

A MEALTIME OBSERVATION STUDY;
OBESITY, ETHNICITY AND OBSERVED MATERNAL
FEEDING STYLES

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ABSTRACT

The escalating trend of childhood obesity within genetically stable populations indicates that environmental, and therefore modifiable, factors must be contributing. Infancy (when parents largely determine child-feeding), has been highlighted as a critical time for the development of maladaptive eating behaviours. Despite interest in early interventions, there is no research on child-feeding styles from UK non-white communities. Born in Bradford (BiB) aims to identify factors that contribute to differences in health outcomes between people in South Asian (S. Asian) and European origin. This birth cohort provides a valuable opportunity to explore feeding interactions that may contribute to risk of obesity in a bi-ethnic sample. The current study recruited thirty eight mother-child dyads, according to maternal weight status and ethnicity and observed them during a typical mealtime. A range of positive and negative interactions were coded using the Mealtime Observation Schedule (MOS, Sanders & LeGrice, 1993). Data was also collected regarding mealtime organisation. Observed interactions were compared to mother's self-reports on questionnaire assessments of feeding, parenting styles and infant characteristics. The differences found between the mealtimes of obese and healthy weight mothers were limited compared to the differences observed between S. Asian and non-Asian mothers. Obese mothers were observed to use a greater amount of positive eating comments. They were most likely to report Indulgent parenting, whereas healthy weight mothers were most likely to report Authoritarianism. This difference was not observed in the mealtime interactions. There were several differences between S. Asian and non-Asian mothers in both the meal structures and mother-child interactions. S. Asian mothers used negative parenting behaviours more frequently, and less positive behaviour. In the healthy weight S. Asian group, this was paralleled by greater levels of negative child behaviour. Both maternal and child age also influenced these outcomes. Differences in mealtime interactions may contribute to differences in obesity rates across different ethnicities. However, research regarding parenting styles is mostly based on white European samples. It is argued that current measures are not culturally appropriate for S. Asian families living in the UK. More research is needed in order to develop culturally appropriate interventions regarding child feeding.

TABLE OF CONTENT

ACKNOWLEDGEMENTS	3
ABSTRACT	4
List of Tables.....	9
List of Figures	10
Abbreviations	11
LITERATURE REVIEW	12
Introduction	12
The Rise of Childhood Obesity.....	12
Children at Risk	13
Different Parenting Styles	16
Figure 1: Typological Approach to Parenting Styles.....	16
Parenting Styles and Outcomes.....	17
Cultural and Ethnic Variations of Parenting Styles	18
Parent-Feeding Styles.....	22
Control during Mealtimes	24
Pressure to Eat.....	25
Restriction	26
Child Eating Behaviours & Temperament.....	28
Mealtime Observations	29
The Effects of Maternal Eating Difficulties.....	32
Maternal Obesity.....	35
Obesity and Ethnicity	37
Ethnicity and Feeding Styles.....	37
AIMS	41
METHOD	42
Design	42
Participants.....	42
Calculating BMI.....	43
Defining Ethnicity.....	43
Figure 2: The Recruitment Process	45
Table 1: Reasons Cited for Non-participation	46
Sample Characteristics	46

Table 2: Gender frequency of the children observed	47
Procedure.....	47
Carrying out the recordings.....	48
Measures	50
The Mealtime Observation Schedule (MOS).....	50
Table 3: Mealtime Observation Scheduling (MOS) coding categories for parent behaviours.....	51
Table 4: Mealtime Observation Scheduling (MOS) coding categories for child behaviours.....	52
The Caregivers Feeding Styles Questionnaire (CFSQ)	53
Parenting Practices Questionnaire (PPQ)	53
Infant Characteristics Questionnaire (ICQ)	54
Data Analysis	55
Translations	55
MOS Summary Scores	55
Inter-rater Reliability.....	56
Questionnaire Data.....	57
RESULTS.....	58
Participant Characteristics.....	58
Table 5: Mean (SD) and range of final sample characteristics.....	58
Table 6: Frequency data of variables related to socioeconomic status.....	59
Organisation & Environmental Context of the Mealtime	59
Table 7: Frequencies of various environmental features of the mealtimes.....	60
Table 8: Mean (SD) and range of meal duration, speed of eating and food presentation	61
Positive Parent Behaviours	62
Table 9: Mean (SD) percentage of mealtime intervals that mother's positive behaviours occurred.....	62
Negative Parent Behaviours	63
Table 10: Mean (SD) percentage of mealtime intervals that mother's negative parenting behaviours occurred.....	64
Controlling Behaviours - Positive & Negative	65
Table 11: Mean (SD) percentage of mealtime intervals that mother's controlling behaviours occurred.....	63

Positive Child Behaviours.....	67
Table 12: Mean (SD) percentage of mealtime intervals that positive child behaviours occurred	67
Negative Child Behaviours	68
Table 13: Mean (SD) percentage of mealtime intervals negative child behaviours occurred.....	69
Caregivers Feeding Styles Questionnaire	70
Table 14: Mean (SD) scores on the dimensions of demandingness and responsiveness.....	70
Table 15: Frequency of different parenting styles within the four groups....	71
Parenting Practices Questionnaire.....	72
Table 16: Mean (SD) scores on the warmth and hostility dimensions.....	72
Infant Characteristics Questionnaire.....	72
Table 17: Mean (SD) ICQ scores.....	73
DISCUSSION	74
Overview of Findings.....	74
The Impact of Maternal Weight on Mealtimes.....	75
The Impact of Maternal Ethnicity on Mealtimes.....	77
Comparison between Questionnaire Assessments and Observations	81
Additional Factors that Influenced Mealtime Interactions.....	84
Features of the Mealtimes Observed Across the Groups.....	85
Methodological Issues.....	86
Strengths and Limitations of Measures.....	90
Challenges in Conducting Bi-ethnic Research.....	89
Directions of Future Research.....	91
Clinical Implications.....	93
REFERENCES	95
APPENDIX	112
Appendix 1: Outline Research Proposal	112
Appendix 2: Introducing the Mealtime Observation Study.....	117
Appendix 3: Patient Information Sheet.....	118
Appendix 4: Contact Sheet.....	120
Appendix 5: Instruction letter	121
Appendix 6: Consent Form	123

Appendix 7: Instructions for Research Assistant	125
Appendix 8: Letter accompanying the mealtime recording DVD	127
Appendix 9: Parent Mealtime Observation Codes	128
Appendix 10: Child Mealtime Observation Codes	130
Appendix 11: Contract for Translator	132
Appendix 12: Evidence that mothers of different ethnicities were not outliers	133

List of Tables

Table 1: Reasons Cited for Non-participation	45
Table 2: Gender frequency of the children observed	46
Table 3: Mealtime Observation Schedule coding categories for parent behaviours..	50
Table 4: Mealtime Observation Scheduling coding categories for child behaviours	51
Table 5: Mean (SD) and range of final sample characteristics.....	56
Table 6: Frequency data of variables related to socioeconomic status	59
Table 7: Frequencies of various environmental features of the mealtimes.....	60
Table 8: Mean (SD) and range of meal duration, speed of eating and food presentation	61
Table 9: Mean (SD) percentage of mealtime intervals that mother's positive behaviours occurred	62
Table 10: Mean (SD) percentage of mealtime intervals that mother's negative parenting behaviours occurred	64
Table 11: Mean (SD) percentage of mealtime intervals that mother's controlling behaviour occurred.....	63
Table 12: Mean (SD) percentage of mealtime intervals that positive child behaviours occurred.....	67
Table 13: Mean (SD) percentage of mealtime intervals negative child behaviours occurred.....	69
Table 14: Mean (SD) scores on the dimensions of demandingness and responsiveness.....	67
Table 15: Frequency of different parenting styles within the four groups.....	71
Table 16: Mean (SD) scores on the warmth and hostility dimensions.....	70

List of Figures

Figure 1: Typological Approach to Feeding Styles 16
Figure 2: The Recruitment Process45

Abbreviations

BiB – Born in Bradford

BiB1000 – a sub-cohort of 1000 families within the wider BiB birth cohort

BMI – Body Mass Index

CFQ – Child Feeding Questionnaire

CFSQ – Caregiver’s Feeding Styles Questionnaire

CHD – Coronary Heart Disease

HSE – Health Survey for England

ICQ – Infant Characteristics Questionnaire

kg – kilograms

MOS – Mealtime Observation Schedule

m. – metres

m – months

NIHR – National Institute for Health Research

PPQ – Parenting Practices Questionnaire

R&D – Research and Design

REC – Research Ethics Committee

S. Asian – South Asian

UK – United Kingdom

US – United States

USDA – United States Department of Agriculture

WHO – World Health Organisation

y – years

LITERATURE REVIEW

Introduction

This study is one of a series of funded studies within the Born in Bradford (BiB) research project (<http://www.borninbradford.nhs.uk/>). BiB is following the lives of around 13,000 babies over the next 20 years. In general, BiB is aiming to increase understanding of the factors that contribute to health and well being, and identify factors that influence differences in health outcomes between people of South Asian (S. Asian) and European origin. A series of studies, with the collective aim of developing an early intervention for childhood obesity, is currently funded by a 5-year National Institute for Health Research (NIHR) project grant.

Childhood obesity is a multisystem disease related to genetic and perinatal factors, levels of physical activity and diet, and wider environmental factors such as food availability, quality, policy and advertising. Rising prevalence rates among genetically stable populations indicate that environmental, and therefore modifiable, factors must underlie the childhood obesity epidemic (Ebbeling, Pawlak & Ludwig, 2002). It is believed that all individual decisions to consume and to cease consuming on the basis of bodily sensations are in fact learned (Connor & Armitage, 2002) and parents have a significant role in this learning process, especially in the preschool ages. In order to contribute to the prevention of obesity in childhood, we need a better understanding of potential maladaptive parental feeding interactions. This study investigates Asian and Non-Asian parental feeding behaviours, children's feeding behaviours and the environmental and emotional context of mealtimes for obese mothers compared to those of normal/ healthy weight.

The Rise of Childhood Obesity

The rapidly escalating trend of obesity and overweight in childhood is a serious public health problem and has been labeled an international epidemic (e.g. Baur, 2002, Department of Health, 2008). Individual studies and secondary analyses of census and National Health and Nutrition Examination Survey datasets have revealed that this trend now extends to younger pre-school children (Board on Health Promotion and Disease Prevention, 2005). Obesity in British children has been

reported as being between 1% and 12% in 2001 (Rudolf, Sahota & Barth, 2001). The different ranges reported across studies can be explained by the different standard cut off points used when defining overweight and obesity in children. Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2). The measurement of obesity among children needs to take account of the different growth patterns among boys and girls at each age, therefore a single categorisation cannot be used to define childhood obesity as is the case with adults (The Information Centre for Health and Social Care, 2011).

Recent statistics regarding the levels of obesity in children have used BMI threshold for each age and calculated the percentage of boys and girls who were over the 85th (overweight) or 95th (obese) BMI percentiles (based on the 1990 UK reference population; The Information Centre for Health and Social Care, 2011). For boys aged 2 -10 years, the prevalence of obesity increased from 9.7% in 1995, peaked at 17.4% in 2006, but then steadily fell to 13.7% in 2009. Among girls the prevalence of obesity increased from 10.6% in 1995, to 17.4% in 2005, but similarly decreased to 15.2% by 2009 (Health Survey for England [HSE], 2010: The Information Centre for Health and Social Care, 2011). There are therefore indications that the trends may be leveling out, but continuous data collection is imperative to ascertain the continuing pattern and more needs to be learned about preventing obesity.

Children at Risk

Obesity is clearly associated with increased mortality and morbidity. Both the physical and psychological co-morbidities are well documented and include type II diabetes, cardiovascular disease, gallbladder disease, hypertension, certain cancers and depression (e.g. Pi-Sunyer, 1991). Abdominal, or central, obesity has specifically been associated with increased risk of myocardial infarction (heart attack), in both sexes, at all ages, and worldwide (Yusuf et al., 2004).

Childhood obesity has been repeatedly shown to be an independent risk factor for adult obesity (Serdula, Ivery, Coates, Freedman, Williamson & Byers, 1993; Felton, Pate & Parsons, 1998; Whitaker, Pepe, Wright, Seidel & Dietz, 1998). Obese children have been reported to have between a 25 and 50% chance of progression to

adult obesity (Must & Straus, 1999). A recent longitudinal study that measured waist circumference, skin thickness and BMI of 468 participants from 0-17 years concluded that before 6-months old was a critical period and that weight gain during this time was consistently associated with higher body composition later in life (Botton et al. 2008). However McCarthy and colleagues (2007) found that increased speed of weight gain from 1-year 9-months to 5-years was the strongest predictor of adult BMI and waist circumference.

Until recently, studies of infant feeding and overweight in early childhood have focused primarily on the role of breastfeeding compared with formula feeding. The role of breastfeeding in the development of later childhood obesity is a controversial topic and the evidence is mixed. This could be attributed in part to the difficulty of conducting randomized controlled trials, recall bias and the lack of clear definition of breastfeeding by researchers, in terms of exclusivity of breastfeeding and/or time frame (Garden, Marks & Almqvist, 2011). Formula feeding has been linked to greater consumption (Agras, Kraemer, Berkowitz & Korner, 1990), rapid weight gain (Baker, Michaelsen, Rasmussen & Sorensen, 2004), and greater weight gain (Alexy, Kersting, Sichert-Heller, Manz & Schoch, 1999) in infancy.

However, in a systematic review of childhood predictors of adult obesity, Parsons and colleagues concluded that there was no consistent relationship pattern between whether or not an infant was breast fed, how long infants were breast fed, when solid foods were introduced or energy intake in infancy and risk of obesity up to 7 years old (Parsons, Power, Logan & Summerbell 1999). In a more recent review, examining the evidence on the effects of breastfeeding on short and long-term health outcomes in developed countries, a history of breastfeeding was associated with lower levels of obesity and obesity related conditions, such as type 2 diabetes (Ip et al. 2007). However, there was insufficient good quality data to address the relationship between breastfeeding and cardiovascular disease. Almost all the data in the review were gathered from observational studies and therefore no causality can be inferred. It appears that research that has focused on investigating children's dietary patterns prior to weaning has made a valued, but limited, contribution towards developing our understanding about the development of overweight in early

childhood. Research has begun to delineate factors that can predict which children are at significant risk for the development of obesity in later life.

A significant risk factor is having one obese biological first generation relative (Small, Anderson, Mazurek & Melnyk, 2007). The HSE found that obesity prevalence rates were higher among children who lived with parents who were either overweight or obese. For boys aged 2-15 years, 24% of those living with at least one obese parent were categorized as obese, compared with 11% of boys whose parents were either normal weight or underweight. For girls aged 2-15 years, 21% of those living in (what the HSE labeled) 'overweight/obese households' were obese, compared to 10% living in 'normal/underweight households'. The research is consistent in the finding that infants who have an obese parent, especially those who have two obese parents, are at an increased risk of obesity in childhood and adulthood. Furthermore, this risk is substantial. It has been reported that parental obesity more than doubles the risk of adult obesity among both obese and non-obese children less than 10 years of age (Whitaker, Wright, Pepe, Seidel & Dietz, 1997). More recently, it was reported that having an obese parent increases the likelihood that a child will be obese 4-5 fold (Daniels et al. 2005).

The precise mechanisms by which parental obesity increases the likelihood of a child becoming obese are likely to be multi-factorial and complex. It is important to note that research suggests that between 5-25% of the variance in weight within a population can be attributed to genetic variability (Bouchard, Despres & Tremblay, 1991). Clearly it is difficult to assess the contribution of genetics over and above that of a shared environment and culture (Kimm, 1995). In fact, over 20 years ago after a series of adoption studies with samples of both identical and fraternal twins that had either grown up apart or together, Stunkard and colleagues concluded that 'genetic influences on body-mass index are substantial, whereas the childhood environment has little or no influence' (Stunkard, Harris, Pedersen & McClearn, 1990 p.1483). However, we do know that the human genotype has not altered substantially over recent decades and so genetics cannot account for the dramatic rise in obesity in the last 20-30 years (Hill & Melanson, 1999).

Different Parenting Styles

It is parents who predominantly determine the availability of foods for their children including what, how and when specific foods are available. Parents serve as role models, socializing children to their food choices, eating habits and feeding behaviours, as well as providing examples for attitudes and coping skills and setting standards for perfection and acceptance (Hall & Cohn, 1992). Parents are also important determiners of the social contexts in which children eat, including the emotional tone of different eating occasions which will of course be influenced by general parental styles and family context.

General parenting styles have been summarized as two dimensions comprising control/demandingness and warmth/responsiveness (Baumrind, 1971; Baumrind 1989; Maccoby & Martin, 1983). These independent dimensions, when crossed, yield four different parenting styles (Figure 1).

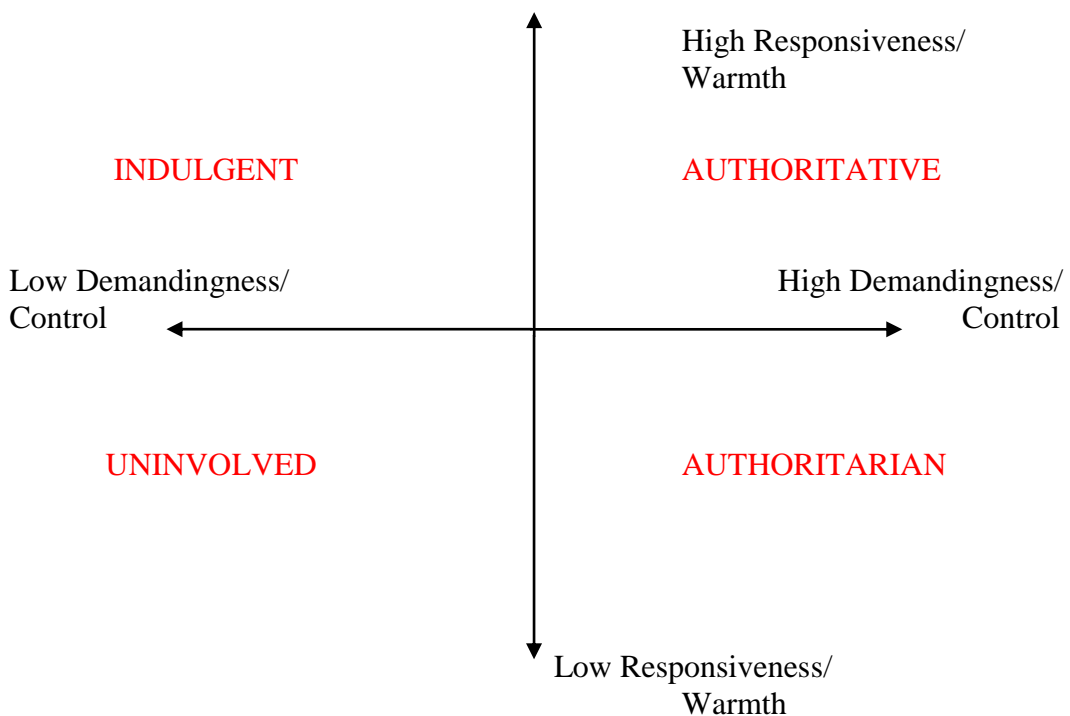


Figure 1: Typological Approach to Parenting Styles

Authoritarian parenting is characterized by high control and low warmth. Such parents may have high expectations for their child whilst being unable to, or not wanting to provide, a high degree of emotional support. They are therefore demanding parents but not consistently responsive to their child's emotional needs.

These parents are most likely to place importance on obedience to rules and not always able to take their child's needs into consideration. *Permissive* parents are those who use low levels of control. Permissiveness and high levels of warmth demonstrates a more *Indulgent* parenting style. These parents are able to be responsive and can be warm, accepting and tolerant of the child's impulses. Indulgent parents do not put demands on their children regarding their behaviour and avoid exerting their authority. More recently, permissive parents have been distinguished from parents who demonstrate both low levels of warmth and responsiveness. This parenting style has been referred to in the literature as *Uninvolved* parenting or 'rejecting-neglecting' parents (Maccoby & Martin, 1983). Like indulgent parents they allow children a lot of independence, without setting clear goals or making many demands on their children. But uninvolved parents do not demonstrate care or concern and so can fail to protect their children. Finally, *Authoritative* parenting is characterized by high control and high warmth. Those categorized as Authoritative control and guide their children by setting clear, developmentally appropriate goals and expectations and giving consistent positive responses to their child's successes. An Authoritative parent is therefore warm, firm and accepting of their individual child's need for psychological autonomy (Steinberg, 2001).

Parenting Styles and Outcomes

Steinberg and his colleagues have conducted an extensive set of studies assessing the associations between parenting typologies and various adolescent outcomes (Steinberg, 2001). In general, positive emotional, social and academic adjustment is associated with Authoritative parenting (Maccoby & Martin, 1983; Steinberg, 2001). Authoritative parenting has been consistently correlated with a wide range of positive outcomes in adolescence including increased self esteem, autonomy and competence, better academic achievement and more advanced moral development (Lamborn, Mounts, Steinberg & Dornbusch, 1994; Steinberg, Lamborn, Darling, Mounts & Dornbusch, 1994; Steinberg, Lamborn, Dornbusch & Darling, 1992). By contrast, Permissive and Authoritarian parenting styles are associated with poorer outcomes (Radziszewska, Richardson, Dent & Flay, 1996; Baumrind, Larzelere & Owens, 2010). Children of Authoritarian parents (high control and low warmth)

have been found to be more likely to experience mental health difficulties, such as anxiety, depression and eating problems and less likely to develop emotional maturity, adequate behavioural inhibition and self-regulation (Berg-Nielsen, Vikan & Dahl, 2002; Baumrind, Larzelere & Owens, 2010). Permissive parenting is associated with impulsivity, aggressive behaviour and substance misuse in adolescence (Baumrind, 1991; Maccoby & Martin, 1983). Baumrind proposed that the effectiveness of the Authoritative parenting style was due to the high expectations that parents held for their children's behaviour and also the emotional support present for the child to achieve these clear goals (Baumrind, 1991).

Evidence from the first wave of the 'Growing up in Australia' longitudinal research project shows that three parenting dimensions of global self-efficacy, warmth and hostility, all significantly and independently predict child development outcomes. Lower self efficacy, lower warmth and higher hostility are associated with a greater likelihood of negative child outcomes in terms of health and physical development, social and emotional functioning and learning and academic competency (Growing up in Australia; Annual Report 2005-2006). This finding was evident in the study's infant cohort (0-1 years) and their child cohort (4-5 years). The findings for the child cohort indicate that parental hostility is a particularly potent predictor of poorer development outcomes for 4-5 year olds. It is interesting to note that in this large population sample somewhat subtle variations (in degrees of warmth and hostility) occurring within the 'normal' range of parenting behaviours are potent predictors of children's outcomes (Growing up in Australia; Annual Report 2005-2006). Most of the research in relation to child adjustment and parenting styles has involved western, white middle-class families. It has only been since the 1990's that research has started to look at ethnic and cultural variations in parenting styles.

Cultural and Ethnic Variations in Parenting Styles

Beliefs about beneficial child rearing practices can vary widely cross-culturally. Even within western societies different cultural groups may have different beliefs and opinions about parenting styles (Music, 2011). People tend to view their own sociocultural practices as superior and may be confused by values that others take for granted. This, in turn, can lead to judgmental attitudes regarding cultural differences. This is a particular issue in contemporary multi-cultural societies such as

Bradford. Here the ethnic minority population accounts for approximately 18% of the district's total population, 86% of whom are of Asian origin and predominantly Pakistani. A further 7% are of Afro-Caribbean origin (Bradford Metropolitan District Council, 2009).

Cross-cultural developmental researchers (e.g. Kagitcibasi, 1996) have emphasized that parenting practices are related to the attributes that are most valued in the specific culture. Pakistani culture and its constructions are influenced both by Islam and the older S. Asian heritage (Stewart et al. 2000). Social development in this culture requires 'empathy for others, a sense of group unity, a view of life common to the group, and skills of interacting constructively with others' (Obeid, 1988 p.160). Conformity is valued in Pakistan as it is in most communal cultures (Miles, 1992).

The distinction between cultures that are primarily egocentric or sociocentric is an important one, even if the distinction describes a spectrum rather than any absolute differentiation (Geertz, 2000). Sociocentric practices emphasize parental control, social cohesion, interdependence and community expectations. For example, Chen, Hastings, Rubin, Chen, Cen and Stewart (1998) reported that many Chinese mothers actively discourage individuality in their children and encourage compliance, cooperativeness and interdependent ways of behaving. In cultures derived from Pakistan and the Indian sub-continent, the term used to depict family honour is 'izzat', which is a complex construct with no single meaning (Gilbert, Gilbert & Sanhera, 2004). The concept of 'izzat' is by no means particular to Pakistani populations. Maintaining family 'izzat' (translated as pride, honour and self-respect) has been thought to be an important motivator and determinant of behaviour (Mann, 1994). Related to the centrality of this construct, the use of shaming as a child-rearing practice is viewed as a common socialization strategy in societies which emphasise mutual interdependence over individual autonomy (Feghali, 1997). Shame-induction has been measured in studies by items such as "my parent made me feel ashamed when I misbehaved" or "my parent used fear of God to discipline me" (Stewart et al. 2000). Shame induction has been shown to be a common practice as perceived by adolescent males and females in urban Pakistan (Stewart et al. 2000). Childhood obedience and acceptance of the authority of elders is expected in

Pakistani culture whilst both generations are exhorted to deal with each other in an affectionate and gentle manner (Obeid, 1988).

In contrast to sociocentric ideas, western cultures are more egocentric and have been shown to value autonomy, self-esteem and self-assertion (Rothbaum & Morelli, 2005). 'Control' tends to be highly valued in sociocentric cultures and yet it can have quite negative connotations for many American and Western European parents. However, such differences are not about one way being "better", nor about parents loving their children any more or less. Human beings are shaped by and adapt to their environmental conditions and we can only ever make judgments and hold opinions in light of our own unique tapestry of experiences and knowledge. Therefore, it is impossible to argue that one parenting practice is more "natural" than another. The interface between culture and child development is complex. The very psychology of another culture, its concepts, ideas and presuppositions, can differ hugely. In Britain it has been argued that professionals and government documents encourage parenting styles and methods that are not culturally appropriate for parents from Asian backgrounds (Butt & Box, 1998). For instance, they might emphasize the role of mothers at the expense of the role of the extended family and devalue parenting beliefs that differ from the cultural mainstream (Music, 2011).

The applicability of Baumrind's (1967) typologies with non-western groups has been challenged. For example, Chao (1994) believes that 'Authoritarian control' is not a valid construct when applied to Chinese, and more broadly Asian, parenting. Control and restrictiveness that are characteristic of these families reflect a different set of underlying beliefs than those of European-Americans. Within western culture, control and strictness tends to have negative connotations and are equated with domination, which may explain the negative outcomes associated with high parental control. In contrast, Chao (1994) claims that, within East Asian culture, control is rooted in a notion of training that reflects role relationships defined by Confucianism and has positive connotations. Confucian philosophy emphasizes devotion to parents, the importance of education, respect for authority and emotional restraint (Van Campen & Russell, 2010). It could be argued that parenting typologies originally developed with American samples cannot be translated to other cultures, but instead reflect their sociocultural contexts and underlying beliefs and ideas.

Consistent with Chao's position, Rohner and Pettengill (1985) found that parental 'strictness' was positively correlated with parental warmth and suggested that East Asian adolescents respond positively to parental control, unlike western adolescents. It is important to note that East Asian parents have been described as less warm and accepting than western parents in the research literature (e.g. Greenberger & Chen, 1996; Lin & Fu, 1990). However, these research samples were dominated by Chinese, Japanese and Korean participants from more Confucian cultures (Stewart et al. 2000). There is no known UK research regarding parenting styles of Asian families living in England.

Steinberg (2001) asserts that the benefits of Authoritative parenting "transcend the boundaries of ethnicity, socioeconomic status, and household composition" (p.12). Studies of American adolescents show that regardless of their racial or social background or their parent's marital status, adolescents with Authoritative parents generally show higher academic achievement, have lower rates of anxiety and depression and perform better on measures of self reliance and self esteem (Steinberg, 1990). Indeed, Steinberg asserts that the positive outcomes associated with Authoritative parenting have been replicated by researchers in different countries, using different methodologies, different samples and different measures (Steinberg, 2001). It is important to note that the countries where this finding has been replicated i.e. China, Pakistan, Hong Kong, Scotland, Australia and Argentina (Feldman, Rosenthal, Mont-Reynaud, Lau & Leung, 1991; Shek, 1996; Shucksmith, Hendry, Glendinning, 1995; Stewart, Bond, Zaman, Dar & Anwar, 1999), have diverse value systems. However, it has been reported that African American, and to a lesser extent Asian American, teenagers are not as negatively affected by Authoritarian parenting compared to white adolescents (Baldwin & Baldwin, 1989; Steinberg, Dornbusch & Brown, 1992). Despite this, Authoritative parenting remains a potent predictor of a diverse range of positive child developmental outcomes.

The number of studies on parenting practices and outcomes in non-western cultures is increasing. However, there remains an over-representation of East Asian cultures and an underrepresentation of S. Asian Cultures in these studies (Bond & Smith,

1996). Another issue is the widespread inappropriate labeling of ethnicity in research. “Ethnicity is a multi-faceted quality that refers to the group which people belong, and/or are perceived to belong, as a result of certain shared characteristics, including geographical and ancestral origins, but particularly cultural traditions and languages” (Bhopal, 2004 p.441). Understanding and defining a person’s ethnicity is complex, and accurate use of terminology remains controversial. Research often lacks full descriptions of the characteristic of the populations studied and fails to acknowledge that the very characteristics that define ethnicity are fluid and imprecise, meaning that they are not easily measured. Labels can hide significant heterogeneity of cultures. For example, the term ‘white’, often used as a key descriptor of a sample, can refer to individuals of English, Welsh, Irish, Scottish, New Zealander - and in the US – Iranian and Moroccan descent (Bhopal & Donaldson, 1998). Despite the lack of international understanding and agreement on the meaning of labels assigned to different groups, knowledge of cultural differences in parenting styles is crucial for policy makers. Policies designed to support families may not fit well with ‘ethnic minority’ populations whose parenting styles differ from the dominant model.

Parent-Feeding Styles

There has been a lack of research regarding the impact of different parenting styles, (as previously discussed according to Baumrind’s (1971, 1989) classification) on *early* child development outcomes. Feeding a child is a crucial parenting behaviour and a central nurturing role of parents, especially in the early years. A parent’s feeding practices, and the way a child responds to these practices are an important and complex part of the regular interaction within the parent-infant dyad (Satter, 1999). In the first few years of life these interactions occur during a sensitive period of brain development and are therefore likely to shape the individual child’s eating behavior in the long-term. In fact, parent feeding practices may have a life-long impact on appetite and weight regulation (Baughcum et al. 2001). In general, parents try to teach their child adequate eating behaviours by using different feeding strategies and these influence children’s eating behaviour in different ways. Parental child-feeding patterns have been mapped on to the taxonomy of parenting styles that have previously been discussed (Birch & Fisher, 1995).

Authoritarian child-feeding patterns describe attempts to control a child's eating with little regard for the child's individual preferences and choices. Parents categorized as Authoritarian by self-report on the Caregiver's Feeding Styles Questionnaire ([CFSQ] Hughes, Power, Orlet-Fisher, Mueller & Nicklas, 2003) have been found to report significantly higher levels of restrictive feeding, greater use of pressure to try to get their child to eat, as well as inconsistency and physical punishment (Hughes et al. 2003). This more controlling parenting style has been found to correlate with the provision of a greater number of prompts or cues from the mother for their child to eat (Drucker, Hammer, Agras & Bryson, 1999).

A Permissive feeding style refers to generally allowing a child to make his or her own decisions regarding what, where and how much he or she eats. This is either indulgent (characterized by high levels of warmth) or neglectful/uninvolved (characterized by low levels of warmth). Both indulgent and uninvolved parents tend to report using low levels of restriction and pressure within their feeding strategies. Uninvolved parents demonstrate less nurturing and organization, and report being less likely to follow-through with discipline (Hughes, Power, Fisher, Mueller & Nicklas, 2003). Within a sample of low-income preschool children, parents who reported using an indulgent feeding style also reported lower levels of negative affect for both themselves and their child, compared with Authoritarian and Authoritative parents. However an indulgent parent-feeding style was found to be significantly associated with higher child BMI (Hughes, Shewchuk, Baskin, Nicklas & Haiyan, 2008).

Authoritative refers to a balance between Authoritarian and Permissive styles, where a parent balances their concerns for a healthful intake with the child's own desire to exert control and display self-regulation (Patrick, Niklas, Hughes & Morales, 2005). This style of parenting is associated with higher levels of monitoring, nurturing, discipline, organization and reasoning (Hughes, Power, Fisher, Mueller & Nicklas, 2003). A maternal Authoritative style (which is particularly characterized by high levels of nurturing) has specifically been associated with lower consumption of calories in adolescents (Mi-Jeong, McIntosh, Anding, Kubena, Reed & Gap-Soon, 2008).

The limited research that has related general parenting styles to parental feeding practices almost exclusively uses American samples that vary in age (e.g. Hubbs-Tait, Kennedy, Page, Topham & Harrist 2008). Studies exploring the relationship between parental beliefs and behaviours related to child feeding and child overweight have also focused on European-American populations (Birch & Davison, 2001). Again, the literature is therefore dominated by samples consisting of predominantly white, middle-class, educated participants. The extent to which general parenting represents parental feeding styles in ethnically diverse populations is therefore not adequately understood. Also, relatively little is known about parental beliefs and feeding styles within specific ethnic minority cultures (Anderson, Hughes, Fisher & Nicklas, 2005). At present there is no known research on the feeding behaviour of UK S. Asian parents and their children.

Control during Mealtimes

Experts believe that our innate internal biological cues of hunger, appetite and satiety are reliable and should be depended on to inform and regulate food selection and guide energy balance and body weight (Fox, Devaney, Reidy, Razafindrekoto & Ziegler, 2006; Satter, 2007). It has been hypothesized that when parents, however unintentionally, over-control their child's food intake the child learns to respond to external cues rather than internal satiety and hunger cues. This interference with the child's innate ability to self-regulate their energy intake could lead to over consumption and therefore weight gain (Orrell-Valente, Hill, Brechwald, Dodge, Peltit & Bates, 2007; Jansen, Mulkens, Emond & Jansen, 2008). Snoek, Engels, Janssens and van Strien (2007) found that the maternal parenting strategies of high psychological control, high behavioural control and low support were all related to an increased level of emotional eating (and therefore increased risk of weight gain) among a sample of Dutch adolescents. These findings are consistent with a recent study that collected self-report questionnaire data from 450 mothers and interviewed their children aged between 6-8 years old (Topham et al. 2011). From the self-report data, parents were rated on dimensions of warmth and support, and reasoning and induction, and categorised into different parenting styles. It was found that Authoritarian parents, rated lower on dimensions of warmth and reasoning and who used more non-reasoning punishment, were most likely to have children who reported higher levels of emotional eating (Topham et al. 2011).

Paradoxically, parental control refers to direct strategies that parents may use in order to *improve* the health of their child e.g. pressuring the child to eat healthy foods and restricting intake of unhealthy foods (Patrick, Niklas, Hughes & Morales, 2005). Parents assume that children need help in determining what, when and how much to eat (Scagolioni, 2008). However, the use of these child-feeding practices may provide the child with fewer opportunities to develop self-control and remain self-regulated (Brown & Ogden, 2004).

Pressure to Eat

The effects of pressure to eat are complex and appear to have a paradoxical relationship with children's energy intake, weight status and food preference (Wardle & Carnell, 2006). Pressure to eat can vary from 'strong verbal control', such as providing direct commands or corrections to a child to 'gentle verbal control' such as suggestions or prompts to eat (Stein, Woolley & Murray, 2001). In an experimental study examining the influence of pressure to eat, Fiorito, Francis and Birch (2006) found that children within the normal weight range consumed more soup and made fewer negative comments when they were not pressured to eat. Therefore pressure to eat, which in this study constituted specific verbal instructions to 'finish your soup', was found to be ineffective at promoting food intake. A similar negative association between parents' use of pressure to eat and children's intake of fruit and vegetables has been found in a white American sample of 5-year old girls (Fisher, Mitchell, Smiaklas, Wright & Birch, 2002) and replicated with British 2-6 year old girls and boys (Wardle, Carnell, Cooke, 2005). Pressuring children to eat foods that are labeled as 'good for them' has been associated with a lower intake of fruit and vegetables in children perceived to be 'picky' eaters (Galloway, Fiorito, Lee & Birch, 2005). In a longitudinal questionnaire study of mothers with 1-2 year olds, use of pressure to eat at 1-year predicted significantly lower frequency of fruit consumption at 2-years. This pattern did not achieve significance for vegetable consumption but this may have been due to the relatively small sample size of 60 mothers. The more indirect strategy of maternal modeling of healthy eating at 1-year predicted higher child frequency of vegetable consumption at 2-years (Gregory, Paxton & Brozovic, 2011).

Consistently, results from cross-sectional studies show that higher frequency of pressure to eat from parents is associated with lower child weight status (Matheson, Robinson, Varady & Killen, 2006; Powers, Chamberlin, van Schaick, Sherman, & Whitaker, 2006; Spruijt-Metz, Lindquist, Birch, Fisher & Goran, 2002). However, studies using samples representing different socioeconomic groups have failed to find a positive relationship between parental control and children's weight status (Baughcum et al. 2001; Gable & Lutz, 2000). Robinson, Kiernan, Matheson and Haydel (2001) in a sample of 792 children with diverse ethnic and socioeconomic backgrounds, found that *low levels* of control were correlated with overweight in girls but no relationship was found for boys.

Restriction

Parent's restrictive behaviour has been found to be positively correlated with children's weight: the more restriction of food intake, the higher the weight (Birch, Fisher & Davison, 2003; Constanzo & Woody, 1985). In an experimental study, Fisher & Birch (1999) found that children increased their requests for a palatable snack food, made more attempts to obtain it and also made more positive comments about the specific food during restricted sessions compared to unrestricted sessions. Jansen, Mulkens & Jansen (2007) carried out an experimental study, randomly assigning 74, 5-6 year old children into one of two conditions: a prohibition condition and a no-prohibition condition. There were two phases of the experiment. In the first phase the prohibition group was instructed that they could only eat the yellow M&M chocolates and crisps, and were not allowed to have any of the red M&Ms and crisps. No such restrictions were given to the non-prohibition group. The second phase of the experiment was an "all you can eat" phase for both groups. In line with Fisher & Birch's (1999) findings, it was found that prohibiting the intake of red snacks, increased desire for and intake of these red foods when these restrictions were lifted. Children in the control condition, who had no such restrictions imposed, showed no increase in desire for, or intake of, the red foods over time. Jansen, Mulkens, Edmond & Jansen (2008) went on to examine whether the effects of restricting attractive snacks would also be applicable to relatively less attractive and healthier kinds of food i.e. fruit. In an experiment with 5-7 year olds, children prohibited from either fruit or sweets consumed more of the earlier

forbidden food during a second taste session than those children who were not prohibited in the first phase of the experiment. The extra intake of the formerly forbidden food was not compensated for by eating less of the other presented kinds of food. It has therefore been demonstrated that restriction can lead to higher intakes of both healthy and unhealthy foods.

Birch and Fisher (1999) showed that the relative weight of preschool children is greater when parents report more restriction of children's access to palatable snack foods. In Jansen, Mulken & Jansen's (2007) study, children of parents reporting low or high levels of restriction, measured with the restriction scale of the Child Feeding Questionnaire ([CFQ] Birch, Fisher, Grimm-Thomas, Markey, Sawyer & Johnson 2001), consumed significantly more snacks during the experiment than the children whose parents reported a moderate level of restriction. This suggests that both high levels and lack of restriction are associated with increased energy intake. In a review of 16 studies investigating the relationship between parental restrictive feeding strategies and child weight, Faith and colleagues reported that findings were inconsistent across studies; nine reported a positive association and seven reported either a negative association or no association at all. It was also highlighted that socio-demographic information was reported inconsistently across studies (Faith, Scanlon, Birch, Francis & Sherry, 2004). Recent longitudinal research has strengthened the assertion that highly restrictive feeding practices is associated with child weight gain (Clark, Goyder, Bissell, Blank & Peters, 2007). However, at present, little is known about the effects of restriction of certain types of food and its effect on preference and intake in the long-term.

It appears then, that some of the strategies that parents adopt with the intention of positively influencing food preference and consumption in their children may have the opposite effect (Morton, Campbell, Santich & Worsley, 1999). However, due to the cross-sectional design of many of the studies it remains unclear whether parents exert controlling feeding strategies as a result of their child's feeding behaviour and/or over-consumption, or if children of highly controlling parents become less able to self-regulate their food intake, which in turn leads to over-consumption. In other words, is it that parents are restricting their children's intake of certain foods and this causes overconsumption and therefore overweight, or is that children are

perceived to be overweight and so parents impose restrictions? It seems reasonable to suggest that parents are most likely to attempt to control children's behavior in areas that are perceived to be problematic either for the child or the parent (Constanzo & Woody, 1985).

Child Eating Behaviours & Temperament

A recent questionnaire study found that in a sample of 183 mothers with 2-4 year olds, the child's BMI did not independently predict maternal feeding practices (Gregory et al. 2010). However, child food fussiness positively predicted maternal pressure to eat and child food responsiveness positively predicted restrictive parenting strategies. Pressure to eat was positively correlated with concern about child underweight. Restriction was positively correlated with concern about child overweight. More indirect parental strategies of monitoring and modeling were not independently associated with maternal concern about child weight, which may suggest that parents do not view these strategies as useful in promoting appropriate child feeding behaviour.

It is important to note that it is not only the parent's behaviour but also the child's temperament that influences the feeding interaction. The reciprocity within parent-infant dyads is likely to be affected by how a child behaves and their perceived temperament. Temperament can be defined as individual differences in reactivity and self-regulation (Rothbart, 1981). The more 'difficult' a child is perceived to be temperamentally, the lower the degree of maternal responsiveness (Milliones, 1978). Infant temperaments (as well as child weight) have been found to be significant predictors of maternal controlling feeding practices at 1 and 2 years of age (Blissett & Farrow, 2007). The Infant Characteristics Questionnaire (ICQ) was used, which was developed by Bates, Freeland and Lounsbury (1979), following the influential studies of infant temperament from Thomas and colleagues (Thomas & Chess, 1977; Thomas, Chess & Birch, 1968; Thomas, Chess, Birch, Hertzog & Korn, 1963). The ICQ was used to assess infant's fussiness/difficultness and adaptability at 6-months and 1-year, dullness and predictability at 6-months, and sociability and persistence at 1-year. Infants who were perceived to be less dull received more maternal monitoring at 1-year, infants who were less predictable received less restriction at 1-year, and those who were perceived to be more difficult received less restriction at 2-

years. Children reported by their mothers to have more emotional temperaments were also reported to display more food avoidant eating behaviours in a recent questionnaire study of 3-8year olds (Haycraft, Farrow, Meyer, Powell & Blissett, 2011).

Satter proposed the concept of “division of responsibility” in infant-feeding, recommending that parents should be responsible and in control of providing access to foods in terms of type, quality and timing and that a child should be allowed autonomy for how much is eaten (Satter, 1986, 1990). However, this balance is difficult to both strike and maintain. Individual food preferences are developed from genetically determined predispositions to like sweet and salty flavours and dislike bitter and sour tastes (Scagolioni, 2008). The first three years of life are a particular challenge for parents as the child’s feeding needs and abilities change significantly with motor, cognitive and social development (Hui Liu & Stein, 2005). By the time children are 3-4 years old, eating is no longer deprivation-driven but is influenced by their responsiveness to external environmental cues about food intake (Patrick, Nicklas, Hughes & Morales, 2007). Also, with the development of language come more overt requests for specific types of foods and individual responses to food refusal that parents have to contend with. The picture is further complicated by the fact that parents perceive clear societal and cultural pressures which promote the consumption of ‘unhealthy’ snack foods (Morton, Campbell, Santich & Worsley, 1999).

Mealtime Observations

Research in this field tends to rely heavily on self-report to gather data regarding nutrition, activity levels and specific parenting practices despite the questionable validity and reliability of parent-reported information (Small, Anderson, Mazurek & Melnyk, 2007). The difficulty in relying on self-report and retrospective measures is their susceptibility to bias and social desirability effects. Studies including direct observations of family functioning at mealtimes are less susceptible to bias because they rate ongoing moment-to-moment behaviour and the ecological validity of findings is increased (e.g. Patterson & Forgatch, 1995). Measurement protocols that use independent observers to code parent-child interactions under either naturalistic or experimental conditions are considered the “gold standard” in studies of parenting

and its effects on children (Webster-Stratton & Lindsay, 1999). There has been a lack of research in child-feeding that incorporate both self-report and observational methods.

Research that has used these methods has studied older children and compared families with an overweight or normal weight child. Moens, Braet and Soetens (2007), as well as administering self report measures, conducted mealtime observations with 56 families; 28 families had a child deemed to be at risk of overweight or already on a waiting list for treatment for overweight, and 28 families had a healthy weight child. The children were between 7-13 years old. All families that participated in this study were European, but varied in socioeconomic status. Recordings of mealtimes were coded according to items that related to ‘behavioural control’ (‘the way in which the family expresses and maintains standards for the behavior of its members’: Moens et al. 2007, pg. 55) and ‘interpersonal involvement’ (‘the extent to which family members show interest in, and place value on, each other’s activities and concerns’: Moens et al. 2007, pg. 55). Based on the CFQ (Dutch version by Moens, Pottier, & Braet, 2002), mothers of overweight children reported using more restrictive feeding strategies. The mealtime observations highlighted a higher prevalence of maladaptive control strategies used in the families where a child had weight problems (54%) compared with the families where the child was of normal weight (29%). The most prevalent of these maladaptive control strategies was a low control/permissive style of feeding. Interestingly, when examining the extent of parental support in both groups of parents, results differed according to whether self-report or observation methods were used. According to the Ghent Parental Behaviour Scale (Van Leeuwen, 2000) parents of children with overweight and normal weight used similar levels of positive parental behavior; ‘showing interest and giving positive attention to the child’ (Moens et al. 2007 pg. 58). However mealtime observations demonstrated significantly lower scores on this scale and also lower levels of interpersonal involvement.

The difference found between self-reports and observations can be interpreted in a number of ways. It may be due to social desirability in that parents report how they think they or their child *should* behave, while observations of reality reveal contradictions (Eddy, Dishion & Stoolmiller, 1998). Alternatively, parents may

genuinely believe that they are sufficiently positively involved, and do maintain control, whereas the observational studies reveal otherwise. It may be that behavioural patterns emerged as a result of the observation and recording of the mealtime. Inconsistencies between self-report and observations in Moet and colleagues study (2007), could be attributed to the fact that observations were rated according to parental involvement in specific mealtimes, while the questionnaire measured involvement in terms of general parenting.

One major limitation of studies that use a design which compares families of obese children with families of non-obese children is they prevent conclusions about the direction of effects. Parental feeding strategies could be shaped by the child's weight rather than being a contributory factor to the child's weight status (Wardle et al. 2002). American investigators have looked at gender and socioeconomic status differences in parent-child interactions at mealtimes in families with a 5-year old regardless of their relative weight (Orrell-Valente, Hill, Brechwald, Dodge, Pettit & Bates, 2007). The sample consisted of both European American and African American children; 27% were from single parent households. This study used a focused narrative observational system (Petit & Bates; 1990; Petit, Bates & Dodge, 1993) which involves trained observers recording narrative accounts, which describe in detail episodes of family interactions. These written narratives were subsequently coded, focusing on parent's socialization of children's eating at mealtimes. Overall, 85% of parents (regardless of the marital status or socioeconomic status or sex of the child) encouraged their child to consume more at the target mealtime, and the researchers report that over a third of the children consumed moderately - substantially more than they would otherwise have (Orrell-Valente et al., 2007). It appears that parents are inadvertently socializing their children to eat according to external parental cues and not to their internal biological cues of satiety (Birch, McPhee, Shoba, Steinbert & Krehbiel, 1987).

Much of the child feeding research has focused on older children. Feeding styles, like parenting styles, may change with age. When younger children have been included in research samples, the focus has been on the structure of eating and feeding acts but without finding any differences according to the child's relative weight (Parkinson & Drewett, 2001). Interestingly, mealtime observations have

been used more where a child's low weight is a concern than where there may be a risk of child obesity. Observational studies have identified features of the organization and emotional tenor of mealtimes that may underpin the development of feeding problems. For example, 4-year olds with 'failure to thrive' have been found to have more disorganized mealtimes compared with those in control families (Heptinstall, Puckering, Scuse, Start, Zur-Szpiro & Dowdney, 1987). Mealtime disorganization refers to both how the mealtime is managed by the mother, and the environment in which the child's mealtime takes place. Factors include location, distractibility of the child and the presence of caregiver or siblings. Mealtime observational studies under naturalistic conditions present a means of furthering knowledge about the impact of the environmental context of mealtimes on children's eating behaviour.

The Effects of Maternal Eating Difficulties

Research exploring the differences between child feeding behaviours of mothers with eating difficulties compared to mothers with no current or present eating difficulties, has included younger children. The research available has found no significant difference between the parenting styles of mothers with or without a diagnosable eating disorder (Agras, Hammer & McNicholas, 1999). However, it is widely accepted that the need for control is a central feature of eating pathology and this increased need for control has been linked with an Authoritarian parenting style (Haycraft & Blissett, 2010). Higher levels of maternal eating disorder symptoms in a non-clinical sample have been shown to positively correlate with more Authoritarian and Permissive parenting styles (Haycraft & Blissett, 2010). Whelan and Cooper's (2000) analysis of mealtime environment revealed specific disturbances in the mother-child relationship in the context of maternal eating disorder. While there was no relationship between degree of maternal eating disorder and extent of child feeding problem, ratings of disorganization and control were significantly higher for mothers of children with feeding problems. This suggests that a mother's difficulty with her own eating behaviour has an effect on her abilities to organize her child's mealtime in a way that is widely believed to be conducive to healthy eating (Cooper, Whelan, Woolgar & Murray, 2004).

Stein, Woolley, Cooper and Fairburn (1994) observed and recorded two groups of 12-14 month olds, and their mothers at play and during a mealtime. One group of mothers had bulimia nervosa; the second was a matched community control group. Video recordings were both event and time sampled and behaviours were coded according to maternal emotional valence, intrusiveness, verbal control, non-controlling utterances, facilitation, mother-infant interaction (physical contact and emotional control), infant mood and rate of activity. Analyses indicated that mothers with bulimia were more intrusive and less facilitating during both mealtimes and play. They were also more likely to express negative emotions during the mealtime, though not during play. Also, compared with controls, the index infants' emotional tone was more negative, and there were more mealtime conflicts. There were therefore significantly more 'conflict episodes' identified in the mother-infant dyads where mothers had bulimia. Three types of conflict were later identified; issues over who fed the infant (mother or child); maternal concern about the infant making a mess; the infant refusing food despite repeated offers from the mother (Stein, Woolley & McPherson, 1999). They appeared less able to attend to their child's cues indicating a particular effect of their own eating difficulties within the parent-infant interaction.

Some mothers with eating disorder symptoms may avoid conflict by withdrawing themselves from stressful interactions at mealtimes (Waugh & Bulik, 1999). Waugh and Bulik (1999) also recorded a mealtime and used the Mealtime Observation Schedule (MOS; Sanders, LeGrice & Turner, 1993) to assess the interaction between mothers and their children aged 1-4 years. A group of ten mothers with current or past diagnosis of anorexia or bulimia were compared with ten mothers with no eating difficulties. It was found that there were no significant differences in any of the child or parent behavioural categories, apart from positive eating comments. Mothers in the control group made significantly more positive eating comments about food and eating. For example, "yum, do they taste nice?" and "this is yummy potato soup", comments that show appreciation of the taste of food and enjoyment in the mealtime context. By comparison, the index mothers ate with their children less and withdrew themselves from the mealtime interactions. This may demonstrate an attempt to minimize stressful scenarios and avoid possible conflict.

It appears that the mothers categorized as having an eating disorder in the above studies found infant mealtimes stressful. Internal and external factors influence cognitive appraisals of situations as stressful. An infant's food requests and/or food refusal, and an infant's desire to experiment with self-feeding, require a caregiver to draw on emotional and cognitive resources, in order to attend to them appropriately. It may be that mothers with significant eating difficulties have fewer resources available to them to deal effectively with their child's demands. It has been found that even in a non-clinical sample, even modest levels of eating difficulties were related to parenting styles that are widely believed to be less adaptive, at least in western cultures (Haycraft & Blissett, 2010). Mothers with a mean BMI of 24 (healthy weight) were scored on three eating-related subscales of the Eating Disorders Inventory; drive for thinness, bulimia and body dissatisfaction. Higher levels of drive for thinness and body dissatisfaction were significantly related to a more permissive style of parenting (low level of control). In contrast, bulimia and a drive for thinness were positively associated with Authoritarian parenting (high level of control). Given previous research it may be predicted that mothers with either a Permissive or Authoritarian style of parenting may have children at higher risk of overweight or obesity. The mean age of the mothers' children was 39 months. Their BMI Z-scores (standardized BMI scores according to age and gender, Child Growth Association, 1996) were found to be unrelated to both the Eating Disorder Inventory variables and the Parenting Styles and Dimensions Questionnaire variables.

Caregiver responsiveness to infant hunger and satiety cues is thought to play a significant role in the development of infant obesity but this aspect of the mother-infant feeding interaction remains under researched (Hodges, Hughes, Hopkinson & Fisher, 2007). Qualitative research into maternal perception and interpretation of infant initiation and termination of feeding cues has revealed considerable variation in the extent to which mothers perceive and act upon infant cues. Some mothers were more focused on the amount consumed or the eating schedule (Hodges, Hughes, Hopkinson & Fisher, 2007). In a descriptive study of naturalistic interactions within 19 mother-infant dyads, where mothers were characterized as emotionally depressed, they varied significantly in level of responsiveness to their child (Donna, 1995). Although it is reported that maternal depression was associated with both over-response and under-response, it is reasonable to assume that this

variation occurs in a 'normal' sample. The lack of a control group in this study makes it difficult to draw any definitive conclusions. However, what is useful to consider is the reported link between levels of responsiveness and affect. Those mothers in the sample, who were rated as responding adequately to their child's cues, were not just always physically available but also showed no anxiety and were rated as more positively responsive to their child's displays of positive and negative emotions.

Maternal Obesity

In a questionnaire study attempting to evaluate early feeding practices that may lead to obesity, Baughcum and colleagues found three factors that were associated with maternal obesity (Baughcum et al. 2001). Firstly, obese mothers reported a significantly higher degree of age-inappropriate feeding than non-obese mothers, such as giving a child a bottle during the day or the mother feeding the child herself if the child was perceived to not having eaten enough. Secondly, obese mothers reported using significantly less mealtime structure; this refers to a child watching TV during a mealtime, having set times for meals and snacks and mothers sitting down with their child during mealtimes. However, once family income was accounted for, there was no longer a significant association between age-inappropriate feeding or structured feeding scores and maternal obesity. Finally, obese mothers reported greater concern about their child under-eating and being underweight than non-obese mothers, independent of family income and the child's weight. It is this heightened concern that may have a paradoxical effect, by motivating obese mothers to impose greater degrees of instruction and control over their infant's mealtimes with the intention of promoting healthy eating and appropriate weight gain. Lori, Scott and Birch (2001) reported that mothers who were preoccupied with their own weight and eating also reported higher levels of restrictive parenting strategies with their 5-year old daughters. Overweight mothers' child-feeding styles appeared to be influenced by observable child weight characteristics, concerns for the child's weight status, and mothers' own histories of overweight (Lori, Scott & Birch, 2001).

It is important to note that obesity is related to increased levels of body dissatisfaction and impaired self esteem, (Wardle, Waller & Fox, 2002). Body

dissatisfaction – the discord between internalized weight standards and external reality – is reflected in personal attitudes towards eating (Satter, 2008). Individuals who have been labeled as ‘obese’ and therefore ‘too fat’ often have higher levels of body dissatisfaction, and feel ashamed of their eating (Rodin, Silberstein & Stiegel-Moore, 1985). An inability to sustain long-term weight loss also fuels various negative emotions such as desperation, pain, boredom and frustration (Davis, Clark, Carrese, Gary & Cooper, 2005). Given the current pattern of evidence it seems reasonable that obese mothers may have more difficulties in their feeding interactions with their child. For obese women, who are frequently perceived as failing to control their weight and their own eating behaviour, having to think about food on their child’s behalf and manage mealtimes may be a specific challenge.

Wardle and colleagues carried out a large study designed to investigate whether obese parents did in fact differ from normal parents in their feeding styles (Wardle, Sanderson, Guthrie, Rapoport & Plomin, 2002). The community sample comprised 214 families with same sex twins aged between 3-5 years old; 100 of these families included parents who were both obese, 114 where the parents were either normal weight or lean. The four aspects of feeding that were assessed were emotional feeding (offering food to deal with emotional distress), instrumental feeding (using food as a reward), prompting or encouragement to eat, and control over feeding. There was no significant difference between the obese and normal weight parents with regard to the first three feeding strategies. Interestingly, obese mothers reported significantly *less* control over their children’s intake compared with the matched controls. It is important to note that this study relied, as so many others, purely on self-report questionnaires. As previously discussed, there can be significant differences found according to whether self-report or observational methods are used to gather data (e.g. Moen et al. 2007). Observing child-feeding styles of both obese and normal-weight mothers is a way of examining the processes that may contribute to the transmission of obesity risk. Observations preserve the precise actions of individuals in the moment, in a way retrospective self-report cannot. Recording procedures allow detailed analysis utilising quantitative indices to further understanding regarding interaction processes.

Obesity and Ethnicity

The scale of the problem of obesity is more prominent in minority populations (Kime, 1995). In America the prevalence of obesity is 37.4% among African-American women and 34.2% among Mexican-American women, compared with 22.4% among white women (Kuczmarski, Flegal, Campbell & Johnson, 1994). These ethnic group differences also extend to young children (Brown, Serdula, Cauns, Godes, Jacobs & Elmer, 1986; Wiecha & Casey, 1994).

Health statistics indicate that adult British S. Asians and Afro-Caribbeans have increased susceptibility to morbidities associated with obesity. For example, they are six times more likely to develop Type II diabetes than white communities (Race for Change, 2005). There are also significantly higher hospital admission rates due to coronary heart disease (CHD) in Pakistani, Bangladeshi, Indian and Mixed White and Asian groups, reflecting the higher prevalence of CHD in these groups compared with the UK average (Association of Public Health Observations, 2005). It has been reported that S. Asian children have more biochemical risk factors for cardiovascular disease and higher insulin resistance than White British children (Flegal, Carroll & Ogden, 2002). These ethnic variations can only be explained to a limited degree in terms of obesity. In fact, the British Heart Foundation report relatively low levels of general obesity among Pakistani (15%), Indian (14%) and Bangladeshi (6%) men; compared with 23% in the general population. However, it is noted that they have similar levels of raised weight to hip ratio compared with the general population. There is a strong correlation between central obesity and CHD (Yusuf et al. 2004). Interestingly, associated factors such as blood pressure and cholesterol fail to account for the extent of these ethnic variations (Parliamentary Office of Science & Technology, 2007). In addition, compared to the general population (23%), obesity prevalence is higher for Pakistani and Bangladeshi women (28%). Bangladeshi women are nearly twice as likely to have a raised waist to hip ratio as women in the general population (The British Heart Foundation, 2009). It has also been demonstrated that British Afro-Caribbean and Pakistani girls have an increased risk of being obese, and Indian and Pakistani boys have an increased risk of being overweight compared with the general population (Saxena, Ambler, Cole & Majeed, 2004). Furthermore, lifestyle factors such as a high fat diet and lack of physical

exercise have been identified as specific factors contributing to the excess risk of CHD for S. Asians in the UK (Kuppuswamy & Gupta, 2005). Darr, Astin and Atkin (2008) reported that in their sample of 45 Asian participants, Pakistani-Muslims and Indian-Sikhs were most likely to attribute their dietary habits as a causal factor in their CHD and to believe their traditional S. Asian diet had been detrimental to their health. However, in this sample, very few were still using ghee (clarified butter used traditionally in S. Asia) in their cooking.

Socioeconomic factors could also contribute to these health inequalities. People from ethnic minority groups are generally more deprived in terms of socioeconomic status and poverty; with northern regions having a higher proportion in the lower social classes among most ethnic groups (North East Public Health Observatory, 2009). Other socioeconomic factors, including poverty and social exclusion of families as a result of migration, may act cumulatively to increase health risks for ethnic minorities (Bhopal, 2002). Two qualitative studies conducted in Leicester, with people of S. Asian origin who had CHD, reported that the most commonly identified risk factor for their CHD was stress (Webster, Thompson & Mayou, 2002; Farooqi, Nagra, Edgar & Khunt, 2000). Stress as a causal factor for CHD is controversial, but in these two studies, it was the issue consistently identified across focus groups. In the latter study, participants frequently attributed their self-reported stress to their ethnic minority status, specifically their experiences of immigration status and racial disadvantage (Farooqi, Nagra, Edgar & Khunt, 2000).

There is a body of research that has considered socio-cultural factors related to adults' eating behaviours and attitudes. However much of this work has looked at populations that have clear differences in rates of childhood obesity, such as American and French populations. The origins of these ethnic differences in obesity prevalence rates remain poorly understood (Anderson, Hughes, Fisher & Nicklas, 2005). Research with different subcultures within the population in Britain is limited. In general it has been found that Asian girls living in Britain have a more positive body image, particularly weight-related body image, than their White counterparts (Wardle and Marsland, 1990; Ahmed, Waller and Verduy, 1994, Altabe, 1998). However not all findings have been consistent. For example, Hill and Bhatti (1995) reported British/Asian-descent girls' degree of weight concerns

were similar to those of White girls. This may be due to the increased level of acculturation (the process by which members of one cultural group adopt the beliefs and behaviours of another group), within this sample.

Ethnicity and Feeding Practices

International studies regarding ethnicity and feeding practices are similarly limited; Asian populations are rarely included. Some studies have reported ethnicity differences in certain parent feeding practices. For example, using the CFQ, African-American mothers score higher than White mothers on monitoring, restriction, pressure to eat and concerns about child's weight (Spruijt-Metz et al. 2002). McGarvey and colleague's focus groups with African-American, white non-Hispanic, Hispanic and Vietnamese parents revealed different perspectives between the different ethnic groups regarding age-appropriate food, infant satiety and overweight. In contrast, other studies have failed to show ethnic differences in feeding practices. In a recent study with an ethnically diverse sample, differences in the level of restrictive feeding practices reported by parents of African American children and parents of Caucasian children disappeared after controlling for child's weight (Gray et al., 2010). It may be that the child's weight, rather than specific cultural variables, determines the use of certain feeding practices (Gray et al. 2010). There is also some indication that ethnicity can potentially impact the outcomes associated with parent feeding styles. Participants in Hoerr and colleague's (2009) questionnaire study were 715 children and their low-income parents from Texas and Alabama representing three ethnic groups; African-American, Hispanic and White. Findings suggested that it was an Authoritarian, not an Authoritative, feeding style that was associated with better eating-behaviours (i.e. consumption of fruit and vegetables) for these children (Hoerr et al. 2009). Robinson and colleague's (2001) found that increased parental feeding control had negative associations with child BMI for white and Asian girls but not Hispanic girls living in Northern California.

There are diverse groups living in England; unique groups with experiences and behaviours that may be a reflection of their ethnic culture, the majority culture or a combination of both. It is important to gain a greater understanding of these groups so that professionals and services are better equipped to provide care for people with diverse values, beliefs and behaviours. More specifically, we do not know very

much about the relationship between ethnicity and feeding practices. The present study represents an opportunity to investigate this.

Learning about what may contribute to increased risk of childhood obesity is a critical research issue (Chien et al., 2006). The impact of family life on young children's eating behaviours is a neglected area of research and there is a specific need to focus more on the process of family eating i.e. the *how* we eat not *what* we eat (Kime, 2009). There is also a considerable lack of research involving families of different ethnicities living in England, and limited knowledge about the factors that may contribute to risk of obesity in children of different ethnicities. The recruitment of the large BiB birth cohort provides a valuable opportunity to explore maternal feeding styles and young children's feeding behaviours in a bi-ethnic sample.

AIMS

This study aims to explore the influence of two factors, maternal weight and ethnicity, on mealtime interactions. Specifically:

- whether the meal structures and mealtime interactions of mothers categorised as obese, and their children, are different to healthy weight mothers:
- whether there is a difference between S. Asian and non-Asian mothers in the meal structures and mealtime interactions with their children,
- and in addition, whether mothers' parenting styles captured by questionnaire assessments will show similar outcomes to those observed during mealtimes.

METHOD

Design

This study is a cross-sectional comparison between four groups of mother-infant dyads, using observational and self-report measures of parental and child behaviour.

Participants

Women were eligible for recruitment into the wider BiB birth cohort study if they gave birth at the Bradford Royal Infirmary between March 2007-2010. Women were usually recruited when they attended the hospital for a routine oral glucose tolerance test between 26 and 28 weeks gestation, and recruitment of their babies occurred at birth. Within the BiB cohort of around 13,000 mothers, a research intensive, sub-cohort of 1000 families, referred to as the BiB1000, was recruited between August 2008 and March 2009. These mothers consented to extended interviews and indicated their willingness to participate in additional biomedical and social research. A specially trained community research team saw these families when the children were 6-months, 12-months, 18-months and 2-years old, and will be seeing them again when they are 3-years old.

The present study recruited potential participants from BiB clinics that BiB1000 mothers attended when their child was both 18-months and 2-years old.

Questionnaire data, collected at the 6 and 12-month clinics has also been used. The BiB Research Administrators, who facilitated these clinics, introduced the study to all potential participants. The team needed to be familiar with the study, in order to answer participant's questions about it, so I attended three BiB team meetings to speak about the study and the proposed research (see Appendix 1). At a later date, I provided Research Administrators with a set of written instructions about how to introduce the study with potential participants (see Appendix 2). I also attended a number of clinics to model the recruitment process to different members of the team.

At the BiB clinics, Research Administrators initially spoke to every mother about the study, provided written information for them to take away with them (see Appendix 3) and asked whether they consented to be contacted about it. If the mother was

happy to be contacted the Administrator completed a contact form for that mother and I collected these forms at a later date (see Appendix 4). The contact forms recorded the mother's height and weight, their child's date of birth and their address and telephone numbers.

Calculating BMI

Height was measured using a portable stadiometer to the nearest millimeter (without shoes) and weight was measured using electronic scales to the nearest gram. These measurements were taken during the routine clinic appointments for all BiB1000 mothers. BMI was calculated for all mothers who consented to be contacted about the study. BMI refers to an individual's weight (in kg) divided by their height (in m) squared. This study used the online BMI tool on the US Department of Health and Human services website; <http://www.nhlbisupport.com/bmi/> to calculate potential participant BMIs.

BMI is the agreed measure defining normal weight, overweight and obesity and is used around the world, enabling comparisons between countries, regions and population sub-groups. No specialized equipment is needed and therefore it is easy to measure accurately and consistently across a sample of participants. Adults are defined as healthy weight if their BMI does not exceed 25 kg/m² and obese if their BMI exceeds 30 kg/m². All mothers who agreed to be contacted about the study were categorised into one of the following groups:

- Underweight = <18.5
- Normal weight = 18.5–25.0
- Overweight = 25.1–30.0
- Obesity = BMI of 30 or greater

These values relate to the World Health Organisation International Classification of adult underweight, overweight and obesity (WHO; 2000, 2004).

Defining Ethnicity

Mothers were contacted if they were eligible for the study on the basis of BMI and ethnicity, according to the following four groups. The plan was to recruit ten mother-child dyads into each group, giving a total of 40 pairs of participants.

1. South Asian ethnicity, healthy weight mothers
2. South Asian ethnicity, obese mothers
3. Non-Asian ethnicity, healthy weight mothers
4. Non-Asian ethnicity, obese mothers

Ethnicity was self defined, by all potential participants, on recruitment to the BiB cohort project. It is important to note that the label 'South Asian' refers to a person who identifies their ancestry within the countries of the Indian subcontinent, including India, Pakistan, Bangladesh, and Sri Lanka (Bhopal, 2004). Despite a recommendation in the literature to avoid such vague labels as 'Non-Asian' (Bhopal & Donaldson, 1998), this label was chosen as this group is the comparison group and factually correct. It was expected to be a predominantly, but not exclusively, group of white British mothers.

Figure 2 on the following page, shows the recruitment process that started in September 2010 and finished in May 2011. Over eight months a total of 125 mothers consented to be contacted about the study; 90 of these were eligible for the study on the basis of weight status; 52 were in the healthy weight range ($BMI \geq 18.5 - 25$) and 38 were classed as obese ($BMI \geq 30$). From the 52 healthy weight participants, 27 were Non-Asian. All ten participants required for the healthy weight non-Asian subsample were recruited within three months. In fact, Research Administrators at the BiB clinics were informed in January 2011 not to ask any more healthy weight Non-Asian mothers if they wished to be contacted regarding the mealtime observation study. Consent was gained from an 11th Non-Asian healthy weight participant due to one mealtime recording having no sound. The next subgroup that achieved full recruitment numbers was the S. Asian obese group in March 2011, closely followed by the Non-Asian obese group in April 2011. However, full recruitment to the Non-Asian obese group was delayed as extra recordings had to be carried out (one because the recording failed and another because the father facilitated the mealtime as the mother had to leave the house at the last minute).

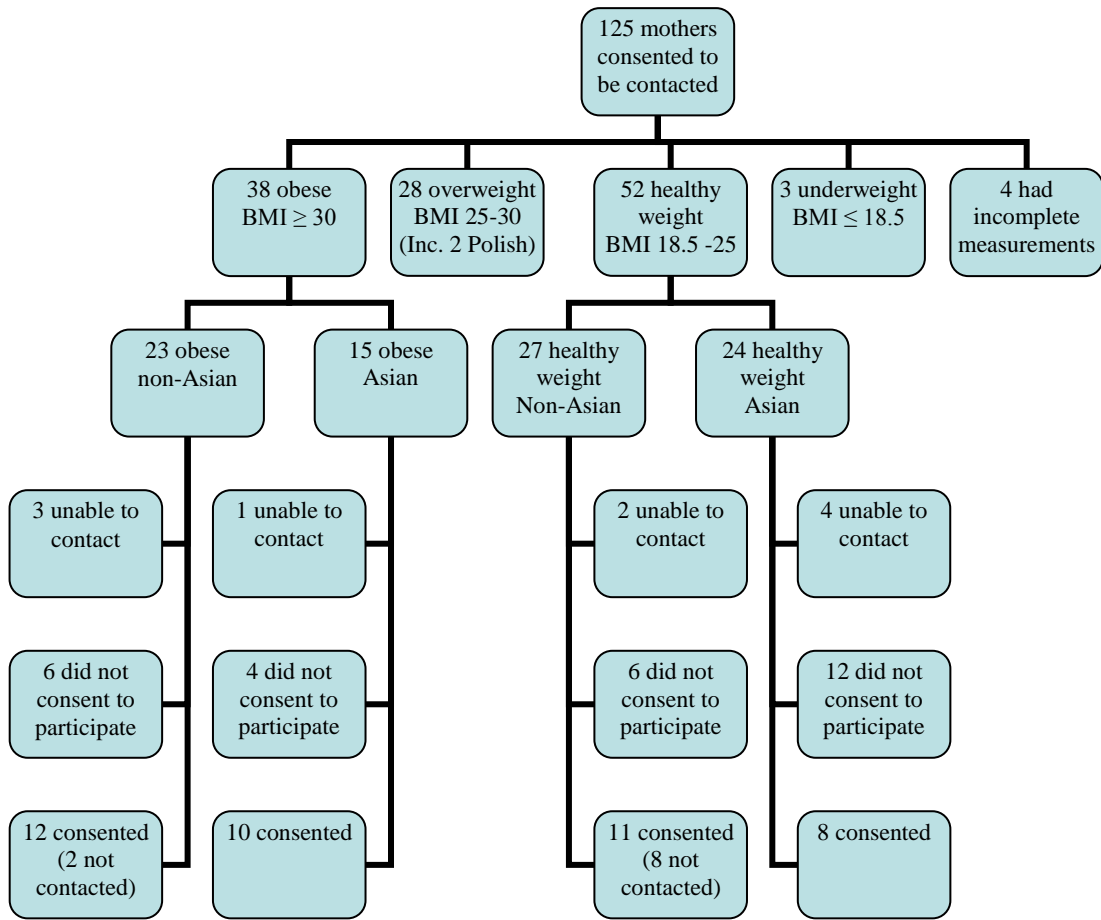


Figure 2: The Recruitment Process

Due to time constraints the recruitment process had to stop in May 2011 before a complete subgroup of S. Asian healthy weight mothers had been recruited. As can be seen from Table 1 this group were the hardest to recruit, with twelve mothers not consenting to the study when I contacted them. Table 1 below lists the different reasons cited for not consenting to participate in the study. It is important to note that for ethical reasons mothers who were not consenting were not asked why, and they were also informed that not participating in this study did not affect their further involvement with the wider BiB project.

Seventeen of the 28 mothers not consenting to take part in the study volunteered their reasons why. The reason most often cited by S. Asian mothers for non-participation was that either their husband or relatives in the household had either explicitly refused consent or the mother felt they would not be comfortable with this. The reason most often cited by Non-Asian women was work commitments. Only

three of the 28 mothers not consenting to take part in the study cited being recorded as the reason. In total three mothers cited a current pregnancy as reason to not participate. Pregnant mothers were still eligible for the study and three pregnant women took part in the study.

Table 1: Reasons Cited for Non-participation

	South Asian obese mothers N = 4	South Asian healthy weight mothers N = 12	Non-Asian obese mothers N = 6	Non-Asian healthy weight mothers N = 6
No reason given	3	4	0	4
Not wanting to be videoed	0	2	1	0
Work commitments	0	0	3	1
No consent from others in family	0	4	0	0
Pregnancy	0	2	1	0
Other	1	0	1	1

Sample Characteristics

The group labeled the ‘Non-Asian healthy weight group’ included one mother who was Black. The ‘Non-Asian obese group’ included one mother who was of mixed race (Caribbean and white UK). Both were born in England. These participants were included in the sample as the main purpose of the research was to compare an Asian sample with non-Asian mothers living in Bradford. In total, six of the Asian mothers had been born in Pakistan (three were obese and three were healthy weight), one had been born in Iran (West Asia). Fifteen mothers identified themselves as Pakistani and two identified themselves as Indian. One mother from the Non-Asian healthy weight group was born in Scotland. The rest of the participants (N=30) were born in England.

The mothers who consented to participate in the study gave consent for their infant to take part also. Table 2 shows that there were more boys than girls in the total sample.

Table 2: Gender frequency of the children observed

	South Asian obese mothers N = 10	South Asian healthy weight mothers N = 8	Non-Asian obese mothers N = 10	Non-Asian healthy weight mothers N = 10
Male child	6	6	7	5
Female Child	4	2	3	5

In the Non-Asian healthy weight group there were two pregnant women and in the S. Asian healthy weight group there was one pregnant woman who was included in the study. Their BMI was worked out on the basis of self-reports of their weight in either pounds or kilograms prior to pregnancy and this was checked with the BiB BMI records taken when the mother was recruited to the BiB1000.

The study rationale and protocol were submitted to the South Yorkshire Research Ethics Committee (REC) and formally reviewed in May 2010. Final Research and Design (R&D) approval was confirmed after a favorable ethical opinion had been given by the REC. All participants were given the opportunity to discuss their experience of participating in the study, and to request additional information or support if they felt they needed it. The names of all the participants (adult and child) and identifying details have been omitted from this report to protect their confidentiality.

Procedure

Following telephone contact about the study, an expression of verbal consent was followed up by provision of written information. A letter detailing instructions for the mealtime recording (see Appendix 5) and a consent form (see Appendix 6) were sent out. Written instructions included a suggestion that the mothers prepare an ordinary meal for their child on the day of the observation; neither the child's favourite meal, nor something that they had not tried before or that they dislike. Mothers were also asked to carry out mealtimes as they would were no one else present, and not to invite additional people who would not have normally been there. It was indicated that it was important that I did not interact with the participants during the recording of the mealtime and that I would try to keep out of the child's field of view during the mealtime.

I arranged to visit a participant's home, and record a meal, at a time that was most convenient for the mothers. Twenty-nine mealtime observations were carried out by me and eleven by a BiB Research Assistant. Two mealtime observations were recorded jointly with the Research Assistant to establish procedural consistency. Instructions were provided for both scheduling mealtime recordings with participants and carrying out the recordings to ensure a standardized research process was experienced by all participants (see Appendix 7).

Carrying out the recordings

It was arranged that either the Research Assistant or I would arrive at the participant's home 15-25 minutes before the child's usual mealtime, in order to set up the recording equipment. This provided the opportunity for the participants to have any questions answered and also allowed some habituation to the presence of the camera.

A typical meal was recorded in the participant's home when the child was between 18 and 27 months old. These took place on both weekdays and weekends. However data were not collected on holidays or on any other day that involved scheduled celebrations with food.

On arrival at the participant's home, and after meeting both the participants, the recording equipment was set up in the room where the meal was to take place. The camera was set up on a tripod at a maximum distance from the focus of the mealtime, utilizing the zoom function to maintain appropriate optical distance (approximately 3m). It was important that all non-verbal communication could be picked up.

Once the equipment was set up, participants were reminded of issues regarding confidentiality and consent and the written consent form was completed. It was ensured that all of the mothers understood that they were free to withdraw both themselves and their child from the study at any time. Before the recording began the participants were invited to talk about their experience of feeding their child.

Recording started when the mother indicated that she fully understood the issues of consent and confidentiality. Mothers indicated when the mealtime was over. Following the mealtime observation mothers were asked how it felt to be recorded and whether they thought that either they or their child acted any differently due to being observed.

Full notes on what was discussed before and after the recording were written up after leaving the participant's home. Notes were also taken on the following topics regarding the environmental context of the meal:

- 1) Were there distractions, or things occurring, that the camera would not have picked up? Was the child eating on their own or were there other family members present? Also, whether a TV was left on during a mealtime was noted.
- 2) The food the child was given (including main meal and dessert), was noted. It was later noted whether or not this counted *towards* portions of fruit or vegetables for the child. To be counted, fruit or vegetables could be fresh, dried, cooked in the meal, previously frozen etc. The NHS 'Your Health Your Choices' website was consulted.
(<http://www.nhs.uk/Livewell/5ADAY/Pages/Whatcounts.aspx>)
- 3) Finally, the emotional tone of the mealtime was also noted to assist with coding decisions regarding whether interactions were positive or negative – What did it feel like to be there before, during and after the mealtime? Was it a tense or relaxed environment?

A pilot mealtime recording was carried out in March 2010 to practise the above procedure. All participants who took part in the study were provided with a copy of the mealtime recording on DVD and thanked, in writing, for participating in the study (see Appendix 8)

Measures

When mothers were initially recruited on to the BiB cohort project, the initial assessment included a series of questions in order to gather data on a range of demographic factors. The following are of interest for the present study:

- Mother's country of birth
- Education status – Mothers were asked if they had attended school, further education or higher education. Further education refers to education after 16-years old. In England this usually includes A-levels and/or vocational courses. Higher education refers to education after 18-years old and includes University and postgraduate degrees.
- Current Household Structure – Mothers were asked who they live with.
- The Index of Multiple Deprivation (IMD) was calculated from each participant's postcode. This is an overall measure of deprivation experienced by people living in an area.

The Mealtime Observation Schedule (MOS)

All recorded mealtimes were analysed using the MOS (Sanders, Le Grice, Turner 1993), a coding system that has been used to analyse interaction and child eating behaviour during mealtime observations. The MOS originates from the Positive Parenting Program (known as Triple P). Triple P is a parenting and family support strategy that aims to prevent behavioural, emotional and developmental problems in children by enhancing the knowledge, skills and confidence of parents. The MOS is derived from the Family Observation Schedule (Sanders, Dadds & Bor, 1989) which has been widely used to study patterns of parent-child interaction. The MOS has been tailored for observations of child feeding across a wide age-range.

The MOS was selected to code the mealtime observations as it covers a wide range of verbal and nonverbal behaviours for both parent and child. It is also one of the rare behaviour coding schedules that can be used without the need for extensive observer training. An observation coding schedule that had been used with a bi-ethnic sample and requires brief training to use could not be found. The MOS has an established protocol that has been used in previous research (Sanders et al.1993;

Sanders, Patel, LeGrice & Shepherd, 1993). Using the recordings of the mealtimes, mothers' and infants' behaviours were coded in 10-second intervals. Behaviour categories were scored for their presence in a particular 10-second interval, but not for the frequency of occurrence within an interval. Several categories can be coded during an interval, with the exception of codes which are mutually exclusive. The length of meal times for each mother-infant dyad was also noted.

There are sixteen categories of parent behaviour in the MOS (nine positive, six negative and no interaction: see Appendix 9). An example of a positive behaviour is presentation of food, which includes attempts by the mother to move food closer to the child, to make it easier to reach, to hold food to the child's mouth, to add food to the child's plate, or to alter or prepare food on the child's plate. A further eighteen categories relate specifically to child behaviour (seven positive, eleven negative: see Appendix 10). For example, self bites refers to bites the child takes independently, whereas prompted bite refers to when the child takes a mouthful of food following a verbal or non-verbal instruction, prompt, or physical offer of food or utensil to the child by the mother (MOS; Sanders et al.1993). Table 3 and 4 below detail the different types of positive and negative behaviours coded for both mother and child respectively. Negative parent behaviours are judged from the mother's tone of voice and facial expression.

Table 3: Mealtime Observation Scheduling (MOS) coding categories for parent behaviours

Positive Parent Behaviours	Negative Parent Behaviours
Praise	Aversive contact
Contact	Aversive specific instruction
Specific Instruction	Aversive vague instruction
Vague instruction	Aversive prompt
Prompt	Aversive eating comment
Eating comment	Aversive social attention
Presentation of food	
Removal of food	
Social attention	

(Sanders, Le Grice, & Turner,1993)

Table 4: Mealtime Observation Scheduling (MOS) coding categories for child behaviours

Positive Child Behaviours	Aversive Child Behaviours
Request for food	Food refusal
Food preparation	Vomit
Self bite	Playing with food
Prompted bite	Leaving the table
Chew	Holding food
Appropriate verbal interaction	Non-compliance
Engaged Activity	Complaint
	Aversive demand
	Physical negative
	Oppositional behaviour
	Non-interaction

(Sanders, Le Grice, & Turner, 1993)

The MOS has been shown to yield a satisfactory level of inter-rater reliability with a mean of 0.83 obtained for parent behaviour (range 0.71 – 0.99) and 0.80 for child behaviour (range = 0.50 – 0.99, Sanders et al. 1993). Waugh & Bulik (1999) also used this schedule in a mealtime observation study. Average agreement over behavioural categories was reported to be excellent and ranged from 90-100%.

In addition there are three affect codes in the MOS which may be scored for both child and parent. These codes are based on non-verbal behaviour, not on speech content and are labeled ‘anxious’, ‘depressed’ or ‘angry’. Although the manual states that these codes relate to transient affect, the specific mood states in the MOS are all negative and all raters, in the current study, agreed that they did not satisfactorily capture the emotional context of the mealtimes. Therefore the affect codes were not used in the current study.

A number of questionnaire assessments were administered during earlier phases of the BiB1000 cohort research. The questionnaires of relevance to the current mealtime observation study focused on parenting styles and infant characteristics.

The Caregivers Feeding Styles Questionnaire (CFSQ)

BiB1000 parents at the 12-month clinic were all given the opportunity to complete the CFSQ (Hughes et al. 2003). This tool was developed in the US with 231 primary caregivers, 85% of whom were mothers. Participants were either Hispanic (130) or African American (101) with pre-school children. The questionnaire involves 19 items concerning the parent's interactions with their child during a mealtime.

Parents are instructed to circle the best answer that describes how often certain things happen. For example, 'Tell the child to eat at least a little bit of food during dinner'. Responses are rated on 5-point Likert scales and ranged from never (1) to always (5). Exploratory factor analysis resulted in the ability of the CFSQ to categorize caregivers into Authoritative, Authoritarian, Indulgent and Uninvolved child feeding styles, according to levels of demandingness and responsiveness (see Figure 1, p.15). Test re-test correlations (7-14 days) were 0.85 for demandingness and 0.82 for responsiveness. The CSFQ was also shown to have satisfactory internal consistency (Hughes et al. 2003). Convergent validity was evaluated by relating feeding styles to two independent measures, the CFQ (Birch et al. 2001) and the Parenting Dimensions Inventory (Power, 2002). The CFSQ is an appropriate measure for the current study due to the broad spectrum of feeding styles it relates to and its ability to categorize parents into four distinct child-feeding patterns.

Additionally, the fact that it has been validated in a low income population of mixed ethnicity makes it suitable for the bi-ethnic sample in this study.

Parenting Practices Questionnaire (PPQ)

The PPQ (Growing up in Australia Wave 1, 2004) includes questions about the parent's relationship with their child. Parents at the 6 month BiB clinics were asked to complete this questionnaire about their views on child-rearing. The measure incorporated three continuous parenting dimensions; self-efficacy, warmth and hostility. For the purpose of the current study the data regarding warmth and hostility were of most interest as they relate to the positive and aversive parent-child interactions coded with the MOS. The dimension of parental warmth is measured using six items that originated from the Child Rearing Questionnaire (Paterson & Sanson, 1999). These items address the frequency with which the parent displays warm, affectionate behaviours to their child. For example, "How often do you

express affection by hugging, kissing and holding this child?” Responses were rated on 5-point Likert scales and ranged from never/almost never (1) to always/almost always (5). Total item scores form a total warmth score ranging from 6 (low warmth) to 30 (high warmth).

The hostile parenting dimension includes five items regarding the frequency with which the parent’s interactions with the child were irritable and angry. Parents were asked to think about the last four weeks and decide to what extent each statement described the way they had been feeling or behaving with their child. For example, “I have lost my temper with this child”. Responses were rated on 10-point Likert scales and ranged from not at all (1) to all the time (10). Total item scores form a total hostility score ranging from 5 (low hostility) to 50 (high hostility).

Warmth and hostility are dimensions of parenting that have been reported to have construct validity when modeled against a wide range of concurrent family and parental characteristics (Zubrick, Smith, Nicholson, Sanson & Jackiewicz, 2007). Following the Growing up in Australia protocol, missing items were replaced with the mean of completed items for up to two missing items. If three or more items were missing, respondents were coded as missing data for this measure.

Infant Characteristics Questionnaire (ICQ)

Another measure administered at the 6-month BiB clinic was the ICQ. This questionnaire was devised following factor analysis of the responses of 322 mothers of 4-6 month old infants (Bates et al. 1979). This process yielded four factors labeled as adaptability, fussiness/difficultness, dullness and predictability. Internal consistency estimates for the factor scales with a cross-validated sample of N=196 ranged from 0.39 to 0.79 with a median coefficient α of 0.63 (Bates et al.1979). The ICQ has been reported to have a stable factor structure, adequate reliability over time, and adequate convergence with other measures of temperament (Bates et al.1979).

This parent report measure included 24 items that covered the above four factors. For example, “How easy or difficult is it for you to predict when your baby will

become hungry?” Parents’ answers were rated on a 7-point Likert scale, ranging from “easy” (1) through to “average” (4) to “difficult” (7). Missing items were replaced with the mean of the completed items within the same dimension (for up to two missing items).

The reliability of these questionnaires with the BiB cohort will be calculated in the future from analysis of the BiB data. Cronbachs alpha values will be available from the BiB study team.

DATA ANALYSIS

Translations

Mealtimes where the mother and child spoke in Punjabi or Urdu (or in one case Arabic) were translated before the recordings were analysed. Translators completed a specifically designed contract before completing the work (see Appendix 11). Translators were instructed to capture conceptual equivalence, which preserved the use of local metaphor and the meaning intended by the participant, rather than concentrating on literal translations (Atkin & Chattoo, 2006).

MOS Summary Scores

Once all the mealtimes had been coded in 10-second intervals, a MOS scoring sheet was completed for each of the participants. This was done after coding was complete to minimize bias during the coding procedure. The aim was to make data analysis as systematic, transparent and amenable to audit as possible.

Following the MOS scoring protocol (Sanders et al. 1993), the percentage of intervals where behaviours occurred was calculated for each mother-infant dyad. The overall percentage of intervals of positive and negative behaviours was also calculated. The occurrence of any aversive behaviour meant that the interval was coded as aversive for that individual, regardless of the occurrence of positive behaviours in the same interval. An interval in which the parent was not interacting with their child was not scored as positive or aversive and was therefore not incorporated in the percentage of intervals of positive parent behaviour. Non-interaction was however categorized as aversive child behaviour and so it was

incorporated in the percentage of intervals of aversive child behaviours. The bite frequency was also calculated. The total number of bites (voluntary and prompted) was divided by the total number of intervals coded for the child, and multiplied by six to obtain the bite rate per minute.

Two-way between groups Analyses of Variance (ANOVA) was felt to be the most appropriate method of analysis as the aim was to explore whether there were differences in the mealtime interactions of obese and healthy weight mothers and the S. Asian and non-Asian mothers. ANOVA's enabled examination of the separate impact of the two variables (weight and ethnicity) on both the parent and child behaviours and also the potential interaction between these two variables. Mother's age, their child's age, and deprivation (IMD 2010) could be controlled for by including these as covariates.

Inter-rater Reliability

I coded all 40 mealtime observations. To ensure reliability of coding, two additional raters coded four mealtime recordings each; one selected from each of the participant groups. Two of these recordings were the same and therefore coded by all three raters. The additional raters were blind to the aims of the study. One of these raters was Asian and female and one was British and male. Raters were required to learn the definitions and rules provided in the MOS manual. Training involved each rater attending a 1-hour meeting to discuss coding decision rules and exclusion criteria.

Inter-rater reliability was established by computing intra-class correlations. The mean intra-class correlation for three raters was 0.86 and for two raters was 0.829. This indicates high levels of inter-rater agreement.

Questionnaire Data

For the CFSQ, each participant's overall scores on the dimensions of demandingness and responsiveness were calculated. Demandingness was calculated as the mean of scores on nineteen of the items. Responsiveness was calculated as the mean of seven items over the total mean. Median splits for the sample on the two dimensions were calculated and each participant was categorized into high and low categories on

demandingness and responsiveness. Finally, participants were categorised into feeding styles based on their scores on the two dimensions.

For the PPQ, participant's scores on six questions were totaled to give a score on the dimension of warmth and a further seven questions gave a score on the dimension of hostility. For the ICQ, five questions related to the dimension of child adaptability, nine to fussy/difficultness, four to dullness and six to predictability. Each participant's total scores on the four dimensions were calculated.

RESULTS

Participant Characteristics

Table 5 summarizes the characteristics of the mothers and their children who took part in the study. Overall, the mean age of the mothers was 29y 8m and the mean age of the children was 1y 9m. There was no significant difference between the groups in terms of mothers' or children's age.

Table 5: Mean (SD) and range of final sample characteristics

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Mother's BMI	35.8 (4.9) 30.0 - 45.1	22.9 (2.7) 19.0 - 25.0	34.1 (4.7) 30.2 - 43.7	21.6 (1.4) 18.9 - 23.4
Mother's age (years)	31.7 (5.4) 20 - 38	27.6 (4.6) 21 - 33	31.1 (5.5) 25 - 43	28.8 (6.3) 18 - 39
Child's age (years)	2.0 (0.1) 1.5 - 2.3	1.9 (0.2) 1.6 - 2.1	1.8 (0.3) 1.5 - 2.3	1.7 (0.3) 1.5 - 1.9
IMD Score	36.9 (17.6)	31.1 (9.9)	29.8 (18.0)	39.2 (19.4)
IMD Ranking	23.6 (19.4)	26.3 (13.2)	34.6 (26.6)	25.9 (24.6)

There were no significant differences in the IMD 2010 scores and rankings between groups. There were ten mothers, in the total sample, who were ranked as within the most deprived decile in England.

Table 6 summarises the marital status of the mothers and the frequency with which the child's father lived in the same household. It also shows the mother's level of education. One mother in the Non-Asian obese group was divorced and living with the child's father. Information regarding marital status and household composition was missing for another participant in this group. Only one mother was in her

second marriage (in the S. Asian obese group). Fifty percent of the mothers in the sample had attended higher education (education after 18-years old). By contrast, nine of the 38 mothers either did not attend school or left before the age of sixteen. Data regarding education was missing for one mother in the S. Asian obese group, one mother in the non-Asian obese group and two mothers in the non-Asian healthy weight group. There were no systematic differences between groups in marital status or education.

Table 6: Frequency data of variables related to socioeconomic status

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Married & living with child's father	10	8	6	8
Single & not living with child's father	0	0	2	2
Mother did not attend school	1	1	0	1
Mother attended school education	4	0	1	1
Mother attended further education	0	2	3	1
Mother attended higher education	4	5	5	5

Organisation & Environmental Context of the Mealtime

In total, six breakfasts, twenty-six lunches and six dinners were recorded. The majority of mothers felt that the recorded mealtime was typical, in that their child's behaviour was not much different to usual. Notes taken at the meal, and data gathered through observations of the mealtime recordings, were drawn together to give a representation of the environmental context and organisation of the participant's mealtimes.

Fifty percent or more of mealtimes involved the provision of some fruit or vegetables (Table 7). The mothers in the Non-Asian healthy weight group supplied

fruit or vegetables most frequently (70%). The numbers of children that ate their meal, with no one else eating at the same time, was comparable across all four groups. The mother-child group that was least likely to eat together was the S. Asian healthy weight group, only 25% of mothers in this group ate at the same time as their child. In the S. Asian obese groups 40% of mothers left a TV on compared to 25% in the S. Asian healthy weight group and 20% in both the Non-Asian obese and healthy weight groups. Organisation of the mealtime, and the level of ‘restraint’ mothers used, varied within the sample. There was a tendency for non-Asian mothers to seat their child in a high chair or booster seat more than S. Asian mothers.

Table 7: Frequencies of various environmental features of the mealtimes

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Meal counts towards 5 fruit/veg a day	6	4	5	7
No people eating with child	6	4	5	5
Mother eating with child	4	2	4	5
2-5 family members eating with child	1	3	1	0
TV on during meal	4	2	2	2
At a high chair with attached tray	4	1	2	6
At a table in a high chair or in a booster seat	0	0	4	4
On a chair/stool at a table	4	3	4	0
On a sofa	0	2	0	0
Table & chair not used	2	2	0	0

Means (and SDs) are reported for both ethnicity and weight status for the majority of the MOS outcomes. Table 8 below summarizes features of the mealtimes that relate to the pace of the meal, specifically, how long the meal lasted, how quickly the child

ate and the percentage of the meals that involved the mother presenting food to their child.

S. Asian mothers presented food more times to their child compared to non-Asian mothers ($F(1,31) = 4.15, p = 0.05$). The main effect for weight status did not reach statistical significance ($F(1,31) = 0.02, p = 0.89$) and there was no interaction effect ($F(1,31) = 0.01, p = 0.94$).

Table 8: Mean (SD) and range of meal duration, speed of eating and food presentation

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Mother presenting food (%)	31.1 (23.9) 4.9 - 82.5	31.2 (17.0) 6.0 - 57.0	18.8 (10.7) 4.2 - 38.1	18.4 (15.5) 1.7 - 52.5
Meal Duration (min.)	21.5 (11.3) 9.1 - 45.0	15.1 (6.8) 10.1 - 26.0	16.8 (4.9) 6.2 - 21.4	25.6 (5.0) 19.4 - 35.3
Speed of eating (bites per min)	2.2 (0.7) 1.3 - 3.4	1.8 (1.2) 0.2 - 36.7	2.5 (1.2) 0.7 - 4.8	6.5 (10.8) 1.3 - 36.7

In relation to length of mealtime the main effects for weight status ($F(1,31) = 0.13, p = 0.72$) and ethnicity did not reach statistical significance ($F(1,31) = 0.57, p = 0.46$). However, the interaction effect was statistically significant ($F(1,31) = 7.68, p = 0.009$). The meal duration, was shortest for the children whose mothers were S. Asian and healthy weight and longest for the children whose mother was Non-Asian and healthy weight. This pattern only occurred in the healthy weight groups.

The speed at which the child ate was comparable across all four groups. There was no main effect found for weight status ($F(1,31) = 0.37, p = 0.55$) or ethnicity ($F(1,31) = 2.94, p = 0.10$), and no statistically significant interaction ($F(1,31) = 1.76, p = 0.20$).

Positive Parent Behaviours

The following results are organized by positive parent behaviours, negative parent behaviours, positive child behaviours and negative child behaviours, as measured by the MOS. Table 9 shows overall mean positive mother-child behaviours in all groups and then more specific positive verbal and non-verbal behaviours.

Table 9: Mean (SD) percentage of mealtime intervals that mother's positive behaviours occurred

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Total Mother-Child Positive Behaviours	75.9 (19.5)	61.4 (20.8)	87.6 (9.5)	89.0 (8.5)
Positive Eating Comment	23.3 (13.0)	10.3 (8.1)	36.9 (7.0)	25.9 (10.9)
Positive Social Attention	18.1 (14.5)	23.9 (12.0)	28.7 (9.6)	37.8 (16.3)
Praise	10.5 (11.7)	6.6 (3.9)	7.0 (5.1)	11.5 (11.6)
Positive Contact	16.5 (30.6)	12.5 (10.6)	4.9 (3.7)	4.6 (2.1)

Overall, there was significantly less positive mother-child behaviour in the mealtimes of the S. Asian mothers compared with the non-Asian mothers ($F(1,31) = 10.91, p = 0.002$). The lowest level of positive mother-child behaviour was in the healthy weight S. Asian group. The main effect for weight status did not reach statistical significance ($F(1,31) = 3.22, p = 0.08$) and there was no interaction ($F(1,31) = 1.18, p = 0.29$).

S. Asian mothers also used positive eating comments significantly less frequently than non-Asian mothers. Again, the lowest levels of positive eating comments were made by mothers in the healthy weight S. Asian group. Furthermore, obese mothers made more positive comments than normal weight mothers. Accordingly, there was a significant main effect for both ethnicity ($F(1,31) = 16.16, p < 0.001$) and weight

status ($F(1,31) = 10.25, p = 0.003$). The interaction effect did not reach statistical significance ($F(1,31) = 0.38, p = 0.54$).

S. Asian mothers displayed significantly less positive social attention towards their children compared to non-Asian mothers ($F(1,31) = 6.04, p = 0.02$). The lowest amount of positive attention was displayed by the obese S. Asian mothers. The highest levels of positive social attention were displayed by the Non-Asian healthy weight mothers. However, the main effect of weight status ($F(1,31) = 2.69, p = 0.11$) and the interaction effect ($F(1,31) = 0.03, p = 0.87$) did not reach statistical significance.

The level of verbal praise was comparable across groups. The main effects for weight status ($F(1,31) = 0.15, p = 0.70$) and ethnicity ($F(1,31) = 0.03, p = 0.86$) were not statistically significant and there was no interaction effect ($F(1,31) = 1.10, p = 0.30$). Similarly, there was no difference between groups in the levels of positive contact between mothers and children within mealtimes. The main effect for weight status ($F(1,31) = 0.76, p = 0.39$) and ethnicity ($F(1,31) = 2.21, p = 0.15$) were not statistically significant and there was no interaction effect ($F(1,31) = 0.00, p = 0.95$). However, maternal age was a significant covariate and was negatively and significantly correlated ($r(36) = -0.346, p = 0.03$), indicating that younger mothers had more positive contact with their children.

Negative Parent Behaviours

Table 10, on the following page, summarizes the mean negative parent behaviours in all groups and then more specific negative verbal and non-verbal behaviours. Levels of all negative behaviours were lower than those of positive behaviours across all groups. In all four groups there were mother-infant dyads that displayed no negative behaviours at all during a mealtime.

Table 10: Mean (SD) percentage of mealtime intervals that mother’s negative parenting behaviours occurred

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Total Mother-Child Negative Behaviours	12.4 (12.1)	28.8 (23.4)	7.8 (9.3)	7.3 (8.0)
Negative Eating Comment	3.0 (3.0)	5.1 (6.1)	4.9 (10.7)	1.7 (3.7)
Negative Contact	0.1 (0.3)	3.5 (6.0)	0.0 (0.0)	0.0 (0.0)

S. Asian mothers displayed significantly more negative parenting behaviours during the mealtimes than non-Asian mothers ($F(1,31) = 5.58, p = 0.03$). A main effect for weight status ($F(1,31) = 8.84, p = 0.01$) indicated that healthy weight mothers showed more negative parenting behaviours than obese mothers. Overall, the highest amount of negative behaviour was displayed by participants in the healthy weight S. Asian group, however the interaction ($F(1,31) = 2.17, p = 0.15$) did not reach statistical significance. All three covariates were significant in this analysis. There were weak and non-significant negative correlations between negative parenting behaviours and mother’s age and deprivation score. There was a significant correlation with child’s age ($r(36)=0.387, p = 0.016$) indicating more negative parenting behaviours in older children.

There were no significant differences between groups regarding the amount of negative eating comments made during mealtimes. There was no main effect for weight status ($F(1,31) = 0.10, p = 0.76$) or ethnicity ($F(1,31) = 0.21, p = 0.65$) and there was no interaction effect ($F(1,31) = 0.70, p = 0.41$).

Levels of negative physical contact were low across all groups. There were no instances of negative physical contact in either the Non-Asian healthy weight or obese groups.

Controlling Behaviours - Positive & Negative

Instructions and prompts, both vague and specific, and positive or negative can be viewed as attempts to exert a degree of parental control over the mealtime. Table 11 summarizes levels of instructions and prompts that mothers in the different groups used throughout the mealtimes. For examples of parent behaviours see Appendix 9.

Table 11: Mean (SD) percentage of mealtime intervals that mother's controlling behaviours occurred

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Positive Specific Instruction	12.6 (10.3)	7.4 (5.1)	8.5 (10.2)	2.9 (2.6)
Negative Specific Instruction	2.7 (3.0)	7.1 (6.9)	0.7 (1.3)	0.3 (0.5)
Positive Vague Instruction	5.3 (6.3)	3.2 (2.4)	6.0 (3.8)	4.0 (2.5)
Negative Vague Instruction	0.5 (0.9)	5.7 (10.5)	0.5 (1.1)	0.5 (0.7)
Positive Prompt	2.0 (1.8)	1.3 (2.0)	3.2 (3.1)	3.8 (3.3)
Negative Prompt	1.1 (2.0)	1.2 (2.0)	0.3 (0.6)	0.2 (0.3)

While obese mothers tended to use positive specific instructions more frequently than healthy weight mothers, the difference was not significant ($F(1,31) = 2.36, p = 0.16$). There was no main effect of ethnicity ($F(1,31) = 0.11, p = 0.74$) and no interaction effect ($F(1,31) = 0.01, p = 0.92$). However, the child's age was a significant covariate in this analysis. Follow-up correlational analysis showed a significant positive association with this measure ($r(36) = 0.572, p < .001$) indicating that mothers used more positive specific instructions with older children.

S. Asian mothers used significantly more negative specific instructions compared with non-Asian mothers ($F(1,31) = 11.71, p = 0.002$). The highest amount of

negative specific instructions was used by the mothers in the S. Asian healthy weight group. Healthy weight Non-Asian mothers used the least number. Levene's test of equality of error variances was significant ($p = 0.001$). Accordingly, a more stringent significance level of $p \leq 0.01$ was set for evaluating the results. The main effect for weight status ($F(1,31) = 6.58, p = 0.02$) and the interaction effect ($F(1,31) = 2.93, p = 0.10$), therefore did not reach statistical significance. Again, the child's age was a significant covariate in this analysis, as was mother's age. Follow-up correlational analysis showed a significant positive association with child's ($r(36) = 0.340, p = .04$) indicating that mothers used more negative specific instructions with older children. The association with maternal age was negative and the correlation weak and non-significant ($r(36) = -0.017, NS$).

In contrast to the differences found regarding S. Asian and non-Asian mother's use of specific instructions there were no differences found in amount of vague instructions used. For positive vague instructions, there was no main effect for ethnicity ($F(1,31) = 3.24, p = 0.08$), or weight status ($F(1,31) = 1.32, p = 0.26$), and no significant interaction effect ($F(1,31) = 0.20, p = 0.66$). For negative vague instructions, there was a main effect of weight status ($F(1,31) = 4.51, p = 0.04$), but no main effect for ethnicity ($F(1,31) = 1.73, p = 0.20$) or significant interaction effect ($F(1,31) = 1.96, p = 0.17$). A significant Levene's test indicates that the weight status effect should not be considered reliable.

There was no difference between S. Asian and non-Asian mothers in the amount of positive prompts used ($F(1,31) = 2.05, p = 0.16$). There was no main effect of weight status ($F(1,31) = 0.03, p = 0.88$) and no interaction effect ($F(1,31) = 0.35, p = 0.56$). Negative prompts were rare, only observed in 13 of the 38 mealtimes, and not amenable to statistical analysis.

Positive Child Behaviours

Table 12 shows levels of overall positive child behaviours, followed by more specific positive verbal and non-verbal behaviours, for all four groups. For examples of child behaviours see Appendix 10.

Table 12: Mean (SD) percentage of mealtime intervals that positive child behaviours occurred

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Total Child Positive Behaviours	71.2 (21.5)	51.6 (29.2)	71.1 (19.3)	80.3 (15.2)
Child's Food Preparation	10.6 (11.7)	10.5 (10.6)	7.7 (7.0)	15.6 (11.1)
Self Bites	14.5 (12.8)	16.0 (17.1)	25.9 (14.4)	32.9 (20.6)
Prompted Bites	17.8 (12.5)	12.2 (11.7)	9.3 (8.9)	8.3 (9.2)
Engaged Activity	15.2 (13.3)	12.7 (11.9)	10.3 (6.4)	10.0 (5.0)
Appropriate Verbal Behaviour	6.5 (6.3)	3.9 (5.0)	10.7 (5.4)	10.8 (7.8)

There were no differences in total positive child behaviour during mealtimes by ethnicity ($F(1,31) = 2.41, p = 0.13$), weight status ($F(1,31) = 0.88, p = 0.36$), or any interaction ($F(1,31) = 3.43, p = 0.07$). However, there was a significantly lower number of intervals coded as only appropriate verbal interaction for the children with S. Asian mothers, compared to those with non-Asian mothers ($F(1,31) = 8.14, p = 0.008$). The lowest percentage of intervals coded as verbal interaction was in the group with healthy weight S. Asian mothers. The main effect for weight status ($F(1,31) = 0.20, p = 0.66$) was not significant and there was no significant interaction ($F(1,31) = 1.06, p = 0.31$).

Children with S. Asian mothers demonstrated a significantly lower number of independent self-bites compared with children of non-Asian mothers ($F(1,31) = 5.44,$

$p = 0.026$). Children with healthy weight Non-Asian mothers displayed the highest level of independent eating, followed by obese Non-Asian mothers. The main effect of weight status ($F(1,31) = 0.87, p = 0.36$) was not significant and there was no significant interaction effect ($F(1,31) = 0.35, p = 0.56$). In contrast, there were no significant differences in the number of prompted bites across the four groups. The main effect for weight status ($F(1,31) = 1.35, p = 0.25$) and ethnicity ($F(1,31) = 3.13, p = 0.09$) were not statistically significant and there was no interaction ($F(1,31) = 0.08, p = 0.78$).

Children with S. Asian mothers also showed higher levels of engaged activity ($F(1,31) = 6.83, p = 0.01$). Again, there was no main effect for weight status ($F(1,31) = 2.73, p = 0.11$) and no interaction effect ($F(1,31) = 0.02, p = 0.89$). Child's age was a significant covariate. The association was negative ($r(36) = -0.383, p = 0.02$) showing that younger children had lower levels of engaged activity.

Children in all four groups demonstrated comparable levels of independent food preparation. The main effect for weight status ($F(1,31) = 2.49, p = 0.13$) and ethnicity ($F(1,31) = 0.11, p = 0.74$) were not statistically significant and there was no interaction effect ($F(1,31) = 1.74, p = 0.20$).

Negative Child Behaviours

Table 13, on the following page, shows levels of overall negative child behaviours, followed by more specific negative verbal and non-verbal child behaviours. In all four groups a higher percentage of child positive behaviours occurred during mealtimes compared with negative child behaviours. In fact, scores on MOS variables such as negative demands, physically negative behaviours, and oppositional behaviour and complaints were so low they were not included for analysis.

Table 13: Mean (SD) percentage of mealtime intervals negative child behaviours occurred

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Total Child Negative Behaviours	29.7 (20.5)	48.4 (29.2)	25.9 (12.3)	20.4 (14.6)
Non- Compliance	1.8 (1.7)	5.9 (6.8)	2.6 (4.7)	0.7 (1.0)
Leave the Table	0.4 (1.4)	22.1 (32.2)	6.1 (13.2)	0.5 (0.9)
Food Refusal	8.6 (9.2)	9.2 (4.5)	5.2 (4.0)	5.5 (9.7)

Children with S. Asian mothers demonstrated marginally greater levels of negative behaviours during mealtimes ($F(1,31) = 4.01, p = 0.054$). The overall levels of negative behaviours demonstrated by the child were highest in the group of children who had healthy weight S. Asian mothers. The main effect for weight status was not significant ($F(1,31) = 1.34, p = 0.26$), and there was no significant interaction effect ($F(1,31) = 2.99, p = 0.09$).

There was a main effect of ethnicity on time away from the table ($F(1,31) = 5.10, p = 0.03$) but no effect of weight status ($F(1,31) = 0.96, p = 0.34$). There was also a significant interaction ($F(1,31) = 5.38, p = 0.03$). Children of healthy weight S. Asian mothers spent a significantly greater amount of time away from the meal-table, or focus of the mealtime, compared with the healthy weight non-Asian group. This difference was only seen in the healthy weight groups and was mirrored in levels of non-compliance. These were also significantly higher in the group of children with healthy weight S. Asian mothers compared to healthy weight non-Asian mothers. The interaction effect between weight status and ethnicity ($F(1,31) = 4.68, p = 0.04$) was statistically significant. The main effects for weight status ($F(1,31) = 2.50, p = 0.12$) and ethnicity ($F(1,31) = 0.61, p = 0.44$) were not. Interestingly, the covariate, children's age, was significant in both of these analyses

indicating that older children were more non-compliant ($r(36) = 0.419, p = 0.009$) and spent more time away from the table ($r(36) = 0.637, p < 0.001$).

The amount that children refused food was comparable across groups. There was no main effect for weight status ($F(1,31) = 0.35, p = 0.56$) or ethnicity ($F(1,31) = 0.78, p = 0.39$) and there was no interaction effect ($F(1,31) = 0.16, p = 0.69$). The number of negative demands, physically negative behaviours, and oppositional behaviour and complaints were low across all groups. Children with non-Asian mothers (either healthy weight or obese) displayed no negative verbal demands. No physically negative behaviour was displayed by children with obese S. Asian mothers.

Caregivers Feeding Styles Questionnaire

Table 14 below shows the mean scores, for all four groups, on the two dimensions of demandingness (control) and responsiveness as measured by the CFSQ. CFSQ data was missing for two mothers; one in the S. Asian healthy weight group and one in the non-Asian healthy weight group.

Table 14: Mean (SD) scores on the dimensions of demandingness and responsiveness

	South Asian Obese N = 10	South Asian Healthy Weight N = 7	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 9
demandingness	39.1 (6.2)	50.4 (9.9)	43.0 (10.2)	50.9 (11.6)
responsiveness	20.0 (3.4)	21.8 (5.3)	21.9 (4.5)	20.7 (5.1)

Obese mothers reported that they were significantly less demanding, in their child feeding style, than healthy weight mothers ($F(1,31) = 6.83, p = 0.014$). There was no main effect for ethnicity ($F(1,31) = 0.25, p = 0.62$) and there was no interaction effect ($F(1,31) = 0.26, p = 0.61$). There were no differences between the four groups on reported responsiveness. There was no main effect for weight status ($F(1,31) = 0.11, p = 0.74$) or ethnicity ($F(1,31) = 0.51, p = 0.48$) and there was no interaction effect ($F(1,31) = 0.82, p = 0.37$).

Table 15 below indicates self-reported caregiver's feeding styles for all four groups. Each participant's feeding style was calculated on their individual mean scores on both the demandingness and responsiveness dimensions.

Table 15: Frequency of different parenting styles within the four groups

	South Asian Obese N = 10	South Asian Healthy Weight N = 7	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 9
Authoritative (high demand/high response)	1	2	1	0
Authoritarian (high demand/low response)	1	4	3	6
Indulgent (low demand/high response)	7	0	6	1
Uninvolved (low demand/low response)	1	1	0	2

Obese mothers were most likely to report using an Indulgent parenting style (N = 13). In contrast, mothers of healthy weight were most likely to report using an Authoritarian parenting style (N = 10).

Parenting Practices Questionnaire

Table 16 shows mean scores on two dimensions of the PPQ. In all groups mother's mean scores were higher regarding warm parenting practices than use of hostile parenting practices.

Table 16: Mean (SD) scores on the warmth and hostility dimensions

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Warmth	27.6 (2.8)	27.0 (2.3)	28.9 (1.5)	28.6 (1.6)
Hostility	9.0 (5.5)	9.0 (4.2)	7.6 (4.5)	8.2 (3.8)

S. Asian mothers reported using a significantly less warm parenting style compared to non-Asian mothers. Accordingly, there was a main effect for ethnicity ($F(1,31) = 5.52, p = 0.026$). There was no main effect for weight status ($F(1,31) = 0.61, p = 0.44$) and there was no interaction effect ($F(1,31) = 0.30, p = 0.59$). Hostility did not differ between the groups.

Infant Characteristics Questionnaire

Table 17, on the following page, indicates the mean scores on the ICQ for all four groups. The higher the score the more difficult the child is reported to be.

There was not a significant difference in total ICQ score between the groups. There was no main effect for weight status ($F(1,31) = 0.30, p = 0.59$) or ethnicity ($F(1,31) = 0.72, p = 0.79$) and there was no interaction effect ($F(1,31) = 0.63, p = 0.43$).

Table 17: Mean (SD) ICQ scores

	South Asian Obese N = 10	South Asian Healthy Weight N = 8	Non-Asian Obese N = 10	Non-Asian Healthy Weight N = 10
Total ICQ score	60.1 (17.7)	63.3 (9.6)	60.1 (14.6)	60.6 (14.8)
Adaptability	9.8 (3.9)	8.8 (5.0)	11.0 (4.0)	13.7 (5.2)
Fussy/Difficultness	23.8 (3.0)	24.9 (8.7)	25.6 (7.6)	27.3 (7.9)
Dullness	9.2 (2.3)	10.1 (2.7)	10.1 (1.5)	12.0 (3.0)
Predictability	17.5 (6.1)	17.4 (6.6)	17.3 (4.1)	17.3 (7.5)

After controlling for covariates, scores obtained on all dimensions were comparable across all four groups. For adaptability there was no main effect of weight status ($F(1,31) = 0.46, p = 0.50$) or ethnicity ($F(1,31) = 1.09, p = 0.30$) and there was no interaction effect ($F(1,31) = 0.52, p = 0.48$). With regards to difficultness, there was no main effect for weight status ($F(1,31) = 0.01, p = 0.93$) or ethnicity ($F(1,31) = 0.01, p = 0.91$) and there was no interaction effect ($F(1,31) = 0.15, p = 0.70$). For dullness, there was no main effect for weight status ($F(1,31) = 0.10, p = 0.33$) or ethnicity ($F(1,31) = 1.12, p = 0.30$) and there was no interaction effect ($F(1,31) = 0.05, p = 0.82$). Finally, for predictability, there was no main effect for weight status ($F(1,31) = 0.30, p = 0.86$) or ethnicity ($F(1,31) = 0.33, p = 0.57$) and there was no interaction effect ($F(1,31) = 1.16, p = 0.29$).

DISCUSSION

Overview of Findings

There were three main aims of the current study. Firstly, the impact that maternal weight may have on the structure and organisation of mealtimes, and mother-child interactions during mealtimes, was explored. Observations of 38 mealtime interactions found that maternal weight status had a small, but measurable impact on maternal verbal feeding behaviours. Obese mothers used fewer negative parenting behaviours than healthy weight mothers. More specifically, they used a greater number of positive eating comments during mealtimes. The children of obese mothers did not behave in a significantly different way than the children of healthy weight mothers.

Secondly, the impact that ethnicity may have on mealtime organisation and mother-child mealtime interactions, was examined. Several differences were found between the mealtimes of S. Asian mothers and non-Asian mothers. The most unstructured mealtimes were observed in the S. Asian groups, for example, four S. Asian mothers did not use a table for their child's mealtime. S. Asian mothers also demonstrated less positive and more negative mother-child interaction during mealtimes. More specifically, S. Asian mothers made fewer positive eating comments and spent less time during the mealtimes providing positive social attention. They also showed a greater number of negative specific instructions than non-Asian mothers. This increased level of maternal negative behaviour was paralleled by greater levels of negative child behaviour. However, the children of S. Asian mothers spent more time demonstrating engaged activity and less time verbalizing during mealtimes (whilst not displaying any other behaviours). In addition, S. Asian mothers presented food to their child a greater number of times during a meal. This is consistent with the finding that their children demonstrated less independent eating.

The final aim was to compare mother's self-reported parenting styles on questionnaire assessments with the parenting behaviours observed during mealtimes. Obese mothers' self-reports on the CFSQ indicated that they have a less demanding parenting style. Obese mothers were most likely to report using an Indulgent

parenting style (low control, high warmth), whereas healthy weight mothers were most likely to report using an Authoritarian style (high control, low warmth). This difference was not observed in the interactions during actual mealtimes. S. Asian mothers reported using less warmth in their parenting practices than non-Asian mothers and this was consistent with the observational findings.

The following discussion will take each study aim in turn and relate what has been found in the current study to the current research literature. Methodological issues related to the current study, as well as the challenges in conducting bi-ethnic research will be examined. Directions for future research will be identified and finally the clinical implications of the study findings will be discussed.

The Impact of Maternal Weight on Mealtimes

Children of obese parents have been found to be of significant risk of childhood obesity (Daniels et al. 2005; Small et al. 2007). For this reason, the current study recruited mother-child dyads where mothers had a BMI of over 30, in order to explore the interaction patterns and mealtime contexts that may be contributing to this increased risk. Two significant differences in the verbal behaviour of the obese mothers, compared with the healthy weight mothers, were found. Firstly, obese mothers showed fewer negative parenting behaviours. Obese mothers, in this study, are different to mothers categorised as having eating disorders (e.g. in Stein et al.'s study 1994) who have been reported to find their children's mealtimes more stressful. In fact, it was the healthy weight Asian mothers, in the sample, who appeared to find the mealtimes most stressful. It was this group that most frequently used negative physical contact and negative eating comments during the mealtimes. However, overall, mealtimes were characterized by positive parenting interactions with negative parenting behaviours being comparatively uncommon.

In addition, obese mothers made more positive eating comments during mealtimes compared to healthy weight mothers. This finding can be compared with that of Waugh and Bulik (1999) who also used the MOS. In Waugh & Bulik's (1999) study the non-eating disorder control group used positive eating comments during mealtimes (20.8%). This is comparable to the overall mean percentage of intervals in which mothers of healthy weight used positive eating comments in the current

study (18.1%). Waugh and Bulik (1999) found that mothers with current or past eating disorders (anorexia or bulimia) used significantly fewer positive eating comments (8.6%). The authors took the low levels of positive eating comments as evidence that mothers with histories of eating disorders still found mealtimes' uncomfortable. By contrast, in the present study, obese mothers' greater use of positive eating comments (30.1%) suggests an increased amount of positive appreciation of the taste of food and the experience of eating. This is presented as a positive parenting strategy in the literature and one that helps socialize children to have positive experiences at mealtimes. Together with the finding that obese mothers used fewer negative parenting behaviours, the current suggests that overall the mealtimes of the children with obese mothers are more positive, enjoyable experiences. However, the children of the obese mothers did not behave significantly differently compared with the children of healthy weight mothers.

Although obesity has been related to increased levels of body dissatisfaction and lower self esteem (Wardle et al. 2002), any individual's acceptance of his or her weight will be influenced by various internal factors such as attitudes and social norms and external factors such as social support (Davis, Clark, Carres, Gary & Cooper, 2005), and not merely BMI status. Obese mothers are often assumed to be struggling with their own feeding behaviour, but this may not necessarily be the case. The current study indicates that obese mothers are able to organize and manage mealtimes effectively with their young children and talk positively about food and eating without increased levels of negative verbal or non-verbal behaviour.

In a questionnaire study with 453 mothers of 11-23 month olds and 634, 2-5 year olds, maternal concern about infant under-eating was higher for obese mothers than healthy weight mothers, independent of the child's weight (Baugcum et al. 2001). It was postulated that this heightened concern may have a paradoxical effect of motivating obese mothers to impose a greater degree of control over their child's mealtimes. There is no evidence in the current study, with children of the same age, that obese mothers were more concerned than healthy weight mothers about their child's feeding behaviour. The current study also does not indicate that obese mothers use more controlling parenting practices as there were no significant

differences between the number of instructions (vague or specific) or prompts used by the obese and healthy weight mothers.

A recent mealtime observational study indicated a higher prevalence of ‘maladaptive control strategies’ used by mothers of children at risk of obesity (Moens et al. 2007). These mothers were observed to use less positive parenting strategies and less control than mothers in the control group. They also demonstrated less interpersonal involvement in their children’s mealtime. These findings are not consistent with the current study. In the present study, the children at risk of obesity were the children with obese mothers. These mothers did not show less positive parenting behaviour or use fewer instructions or prompts during mealtimes. Neither did they demonstrate less interaction during mealtimes. However in Moen’s and colleagues study (2007) the children were 7-13 years old and those deemed to be at risk of obesity were the ones that were already overweight. Therefore parental feeding strategies are likely to have been shaped by the child’s weight and are not necessarily a causal factor in the child’s weight status (Wardle et al. 2002). The design of the present study precludes examination of the causal role of parenting behaviours, which would require an examination of the extent to which parental feeding practices predict children’s later feeding behaviour. However, the children in this study were younger than in most current studies on mother-child feeding behaviour and the children were selected from a birth cohort and therefore not a clinical sample where weight has been flagged as a concern.

The Impact of Ethnicity on Mealtimes

In contrast to the limited impact of maternal weight, there were a large number of differences between the interactions of the S. Asian mother-child dyads and those of the non-Asian dyads. S. Asian mothers were less likely to seat their child in a high chair or booster seat more than non-Asian mothers. It was only in the S. Asian groups that mothers were observed to seat their child on a sofa to eat their meal (N = 2), to use a car seat (N = 1) and to use a mat laid out on the floor (N = 1). Due to the variety of environmental contexts used by the mothers in the study and the small sample size it is difficult to draw any definitive conclusions. However, it may be that the way some mothers organize their mealtimes is not conducive to positive

mother-child interactions. Or, it may be that the way mothers currently organize mealtimes has been influenced by their child's past behaviour and responses to being in a more 'restrained' seating arrangement (such as a high chair with an attached tray). In the Asian healthy weight group, half of the mothers (N=4) did not use a table during their child's mealtime. The mealtimes of this group were characterised by the highest levels of mother-child aversive interaction. In particular, these mothers used the greatest number of negative specific instructions, and the fewest positive eating comments, during mealtimes with their children. The children of these mothers also showed the highest amount of negative child behaviours; they spent the longest time away from the table and showed the most non-compliance compared to children of mothers of similar weights but different ethnicity. Out of the 38 mealtime episodes only two mothers demonstrated more negative than positive parenting behaviours; these were both in the Asian healthy weight group.

In general, these findings support the findings of Sanders and colleagues (1993) that mealtimes can become mutually aversive encounters for both parent and child. The child's behaviour influences the verbal and non-verbal behaviour of the mother, and vice versa. The fact that the mealtimes become apparently negative experiences for both mother and child may be a reason why the S. Asian healthy weight group also had significantly shorter meals than the non-Asian healthy weight group. Indeed two mothers in this group 'abandoned' the mealtimes due to the level of conflict that was occurring. The amount of time that mothers and children in this group engaged in negative interaction ranged from 0% to 61.3% of the mealtimes. This indicates that there can be important variations in parenting styles within as well as between cultural groups defined in terms of ethnicity.

Infants in the current study were 18-27 months old. This is younger than many of the mealtime observation studies previously investigating children at risk of obesity (e.g. Moen et al. 2007). These children were at an important developmental stage, not only in terms of their cognitive and physical development but also in terms of developing their feeding skills. Stein and colleague's (1999) study did incorporate children as young as 12-14 months old, but mothers in the index group had current or past eating difficulties. However, the observations during the current study support those previously made by Stein and colleagues (1999) regarding the conflicts

that can arise between mothers and their infants during mealtimes. Conflicts were observed to be concerned with whether the child was self-feeding or the mother remained in control of the feeding utensils or about the child continuing to refuse food despite repeated offers from their mother.

Stein and colleagues (1994, 1999) found a significantly greater amount of conflict in the interactions between mothers with bulimia and their children, compared with a matched control group of mothers and their children. The mothers, in the current study, who showed increased levels of conflict with their child were Asian and healthy weight. This was the smallest of the groups (N=8). No measures of eating difficulties were administered in the current study. It is possible that mothers in this group had a higher level of eating difficulties compared with the other sub-groups. Just as a BMI of over 30 should not be taken as proof that a mother struggles with their own feeding behaviour, a healthy BMI should not be taken as proof that individuals have no eating difficulties. In fact, normal weight is not uncommon for those diagnosed with bulimia (Hudson et al. 1988). However, when speaking to the mothers at the time of the recording, it was within the non-Asian healthy weight group that two mothers disclosed having past difficulties with their weight and eating behaviour, not the S. Asian healthy weight group.

In the current literature, parental pressure to eat is understood to vary between 'strong verbal control', such as providing a child with direct commands or directions, and 'gentle verbal control' such as suggestions or prompts to eat (Stein, Woolley & Murray, 2001). In the current study, control was examined using the MOS variables of specific and vague instructions and prompts. In line with Orrell-Valente and colleague's (2007) findings, mothers in all groups were observed to encourage their child to eat.

The results may indicate that S. Asian mothers exert a different *type* of control during mealtimes with their children by giving a greater number of specific and clear direct instructions. S. Asian mothers, in this study, tended to use more negative specific instructions, but not more positive instructions. By contrast, non-Asian mothers used more positive prompts in order to manage a mealtime. This finding could be seen as consistent with the idea that parenting practices are related to the

attributes most valued in a specific culture (Kagitcibasi, 1996). Most of the S. Asian mothers (N = 15) identified themselves as Pakistani. As conformity, compliance, parental control and obedience are believed to be emphasised in Pakistani cultures (Miles, 1992) it makes sense that compared with non-Asian mothers they would use more direct and purposeful commands with their children. In the current study negative parent behaviours are judged from the mother's tone of voice and facial expression. There is evidence that there are significant differences regarding emotion judgments, display rules and self-reported emotional expressions between people of different ethnicities (Matsumota, 1993). It may be that as the coding of the mealtime interactions was carried out by me (who is white and British), judgments regarding positivity or negativity of interactions were culturally biased.

The finding that non-Asian mothers used more positive strategies is consistent with the literature that describes Asian parents as less warm than western parents (e.g. Greenberger & Chen, 1996; Lin & Fu, 1990). However the latter research was based on East Asian and more predominantly Confucian cultures (Stewart et al. 2000). Positive prompting in the MOS refers to when a mother's vague or specific instructions has been responded to by their child within a 10-second interval. The finding that non-Asian mothers use a significantly greater amount of positive prompts than S. Asian mothers may therefore indicate a different method of maintaining control rather than a lower amount of control strategies being used during mealtimes.

It may be that the increased amount of negative parenting behaviour and less positive feeding behaviour observed in the S. Asian groups contributes to the increased risk of obesity for Pakistani girls and overweight for Indian and Pakistani boys (Saxena, 2004). The current study was not able to recruit equal numbers of boys and girls into the study so it is not possible to discuss gender differences. However, negative parenting strategies have been linked to negative child health and physical development outcomes (Growing Up in Australia, 2004). But parenting styles that lead to optimal development for children may differ by culture in important ways (Van Campen & Russell, 2010). More research is needed to explore the impact of these differences in parenting strategies within S. Asian families. According to the literature, by using either of these control strategies (prompts or instructions)

mothers may be inadvertently socializing their children to eat according to external parental commands and cues rather than according to their own innate biological cues of hunger and satiety (Birch et al. 1987). Some infants may submit to this pressure from their mothers to the extent that they over-eat. Others may resist this pressure to the extent they under-eat (Satter, 1995). However, this theorizing emanates from western egocentric cultures and should not be naively generalized to S. Asian families.

In the current study, there were no differences between groups regarding the speed in which the children ate. These findings are consistent with Fiorito, Francis & Birch's (2006) finding that verbal instructions to eat were ineffective at promoting food intake. Here there was no paradoxical effect found, children given fewer instructions or prompts did not eat quicker. However, the quantity of food consumed by the children in their mealtimes was not measured.

Interestingly, S. Asian mothers presented food more times to their child compared with non-Asian mothers (this is rated as a positive behaviour within the MOS). If this difference was due to S. Asian mothers physically feeding their child rather than the child self-feeding this would have been reflected in increased levels of prompted bites. However, there were no significant differences between groups regarding prompted bites. Children of S. Asian mothers did not eat slower, or refuse food more, but they did demonstrate less independent eating.

Comparison between Questionnaire Assessments and Observations

Questionnaire assessments administered by the BiB research team were incorporated in the present study to enable a comparison between parent interactions observed during mealtimes and self-reported parenting styles. The CFSQ results showed that obese mothers reported themselves to be less demanding parents than healthy weight mothers. This was not supported by the single meal observations as the obese mothers did not use significantly less instructions or prompts than healthy weight mothers. Due to lower scores on the dimension of demandingness, obese mothers were most likely to be categorised as using Indulgent feeding styles. This is

consistent with Moen and colleagues (2007) categorization of obese mothers following mealtime observations. It is also consistent with Wardle and colleagues' (2002) questionnaire study where obese mothers reported significantly less control over their child's feeding behaviour compared with matched controls. Research indicates that parents that report using this feeding style also indicate lower levels of negative affect for both themselves and their child (Hughes et al. 2008). Consistent with Hughes and colleagues' (2008) questionnaire study, obese mothers in the current study, were observed to use fewer negative parenting behaviours than mothers of healthy weight. An indulgent parent-feeding style (low demandingness/high responsivity) has been associated with higher child BMI (Hughes et al. 2008) and lower intake of nutrient-rich foods (Hoerr et al. 2009). In the current study obese mothers were just as likely to provide fruit or vegetables within a meal as the healthy weight mothers (N=11). However, the current study did not calculate child BMI or quantity the child ate.

In contrast to obese mothers, healthy weight mothers were most likely to be categorized as having an Authoritarian (high demandingness/low responsivity) parenting style. Such parents have been found to use more restrictive feeding practices, more pressure to eat and be more likely to use physical punishment as a parenting strategy (Hughes et al. 2003). This is consistent with the current finding during the mealtime observations, that healthy weight mothers showed more negative parenting behaviours than obese mothers. Interestingly, both obese and healthy weight mothers self-reported parenting styles that the literature claims are inferior to the Authoritative (high demand/high response) parenting style in terms of child outcomes. The CFSQ also did not reveal any significant differences between S. Asian and non-Asian parenting styles. The CFSQ is based on Baumrind's (1971, 1989) typologies of parenting styles (see Figure 1). This theory, developed by a white American, was developed primarily with white middle class Americans in mind as this reflected the demographic makeup of the US at this time. Current knowledge regarding what constitutes optimal parenting has derived from research that is potentially biased in this way. A limitation of self-report measures is social desirability response bias (Eddy et al. 1998). It may be that parents report using parenting styles that they consider to be optimal or more socially desirable.

The most effective parenting style in terms of child outcomes is reported to be the Authoritative (high control, high warmth; Steinberg et al. 1992, 1994, 2001). However, of 38 mothers in the current sample, only four self-report using an Authoritative parenting style. This may be because mothers living in Bradford do not generally believe that Authoritative parenting styles are superior or effective. Also, it cannot be assumed that Authoritative parenting is associated with positive child outcomes with non-Asian and S. Asian families living in this specific cultural context.

The dimensions of warmth and hostility within the PPQ could be viewed as more appropriate for examining non-western cultures than typologies such as Authoritarian and Authoritative parenting (Darling and Steinberg, 1993). Via the PPQ, S. Asian mothers reported using less warmth in their parenting than non-Asian mothers. This is consistent with the single mealtime observations where S. Asian mothers demonstrated less positive mother-child interactions and more negative parenting behaviours, than non-Asian mothers. Parental warmth has consistently emerged as a dimension associated with positive developmental outcomes with both Pakistani young women (Stewart et al. 1999) and adolescents in Bangladesh (Stewart et al. 2000). However, both the impact of parental warmth in child feeding practices and its relation to child outcomes within ethnically diverse cultures living in England remains un-researched.

There were no differences found between groups regarding the ICQ scores. Mothers rated their children as having similar levels of fussiness/difficultness, adaptability, predictability and dullness, regardless of ethnicity or weight status. This suggests that differences found between groups, regarding different parenting styles used, cannot be attributed to differences in perception of infant temperament. However, the ICQ explores more general infant temperament characteristics and not the infant's expected feeding behaviour. A more appropriate measure for the current study may have been the Infant Feeding Style Questionnaire (Thompson, Mendez, Borja, Adair, Zimmer & Bentley, 2009). This self-report measure includes 39 questions on maternal beliefs, 24 questions on behaviours and an additional 20 behavioural items pertaining to solid feeding and is suitable for children over 6 months old. This measure would have enabled classification according to five

feeding styles; laissez-faire, pressuring, restrictive, responsive and indulgent. Thus a comparison could have been made regarding self-reported feeding and parenting style and self-reported feeding and observed feeding style. The Infant Feeding Style Questionnaire was considered as part of the BiB1000 battery, but considering the length of the assessment schedule it was not included, and therefore it was not possible to incorporate it within the current study.

Inconsistencies between self-report and observations in the current study could be attributed to the fact that observations were rated according to specific verbal and non-verbal interactions during one mealtime, while questionnaires measure more general parenting styles believed to be used over time. Unlike the observation measure, results from the three questionnaires were not indicative of many differences between the groups. This may be due to the small sample size. Or it may be that behavioural patterns that emerge during mealtime observations are different to those that parents usually engage in with their children. This was not supported by mothers' reports at the time of recording. However it cannot be ruled out that the single mealtime observations did not always capture *typical* mother and child feeding behaviours.

Additional Factors that Influenced Mealtime Interactions

The age of the mothers in the sample, their child's age and their IMD2010 were all entered as covariates in the main analyses. It was found that younger mothers had more positive physical contact with their children, regardless of weight status or ethnicity. This highlights how various factors can influence interactions. The current study did not collect data regarding whether it was the mother's first child or perceptions of child's weight and health that may also have affected mealtime interactions.

The children in the current sample ranged from 18-27 months old. Their age was a significant factor influencing mother-child interactions. As would be expected, younger children spent less time simply engaged with the mealtime and not demonstrating any other verbal or non-verbal behaviour. Older children demonstrated increased levels of non-compliance and spent more time away from

the meal-table. These differences in the children's behaviour are reflected in the observed maternal feeding behaviours. Mothers, in the current study, were found to use more negative parenting behaviours during mealtimes with older children than younger children. More specifically, they used more negative instructions and a greater amount of positive instructions. Taken together these results suggest that, as would be expected, older toddlers are more challenging to manage at mealtimes than infants. As a child progresses from infant to toddler they demonstrate increased attempts to exert control over their environments, a striving for independence and the desire to test out parental boundaries (Satter, 1995). Mealtimes are opportunities for toddlers to explore and test limits and experiment with self-feeding. However, it is again important to note that these perceptions are based upon mainly white western child development literature.

Features of the Mealtimes Observed Across the Groups

The NHS currently recommends at least five portions of fruit a day for children and families (<http://www.nhs.uk/Livewell/5ADAY/Pages/Whatcounts.aspx>). According to the United States Department of Agriculture the average 2-year old should be eating approximately one cup of vegetables and one cup of fruits per day (USDA, 2008). In the current study 42% of the sample ate a main meal without being provided with any fruit or vegetables that would count towards a portion. This may be due to mothers' prior experience of giving their infant these types of foods and a wish to minimize any aversive child behaviours during a recorded mealtime. However, mothers were instructed to give their child a *typical* meal on the day of recording, which all mothers reported that they had done. Eating 'five a day' is based on advice from WHO which recommends daily fruit and vegetable intake to lower the risk of serious health problems, such as CHD, type -2 diabetes and obesity. If children's food preference at such a young age negatively influences whether children are offered fruit/vegetables in subsequent meals, this could have an impact on their future health and eating preferences.

Indirect strategies of maternal modeling at 1-year have been shown to predict higher child vegetable consumption as 2-years (Gregory et al. 2011). In the current study only half of the children were actually eating at the same time as anyone else, which

meant that there were limited opportunities for social learning. Twenty-six of the 38 mealtimes recorded were carried out at lunchtime. Mothers found it most convenient to schedule the recordings to take place at this time and tended to report that family meals were more common in the evening. However, given the widely accepted belief that modeling is important for teaching children to eat rich and varied diets (e.g. Waugh & Bulik, 1999), the current study indicates that mothers may be missing valuable opportunities to model healthy eating behaviour to their children by not eating with them and modeling healthy eating behaviour. It is important to note that mothers were instructed not to invite additional people to be present during the mealtime. This may have contributed to increased levels of sole dining.

Over a quarter (N=10) of mothers in the total sample had the TV on whilst their child was eating. Eating whilst watching TV and increased levels of TV watching have been positively and independently associated with childhood and adolescent overweight and obesity (e.g. Liang, Kuhle & Veugelers, 2009). It has also been reported that eating meals in front of the TV, instead of with the family in a structured setting, diminishes both the nutritional and psychosocial benefits of mealtimes (Gable, Chang & Krull, 2007; Feldman, Eisenberg, Neumark-Sztaner & Story, 2007). Despite the highest rate of observed TV watching being in the S. Asian obese group, the current study did not find obese mothers to be significantly more likely to have the TV on during their child's mealtime compared to healthy weight mothers.

Methodological Issues

It was hoped that ten mothers would be recruited to each of the four participant sub-groups. Healthy weight Asian mothers were harder to recruit to the study than mothers within the other sub-groups (see Figure 2). This group demonstrated the highest frequency of negative parent and child behaviour as well as substantial within-group variations. The results suggest that parenting styles and practices vary greatly within as well as across ethnic groups and larger samples of participants are necessary to explore these variations.

Despite the majority of mothers feeling that the recorded mealtime was typical and their child's behaviour not much difficult to usual, some behavioural patterns may emerge as part of the mother or child's reaction to being observed (Gardner, 2000). Inevitably, the recorded mealtimes were not reported to be typical and representative for all 38 participants. Four mothers reported feeling self-conscious at the beginning of the mealtime. Being recorded, and being supplied a copy of the recording, may motivate mothers to try to demonstrate what they believe are effective parenting strategies. It is difficult to measure the degree of social desirability responding across groups. For those mothers whose culture emphasizes the construct of family honour, there may have been increased motivation to behave in a way that is viewed as desirable parenting by themselves and others.

Strengths and Limitations of Measures

Naturalistic observational studies regarding parenting have been previously labeled as the "gold standard" within this field (Webster-Stratton & Lindsay, 1999). The time costs involved with such a research project generally preclude their use in population studies. Also studies that include both self-reported measures of parenting styles and observations during actual mealtimes are rare. The current findings are therefore beneficial and valuable in this field of research but not without limitations. Most importantly the cross-sectional design prevents conclusions about the direction of effects. Collecting, coding and interpreting observational data is a time-consuming process that restricts sample size. This lowers the stability of measurement and also the power of statistical analyses (Stoolmiller, Eddy & Reid, 2000).

Using the MOS enabled the recorded mealtimes to be coded for a wide range of parent and child verbal and non verbal behaviours. It also enabled direct comparison with Waugh and Bulik's (1999) study. This type of moment-to-moment coding is consistent with recent emphasis in the literature regarding more fine-grained and detailed analysis of components of parenting styles (Baumrind et al. 2010).

The MOS originally derived from extensive work with 'oppositional children' and children with 'feeding problems'. It was therefore designed for use with a clinical population, that is, parents and children experiencing significant difficulties. The

current study sample was not a clinical sample and there were a significantly greater proportion of mealtimes categorised as positive rather than aversive. Due to the low frequencies of some child behaviours (such as oppositional behaviour, aversive demand and physically negative behaviours) these categories were combined.

One problem with the MOS is that a child's engaged activity and verbal interaction are both exclusive categories. They were therefore not scored if any other behaviour could be scored within an interval. Similarly, parental positive attention could only be scored if no other positive behaviour was scored during that interval but could if there were negative behaviours coded. The use of exclusive coding strategies meant that if, for example, a child is chewing, social interactional behaviours occurring in the same interval are lost in the analysis. This is a limitation of the MOS, for use in the current study, but it is symptomatic of the fact that the measure was designed for observations with children with feeding difficulties (with a high rate of food refusal and low food intake).

The MOS was also limited in its ability to capture the emotional tone of the mealtime as it only includes three negative affect codes which did not adequately capture the subtle variations in mood observed and were less appropriate considering that most of the mealtimes were categorised by positive affect. Also, as only one mealtime was recorded per mother-child dyad the parenting behaviours captured by the MOS cannot be assumed to be stable over time.

It is also difficult for questionnaire measures to adequately capture the rich constructs of child feeding styles. Authoritative parenting is conceptualized as more than a compilation of specific parenting practices and rather as an emotional context (Darling & Steinberg, 1993). 'Parenting practices are best viewed not as instantiations of authoritativeness, but as specific actions that often have different meanings depending on the emotional climate in which they occur, a climate that is determined by the more general parenting styles' (Steinberg, 2001 p.9-10). The emotional context of mealtimes is therefore paramount and not easily measured via questionnaires.

Like the MOS, many of the tools available for assessing parenting styles have been developed through research and practice with clinical populations. Such measures may discriminate well for those with a high level of problems, but show restricted or skewed distributions when applied to a non-clinical population (Nicholson et al. 2006, cited by Zubrick, Smith, Nicholson, Sanson & Jackiewicz, 2008). Even within western societies, it should not be presumed that the self-report questionnaires developed in one culture translate exactly to another culture.

As a parent self-report questionnaire, the ICQ has the advantage of utilizing the parent's experience and observations of their child over a variety of situations and environments. This knowledge is used in the assessment of their temperament. However, an assessment of a child's temperament cannot be independent of the child's environment. Temperament can only be assessed as it is demonstrated within the parent-infant system of interaction. An infant's verbal and non-verbal behaviour is the result of the interaction, and in this way temperament and context cannot be separated (Rothbart, 1981).

Challenges in Conducting Bi-ethnic Research

As previously discussed, the vast amount of empirical support showing certain parenting styles as optimal have resulted from studies with European American white populations. Theorists and researchers hold implicit assumptions about child development and child rearing that are rarely addressed in their work. Most research on parenting and child development has therefore been informed by cultures that could be described as egocentric and valuing independence. Inadvertently, child-feeding research and the measures developed are lacking in variables of interdependence and sociocentric values. The main challenge in conducting bi-ethnic research is therefore the paucity of culturally sensitive measures. The measures used in the current study have not been developed with S. Asian families in mind. It is therefore important that the current findings are not taken as evidence that Asian mothers demonstrate less optimal parenting. The MOS use of 'positive' and 'aversive' types of interactions could be seen as fostering inaccurate inferences towards 'good' and 'bad' parenting. The current findings indicate that according to measures designed for use with non-Asian mothers, S. Asian mothers feeding behaviours differ in a number of ways. For a measure to be sensitive to the

parenting goals and practices of S. Asian mothers it needs to be developed based on their reported values and beliefs.

As a white British female carrying out the observations and coding data I was aware of my own biases and where my own ethnicity and culture may influence my coding. In order to minimize coding bias another two raters, one being S. Asian, each coded 10% of the data and ensured a high level of coding reliability. Also, eleven of the mealtimes were recorded by a S. Asian Research Assistant, who collected the corresponding qualitative data for these participants. As the Research Assistant had recorded the emotional tone of the mealtimes, coding of the observations was also based on her perspective regarding whether interactions were positive or negative.

In the S. Asian healthy weight group, four mothers stated that non-participation was due to other family members not giving consent. It is recognised that inviting a stranger into your home to record a typically private family experience can be a challenge for many women, regardless of ethnicity. In more interdependent cultures (such as Pakistan) there is an increased likelihood that parents and children will also live with extended family such as grandparents and aunts and uncles. In communities that place a high value on collectivity and interdependence, various family members are likely to have an important role in decision-making. It is important not to make assumptions that non-participation, due to restrictions by family members, is evidence of the existence of oppressive female stereotypes. It is true that the status of women in Pakistan (and the rest of South Asia) is far more discrepant from their male counterparts than in the west (Stewart et al. 2000). However, the majority of the mothers in the current study were second generation S. Asian young women born in England. The mothers in this sample are expected to be acculturated to living in a western society. They are likely to be influenced by both the western and non-western ancestral cultural ideals.

It is important to note that the concept of ethnicity is complex and multidimensional and changes over time. As such, it is open to varying degrees of interpretation (Bhopal, 2004). Although health care needs may differ between S. Asian and non-Asian people there is also a need to avoid the unnecessary stereotyping of people by their ethnicity. It should not be presumed that all participants from the same ethnic group are alike. In fact both the S. Asian and non-Asian groups in the current study

were heterogeneous groups. Increasingly, factors such as religion, language, gender and class serve to highlight differences as well as commonalities amongst members (Karlsen & Nazroo, 2006). A strength of the current study lies in the detail provided regarding the composition of all groups. However, data regarding language and religion were not gathered from the BiB project. Stricter exclusion criteria and a different sampling approach might ideally have been used during the recruitment process. A matched between-groups design could have been adopted to limit the number of confounding variables. However, this was not feasible within the project's constraints, as this strategy would have taken significantly longer and it would not have been possible to recruit adequate numbers of participants.

As previously discussed the label 'South Asian' in this study refers to a person who identifies their ancestry within the countries of the Indian subcontinent, including India and Pakistan (Bhopal, 2004). One mother, in the Asian obese group, who identified herself to be Asian had been born in Iran. The group labeled the 'Non-Asian healthy weight group' included one mother who was Black. The 'Non-Asian obese group' included one mother who was of dual heritage. None of these mothers were in the healthy weight S. Asian group which differed the most from the other three groups. To ascertain that these three mothers did not differ significantly from the mothers within their participant groups their demographic data, aspects of their mealtime organisation and their scores on total percentage of mother-child positive and negative behaviours were compared with the mean group scores (See Appendix 12). There were no extreme values found. The only difference was that the mother of dual heritage in the non-Asian obese group was the oldest in the group by 4 years.

Directions of Future Research

The mechanisms by which parental obesity increases the risk of childhood obesity are expected to be complex. It is possible that the use of high levels of positive eating comments by obese mothers found in this study may be contributing to this risk. However, this does not fit with the current literature. Much more extensive research is needed to examine the impact of this strategy over time. Participants were selected based on maternal weight and the child's weight was not measured. It

would be of interest to compare mealtimes of overweight toddlers with normal weight toddlers.

Data gathered in the present study will be stored securely for 10 years. This provides the opportunity for longitudinal follow-up. However, the small sample in this study limits the value of follow-up studies. Still, an opportunity to generate more detailed, reflective information comes from playing back the mealtime recordings to the mothers who participated in the study and exploring the mother's experience of feeding her child. A subsequent qualitative study could explore the mother's thoughts, feelings, views and attitudes in relation to the task of feeding their child and how this relates to their scores on the MOS. Data could be gathered regarding the mothers' food/weight concerns, as well as their perceptions of food and feeding culture within the family. A technique known as Interpersonal Process Recall (IPR; Kagan & Kagan 1991) could be used as an approach to gather reflections from mothers about their mealtime experiences. Using such methods could contribute to understanding the beliefs behind parenting practices when comparing cultural groups.

Stein and colleagues (1994) recorded mother and infant interactions in two different situations, at play as well as mealtimes. This enabled some establishment of whether observed parenting behaviour was feeding dependent or was characteristic of a more general parenting style. Recording more than one mealtime for each mother-infant dyad would also have enabled comment regarding the consistency of mother and infant behaviour across time. Considering the natural variability in appetite over time there may be variations in children's eating behaviour from one meal to the next. Ideally, a minimum of two meals for each mother-infant dyad would have been recorded to minimize within participant effects in feeding behaviour. However this would have had a considerable impact on limited resources available for the current study.

Due to the current study recruiting from the BiB birth cohort sample and predominantly mothers attending the BiB clinics, the current sample focused on mother-infant dyads. The present study does not provide any insight into the role that father and other members of the family play during mealtimes. Mothers are of particular interest as they have been shown to spend significantly more time than

fathers in direct interactions with their children across several familial situations (McHale et al. 1995). The current study could be replicated using fathers to compare the interaction patterns and parenting styles used by fathers and mothers.

Clinical Implications

The rapid rise in the prevalence of childhood obesity has stimulated research on early parent feeding styles. Despite the need, suggested by some researchers, for early intervention efforts directed to early parenting variables (e.g. Topham et al. 2011), the current study indicates the significant differences between mothers of different cultural and ethnic backgrounds in the way they interact with their children during mealtimes. Further research is needed regarding these ethnic variations in interaction and whether these differences influence obesity risk in children.

Although parents may currently obtain guidance on aspects of feeding that are thought to promote healthy eating behaviour in children (e.g. Satter, 1987, 2000), this literature is based on studies of white middle class families. Parenting interventions need to be specifically designed in terms of population characteristics, and program features and processes such as program goals. Future intervention effectiveness will be enhanced if practitioners know which components of parenting to target within a culturally sensitive context.

Some have asserted that the current research literature indicates that it would be beneficial to institute a systematic large-scale, multifaceted and ongoing public health campaign to educate parents regarding beneficial parenting strategies (Steinberg, 2001). In contrast, without scientific evidence that particular child-feeding practices either promote or protect against later obesity, more specific child-feeding early interventions are thought to be premature (Luster & Okagaki, 2005). The current study indicates that mothers of different ethnicities, living within the same geographical region, can demonstrate different parenting behaviours when feeding their toddlers. It has also revealed important differences in the frequency of positive and negative parenting strategies within and between groups that require further exploration. It is believed that more research is essential to ensure that early child-feeding interventions are both culturally appropriate and effective.

REFERENCES

- Agras, W.H., Kraemer, R., Berkowitz, A. & Korner, L.H. (1990). Does a vigorous feeding style influence early development of adiposity? *The Journal of Pediatrics*, 110; 799-804.
- Agras, S., Hammer, L. & McNicholas, F. (1999). A prospective study of the influences of eating-disordered mothers on their children. *International Journal of Eating Disorders*, 25, 253-262.
- Ahmad, S., Waller, G., & Verduyn, C. (1994). Eating attitudes among Asian school girls: The role of perceived parental control. *International Journal of Eating Disorders*, 15, 91–97.
- Alexy, U., Kersting, M., Sichert-Heller, W., Manz, F. & Schoch, G. (1999). Macro-nutrient intake of 3-36 month German infants and children: Results of the DONALD study. Dortmund Nutritional and Anthropometric Longitudinally Designed Study. *Annual Journal of Nutrition*, 43; 14-22.
- Altabe, M. (1998). Ethnicity and body-image: Quantitative and qualitative analysis. *International Journal of Eating Disorders* 23; 153-159.
- American Academy of Pediatrics. (2003). Prevention of pediatric overweight and obesity. *Pediatrics*, 112(424), 430.
- Anderson, C.B., Hughes, S.O., Fisher, J.O. & Nicklas, T.A. (2005). Cross-cultural equivalence of feeding beliefs and practices: The psychometric properties of the child feeding questionnaire among blacks and Hispanics. *Preventative Medicine* 41; 521-531.
- Association of Public Health Observations (2005). *Ethnicity and Health, Indications of Public Health in the English Regions*, 4.
- Atkin, K. & Chattoo, S. (2006). Approaches to conducting qualitative research in ethnically diverse populations. In J. Nazroo (ed) *Health and Social Research in Multi-ethnic Societies*; Routledge, London, 95-115.
- Baker, J.L., Michaelsen, K.F., Rasmussen, K.M. & Sorensen, T.I. (2004). Maternal prepregnant body mass index, duration of breastfeeding, and timing of complementary food introduction are associated with infant weight gain. *American Journal of Clinical Nutrition*, 80; 1579-1588.
- Baldwin, C., & Baldwin, A. (1989). *The role of family interaction in the prediction of adolescent competence*. Paper presented at the meeting of the Society for Research in Child Development, Kansas City, MO.
- Bates, J.E., Freeland, C.A., & Lounsbury, M.L. (1979). Measure of infant difficultness. *Child Development*, 50, 794-803.

Baughcum, A.E., Powers, S., Johnson, S.B., Chamberlin, L.A., Deeks, C.M., Jain, A. et al. (2001). Maternal feeding practices and their relationships to overweight in early childhood. *Journal of Developmental and Behavioral Pediatrics*, 22; 391-408.

Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology Monographs*, 4, 1-103.

Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *Journal of Early Adolescence*, 11, 56-95.

Baumrind, D., Larzelere, R.E. & Owens, E.B. (2010). Effects of preschool parents' power assertiveness patterns and practices on adolescent development. *Parenting Science and Practice*, 10; 157-201.

Baur, L.A. (2002) Child and adolescent obesity in the 21st century: an Australian perspective. *Asia Pacific Journal of Clinical Nutrition*, 11(3), S524-S528.

Berg-Smith, S. M., Stevens, V. J., Brown, K. M., Van-Horn, L., Gernhofer, N., Peters, E., et al. (1999). A brief motivational intervention to improve dietary adherence in adolescents: The dietary intervention study in children (DISC) research group. *Health Education Research*, 14, 399-410.

Bhopal, R. (2002). Epidemic of cardiovascular disease in South Asians. *British Medical Journal*, 324; 625-626.

Bhopal, R. (2004). Glossary of terms relating to ethnicity and race: for reflection and debate. *Journal of Epidemiological Community Health*, 58; 441-445.

Bhopal, R. & Donaldson, L. (1998). White, European, Western, Caucasian, or what? Inappropriate labeling in research on race, ethnicity and health. *American Journal of Public Health*, 88; 1303-1307.

Birch L. L. (1980). Effects of peer models' food choices and eating behaviors on preschoolers' food preferences. *Child Development* 51, 489-496.

Birch, L.L. & Davison, K.K. (2001). Family environmental factors influencing the developing behavioral controls of food intake and child overweight. *Pediatric Clinics of North America*, 48(4); 893-907

Birch, L.L. & Fisher, J.O. (1995). Appetite and eating behaviour in children. *Pediatric Nutrition*, 42, 931-953.

Birch, L.L., Fisher, J.O., Davison, K.K. (2003). Learning to overeat: Maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *American Journal of Clinical Nutrition*, 78, 215-220.

Birch, L.L., Fisher, J.O., Grimm-Thomas, K., Markey, C.N., Sawyer, R. & Johnson, S.L. (2001). Confirmatory factor analysis of the Child Feeding

Questionnaire: a measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite*. 36: 201-210.

Birch, L.L., McPhee, L., Shoba, B.C., Steinbert, L., & Krehbiel, R. (1987). Clean your plate: Effects of child feeding practices on the development of intake regulation. *Learning and Motivation*, 18, 301-317.

Blissett, J. & Farrow, C. (2007) . Predictors of maternal control of feeding at 1 and 2 years of age. *International Journal of Obesity*, 31, 1520-1526.

Bond, M. H., & Smith, P. B. (1996). Cross-cultural social and organizational psychology. *Annual Review of Psychology*, 47, 205–235.

Botton, J., Heude, B., Maccario, J., Ducimetiere, P. & Charles, M.A. & FLVS Study Group (2008). Postnatal weight and height growth velocities at different ages between birth and 5 year and body composition in adolescent boys and girls. *American Journal of Clinical Nutrition*, 87; 1760-1768.

Bouchard, C., Despres, J.P. & Tremblay, A. (1991). Genetics of obesity and human energy metabolism. *Proceeding of the Nutrition Society* 50(2), 139-147.

Bradford Metropolitan District Council. Life in the Community. At http://www.bradford.gov.uk/life_in_the_community/population_and_migration/people (Accessed April 2009).

British Heart Foundation (200) At <http://www.heartstats.org/datapage.asp> (Accessed February 2010).

Brown R & Ogden J (2004) Children's eating attitudes and behaviour: a study of the modelling and control theories of parental influence. *Health Education Research* 19(3), 261–271.

Brown, J.E., Serdula, M., Cauns, K., Godes, J.R., Jacobs, D.R. Jr. & Elmer, P. (1986). Ethnic group differences in nutritional status of young children from low-income areas of an urban county. *American Journal of Clinical Nutrition* 44(6); 938-944.

Butt, J. & Box, L. (1998). *Family centred; A study of the use of family centres by Black families*. London: Race Equality unit.

Chao, R.K. (1994). Beyond parental control and authoritarian parenting style: Understanding Chinese parenting through the cultural notion of training. *Child Development*, 65; 1111-1119.

Chien, A., Coker, T., Choi, L., Slora, E., Bodnar, P., Weiley, V. (2006). What do pediatric primary care providers think are important research questions? A perspective from PROS providers. *Ambulatory Pediatrics*, 6, 352-355.

Child Growth Foundation (1996). *Cross sectional stature and weight reference*

curves for the UK. London, United Kingdom: Child Growth Foundation.

Clark, H.R., Goyder, E., Bissell, P., Blank, L., & Peters, J. (2007). How do parents' child-feeding behaviours influence child weight? Implications for childhood obesity policy. *Journal of Public Health (Oxford)*, 29, 132-141.

Conner, M. Armitage, C.J. (2002). *The Social Psychology of Food*. Open University Press, 114-133.

Costanzo, P.R. & Woody, E.Z. (1985). Domain-specific parenting styles and their impact on the child's development of particular deviance: The example of obesity-proneness. *Journal of Social and Clinical Psychology*, 3, 425-445.

Cooper, P.J., Whelan, E., Woolgar, M. & Murray, L. (2004). Association between childhood feeding problems and maternal eating disorder: Role of the family environment. *British Journal of Psychiatry*, 184, 210-215.

Danckert, N.K., Gunther, A.L., Kroke, A., Hornberg, C. & Buyken, A.E. (2007). How early dietary factors modify the effect of rapid weight gain in infancy on subsequent body composition development in term children whose birth weight was appropriate for gestational age. *American Journal of Clinical Nutrition*, 86; 1700-1708.

Daniels, S. R., Arnett, D. K., Eckel, R. H., Gidding, S. S., Hayman, L. L., Kumanyika, S., Robinson, T. N., Scott, B. J., Jeor, S. S., & Williams, C. L. (2005) Prevention, and treatment of overweight in children and adolescents: pathophysiology and consequences. *Circulation*, 111, 1999-2012.

Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin*, 113(3), 487-496.

Darr, A., Astin, K. & Atkin, K. (2008). Causal attributions, lifestyle change and coronary heart disease: illness beliefs of patients of South Asian and European origin living in the UK. *Heart & Lung – The Journal of Acute & Critical Care*, 37(2); 91-104.

Davis, E.M., Clark, J.M., Carrese, J.A., Gary, T.L. & Cooper, L.A. (2005). Racial and socioeconomic differences in the weight loss experiences of obese women. *Research and Practice* 95(9); 2539-2543.

Davison K.K. & Birch, L.L. (2001). Childhood overweight: a contextual model and recommendations for future research. *Obesity Reviews*, 2; 159-171.

Department of Health (2008). *Healthy weight, healthy lives*. A cross government strategy for England. At <http://webarchives.gov.uk> (Accessed May 2011).

Dietz, W. (2003). *Pediatric obesity*. New York: Lippincott, Williams & Wilkins

Donna, K. (1995). Maternal responsiveness of socially high-risk mothers to the elicitation cues of their 7-month-old infants. *Journal of Pediatric Nursing*, 10(4), 254-263.

Drucker, R.R., Hammer, L.D., Agras, W.S., Bryson, S. (1999). Can mothers influence their child's eating behaviour? *Journal of Developmental Behavioural Paediatrics* 20; 88-92.

Ebbeling, C.B., Pawlak, D.B., Ludwig, D.S. (2002). Childhood obesity: public-health crisis, common sense cure. *The Lancet*, 360; 473-82.

Eddy, J.M., Dishion, T. & Stoolmiller, M. (1998). The analysis of intervention change in children and families: methodological and conceptual issues embedded in intervention studies. *Journal of Abnormal Psychology*, 26, 53-71.

Elliott, R. & Shapiro, D.A. (1988). Brief structured recall: A more efficient method for studying significant therapy events. *British Journal of Medical Psychology*, 61: 141-153.

English Indices of Deprivation 2010 (2011). Communities on Local Government; *Neighbourhoods Statistical Release*; 1-21.

Faith, M.S., Scanlon, K.S., Birch, L.L., Francis, L.A. & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research*, 12; 1711-1722.

Farooqi, A., Nagra, D., Edgar, T. & Khunti, K. (2000). Attitudes to lifestyle risk factors for coronary heart disease amongst South Asians in Leicester: a focus group study. *Family Practice*, 17(4); 293-297.

Feghali, E. (1997). Arab cultural communication patterns. *International Journal of Intercultural Relations*, 21; 345-378.

Feldman, S., Eisenberg, M.E., Neumark-Sztaner, D. & Story, M. (2007). Associations between watching TV during family meals and dietary intake among adolescents. *Journal of Nutrition Education and Behaviour*; 39, 257-263.

Feldman, S. S., Rosenthal, D. A., Mont-Reynaud, R., Lau, S., & Leung, K. (1991). Ain't misbehavin': Adolescent values and family environments as correlates of misconduct in a crossnational study of Chinese, Australian, and American youth. *Journal of Research in Adolescence*, 1, 109-134.

Fisher, J.O. & Birch, L.L. (1999). Restricting access to palatable foods affects children's behavioural response, food selection and intake. *American Journal of Clinical Nutrition*, 69, 1264-1272.

Fisher, J.O., Mitchell, D.C., Smiciklas-Wright, H., & Birch, L.L. (2002). Parental influences on young girls' fruit and vegetable, micronutrient, and fat intakes. *Journal of the American Dietetic Association*, 102; 58-64.

Fitzgibbon, M.L., Stolley, M.R., Dyer, A.R., VanHorn, L., & KauferChristoffel, K. (2002). A community-based obesity prevention program for minority children: Rationale and study design for hip-hop to health jr. [Electronic version]. *Preventive Medicine*, 34, 289-297.

Fox, M.K., Devaney, B., Reidy, K., Razafindrakoto, C. & Ziegler, P. (2006). Relationship between portion size and energy intake among infants and toddlers: Evidence of self-regulation. *Journal of the American Dietetic Association*, 106, S77-S83.

Francis L. A., Hofer S.M. & Birch L.L. (2001) Predictors of maternal child-feeding style: maternal and child characteristics. *Appetite* 37, 231–243.

Gable, S., Chang, Y., Krull, J.L. (2007). Television watching and frequency of family meals are predictive of overweight onset and persistence in a national sample of school-aged children. *Journal of American Dietetic Association*; 107, 53-61

Gable, S. & Lutz, S. (2000). Household, parent and child contributions to childhood obesity. *Family Relations*, 49; 293-300.

Galloway, A.T., Fiorito, L.M., Lee, Y. & Birch, L.L. (2005). Parental pressure, dietary patterns, and weight status in girls who are ‘picky eaters’. *Journal of the American Dietetic Association*, 105, 541-548.

Garden, F., Marks, G. & Almqvist, C. (2011). Infant and early childhood dietary predictors of overweight at age 8 years in the Childhood Asthma Prevention Study population. *European Journal of Clinical Nutrition*, 65(4); 454-462.

Gardner, F. (2000). Methodological issues in the direct observation of parent-child interactions: do observational findings reflect the natural behaviour of participants? *Clinical Child and Family Psychology Review* 3; 185-198.

Geertz, C. (2000). *The interpretation of cultures*. New York: Basic Books.

Gilbert, P., Gilbert, J. & Sanghera, J. (2004). A focus group exploration of the impact of izzat, shame, subordination and entrapment on mental health and service use in South Asian women living in Derby. *Mental Health, Religion and Culture*, 7(2); 109-130.

Gray, W.N., Janicke, D.M., Wistedt, K.M. & Dumont-Driscoll (2010). Factors associated with parental use of restrictive feeding practices to control their children’s food intake. *Appetite*, 55; 332-337.

Greenberger, E., & Chen, C. (1996). Perceived family relationships and depressed mood in early and late adolescence: A comparison of European and Asian Americans. *Developmental Psychology*, 32, 707–716.

Gregory, J., Paxton, S. & Brozovic, A. (2011). Maternal feeding practices predict fruit and vegetable consumption in young children. Results of a 12-month longitudinal study. *Appetite*, 51(1); 167-172.

Hall, L., & Cohn, L. (1992). *Bulimia, A Guide to Recovery*. Gurze Books: C.A.

Haycraft, E. & Blissett, J. (2010). Eating disorder symptoms and parenting styles. *Appetite*, 54 (1), 221-224.

Haycraft, E., Farrow, C., Meyer, C., Powell, F., Blissett, J. (2011). Relationships between temperament and eating behaviour in young children. *Appetite*, 56(3); 689-692.

Heptinstall, F., Puckering, C., Scuse, D., Start, K., Zur-Szpiro, S. & Dowdney, L. (1987) Nutrition and mealtime behaviour in families of growth retarded children. *Human Nutrition: Applied Nutrition*, 41A, 390-402.

Hill, A.J. & Bhatti, R. (1995). Body image perception and dieting in preadolescent British Asian girls: Links with eating disorders. *International Journal of Eating Disorders*, 17, 175-183.

Hill, J.O., Melanson, E.L. (1999). Overview of the determinants of overweight and obesity: Current evidence and research issues. *Medical Science Sports Exercise* 31(115); S515-521.

Hodges, E., Hughes, S., Hopkinson, J., Fisher, J. (2008). Maternal decisions about the initiation and termination of infant feeding. *Appetite* 50 (2-3), 333-339.

Hoerr, S.L., Hughes, S.O., Fisher, J.O., Nicklas, T.A., Liu, Y. & Shewchuk, R.M. (2009). Associations among parental feeding styles and children's food intake in families with limited incomes. *International Journal of Behavioral Nutrition and Physical Activity*; 1-7.

Hubbs-Tait, L., Kennedy, T.S., Page, M.C., Topham, G.L. & Harrist, A.W. (2008). Parental feeding practices predict authoritative, authoritarian, and permissive parenting styles. *Journal of the American Dietetic Association*, 108, 1154-1161.

Hudson, J., Pope, H., Wurtman, J., Yurgelun-Todd, D., Mark, S. & Rosenthal, N. (1988). A controlled study of obese women with bulimia. *The Journal of Nervous and Mental Disease*, 176 (13); 144-152.

Hughes, S., Power, T., Orlet-Fisher, J., Mueller, S. & Nicklas, T. (2003). The development of the caregivers feeding styles questionnaire. *Journal of the American Dietetic Association*; 103, 20.

Hughes, S., Power, T., Orlet-Fisher, J., Mueller, S. & Nicklas, T. (2005). Revisiting a neglected construct: parenting styles in a child-feeding context. *Appetite*. 44: 83-92.

Hughes, S., Shewchuk, R., Baskin, M., Nicklas, T. & Haiyan, Q. (2008). Indulgent feeding style and children's weight status in preschool. *Journal of Developmental and Behavioral Pediatrics*. 29(5); 403-410.

Hui Liu, Y. & Stein, M.T. (2005). Feeding behavior of infants and young children and its impact on psychosocial and emotional development. Encyclopedia on Early Childhood Development. Accessed online <http://www.enfant-encyclopedie.com/Pages/PDF/Liu-SteinANGxp.pdf> (February 2010).

Institute of Medicine Committee on Prevention of Obesity in Children and Youth, Food and Nutrition Board, Board on Health Promotion and Disease Prevention. (2005). In J.P. Koplan, C.T. Liverman & I.K. Vivica (Eds.), *Preventing childhood obesity: Health in the balance*. Washington, DC: The National Academies Press.

Ip, S., Chung, M., Raman, G., Chew, P., Magula, N., DeVine, D., Trikalinos, T. & Lau, J. (2007). Breastfeeding and maternal and infant health outcomes in developed countries. *Evidence Report/Technology Assessment* 153; 1-186.

Jansen, E., Mulkens, S., Emond, Y. & Jansen, A. (2008). From the garden of Eden to the land of the plenty; Restriction of fruit and sweets intake leads to increased fruit and sweets consumption in children. *Appetite*, 51; 570-575.

Jansen, E., Mulkens, S. & Jansen, A. (2007). Do not eat the red food! Prohibition of snacks leads to their relatively higher consumption in children. *Appetite*. 49: 572-577.

Johannsen D.L., Johannsen N.M. & Specker B. L.(2006) Influence of parents' eating behaviors and child feeding practices on children's weight status *Obesity* 14(3): 431-439.

Johnson, S.L. & Birch, L.L. (1991). Parents' and children's adiposity and eating style. *Pediatrics*, 94, 653-661.

Kagan, N., & Kagan, H. (1991). Interpersonal process recall: A research/training model. In P.N. Dowrick, *A Practical Guide to Using Video in the Behavioral Sciences*. Canada; Wiley.

Kagitcibasi, C. (1996). *Family and human development across cultures*. Mahwah, NJ: Erlbaum.

Karlsen, S., Nazroo (2006). Defining and measuring ethnicity and 'race': theoretical and conceptual issues for health and social care research. In J. Nazroo (ed) *Health and Social Research in Multi-ethnic Societies*; Routledge, London; 20-38.

Kime, N. (2009). How children eat may contribute to rising levels of obesity. Children's eating behaviours: An intergenerational study of family influences. *International Journal of Health Promotion and Education*, 47; 4-11.

- Kimm, S.Y. (1995). The role of dietary fiber in the development and treatment of childhood obesity. *Pediatrics* 95 (S pt 2); 1010-1014.
- Kuczmarski, R.J., Flegal, K.M., Campbell, S.M., Johnson, C.L. (1994). Increasing prevalence of overweight among US adults: The National Health and Nutrition Examination Surveys, 1960-1991. *Journal of American Medical Society* 272 (3); 205-211.
- Kuppuswamy, V.C., Gupta, S. (2005). Excess coronary heart disease in South Asians in the United Kingdom. *British Medical Journal*, 314; 705-710.
- Lamborn, S., Mounts, N., Steinberg, L., & Dornbusch, S. (1991). Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent, and neglectful homes. *Child Development*, 62, 1049–1065.
- Landis, J.R. & Koch, G.G. (1977). The measurement of observer agreement for categorical data. *Biometrics* 33; 159-174.
- Lincoln, Y.S. & Guba, E.G. (1989). Judging the quality of case study reports, *Qualitative Studies in Education*, 3: 53-9.
- Liang, T., Kuhle, S., & Veugelers, P.J. (2009). Nutrition and body weights of Canadian children watching television and eating while watching television. *Public Health Nutrition*; 12(2), 2457-2463.
- Lin, C. Y. C., & Fu, V. R. (1990). A comparison of child rearing practices among Chinese, immigrant Chinese, and Caucasian-American parents. *Child Development*, 61, 429–433.
- Luster, T. & Okagaki, L. (2005). Parenting: an Ecological Perspective. *Monographs in Parenting*, 319-335.
- Lyznicki, J.M., Young, D.C., Riggs, J.A., & Davis, R.M. (2001). Council on scientific affairs AMA. obesity: Assessment and management in primary care. *American Family Physician*, 63(11), 2185-2196.
- Maccoby, E.E. & Martin, J.A. (1983). Socialization in the context of the family: parent-child interaction. In Hetherington EM, ed. *Handbook of Child Psychology: Socialization, Personality, and Social Development*. 4th ed. New York, NY: Wiley; 1-101.
- Mann, E. A. (1994). Education, money and the role of women in maintaining minority identity. In Z.Hasan (Ed.), *Forging identities: Gender, communities and the state* (pp. 130–168). New Delhi: Raj Press.
- Matheson, D., Robinson, T.N., Varady, A., & Killen, J.D. (2006). Do Mexican-American mothers' food-related parenting practices influence their children's weight and dietary intake? *Journal of American Dietetic Association*, 106, 1861-1865.

Matsumota, D. (1993). Ethnic differences in affect intensity, emotion judgements, display rule attitudes, and self-reported emotional expression in an American sample. *Motivation and Emotion* 17 (2); 1-17.

McCarthy, A., Hughes, R., Tilling, K., Davies, D., Smith, G.D. & Ben-Shiomo, Y. (2007). Birth weight; postnatal, infant and childhood growth; and obesity in young adulthood: evidence from the Barry Caerphilly Growth Study. *American Journal of Clinical Nutrition*, 86; 907-913.

McGarvey, E., Collie, K., Fraser, G., Shufflebarger, C., Lloyd, B. & Oliver, M.N. (2006). Using focus group results to inform preschool childhood obesity prevention programming. *Ethnicity and Health*, 11(3); 265-285.

McHale S.M., Crouter A.C., McGuire S.A. & Updegraff K.A. (1995). Congruence between mothers' and fathers' family relations and children's well being. *Child Development*, 66; 116-128.

Mi-Jeong, K., McIntosh, W.A., Anding, J., Kubena, K.S., Reed, D.B. & Gapsoon, M. (2008). Perceived parenting behaviours predict young adolescents nutritional intake and body fatness. *Maternal and Child Nutrition* 4(4); 287-303.

Miles, M. (1992). Concepts of mental retardation in Pakistan: Toward cross-cultural and historical perspectives. *Disability, Handicap and Society*, 7, 235-255.

Milliones, J. (1978). Relationship between perceived child temperament and maternal behaviours. *Child Development* 49(4); 1255-1257.

Mir, G. (2008) *How can we ensure culturally competent services?* Research in practice for adults, Dartington. Outline 14; 10.

Moens, E., Braet, C. & Soetens, B. (2007). Observation of family functioning at mealtime a comparison between families of children with and without overweight. *Journal of Pediatric Psychology*. 32: 52-63.

Moens, E., Pottier, E. & Braet, C. (2002). *The Child Feeding Questionnaire*. Dutch translation of the Child Feeding Questionnaire, authored by Johnson & Birch. Unpublished manuscript.

Morton, H., Campbell, K., Santich, B. & Worsley, A. (1999). Parental strategies and young children's snacking behaviour; A pilot study. *Australian Journal of Nutrition and Dietetics* 56(4); 215-220.

Music, G. (2011). *Nurturing Natures: Attachment and children's emotional, sociocultural, and brain development*. Psychology Press, 72-81.

Must, A. & Strauss, R.S. (1999). Risks and consequences of childhood and adolescent obesity. *International Journal of Obesity and Related Metabolic Disorders*, 23(2), S2-S11.

North East Public Health Observatory (2009) At www.nepho.org.uk (Accessed February 2010).

Obeid, R.A. (1988). An Islamic theory of human development. In T.R. Murray (Ed.). *Oriental theories of human development* (p. 155-174). New York: Peter Lang.

Ogden, C.L., Flegal, K.M., Carroll, M.D., & Johnson, C.L. (2002). Prevalence and trends in overweight among US children and adolescents, 1999-2000. *Journal of the American Medical Association*, 288(14), 1728-1732.

Orrell-Valente, J.K., Hill, L.G., Brechwald, W.A., Dodge, K.A., Pettit, G.S. & Bates, J.E. (2007). "Just three more bites": an observational analysis of parents' socialisation of children's eating at mealtime. *Appetite*. 48: 37-45.

Papadopoulos, I., Tiilki, M. & Shelley, L. (2004). Promoting cultural competence in healthcare through a research-based intervention in the UK. *Diversity in Health and Social Care*, 1; 107-115.

Parkinson, K.N. & Drewett, R.F. (2001). Feeding behaviour in the weaning period. *Journal of Child Psychology & Psychiatry*, 42, 971-978.

Parsons, T.J., Power, C., Logan, S., Summerbell, C. D. (1999). Childhood predictors of adult obesity: A systematic review. *International Journal of Obesity Related Metabolic Disorder* 23 (Suppl 8); S1-S107.

Patrick, H., Nicklas, T.A., Hughes, S.O. & Morales, M. (2005). The benefits of authoritative feeding style: Caregiver feeding styles and children's food consumption patterns. *Appetite*, 44, 243-249.

Paterson, G. & Sanson, A. (1999). The association of behavioural adjustment to temperament, parenting and family characteristics among 5-year old children. *Social Development*, 8; 293-309.

Patterson, G.R. & Forgatch, M.S. (1995). Predicting future clinical adjustment from treatment outcome and process variables. *Psychological Assessment* 7; 275-285.

Petit, G.S. & Bates, J.E. (1990). Describing family interaction patterns in early childhood: A social events perspective. *Journal of Applied Developmental Psychology*, 11, 395-418.

Petit, G.S., Bates, J.E., & Dodge, K.A. (1993). Family interaction patterns and children's conduct problems at home and at school: A longitudinal perspective. *School Psychology Review*, 22, 403-420.

Pi-Sunyer, F.X. (1991). Health implications of obesity. *American Journal of Clinical Nutrition* 53(6); 1595S-1603S.

Powers, S.W., Chamberlin, L.A., van Schaick, K.B., Sherman, S.N., & Whitaker, R.C. (2006). Maternal feeding strategies, child eating behaviors, and child BMI in low-income African-American preschoolers. *Obesity*, 14; 2026-2033.

Radziszewska, B., Richardson, L.J., Dent, C.W. & Flay, B.R. (1996). Parenting style and adolescent depressive symptoms, smoking and academic achievement: Ethnic, gender and SES differences. *Behavioural Medicine*, 19, 289-305.

Raynor, P. unpublished. *Born in Bradford, a cohort study of babies born in Bradford and their parents: protocol for recruitment phase*. Accessed November 2009. www.borninbradford.nhs.uk

Rhee, K.E., Lumeng, J.C., Appugliese, D.P., Kaciroti, N. & Bradley, R.H. (2006). Parenting styles and overweight status in first grade. *Pediatrics*, 117; 2047-2054.

Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (2001). The Parenting Styles and Dimensions Questionnaire (PSQD). In B. F. Perlmutter, J.Touliatos, & G. W. Holden (Eds.), *Handbook of Family Measurement Techniques: Vol. 3. Instruments & Index* (pp. 319 - 321). Thousand Oaks: Sage.

Robinson, T.N., Kiernan, M., Matheson, D.M., & Haydel, K.F. (2001). Is parental control over children's eating associated with childhood obesity? Results from a population-based sample of third graders. *Obesity Research*, 9, 306-312.

Rodin, J., Silberstein, L.R., Stiegel-Moore, R.H. (1985). Women and weight: A normative discontent. In: Sonderegger TB, ed. *Nebraska Symposium on Motivation, 1984: Psychology and Gender*. Lincoln, Neb: University of Nebraska, 1985; 267-308.

Rohner, R., & Pettengill, S. M. (1985). Perceived parental acceptance–rejection and parental control among Korean adolescents. *Child Development*, 56, 524–528.

Rothbaum, F. & Morelli, G.F. (2005). Attachment and culture: Bridging relativism and universalism. In G. Friedlmeier, P. Chakkarath, & B. Schwarz (Eds), *Culture and human development: The importance of cross-cultural research for the social sciences* (pp. 99-124). London: Routledge.

Rudolf, M.C., Sahota, P., Barth, J.H. (2001). Increasing prevalence of obesity in primary school children; Cohort study. *British Medical Journal* 322; 1094-1095.

Rothbart, M.K. (1981). Measurement of temperament in infancy. *Child Development*, 52; 569-578.

Sanders, M.R., Dadds, M.R. & Bor, W. (1989). Contextual analysis of child oppositional and maternal aversive behaviours in families of conduct disordered and non-problem children. *Journal of Clinical Child Psychology*, 18, 72-83.

Sanders, M. R., Le Grice, B., & Turner, K.M.T. (1993). *Mealtime observation schedule: An observer's manual* (Rev.ed.). Unpublished technical manual, Behavior Research and Therapy Centre, University of Queensland.

Sanders, M.R., Patel, R.K., Le Grice, B. & Shepherd, R.W. (1993). Children with persistent feeding difficulties: An observational analysis of the feeding interactions of problem and non-problem eaters. *Health Psychology* 12(1); 64-73.

Satter, E. (1986). The feeding relationship. *Journal of American Dietetic Association*, 86; 352-356.

Satter, E. (1990). The feeding relationship: Problems and interventions. *Journal of Pediatrics* 117; S181-S191.

Satter, E. (1999). The feeding relationship. In D. B. Kessler & P. Dawson (Eds.), *Failure to thrive and pediatric undernutrition: a transdisciplinary approach* (pp. 121-149). In Baltimore, MD: Paul H. Brookes Publishing.

Satter, E. (2007). Eating competence: Definition and evidence for the Satter Eating Competence Model. *Journal of Nutrition, Education and Behaviour*, 39(5); S142-S153.

Satter, E. (2008). The secret in a nutshell. In: *Secrets of Feeding a Healthy Family*. Madison, Wis: Kelcy Press, 2-14.

Saxena, S., Ambler, G., Cole, T.J. & Majeed, A. (2004). Ethnic group differences in overweight and obese children and young people in England: Cross sectional survey. *Archives of Disease in Childhood*, 89; 30-36.

Scaglioni, S., Salvioni, M. & Galimberti, C. (2008). Influence of parental attitudes in the development of children eating behaviour. *British Journal of Nutrition* 99(1); 22-15.

Serdula, M., Ivery, D., Coates, R., Freedman, D., Williamson, D., & Byers, T. (1993). Do obese children become obese adults? A review of the literature. *Preventative Medicine*, 22(2), 167-177.

Shek, D.T. (1996). Mental health of Chinese adolescents. In S. Lau (Ed.). *Growing up the Chinese way*. Chinese University Press; Beijing.

Shucksmith, J., Hendry, L., & Glendinning, A. (1995). Models of parenting: Implications for adolescent well-being within different types of family contexts. *Journal of Adolescence*, 18,253–270.

Shunk JA & Birch LL (2004) Girls at risk for overweight at age5 are at risk for dietary restraint, disinhibited overeating, weight concerns, and greater weight gain from 5 to 9 years. *Journal of the American Dietetic Association* 104(10), 1546–1547.

Small, L., Anderson, D. & Mazurek Melnyk, B. (2007). Prevention and early treatment of overweight and obesity in young children; A critical review and appraisal of the evidence. *Pediatric Nursing* 33(2); 149-161.

Smith, J.A. & Osborn, M. (2003). Interpretative phenomenological analysis. In J.A. Smith (Ed.), *Qualitative psychology: A Practical Guide to Methods*. London: Sage.

Snoek, H., Engels, R., Jansses, J. & van Strein, T. (2007). Parental behaviour and adolescents' emotional eating. *Appetite*, 49; 223-230.

Spruijt-Metz, D., Lindquist, C.H., Birch, L.L., Fisher, J.O., & Goran, M.I. (2002). Relation between mothers' child-feeding practices and children's adiposity. *American Journal of Clinical Nutrition*, 75, 581-586.

Stein, A., Woolley, H., Cooper, S.D. & Fairburn, C.G. (1994). An observational study of mothers with eating disorders and their infants. *Journal of Child Psychology & Psychiatry*, 35, 733-748.

Stein, A., Woolley, H. & McPherson, K. (1999). Conflict between mothers with eating disorders and their infants during mealtimes. *British Journal of Psychiatry*, 175, 455-461.

Stein, A., Woolley, H., Murray, L. Cooper, P., Cooper, S., Noble, F., Affonso, N., Fairburn, C. (2001). Influence of psychiatric disorder on the controlling behavior of mothers with 1-year-old infants. A study of women with maternal eating disorder, postnatal depression and a healthy comparison group. *British Journal of Psychiatry* 179; 157-162.

Steinberg, L. (1990). Autonomy, conflict and harmony in the family relationship. In S.Feldman & G.Elliott (Eds.). *At the threshold: The developing Adolescent* (pp. 255-276) Cambridge, MA: Harvard University Press.

Steinberg, L. (2001). We know some things: Parent-adolescent relationships in retrospect and prospect. *Journal of Research on Adolescence*, 11(1); 1-19.

Steinberg, L., Blatt-Eisengart, I. & Cauffman, E. (2006). Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent and neglectful homes; A replication sample of serious juvenile offenders. *Journal of Research on Adolescence* 16(1); 47-58.

Steinberg, L., Dornbusch, S., & Brown, B. (1992). Ethnic differences in adolescent achievement: An ecological perspective. *American Psychologist*, 47, 723-729.

Steinberg, L., Lamborn, S., Darling, N., Mounts, N. & Dornbusch, S. (1994). Over-time changes in adjustment and competence among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development*, 65; 754-770.

Steinberg, L., Lamborn, S., Dornbusch, S. & Darling, N. (1992). Impact of parenting practices on adolescent achievement. Authoritative parenting, school involvement, and encouragement to succeed. *Child Development*, 63(5); 1266-1281.

Stewart, S., Bond, M., Zaman, R., Dar, R., & Anwar, M. (2000). Perceptions of parents and adolescent outcomes in Pakistan. *British Journal of Developmental Psychology* (2000), 18, 335–352

Stiles, W.B. (1993). Quality control in qualitative research. *Clinical Psychology Review*, 13: 593-618.

Stoolmiller, M., Eddy, J.M., Reid, J.B. (2000). Detecting and describing preventative intervention effects in a universal school-based randomized trial target delinquent and violent behaviour. *Journal of Consulting and Clinical Psychology*, 68; 296-306.

Stunkard, A.J., Harris, J.R., Pedersen, N.L., McClearn, G.E. (1990). The body-mass index of twins who have been reared apart. *The New England Journal of Medicine*, 322(21); 1483-1487.

Summerbell, C.D., Ashton, V., Campbell, K.J., Edmunds, L., Kelly, S., & Waters, E. (2003). Interventions for treating obesity in children. *The Cochrane Database of Systematic Reviews*, (3), Art. No.: CD001872. DOI.1002/14651858.CD001872.

Summerbell, C.D., Waters, E., Edmunds, L.D., Kelly, S., Brown, T., & Campbell, K.J. (2005). Interventions for preventing obesity in children. *The Cochrane Database of Systematic Reviews*, 3, Art. No.: CD001871. DOI: 10.1002/14651858.CD001871. pub2

The Health and Social Care Information Centre (2009). Statistics on obesity, physical activity and diet, England, February 2009. Available at www.icnhs.uk/statics-and-data-collections/health-and-lifestyles (Accessed February 2010).

The National Health Service Information Centre (2008). Health Survey for England 2007. Available at www.icnhs.uk/pubs/hse07/healthylifestyles (Accessed February 2010).

Thomas, A. & Chess, S. (1977). *Temperament and development*. New York: Brunner/Mazel.

Thomas, A., Chess, S. & Birch, H.G. (1968). *Temperament and behavioral disorders in children*. New York: New York University Press.

Thomas, A., Chess, S., Birch, H.G., Hertzog, M.E. & Korn, S. (1963). *Behavioral individuality in early childhood*. New York: New York University Press.

Thompson, A.L., Mendez, M.A., Borja, J.B., Adair, L.S., Zimmer, C.R. & Bentley, M.E. (2009). Development and validation of the Infant Feeding Style Questionnaire. *Appetite* 53; 210-221.

Topham, G., Hubbs-Tait, L., Rutledge, J., Page, M., Kennedy, T., Shriver, L., Harrist, A. (2011). Parenting styles, parental response to child emotion and family emotional responsiveness are related to child emotional eating. *Appetite*, 56(2); 261-264.

United States Department of Agriculture, Food and Nutrition Service (2008). *Increasing food and vegetable consumption through the USDA nutrition assistance program. A Progress Report*, 1-26.

Van Campen, K. S., & Russell, S. T. (2010). *Cultural differences in parenting practices: What Asian American families can teach us* (Frances McClelland Institute for Children, Youth, and Families Research Link, Vol. 2, No. 1). Tucson, AZ: The University of Arizona.

Van Leeuwen, K.G., Braet, C., Fournier, C. & Moens, E. (2001). Do mothers and fathers of obese and non-obese children differ in their parental behaviour. Cited by Moens, E., Braet, C. & Soetens, B. (2007). Observation of family functioning at mealtime a comparison between families of children with and without overweight. *Journal of Pediatric Psychology*. 32: 52-63.

Wake, M., Nicholson, J.M. (2007). Preschooler obesity and parenting styles of mothers and fathers: Australian National Population Study. *Pediatrics*, 120; 1520-1527.

Wardle, J. & Carnell, S. (2006). Parental feeding practices and children's weight. *Acta Paediatrica*. 96: 5-11.

Wardle, J., Carnell, S. & Cooke, L. (2005). Parental control over feeding and children's fruit and vegetable intake: How are they related? *Journal of the American Dietetic Association*, 105, 227-232.

Wardle, J., Guthrie, C.A., Sanderson, S. & Rapoport, L. (2001). Development of the Children's Eating Behaviour Questionnaire. *Journal of Child Psychology & Psychiatry*, 42, 963-970.

Wardle, J. & Marsland, L. (1990). Adolescent concerns about weight and eating; A social-developmental perspective. *Journal of Psychosomatic Research*, 34, 377-391.

Wardle, J., Sanderson, S., Guthrie, C.A., Rapoport, L., Plomin, R. (2002). Parental feeding style and the inter-generational transmission of obesity risk. *Obesity Research* 10(6); 453-463.

Wardle, J., Waller, J. & Fox, E. (2002). Age of onset and body dissatisfaction in obesity. *Addictive Behaviours* 27(4); 561-573.

Waugh, E. & Bulik, C. (1999). Offspring of mothers with eating disorders. *International Journal of Eating Disorders* (25); 123-133.

Webster, R.A., Thompson, D.H. & Mayou, R.A. (2002). The experiences and needs of Gujarati Hindu patients and partners in the first month after a myocardial infarction. *European Journal of Cardiovascular Nursing*, 1; 69-76.

Webster-Stratton, C. & Lindsay, D.W. (1999). Social Competence and conduct problems in young children: issues in assessment. *Clinical Child Psychology* 21(1); 25-43.

Whelan, E. & Cooper, P.J. (2000). The association between childhood feeding problems and maternal eating disorders. *International Journal of Eating Disorders*, 25, 123-133.

Whitaker, R.C., Wright, J.A., Pepe, M.S., Seidel, K.D., Dietz, W.H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *The New England Journal of Medicine* 337(13), 869-73.

Wiecha, J.L. & Casey, V.A. (1994). High prevalence of overweight and short stature among Head Start children in Massachusetts. *Public Health Report* 109(6); 767-773.

Willig, C. (2001). *Introducing Qualitative Research in Psychology: Adventures in Theory and Method*. Buckingham; Open University Press.

World Health Organization. (2000). Obesity; preventing and managing the global epidemic: Report of a WHO consultation of obesity. *WHO Technical Report Series* 894. Geneva.

World Health Organization. (2004). WHO expert consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *The Lancet*; 157-163.

Yusuf, S., Hawken, S., Ounpuu, S., Dans, T., Avezum, A., Lanus, F., McQueen, M., Budaj, A., Pais, P., Varigos, J., Lisheng, L., INTERHEART Study investigators (2004). Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the interheart study): Case-control study. *Lancet*; 364, 937-952.

Zubrick, S.R., Smith, G.S., Nicholson, J.M., Sanson, A.V. & Jackiewicz, T.A. & The LSAC Research Consortium (2008). *Parenting and families in Australia. Social Policy Research Paper No. 34*, Australian Government; Department of families, housing, community services and indigenous affairs; 1-216.

APPENDIX

Appendix 1: Outline Research Proposal

Title: A meal time observation study: Obesity, ethnicity and observed maternal feeding styles

Author: Sarah Wilson

Degree: Doctorate in Clinical Psychology, research completion June 2011

Supervisors: Prof Andy Hill & Dr Sylvie Collins

Overview: This study is one of a series of funded studies planned for the Born in Bradford (BiB) cohort and designed to better understand the family food environment and its relationship to family obesity. The BiB studies are funded by a 5-year NIHR project grant. In general they are aiming to increase understanding of the factors that contribute to health and well being, and identify factors that influence differences in them between people of South Asian (mainly Pakistani) and European origin (<http://www.borninbradford.nhs.uk/Pages/Home.aspx>).

Rising prevalence rates among genetically stable populations indicate that environmental and therefore modifiable factors must underlie the childhood obesity epidemic (Ebbeling, Pawlak & Ludwig, 2002). It is believed that all individual decisions to consume and to cease consuming on the basis of bodily sensations are in fact learned (Connor & Armitage, 2002) and parents clearly have a dominant role in this learning process, especially in the preschool ages. In order to contribute to the prevention of obesity in childhood, we need a better understanding of potential maladaptive parental feeding interactions. I am proposing to investigate Caucasian and Asian parental feeding behaviours, children's feeding behaviours and the emotional context of mealtimes for obese mothers compared to those of normal weight.

Literature Review: Feeding a child is a crucial nurturing role and a central element of parenting. Feeding involves complex interactions between a caregiver, most often the mother, and her child. In general parents try to teach their child adequate eating behaviours by using different feeding strategies and these influence children's eating behaviour in different ways. These interactions, involving caregiver responsiveness to infant hunger and satiety cues, are thought to play a significant role in the development of infant obesity. This aspect of the mother-infant feeding interaction remains under researched (Hodges, Hughes, Hopkinson & Fisher, 2007).

The impact of family life on children's eating behaviours is a largely neglected area of research and there is a specific need to focus more on the process of family eating i.e. the *how* we eat not *what* we eat (Kime, 2009). Research in this field tends to rely heavily on self-report to gather data regarding nutrition, activity levels and specific parenting practices despite the questionable validity and reliability of self-reported or parent-reported information (Small, Anderson, Mazurek, Melnyk, 2007).

Studies including observations of family functioning at mealtimes are less susceptible to bias, than using self-report measures, because they rate ongoing moment-to-moment behaviour so the ecological validity of findings is increased (e.g. Patterson & Forgatch, 1995). Past research has used these methods in older children (7-13 year olds) comparing families with an overweight or normal weight child (Moens, Braet and Soetens, 2007). The mealtime observations highlighted a higher prevalence of maladaptive control strategies used in the families where a child had weight problems compared to the families where the child was of normal weight. Studies that use a design in which they compare families of obese children with families of non-obese children are limited because parental feeding strategies could be shaped by the child's weight rather than being a contributory factor to the child's weight status (Wardle et al. 2002).

US investigators have looked at gender and socioeconomic status differences in parent-child interactions at mealtimes in families with a 5 year old regardless of their relative weight (Orrell-Valente, Hill, Brechwald, Dodge, Pettit & Bates, 2007). Overall 85% of parents tried to get their child to consume more at the target mealtime. The researchers report that over a third of the children ate moderately to substantially more than they would otherwise have (Orrell-Valente, 2007). It appears that parents are inadvertently socializing their children to eat according to external parental cues and not to their internal biological cues of satiety (Birch, McPhee, Shoba, Steinbert & Krehbiel, 1987).

For younger children (12-14 months) the focus has been on the structure of eating and feeding acts but without finding any differences according to the child's relative weight (Parkinson & Drewett, 2001). Interestingly mealtime observations have been used more where a child's low weight is a concern than where perhaps there may be a risk of child obesity. Observing child-feeding styles of both obese and normal-weight mothers is a way of examining the processes that may contribute to the transmission of obesity risk in a more objective manner.

The problem of obesity appears to be more prominent in minority populations. The Pakistani and Bangladeshi communities represent 18% of the population in Bradford. Health statistics indicate that these communities have increased susceptibility to morbidities associated with obesity. It seems reasonable that cultural influences that include exposure to different settings, availability to different food types, food preparation and different beliefs and expectations about food may lead women of different cultures to have significantly different experiences of what it means to be overweight or obese and what it is like to feed their child. Any one individual's acceptance of his or her weight tends to be influenced by both internal factors such as attitudes and social norms and external factors such as social support (Davis, Clark, Carres, Gary & Cooper, 2005). We do not know very much about the relationship between ethnicity and parenting styles or indeed ethnicity and feeding practices. The present study represents an opportunity to look at this.

Research Aims & hypotheses: This study aims to examine the influence of two factors (parental weight and ethnicity) on mealtime interactions.

It is hypothesized that the mealtimes of children with obese mothers will be characterized by significantly more intrusive parent behaviours and more negative affect compared to mealtimes led by normal weight mothers.

It is also hypothesized that there will be a difference between South Asian and European (Caucasian) mothers in their mealtime interactions.

Participants: Within the larger BiB cohort of 14,000 the programme has recruited a research intensive, sub-cohort of 1000+ families referred to as the BiB1000. These mothers have consented to 6 monthly extended interviews and have indicated their willingness to participate in additional biomedical and social research. The present study will use information already gathered on ethnicity and BMI at booking date to identify potential participants from 4 groups.

1. Caucasian ethnicity, normal weight mother
2. Caucasian ethnicity, obese mother
3. SE Asian ethnicity, normal weight mother
4. SE Asian ethnicity, obese mother

It is intended that 40 (10 in each group) mother-infant dyads will take part in mealtime observations. Although the present study is not designed to look at any influence of the child's sex it is intended that the numbers of male and female children will be approximately equal.

Eligible mothers will be identified by the BiB research team and contacted to ask about interest in the research project. An expression of interest will be followed by written information about the study and consent forms to complete. They will then be contacted via telephone by the BiB research team in order to provide an opportunity to ask questions about the study. Once written consent is received, arrangements will be made to visit the participant's homes to film mother and infant during a mealtime at a time that is convenient for them.

Procedure: A typical lunchtime meal will be video-recorded in the family home when the child is between 12 and 18 months old. Recording of mealtimes will be conducted by myself and a Researcher from the BiB project who speaks Urdu. The researcher from the BiB project will carry out most of the recordings of the Asian family's mealtimes. It will be arranged with the family to arrive at their home 30 minutes before the typical meal time. On arrival, after being introduced to the child, the recording equipment will be set up in the room the mother reports the meal will take place. This will be done straight away to give the mother-infant pair time to habituate to its presence. Once the equipment is set up, participants will be given the opportunity to see themselves on tape and habituate to the process of being observed. They will be reminded of issues regarding confidentiality and consent. All participants will be informed via standardized instructions to carry on with their normal mealtimes i.e. to not do or eat in any way different to their usual mealtime practice. The researcher will not interact with mother or infant during the recording of the mealtime and will make some notes during the mealtime observation, particularly about the emotional tenor of the mealtime and what it feels like to be in the room. It will also be important to note down any contextual factors or distractions that may be occurring off camera. Following the mealtime observation

the researcher will debrief the mother and provide an opportunity to discuss the project and how it felt for them to be recorded. Notes on what is discussed at this stage can be written up when the researcher has left the participant's home. The least intrusive method (i.e. self report) will be used to check current weight against objective weight obtained at time booking into the BiB project.

Data Analysis: It is estimated that three mealtimes with Caucasian mother-infant dyads and three mealtimes with Asian mother-infant dyads will be recorded together with the BiB researcher to establish consistency and co-observations will occur again at mid-point to assist maintenance of consistency.

The Mealtime Observation Schedule (MOS; Sanders & Le Grice, 1989; Sanders, Grice, Turner 1993) coding system will be used to record family interaction and child eating behaviour during recorded mealtime observation sessions. The MOS has been selected to code the observations as it covers a wide range of parental and child behaviours and can be carried out without the need for observer training. Parents' and children's verbal and nonverbal behaviour over a whole mealtime will be coded by dividing the observation into 10 second intervals. There are 16 categories of parent behaviour (9 positive, 6 aversive and no interaction). A further 18 categories relate specifically to child behaviour (7 positive, 11 aversive). The percentage of intervals for where each behaviour occurs is calculated for each mother-infant dyad. The percentage of intervals of positive and negative behaviours will also be calculated. In addition there are 3 affect codes which may be scored for both child and parent. Where there is disagreement over rating, these two raters will try to reach agreement with additional input from Academic Supervisors.

Appropriate post hoc tests between conditions for non-parametric data will be carried out and a two-way, between-groups analysis of variance (2X2 ANOVA). This will allow examination of the possible individual effects of the 2 independent variables (obesity status and ethnicity). It will also enable an exploration of the possibility of an 'interaction effect' where the effect of one independent variable on the dependent variable may depend on the level of the second independent variable. Pilot mealtime observations will be carried out in March 2010 so there is an opportunity for the researcher to practice with the recording equipment and the coding schedule.

References:

Conner, M. Armitage, C.J. (2002). *The Social Psychology of Food*. Open University Press, 114-133.

Davis, E.M., Clark, J.M., Carrese, J.A., Gary, T.L. & Cooper, L.A. (2005). Racial and socioeconomic differences in the weight loss experiences of obese women. *Research and Practice* 95(9); 2539-2543.

Ebbeling, C.B., Pawlak, D.B., Ludwig, D.S. (2002). Childhood obesity: public-health crisis, common sense cure. *The Lancet*, 360; 473-82.

Hodges, E., Hughes, S., Hopkinson, J., Fisher, J. (2008). Maternal decisions about the initiation and termination of infant feeding. *Appetite* 50 (2-3), 333-339.

- Kime, N. (2009). How children eat may contribute to rising levels of obesity. Children's eating behaviours: An intergenerational study of family influences. *International Journal of Health Promotion and Education*, 47; 4-11.
- Moens, E., Pottier, E. & Braet, C. (2002). *The Child Feeding Questionnaire*. Dutch translation of the Child Feeding Questionnaire, authored by Johnson & Birch. Unpublished manuscript.
- Orrell-Valente, J.K., Hill, L.G., Brechwald, W.A., Dodge, K.A., Pettit, G.S. & Bates, J.E. (2007). "Just three more bites": an observational analysis of parents' socialisation of children's eating at mealtime. *Appetite*. 48: 37-45.
- Parkinson, K.N. & Drewett, R.F. (2001). Feeding behaviour in the weaning period. *Journal of Child Psychology & Psychiatry*, 42, 971-978.
- Patterson, G.R. & Forgatch, M.S. (1995). Predicting future clinical adjustment from treatment outcome and process variables. *Psychological Assessment* 7; 275-285.
- Sanders, M. R. & Le Grice, B. (1989). *Mealtime Observation Schedule: An observer's manual*. Unpublished Technical Manual, University of Queensland, Herston, Australia.
- Sanders, M. R., Le Grice, B., & Turner, K.M.T. (1993). *Mealtime observation schedule: An observer's manual* (Rev.ed.). Unpublished technical manual, Behavior Research and Therapy Centre, University of Queensland.
- Small, L., Anderson, D. & Mazurek Melnyk, B. (2007). Prevention and early treatment of overweight and obesity in young children; A critical review and appraisal of the evidence. *Pediatric Nursing* 33(2); 149-161.
- Wardle, J., Sanderson, S., Guthrie, C.A., Rapoport, L., Plomin, R. (2002). Parental feeding style and the inter-generational transmission of obesity risk. *Obesity Research* 10(6); 453-463.

Appendix 2: Introducing the Mealtime Observation Study

I would now like to talk to you about a study that is being done by a Trainee Clinical Psychologist from the University of Leeds. Her name is Sarah and she is interested in parent and child interactions at mealtimes. You are being invited to take part in this study as you are already a volunteer in the Born in Bradford Project. The aim of the project is to explore differences in how mothers and children communicate with each other at mealtimes. If you were interested in taking part in the study it would involve Sarah coming to meet you and your child at your home and her video recording a typical lunchtime in your home. You could talk to Sarah about the experiences you have with feeding your young child as this can be a challenging task for a lot of parents. If you wish you can also keep a copy of the mealtime recording. The recordings will be kept in locked cabinets and will only be looked at by Sarah and her Supervisors.

I will give you an information sheet now about the study so that you can read through it in your own time. Sarah's contact details are on there and she is more than happy for you to contact her if you have any questions about taking part. There is also a consent form that you can either fill in now or take it away with you to complete. If you wish to take part Sarah will contact you to arrange a time that is most convenient for you to come to your house and record a typical lunchtime. There is no need for you to do anything different to what you normally would. Sarah is interested in typical mealtimes so you would just be carrying on as normal!

Appendix 3: Patient Information Sheet



Bradford Teaching Hospitals 
NHS Foundation Trust

Patient Information Sheet **A meal time observation study** Please read this information sheet carefully

These information sheets give details of a research project set up as part of Born in Bradford. Before you decide if you want to participate it is important that you understand why the research is being done and what it will involve for you. Please take some time to read the following information carefully. If you have any questions about the project please contact the Chief Investigator Sarah Wilson - contact details are given at the end of the information sheet.

Why have I been invited?

You have been invited to take part in this study as you are already a volunteer in the Born in Bradford Project and have already provided consent to take part in further research regarding early family feeding processes. Women of different weights and ethnicities are being selected for this mealtime observation study.

Do I have to take part?

It is up to you whether or not you take part. If you decide to take part you will be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and you will not have to give a reason. If you decide not to take part this will not affect your involvement in the wider Born in Bradford Project.

What is the purpose of the study?

We are interested in the different ways mothers and children communicate with each other during mealtimes. The aim of the project is to explore if differences in eating patterns set down in early life affect the health and well being of children when they are older. In order to do this we would like to make video recordings of mothers and children during a main meal. The study will not involve judging you in any way about your feeding practices with your children. The recordings will be looked at only by members of the research team.

What will happen to me if I take part?

Whether you decide to take part in the project is entirely up to you. If you decide you want to take part and later you change your mind, you can withdraw your consent. As part of the research process, you will be asked to:

- Sign the attached consent form
- Arrange a mutually convenient time for the researcher to come and visit you
- Agree to a video recording being taken of you and your child during a main mealtime

What are the possible disadvantages of taking part?

You may find the experience a little uncomfortable. You may ask that, the video is stopped at any time. Any recording will be destroyed immediately if requested.

What are the possible benefits of taking part?

Some women say they enjoy taking part in research that may help other women and their babies in the future. Others find talking to a researcher about themselves and how they are getting on with bringing up their child helpful.

What if there is a problem?

If you are harmed by taking part in this study there are no special compensation arrangements. If you wish to complain, or have any concerns about any aspect of the way you have been approached or treated during the course of this study, the normal NHS complaints mechanisms are available to you. You may wish to contact the Patient Advice and Liaison Service (PALS) for independent advice, support and information. This service is available to listen to your concerns and help sort out problems quickly on your behalf.

Patient Advice and Liaison Service (PALS)
Bradford Royal Infirmary
Duckworth Lane
Bradford
BD9 6RJ

Will my taking part in this study be kept confidential?

All information collected about you during the course of the research will be stored in strict confidence, as is required by law in the Data Protection Act. A study number will be the only way information can be linked to you. The recordings will be kept in secure cabinets for up to 10 years and then they will be destroyed. However any mealtime recordings may be destroyed earlier if requested.

What will happen to the results of the research study?

The research will be written up and may be published in academic journals or presented at academic conferences. To make sure people in the study have the opportunity to hear about findings we will send results to local community groups in Bradford and to GPs. None of these publications will identify individual people. A brief summary of the results will be forwarded to you when the project is completed.

What if I have any questions or problems?

A researcher will talk through the project if you wish to take part. You can also contact the Chief Investigator at any point to discuss the project and ask any questions that you may have.

Who has reviewed this study?

This study has been reviewed and approved by the South Yorkshire Research Ethics Committee.

Sarah Wilson

Charles Thackrah Building, 101 Clarendon Road, Leeds LS2 9LJ.

Telephone Number 07968317687

Appendix 4: Contact Sheet

Mealtime Observation Study

- You are being invited to take part in this study as you are already a volunteer in the Born in Bradford Project.
- The aim of the project is to explore differences in how mothers and children communicate with each other at mealtimes.
- The study is being carried out by a Psychologist in training at Leeds University called Sarah Wilson
- The study would involve Sarah coming to meet you and your child at your home and video recording a typical lunchtime in your home.
- You may find it interesting to talk to a Psychologist about feeding your child as it is a challenging time for most mothers.
- You can also keep a copy of the mealtime recording.

Would you be willing for Sarah to contact you about this study?

If yes

Name.....

Address.....

Mobile Number.....

Telephone Number.....

Baby's D.O.B.....

Best times of the day to call.....

ALSO GIVE INFORMATION SHEET

Appendix 5: Instruction letter

Bradford Teaching Hospitals 
NHS Foundation Trust



Charles Thackrah Building
101 Clarendon Road,
Leeds, LS2 9LJ.
07968 317 687 (mob)

Dear Parent,

Thank you for agreeing to take part in the mealtime observation study. I hope you will find the experience interesting and of minimal inconvenience to you. As previously discussed I wish to record a **typical** mealtime with you and your child.

- We have arranged for me to arrive at your home 30 minutes before your usual mealtime so that I can set up the recording equipment. This will also provide the opportunity to answer any questions you may have.
- Please prepare an ordinary meal for your child. The meal should be neither your child's favourite meal, nor something that they have never tried or anything that they really don't like. It does not matter whether this is done before or after I arrive.
- Please try to carry out the mealtime as you would if no one else was present. It is important that I do not interact with you or your child during the recording of the mealtime. I will therefore try to keep out of your child's field of view during the mealtime.
- The only thing that may be different from a usual mealtime for you is that I need to record mothers and their infants only. Ideally therefore there should be no other people present. I will also take some notes whilst the mealtime is being recorded.
- I will ask you to complete a consent form before we start. However, even when you have signed the consent form, if you change your mind about taking part, you are free to withdraw from the study at any time.

If you have any questions please do not hesitate to contact me on the mobile number above. I look forward to meeting you and your child for the mealtime observation.

Best wishes

Sarah Wilson
Psychologist in Clinical Training

Appendix 6: Consent Form



CONSENT FORM

Research Title: A mealtime observation study; Obesity, ethnicity and observed maternal feeding practices.

Researcher: Sarah Wilson

The purpose of this form is to make sure that you are happy for you and your child to take part in the research and that you know what is involved. Please circle your response to each question.

Have you read and understood the information sheet regarding the mealtime observation study? YES/NO

Have you had the opportunity to ask questions and discuss the study? YES/NO

If you have asked questions have you had satisfactory answers to your questions? YES/NO

Do you agree for both you and your child to take part in the study? YES/NO

Do you understand that you are both free to withdraw at any time? YES/NO

Do you agree to the mealtime being filmed? YES/NO

Do you give permission for the researcher to make notes during the mealtime? YES/NO

Do you give permission for reports of the research to include references to the specific mealtime on the understanding that your anonymity will be maintained at all times? YES/NO

Do you agree for video clips of your mealtime to be used in Presentations about the study findings? YES/NO

Data will be stored securely for up to 10 years. Do you understand that you have a right to request that the data is destroyed at any point in time? YES/NO

Do you agree for the stored video recordings to be used in future research studies that has been granted ethical approval? YES/NO

Do you understand that data collected during the study may be looked at by individuals from regulatory authorities or from the NHS Trust, where it is relevant to you taking part in this research. Do you give permission for these individuals to have access to your records.

YES/NO

I agree to take part.

YES/NO

Participant ID Number: _____

Signed: _____

Name in BLOCK capitals: _____

Date: _____

Researcher: _____

Appendix 7: Instructions for Research Assistant

When phoning to schedule a mealtime observation:

- Introduce yourself as a Research Assistant on the Mealtime Observation Study that is linked with the Born in Bradford Project.
- Explain that you understand that they have already spoken to me and that they have indicated their consent to be involved in the project.
- Check that they are still willing to participate in the study and ask them if they have any questions about it at this stage.
- Arrange a time to carry out the recording at a time that is most convenient for them. Check what mealtimes are most likely to be mother and infant. The less extra people there are the better!!
- Explain that you will need to go about 15-25mins before the mealtime to set the camera up, enabling the child and Mum to get used to the presence of the camera. This also gives you chance to chat to the Mum about how they are finding feeding and collect the completed consent form.
- Check the address you're going to.

Carrying out the Mealtime Observation

- Please set the camera up as soon as you arrive at the participant's home. The camera needs to be in a position that ensures that Mum & infant are in the frame (be aware of lighting). You may wish to have a practice with the camera before you use it.
- They will have already received a consent form through the post and hopefully filled it in, but I will provide you with copies in case it has been lost. The participant needs to indicate YES to all items on the consent form before filming commences.
- Provide explicit opportunities to ask questions. I usually try and have an informal chat about how they are finding the experience of feeding their child. I usually write up these notes later.
- During the mealtime I try and stay out of the child's view. This often means sitting in another room. Remind parents that the aim is to get as typical mealtime as possible and so whilst the recording is taking place you will not talk & try and stay out of the way.

- I make brief notes during the observation (unless it feels too distracting – often depends on the environment) – on what it feels like to be there E.g is it a tense or relaxed environment? Are there distractions or things occurring that the video camera won't pick up?
- After the mealtime I ask the Mum how it felt to be recorded, whether they felt that their child behaved any differently to how they do usually, whether they ate the usual amount and I note down what they had to eat and write up notes afterwards.
- Rewind the tape to beginning and label both the actual tape and the tape box with the participant number (which is in the top right hand corner of the participant contact sheet) and also the date you carried out the recording.
- We will have to arrange to meet up so I can gather participant contact sheets, completed consent forms, observation notes and tapes for each participant.

If there are any problems you can always call me before, during or after an observation (07968 317687).

Thank you so much for your help. It is greatly appreciated!!

Sarah

Appendix 8: Letter accompanying the mealtime recording DVD



Bradford Teaching Hospitals 
NHS Foundation Trust

Charles Thackrah Building,
101 Clarendon Road,
Leeds, LS2 9LJ.

Dear Parent,

Thank you for taking part in the mealtime observation study, your involvement is greatly appreciated.

Please find enclosed a copy of the mealtime I filmed at your home.

I expect to complete the research at the end of June and I intend to send all participants a brief summary of the key findings of the study at this time. I hope you will find this interesting. Thank you again for participating in this study.

Best wishes

Sarah Wilson
Psychologist in Clinical Training

Appendix 9: Parent Mealtime Observation Codes

Praise	Any non-aversive praise offered to the child by the parent E.g. “well done, you’re such a good boy”
Positive Contact	Any physical contact deemed to be non-aversive i.e. not causing, or having the potential to cause pain or discomfort to the child E.g. stroking the child’s back
Negative Contact	Any contact causing, or having the potential to cause pain or discomfort to the child E.g. pulling the child by the wrist when the child was resisting
Positive Specific Instructions	Any verbal command that is clear and has a specific behavioural referent, and is presented non-aversively E.g. “mmm have some more peas”
Negative Specific Instructions	Any verbal command that is clear and has a specific behavioural referent, and is presented aversively E.g. “stop that now or I will smack you”
Positive Vague Instructions	Any verbal command that is unclear, lacks a specific behavioural referent, and is presented calmly E.g. “why don’t you try some carrot”
Negative Vague Instructions	Any verbal command that is unclear, lacks a specific behavioural referent, and is presented aversively E.g. “I think you should try and eat more” (frowning face and assertive tone)
Positive Prompts	Any positive specific or vague instruction which works i.e. the child complies (within 10 seconds or so) E.g. “Ready?” (whilst holding up food)
Negative Prompts	Any aversive specific or vague instruction which works i.e. the child complies (within 10 seconds or so) E.g. “Put your drink down now” (said abruptly and in a louder voice than before)
Positive Eating Comments	Any comment or question that is related to the current meal, and is presented non-aversively (e.g. “Yumm”, “Do you want more yoghurt or have you had enough?”). E.g. “This is delicious, mummy likes tomatoes.”
Negative Eating Comments	Any comment or question that is related to the current meal, and is presented aversively. E.g. “uuurgh don’t eat that now it’s dirty”
Presentation of Food	Any attempt by the parent to move food closer to the child to make it easier to reach, or to hold food

	to the child's mouth. Not coded for drinks. E.g. scooping food onto a spoon for the child to pick up
Removal of Food	Any instance of food being removed by the parent – out of the child's hands, or out of the proximity of the child. Again, not coded for drinks. E.g. removing the child's plate from their reach
Positive Social Attention	Any non-aversive attention, verbal or non-verbal, that cannot be scored under other categories. It may be patient initiated or in response to the child. E.g. watching the child eat
Negative Social Attention	As above, except deemed to be aversive due to content or voice presentation. E.g. shaking head and clicking tongue at something their child has done
No Interaction	No interaction from the parent E.g. Mum answers the phone – not looking at child

Appendix 10: Child Mealtime Observation Codes

Examples of different types of interaction from observations conducted are also included

Request for food	Any verbal or non-verbal (e.g. gesturing) request for food (E.g. “more”)
Food preparation	Any attempt to prepare food for eating i.e. opening packages, using utensils to prepare food (e.g. cutting up, scooping onto fork). (E.g. stabbing chips with a fork)
Self Bite	Voluntary placement of food in the mouth, and taking a bite.
Prompted Bite	Placement of food in the mouth, and taking a bite, in response to an instruction or physical presentation of food by another.
Chew	Any action moving food around the mouth, grinding it between the teeth.
Food Refusal	Any action refusing an offer of food or instruction to eat by the parent (e.g. shaking the head, pushing food away, saying “no”). E.g. turning the head away from the spoonful of food being offered
Vomit	Any food which has been in the mouth and comes out again. This does not necessarily have to be “vomiting”, the child may simply drop food out of their mouth, or spit it back onto the plate. E.g. letting chewed up tomato dribble out of the mouth
Play	Non-constructive use of utensils such as pushing food from one side of the plate to the other, playing with the food as if it were a toy (e.g. pushing an apple round the table while making the sound of a car), or fiddling with the food. E.g. rolling a babybel cheese and saying “choo choo”
Leave Table	Any time the child gets out of the chair, stands up, sits on the floor, or leaves the table. If the behaviour is in opposition to a parental instruction, the child will also be coded as non-compliance.

	E.g. going under the table
Hold Food	Holding food in the hand without biting or chewing for the entire interval (N.B. even if the child is talking at the same time, this is not coded as an appropriate interaction if food is being held).
Non-compliance	Refusal to initiate compliance with instructions within 5 seconds. E.g. refusing to use a fork
Complaint	Any verbal complaint (e.g. whining, screaming, grizzling, vocal protests, displays of temper). Excludes aversive demands. E.g. a high pitched whine
Aversive Demand	Any instruction directed to another person, that is judged to be aversive or unpleasant (e.g. "Fix my dinner now!"). E.g. "give it!"
Physically Negative	Any actual or threatened physical attack or damage to another person, or destruction of an object (e.g. punching, kicking, biting, scratching, pinching). E.g. kicking Mum under the table
Oppositional Behaviour	Other inappropriate behaviours that cannot be coded as non-compliance, complaint, physically negative (e.g. violating family rules, teasing, deliberate ignoring, humiliating). E.g. turning plate upside down
Appropriate verbal	Acceptable behaviour lasting the entire interval, containing any intelligible/age appropriate verbalisations (e.g. questions, non-aversive demands). E.g. "what's that?"
Engaged Activity	Acceptable behaviour lasting the entire interval, not containing any intelligible/age appropriate verbalisations (e.g. listening to conversation at the table). E.g. smiling at Mum
No Interaction	Absence of interactions with objects or people, ritualistic manipulation of objects, repetitive self-stimulation (e.g. face slapping, head banging). E.g. watching TV

Appendix 11: Contract for Translator

Bradford Teaching Hospitals 
NHS Foundation Trust

CONTRACT FOR TRANSLATION WORK

Researcher: Sarah Wilson

The purpose of this form is to make sure that you are happy to undertake this translation work and that you know what is expected. Please circle your response to each question.

Do you understand that the mealtime recording you have been given access to is only for research purposes? YES/NO

Do you understand that this DVD should not be saved or copied? YES/NO

Do you understand that other people should not be given access to this recording? YES/NO

Do you agree to undertake this translation work? YES/NO

Do you endeavour to complete the translation work in the next 2 weeks? YES/NO

Do you understand that only a nominal fee will be awarded on completion of this work? YES/NO

Do you understand that you are both free to withdraw from this work at any time? YES/NO

Signed: _____

Name in BLOCK capitals: _____

Date: _____

Appendix 12: Evidence that mothers of different ethnicities were not outliers

The mean, standard deviations (SD) and range for each group are printed in red, underneath the individual participant's data.

	Iranian participant	African-Caribbean participant	Dual heritage participant
Participant Group	Asian – obese group	Non- Asian healthy weight group	Non- Asian obese group
Mother's age	24yrs 31yrs (5.4) 20 – 38yrs	38yrs 29yrs (6.3) 18 – 39yrs	43yrs 31yrs (5.5) 25 – 43yrs
IMD 2010 score	24.68 36.9 (17.6) 16.73 – 65.94	63.67 39.2 (19.4) 15.42 – 67.61	19.50 29.8 (18.0) 8.17 – 45.54
Meal duration	19mins 21.5mins (11.3) 9.1 – 45mins	32mins 25.6mins (5.0) 19.4 – 35.3mins	19mins 16.8mins (4.9) 6.2 – 21.4mins
Total positive Mother-Child behaviours	87.83% 75.9% (19.5) 51.1 – 100%	79.27% 89.0% (8.5) 78.13 – 98.3%	97.37% 87.6% (9.5) 67.21 – 99.2%
Total negative Mother-Child behaviours	12.7% 12.4% (12.1) 0 – 33.3%	18.13% 7.3% (8.0) 0 – 21.3%	0.88% 7.8% (9.3) 0 – 31.2%