

DOES SOCIAL CONTRACTING INFLUENCE THE
JUDGEMENT OF CHILDREN'S PAIN?

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others

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ABSTRACT

Research has demonstrated that children's pain is underestimated in clinical settings. Nurses in particular have been highlighted as the professional group most likely to underestimate their pain. Contemporary theories of evolutionary psychology propose that pain assessment is a social exchange situation (e.g. Kappeser et al. 2006), whereby benefits (analgesia) are exchanged with another person when they have paid a cost (pain). A social contract is the cognitive mechanism that supports the exchange of benefits between people. It was proposed in this study, that nurses enter into a social contract with their patient in a pain assessment scenario. Additionally it was suggested that the underestimation of pain occurs in response to cheater-detection; a cognitive mechanism that has developed to ensure the fair distribution of benefits to people in need. It was hypothesised that when rating in a social contract condition, nursing students would impute less pain than when they were rating in a non-social contract condition. This effect would be strengthened when the participant suspected cheating. It was also proposed that participants in the social contract condition would rate higher levels of exaggeration and would be less likely to reduce pain when they suspected cheating.

85 nursing students were recruited to test the hypotheses. Participants were presented with a booklet containing eight vignettes with visual images of children experiencing high and low levels of pain. They also contained written information describing behavioural pain which were either congruent with the visual image (high facial and high behavioural cues) or incongruent. Participants were asked to judge the vignettes from a social contract perspective (as a nurse) and from a neutral perspective (as a visitor to a ward). Ratings of pain, exaggeration, minimisation, reasonableness and intentions to reduce pain were measured using a 10cm visual analogue scale.

The results of this study provided partial support for the hypotheses. No differences in the overall scores of pain between participants rating as nurses or visitors were found. Nurses were found to rate pain higher in conditions containing incongruent pain cues. Nurses did not rate more exaggeration than visitors, however, they did use scores of exaggeration to base their pain scores on, whereas visitors did not. Higher scores of exaggeration were associated with less willingness to reduce pain for nurses specifically. Finally, reasonableness was more strongly associated with intentions to reduce pain for nurses than visitors. These results are discussed with reference to social contracting and cheater detection.

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ABBREVIATIONS

AoM - assumption of mutuality
CFCS -child facial coding system
CHEOPS - children's hospital of Eastern Ontario pain scale
E.G - *exempli gratia*
FAC - facial action coding
FE - facial expression
fMRI - functional magnetic resonance imaging
I.E - *id est*
GA - gestational age
GCT - gate control theory
HADS - hospital anxiety and depression scale
MFF - matching familiar figures test
MRI - magnetic resonance imaging
NICU - neonatal intensive care unit
NHS - National Health Service
OSIQ - R - offer self-image questionnaire - revised
PAM - perception action model
PCT - personal constructs theory
ToM - theory of mind
UK - United Kingdom
VAS - visual analogue scale

INTRODUCTION

We have an ethical and humanitarian responsibility to reduce pain and suffering in young people. This thesis explores the problem of pain mis-estimation in children by the nursing profession using student nurses. 'Pain' is both a physical, emotional and cognitive experience that has an adaptive function in being able to tell us that something is wrong (Goubert et al., 2005). Pain is also a social communication (Craig, 2009). The pain experienced by an individual is communicated to others through pain displays such as facial expressions and vocalisations (Williams, 2002). This communication is crucial to our survival as it signals to others that we need help.

Health professionals have the difficult task of interpreting these signals and making an assessment of pain intensity and the need for treatment. It has been well documented that pain is underestimated in health settings (Zhou, Roberts, & Horgan, 2008; Prkachin, Solomon, & Ross, 2007; Kappesser, Williams, & Prkachin, 2006; Marquiè et al., 2003; Solomon, 2001; Field, 1997; Craig, Lilley, & Gilbert, 1996). Evidence from studies examining the agreement between patient's reports of their pain and that of healthcare professionals and parents, demonstrate the complexity of this communicative process. These studies show that patient's ratings of their own pain and nurses ratings rarely match up; nurses tend to underestimate pain (Kappesser & Williams, 2010), but in a few cases overestimate pain in the presence of low or non-existent pain expression (Heikkinen, Salanterrä, Kettu, & Taittonen, 2005). Nurses as a professional group have been shown to underestimate pain more than any other profession (Prkachin et al., 2007). Parents have been shown to both overestimate and underestimate pain (Zhou et al., 2008).

The pain assessment process is further complicated when the patient has more limited means of communicating e.g., infants, children and people with learning disabilities. The consequences of this are seen in the neglect of pain relief in these populations (Hadjistavropoulos, von Baeyer, & Craig, 2001). Underestimating a child's pain has an impact on their physical and emotional well-being and can adversely influence any future contact that the child may have with health services (Dell'Api, Rennick, & Rosmus, 2007).

Evolutionary thinking suggests that sharing resources with others in need is an adaptive social process that facilitated the proliferation of the human race. This social process is defined by a system of rules (social contracts) which are in place to ensure fairness, i.e. to receive benefits you must pay the cost (Cosmides & Tooby, 1989). When an individual adopts a nursing or helping role, they take on the

task of gatekeeper of resources and benefits, entering into a social exchange scenario with the patient (Williams, 2002). A social contract is entered into between the nurse and the patient, whereby the patient must pay the cost (be in genuine pain) to receive analgesic treatment. This thesis proposes that this cognitive system influences acute pain assessment in hospital settings. It explores the question of whether being in a nursing role influences how pain is judged and how benefits are distributed. A literature search was carried out between the time period of 1950 to July 2011 to support this review. The first part of this chapter will focus on the scope of the problem, how nursing assessment is carried out, the accuracy of pain assessment and known biases that influence pain assessment. The latter part of this chapter will explore these problems using a contemporary theory of evolutionary psychology; cheater detection, which is part of social exchange theory.

Paediatric pain assessment

In 1968, Swafford and Allan published a paper that stated that post-operatively, young children and infants did not experience pain or need pain relief and that this practice should be avoided. This judgement was based on an observation that younger children and infants did not complain of pain as much as older children. It is now known that younger children do not tend to report pain without first being asked (Gilles, 1993). These ill-conceived notions were based on inaccurate inferences from observations of children post-operatively, and have had an impact on the belief-systems of clinical practitioners for decades. The assessment of pain does not happen enough and is a neglected area in clinical settings (Craig, 2009). Research demonstrating that nurses tend to judge pain inaccurately has long been documented, however, inadequate dissemination of this to healthcare professionals has been cited as one of the maintaining factors of this problem (Schechter, Berde, and Yaster 2003b). Nevertheless, the past 30 years has seen research consistently inform health practitioners of a better understanding of children's pain (Brennan-Hunter, 2001). Finally, there is a move towards providing more adequate levels of pain assessment and treatment in the United Kingdom. The Royal College of Nursing (2009) has published a guideline which recommends using self and parental report in the assessment of paediatric acute pain. It has usefully provided developmental guidelines suggesting a number of different assessment tools for use with infants, children and adolescents and has recommendations of tools for use with young people with cognitive impairments.

Assessing patients' pain is a social and communicative process that involves observation, judgement and decision making. Because we cannot see pain directly, we must interpret pain using a number of different cues. In clinical settings, healthcare professionals will use a number of different sources on which to base their inferences. The interpretation of pain cues is a process which involves many psychological processes influenced by variable external factors such as the availability of medical information and the personal experiences of the professional. Considering the array of factors that make up the process of pain expression and interpretation, it is predictable that pain assessment in healthcare settings is frequently inaccurate. Assessing the child in pain adds further challenges and another dimension of complexity to pain assessment. Communicating with an individual who has a limited ability (compared to the average adult) to verbally express their pain can cause complications for the clinician. Not only must the verbal information be taken into account, but additional information from non-verbal behaviours and accomplice reports are important. Professionals struggle to identify what is pain non-verbal behaviour and what is not (Craig, 2009). Adequate pain assessment demands the appropriate use of self report tools. Even when these tools are in use however, they omit much of the qualitative information about the multidimensional nature of the pain experience. Despite a wealth of self-report tools available, and evidence that the inclusion of self report data increases the accuracy of pain estimations (Kappesser et al., 2006), clinicians rely heavily on the non-verbal cues of pain such as facial expression, observed behaviours and reports of restricted functional activity (Schiavenato & Craig, 2010).

What is pain?

Pain is 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage' (International Association for the Study of Pain, 2011). Ronald Melzack and Patrick Wall introduced the Gate Control Theory of pain (GCT; (Melzack & Wall, 1965) nearly 50 years ago and since then it is understood that pain is both a physiological and psychological experience. Experiences of pain are not directly related to the extent of tissue damage or noxious stimuli, but are influenced and modified by ascending systems activated by noxious or innocuous stimuli and descending pathways activated by psychological and situational factors. GCT was the catalyst for the development of theories that explain why pain is experienced

differently in every individual. We all have a unique experience of the world and as such contrasting histories of physical, social and psychological stimuli. Pain is a subjective experience and the use of the term 'pain' in association with the unpleasant sensory experiences that are attached to it, depend upon an individual's history of pain experiences. Subsequently, what one person with only mild pain experiences may describe as 'the most pain imaginable' may differ from another person who has experienced a greater number of intensely painful episodes. In research and clinical settings, pain is often described and categorised temporally from the onset; terms used are 'acute', 'recurrent' and 'chronic'. Acute pain is transitory short-term pain that is resolved quickly and is regularly the type of pain that is associated with an assault on the body by noxious stimuli (such as a cut), which affects the nociceptors. Recurrent pain relapses and remits over time. Chronic pain is longer-term pain that is experienced for at least six months (although different time frames such as three and 12 months are used in research (Turk, 2001).

Pain has an adaptive function in that it signals for us to stop painful activity or restrict movement to promote healing. Pain is signalled to other people via displays of facial expression, movement, para-vocalisation, and direct verbal communication (Williams, 2002). These displays can act as a warning that there is danger or that the person experiencing pain needs assistance. The way in which an individual communicates that there is a problem and the magnitude and variety of displays is almost certainly not in proportion to the amount of pain experienced (Vervoort, Goubert, & Crombez, 2009). There are a number of theoretical accounts that attempt to explain pain behaviours which will be discussed later in this thesis.

These pain processes described need to be assimilated into the context of the child's current level of development when assessing paediatric pain (McGrath, 2003). Child development is a process that is multidimensional and multidirectional, encompassing physiological, cognitive and psycho-social domains. As environmental influences affect child development in these broad domains, they also affect how children understand pain. As cognition develops, children become able to verbalise concepts and are able to describe pain in more abstract terms rather than using concrete examples. The episodes of pain that they experience act as a frame of reference for which to compare other pain experiences. As the child grows older, the catalogue of experience widens and the child is able to distinguish between different types and intensities of pain. How the child experienced the episodes of pain (e.g. whether they felt in control of the situation) can influence the

emotional context of future pain experiences. For example, many children who undergo painful medical procedures without adequate psychological preparation can experience more procedural distress and pain and anticipate more pain in the future (Rennick & Rashotte, 2009). Feelings of helplessness and a lack of education about the procedure itself contribute to beliefs about the potential for tissue damage resulting in higher reports of pain (Rennick, Johnston, Dougherty, Platt, & Ritchie, 2002). This next section will look at how the developmental stage of the child will influence pain assessment for the nurse.

Pain in neonates and babies (0-12 months)

It is only in relatively recent years that pain management procedures in neonatal units has been accepted as a useful procedure. Prior to this, healthcare settings were rife with myths that described neonates as being insensitive and immune to the effects of pain. Conversely, neonates have lower pain thresholds, become sensitised to repeated pain exposures and have immature systems for maintaining homeostasis, making them more vulnerable to pain (Grunau et al., 2009). Pain assessment for this age group largely relies on visual cues of pain, (e.g. Merkel, Voepel-Lewis, & Malviya, 2002), especially facial expressions, which have been shown to be the most reliable indicator of pain in the first few months of life (Hadjistavropoulos, Craig, Grunau, & Johnson, 1994). Even so, nurses have been found to be poor at interpreting facial pain cues in newborns (Guinsburg et al., 2000). Nurses typically use respiration, behavioural activity and vocal cues in their assessment (Craig et al., 1996; Hamers, Abu-Saad, van den Hout, & Halfens, 1996; Hudson-Barr, Duffey, Holditch-Davis, Funk, & Frauman, 1998). Infants perceptions of pain are complex and are affected by social influences, painting a more complicated picture than the myth of the infant whose system was too immature to even experience pain. Piira, Champion, Bustos, Donnelly, & Lui (2007) found that interaction of parents with the child 30 seconds prior to an immunisation had the greatest impact upon the child's response to pain.

Pre-school children (1-5 years)

Pre-school children offer a challenge for healthcare professionals in that the child's limited cognitive, linguistic and social competencies restrict the range of measurement options available (Gaffney, McGrath, & Dick, 2003). In the pre-operational stage of cognitive development, the child will experience pain as a

primarily physical experience. Children at this stage have high levels of ego-centricity meaning that they may well expect other professionals to be able to 'see' their pain as they sense it. Difficulties in the measurement of the extent of pain and the use of scales are brought about by the child's concrete thinking (i.e. a child of this age may not be able to think about their pain in relative terms). Below four years old, behavioural rating scales offer the most viable methods of pain assessment (Schechter, Berde, & Yaster, 2003). However, it may be possible to engage some to intensive play with the child under four years, in order to elicit information about their pain (McGrath, 2003). At this age, the child looks to their parent to help guide their frame of reference for the pain event. How the parent reacts to the child displaying pain behaviours will determine how the child construes the situation; the child may learn to ignore pain and continue playing or focus on pain.

School-aged children (6-12 years)

Developmentally, this age period spans four stages of cognitive development, the latter end of the pre-operational period (2-7 years), the concrete-operational period (7-11 years), the transitional formal period (10-12 years) and the formal operational period (12 years and above). At the ages of 7 and 8 years of age, children become skilled at measurement, quantification and seriation (the ability to place in ascending and descending order), opening up the use for simple self-report scales. In the concrete operational period, the child is able to specify pain locations on the body and have increased awareness of their body parts and internal organs. Children of this age are able to think in more abstract terms and can begin to grade pain in severity and quality. The child will start to think about the affective aspects of pain, becoming well developed at ages 10-11 years. They may well have a fear of death and destruction and link this to the consequences of their pain. In the transitional formal period, the child's perceptions are not as literal as the concrete-operational period and the child will be able to understand more abstract terms.

Adolescence (13 - 17 years)

During the very early years of adolescence, the individual is increasingly able to think about concepts in abstract terms and will have developed a more comprehensive vocabulary to describe their pain. The adolescent will now be able to think about their pain in terms of the future and imagine the more sinister

implications of pain. The main tasks of adolescence centre around individuation and developing an identity separate from one's parent. As part of this, the adolescent will strive for autonomy and will become more responsible for their own healthcare decisions. The adolescent will be expected to self-report their levels of pain to healthcare professionals. Despite being able to give better quality self-report information, adolescent pain assessment is inadequate. In a large British study of adolescent acute pain post-operatively, Gillies, Smith and Parry-Jones, (1999) found that pain was underestimated and under-treated in adolescents. Both physicians and nursing staff were labouring under many misconceptions about the impact of medications on adolescents and were dismissive of adolescent pain when it was presented clinically. Nurses were under the misconception that they should restrict analgesia because adolescents 'clock-watch' for drugs and staff fear that they may develop an addiction to opiates. Furthermore, many staff thought that when adolescents asked for pain relief they were working under an ulterior motive and seeking attention.

Another interesting finding from this study, was the association of pain with emotional distress in adolescents. Using the Hospital anxiety and Depression Scale (HADS), adolescents were found to have clinical levels of anxiety pre and post surgery and clinical scores for depression post-operatively. This finding supports the proposal that if the psychological components of pain in adolescents were attended to, post-operative acute pain could be treated more effectively. Gillies et al., (1999) used the Offer Self Image Questionnaire - Revised (OSIQ-R) to look at psychological adjustment to adolescence, yielding five scores of self esteem. Interestingly, adolescents that were poorly adjusted reported more pain than adolescents that had were better adjusted. These findings suggest that the maturational stage of the adolescent may have an impact on upon the pain they experience. Although we all work though the developmental stages, this occurs at a rate unique only to the individual. Further education for healthcare workers carrying out pain assessment on adolescent populations is needed.

Agreement between pain experience and assessment

It is frequently documented that pain is inaccurately estimated by health professionals; ratings from observers are rarely in agreement with patient ratings. Pain ratings from the relatives of patients, doctors and nurses have been gathered and compared to the ratings of patients themselves with mixed results.

Nevertheless, consistency has been found for the underestimation of pain in certain professional groups. Rajasagaram, Taylor, Braitberg, Pearsell, and Capp (2009) looked at an opportunistic sample of children coming into an Australian Accident and Emergency department and found that nurse's ratings were lower than both the parent's and the child's. This study used the same assessment methods for both children and adults, tailoring the assessment method to suit the needs of the child. Furthermore, Kroner-Herwig, Morris, Heinrich, Gassmann, and Vath (2009) found a general underestimation of pain by parents from a recent epidemiological study, with children rating more frequent and intense pain experiences. This trend was consistent with the exception of headaches, where child and parental reports were found to be similar. Importantly, they argue that parental reports cannot be regarded as a substitute for children's self reports of pain. In light of the evidence for the bias of parental reports of childhood pain, this argument is even more salient.

Zhou et al., (2008) conducted a meta-analysis looking at self-report pain data between three common relationship dyads found in hospital settings; the child-parent, the child-nurse and the parent-nurse. The settings of the studies varied from post-operative pain to procedure related pain. Large summary effect sizes were calculated suggesting high levels of agreement between nurses, parents and their children however, individual effect sizes (r) varied immensely between studies as indicated by significant results from homogeneity tests. Large summary effect sizes were found for nine studies exploring the child-parent dyad ($r = 0.64$; SE $r = 0.09$) suggesting that child and parental reports correlate strongly. The homogeneity test was statistically significant however (Q-statistic = 54.58, $p < 0.001$), suggesting heterogeneity between the individual effect sizes used for the meta-analysis. Moderate summary effect sizes were found over eight studies for child-nurse dyads (0.58; SE $r = 0.11$) however again, the homogeneity statistic was significant at $p < 0.001$ with a Q statistic of 37.01. Five studies were analysed for the parent-nurse dyad resulting in a moderate summary effect size (0.49; SE $r = 0.13$). The Q statistic was significant at 30.35 $p < 0.001$. Although at first glance these results look promising in terms of the moderate effect sizes, differences between the scores of children and their carers do suggest that parents and nurses assess children's pain differently. Zhou et al. (2008) cite differences in assessment methods between children and adults and between studies as a major factor in the discrepancies found within the dyads.

In a review of adult pain agreement studies, Kappesser and Williams, (2010) clarified the situation and held poorly designed studies using inappropriate

statistical analyses as the culprit in muddying the waters. They argue that only studies providing proportions of overestimation, underestimation and agreement are valid ways of researching this problem. Correlation coefficients (as used in Zhou et al., 2008) are unsuitable for this type of analysis, as they do not allow for the magnitude of differences between pain ratings and, the data may be correlated in terms of rank order of each set. Many studies using these methods were excluded on this basis. Kappesser & Williams, (2010) found significant associations between judge's relationships to patients and discrepancy between pain ratings ($\chi^2 = 196.84$, $p < 0.001$). Healthcare professionals compared to patients relatives were equally likely to agree rather than overestimate (OR = 6.04, 95% CI = 4.32 - 8.45) or underestimate rather than overestimate pain (OR = 7.56, 95% CI = 5.29-10.79). Significant associations were found between pain chronicity and ratings of pain ($\chi^2 = 70.09$, $p < 0.001$); in acute pain, underestimation was more likely than overestimation (OR = 3.07, 95% CI = 2.32 - 4.06) as was agreement (OR = 2.71, 95% CI = 2.05 - 3.58). Most studies looking into pain agreement between young people and observers use correlational methods to analyse trend in pain rating data, omitting comparison using the lafrati criterion data for the analysis of proportions of overestimation, underestimation and agreement within each group (e.g. Bird & Dickson, 2001). The lafrati criterion is a clinically validated measure of of agreement for ratings of pain scores on a VAS between different people (i.e. children and nurses). Scores need to be within 1cm of each other on a 10cm scale to be classed as agreeing, any difference greater than this is classed as a disagreement with pain scores. No studies with children and young people were found that used the lafrati criterion. Therefore, caution should be exercised when interpreting the results from existing studies.

Many studies have attempted to capture and quantify the underestimation of pain, an important phenomena occurring in clinical settings. We know from personal experience, patient reports and research that this phenomena happens, yet the literature is not entirely consistent. Patients and observers use different sets of information to calculate pain severity (i.e. sensations of pain and facial/ behavioural communication) and the interpretation of pain cues is a complicated social process (Craig, 2009). Research looking at the decision-making processes behind pain estimation may be more useful for this clinical problem.

The problem with pain underestimation

Ethical Considerations

'Primum non nocere' is the Latin translation of the declaration 'first, do no harm', constituting part of the Hippocratic Oath sworn by medical doctors on their graduation. Enshrined in the very core of medical philosophy is the idea that first and foremost, we do not cause injury or harm to our patients and consciously contribute to their suffering or their demise. Pain, if left untreated, is harmful to patients and pain relief is often seen as a human right (Brennan & Cousins, 2004). Over time, pain can cause irreversible neurophysiological changes in the brain and precipitate a negative psychological sequela so disruptive that patients can develop post-traumatic reactions, mood disorders and disability, based on their perceptions of their pain as being activity-limiting. If we know that pain causes harm to our patients, then is leaving pain untreated unethical and adverse to the Hippocratic Oath? Of course, this question is complicated by the number of other contextual factors that alter the way in which we judge pain. Clinicians do not simply take pain on 'face value', but make their judgements based on perceptions and knowledges that have their roots founded in their personal and cultural history of pain perception and their own belief systems. 'Social Contract Theory' is a theory that suggests that decisions between people are made on the basis of underlying unconscious processes that, by necessity, have evolved to facilitate complex reciprocal interactions surrounding helping behaviours. Whether decisions to help reduce pain are based on deep-seated cognitive processes or more surface level beliefs, it is clear that the judgements about pain and subsequent decision on whether or how to treat pain is a complicated process. Ethical consideration is the foundation of all good medical practice, but decisions about right or wrong are made on the basis of decision-making processes that are incomparably influenced by many other factors.

Physiological changes

If pain is underestimated by healthcare professionals, it is likely that attempts to reduce pain will be insufficient. If left untreated, pain experienced in very early life can lead to permanent alterations in pain processing through changes to synaptic connectivity and signalling in nociceptive pathways (Fitzgerald, 2005); hyper/hypoalgesia through the re-setting of the stress hormone response (Grunau et al., 2005; Ren et al., 2004); and changes in the balance of inhibitory versus

excitation processes (Fitzgerald, 2005). These neurological changes can alter the way in which pain is experienced leading to greater sensitivity to pain and/or a lower pain tolerance level. There is evidence that pain may not only affect the pain centres of the brain, but may also impact upon the areas of the brain which underlie basic developmental processes in neonates. Grunau et al. (2009) found a relationship between the number of skin breaking procedures in neonates and poorer cognition and motor function at 18 months, regardless of illness severity or post-conceptual age at birth. This finding raises questions about the impact of pain on the neurodevelopment of older infants, children and adolescents. As we have learnt from longitudinal Magnetic Resonance Imaging (MRI) studies, the brain is still developing well into adolescence (Geid, 1999), and so the impact of pain on the brain development of older children and adolescents is still unknown. Furthermore, as children's brains are developing, there is a large degree of neuroplasticity, calling into question the extent to which we can assume that certain factors have a specific amount of influence. This may also raise questions about the impact that experiencing pain has on a child, which will be explored later in this thesis.

In the 1990's, research began to highlight the long-term consequences of the neonate experiencing pain. Cumulative pain in pre-term neonates of less than 28 weeks gestational age (GA) is associated with the altered development of physiological systems (the hypothalamic-pituitary-adrenal axis, altering the neonates stress reactivity systems) and behavioural systems (dampened facial reactivity to pain which could suggest a learned helplessness) independent of illness severity (Grunau et al., 2005). Grunau et al (2009) looked at pre-term infants post admission to a Neonatal Intensive Care Unit (NICU) and found that higher numbers of skin breaking procedures performed on neonates born less than 32 weeks GA predicted lower levels of cognitive and motor development at 8 and 18 months corrected chronological age. They argue that the extent of exposure to pain and the number of days on ventilation may be more specific indicators of poorer cognitive and motor outcome at 8 and 18 months than low GA and birth weight.

Psychological and psychiatric responses

Pain is a phenomena that causes most people to attend to the site where they experience pain, so that we can treat the pain. We also pay attention to sources of pain so that we learn to avoid these and preserve our physical integrity. As such, hypervigilance to pain threats and avoidance behaviours are common

psychological consequences to acute pain, particularly when somebody experiences repeated episodes. Avoidance of activity to prevent pain could impact upon the child's engagement with meaningful activity and ultimately impact on the quality of life for the child. Furthermore, when a person experiences a threat to their life/physical integrity or injury, post traumatic stress disorder (PTSD) can develop. Children can develop PTSD after traumatic healthcare experiences (e.g. Butler, 1996). It is not known whether the level of pain experienced contributes to the development of PTSD, although there are suggestions of this from single case studies (e.g. Schreiber & Galai-Gat, 1993). Furthermore, Rennick et al. (2002) found no differences in young children's psychological responses if they stayed on intensive care units or general hospital wards but did find differences between children when looking at invasive procedures and illness intensity. Although pain was not specifically measured in this study, one could argue that invasive procedures and illness are inextricably linked with pain experiences.

Whether a formal diagnosis of PTSD is an appropriate term to use in this context or not, traumatic and painful experiences in healthcare settings could lead to increased levels of stress, anxiety and avoidance behaviours which could negatively impact on future healthcare. Experiencing acute pain at a young age (7 years and under) has been linked with having a reduced health internal locus of control which continues into later life (Rennick & Rashotte, 2009). Furthermore, Dell'Api et al. (2007) conducted a qualitative study looking into five children's experiences of chronic pain and healthcare professional interactions. The children reported feeling 'abandoned' 'disbelieved' and 'misunderstood'. Dell'Api et al. (2007) discuss the ramifications of these negative experiences including how children can become more 'guarded' in their interactions with health professionals. They also discuss how negative interactions with healthcare staff and the associations of this with pain could alter the way that chronic pain is experienced.

Social models of pain assessment

The existence of facial expressions for pain provides support for the social nature of pain. Facial expressions of pain provide no other function for the individual as other behaviours do (such as curling up in the foetal position) other than communicating to another person that there is a problem. The ability to signal pain through facial displays is present from birth and facilitates parental caregiving. The pain assessment process involves a complex array of signals, interpretation and

interaction. Much research to date has focussed on the quantity and nature of pain signals and the amount of pain recorded by a health professional in comparison to the patient. Until recently, research has neglected to consider how the relationship of the observer to the signaller affects the assessment process.

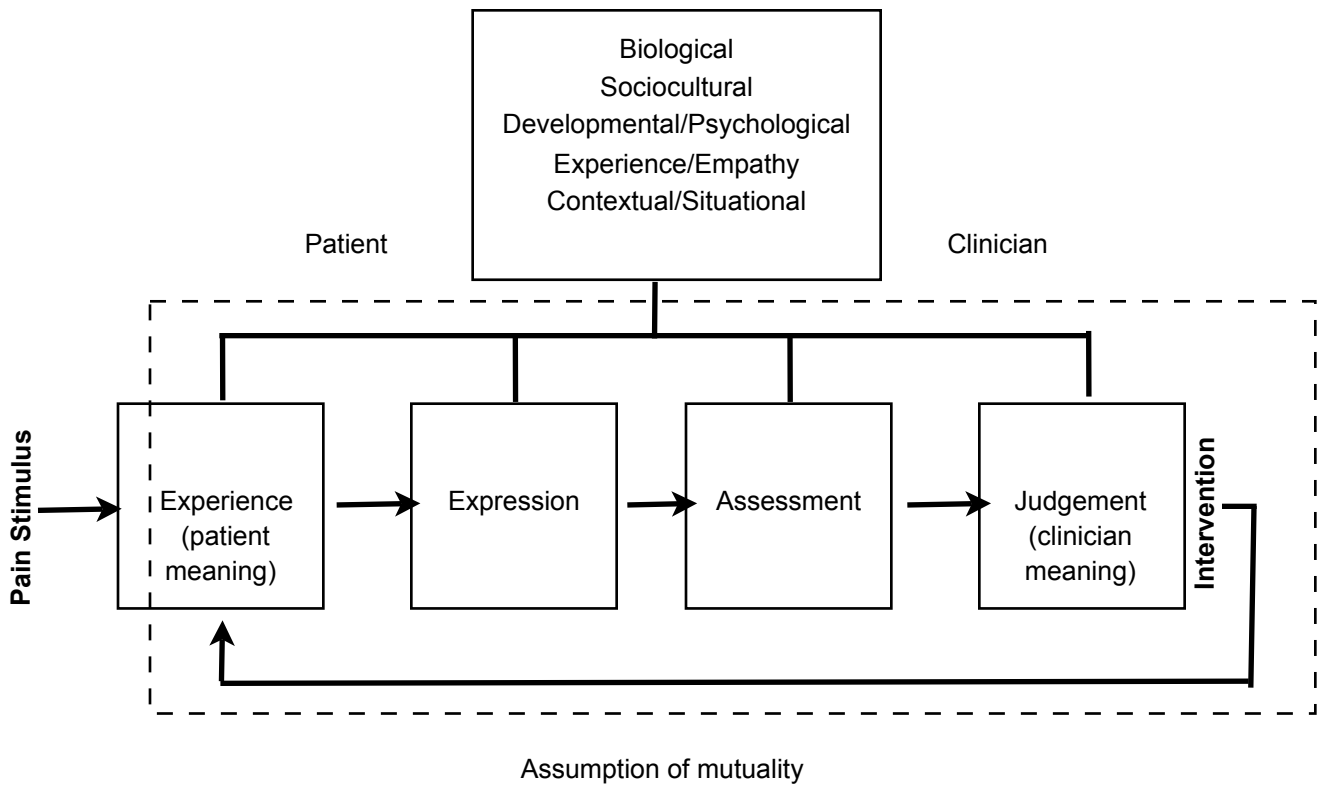
As it is increasingly understood that pain is not merely a physiological or psychological experience, but also a social transaction, models of pain assessment have developed to include the caregiver as an integral part of the process. It is now understood that the communication of pain is a dynamic process whereby the patient and the caregiver influence each other in a series of recursive feedback loops (Craig, 2009). Systemic models of pain assessment include the communications models of pain (Craig, 2009) and a model of pain assessment as a social transaction (Schiavenato & Craig, 2010), which focus on the bidirectional feedback process between patients and clinicians. These models reflect on the dynamic interplay between the patient and clinician; actions from both parties influence their interpretation of events, within the overall context of the historical and contextual factors affecting the individuals.

Figure 1 (pg. 23) demonstrates some of these processes. The pain stimulus starts a process of sensory, emotional and cognitive experience for the patient, which they interpret in the context of their developmental stage and within the constraints of their biological makeup. Cognitively, the event is evaluated in terms of previous experiences to pain and in light of the situational variables. Importantly, the experience of pain does not directly link to the expression of pain; which is influenced by these contextual variables. The expression of pain from the patient then crosses over into the clinician domain, where they will observe a pain display. At this point, this display may have been modulated by the individual variables affecting the patient. The clinician now makes an assessment using the tools available to them (i.e. observation of facial display and behaviour, medical information, self-report, etc.). The critical analysis of these displays is subject to the clinicians own pain history, empathic tendencies and developmental, situational, biological context. A value-laden judgement is made from the information gleaned from the assessment and subsequently the intervention is based on this.

Schiavenato & Craig's (2010) model proposes that feedback from the clinician can impact upon the patient's experience of pain, where the effectiveness of the clinician's treatment will have a positive or negative impact on the patient's experience. The author would suggest however that this feedback exists not only from the intervention, but also from the judgements made of pain. The clinician's

values, opinions and judgements are communicated via other interactions with the patients on the ward such as those discussed by Byrne, Morton, & Salmon (2001). Their study explored how these judgements impacted directly upon the child's expression of pain. Clinician suspicion can cause either amplifications or minimisations of pain expressions. Alternatively, a compassionate response in the clinician could cause a reduction in the suppression of facial pain cues.

Figure 1: Pain assessment as a social transaction (adapted from Schiavenato & Craig, 2010)



Schiavenato & Craig (2010) describe an assumption of mutuality (AoM), whereby there is an implicit assumption during pain assessment, that the patient wants the clinician to reduce their pain and that the clinician wants to treat this. There may be incidences where there is not a consensus for these assumptions; for example, it is unlikely that a very young child would understand the role of a doctor or indeed want an intervention from a medical professional. This need would be

communicated through the parent. Given that the child may not want the medical professional to be there, this undermines the AoM and perhaps the child's expression of their pain. It is already well documented that parental presence in medical procedures can modulate the child's expression of pain (Gonzalez et al., 1989). It is also well known that parent's emotions around pain are highly correlated to that of the child (Goubert, Vervoort, Cano, & Crombez, 2009). Having a proxy establish the AoM may have a different impact on the exchange of pain information between clinician and patient.

Variables in Paediatric Pain Assessment

Patient variables

As with all decision making, there often lies some ambiguity for the health professional assessing a patient's pain. As previously discussed, pain is a subjective experience and cannot be directly inferred from the extent of tissue damage. The assessment of pain is a process influenced by a great number of factors such as; observations of patient facial expression and their behaviour including self-report; the nurse's cognitive interpretation and affective response to the event; and the medical evidence available (Prkachin et al., 2007). The clinician may be working with some or all of these sources of information. This information is interpreted and filtered through the lens of the practitioner, coloured by the clinician's experiences and history. Consequently, the healthcare professional's judgement is subject to biases, a number of which have been researched. Studies have explored biases in pain assessment relating to gender, diagnosis, ethnicity, age, cognitive performance and socio-demographic background of the patient. However, it must be remembered that there is some difficulty in determining the aetiology of discrepant pain scores given by health professionals between groups of people (e.g. boys and girls). It is beyond the scope of this literature review to cover these areas in any great depth, however a brief overview is given.

Gender biases have been found in pain assessment literature (Marquiè et al., 2003). This effect has also been found in a paediatric population (Bennett-Branson & Craig, 1993). In a quantitative study looking at medical student's ratings of the credibility of patient pain reports, Rusconi, Riva, Cherubini, and Montali (2010) found that women were attributed as experiencing less pain and their self-reports were not rated as being as credible as the male reports. Furthermore, qualitative accounts have shown that women's pain is more likely to be disregarded

or assessed as being 'not real' (Hoffmann & Tarzian, 2001; Werner & Malterud, 2003). An exemplar of this phenomenon from clinical practice is demonstrated by women being prescribed sedative pain medication more frequently whereas men are more likely to be given pain relief (Calderone, 1990). Differences between the experiences and reporting of pain have been found between the sexes, where girls are more likely to report pain than boys (Bennett-Branson & Craig, 1993; Gillies et al., 1999). In western society, it is less culturally acceptable for men to report painful experiences, however differences exist in the relative sensitivity to pain between men and women. Studies have shown that women are more likely to report pain as being higher than men do when in contact with a 50°C heat stimulus (Paulson, Minoshima, Morrow, & Casey, 1998). In this study, women's brains showed greater activation in the anterior cingulate cortex and the posterior insula, suggesting that women may be physiologically more sensitive to painful stimuli.

It is understood that children's pain is often underestimated and that children are given less analgesia than their adult counterparts for similar procedures (Selbst & Clark, 1990). We also know that neonatal pain was under-treated for many years until it was recognised that they could sense pain and suffer the consequences of this in the long term. Little is known however, about any biases of pain assessment between children of differing ages. It would be expected that younger children would be subject to more pain underestimation than older children, on the basis that clinicians are relying more on behavioural cues of pain and less on self report information. For example, Craig et al. (1996) documented the variable use of facial and behavioural pain cues by nursing staff. Furthermore, evidence exists that nurses are poor at interpreting facial, behavioural and breathing patterns (Vetter & Heiner, 1996). Accordingly, Hamers et al. (1996) found that paediatric nurses attributed more pain to older children (five years old) than younger children (three years old) when asked to rate vignettes with accompanying video tapes. Even though differences in pain scores were found, interestingly, no differences on the administration of analgesia was found. Conflicting reports concerning age differences have been found, where observer reports of pain are not affected by age differences (Gillies et al., 1999). In a large epidemiological study, Kroner-Herwig et al., (2009) found that differences in the age of children between seven and fourteen years had no impact on agreement studies between parents and their children.

A multitude of wide-ranging factors associated with the patient have been found to influence the pain assessment process, such as level of cognitive functioning

and ethnicity. Patients with cognitive impairments are less likely to receive treatment for their pain (Symons & Oberlander, 2006). Potentially, the patients' communication difficulties influence the quality of their self-report and as such their pain is misunderstood or ignored. In addition, people from ethnic minority populations are less likely to receive analgesia than people from cultural majority populations (Motov & Khan, 2009), suggesting that cultural differences between staff groups and patient groups influence how pain is interpreted or treated. Physical appearance is not only a factor for ethnicity, but also for physical attractiveness; medical professionals have been found to be affected by the physical attractiveness of their patient. Unattractive patients were rated as experiencing more pain and doctors scored higher for solicitude towards them than attractive patients (Hadjistavropoulos, Ross, & Von, 1990). Contextual factors concerning diagnosis and beliefs about pain relating to illness severity have been found to influence the amount of pain attributed to patients regardless of the amount of pain reported by the patient. Puntillo, Neighbor, O'Neil, and Nixon (2003) compared ratings of nurses and patients in an emergency department and found that underestimation was greatest for pain associated with musculo-skeletal injuries, abdominal problems and skin infections. Underestimation occurred for headaches, fractures and radiculopathies but not to the same extent. In paediatric populations, the severity of diagnosis and administration of analgesia has been linked to attribution of pain in children by paediatric nurses rather than children's reports of pain (Hamers et al., 1996). Furthermore, Manne, Jacobsen, and Redd (1992) found that children's ratings of pain were disregarded in favour of nurse beliefs about the amount of pain that the child should be experiencing from venipuncture. Children who had experienced many procedures were rated as experiencing less pain by nurses.

The modification of pain signals

Not all pain display is involuntary and the expression of pain is dependent upon social context. Operant conditioning theories of pain (e.g. Fordyce, Fowler, Lehmann, & DeLateur, 1968) have been useful for drawing attention to the social context of pain and introducing the idea that pain displays can be manipulated as a function of the social environment. These theories however, are not comprehensive enough to adequately describe the complex process of pain expression and interpretation (Williams, 2002) and simply ignore the involuntary nature of most pain displays. Although studies exist that demonstrate the way in which pain behaviour

can be manipulated (e.g. Werner & Malterud, 2003), they do not offer evidence for the aetiology or function of pain behaviours (Williams, 2002). Furthermore, theories of operant pain behaviours have been used inappropriately in clinical settings, allowing the attribution of *all* pain behaviour to be a function of secondary gain by clinical staff (Craig, 2009).

Williams (2002) proposes an evolutionary alternative to the assumption that pain behaviours are *created* for gain. Williams suggests that although facial pain behaviours are created for communicative purposes, the manipulation of facial pain display is more likely to be suppression than exaggeration. Indeed, behaviour previously thought to be an amplification of pain expression is actually a reduction in the suppression of pain behaviour. Importantly, therein lies a discrete difference; patients are not fabricating their pain but allowing themselves to fully express the amount of pain that they are experiencing in front of their caregiver. Empirical evidence exists for this notion in studies looking at parental presence in medical procedures in children where children have been found to express more pain behaviours when with their parents are present. Crombez & Eccleston (2002) develop this argument even further by commenting that pain could not be operantly conditioned in clinical settings; as caregiver pain-reducing behaviour is often not very effective or takes a long time to come into effect, the temporal factors involved would make it unlikely that pain display behaviours are operantly conditioned in a purely behavioural sense.

Pain behaviours have been found to be minimised for a number of different reasons. Patients have been found to suppress pain displays as a response to cultural norms of stoicism and beliefs about the acceptability of displaying pain (Speirs, 2006). There have been reports that women in particular fear that they will be seen as 'histrionic' and so modulate pain displays accordingly so that they look credible (Werner & Malterud, 2003). Some patients have been found to suppress their own pain behaviours as a function of denial, as expressing accurate pain will confirm their belief that their medical condition is worsening (Cleeland, Gonin, & Hatfield, 1994). Conversely, patients have been found to exaggerate pain displays in an attempt to convince doctors that they are experiencing pain for example, in patients who are seeking opioids or malingering (Poole & Craig, 1992). Children wanting attention have been found to amplify their facial expressions, although they are able to hide pain more convincingly than exaggerate pain (Larochette, Chambers, & Craig, 2006). It is important to note that the modified responses that patients display often occur unconsciously (Craig, 2009).

The attention that operant formulations of pain experience have drawn to the material and social benefits of being in pain has detracted from the negative experiences of being in pain and has been used all too often as a reason for why pain behaviours exist despite a lack of medical evidence. Sullivan (2002) writes “under the influence of a Cartesian theory of mind and medico-legal procedures around injuries and accidents, we have become obsessed with... faked and exaggerated pain behaviour”. Byrne, Morton, and Salmon (2001) in a qualitative study looking at the experiences of children in hospital, reported that children were actively discouraged from displaying their pain. On many occasions their pain was “construed... as unreal, unwarranted or not deserving of help” (pg. 69). When children displayed high levels of pain they were accused of being unmotivated, not cooperating, or exaggerating. Hadjistavropoulos and Craig (2002) interpreted similar findings as evidence that these reactions from staff may cause children to either amplify their pain behaviours further to get the treatment they need for their behaviour, or suppress their pain behaviour in order to disengage from the staff in the unit. However, Dell'Api et al. (2007) found that children felt under pressure to ‘perform’ acting ‘normal’ and not display pain behaviours.

Research suggesting that children’s pain ‘behaviours’ can be operantly conditioned by the parents (Novak & Peláez, 2002; Gonzalez et al., 1989) has been influential. There has been an unhelpful belief that parents ‘attending’ to their child’s pain, can increase the amount distress and functional disability. This belief has been widely held in clinical settings and was used as the basis for the treatment of pain for a number of years. However as Craig et al., (1996) discuss, the presence of a parental figure disinhibits the child’s pain expression which allows for minimisation of the pain experience. This is entirely appropriate behaviour when taking into consideration the role of attachment figures in protecting the child, and the child using the parental figure as a safe base.

Professional variables

Research looking into biases in pain assessment has focussed on the characteristics of the patient and has neglected the socio-cultural influences that nurses bring (Schiavenato & Craig, 2010). For example, it is not understood how the ethnic background of the nurse would affect their interpretation of pain cues. It has become apparent that the ethnic background of the patient can affect nurses’ ratings, but we are no clearer if being from a similar ethnic minority background may affect the rater.

Relatively little research has focussed on the context of pain judgements; the relationship of observer to patient and the relative costs and benefits of the judgement on the observer (Williams, 2002). Repeated exposure to pain cues has been cited as a reason why more experienced healthcare professionals have been found to underestimate pain (Prkachin, Mass, & Mercer, 2004; Prkachin et al., 2007). It is believed by some that more experienced clinicians develop an insensitivity to pain cues, habituating to pain expressions. However, this goes against research that has found that observing pain in others makes us more sensitive to pain (Loggia, Mogil, & Bushnell, 2007). Using signal detection techniques, Prkachin et al. (2004) found that clinicians with more exposure to pain cues were able to detect pain amongst groups just as well but were less willing to impute pain in others. It makes sense that nurses are able to detect pain after repeated exposure, but may not be willing (or able) to fully engage with the sensory, affective and cognitive experience of the patient (Craig, 2009). These findings however, do not mirror the pain judgements seen in family members of patients with chronic pain, who will similarly have been exposed to pain cues over a long period of time, who impute pain with increased accuracy (e.g. Prkachin, 2001).

Contextual factors such as medical evidence and nursing knowledge have been found to influence the judgement of pain by nurses. Nurses have been shown to be influenced greatly by medical evidence; interaction effects have been found with pain and the availability of medical evidence in studies providing vignette scenarios and high levels of pain were discounted when medical information was absent. Kappesser et al. (2006) found that when nurses watched videos of patients being treated for shoulder pain, their pain ratings were lower than patient ratings, however when medical information was provided, ratings of pain became more congruent with the patients rating. Similarly, Rusconi et al. (2010) found that the introduction of medical knowledge increased medical students pain and credibility ratings for patient-reports via video stimulus. It seems that medical evidence makes patient expression of pain more credible.

Gaps in nursing knowledge has been cited as a reason contributing to the poor management of children's pain, in particular knowledge about pain assessment (Twycross, 2010). However, studies have failed to find links between better knowledge of pain assessment and management and patient outcomes. Vincent and Denyes (2004) tested the knowledge of 67 paediatric nurses and found that nurses with better knowledge did not administer more analgesia than nurses with poorer knowledge. Similarly, Twycross (2007) shadowed nurses for five hour

slots over two - four shifts and found no relationship between the individual nurse's pain knowledge and children's reports of how well their pain was managed. It is clear that nurses do not apply their theoretical knowledge of pain assessment and management well enough in practice. However, it has also been noted that pain management is often not listed as a priority by nurses (Twycross, 1999; Hamers, Abu-Saad, Halfens, & Schumacher, 1994).

There is evidence that nurses choose not to medicate children over fears that over-medication will lead to issues of dependency, tolerance, side effects or abuse (Craig et al., 1996). Research has shown however, that withdrawal symptoms and addiction from the use of opiates is very rare (Spear, 1992), however it can occur in clinical populations where the child is critically ill and has been prescribed long-term use of opiates (Anald et al. 2010). It is likely that in some instances, there is an exaggerated belief about the risk of addiction and withdrawal from opiate analgesia and these practitioners are being overly cautious, avoiding the use of this type of analgesia. Education about the appropriate use of these medications should be a priority on nurses training programmes.

Observer empathy in the context of pain

Empathy is a multifarious construct, relying on a complex interaction of bottom-up and top-down processes (Goubert et al., 2005). As a result, researchers have struggled to develop one universal definition. Empathy is described in numerous ways across research papers, with researchers attending to different parts of the construct over others to suit their research needs. Within clinical psychology and health settings, the definition of empathy most commonly used is that from Rogers (1959); empathy is the ability of 'perceiving the internal frame of reference of another with accuracy and with the emotional components and meaning which pertain thereto as if one were the person, but without ever losing the 'as if' condition'. As previously discussed, pain is both a physiological and emotional experience and the facial expression of pain will contain these components. The ability of the nurse to imagine the pain experienced by the patient may depend on how well they are able to empathise with the other person. Empathy is influenced by immediate emotional reactions (bottom-up processes) stimulated by observing an event, which are filtered and modulated through cognitive processes (top-down processes). de Waal, (2007) explores empathy using a Russian doll analogy. His analogy involves the layering of cognitive capacities such as perspective taking and

targeted helping over the more primitive layers of sympathetic concern and emotional contagion at the centre. An increased self-other distinction is seen the more you move out of the doll and with increasing complexity of the interactions. The recognised components of empathy will now be explained.

Emotional Contagion

The needs and emotional state of a person is communicated through facial expression, behaviours and vocalisations. Emotional contagion is the ability to adopt another person's emotional state. It is an immediate arousal response to another's emotion which evolved as a short-cut to understanding a situation, enhancing chances of survival (Vignemont & Singer, 2006). As an evolved propensity, this process is present from birth, facilitating the communication of needs from infant to caregiver. Emotional contagion is then utilised in later life through empathy, which facilitates social communication and the development of shared goals (de Waal, 2007).

The Perception - Action Model (PAM) describes how emotional contagion is used to activate representations of one's own experience in the brain, through the person's own neural and bodily representations (Preston and de Waal, 2002). Jackson, Meltzoff, and Decety (2005) demonstrated the PAM in a study using functional-MRI (fMRI), whereby participants were asked to look at images of hands and feet in situations likely to cause a high amount of pain. Significant changes in bilateral activity were found in the brain regions known to be implicated in the processing of one's own pain; the anterior cingulate, the anterior insula and the cerebellum. Similar parts of the brain are activated in both the person displaying the emotion and observer (Levenson and Reuf 1992 as cited in de Waal, 2007). The more similar and socially close the individuals are, the easier the activation is as they are more accurately represented in the brain (Preston and de Waal, 2002). Furthermore, similar neural responses between self-generated and vicarious emotions have been demonstrated in fMRI studies (e.g. Carr et al 2003 as cited in de Waal 2008). This is an adaptive function as it provides information from the environment which is helpful for survival without having to actually experience this for yourself.

Responses to emotional contagion

Prior experience of a painful situation is not essential to be able to detect distress in another person, as demonstrated in an experiment with patients with congenital insensitivity to pain, who were able to detect pain when observed in others (Danziger, Prkachin, & Willer, 2006). However, previously experiencing similar levels of pain oneself may be helpful in producing a more accurate judgement of pain in the observed person. Emotional contagion can be unconsciously modulated by prior experiences, affecting the overall level of empathy experienced by the person (Goubert et al., 2005). For example, if one has experienced extreme pain, seeing another person responding to extreme pain may heighten the amount of emotional contagion felt, as the situation is more familiar (Jackson et al., 2005). The internal representations of the situations will be accessible, whereas if you have not experienced extreme pain, representations at the same level will not exist.

Singer et al. (2006) provided empirical evidence that empathy is not necessarily an automatic response but can be modulated by contextual factors. Subjects were asked to rate the pain of two confederates playing the prisoners dilemma game whilst undergoing fMRI. One confederate played fairly and the other unfairly. When the confederates were shown to be in pain, similar pain responses in the brain were found in subjects viewing the fair player, however when subjects viewed the unfair player, similar neural responses were not found. fMRI scans showed that viewing the unfair player in pain activated the reward centres in the brain. This study demonstrates that empathic responses to other people in pain can be modified dependent upon the type of relationship that the observer has towards the other person. If somebody is seen as a competitor or defector, empathy can be suppressed or can even turn into schadenfreude (de Waal, 2007).

The way in which a person responds to a distressing situation can vary according to personal factors. Responses can be oriented to the observer where they feel personally distressed at what they see, or they could be directed towards the patient, and sympathy is felt (Goubert et al., 2005). Both of these responses have different motivational behavioural responses. If the observer experiences personal distress, they may try to reduce this in ways that are not sympathetic or helpful behaviour. This response has been seen in ape behaviour where a pack of apes all jump on another in distress just to make the distress signal stop (de Waal, 1996 pg. 46). A human response might be to ignore or belittle the pain that the

individual is experiencing. Alternatively, if the individual is able to separate the sufferers pain from their own experience, they may generate a sympathetic response. The emotion is interpreted as separate from their own current experience and is evaluated as the other person being in need, this in turn might result in an attempt to reduce the pain felt by the person. This differs from personal distress in that sympathy is described as “an affective response that consists of feelings of sorrow or concern for a distressed or needy other (rather than sharing the emotion of the other” Eisenberg, 2000) p.677. How well the nurse is able to differentiate between the sense of knowing what another is experiencing and their own personal distress will determine how well they are able to treat their patient (Goubert et al., 2005). Becoming overwhelmed by distress caused by seeing another in pain, could lead to the modification and underestimation of pain in an attempt to cope (Batson, 1991).

Empathy in nursing research

It is a widely received notion that empathy is important in the work of a nurse and the accuracy of the pain assessment that they provide (Goubert et al., 2005). In his work, Rogers (1959) spoke repeatedly of the healing powers of empathy itself and the usefulness of empathy in relieving suffering. Supporting this claim is the finding that levels of nurse empathy have been found to be negatively correlated to patient distress (Olson, 1995) and patient anxiety (Wheeler, Marrett, & Lahey, 1996). Studies have reported mixed results for the levels of empathy in nurses where some have reported low levels of empathy in nurses (Daniels, Denny, & Andrews, 1988) and others have found more moderate levels (Watt-Watson, Garfinkel, Gallop, Stevens, & Streiner, 2000). Empathy is regarded by some not only as a trait, but as a skill that can be developed. This belief has evolved into the development of teaching programmes aimed at increasing empathy in nurses in both university settings (Daniels et al., 1988) and hospital settings (La Monica, 1987). La Monica (1976) found some success in developing empathic skills in nurses after administering a course designed to increase empathy towards patients.

Yu and Kirk (2008) reviewed the literature surrounding the measurement of empathy in nursing research. The inconsistent way in which empathy is defined was reflected in the tools used to measure empathy. Yu and Kirk (2008) found that the concepts measured were inconsistent between the numerous tools that they evaluated. Empathy as a concept is still debated and the multifaceted nature of it

means that researchers appear to focus on one part of it rather than another in favour of brevity.

Parent variables

Schiavenato & Craig's (2010) model of the communication of pain is a step further in developing our understanding of the impact of contextual factors on pain. This model is limited however in the context of the communication of paediatric pain assessment whereby a major factor of consideration is parental report, which often acts as a main source of communication between the professional and child in the assessment process. Parents typically communicate the degree of pain suffered on behalf of their children when they are present for medical procedures. It is often thought that as the parent 'knows their child' they will be able to offer some comparative data on the intensity of the child's pain. Often parental anxiety and fear affects the child's pain experience and display, influencing the overall pain communication and potentially the accuracy of the pain assessment. It has been consistently shown that how parents feel and act before and during procedures correlates to how children feel during procedures and that parental emotions can affect the amount of pain that the child reports (Manne et al., 1992; Dahlquist, Power, & Carlson, 1995). In an interesting study, Manne, (2001) demonstrated this relationship when she found that parental levels of pre-procedural anxiety correlated to the pain ratings they assigned to their children. Demore (2008) found positive correlations between parent psychopathology and the distress of the child during immunisation.

The parents' communication style can impact upon the amount of pain rated by children in self-report studies. In an investigation of parental empathic style and procedure related pain in paediatric cancer patients, Penner et al. (2008) found empathic styles to be positively and negatively associated with a child's pain/distress. Similar to Goubert et al.'s (2005) descriptions of personal distress or sympathetic responses to emotional contagion, parental personal distress was found to be positively associated with child pain and distress. Penner et al. (2008) used Batson's (1991) distinctions of empathic distress and empathic concern. Empathic distress; where the parent will focus on the distressing aspects of the procedure was found to be positively associated to child pain. Empathic concern; where parental empathy that is positive in it's presentation (i.e. sympathetic) and the parent focussed on soothing the child, was found to be negatively associated

with the level of pain distress felt by the child. Parental distress is thought to upset the child in turn and have a negative impact on procedure related pain. Empathic distress has been linked to trait anxiety and state measures of anxiety and distress. Building upon the results of this study, the interaction styles of parents and their children during medical procedures were investigated by Cline et al. (2006). Cline et al. in a qualitative study looked at patterns of parental communication at a paediatric oncology service in the United States of America (USA) and found four main types; 'Normalising' where the parent reframes the situation as 'normal' by engaging in everyday activities with the child such as reading; 'Invalidating', where the parent invalidates the situation by ignoring the child's distress or responding with frustration or anger; 'Supportive', where the parent engages in responses that are comforting and soothing to the child and is accepting of the child's experience and finally, 'Distancing', where the parent disengages with the situation either physically and/or emotionally. Cline et al. found that children who felt invalidated reported the highest levels of pain and distress. It seems probable that if a nurse believes that a child is malingering and subsequently does not show empathy towards the child, that this can be experienced as invalidating, causing the child more distress and affecting the way in which pain is displayed.

Goubert et al. (2009) found that higher levels of parental catastrophising (the extent to which one makes exaggerated appraisals of the pain and the consequence of the pain) led to higher pain attributions for their children. When a parent is assessing their own child's pain, engaging with catastrophising thoughts may lead them to infer more intense pain within the child. Of interest, was the finding that when parents did catastrophise about their child's pain, their ratings were more congruent with the child's than then the parent's who did not catastrophise. Goubert et al., (2009) proposed that a certain amount of catastrophising is adaptive in acute pain settings. However, in chronic pain settings where focusing attention on solutions to the pain may be futile, it may lead to unhelpful behaviours such as 'over-protective' behaviour, and it can lead to more parental distress (Eccleston, Crombez, Scotford, Clinch, & Connell, 2004; Goubert, Eccleston, Vervoort, Jordan, & Crombez, 2006).

Furthermore, it must be remembered that parental report is also subject to contextual factors, for example, their own attachment style. Bowlby (1988) argued that adults revert to their childhood attachment style a times of vulnerability; the clinician acting as the 'safe figure'. It may be warranted to investigate how parent's attachment styles or relationships towards health professionals affect the pain

assessment of their own child specifically. Cultural beliefs and attitudes about pain and parent's own experiences influence the child's experience. Studies have shown a positive relationship between the number of pain models available to children and the reporting of pain (Edwards, 1985). Similarly, recent studies have demonstrated a relationship between parental catastrophising responses to their child's pain and the child's adjustment and coping to pain (Goubert et al., 2006).

Schmidt (2002) writes about pain facial expression functioning as an alarm system, signalling to others that something is wrong. Thinking in evolutionary terms, the kin of the patient expressing pain may respond differently to this signal than would an unrelated health professional, because it is genetically advantageous to do so. In evolutionary terms, it is only within relatively recent years with the development of medicine, that people are in the situation where they are communicating pain to strangers and it is beneficial to do so. As such, because pain signals evolved to be noticed in kin groups, it is possible that the health professional may not be as vigilant to these cues, as would a family member of the person experiencing pain. Furthermore, evolutionary pressures for survival and the continuation of one's genetic lineage alone would dictate that it might be 'safer' to overestimate the child's pain (Williams, 2002). If one overestimates the child's pain, there may be more chance that the parent will provide assistance to the child when it is necessary, guaranteeing their safety, and forsaking the effort given when the child does not need your assistance. Potentially this could explain why parental-reports of children's pain is higher than nurses. Along the same vein, research has shown that children are more easily able to express their pain when a parent is present (Craig, Lilley, & Gilbert, 1996). This would fall in line with evolutionary thinking that it is adaptive for the parent to be aware that the child is in pain, so that they can protect the child and their genetic lineage. In the context of clinical settings, if this behavioural occurrence is not known by health professionals to be a normative response to parental presence, the child may be more at risk of accusations of malingering.

In chronic health settings, parental behaviour can have negative long term implications. Claar, Simons, and Logan (2008) found that parents of children who displayed high levels of emotional distress and gave 'too much' attention to pain behaviour, or were overly critical, tended to have children who 'experienced more functional impairment and somatisation'. Furthermore, it has been found that the amount of distress felt by the parent is linked to the overall outcomes of the child. A review by Palermo (2009) highlights the limited amount of research on the effects of

children's pain on parents, discussing the importance of the parent as an individual suffering the emotional strains of having a child in pain, but also as an important agent influencing the child. Parents have a strong influence on the child's pain experience, but similarly, the child's pain can have a significant affect on the parent's emotional well-being and mental health, relationships with others and financial well-being. Higher levels of anxiety, depression and somatoform disorders were found in the parents of children with chronic pain. Palermo and Chambers (2005) review the literature on parental and family factors influencing children suffering from chronic pain. They also comment on the limited amount of research looking into how family systemic factors can affect the child in pain. The model presented in their work presents a multi-layered integrative model of child chronic pain and associated disability.

Evolutionary Context of Paediatric Pain Assessment

Pain has the function of increasing the likelihood of survival. It signals to the sufferer that they have sustained an injury, and that they need to avoid this activity in the future and take time to recover from their injury. It also signals to the observer important information for their survival, i.e. to avoid the cause of that person's pain. Darwinian theory suggests that pain behaviours enhanced the likelihood of survival and are thus subject to pressures of natural selection (Darwin, 1872). With this are the abilities to enhance and suppress (manipulate) pain behaviours. Behavioural theories such as Fordyce et al.'s (1968) theory of pain behaviour (that pain behaviour can reinforced and has conditioned (certain pain behaviours) and unconditioned elements (e.g. some facial expressions to it) has come under criticism for asserting that pain behaviours seen in clinical settings are operantly controlled. This would lend support to the assumption that pain behaviours are voluntary and have been developed exclusively for secondary gain. Williams (2002) highlights that we share many behaviours with other animals (e.g limping, vocalisation of distress and avoiding activity) where there lacks the opportunity of secondary gain. Furthermore, this theory lends support to a strategy of ignoring patients in pain as a way of extinguishing pain behaviours, an unhelpful and unethical scenario in NHS settings.

The pain relationship and social contracts

The practitioner involved in assessing an individual's pain has a difficult task. They must decide whether to provide benefits (i.e. analgesics, inpatient care) in relation to, and dependent upon the costs that the patient has paid (suffering pain). As a species we spent 99 % of our history as Pleistocene hunter-gatherers and without cooperation within our species, survival would have been extremely difficult or impossible (Gigerenzer & Hug, 1992a). It is essential that if we are to function in social groups, we are able to make predictions on how people will act in certain situations. The problem of social exchange, whereby the cooperation between two individuals could lead to mutual benefit, has been resourced by the development of cognitive processes designed with the purpose of processing this type of information and making predictions of others behaviour, including the ability to predict cheating. Tooby and Cosmides (1989) used Marr's (1982) computational theory to develop their theory of social exchange.

Social contracts are intrinsic agreements that cover a set of rules between two individuals. One person must fulfil one condition in order to gain what the other person is offering. The adaptive specialisation hypothesis posits that the human brain contains a set of social contract algorithms; rules that come into force when in a situation where there lies a cost/benefit exchange. The empirical evidence for these Darwinian algorithms came from Cosmides and Tooby's (1989) analysis of Wason's selection task. The Wason selection task is an experiment of logic, whereby the subjects have to test whether a rule has been violated or not. The subject is presented with four cards which would share information as to whether certain parts of the problem had been fulfilled (P, not P, Q, not Q). To check whether a rule has been violated, the subject should choose the two cards 'P' and 'not Q'. However, the subjects were exceptionally poor at selecting the correct cards, unless the problem was phrased as a social contract, then subjects chose the correct set of cards to detect rule violation. The rules must have cost-benefit structures to be deemed a social contract, there must be some mutual benefit available. For this type of reciprocation to be selected for, we must have evolved the ability to detect 'cheaters'; people who try to accept the benefit without paying the cost. More recent studies have demonstrated that there must be the potential for cheating to take place in order for the situation to be deemed a social contract situation. When replicating the Wason selection tasks, Gigerenzer and Hug (1992b) found that improved performance on the tasks seen between the social exchange scenarios demonstrated by Cosmides and Tooby were only found when the context of the

problems included the potential for the participant to be taken advantage of. In both studies, participants were easily alerted to the cheater detection processing of problems. It makes sense that these algorithms are still present and used in contemporary contexts. Furthermore, social exchange situations scarcely occur simultaneously; in many scenarios exchanges that occur are non-simultaneous, e.g. I will protect you in a fight now if you protect me when I am in a fight later. Therefore, indiscriminate cooperation cannot exist in an environment where there is opportunity for cheating; this will have been selected out. This has been demonstrated empirically, (Trivers 1971; Axelrod and Hamilton 1981; Axelrod, 1984). Humans have the ability to cooperate for benefit; this capacity could not have been selected for unless it included algorithms for detecting and being provoked by cheating. The cheater detection mechanism is the key component in that it includes in the theory, information on the nature of the relationship (competitive, defector) rather than just a long term costs analysis.

Social contract theory and cheater-detection has not been without criticism. de Waal (2007) writes an interesting account of how empathy has driven the evolution of altruistic behaviour, many of his suggestions refuting the long-term costs/benefits analysis involved for social contract situations. de Waal argues that many animals demonstrate altruistic behaviours, yet it must be out of the realms of the animals cognitive capacity to expect the reciprocation of events in the long term. de Waal suggests alternatively that altruism exists for what it was originally intended; animals help others with no expectation of reward, reasons for which include the reduction of their own distress. Although interesting, this suggestion does not refute social contract theory. Social contract theory is built upon ideas of the nature of human relationships, rather than merely the calculation of costs and benefits. Furthermore, humans do have the capacity for long-term costs - benefits analysis.

Social contracts in an NHS setting

It is the hypothesis of this research that when assessing for pain, health professionals find themselves in a social-contracting scenario. Clinicians are in possession of certain benefits (analgesia and care) with which they have the capacity to give when an individual has paid with some cost (being ill or in pain). This may be an unusual situation for one to be faced with. The premise of social exchange is a relationship contingent upon mutual benefit, however as an NHS worker, one cannot expect that gestures of altruism will be reciprocated. It is highly

unlikely that any worker will see their patient again and will receive benefits directly from them. How does this repeated event affect the healthcare professional assessments? Furthermore, how does the repeated presentation of pain assessment cues have an impact on the attunement to potential cheaters? The present cultural situation lies incongruent with our intrinsic rules for social contract relationships and this thesis sets out to explore how this impacts on the assessment of children's pain. Student nurses take part in clinical activity as part of their training and as such, will be experienced in these types of social contract scenario where they are expected to give certain benefits to patients. Consequently, in this study generalisations are made about nursing behaviour from a sample of student nurses.

Schiavento and Craig's (2010) theory of AoM make interesting observations of the contextual interpretation of pain by healthcare professionals. They comment that there is an assumption that the healthcare professional wants to care for the patient, and similarly a presumption of honesty on the part of the patient. When it looks as if this assumption has been violated, this may impact directly on the exchange that takes place between the professional and patient and furthermore any future exchanges. Furthermore, the appearance of a violation of this kind may impact on the relationship between the healthcare professional and the patient; 'When patients appear to violate expectations of sincerity and truthfulness, anger often ensues' Hadjistavropoulos & Craig, (2002). An emotional response to the perceived violation of the agreement is reflective of the value attributed to these exchanges by people and the importance of perceived fairness.

Kappesser et al. (2006) were the first to describe social contract theory in an NHS setting. They discuss estimating another person's pain as a social contract situation; 'if I give you analgesia, then you must be deserving of analgesia'. This person must decide whether the individual is fulfilling their part of the social exchange i.e. deserving of the help they can offer. The benefit triggering the cheater detection mechanism whereby one will 'watch out' and look for cues that could suggest that one is attempting to cheat the social exchange situation. Kappesser and Williams, (2008) looked at the cheating detection mechanism in the relatives of chronic pain patients on the basis that over time these relatives would provide long-term care for these patients which is obviously very costly to them. They focused on behavioural cues of pain underestimation. Offering vignettes to relatives, they varied on whether the person continued or discontinued with either pleasurable or non-pleasurable activities. They then asked people to rate pain estimates of the individuals concerned and fairness of behaviours. Fairness was predicted most

strongly by interactions between liked and disliked tasks. The behaviour of someone stopping disliked tasks but continuing liked tasks alerts the cheater detection mechanisms. They are seen as enjoying a benefit without having paid a cost - being in so much pain that they have to stop liked tasks. These people were also given the lowest pain estimates. Clearly, more work is needed to build upon social contract theory in pain assessment scenarios. Furthermore, social contract theory has yet to be investigated in an inpatient setting or directly with healthcare professionals.

When does the cheater detection mechanism develop? Barrett, Keller, Takezawa, and Wichary (2007) found that children can detect cheaters at a young age. However, DePrince (2005) discussed how it may be beneficial for some children to be unaware of social contracts because their behaviour may lead to the withdrawal of essential care giving benefits. This was discussed within the context of child abuse, whereby a typical reaction to a violation of a social contract may encourage increased aggression, and points to dissociation as a mechanism for this. They found that university students who had significant levels of trauma performed more poorly on social contracts, making more errors than those who were not traumatised, especially those with higher levels of dissociation. Silverstein et al. (2002) discuss the life course of parent-child relationships in terms of the financial and social assistance exchanged within the lifetime. They found that parents who had spent more time with their children received more support socially and financially as they aged, lending support to the notion that social contracts may be maintained throughout the course of a relationship between a parent and child.

Heightened cheater detection mechanisms

There is some evidence from health settings to suggest that cheater detection mechanisms can become heightened. Poole and Craig (1992) showed that priming participants of potential cheating when asked to rate pain from video clips of patients in pain, reduced overall empathy and pain ratings given to the patients. Furthermore, they found that priming reduced the ratings of pain even in those patients instructed to suppress pain. They had hypothesised the possibility that priming would encourage somebody to be more accurate in general, reducing scores of fake pain and increasing scores for pain that was suppressed, however this was not the case. Further to this, Chibnall et al. (1997) found that when medical evidence for pain was present, the medical undergraduates tended to rate pain as higher than when the vignette was presented without medical evidence. They would

also rate the amount of emotional distress as higher for the patients who had medical evidence. Indirectly, this suggests that the students may have believed that the patients may have been faking their symptoms when they did not have any medical evidence.

Kappesser et al. (2006) carried out an experiment using 120 doctors and nurses from accident and emergency departments and oncology departments in a busy city hospital. They tested ratings of pain, over- and underestimation, hidden and faked pain over three conditions containing variations of pain cues. Conditions contained video clips of patients experiencing genuine pain, either on it's own or with patient-report included. In the final condition, participants were given additional information which suggested that *some* of the participants were seeking opioid medication. It was found that groups who had been alerted to the possibility of cheating, underestimated pain on *all* eight vignettes at greater levels than control groups, despite being given the patient's own ratings of pain and corroborating video evidence of pained facial expressions.

The current climate within the NHS is that of austerity; the Government can no longer fund services as it has done previously and professionals are working with more limited resources. Hospital beds are being restricted and there is a movement to get people back into work. Lord Layard's report on the economic impact of depression on incapacity benefit led to millions of pounds of investment into the NHS (Layard et al., 2006). With a cultural shift towards being able to offer less, it follows that those protecting these resources will become cautious, perhaps utilising cheater detection mechanisms to facilitate this. Suspicions may be raised even with children. This thesis proposes that pain assessment is a social exchange scenario and that the patient and healthcare professional enter into a social contract. Cheater detection is used to protect the precious resources that the NHS has to offer patients, but as a consequence of this, type I errors are made, and genuine pain is mistaken for malingering, leaving patients untreated and unnecessarily suffering with pain.

Research hypotheses

Four hypotheses were generated to explore the use of social contracting and cheater detection by paediatric student nurses when assessing children's pain. Firstly, it was hypothesised that student nurses would score pain and intentions to reduce pain lower than if they were in a non-social contract scenario (i.e. a visitor to

a ward). Secondly, it was hypothesised that when participants rated as a nurse, they would rate pain and intentions to reduce pain lower when they suspected cheating (via containing conflicting pain cues) than visitors. Thirdly, it was hypothesised that nurses would rate more exaggeration than visitors in situations containing conflicting pain cues. It was predicted that heightened scores of exaggeration would be associated with less willingness to reduce pain. Finally, it was hypothesised that there would be a relationship between judgements of fairness (reasonableness of behaviour) and intentions to reduce pain in nurses.

METHODOLOGY

Design

This study used a repeated-measures design to explore how social role affected the participant's judgements of child pain displays. Eight scenarios were presented in a booklet, consisting of a photographic image of facial pain display and a short vignette containing pain behaviour cues (appendix 1). The scenarios varied on three conditions resulting in a 2x2x2 design; high/low facial display of pain, high/low behavioural cues which were deemed to be either congruent with facial display or incongruent and finally, the social role perspective of the participant (see Table 1, pg. 45). The booklet consisted of two halves; one presented a scenario where the participant was asked to imagine that they were a nurse working on a ward and the other where the participant was asked to imagine that they were a non-health professional, visiting the ward to deliver some toys. The scenarios containing nurses present a social exchange situation whereas the scenarios containing visitors do not. Of the four scenarios in each half, two contained high pain facial displays and two low pain facial displays. Every pair was coupled with a vignette that had consistent behavioural cues for the display and the other had inconsistent cues for the display, e.g., high pain display with low behavioural cues in the vignette. The presentation of the social role conditions were counterbalanced by reversing the presentation in a second version of the booklet. Version A of the booklet presented the nurse condition first followed by the visitor condition. Version B was the reverse of this.

Participants were asked to make five ratings using a 10cm visual analogue scale (VAS). These were; perceived levels of pain, pain display modulation via the exaggeration or minimisation of facial display, intention to help reduce pain and perceived reasonableness of pain display.

Pain assessment knowledge and levels of personal empathy were measured to account for any individual differences within the sample. These were intended to account for participant knowledge and level of empathy as potential confounding variables.

Table 1: Experimental conditions

Vignette	Social Role	Facial Pain display	Consistent scenario
1	Nurse	High	Yes
2	Nurse	Low	No
3	Nurse	High	No
4	Nurse	Low	Yes
5	Visitor	High	Yes
6	Visitor	Low	No
7	Visitor	High	No
8	Visitor	Low	Yes

Participants

Overall, 85 participants were recruited from the BSc paediatric nursing degree course at the School of Health Care, University of Leeds. The decision to recruit student nurses was based on the need to recruit a large sample of participants. Furthermore at the time, the local paediatric services were undergoing major changes which involved staff and clinical services being centralised in one hospital. It was feared that these factors might complicate the recruitment process. Many nursing students gain clinical experience before commencing their studies and have clinical placements on wards as part of their training. Therefore, it was anticipated that they would have gained enough clinical experience and be sufficiently immersed in nursing culture to be able to participate in this study. Effect sizes for pain scores reported by Kappesser and Williams (2008), were to calculate the power analysis. Kappesser and Williams used social contract theory in a vignette study with relatives of patients with chronic pain to explore scores of pain and perceived fairness. They found a significant main effect of 0.36 for ratings of pain intensity. Using G*Power3 (Faul, Erdfelder, Lang, & Buchner, 2007) for the analysis and calculating for a two-tailed design with an effects size of 0.36 and power of 0.8, it was calculated that a minimum of 63 participants would be needed.

Materials

Vignette Development

Eight vignettes were developed, each consisting of an 6x10 cm image of facial pain display and a written scenario containing contextual information and behavioural pain cues (appendix 2).

Facial Pain Display

The images used were obtained from Dr Vervoort of The University of Ghent, Belgium through an earlier study (Vervoort et al., 2009). Children were asked to participate in a cold pressor task where they were instructed to submerge their left hand in a cooler containing cold water (10°C) for three minutes. The pain experienced in this task is considered to be analogous to other types of acute pain commonly experienced (Chen, 1989). They were coded using the Child Facial Coding System (CFCS) which is a technique that involves the marking and coding of 13 discrete facial movements which are associated with pain displays. This allows for the quantification of facial pain display and allows the investigator to select images that represent high and low pain displays. CFCS has been shown to have good reliability and validity (Gilbert et al., 1999).

Three minute long video images were coded by Dr Vervoort using software that allowed for the coding of a frame per second. Images were coded for intensity (i.e. how intense was the particular facial movement on a scale of 0-2) and frequency (i.e. which of the 13 discrete facial movements is present in this image). Higher combined scores were representative of a greater number of facial movements and higher intensity scores. Inter-rater reliability was demonstrated using a second rater who randomly coded 20% of the material (frequency rated at 77, range .64-.94; intensity was rated at .70, range .57-.94 see Ekman and Friesen (1978) for details of calculating inter-rater reliability for the Facial Action Coding System; FAC). Ten videos (five girls and five boys; age range 9-16) were selected for the purpose of this study on the basis that they displayed varying levels of pain expression throughout the videos. This allowed four image stills of varying intensity to be extracted from the videos showing neutral expression (Facial Expression (FE) 0), low pain expression (FE range 2-4), moderate pain expression (FE range 5-7) and high pain expression (FE range 8-12). For the purposes of this thesis, low pain and high pain images were selected (see appendix 3). Data from another study

using these images with a sample of 66 independent judges (33 male, 33 female) was used to ensure that the low and high pain images could be reliably distinguished from each other (Vervoort, in press). The judges were asked to rate pain intensity on a scale of 0-10. A paired samples t-test revealed that the high pain faces ($M=64.75$ $SD= 18.74$) were rated significantly higher than low pain faces ($M=32.73$ $SD = 17.01$) ($t(64) = -21.75$, $p<.0001$).

Eight images were needed altogether consisting of four images of high pain and four images of low pain. Males and females were equally represented in both high and low pain groups. Pilot study 1 was conducted to assist further with the selection of images. An opportunistic sample of 18 respondents was drawn from the staff and student group of the Doctorate in Clinical Psychology, University of Leeds. Participants were invited to participate via email and were sent a spreadsheet containing the images. For each image, participants were asked to rate pain intensity (0 no pain -10 maximum pain), exaggeration of pain display and minimisation of pain display. Patient age, gender, physical attractiveness have all been shown to contribute to biases in the assessment of pain. Participants were asked to rate these variables to explore any significant differences for these variables between the images. Mean scores and standard deviations were calculated for all images (see appendix 4 for scores). Pearson's correlations were used to explore associations between the pain ratings and the other variables. No associations were found between pain ratings and attractiveness ($r = -0.117$, N.S) or pain ratings and age ($r=0.325$, N.S). No relationship was found between pain and minimisation scores. A significant relationship was found between pain scores and exaggeration scores ($r=. 687$, $p<0.001$). Images were selected on the basis of the FE scores derived from (Vervoort et al., 2009) and from the mean pain rating and exaggeration scores derived from the pilot study. Where possible, the images with the lowest exaggeration scores were selected. The author attempted to select images of comparable intensity scores for each high/low condition. FACs for the images used in the booklet can be found in appendix 3.

Scenario development

Eight written scenarios were developed to accompany the pictorial stimuli, containing behavioural pain cues of varying degrees and contextual information pertaining to the role of the observer. Four of these scenarios were written from the position of a nurse who was responsible for ongoing pain assessment on a paediatric surgical ward. The other four scenarios were written from the perspective

of an employee of a toy company who was visiting the ward to drop off toys and had noticed the child. In each scenario, the child is asked to stop their current activity and move from their current position for the purposes of a clinical procedure. Behavioural cues for pain are included in the scenario description before the child is asked to move. The participant is presented with the reaction of the child to the request through the image of the child, which is situated under the description.

The pain behaviours were derived from the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS; Chapman, 1985) in Young Children, which is a pain assessment tool that uses observed behaviours to determine the level of pain experienced. Behaviours were drawn from different parameters, e.g. cry, torso and leg movements, and touch. Equal amounts of behavioural cues were drawn from each parameter for each description. The pain behaviours were weighted on a four point scale from 0-3. Where the descriptions needed to indicate high pain, behaviours scoring a 3 were used. Where descriptions were indicative of low/no pain, behaviours scoring a 0 or 1 were used. Equivalent pain descriptions (either high or low) had the same number of points.

To ensure face validity, the vignettes were read by an expert panel of judges who had worked with children in clinical settings. The child's ability to express pain unfolds as the child develops and as such, older children are well versed in pain display rules unlike smaller children who will display more vigorous actions, (Craig et al., 1996). Consequently, attempts were made to ensure that the descriptions were developmentally sensitive and that the pain behaviours were sensitive to the medical diagnosis and tissue damage. As the CHEOPS was developed as a post-surgical assessment tool, it was felt appropriate for use in this way.

Visual Analogue Scales

A visual analogue scale (VAS) was used to capture the responses for the vignettes. A 10 cm horizontal line anchored by the maximal and minimal extremes of the dimension was used for this purpose. VAS are widely used in psychological and health research and are known to be of reasonable validity and reliability when used to capture subjective constructs such as pain (McCormack, 1988). It is proffered that the visually presented 10cm continuum provides a method of scoring the 'exactness of experience' that can be difficult to capture verbally (Zealey, 1969, pg.996).

Empathy Measure

Participant levels of empathy were measured in an attempt to account for individual differences influencing pain assessment. A literature search was conducted for the time period of 1950 to July 2011 using 'PsycInfo', 'Medline' and 'Embase' using the search terms 'nurse', 'empathy' and 'rating' or 'tool' or 'scale' or 'measure' or 'questionnaire'. 122 results were returned from Psycinfo, 806 from Embase and 381 from Medline. Within these results, 12 measures of nursing empathy were found along with various papers documenting their use in research. Of interest was a recent systematic review (Yu & Kirk, 2008) and a related paper evaluating nursing empathy tools (Yu & Kirk, 2009). See Table 2 for an overview of the assessment tools. After reviewing the literature, no suitable measures of empathy were found owing to the length of many of the measures reviewed and the time constraints when administering the stimulus materials. Qualitative measures of empathy involving interview and observation of clinicians in hospital contexts were unsuitable due to the study design. Moreover, empathy is a multifaceted construct which relies on various bottom-up and top-down processes. No measure was found that investigated all of the facets of the construct that is discussed in contemporary literature (e.g. Goubert et al., 2005). This was corroborated by the systematic review conducted by Yu & Kirk (2009).

Table 2: Measures of health professional empathy

Measure	Domain	Details	Comments
Barrett-Lennard Relationship Inventory (Barrett-Lennard 1962)	Behavioural	16 item inventory based on a 6 point scale, looking at client-therapist relationships. Client and therapist rated	Not a measure of individual levels of empathy
Carkhuff Empathy Understanding in interpersonal processes scale (Carkhuff 1969)	Behavioural and cognitive	80 item tool containing two indices. Developed for use in a particular situation and rated by a trained rater	Not a measure of individual levels of empathy

Measure	Domain	Details	Comments
Emotional Empathy Tendency Scale (Mehrabian & Epstein 1972)	Emotional contagion	33 item self-report 8 point scale containing 7 sub-scales	Only measures one domain of individual empathy
Emotional Intelligence Scale (Shutte et al. 1998)	Emotional contagion	33 item, 5 point Likert scale	Only measures one domain of individual empathy
Empathy Construct Rating Scale (La Monica 1981)	Cognitive and Behavioural	84 item self-report scale yielding 5 cognitive and behavioural factors	Only available commercially
Hogan Empathy Scale (Hogan 1969)	Cognitive, emotional contagion and moral.	Self-report item containing 39 True/False statements	Developed in a non-clinical setting and too long
Jefferson Scale of Physician Empathy (Hojat et al. 2001)	Cognitive	Self report 5 point rating scale containing 20 items	Only measures one domain of individual empathy
Layton Empathy Test (Layton 1979)	Cognitive and Behavioural	Self report scale containing 24 2-choice items	Developed for use with nursing students but too long
Perception of Empathy Inventory (Wheeler 1990)	Behavioural	33 item patient report scale of their nurses empathy. Uses a 4 point Likert scale.	Not a measure of individual levels of empathy
Reynolds Empathy Scale (Reynolds 2000)	Behavioural	12 item, 7 point scale rated by trained independent raters	Only measures one domain of individual empathy

Measure	Domain	Details	Comments
Staff-Patient Interaction Response Scale (Gallop, Taerk, Lancee, Coates, & Fanning, 1992)	Emotional contagion and behavioural	Written responses to hypothetical scenarios are scored on a 4 point scale by a rater.	Response methods unsuitable and time consuming
Visual Analogue Scale (Wheeler et al. 1996)	Behavioural	Developed for use with clinical tutors in nurse training programmes. 3 item visual analogue scale.	Not a measure of individual levels of empathy

For the purposes of this study, a short measure of empathy was constructed. The questions used to measure empathy in this study were drawn and influenced by multiple sources in an attempt to capture the full multidimensional nature of empathy. Questions pertaining to emotional contagion and affective responses to observing emotional pain were drawn from Mehrabian & Epstein, (1972). Questions relating to the personal experiences of pain were devised by the author and thought to be important in light of the discussions surrounding the epistemological implications of PAM in affecting responses to observing pain (Keyesers, In press). A question relating to the amalgamation of bottom-up and top-down processes 'a sense of knowing the experience of another person' was drawn from (Wheeler, 1990). In response to the movement in nurse training to coach students in empathic skills and the inclusion of psychological teaching in nurse training, participants were also asked if they believed that they had received training in empathy (La Monica, 1976). Finally, using Goubert et al.'s,(2005) model of empathy and pain, behavioural responses to displays of distress were measured as a way of gauging both the affective and behavioural responses to exposure; response oriented to self leading to withdrawal or response to the other leading to acting to reduce pain. The questions used are listed in Table 3 (pg.52), along with details of the facet that the question attempts to measure and the sources from which the question was drawn. All items were measured along a five point Likert scale.

Table 3: Empathy questionnaire construction

Question	Component Measured	Source
1. The people around me have a great influence on my moods	Emotional Contagion	Adapted from question 10 (Mehrabian & Epstein, 1972)
2. I have personally suffered a significant amount of pain in the past	Personal experiences of pain	Author's own
3. I have had some professional training in empathy	Professional training in empathy skills	Author's own
4. I can understand what people are trying to say even if they cannot express it very clearly	The sense of knowing the experience of another person	Adapted from question 5 of (Wheeler, 1990)
5. I become more irritated than sympathetic when I see someone's tears	Distress verses sympathy when viewing someone in pain	Adapted from question 30 of (Mehrabian & Epstein, 1972)
6. When I see a person who is upset, I feel moved to help them.	Typical behavioural response to being affected by another person's negative emotion	Author's own

Paediatric nursing knowledge

Knowledge about the communication of pain and the assessment of this was measured to account for individual differences. A literature search was conducted between the time period of 1950 - July 2011, to investigate measures available to test the current knowledge of paediatric nurses. Only one measure of nurses' knowledge relating to paediatric pain was found; the Pediatric Nurses' Knowledge and Attitudes Survey (PNKAS). The PNKAS is a modification of McCaffery and Ferrell's (1997) Nurses' Knowledge and Attitudes Survey Regarding Pain (NKAS; Manworren, 2001) to make this more relevant to a paediatric population. The PNKAS aims to assess the participant's knowledge and attitudes

Continued...

towards pain assessment and management in addition to the use of analgesics. The PNKAS is a 42 item instrument with scores ranging from 0-42, where a high score reflects greater content mastery. The PNKAS was developed on the basis of paediatric pain management guidelines from the American Psychological Association, the World Health Organisation and the Agency for Healthcare Research and Quality. Content validity was established by an expert panel who rated item relevance. Item ratings were high with modifications made on the basis of the feedback given. Test-retest reliability was determined using 12 childcare professionals (6 of whom were nurses) over an eight week period. The PNKAS scored an acceptable level of stability ($r=0.67$). Internal consistency was tested and found to be adequate on two occasions using data obtained from a sample of 247 paediatric nurses (cronbach alpha 0.72) and 88 members of the American Pediatric Surgical Nurses Association (0.77).

The PNKAS was shortened for the purposes of this study as the full length version of the PNKAS was thought to be too lengthy. Items were removed that focussed on the treatment of pain by behavioural or pharmacological methods. 13 questions were selected from the PNKAS and one question was added by the researcher. See Table 4 for details.

Table 4: PNKAS questions used in the booklet

PNKAS Question	
1	Observable changes in vital signs must be relied upon to verify a child's/adolescent's statement that he has severe pain.
2	Because of an underdeveloped neurological system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences.
3	If the infant/child/adolescent can be distracted from his pain this usually means that he is not experiencing a high level of pain.
4	Infants/children/adolescents may sleep in spite of severe pain.

Continued...

 PNKAS Question

- 5 Comparable stimuli in different people produce the same intensity of pain.
- 6 Children who will require repeated painful procedures (e.g., daily blood draws), should receive maximum treatment for the pain and anxiety of the first procedure to minimize the development of anticipatory anxiety before subsequent procedures
- 7 Parents should not be present during painful procedures.
- 8 The child/adolescent with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure.
- 9 Children, less than 8 years, cannot reliably report pain intensity and, therefore, the nurse should rely on the parents' assessment of the child's pain intensity.
- 10 Based on one's religious beliefs a child/adolescent may think that pain and suffering is necessary.
- 11 The most likely explanation for why a child/adolescent with pain would request increased doses of pain medication is
 a - the child/adolescent is experiencing increased pain
 b - the child/adolescent is experiencing increased anxiety or depression
 c - the child/adolescent is requesting more staff attention
 d - the child/adolescent's requests are related to addiction
- 12 The most accurate judge of the intensity of the child's/adolescent's pain is
 a - the treating physician
 b - their nurse
 c - the child/adolescent
 d - the pharmacist
 e - the child/adolescent's parent

PNKAS Question	
13	<p>Which of the following describes the best approach for cultural considerations in caring for child/adolescent in pain</p> <p>a - because of the diverse and mixed cultures in the UK, there are no longer cultural influences on the pain experience</p> <p>b- nurses should use knowledge that has defined clearly the influence the influence of pain on culture (e.g. Asians are generally stoic, Hispanics are expressive and exaggerate their pain, etc).</p> <p>c - children/adolescent's should be individually assessed to determine cultural influences on pain.</p>

Procedure

The participants were approached in the nursing study teaching rooms either before or after teaching sessions in four pre-arranged sessions. The procedure and details of the study were explained and subjects were told that the researcher was interested in the interpretation of pain. The importance of taking the time to answer questions from both the visitor and professional role was stressed. Participants were told that they would be asked to rate eight vignettes which contained a description of a scenario followed by a visual image of a child who may be experiencing pain. They were told that they would be looking at the vignettes from two perspectives, either as a nurse working on a ward, or a visitor who worked for a toy company. It was made clear that participants were to try and immerse themselves into the role as best as they could and score the VAS as if they were coming from the nurse or visitor perspective. Furthermore, the participants were advised to answer the 'intention to treat pain' scale from the perspective of how much they wanted to reduce pain, rather than their perceived ability to do so. The participants were given an information sheet to read (appendix 5) and time was taken for questions about the study to be answered. If participants agreed they were asked to sign the consent form (appendix 6) and were given a booklet. Versions A and B of the booklets sorted randomly before the study took place and were given out to the participants when they were sat after the discussion. The participants completed the booklet in silence. The booklet took approximately 15 minutes to complete. The author was available to answer any questions. The

participants were asked to submit this to the researcher before leaving the room. A £5.00 voucher was awarded by the researcher when the booklet was handed in.

Ethical considerations

Ethical approval was sought from the Leeds Institute of Health Sciences Ethical Committee and was granted on 24th of February 2011 (see appendix 7).

RESULTS

Description of sample

The sample consisted of 85 nursing students (84 = female, 1=male). 100% of the students approached took part in this study. The mean age of the sample was 21.12 years, S.D.= 3.71: 35 participants were in their first year of training, 27 were in their second year and 23 were in their third year. There were no significant differences between the demographic variables of the three year groups (a one way analysis of variance (ANOVA) found no significant differences between age; months experience working with children/acute pain; experience living with somebody with chronic pain), therefore the data from all three year groups were analysed as one data set. Of the sample, 66 had experience of working with acute pain in a clinical setting (\bar{x} = 15.7 months; SD = 13.05). 22 participants had lived with somebody who had experienced chronic pain. All participants had worked with children in clinical settings but the time varied between participants (\bar{x} = 37.8 months; SD= 37.5; range = 2 - 238 months). Two outliers contributed to the large range. Overall, eight participants were parents or guardians of children.

How do different social role perspectives affect the judgement of pain cues from children?

A repeated measures ANOVA was conducted to test for differences in the VAS ratings for pain and reasonableness from nurse and visitor perspectives, when visual and behavioural pain cues were manipulated.

Visual information

Significant differences for ratings of pain were found between ratings of pain for high and low visual pain cues ($F(1,83) = 312.84, p < 0.0001, \eta^2 0.79$), where more pain was attributed when high visual pain cues were presented (\bar{x} = 68.47; SE = 1.05) than low visual pain cues (\bar{x} = 39.02; SE = 1.39). A significant interaction was found for visual information and social role, suggesting that role can affect the way in which visual information is interpreted ($F(1,83) = 11.25; p < 0.001; \eta^2 0.12$). Specifically, high visual pain was rated higher in the nursing role condition (\bar{x} = 71.11; SE = 1.3) than in the visitor condition (\bar{x} = 65.83; SE = 1.4). Low pain visual

cues were rated lower in the nursing condition ($\bar{x} = 37.14$; SE = 1.6) than the visitor condition ($\bar{x} = 40.86$; SE = 1.7). See Panel 1 of Figure 2 (pg.63).

Incongruent pain cues

Highly significant differences for pain scores were found when visual and behavioural pain information was either congruent or incongruent ($F(1,83) = 24.64$ $p < 0.0001$, partial $\eta^2 0.23$). Vignettes containing incongruent pain cues were rated higher for pain ($\bar{x} = 50.17$; SE = 0.96) than vignettes containing congruent information ($\bar{x} = 57.32$; SE = 1.33). See Figure 2, Panel 2 (pg.63).

Significant interaction effects were found between the intensity of visual pain cues and congruency of behavioural cues ($F(1, 83) = 192.76$ $p < 0.0001$; partial $\eta^2 0.70$). Specifically, when behavioural information was incongruent with the visual image, ratings of pain were more similar; high visual pain image with low pain behavioural cues ($\bar{x} = 60.84$; SE = 1.90), low visual pain image with high behavioural pain cues ($\bar{x} = 53.81$; SE = 1.96). Conversely, when behavioural information was congruent with the visual image, ratings of pain were more dissimilar for high and low visual pain images; high visual pain image and high pain behavioural cues ($\bar{x} = 76.11$; SE = 1.02) low visual pain cues and low pain behavioural cues ($\bar{x} = 24.24$; SE = 1.53). This indicates that behavioural cues affected how images of pain expressions were rated. See Figure 2, panel 3 (pg.63).

A significant interaction effect between the congruency of pain cues and the social role perspective of the participant (i.e. rating as a nurse or a visitor) was found when rating pain ($F(1,83) = 29.20$ $p < 0.0001$, partial $\eta^2 0.26$). This indicates that social role perspective affects how pain is judged in the presence of congruent or incongruent pain cues. Specifically, ratings from a visitor perspective were more similar for the congruent and incongruent vignettes than they were from the nurse perspective; visitor congruent rating ($\bar{x} = 53.02$; SE = 1.31), visitor incongruent rating ($\bar{x} = 53.67$; SE = 1.60); nurse congruent rating ($\bar{x} = 47.32$; SE = 1.15), nurse incongruent rating ($\bar{x} = 60.97$; SE = 1.60). Nurses rated pain higher when faced with conflicting visual and behavioural cues; see Figure 2, Panel 3 (p.63).

Judgements of reasonableness were affected by the congruency of pain cues ($F(1, 83) = 20.77$ $p < 0.0001$, partial $\eta^2 .20$). Overall, congruent pain cues were rated as more reasonable ($\bar{x} = 70.61$; SE = 1.36) than incongruent pain cues ($\bar{x} = 62.65$; SE = 1.51). For reasonableness, a significant interaction between

congruency and social role perspective was found ($F(1,83) = 5.78, p < 0.01$, partial $\eta^2 = 0.06$). This suggests that the judgement of the reasonableness of pain based on congruent or incongruent pain cues is affected by the social role perspective of the rater. Congruent pain cues were judged as being more reasonable by nurses ($\bar{x} = 73.04$; $SE = 1.56$) than visitors ($\bar{x} = 68.18$; $SE = 1.79$). Incongruent pain cues were judged as being slightly more reasonable by visitors ($\bar{x} = 63.26$; $SE = 1.74$) than nurses ($\bar{x} = 62.03$; $SE = 1.74$). Nurses judged congruent pain cues to be more reasonable and incongruent pain cues to be less reasonable; see Figure 6-9, (p.71 & 73) This is an interesting result when taking into consideration the opposite effect found when nurses rated for pain.

Judgements of exaggeration and minimisation

Wilcoxon Signed Ranks tests were conducted to look for differences between nurse and visitor median scores of exaggeration and minimisation for each condition. For exaggeration, significant differences were found for the low visual cue, congruent condition ($z = 5.02$; $p < 0.0001$), with nurses scoring higher for exaggeration more frequently than visitors. Conversely, visitors scored higher for minimisation more frequently on the same condition ($z = 2.00$; $p < 0.05$). These differences were found in the condition where there were the lowest cues for pain modulation. This suggests that nurses are maybe more sensitive to possible exaggeration of pain cues whereas visitors are maybe more sensitive to the minimisation of pain cues. There were no significant differences for any other conditions.

Spearman's correlations were conducted to look for associations between exaggeration and minimisation and dependent variables of pain and reasonableness. Exaggeration was negatively associated with ratings of pain for both incongruent scenarios in the nursing condition (high visual and low behavioural pain, $r_s = .49, p < 0.0001$; low visual and high behavioural pain, $r_s = -.214, p < 0.05$). This relationship was not found in the visitor condition, suggesting that when rating from the nurse perspective, conflicting pain cues will affect the judgement of exaggeration and pain.

When not faced with conflicting pain cues, nurses and visitors rate exaggeration and minimisation more similarly. Negative relationships were found for exaggeration and ratings on pain in the high visual congruent conditions for both the nursing ($r_s = -.49, p < 0.0001$) and visitor condition ($r_s = -.37, p < 0.001$). Conversely,

positive relationships between minimisation and pain were found for the congruent low visual pain scenarios for both the nurse condition ($r_s = .46$, $p < 0.001$) and the visitor condition ($r_s = .29$, $p < 0.01$). This suggests that both nurses and visitors judge exaggeration and ratings of pain similarly when faced with congruent pain conditions, where increased scores of exaggeration are associated with lower ratings of pain. Only when low visual cues are accompanied by low behavioural cues did a relationship found between minimisation and the increased intention to reduce pain (see Table 5, pg.61).

Exaggeration was negatively associated with ratings of reasonableness across all conditions (see Table 5, pg. 61), suggesting a strong relationship between judgements of reasonableness and exaggeration regardless of social role perspective, where scores of reasonableness decrease as scores of exaggeration increase. The findings were not as clear for minimisation, where it was thought to be more reasonable only in the incongruent conditions; positive associations between minimisation and reasonableness were found across all incongruent conditions. Minimisation was negatively correlated with reasonableness in the low visual and low behavioural pain nurse condition suggesting that low pain cues are associated with minimisation and unreasonableness.

Order effects

The presentation of visitor and nurse scenarios was reversed for half of the sample to test for order effects (version A, nurse then visitor; and version B, visitor then nurse). When adding booklet version into the repeated measures ANOVA as a between - subjects factor, some significant interactions were found, suggesting that the order in which the participant took on their social role affects how you would rate pain. A small significant interaction was found for version and congruence ($F(1,83) = 6.71$, $p < 0.01$, partial $\eta^2 = .07$). Participants completing version A scored lower pain for the congruent conditions ($\bar{x} = 48.10$; $SE = 1.34$) than did the participants completing version B ($\bar{x} = 52.25$, $SE = 1.39$). Conversely, the opposite effect was found for incongruent conditions where participants completing version A scored higher pain ($\bar{x} = 58.88$, $SE = 1.85$) compared to participants completing version B ($\bar{x} = 55.66$, $SE = 1.91$). See Figure 2, Panel 4 (p.63).

A

Table 5: association between exaggeration and minimisation for scores of pain, reasonableness and reduce pain

	Visual Pain Cue	Pain		Reasonableness		Reducing Pain		
		Exaggeration	Minimisation	Exaggeration	Minimisation	Exaggeration	Minimisation	
Nurse	Congruent pain cues	High	-.48***	n.s	-.55***	n.s	-.45***	n.s
		Low	.24*	.55***	-.41***	-.28**	n.s	.45***
	Incongruent pain cues	High	-.48***	n.s	-.73***	.22*	-.65***	.29**
		Low	-.21*	n.s	-.50***	.27*	-.31**	.35**
Visitor	Congruent pain cues	High	-.36**	-.25*	-.68***	n.s	n.s	n.s
		Low	.27*	.30**	-.52***	n.s	n.s	n.s
	Incongruent pain cues	High	n.s	n.s	-.74***	.24*	-.24*	n.s
		Low	n.s	n.s	-.51**	.30**	n.s	n.s

***p<0001; **p<001; p<*01.

second interaction effect for the rating of pain was found for

visual pain cue and social role perspective ($F(1,83) = 14.03, p < 0.0001$; see Table 5 pg. 61, and Figure 2, Panel 5, p. 63). When rating as a visitor first (version B), scores for high visual pain in the visitor condition ($\bar{x} = 61.6; SE = 2.0$) were lower than when rating with high visual pain cues as a nurse in the second half of the booklet ($\bar{x} = 73.41, SE = 1.8$). Once the participants took on the nursing role, scores were elevated for high visual pain cues. No such effect was found for the version A booklet, suggesting that it was more difficult to become a 'non-nurse' and look at visual pain cues differently once the participant had taken on this role.

Table 6 : Mean and standard errors for visual pain & social role perspective for booklet version

Role	Visual cue	Version A		Version B	
		\bar{x}	SE	\bar{x}	SE
Nurse	High	68.7	1.8	73.4	1.8
	Low	37.6	2.2	36.7	2.2
Visitor	High	69.9	2.0	61.6	2.0
	Low	37.7	2.4	43.9	2.5

Figure 2: interaction effects of the independent variables on the pain dependent variable (y axis = pain VAS score)

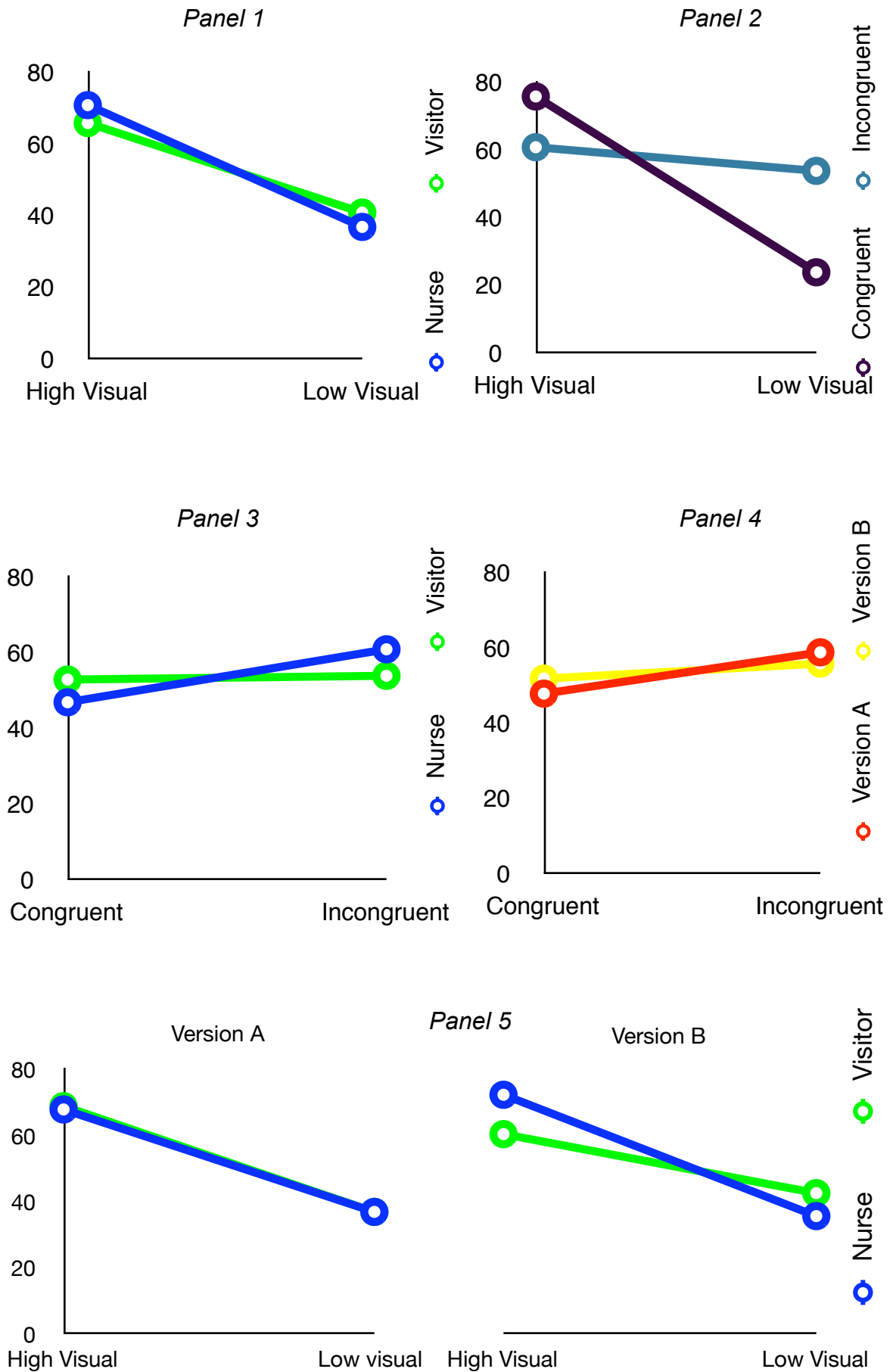
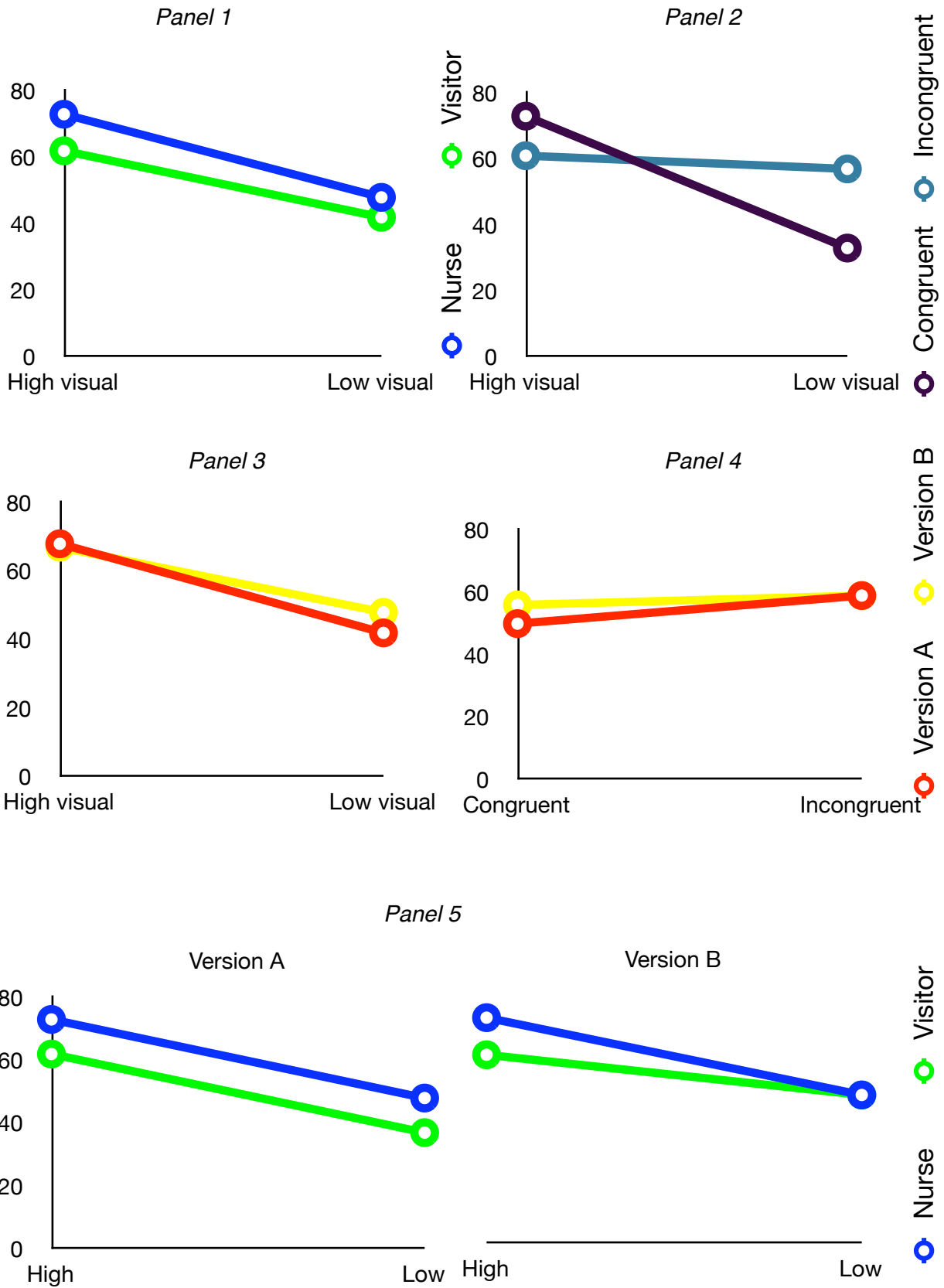


Figure 3: interaction effects of the independent variables on the reduce pain dependent variable (y axis = reduce pain VAS score).



Do judgements of pain affect the intention to treat pain?

A repeated measures ANOVA was conducted to investigate how the different pain cues and social role perspectives affected the participants willingness to reduce pain. Significant differences were found between conditions varying on visual pain, congruency of pain cues and social role perspective.

Visual information

A highly significant difference in the reduce pain dependent variable was found for high and low visual pain information ($F(1,83) = 174.29$, $p < 0.0001$, partial $\eta^2 = 0.67$). High facial pain cues scored higher for reducing pain ($\bar{x} = 67.74$, $SE = 1.34$) than did scenarios with low facial pain cues ($\bar{x} = 45.51$, $SE = 1.83$), see Figure 3, Panel 1, pg.64. This means that the participants were more likely to reduce pain when they were presented with high facial pain cues than lower facial pain cues. Furthermore, facial pain cues accounted for a large amount of the variance in scores across conditions, suggesting that facial pain is an important cue when deciding to treat pain.

Congruency of pain cues

A highly significant difference for the reduce pain variable was found between conditions with congruent and incongruent pain cues ($F(1,83) = 20.11$; $p < 0.0001$; partial $\eta^2 = 0.20$). Participants rated that they were more likely to reduce pain when faced with incongruent rather than the congruent pain condition (incongruent $\bar{x} = 59.53$; $SE = 1.55$, congruent $\bar{x} = 53.74$; $SE = 1.47$).

Congruence and visual pain information had a highly significant interaction effect ($F(1,83) = 116.24$; $p < 0.0001$; partial $\eta^2 = 0.58$). Similarly to the pain rating variable, mean scores for vignettes containing incongruent information were more similar (high visual cue $\bar{x} = 61.73$; $SE = 1.86$; low visual cue $\bar{x} = 57.31$; $SE = 57.31$) than vignettes containing congruent information (high visual cue $\bar{x} = 73.75$; $SE = 1.54$; low visual cue $\bar{x} = 33.71$; $SE = 33.71$), see Figure 3, Panel 2, pg. 64.

Social role perspectives

Significant differences were found for the alternative social role perspectives; $F(1,83) = 15.87$, $p < 0.0001$, partial $\eta^2 = 0.16$. Specifically, nurses were

more likely to reduce pain ($\bar{x} = 60.89$, $SE = 1.62$) than visitors ($\bar{x} = 52.41$; $SE = 1.83$), suggesting that social role perspective had an effect on intentions to reduce pain. Furthermore, a significant interaction effect for social role perspective and visual pain cues was found; $F(1,83) 4.02$, $p < 0.048$, partial $\eta^2 .04$. Specifically, nurses were more likely to reduce pain on high ($\bar{x} = 73.29$, $SE = 1.47$) and low ($\bar{x} = 48.40$, $SE = 2.28$) visual cues than the visitor perspective did on high ($\bar{x} = 62.19$, $SE = 2.05$) and low ($\bar{x} = 42.62$, $SE = 2.22$) visual cues. These results highlight the complicated relationship between judging pain and deciding to treat pain. Nurses were more likely to want to reduce pain when making judgements in the nursing role when faced with both high and low visual cues. However, this decision to treat was made in spite of potentially lower pain ratings e.g. the low-visual congruent condition was judged by nurses to demonstrate lower pain than visitors, but nurses were more likely to treat this pain.

Order effects

As with the judgement of pain, some order effects were found for the reduce pain variable. Small effects were found for the visual pain cue variable; $F(1,83) p < 0.05$, partial $\eta^2 .04$. As demonstrated by Figure 3, Panel 3 (p.64), participants using version B (visitor first) were more likely to want to reduce pain for the conditions containing low visual pain cues (version A $\bar{x} = 42.58$; $SE = 2.54$; version B $\bar{x} = 48.44$; $SE = 2.64$). This effect was strengthened when social role perspective was added into the ANOVA; $F(1,83) 4.43$, $p < 0.05$, partial $\eta^2 .05$ (see Figure 2, Panel 5, p.63). Version B participants were more likely to reduce low visual pain when they were a visitor than when the version A participants were visitors.

Differences were also found for congruency ($F(1,83) = 5.90$; $p < 0.01$, partial $\eta^2 .06$), where participants completing version B were more likely to want to reduce pain in the congruent conditions (version A $\bar{x} = 50.92$; $SE = 2.04$; version B $\bar{x} = 56.54$; $SE = 2.12$). These results suggest that participants who completed the booklet as a visitor first were more likely to rate reduce pain in conditions with low visual pain and where behavioural cues matched the visual cues.

Is there a relationship between pain ratings and intentions to reduce pain?

Two-tailed Pearson's correlations were calculated to look for associations between pain, reasonableness and intentions to reduce pain (see Table 7). Bonferroni corrections were applied to all correlations and scores were interpreted with an adjusted alpha level of 0.006. Correlation coefficients were converted into z scores and comparisons were made between version A and B. No significant differences were found between the correlation coefficients for these groups. Coefficients for the nurse and visitor conditions were also compared using z scores.

Table 7: associations between the dependent variables

		Visual Pain Cue	Pain & Reduce pain	Reasonableness & Reduce pain	Pain & Reasonableness
Nurse	Congruent pain cues	High	0.55***	0.64***	0.64***
		Low	0.51***	-0.12	-0.22
	Incongruent pain cues	High	0.63***	0.70***	0.63***
		Low	0.64***	0.67***	0.68***
Visitor	Congruent pain cues	High	0.29	0.43***	0.52***
		Low	0.52***	-0.12	-0.1
	Incongruent pain cues	High	0.50***	0.26	0.27
		Low	0.39***	0.3	0.47***

***p<0001; **p<001.

There was a significant relationship between the rating of pain and inclination to reduce pain for all eight conditions. All were highly correlated (r ranged from .40 to .64; P<0.0001) with the exception of one condition which more moderately correlated (r = .29; p<.01) and not significant when using the corrected alpha level. The other correlations remained significant despite the application of Bonferroni corrections.

Figure 4 association between ratings of pain and reduce pain in the high congruent pain condition

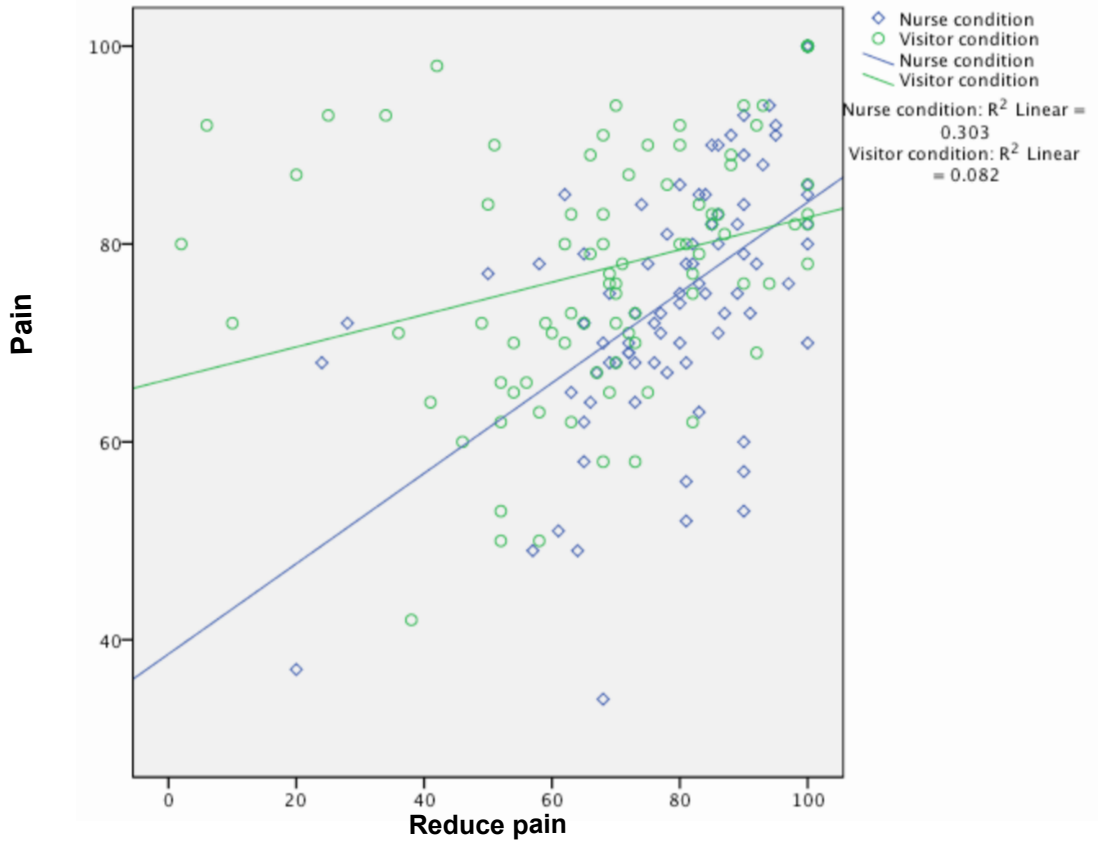
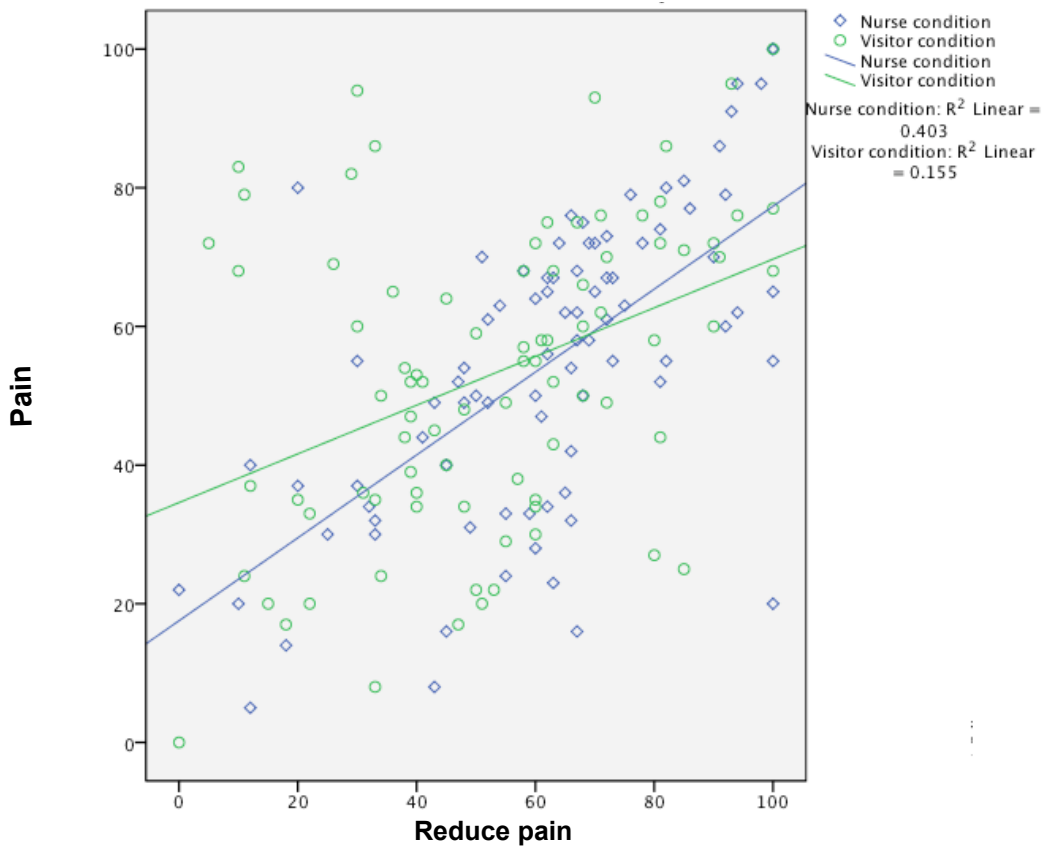


Figure 5 association between ratings of pain and reduce pain in the low congruent pain condition



Two significant differences were found between the nurse and visitor conditions; nurse ($r = 0.55$) and visitor ($r = 0.29$) scores for high visual and high behavioural cue condition ($Z_{\text{Difference}} = 2.04$, $p < 0.05$), suggesting that there was more of an agreement between pain ratings and the reduction of pain in the nurse condition than there was in the visitor condition when high visual pain cues were accompanied by high behavioural pain cues, see Figure 4, pg. 68. A significant difference was found between the nurse ($r = 0.64$) and visitor ($r = 0.39$) condition in the low visual, incongruent condition ($Z_{\text{Difference}} = 2.21$, $p < 0.05$) suggesting that there was more of an agreement between nurses and their ratings of pain and intentions to treat than visitors when low visual pain cues were accompanied with high behavioural cues, see Figure 5 pg. 68.

Exaggeration and minimisation

Spearman's correlations were computed to look for associations between perceived modulation of pain through exaggeration and minimisation and intentions to reduce pain (see table 5, pg.61). From the nursing perspective, ratings of exaggeration were negatively associated with intentions to reduce pain in both of the incongruent behavioural conditions (high visual low behavioural, $r_s = -.64$, $p < 0.0001$; low visual high behavioural, $r_s = -.31$, $p < 0.001$). Interestingly, exaggeration was also highly negatively correlated in the high congruent pain condition when rating as a nurse ($r_s = -.45$, $p < 0.0001$). There was no association for exaggeration in the low visual and behavioural pain when rating as a nurse, however, there was a strong positive association between minimisation and reduce pain for this condition ($r_s = .45$, $p < 0.0001$). This suggests that when rating as a nurse, the participants were less likely to reduce pain when they suspected that somebody was exaggerating their pain. This relationship was not replicated to the same extent in the visitor condition; only one weak relationship was found in the high visual incongruent condition ($r_s = .24$, $p < 0.05$). This suggests that when in a nursing role, participants are less likely to reduce pain when they feel that somebody is exaggerating pain, although there were no real differences in the amount of exaggeration rated between the nurse and visitor conditions.

Pain ratings and reasonableness

There were significant positive relationships between pain and reasonableness ratings for most conditions, see Table 8 pg. 74 . However, a significant association

was not found when low visual pain was presented with low behavioural cues. Differences were found between the nursing and visitor conditions; a weaker relationship between high visual pain and low behavioural pain displays (incongruent condition) was found for the visitor condition ($r = .27$), whereas there was a highly significant association for the nursing condition ($r = .63$; see Table 8 pg.74; Figure 6, pg. 71,) $Z_{\text{Difference}} = 3.84$, $p < 0.0001$. Similarly, although positive relationships were found for pain and reasonableness in the low visual pain high behavioural conditions, stronger relationships were found when rating as a nurse ($r = .68$) than as a visitor ($r = .47$); $Z_{\text{Difference}} = 2.04$, $p < 0.05$. This suggests pain was rated as more reasonable the higher it was judged and this effect was enhanced when judging from a nurse perspective. These results are interesting, as you would expect incongruent conditions to be social exchange situations and more likely to instigate a cheater-detection response and hence more pain being less reasonable.

Figure 6 association between pain and reasonableness for the high congruent condition

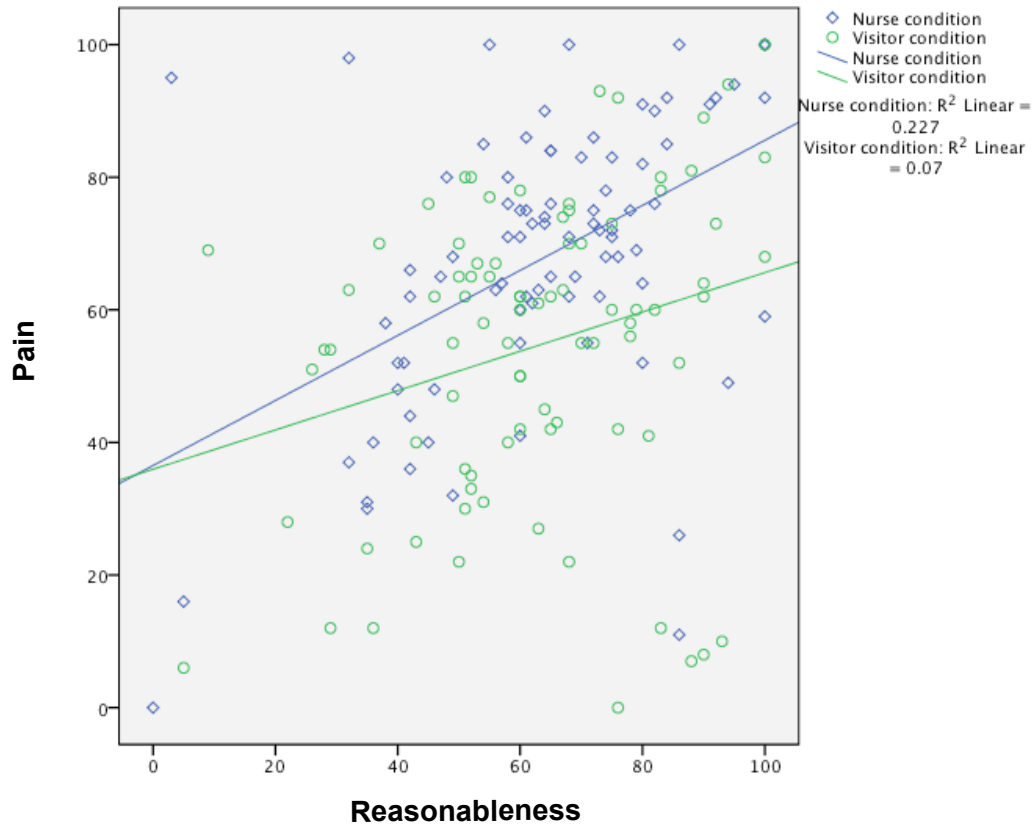
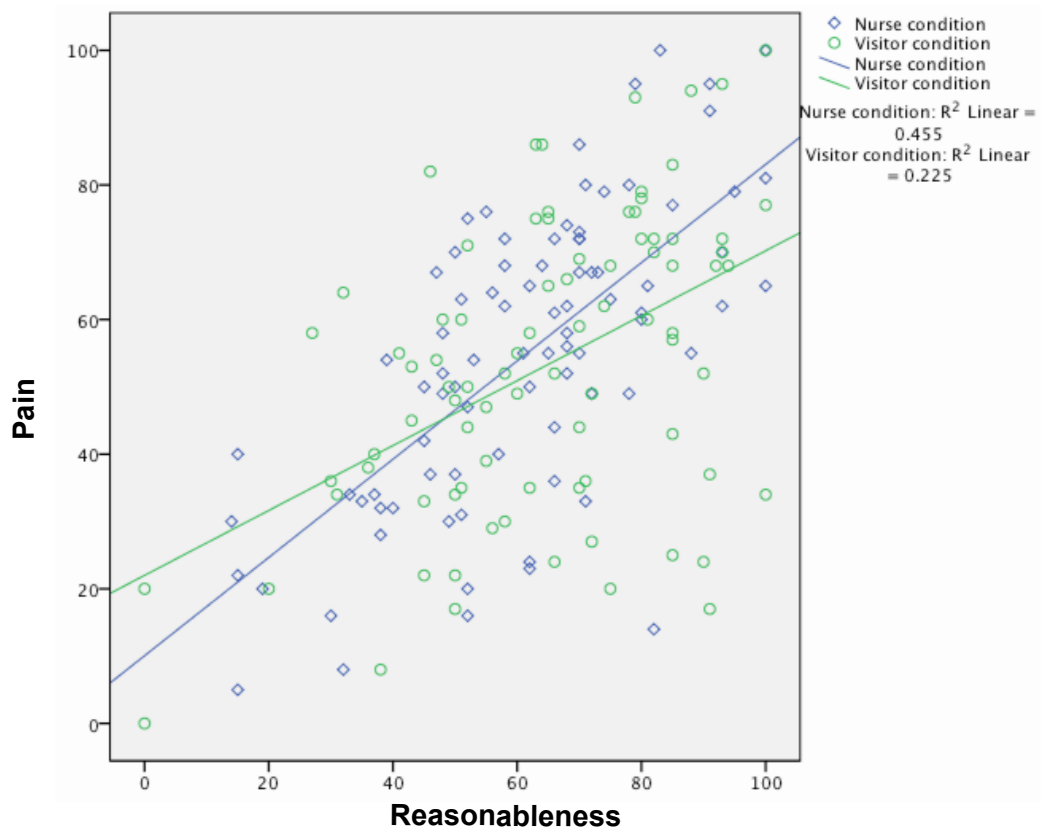


Figure 7 association between pain and reasonableness for the low congruent condition



Reasonableness ratings and intentions to reduce pain

There were significant associations between reasonableness ratings and intention to reduce pain for most variables. Only conditions of low visual pain and low behavioural pain cues did not see significant associations between reasonableness judgements and intentions to reduce pain. See Table .8, pg.74. Intention to reduce pain and reasonableness had a stronger, positive relationship in the nursing condition than in the visitor condition when looking at incongruent pain cues ($p < 0.0001$). This was apparent in conditions containing both high and low visual pain cues, see Table 8, pg.74.

Significant differences were found between participants for the nurse and visitor incongruent conditions; a stronger association was found for nurses ($r = .67$), than visitors ($r = .30$) for low visual with high behavioural cues, $Z_{\text{Difference}} = 3.2$; $p < 0.0001$. Similarly, a stronger relationship was found between pain and reasonableness for nurses ($r = .70$) over visitors ($r = .26$) on the high visual and low behavioural cue condition; $Z_{\text{Difference}} = 3.84$, $p < 0.0001$.

This suggests that intentions to reduce pain increase as judgements of reasonableness do, when looking at incongruent pain cues in a nursing role. Interestingly, judgements of reasonableness and intentions to reduce pain do not emerge when faced with congruent pain cues. See Figure 8 and 9, pg. 73.

Figure 8 association between reasonableness scores and intention to reduce pain for the high incongruent condition

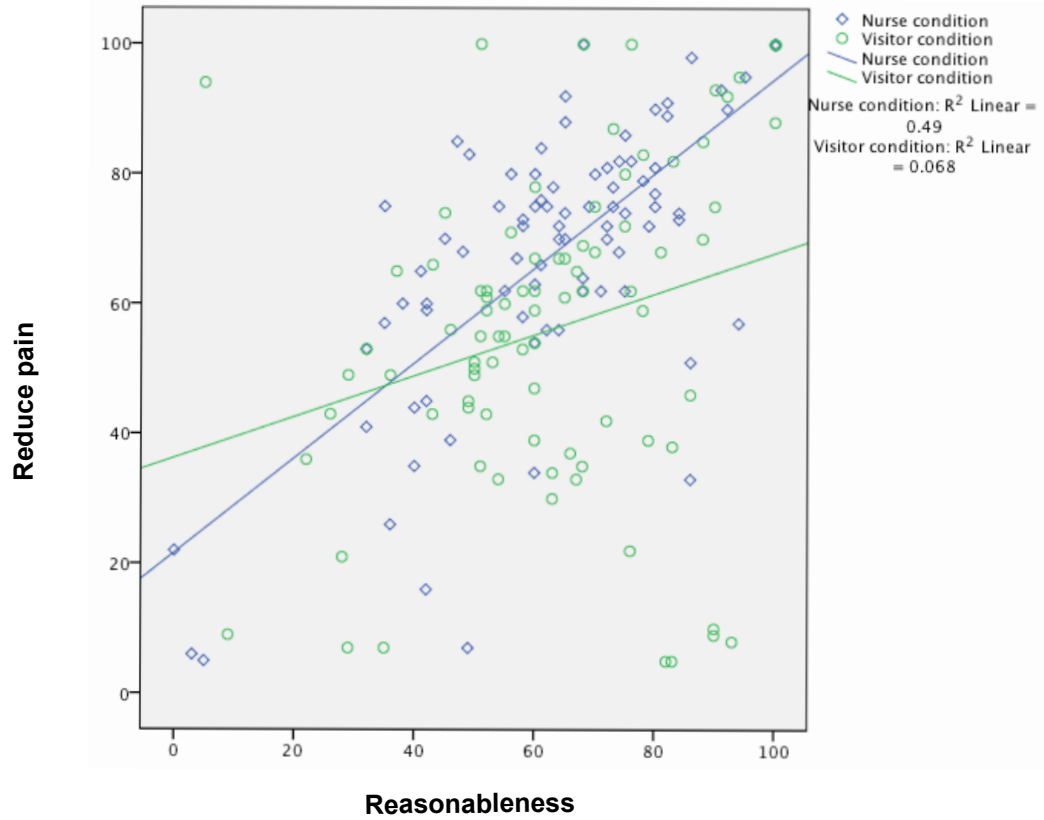


Figure 9 association between reasonableness scores and intention to reduce pain in the low incongruent condition

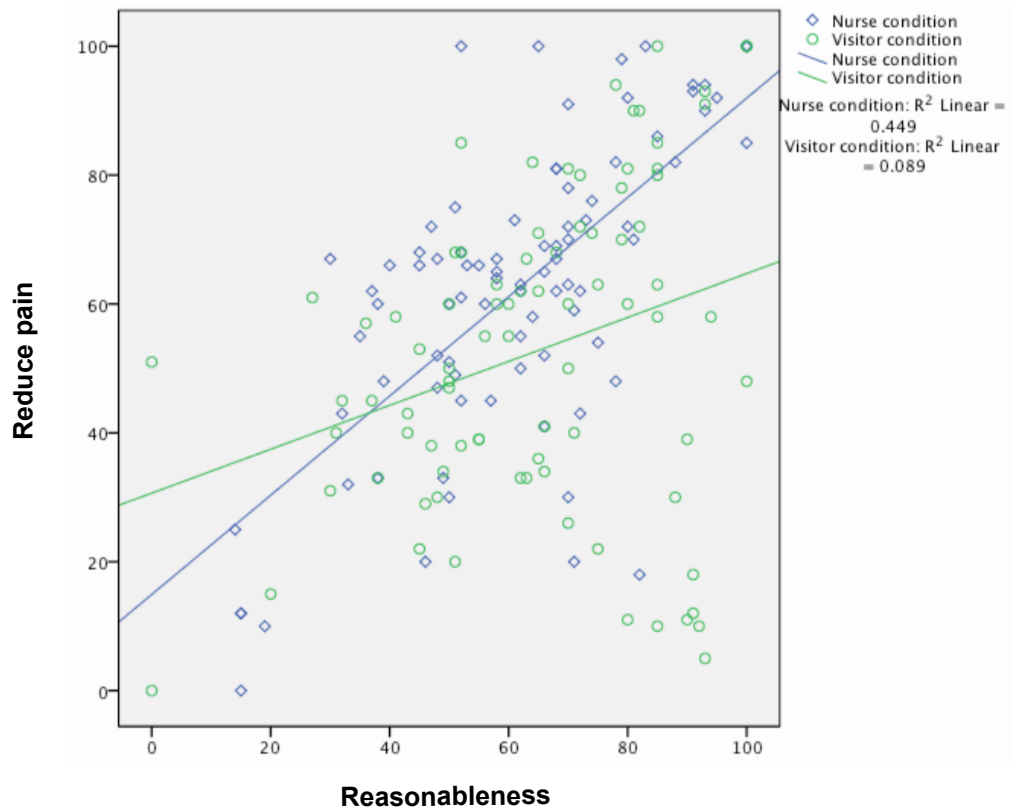


Table 8: independent r comparisons between nursing and visitor dependent variables

Condition		r nurse	zr nurse	r visitor	zr visitor	z difference	Significance
Pain & Reduce Pain							
Congruent	High	0.55	0.62	0.29	0.30	2.04	0.05
	Low	0.51	0.56	0.52	0.58	-0.08	n.s
Incongruent	High	0.63	0.74	0.5	0.55	1.23	n.s
	Low	0.64	0.76	0.39	0.41	2.21	0.05
Reasonableness & Reduce Pain							
Congruent	High	0.64	0.76	0.43	0.46	1.90	n.s
	Low	-0.12	-0.12	-0.12	-0.12	0.00	n.s
Incongruent	High	0.70	0.87	0.26	0.27	3.84	0.0001
	Low	0.67	0.81	0.3	0.31	3.20	0.0001
Pain & Reasonableness							
Congruent	High	0.64	0.758174	0.52	0.57634	1.16	n.s
	Low	-0.22	-0.22366	-0.1	-0.100335	-0.7	n.s
Incongruent	High	0.63	0.741416	0.27	0.276864	2.97	0.01
	Low	0.68	0.829114	0.47	0.51007	2.04	0.05

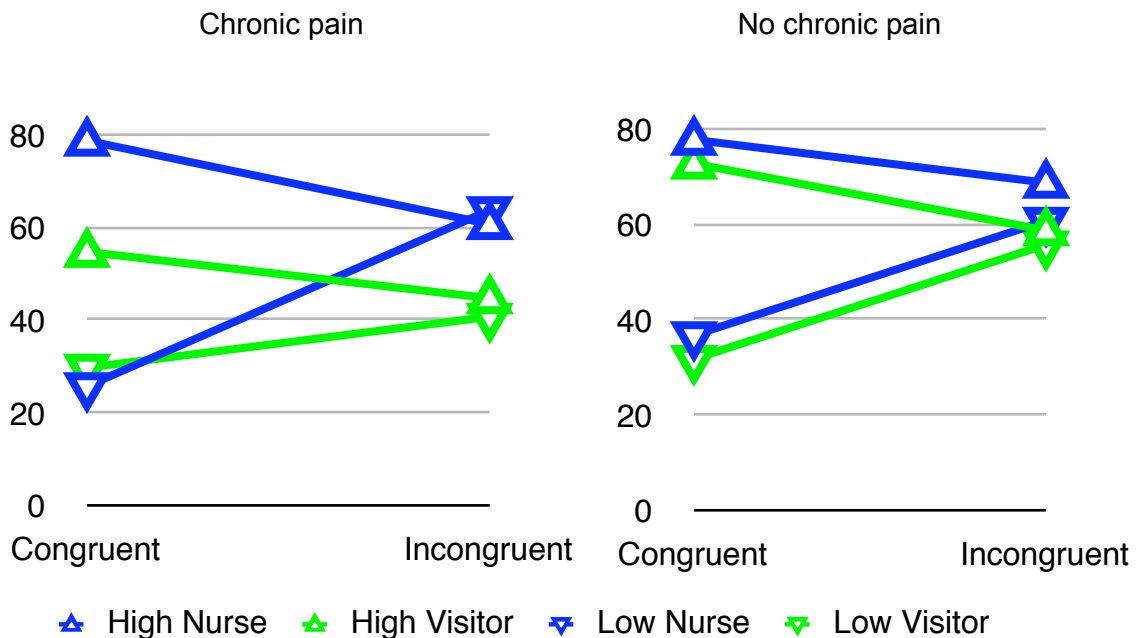
Between-Subject Effects

Chronic pain

Of the sample, 22 had reported living with somebody with chronic pain. A repeated measures ANOVA was conducted to look at chronic pain as a between subjects factor influencing the dependent variables. Ratings of pain and reasonableness were not affected by whether the participant had lived with somebody with chronic pain. However, a significant interaction was found for all three independent variables (visual pain, congruency and social role) and intentions

to reduce pain ($F(1,83) = 8.10; p < 0.006$). Participants who had experience of chronic pain scored lower for reducing pain in the high congruent visitor condition ($\bar{x} = 55.68; SE = 4.4$) than participants who had not had these experiences ($\bar{x} = 73.03; SE = 2.6$). Participants with chronic pain experience were more likely to reduce pain in the incongruent conditions when in their nursing role, and were less likely to reduce pain in their visitor role (see Figure 10), whereas no distinct differences in responses can be seen for participants not experiencing chronic pain.

Figure 10 differences in the intentions to reduce pain responses for people who have lived with somebody with chronic pain



Empathy

Pearson's correlations were conducted for empathy scores and ratings of pain, reduce pain and reasonableness for all eight conditions. Bonferroni corrections were applied to the results to avoid type 1 errors. The adjusted alpha level was 0.006. No associations were found between empathy scores and ratings of pain or reasonableness. One positive association for reducing pain was found for nurses rating the high visual, high behavioural cue condition $r = .29; p < .006$, suggesting that participants scoring higher on empathy were more likely to reduce

pain when faced with high pain cues. A reliability analysis was conducted to explore the the reliability of the empathy questionnaire. The results of the analysis demonstrated that the empathy questionnaire had very poor reliability, Cronbach's alpha = .36 (appendix 8).

Pain knowledge

Pearson's correlations and Bonferroni corrections (adjusted alpha level of 0.006) were calculated for scores of pain knowledge and ratings of pain, intention to reduce pain and reasonableness. There were no significant associations for knowledge of pain and pain scores demonstrating that knowledge of pain assessment does not affect how much pain the participants rated. A significant association was found for knowledge and reasonableness scores for visitors rating the high visual, low behavioural pain condition; $r = .34$, $P < 0.01$. This result suggests that participants who knew more about pain assessment felt that the child showing high visual pain but with low behavioural pain cues was more reasonable in the visitor condition. A significant association was also found for knowledge and reduce pain scores for nurses rating the low visual high behavioural pain condition; $r = .32$; $P < 0.01$. This result suggests that participants with more knowledge would be more likely to reduce the pain of the child showing low visible pain but with high behavioural cues in the nursing condition.

DISCUSSION

This thesis has provided an insight into the impact of social role and context on how we judge pain. It set out to explore the role of social contracting and cheater detection in the estimation of children's pain by nurses. For a situation to be deemed a social exchange scenario, there exists an implicit negotiation between two people whereby one person is expected to give something of benefit to another person when needed and in exchange, commensurate return of these benefits will be received in the future. Underlying this thesis is the notion that pain assessment is a social contracting situation. Subsequently, it is believed that an intrinsic agreement between the nurse and patient exists whereby the patient must fulfil the condition of being in genuine pain in order to gain treatment. It is hypothesised that pain is judged differently depending upon the social role of the observer and their relationship to the patient. If the person judging pain has a role whereby it is expected that benefits will be transferred from one person to another (i.e. analgesia given to a patient from a nurse), it is hypothesised that they will be more sensitive to cues of 'cheating' and the manipulation of pain expression by the patient. Alternatively, a bystander to a pain assessment situation would not be involved in the social exchange of benefits and as such, would not be alerted to cheating in the same way. Cues for cheating were created using incongruent facial pain cues and written behavioural cues in a series of vignettes. It was hypothesised that if a participant perceived a child to be cheating, they would attribute lower pain and intention to treat pain scores. It was also hypothesised that vignettes containing conflicting pain cues would see elevated scores of exaggeration and lower scores of reasonableness. Several hypotheses were developed in response to these assertions.

Hypotheses

Hypothesis one: participants rating as nurses will produce lower ratings of pain and intentions to reduce pain than when rating as visitors.

This hypothesis was rejected. There were no differences in the overall scores of pain ratings between participants when judging the vignettes as nurses or visitors. Differences were found in the overall scores for reducing pain, where nurses had higher intentions to reduce pain than when rating as a visitor.

Hypothesis two: nurses will rate pain and intentions to treat pain lower than visitors in scenarios containing conflicting pain cues.

The hypothesis was rejected. When rating as nurses, participants attributed higher pain in scenarios containing incongruent pain cues. No differences between the social role perspectives were found for intentions to reduce pain in scenarios containing conflicting pain cues.

Hypothesis three: participants rating as nurses will attribute higher levels of exaggeration in situations containing conflicting pain cues, than when rating as a visitor. Heightened scores of exaggeration reduce the willingness to reduce pain.

The hypothesis was partially supported; nurses did not rate exaggeration higher than visitors, however, higher scores of exaggeration were associated with less willingness to reduce pain for nurses.

Hypothesis four: there will be a relationship between judgements of reasonableness and intentions to reduce pain in nurses.

The hypothesis was accepted. Scores of reasonableness had a stronger association with intentions to reduce pain for nurses than for visitors.

Exploration of results

Summary of results

A major finding of this study is that judgements of pain and decisions to reduce pain are affected by social role and the context of the situation. Participants rate visual pain cues on a wider scale when judging from a nurse perspective, suggesting that the social role of the observer of pain can affect the interpretation of visual cues. Facial expression coupled with incongruent behavioural cues are judged differently by participants from the nursing perspective; this is heightened in vignettes containing high pain visual cues. Judgements of exaggeration and reasonableness were important for nurses when deciding whether to reduce pain, suggesting that nurses are more attuned to cues of exaggeration when assessing

pain. These results support the idea that pain assessment and decisions to treat pain are affected by social processes.

Perceptions of visual pain cues

Visual cues accounted for the most variance in pain and intention to reduce pain scores, corroborating with the literature that discusses facial pain display as a dominant cue in the communication of pain (Williams, 2002). This is also consistent with the literature that suggests that nurses use facial cues more than behavioural or self-report data (Katsma & Souza, 2000). Visual cues of pain were interpreted differently, depending upon the social perspective of the participant. The results suggest that when somebody assumes a nursing role, a wider scale of reference is used when judging visual pain cues. This was evidenced by participants perceiving high visual pain as greater pain and low visual pain as lower pain when in a nursing role. When in the visitor role, a shortened scale was used to judge pain cues and more moderate scores were attributed to visual pain.

Of interest, are ideas in the literature which have addressed issues in the scaling of pain. The habituation hypothesis has long been cited as a reason for why more experienced nurses underestimate pain (Mason, 1981; Perry & Heidrich, 1982). It is believed that repeated exposure to pain causes nurses to habituate (or become used to) these cues so much so, that they do not have the same response as people without this exposure. In an experimental study, Prkachin et al. (2004) found that observers exposed to high facial pain displays were more reluctant to find pain in new faces. It was suggested that the judges reset their internal pain scale as a result of exposure to high intensity pain displays. In clinical settings, this would mean that the experiences that children and their parents would rate as being high on their internal pain scales, would be judged to be lower by the nurse. Psychodynamic thinking would interpret these procedures as being a defence mechanism; a protective factor for nurses who would potentially burn out if they allowed themselves to be too empathic to all of their patient's experiences. The habituation hypothesis is not without criticism; evidence that suggests that more experienced nurses are more likely to underestimate pain is marred by other studies finding that less experienced nurses are more likely to underestimate pain (e.g. Halfens, Evers, & Abu-Saad, 1990). Kappesser and Williams (2008) compared ratings of relatives of patients who experience chronic pain to patient self-report ratings contained within vignettes and found that high pain reports were scored lower by the relatives and low pain reports were scored higher. As this group were

likely to have a high exposure to pain displays as a result of living with their relatives, it is unclear whether the habituation hypothesis can account for greater visual pain scales found in nurses. Kappesser and Williams believed that more limited *personal* experience of pain is the cause of smaller internal pain scales. This was replicated in a simulation study by Idvall and Brudin (2005), who concluded that the underestimation of pain is caused by observers using a narrower distribution for their estimates than those whose pain they were estimating.

The findings from this study suggest a modification to the theories of internal pain scales. It is proposed that the use of an internal visual pain scale is context-dependent; the length of the scale can depend upon the perspective of the judge and can be adapted according to the situation. Currently, there is no literature that looks at the intrapersonal interpretation of visual pain cues across different social contracting contexts. Interestingly, brain imaging studies have found empathic responses to pain can be adapted across situations when one suspects that the other person is acting unfairly (Singer et al., 2006). The author suggests that the implicit scale used to rate visual pain will change dependent upon the nature of the relationship between observer and person in pain. This is a novel idea and one that would merit significant investigation in the future.

Perceptions of behavioural cues

Despite visual facial pain accounting for the most variance between dependent variable scores, written accounts of behavioural pain cues via descriptions in the booklets did impact upon ratings of pain. High and low visual pain displays were modulated by the addition of incongruent behavioural descriptions, e.g. high facial pain displays scored lower overall for pain when accompanied by low behavioural cues than a high behavioural cue. The degree of change in pain scores were not matched in the low facial display conditions, demonstrating the potency of facial pain cues in high pain expression.

Perceptions of incongruent pain cues

Contrary to hypothesis two, participants scored incongruent pain as higher when rating from the nursing than the visitor perspective. If the nurse and visitor roles are considered to represent differing perspectives, this finding goes against the literature that suggests that nurses tend to underestimate pain compared to other groups (Zhou et al., 2008; Prkachin et al., 2007; Kappesser et al., 2006;

Marquiè et al., 2003; Solomon, 2001; Field, 1997; Craig et al., 1996). It must be acknowledged however, that these participants were still nurses, and thus their attempts to rate as non-nurses may not have been fully successful. A control group may have rated more pain than the nursing students acting from the visitor perspective in this study. Interestingly however, this increased pain score attributed to incongruent conditions by nurses was not mirrored in their intentions to reduce this pain, where no differences were found between nurses and visitors. A possible explanation for this finding is that participants were responding to the demand characteristics created by the experiment; when feeling unsure how to rate pain, opting for a higher rating of pain is safer and more socially acceptable than giving a lower rating of pain. However, when asked about their intentions to reduce pain, conflicting pain cues influenced their reasoning in a different way; they felt that they could not act upon this heightened rating of pain. Reducing pain requires more energy than simply rating pain as being higher. It could be argued that intentions to and/or the treatment pain, are more valid outcome measures when looking at pain assessment as a social contract situation.

Reasonableness of incongruent pain displays

Ratings of reasonableness were intended to tap into the element of fairness; an important notion when thinking about social exchange theory and cheater detection (Cosmides & Tooby, 1989). Essentially, the question asked was; how fair is this person being with their pain behaviour? An assumption is, if somebody is being unreasonable, they taking advantage and cheating in the social exchange situation. Congruent pain cues were thought to be more reasonable than incongruent pain cues, particularly by nurses who scored higher than visitors. Interestingly, there were no differences in scores of reasonableness between nurses and visitors for incongruent pain displays, although these were found to be less reasonable overall. Higher scores of reasonableness were not reflected in higher scores of pain, conversely, nurses scored lower pain in scenarios with congruent pain cues.

Nurses prefer pain displays to be consistent and find this to be more reasonable than when interpreting pain displays as a visitor. It is important for nurses to assess pain appropriately and mixed pain displays complicate the pain assessment process. Consistent pain displays will make the task a simpler process for the nurse and the desire for this is reflected within the elevated reasonableness scores. Inconsistent pain displays are thought to be more unreasonable when rating as both a nurse and a visitor, mixed pain displays complicate the process for both

groups. It is important to think of the ramifications of this judgement on clinical practice. Patients who are consistent with their pain displays may have better interactions and form better relationships with nurses who think they are being more reasonable, subsequently affecting patient satisfaction. However, patients who sense that nurses would prefer consistent cues of pain may alter their displays to fit with these. This fits with the literature which found that children hide their pain from nurses when they sensed that the nurses were unhappy with their pain displays (Dell'Api et al., 2007). Ultimately, casting a judgement of whether a pain display is reasonable or not will be communicated via interactions between the nurse and the patient and this has the potential to impact upon the pain experience of the patient (Schiavenato & Craig, 2010). This thesis has demonstrated that judgements of pain display reasonableness are contingent upon the consistency of acute pain facial and behavioural displays.

Perceptions of exaggeration

The study of exaggeration in a pain context provides a conceptual link between pain display modification techniques and the observer's interpretation of this as cheating (Kappesser et al., 2006). Exaggeration of pain displays would be a major signal that somebody is cheating in a pain assessment scenario and so is important when looking for the use of cheater detection in clinical settings. In congruent high pain scenarios, significant negative associations were found between exaggeration and pain scores, reflecting that pain scores were potentially lowered in the presence of perceived exaggeration. This was found in both nursing and visitor conditions. Similarly, Rusconi et al., (2010) found that medical students were less certain about the credibility of patient-reports of pain, when presented with vignettes containing congruent high pain scenarios. This uncertainty about the credibility of patient-reports was not found for vignettes containing low pain cues. The findings from the present study corroborate the assertion by Rusconi et al., that high pain displays may give rise to questions about their validity, regardless of the intent of the patient making the display.

Participants scored similar amounts of exaggeration and minimisation across both nursing and visitor conditions for all but one of the conditions. A highly significant difference for scores of exaggeration were found for the vignette containing congruent low pain cues, where nurses scored higher for exaggeration and visitors higher for minimisation. These results are not surprising, as the facial pain displays were of genuine pain and behavioural vignettes provided cues of behavioural inconsistency rather than priming participants for potential malingering.

It is interesting that the condition containing the lowest levels of pain cues (and was least expected to yield any scores of exaggeration) found this effect. This finding suggests that nurses were perhaps more sensitive to signs of exaggeration at baseline, but that this was a subtle difference that becomes conflicted when pain cues become harder to interpret.

Although participants did not consistently differ on the amount of exaggeration rated when scoring as a nurse or as a visitor, nurse judgements of exaggeration were strongly associated between ratings of pain and intentions to reduce pain. This suggests that judgements of pain were dependent upon judgements of exaggeration in the nurse condition only. Highly significant negative correlations were found for conditions containing incongruent pain cues for nurses suggesting that when rating as a nurse, judgements of exaggeration may be used as evidence when making a pain assessment and deciding to treat pain in situations where pain displays may be inconsistent. The judgement of exaggeration is not associated with the visitor's pain score in these specific situations and therefore could be argued that when rating as a visitor, the scores of pain and intentions to reduce pain were not dependent upon exaggeration, thus the participants were not employing cheater detection.

A positive association for minimisation was found for both the visitor and nurse conditions for low congruent pain, suggesting that when participants felt that the child in the vignette was minimising their pain, they would compensate for this by attributing a high pain score. It is interesting that participants during both conditions utilised minimisation as a modulator of pain score in this category, yet exaggeration was used only in the nursing condition. This finding implies that observations of exaggeration and minimisation are used differently in the judgement of pain. Exaggeration is used exclusively in social contract situations, whereas minimisation is unimportant in a social contract scenario

These findings could be interpreted as providing evidence for the hypothesis that nurses are more likely to make and use judgements of exaggeration to assess pain in clinical scenarios. Subsequently, it could be proposed that nurses are more likely to modify their scores for pain when they suspect that somebody is exaggerating, or 'cheating' in the social exchange. Visitors did not use their judgements of exaggeration to assess pain because they were not in a social exchange scenario, and so it was not important for them to detect 'cheating' as it was for the nurses. This also provides evidence for the notion that nurses are involved in a social exchange scenario with patients and employ judgements of

exaggeration to detect cheaters and qualify pain judgements. For both nurse and visitor conditions, exaggeration was associated with unreasonableness.

Other findings relevant to the underestimation of paediatric pain

Decisions to reduce pain

Previous research has found that willingness to impute pain in another does not necessarily mean that steps will be taken to reduce this pain. Hamers et al. (1996) found that more experienced nurses were less willing to reduce pain in children, despite rating the same amount of pain as less experienced nurses. Experience of the nurse however is not the only factor involved, as some studies have found that the years of clinical experience did not impact on pain decision-making (Griffin, Polit, & Byrne, 2008). The present study supports the finding that the decision to reduce pain is related, but not inextricably linked to the assessment of pain. Findings that nurses are more likely to reduce pain than visitors supports the theory that pain assessment is a social exchange scenario.

Scores of pain were not exactly matched by intentions to reduce pain. In particular, social role perspective was found to affect intentions to reduce pain; nurses rated less pain than visitors in the condition containing congruent low pain cues however, nurses were more likely to reduce the pain. Generally, the participants found that they were more likely to want to reduce pain when they were rating from a nursing role, rather than in their visitor role. This effect was not due to the participant's perception of their ability to reduce the pain of the child in the vignette. A presentation made to participants before they undertook this project made it abundantly clear that the reduce pain scale was a measure of the participant's urge to reduce pain and their intentions to do so. The rating in this measure should not be contingent upon their perceived ability to reduce pain or whether the participants felt that this was part of their professional role.

This result can be explored further when comparing responses of intentions to reduce pain with the scores relating to visual pain. When rating pain using visual cues, the participants used a wider scale of reference when scoring as a nurse than as a visitor; high visual pain was scored higher and low visual pain was scored lower. When it came to deciding whether to reduce pain, nurses however, were more likely to reduce pain for both high and low visual pain cue conditions. This could be interpreted in a number of different ways. The simplest idea is that when in a nursing role, one feels that it is part of their professional duty to reduce pain, and

the visitor to a ward does not have this duty. However, another interpretation of this could be that the nurse has been socially contracted to reduce pain as part of their role; the patient has satisfied the nurses requirements and given adequate evidence of need and so this is rewarded with the reduction of pain. The visitor is not bound by this contract and so does not need to give anything to the patient.

Correlations between scores of reasonableness and intentions to reduce pain between nurse and visitor perspectives corroborate the assertion that pain assessment scenarios are influenced by judgements of fairness. When rating as a nurse, the decision to reduce pain in scenarios containing incongruent pain cues was greatly associated with judgements of reasonableness; the more reasonable the behaviour was thought to be, the more the nurse would decide to reduce the pain. Judgements of reasonableness were less important when thinking about reducing pain as a visitor. Strong positive associations were found for reasonableness and intentions to reduce pain for both nurses and visitors for the high visual scenario with congruent behavioural cues, but no significant associations were found in the low pain cue scenario. This suggests that for any situation containing a high pain cue, judgements of reasonableness are important for decision-making. This is strengthened when in a social-exchange scenario, i.e. assessment of pain by a nurse. Similarly, scores of exaggeration were negatively associated with the reduction of pain. In parallel to how judgements of reasonableness were used, this association was present when rating as a nurse, not as a visitor, and in conditions containing high pain cues and not the condition containing only low pain cues.

These findings suggest that whether or not a nurse decides to reduce pain will depend upon their judgement of fairness (or cheating) by the patient. The fact that these trends were found only in the nurse scenario, strengthen the argument that pain assessment and the treatment of pain are social exchange scenarios and cheater detection is employed.

Chronic Pain

When rating from a nurse perspective, participants who had lived with another person experiencing chronic pain, rated pain and willingness to reduce pain similarly to participants without this historical experience. In the non-social contract condition, participants experiencing chronic pain were less willing to reduce pain than when they were rating as nurses. This is an interesting result, and counter to the general direction of results found in the general sample. Whilst living with

another person experiencing chronic pain, it is likely that these participants will have been frequently in the position where they needed to provide some assistance to this person (Newton-John & Williams, 2006), and as such negotiating a social contract from necessity and employing cheater detection to ensure that their relative / close friend was not taking advantage of the situation. It could be argued that this group of people perhaps identified with the visitor role as being a social contracting situation; they were presumably not acting in a professional role when they interacted with the person in question who they had lived with. As such they are used to making informal assessments of pain in their private lives. This theory does not explain why intentions to reduce pain were lower than when rating as a nurse. When working as a nurse however, you are professionally obligated to treat pain whereas as a bystander / friend there is not this professional obligation. Furthermore, when in a non-clinical situation as described before, it is likely that these participants would not have made an explicit pain judgement, rather the judgement would have been focussed on the willingness to give/not give help. This argument echoes the findings of Kappesser and Williams (2008), who demonstrated that cues to cheating and judgements made from these cues were context dependent, differing in salience from one group to another i.e. clinical and non-clinical staff. This could account for why it was only the willingness to reduce pain that was affected rather than any assessment of pain. Furthermore, it is interesting that there was a disparity between scores in the high congruent condition, where there were no intentional cues for cheating provided by the researcher. Situations containing high pain cues have been demonstrated by Rusconi et al. (2010) to be questioned for validity more than situations containing lower pain cues. This finding adds to this perspective that when somebody has more experience of social contract scenarios, the threshold for helping behaviour is much higher. Furthermore, it also suggests that helping behaviour maybe role-specific, rather than helping being directly linked to the judgement of need.

Levels of empathy

As higher levels of empathy have been associated with increased likelihood of identifying the needs of patients (Olson, 1995), it was predicted that high levels of empathy would be associated with scores of high pain in the congruent high conditions and scores of low pain in the congruent low conditions. It was also anticipated that high levels of empathy would equate to high levels of helping behaviour across all conditions. However, as the empathy questionnaire had poor

reliability, firm conclusions about the impact of empathy on nurses judgements of pain should not be drawn from this study.

A moderate positive correlation was found for empathy and ratings to reduce pain in only one condition in this study (high congruent condition). This may provide some evidence that nurses' individual levels of empathy could influence how willing they are to reduce the levels of pain in their patients. Nonetheless it is interesting that levels of empathy were not associated with reducing pain in any other condition and no associations were found between pain ratings and level of participant empathy. The finding from this study is similar to other studies of empathy which have found no correlations with empathy and accurate estimations of pain (Watt-Watson, Stevens, Garfinkel, Streiner, & Gallop, 2001). Furthermore, in a related study, empathy only accounted for 3% of the variance between scores of pain and levels of analgesia administered for 225 patients undergoing cardiac surgery (Watt-Watson et al., 2000). If it is accepted that the empathy data generated from this study are a valid measure of empathy, then this finding would go against the literature that suggests that empathy is important in the assessment of pain (e.g. Yu & Kirk, 2008). However, there were many limitations to the way in which empathy was measured in this study, in addition to the poor reliability demonstrated for the empathy questionnaire. Furthermore, the empathy literature suggests that personal experience of pain can help with the interpretation of pain displays and create more accurate assessments of pain (Goubert et al., 2005). To measure whether empathy was important as an intrapersonal factor in the assessment of pain, perhaps individual measures of empathic response for each vignette would have been helpful in ascertaining whether heightened emotional responses to vignettes followed on to individuals wanting to reduce pain or more accurate pain assessment.

Nursing Knowledge

Paediatric pain knowledge is important for the appropriate implementation of pain relief and the interpretation of guidelines (Rieman, Gordon, & Marvin, 2007). However research has shown new graduates from nursing schools to be lacking in knowledge about pain assessment (Salantera & Lauri, 2000) and that they are not confident in the use of non-pharmacological methods of pain management (Salantera, Lauri, Salmi, & Helenius, 1999). Knowledge of pain assessment and management practices have been found to have no bearing on how well pain is managed in children (Watt-Watson, 1997; Vincent & Denyes, 2004; Twycross, 2007). The results of this study corroborate these findings. Knowledge of pain

assessment was, for most conditions, not associated with any of the dependent variables. There was a significant positive association for knowledge and intentions to reduce pain for the condition containing low visual cues and high behavioural cues. It is unclear why this should occur in the nursing condition and not the visitor condition. As this significant association only occurred once, it is likely that this is an anomalous result. Furthermore, it is unclear how nursing knowledge would influence the ratings of pain in this study. The participants were not given any information of medical status or diagnosis in the vignettes. Information was limited to a description of behavioural display and an activity that the child was engaged with prior to being asked to move. It is possible that more of an effect would have been found if nurses had to interpret some medical information as they would in clinical settings, so the impact of nurse knowledge in pain assessment scenarios cannot be ruled out altogether.

Order effects

The order in which the social role perspective of the vignettes was presented, had an effect upon the scores of pain and intentions to reduce pain. Participants who rated as a nurse first (version A), attributed less pain to congruent scenarios and more pain to incongruent scenarios than participants who rated as a visitor first (version B). These patterns of results are similar to the general trend found for nurses across congruent and incongruent conditions, which suggests that when rating as a nurse first, it was more difficult to change perspective to the visitor. Interestingly, an interaction was found for intentions to reduce pain and congruency. This interaction was not found for the main analysis. In the overall analysis, congruency in itself was not found to have an impact upon intentions to reduce pain however, when order was included as a between-subjects factor, participants rating as a nurse first were less likely to reduce pain for congruent scenarios. There were no differences for willingness to treat pain for incongruent scenarios. The pain and reduce pain scores follow the same pattern for each group, and so it would seem that the decisions to reduce pain were based on pain assessments. The vignettes with incongruent pain cues were rated higher for pain, and it seems this effect is strengthened when rating as a nurse first potentially as it is more difficult to change to the visitor perspective than the visitor to nurse perspective.

Participants completing the experiment from the nurse perspective first (version A), rated visual pain similarly when as a nurse or as a visitor. Participants in version B, rated less pain in the conditions containing high visual pain cues and

more pain in the conditions containing low visual pain cues. Thus, the lengthened visual pain scale effect for nurses discussed earlier in this thesis comes more from participants scoring as a visitor first and the nurse second. A shift in the way visual cues are interpreted is demonstrated only when participants move to the nurse perspective for the second half of the booklet. They were also more likely to want to reduce pain in the conditions containing low visual pain cues.

These order effects demonstrate some of the difficulties that the participants had in changing from one perspective to another. This was commented upon by participants with the author anecdotally after completion of the booklet. Unfortunately the author has no knowledge or whether there were different reports from participants completing different versions of the booklet. It appears that the participants had more difficulty coming out role after completing the nurse perspective than they did after completing the visitor perspective. This could be for a number of reasons. One is that, as the participants were training to be nurses, once they had completed the task in a familiar nursing role perspective, it was difficult for the participants to then switch to a more unfamiliar (visitor) role for that setting.

Identity of the nurse affecting the interpretation of pain

The notion of the 'self' has been theorised and discussed in academic literature since the birth of psychology as a discipline (James, 1891). George Kelly was an American psychologist who developed Personal Construct Theory (PCT) as a way of understanding human behaviour. Kelly believed that we approach the world not as it is, but as it appears to us to be (Fransella & Dalton, 2002). We interpret the world through our 'construing goggles' and make sense of information in light of our own personal constructs; mini theories of how things are. Our constructs develop based on our experience and we test these out behaviourally, seeking information that validates our preferred construal of the situation. How the 'self' is constructed influences which environmental stimuli are attended to and the context with which we engage. 'Roles' are structured in relation to other people in a person's life; the individual's construct structure has 'frames' which help to predict and control interactions with other people (Butler & Green, 2007). For example, a common social role would be mother and a core construct of this role would be protective.

A study by (Hartley, 1986) demonstrates that people can have a repertoire of constructs with behavioural elements associated. He asked children aged between

6-8 years old from an area of socio-economic deprivation to do Matching Familiar Figures test (MFF). Children were measured on traits of impulsivity and reflectiveness. The participants were asked to do some items of the MMF as they prefer and then 'as if they were clever' and 'not clever'. It was found that children could improve their performance on the task, decrease impulsivity and increase reflectiveness by acting 'as if' they were clever. Children could also impair their performance by acting as being 'not clever'. These findings suggest that people have a repertoire of roles available to them and that these different roles can impact upon behaviour and cognitive processing. This finding resonates with the present study, whereby the participant roles had an impact upon their performance on a particular task. Furthermore, the results are in line with Kelly's basic principles of PCT, in that we have found that the nursing role has influenced the judgement of pain at a perceptual level (e.g. judgement of visual cues) and decision-making level (e.g. decision to reduce pain). PCT posits that self image regulates behaviour in that actions of people are in line with their view of the self. Exploration of how this role is perceived by nurses may shed light into the decision-making processes that take place. Thinking about what it is or what it means to be a nurse can only be achieved by careful discussion with nurses.

PCT posits that nurses will have a finite number of constructs; these are dichotomous personal qualities organised along a continuum with the contrasting concept at the other end of the spectrum e.g. caring verses uncaring . These will have developed from experiences of being a nurse but will also drawn from ideas developed through personal experiences such as watching hospital television programmes or experiences of being in hospital. As such, the participants will have developed a unique set of ideas that construct their personal identity as a nurse. Despite the importance that PCT places with the individuality of a person's experience, there are commonalities with our experience and themes of constructs have been found within particular groups (Butler, 2001). These common experiences will have created a constructs core to the professional identity of the nurse. If the construct of caring were to be taken (a safe assumption to make in that nursing is commonly referred to as a caring profession) there is the idea that the nurse is caring and as such must act in a way that supports this image. Elevated scores for intentions to reduce pain in the nursing condition compared to the visitor condition support this idea. How does the nurse role fit in with cheater detection theory? Acting in an uncaring way will make the nurse feel uncomfortable. If social contracting and cheater detection were taken into consideration, a situation would

arise whereby (most likely) the nurse will want to act in accordance with their personal construct of being caring, yet they must ensure the protection of their resources from potential cheaters. Possibly, a dilemma could be introduced where the nurse wants to fulfil the role of caring nurse, but cannot do this if the pain is not genuine. This could create an emotional response of guilt, which is a response that occurs when somebody is acting at odds with their core role (Butler & Green, 2007, pg.39).

Clinical implications

Cheater-detection is a cognitive heuristic that has been selected for because of the advantages it brings to ensure the fair sharing of resources in social groups. This process is well established in the human psyche and training nurses to bypass this mechanism is not feasible. Research looking at the influence of social contracts and cheater detection on pain assessment is in its infancy, and much more is needed before significant change in response to these findings can be implemented at a clinical level. Nevertheless, the findings of this study are beneficial to clinical practice. Viewing the underestimation of pain by nurses as a social factor is a way of thinking about this problem in a less blaming and judgemental way.

Supporting the evolutionary hypothesis for the expression of pain has implications for the training of staff and assessment procedures. There is scope for training of staff to raise awareness of cheater detection and its role in pain assessment. It may be useful for staff to know that they seek cues for exaggeration to judge pain when nursing. This is of particular importance when taking into consideration the context of paediatric pain. It has been demonstrated that children are poor at exaggerating pain displays and adults quite successful at detecting modulated pain displays (Larochette et al., 2006). Therefore it is likely that the nurse would be able to detect faked pain. Training focussing on exerting less effort in detecting exaggeration may prove fruitful in reducing the underestimation of pain.

As well as structured training programmes that explore these aspects of pain displays, supervision groups with a specific focus on pain assessment and management may prove useful for nurses. In a qualitative study, nurses found supervision groups that were facilitated by clinical psychologists to be a beneficial forum to share clinical experiences and to increase competence (Charlton, 2010). These would provide a space to explore conflicts that arise from needing to treat pain as part of a nursing role, and the need to identify cheating. It is unlikely that these discussions could take place on a ward and supervision by a

clinical psychologist would facilitate difficult conversations and encourage reflection. If nurses are able to reflect upon specific cases where a child's pain has been untreated in a space separate from the ward environment, they may be more likely to reflect upon this when a situation arises (Schön, 1983).

Limitations

Participants

The use of nursing students as opposed to fully qualified nurses may bring criticism about whether this sample was representative of a nurse population or that the results could be generalised to the nursing population. Nursing students have spent less time in their nursing role and may not have been able to identify themselves as a nurse as well as a nurse who had been qualified for a number of years. As such, this could have had an impact on the participant's ability to embrace the nursing role. Furthermore, the student nurses will have been exposed to less experiences of pain assessment and potentially less experiences of observing acute pain. It could be argued therefore, that they may be less skilled in detecting pain cues and less confident when deciding to treat pain. Furthermore, it could be argued that participants with less pain assessment experience could be detrimental to finding a sensitised cheater detection mechanism.

Despite the limitations that using a student nurse population brings, there are some advantages to drawing participants from this group. It is plausible that the use of student nurses aided the within-subjects design of this study. Having spent less time in a nursing role could have meant that this group of participants were more flexible and able to imagine themselves in the non-nursing role. It may have been very difficult for a qualified nurse who has worked in this role for longer, to imagine themselves as an impartial visitor when confronted with a very familiar clinical scenario. As such, it could be argued that this within-subjects design was only made possible by using student nurses.

The use of students is very common in psychology research and they have been used in research focussing on similar topics (e.g. Rusconi et al., 2010). Furthermore, Marquière et al. (2003) found no differences between the miscalibration of pain between expert raters and novice raters, suggesting that length of clinical experience does not matter when rating pain displays. Nevertheless, many nursing students do undertake work as nursing assistants or voluntary work to gain access

to nursing courses. This is demonstrated in the demographic information though the range of experience that the participants had. The mean months of clinical experience score reflects that the nursing students had a wealth of clinical experience. Finally, the purpose of this experiment was to look at the impact of social role on judgements of pain, not on the ability of participants as nurses. It was only necessary for the participants to have had enough nursing experience to be able to imagine themselves in the role. As an effect was found for social role perspective, it is arguable that the nursing students adequately managed to assume a nursing role for the purposes of this study.

Study design

It is arguable that a between-subjects design would have been an equally constructive way of exploring the research hypotheses. A control group would have enabled some of the research questions to be explored in a more definitive manner; i.e. whether nurses versus controls judge pain differently. This design would have taken away the ambiguity that surrounds whether or not the participants were able to embrace the social roles in the vignettes or indeed switch from one perspective to the other successfully. Furthermore, the inclusion of a control group would have allowed this study to explore if the cheater detection mechanism is heightened as a result of working in a clinical environment or not. If no differences were found between the groups, then it would be arguable that cheater detection does not become heightened after repeated exposures to pain assessment scenarios. This conclusion would have been further strengthened by using fully qualified, more experienced nurses.

Nevertheless, there are some distinct advantages to using the within-subjects design in this study. This design allowed the author to explore the impact of the situational variable of a social contract situation versus non-social contract situation. Asking nurses to provide answers for just the pain assessment scenario and controls for the non-pain scenario would have provided information about nursing judgements versus control judgements of pain. It would not have been clear whether it was nurses as a professional group, or the social contracting scenario that would have contributed to any differences in ratings. This design allowed the author to think about the impact of the social contract and professional role on pain judgement rather than nurses' as a professional group. This allowed an interesting finding that external, social factors such as the scenario, social perspective and

potentially the social contract alters the judgement of pain and intentions to reduce pain. This is opposed to other theories that suggest that it is variables internal to the nurse that impact on pain judgements (e.g. length of experience). These findings therefore lean towards a less judgemental and blaming understanding of why nurses may judge pain in the ways demonstrated in clinical settings.

Demand characteristics

A participant taking part in a study is sometimes motivated to ascertain the true purpose of the experiment and will answer in a way that fulfils what they believe is, the experimenters hypothesis. It is possible that the results of this experiment were affected by demand characteristics. As the participants were nursing students, they may have been motivated to portray a 'good impression' of nursing. To counter this, the experimenter made it explicit that answers would be anonymised and would not be fed back to their tutors. The participants were approached for the task and offered an incentive to complete the experiment. It was felt that this incentive was large enough to tempt participants that would not typically be interested in taking part in a psychology experiment and to counter any biases in recruitment.

Task demands

Many of the participants who completed version A of the booklet (nurse then visitor) commented that it was challenging to swap perspectives and not think as a nurse, therefore the possibility exists that participants may not have been able to fully embrace the social role that they were tasked with. Between-subjects effects found for booklet version add greater weight to this idea that the imaginary task was challenging for participants. If this is correct, then scores on the dependent variables could have seen greater differences between nurse and visitor conditions. The inclusion of a manipulation check would have been a good way of measuring the extent to which the participants were able to imagine the roles that they were tasked with. As this was not included in the design of the study, there is no way of objectively determining how well the participant was able to take on each role, or if the order in which the booklet was completed had an impact on the participant's ability to imagine themselves in a particular role. It is recommended that this be included in any future research that takes place using a similar task.

Stimulus materials

There were elements within the design of the booklet that could have been improved. One in particular was the use of different genders across high and low visual conditions, i.e. girls were used for the high congruent condition and boys were used for the high incongruent condition. It would have been preferable to use the same gender consistently across all conditions to avoid biases relating to gender. This study uses images that were kindly donated from another research team in Belgium. There was a limited range of images available and there were not the resources to develop more for the purposes of this study.

The expressions of pain captured in the visual images used in this task were produced using a cold presser task. Thus, the pain expression could be respondent pain; pain expression directly linked to the sensation of pain, not influenced by the contextual factors brought about in a social situation. Arguably, when these images were captured, the children were still around people and as such a social situation. However, it could be argued that pain expression is essentially a social communication, thus the types of expression communicated in clinical settings could have qualitative elements not captured by this method of simulation.

Furthermore it is possible that a confounding variable was introduced in the written vignettes, as the nurse and visitor scenarios contained slightly different information from each other to increase ecological validity. The nurse vignettes contained information relating to the type of ward that they were working on (post-surgical) to build description into the vignette. This information was not included in the visitor vignette as it is unlikely that a visitor of this kind would know what type of ward they were visiting. However, it is possible that the extra information that the participants were given in the nurse condition altered their judgement of the pain, as post-surgically, you would expect a patient to experience some degree of pain. However, it is arguable that the participants were cued to anticipate pain displays across both perspectives from the discussion that took place prior to completing the booklet, where they were asked to rate pain from two perspectives. However, in any replication studies in the future, it is suggested that exactly the same information is given, but in an ecologically congruent description (e.g. you are told to deliver some toys to the post-surgical ward).

Finally, the addition of a patient pain rating in the vignette may have been a useful way to cue participants into cheating and an opportunity to increase the ecological validity of the study. Good nursing practice dictates that where possible,

patient self-report is sought (Royal College of Nursing, 2009). As discussed earlier in this thesis, pain expression is modulated by social context (Sullivan, 2002; Schmidt, 2002) thus it cannot be solely relied upon for an accurate measure of pain intensity. Self-report data provides invaluable information for the clinician and acts as an anchor point for the clinician to make their own judgement of pain (Kappesser & Williams, 2008). In this study, these could have been effectively used to cue cheating, e.g. a vignette containing high facial pain cues and high self report but low behavioural pain cues. The addition of another factor however would have meant that either this study would have had insufficient power, or it would be necessary to extend recruitment.

Questionnaires

Due to participant time demands and concerns about maintaining levels of motivation in the participants, the booklet was made as short as possible. Therefore, a shortened version of the PNKAS was used to test for nursing knowledge and an experimenter designed empathy measure was used. It would have been preferable to use fully standardised measures of knowledge and empathy for this task so that comparisons of this study could be made with normative data. Unfortunately, there was no way of making these comparisons, however due to recruiting 100% of the population that was approached, it is likely that a representative sample of nursing students was used. There is also the possibility that these measures did not accurately capture the constructs they set out to assess. Yu and Kirk (2009) conducted a systematic review to evaluate tools used to measure empathy in nursing research and did not find one that was satisfactory conceptually or psychometrically. However, only questions not pertaining to pain assessment were taken out of the PNKAS. Furthermore, the PNKAS does not use any sort of criteria for judging good or poor pain knowledge. Higher scores simply mean better knowledge of pain.

Empathy is a notoriously difficult construct to measure and there does not exist a quick measure for this in the literature. When developing the questionnaire, care was taken to ensure that all of the elements of empathy discussed in the literature were represented by a question. However, in attempting to do this, one of the items appeared to be incongruent with the other items (i.e. item 3: I have had some professional training in empathy). The decision to include this item was in response to the wealth of nurse training programmes aimed at increasing nurse empathy (La Monica, 1976) and was intended to capture the effect of any prior

teaching focus that the nursing students may have had. As the other items focus more on the emotional side of empathy, it is possible that this item may have seemed unusual perhaps confusing. Despite this, a reliability analysis revealed that the empathy scale overall had very low reliability (Cronbach's α .36), and that this item actually improved the reliability (see appendix 8). It is clear that the scale devised to measure empathy in this study was not a reliable measure of empathy and further work on an appropriate shorter scale to measure empathy should be carried out in future projects.

Visual Analogue Scales

Visual analogue scales have their limitations, especially when measuring complex constructs such as pain. Pain is not a uni-dimensional construct, yet participants were asked to rate pain on one scale. This simple method of measuring a pain estimate will have lost a lot of information that might have been valuable to answering the research questions.

The way in which intentions to reduce pain was measured has many limitations. The VAS is a unidimensional construct, unlike the decision to reduce pain, which is complex. There was no measure of *how* the nurse intended to reduce pain, i.e. analgesia, distraction techniques. These methods of pain reduction use different amounts of energy and arguably have different costs to the nurse. A range of different pain reduction methods for the nurse to choose from would have provided richer data. This would involve however, weighting each pain reduction method on its cost to the nurse. Furthermore, this in itself would be dependent upon how costly the individual nurse perceives each intervention to be. Moreover, saying that you will reduce pain and physically reducing pain is different. It is impossible to ascertain whether the nurses would have carried out the actions that they originally intended. Nevertheless, it would have been inappropriate to include these measures in this study. Further research exploring the perceived costs of pain reduction methods to nurses would be fruitful and interesting.

The presence and utilisation of a cheater detection mechanism in pain assessment is difficult to test empirically. In this research, participants were not explicitly asked if they thought that the patients in the vignettes were faking their pain. Instead this was inferred from ratings of reasonableness, exaggeration and minimisation. The addition of a question asking whether participants thought that the children were faking their pain would have answered this question, yet it seemed possible that the participants would have wanted to act in a socially

desirable way and may not have felt confident enough to admit that they thought a child was cheating in this context.

There were some limitations in the design of the VAS's. For the measurement of pain, the anchor points were 'low pain' and 'high pain'. These were used as it was decided that the images used depicted a child experiencing either low or high pain. As such, the vignettes were designed to measure either low or high pain, not 'no pain'. However, many participants did rate at the extreme end of the scale (i.e. 0 cm) which may suggest that in some instances, they did interpret the end of the scale as being no pain instead of lowest level of pain imaginable. It is unlikely that qualitatively, there is very little difference between the perception of the lowest pain imaginable and no pain. If this study were to be replicated, it is recommended that the anchor point be adjusted to say 'no pain', rather than 'low pain'. This would make a clearer distinction between participants choice in rating 0cm on the VAS and could allow for differentiation between no pain and very low pain. The addition of the numerical values of 0 and 10 at the anchor points may also serve to aid the participant in their scoring on a VAS.

Ecological validity

As with all research that aims to explore a phenomenon outside of the environment of that in which it occurs, this study has certain deficits. Pain expression is dynamic and fluid; movements of the face and body, and vocalisations will vary dependent upon social context. For this study, participants were asked to view facial images and imagine behavioural displays through written accounts. Undoubtedly, there are disadvantages to rating pain in this way verses the observation of pain in a real life setting. Observing the dynamic movement of pain display via video image or in clinical settings will tap into the cognitive processes involved in the judgement of pain in a more reliable way. Imagining a child's behaviour from a written account will provide a qualitatively different experience for each participant. Nevertheless, using photographic images allowed the intensity of pain displays to be controlled for and allowed this study to be carried out relatively inexpensively.

Furthermore, other variables can be controlled and accounted for that we know has an impact on pain assessment such as availability of medical information. Hamers et al. (1996) found that paediatric nurses were more willing to attribute pain and administer analgesia when children were more vocally expressive of their pain. However, severity of medical diagnosis and intensity of vocal expression were the

only factors manipulated in vignettes. Therefore this study does not provide evidence for vocal expressions over visual or behavioural descriptions of pain, just that vocal expression is a factor when assessing pain.

Future Research

The exploration of pain assessment as a social exchange scenario has only just begun. There is scope to replicate this study with groups of qualified nurses and compare the results to this study. In particular this may clarify the results around implicit scaling of visual pain and the habituation hypothesis. Furthermore, this study could be repeated with the addition of patient self-report ratings within the vignettes to increase the ecological validity and create an anchor point for which to compare participant's scores of pain. This may also provide a more efficient cue to cheating. The inclusion of video vignettes would further increase ecological validity. Moreover, the measurement of intentions to reduce pain could be developed to include the particular steps that nurses would take to reduce pain.

The present study provides evidence that judgements of reasonableness are important for the decision to reduce pain. There is scope for a study that would explore the concepts of reasonableness and fairness with nurses. A qualitative study would provide an opportunity to explore the emotional responses of nurses to their patients may provide an insight into the issues of fairness and reasonableness. Furthermore, a study that looks into how nurses perceive their social role may answer questions surrounding the impact of their identity on treatment decisions.

Conclusions

Research that explores the underestimation of acute pain by nurses has focussed on variables intrinsic to the individual or external variables that impact upon their cognition. The findings from these studies however often conflict with each other. Focus is moving away from the individual health professional towards thinking about pain assessment as a social and dynamic process. The evolutionary theory of social contracting applied to pain assessment provides a way of reasoning about the underestimation of pain in children that is less blaming for nurses. It can be suggested that the underestimation of pain occurs in response to cheater-detection; a cognitive mechanism that has developed to ensure the fair distribution of benefits to people in need. It is argued in this thesis that cheater detection is used in pain assessment situations. This study provides evidence that nurses

employ a cheater detection mechanism through the use of judgements of exaggeration. This study has broken new ground in the attempt to explore the effect of cheater-detection through the manipulation of social context and social role. The finding that people will alter their judgements and decision-making about pain, depending on the role that they take, supports the theory that pain assessment is influenced by social contracting.

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APPENDIX

Appendix 1 example page from stimulus booklet

Melissa

You are a nurse working on a paediatric surgical ward. It is part of your job to provide ongoing pain assessment for particular children on the ward.

Melissa is a 11 year old girl who is recovering from an operation. You are writing up some notes for another patient on the ward. You notice Melissa looking tense with her knees drawn up, clutching her stomach. She is crying. You need to move Melissa so that her bed sheets can be changed. You ask her to move from the bed to the chair. This is what you see.

Please make a mark along each line

How much pain is Melissa experiencing?

To what extent is Melissa exaggerating pain?

To what extent is Melissa minimising pain?

How likely is it that you would help reduce Melissa's pain?

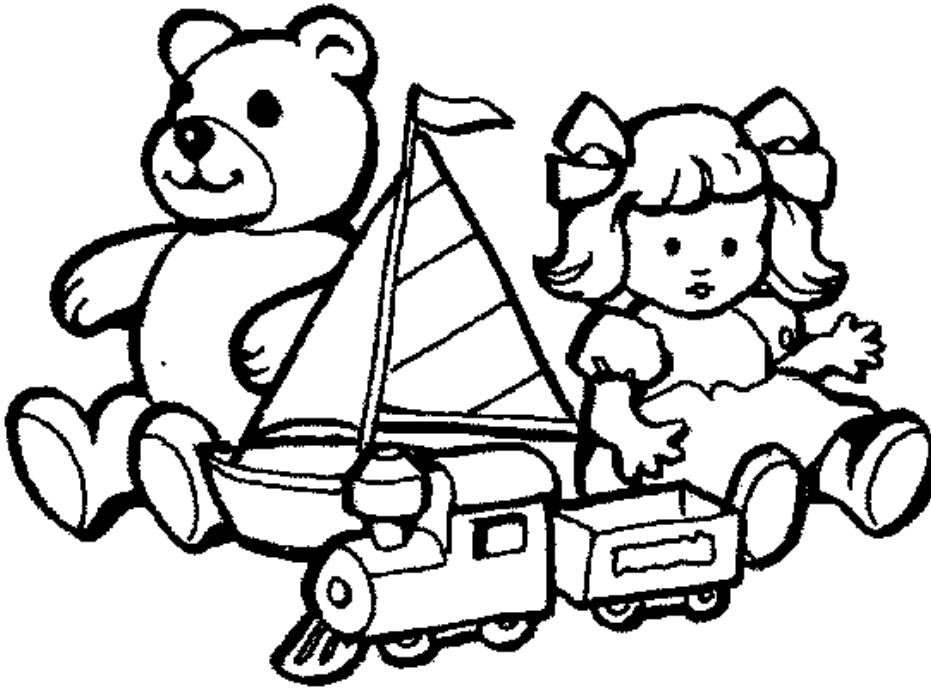
How reasonable do you think Melissa's reaction is?

IMAGE



Social role instruction booklet A

Now I need you to imagine that you are not a nurse, but that you work for a toy company and are visiting the ward to donate some toys



Social role instruction booklet B

Now I need you to imagine that you are a nurse working on
the ward



Appendix 2 vignettes

High Congruent vignettes

Nurse vignette

You are a nurse working on a paediatric surgical ward. It is part of your job to provide ongoing pain assessment for particular children on the ward.

Melissa is a 10 year old girl who is recovering from an operation. You are writing up some notes for another patient on the ward. You notice Melissa looking tense with her knees drawn up, clutching her stomach. She is crying. You need to move Melissa so that her bed sheets can be changed. You ask her to move from the bed to the chair. This is what you see.

Visitor vignette

You work for a toy company and have arrived to drop off some toys for the children's surgical ward at the local hospital.

You notice that there is a girl lying in bed, looking tense with her knees drawn up, clutching her stomach. She is crying. You see that the healthcare assistant needs to weigh the girl on some seated scales. The healthcare assistant asks her to move from the bed to the weighing chair. This is what you see.

Low Congruent vignettes

Nurse vignette

You are a nurse working on a paediatric surgical ward. It is part of your job to provide ongoing pain assessment for particular children on the ward.

Jason is a 12 year old boy who is recovering from an operation. When completing your rounds, you see Jason lying on his bed playing a handheld games console. He appears relaxed. You need to ascertain Jason's current weight on the weighing chair. You ask him to move from the bed to the chair. This is what you see.

Visitor vignette

You work for a toy company and have arrived to drop off some toys for the children's surgical ward at the local hospital.

You notice that there is a boy lying down in bed, reading a magazine. He appears relaxed. You see that a healthcare assistant asks him to sit up so that he can take his medication. This is what you see.

High Incongruent Vignettes

Nurse vignette

You are a nurse working on a paediatric surgical ward. It is part of your job to provide ongoing pain assessment for particular children on the ward.

Jacob is a 12 year old boy who is recovering from an operation. You are dispensing medication to the patients on the ward. You notice that Jacob is lying down on the bed, reading a magazine. He appears relaxed. You need to ensure that Jacob sits up on the bed as you need to watch him take his medication. You ask him to sit up. This is what you see.

Visitor vignette

You work for a toy company and have arrived to drop off some toys for the children's surgical ward at the local hospital.

You see a boy who is lying on his bed playing a handheld games console. He appears relaxed. The healthcare assistant asks him to move from the bed to the chair beside his bed. This is what you see.

Low Incongruent Vignettes

Nurse Vignette

You are a nurse working on a paediatric surgical ward. It is part of your job to provide ongoing pain assessment for particular children on the ward.

Kristen is an 11 year old girl who is recovering from an operation. You are taking the blood pressure of another patient. You notice that Kristen is lying in her bed squirming and kicking her legs in the bed. She is reaching for a wound on her side and is making a moaning sound. You need to ascertain Kristen's current weight on the weighing chair. You ask her to move from the bed to the chair. This is what you see.

Visitor Vignette

You work for a toy company and have arrived to drop off some toys for the children's surgical ward at the local hospital.

You notice that there is a girl lying in her bed, squirming and kicking her legs in the bed. She is reaching for a wound on her side and is making a moaning sound. You see that the healthcare assistant needs to weigh the girl on some seated scales. The healthcare assistant asks her to move from the bed to the weighing chair. This is what you see.

Appendix 3 facial action coding scores for the images used in this study

Social role	Congruency	Visual cue	Facial Expression
Nurse	Congruent	High	11
		Low	3
	Incongruent	High	10
		Low	3
Visitor	Congruent	High	11
		Low	4
	Incongruent	High	12
		Low	2

Appendix 4 results of the pilot study

Image	Selected for study?	Pain		Exaggeration	
		\bar{x}	SE	\bar{x}	SE
M1L	No	4.9	1.8	4.9	1.8
M1H	Yes	6.9	1.8	3.3	2.7
M2L	Yes	2.0	1.6	0.0	0.2
M2H	No	4.6	1.2	1.7	2.6
M3L	No	1.4	1.7	0.2	1.0
M3H	No	5.8	2.0	2.3	2.2
M4L	No	2.6	2.0	1.0	1.7
M4H	Yes	4.4	2.2	1.9	2.1
M5L	Yes	0.6	1.2	0.9	1.6
M5H	No	2.7	2.4	0.0	0.0
F1L	Yes	2.2	2.0	0.0	0.0
F1H	No	3.7	1.4	1.2	2.1
F2L	No	4.3	2.1	0.1	0.5
F2H	Yes	5.6	2.3	4.1	2.8
F3L	Yes	1.4	1.7	0.4	1.3
F3H	No	4.8	1.8	5.3	3.2
F4L	No	2.2	2.8	0.0	0.2
F4H	Yes	4.1	2.3	4.8	2.7
F5L	No	3.2	2.3	0.2	0.4
F5H	No	4.2	2.3	1.4	2.3



Information Sheet - Paediatric Nursing Study

What does this study involve?

This study aims to find out more about pain in children. I will ask you to read some vignettes and look at some images of children who may be experiencing some pain. I will then need you to answer some questions about them. All responses are anonymous and will not affect your studies. You are free to stop filling in the booklet at any time.

What is the potential harm or risks?

The booklet contains images of children who may be experiencing some pain. We do not anticipate that you will find these images distressing, however everybody is different. If you find any of these images affect you, please speak to the researcher (Laura Charlton-Miller).

What's in it for me?

You will receive a five pound gift voucher as thanks for participating in the study. You are also able to receive a short summary of the study after completion if you so wish.

If you are interested in taking part in this study and cannot participate now, please fill in your email address below and I will arrange to send you a booklet.

Email -----

Many thanks,

Laura Charlton-Miller
 Psychologist in Clinical Training
 Leeds Institute of Health Sciences
 Leeds University

Contact: Laura Charlton-Miller
 Room G.04 Charles Thackrah Building
 University of Leeds
 LS2 9JL
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Paediatric Nursing Study - Consent form

This study aims to find out more about pain in children.

Please sign below to acknowledge that you have read the information sheet and that you agree to participate in this study

Signed -----

Please sign below to acknowledge that you understand that you are able to pull out of this study at any time.

Signed -----

Please provide your email address if you would like a summary of the research once data collection has been completed.

Email -----

Many thanks,

Laura Charlton-Miller
Psychologist in Clinical Training
Leeds Institute of Health Sciences
Leeds University

Contact: Laura Charlton-Miller
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Appendix 7 letter confirming ethical approval

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Ms Laura Charlton Miller
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24 February 2011

Dear Laura

Re ref no: HSLTLM/10/ 010
Title: Do nursing students use cheater detection when assessing pain in children?

I am pleased to inform you that the above research application has been reviewed by the Leeds Institute of Health Sciences and Leeds Institute of Genetics, Health and Therapeutics and Leeds Institute of Molecular Medicine (LIHS/LIGHT/LIMM) joint ethics committee and following receipt of the amendments requested, I can confirm a favourable ethical opinion on the basis described in the application form, protocol and supporting documentation as submitted at date of this letter.

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval. This includes recruitment methodology and all changes must be ethically approved prior to implementation. Please contact the Faculty Research Ethics and Governance Administrator for further information (r.e.desouza@leeds.ac.uk)

Ethical approval does not infer you have the right of access to any member of staff or student or documents and the premises of the University of Leeds. Nor does it imply any right of access to the premises of any other organisation, including clinical areas. The committee takes no responsibility for you gaining access to staff, students and/or premises prior to, during or following your research activities.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited.

It is our policy to remind everyone that it is your responsibility to comply with Health and Safety, Data Protection and any other legal and/or professional guidelines there may be.

I wish you every success with the project.

Yours sincerely

Laura Stroud

**Professor Alastair Hay/Mrs Laura Stroud/Dr David Jayne
Chairs, LIHS/LIGHT/LIMM REC**

Appendix 8 reliability analysis for the empathy measure

The overall Cronbach's alpha was .36.

Item	Cronbach's Alpha if deleted
The people around me have a great influence on my mood	.35
I have personally suffered a significant amount of pain in the past	.27
I have had some personal training in empathy	.19
I can understand what people are trying to say even if they cant express it clearly	.32
I become more irritated than sympathetic when I see someone's tears	.40
When I see a person who is upset I feel moved to help them	.30