't hear you=

S: =The cat **catch*ed*** the mouse

(18.03.00) *{S.'s response to test item}*

S: The girl fell down the stairs and broke her glasses *{Laughs}*

L: Broke her glasses?

S: Yeah.

L: Did ya say "breaked" or "break"?

S: **break*ed***.

(20.05.00) *{S.'s response to repetition test item}*

L: The fielder caught the ball and the crowd cheered loudly

S: The fielder **catch*ed***-caught the ball and the erm e:r (…) and the people cheered

(20.05.00) *S.'s response to test item*

L: Tom saw Peter. David saw Frank. Who was seen Tom David Peter or Frank?

S: Tom **see*d*** Peter (…) and Dave saw Frank.

(20.05.00) *{S. has just asked how L. would feel if the equipment was stolen}.*

S: I'd be upset if somebody **stol*ed*** my stuff.

L: If somebody..?

S: If somebody **steel*ed*** my stuff.

L: Yeah, you'd be upset if somebody?

S: **Steel*ed*** my stuff.

S: Irregular plural nouns:

(04.06.98) Hello: Gentle**mans**

(04.06.98) Hello gentlemen-gentle**mans** an' the ladies and welcome to the show

(07.10.98) Hello ladies and gentle**mans** we're watching me and Georgina.

(07.10.98 Hello Lady and Gentle**mans** we're now colouring now.

(07.10.98) We're starting now, Lady and Gentle**mans**.

(07.10.98) Hello..well that's (all) Ladies and Gentle**mans.**

(07.10.98) I was only just talkin' about Ladies and Gentle**mans** here.

(09.12.98) *{S.'s response to test item}*

L: What has the cat just done?

S: Cat catch the mouse (..) It's **mouses**-there's two **mouses**

(24.04.99) *(S.'s responses to test item)*

L: Here is one foot Here are two:?

S: (..) **Feets**!

L: What was that?

S: Feet (..) **feets** (..) hahh..huh

(24.04.99) *{S.'s responses to test item}*

L: Here is one child. Here are three:?

S: (..) Girls (...) **childs**..

(18.03.00) {*S. and L. talking after test administration has finished}*

L: Is that how you'd tell a story to erm a baby or a child or [[somethin'?

S: [[Probably..I dunno (shrugs simultaneously) I'm not good with **childs**, toddlers huhh (..)[[or babies.

L: [[You're not good with childs or toddlers?

S: No

L: Don't you like childs?

S: Yeah, they're all right.

(20.05.00) *{S.'s response to test item}*

L: Here is one child. Here are three....?

S: (..) Child (..) chil-children (..) **childrens**.

S: Irregular third person singular:

(18.03.00) mm: *{Shrugs})* Football netball (..) mm: dunno (..) tennis. Dunno what else. *{Slight pause}* Sometime_ [**du:z**] cross country

S: Irregular comparative adverbs:

(24.04.99) *{S.'s responses to test item}*

L: This picture is good, but his picture is even?

S: **Good*er***.

L: and this picture is the?

S: **Good*est***.

(20.05.00) *{S.'s responses to test item}*

L: This picture is good, but his picture is even?

S: **Good*er***.

L: and this picture is the?

S: **Good*est***.

2 Georgina's Overregularizations

G: Irregular past tense verbs.

(28.10.98) *{G. talks to her adoptive mother about her 'broken' microphone}*

G: I('ve) **brok*en*** mine I just **brok*ed*** it mum.

K: Her's is perhaps off as well is it?

G: I **brok*ed*** it.

(09.12.98) He **blow*ed*** a whistle

(28.10.98) It was **feed*ed*** to her.

(19.11.98) No Donna **teach*ed*** me. **Teach*ed*** me how to do it.

(19.11.98) She **teach*ed*** me how to do it so

(19.11.98) mhm: Donna **teach*ed*** me how to do it (..) on-on Saturday (..) She **teach*ed*** me how to do it.

(19.11.98) Still got it. It **light*ed*** up.

(19.11.98) Look it **light*ed*** up.

(19.11.98) 'Cuz my friend who **teach*ed*** me (..) she did..that.

(19.11.98) Dina **teach*ed*** me how to do this 'walk the dog.'

(20.05.00) *{G.'s response to test item}*

L: The student did not know the teacher who taught year five last year.

G: E:rm The student didn't know (…) know e:rm her who **teach*ed*** them last year.

(20.05.00) *{G.'s response to test item}*

L: Today the boy draws the cat. Yesterday he:?

G: **Drawn*ed*** the cat

L: No.

G: Yesterday he **drawn*ed*** the cat.

L: Today he draws. Yesterday he?

G: **Draw*ed***.

G: *Irregular plural nouns:*

(24.04.99) *{G.'s response to test item}*

L: Here is one foot. Here are two:?

G: (..) **Foots**

(24.04.99) *{G.'s response to test item}*

L: Here is one child. Here are three:?

G: (...) **Childs**

(20.05.00) *{G.'s response to test item}*

L: Here is one foot. [[Here are two=

G: [[Foot.

=**Foot<u>s</u>**.

(20.05.00) *{G.'s response to test item}.*

L: Here is one child. Here are [[three-

G: [[Three **childrens**.

G: *Irregular third person singular:*

(19.11.98) It's neater than my brother=He just [**du:z**] rush, rush, rush one.

(19.11.98) Nicholas's yo-yo [**du:z**] the sleeper cuz' (..) erm I do it an' it doesn't do it for me.

(16.10.99) mm Whoever [**du:z**] the better yeah? {*giggles}* (..) can 'ave the prize-can have the prize.

(24.04.99) Well me an' Sariah can play a game, while Nicholas [**du:z**] this.

G: *Overregularization of irregular comparative adverbs:*

(24.04.99) *{G.'s responses to test item}*

L: This picture is good, but his picture is even?

G: Bad-Badder-**Good*er*** (…) Good..

3 Ingrid's Overegularizations

I: Irregular past tense verbs:

(09.06.98) St George came up and **fight*ed*** dragon

(29.06.98) *{I. and, her adoptive mother, M. talk during dinner}*

I: Should have **think*ed***.

M: Thought

I: Thought

(22.07.98) *{I. is playing with her blow-up shark in front of the camera}* Yea:h, look! Do you want your head **bit*ed*** off?

(10.09.98) Eeeee! That is quite silly. Very very silly hedgehog. D'you like being it **thrown*ed*** at you?

(10.09.98) *{I. talks about the detachable microphone she is wearing}.*

Don't think it's workin'(…) I've **brok*eden*** the thing.

(21.09.98) *{I. is talking to her friend R about who has been chosen for the school choir}*

mm: Who was it? Kara wan't-Kara wasn't being **chos*ed***.

(21.09.98) A:hh! Some people have had their tooth **took*en*** out in our school before.

(14.10.98) *{I. is with another friend, S. and thinks that the detachable microphone, she is wearing, may have been damaged}.*

Ooh! It's just been **broken*ed***

(14.12.98) {*I.'s response to test item}*

And then he **driv*ed*** off *{Later on I. overregularizes the same word again}* And then he **driv*ed*** off and when he got near a train station or something (..) he made some friends.

(14.10.98) *{I. says "singed" soon after her friend, S. has made the same error}*

Yeah and we **sing*ed*** loads of things.

(14.10.98) *{I. asks her father, J.P. where her mother goes to work}*

Where Mummy **goed**?

(10.03.99) *{I.'s response to test item}*

L: The boy is writing a letter. This is the letter the boy?

I: **Wrote*n*.**

(13.04.99) *{Talks about getting hurt in karate}*

Y'know if I just bounced on the bed (..) and just a little bit **stick*ed*** up (..) I would just keep playing

(19.10.99) *{I.'s response to test item}*

L: What has the cat just done?

I: He-He-He's got two mice-Just **catch*ed*** two mice and he's going to eat them.

L: What has the cat just done?

I: **Catch*ed*** two mice.

(19.10.99) I've **hid*ed*** those Smarties *{giggles}*

(16.05.00) *{I.'s response to test item}*

L: *{Shows I. a picture of a street scene}* Can you make a sentence out of this picture using the word if?

I: If I get **runn*ed*** over I'll get told over-off I meant.

L: If I get=

I: =get <u>run</u> over I'll get told off.

(16.05.00) *{I.'s response to repetition test item}*

L: After the students had completed the lesson the teacher asked them to write a report.

I: After the children..**wrot*ed*** a letter (..) they (…) taught (…) a report.

(20.05.00) *{I. speaks during a game 'catch the ball' in the garden}*

I just **catch*ed*** the ball.

I: Irregular plural nouns:

(02.12.98) (*I.'s response to test item)*

L: What has the cat just done?

I: Killed some **mice*s*** (..) Getting some **mice*s***.

(02.12.98) *{I. and L. talking over dinner}*

L: I just don't like eating meat very much.

I: D'ya like **chicken<u>s</u>**?

(10.03.99) *{I.'s response to test item}*

L: Can you make a sentence about this picture using the word, playing?

I: They are playin' cards-no they are playin' **dices**

(10.03.99) *{I.'s response to test item}*

L: Neither Mum nor Dad helped the twins They got dressed by:?

I: **Themselfs**. Oh clever little twins!

(10.03.99) *{I.'s response to test item}*

L: Here is one child. Here are three:?

I: (..) **Childs** (..) children

(10.03.99) *{I.'s responses to test item}*

He loves **scar*fes*** hats (...) I only know those.

(19.10.99) *{I.'s response to test item}*

L: The elephant is pushed by the boy.

I: *{Points}* Number two. The **tooths** are pushing.

(19.10.99) *{I.'s response to test item}*

I: *{giggles}* Wha:t? I said it: Going to eat them.

L: Catched two mice?

I: Yeah-**Mices**!

I: Overregularization of comparative adverbs:

(14.12.98) *{I.'s describes one of the tests}*

It's the **boring*est*** one I've ever played

Appendix F: Chapter 8.

(I) Criteria for Analysing C-Units (Adapted from Loban, 1976)

1. Words will be counted according to their adult counterpart.

2. Where the transcripts are long enough, 500 words of each child's spontaneous speech will be taken from the middle using the 'word count' option in Microsoft Word.

3. Words or responses that are unclear will be deleted. Requests for *clarification such as "Hm?" and "Huh?" and exclamations such as "Yea:h!", "Wo:w" or "He::y!" will be deleted unless they function as answers to questions. Vocatives (i.e. names) outside communication units will also be excluded. The word total will, again, be made up to 500 words by adding more speech from the transcript.

4. Exact or virtual repetitions of words or phrases and so on, within C-Units and unfinished sentences will be allocated to a separate category called mazes (see Loban, 1976.) which can give an index of linguistic uncertainty when the mean number of words in mazes is calculated.

5. "Yes", "No", "uh-huh" and "mhm:" will be counted as separate communication units if they answer a preceding question. These (elliptical) responses will be counted as one word and credit will only be given for the words that are *actually said* (rather than inferred). For example,

Units	Words	
		Georgina: Q. Are you going to get a cake?
1.	1.	Sariah: A. Yes.

What Sariah meant by her response is "Yes [I am going to get a cake.]", but saying this would have involved unnecessarily repeating part of the previous

question-hence ellipsis. However, due to Sariah's language difficulties and variability in rule application, it cannot be predicted with certainty whether she would have said the sentence correctly or even have included all the constituents. For example. S might have omitted the determiner or subject element since she often does this in her spontaneous speech. Therefore counting words not actually said could result in a misrepresentation of language ability and so only words *actually produced* will be credited.

6. Similarly for elliptical responses in reply to preceding statements, words will only be counted if they are actually said.

7. Contractions such as "I'm", "didn't", "shouldn't", "they've", "she's" will be counted as two words.

8. Common contractions such as "gonna" (going to), "wanna" (want to), and "ain't" (have not) will be counted as two words. However, contracted responses such as "dunno" (I do not know) will be counted as four words.

9. Words that function as compound nouns will be counted separately, so that "black bird" will be counted as two words instead of one.

*The decision was taken to delete one-word requests for clarification such as "Huh?' because some children have a high proportion of these responses in their transcripts at times. Including these responses in the overall C-Unit count would have resulted in an unfairly deflated representation of their language ability-especially since repeated requests for clarification may be the result of untested, residual hearing loss.

Additional rules

1. Tag questions and declarative statements (or comment clauses) at the end of sentences such as the examples below:

    I. "This worked at school, though, <u>didn't it</u>?"

II. "Yeah, look, I can do it, I think."

will be included in the main C-Unit and will not be analysed separately (i.e. analysed as a separate C-Unit).

2. Comment clauses or discourse markers such as "you know" will still be relegated to the maze category. This is because, S. quite often says this and its repeated use indicates some kind of formulaic speech. For practical purposes, every time "you know" occurs, it will be marked as a maze in parenthesis in order to provide some index of repetition or stereotyped/formulaic speech. This is not to undermine the communicative value of discourse markers such as "you know".

3. One word responses to Yes/No questions. Including these in the C-Unit count does decrease the mean length of C-Unit figure. However, one-word responses such as "Yes" or "No" will only be deleted if the authors such as Loban or Hunt etc have also done this.

4. An asterisk * beside a C-Unit consisting of one-word response such as "Yes" or "No" indicates a response to a question.

Arbitrariness of the rules

It is recognised that the above additional rules are somewhat arbitrary**,** but in the absence of standardised conventions for analysing the syntax of spontaneous, conversational speech, this is unavoidable. However, the main rules follow Loban's original (1976) conventions for using C-Units.