The Behavioural Expression of Empathy to Others' Pain versus Others' Sadness in Young Children

by

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acknowledgement in scholarly writing), and that all such use is clearly acknowledged.

To Elizabeth, for inspiring me to pursue a career in child psychology,

and

Jake, for providing the love and support to make it possible

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Abstract

Empathy for others' pain is an important human capacity. Despite this, little is known about how children develop or express their empathy for another individual's pain. Thus, this dissertation aimed to accomplish two primary objectives: 1) to describe and compare children's expressions of empathy toward others' pain and others' sadness, and 2) to examine whether developmental (i.e., age and sex) or interindividual variables of interest (i.e., temperament, social-emotional variables, language abilities) predict children's expressions of empathy for pain and empathy for sadness. To this end, 120 children (60 boys, 60 girls) between the ages of 18 and 36 months ($M = 26.44$ months; $SD = 5.17$ months) were assessed for their empathy-related behavioural responses to lab-based simulations of pain and sadness. Children's responses were coded for: *prosocial behaviours* (e.g., sharing), *attempts to understand the distress* (e.g., hypothesis testing), *self-distress behaviours* (e.g., self-soothing), *unresponsive/inappropriate responses* (e.g., ignoring, showing anger), and *miscellaneous responses* (e.g., imitation). Children were also given an overall rating of *global concern*. Differences emerged when individual behavioural codes were compared between pain and sadness simulations. Specifically, children were more likely to be distressed by, but also more likely to be prosocially responsive to, another's sadness. Interestingly, children were more likely to actively play during another's pain. Two principal component analyses were conducted: one for the pain simulations and one for the sadness simulations. Three components emerged both for pain (Empathic Concern for Others' Pain, Personal Distress to Others' Pain, and Unresponsiveness to Others' Pain) and for sadness (Empathic Concern for Others' Sadness, Personal Distress to Others' Sadness, and Social Referencing in Response to Others' Sadness). While there was some overlap in the conceptualization of the first two components for both pain and sadness, the behaviours that loaded onto these components were different. Additionally, the third component for each analysis described very different phenomena. For pain, this final component described general unresponsiveness to the other's distress. For sadness, the final component described a tendency to gauge one's response on the reaction of a parent. Hierarchical regression analyses examining the influence of developmental (i.e., age and sex) and interindividual variables of interest (i.e., temperament, social-emotional variables, and language abilities) in children's empathy-related responses were also conducted for each pain and sadness component. In general, age or sex differences only emerged for empathy-related responses to pain. Temperament, and to a certain extent social-emotional variables, showed some predictive value in how children would respond to another's pain or sadness. Language showed very little predictive value in children's expressions of empathy. While the findings of the current study indicate some conceptual similarities across children's empathic responses to pain and sadness, they also show interesting and important differences in the behavioural expression of children's empathic responses to pain and sadness. Additionally, developmental and interindividual variables predictive of children's empathic responses to pain and sadness emerged. A developmentally appropriate model of empathy is proposed highlighting all of these influences on children's expressions of empathy.

List of Abbreviations and Symbols Used

CHILDES   Child Language Data Exchange System

r Correlation

df Degrees of freedom

☆   Denotes a statistically significant difference ($p < 0.05$)

ECBQ   Early Childhood Behavior Questionnaire

fMRI   functional Magnetic Resonance Imaging

HRM   Halifax Regional Municipality

Δ   Increment of change

ITSEA   Infant-Toddler Social and Emotional Assessment

KMO   Kaiser-Meyer-Olkin value

CDI   MacArthur-Bates Communicative Development Inventories

M Mean

MANOVA   Multivariate analysis of variance

n Number of cases (in a subsample)

PAM   Perception-action mechanism

p p-value for significance testing

R Range

SD Standard deviation

β   Standardized regression coefficient

N   Total number of cases

T T-score (standardized score with $M = 50$, $SD = 10$)

HSD   Tukey's honestly significant difference

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Chapter 1: Introduction

Children are frequently exposed to pain during childhood. These painful experiences can range from minor everyday pain (e.g., falling down and scraping one's knee) to more intense, acute pain (e.g., immunizations) to chronic or recurrent pain (e.g., abdominal pain, headaches). While some forms of acute and recurrent pain may be present during the first year of life, the frequency of everyday bumps and bruises increases as children mature, their bodies become more mobile, and opportunities for peer and sibling interactions increase. In fact, these less intense, but still painful events occur more frequently than other sources of pain in childhood (e.g., medical procedures, illness; Harbeck & Peterson, 1992; Ross & Ross, 1984; Savedra, Gibbons, Tesler, Ward, & Wegner, 1982). Thus, for many healthy and typically developing children, these everyday types of childhood experiences constitute their growing understanding of the experience of pain. Furthermore, the frequency with which children encounter everyday pain creates ample opportunities for even the youngest children to witness pain in their peers, siblings, and others. This exposure serves to lay the foundation of children's awareness of the pain experience through their own and others' perspectives.

Fearon, McGrath, and Achat (1996) examined everyday pain among children in a daycare setting. Using a behavioural checklist, trained coders observed and recorded spontaneous incidents of pain in the daycare setting. Observations of 53 children ($M = 52$ months; $R = 28\text{-}81$ months) occurred over approximately 120 hours. During this time, 300 incidents were observed by the coders, yielding an overall rate of 0.33 incidents per hour per child. Many of these painful incidents (31%) involved children's heads, necks, and faces. Almost half (49%) of the recorded incidents were rated by observers as

causing only brief, minor discomfort to the injured child. Only 5 incidents (2%) were rated as causing severe pain. In a follow-up to this study, von Baeyer and colleagues (1998) used the same behavioural checklist to observe 50 children across six daycare settings ($M = 52.6$ months; $R = 36.8$-67.8 months). Similar to the findings of Fearon and colleagues (1996), children in this sample yielded an overall average of 0.41 incidents per hour per child. In a recent examination of everyday pain, trained coders observed and recorded spontaneous pain incidents in toddlers ($M = 21.04$ months; $R = 12$-32 months). The younger children in this sample experienced more incidents of pain, yielding an overall average of 0.57 incidents per hour per child (Chambers et al., 2010).

With these frequent incidents of everyday painful events in childhood, children are given the opportunity to not only experience pain themselves, but also to observe pain in others' vocal, facial, and behavioural expressions. Recent research indicates that the capacity to appreciate others' pain emerges early. Deyo, Prkachin, and Mercer (2004) investigated the development of sensitivity to others' pain from early childhood into young adulthood. A total of 134 participants across four different age groups (5-6 years, 8-9 years, 11-12 years, and young adults) judged the amount of pain in videotaped excerpts of shoulder-injured patients undergoing active and passive range-of-motion assessments. Based on facial displays of pain, the videotaped excerpts were rated prior to the study as exhibiting no pain, some pain, or strong pain. Results indicated that all participants, regardless of age group, found the facial expressions of strong pain more distinguishable than the facial expressions of milder pain. In addition, the ability to recognize pain exhibited in others' facial expressions increased with age. This trend continued up until age 11, at which point children responded in much the same way as

young adult ($M = 22$ years, $SD = 6$ years) participants. These findings suggest that while the sensitivity to others' facial expressions of pain is an ability already well established by 5 to 6 years of age, refinements in this ability continue as children mature.

Observing pain or suffering in others can provoke a vicarious emotional response, often referred to as *empathy*. Empathy, or experiencing a similar feeling as another, can serve to motivate individuals to respond to a distressed person's needs. Thus, empathy for someone's pain is an important motivator of helping behaviour. Past research on empathy has suggested that some components of empathy (e.g., displays of concern, attempts to understand the distress of the other) increase between the ages of 14 and 20 months (Zahn-Waxler, Robinson, & Emde, 1992). Additionally, prosocial acts (e.g., attempting to comfort the distressed other) start to emerge during this time period and appear with even greater frequency as children enter their third year of life (Robinson, Zahn-Waxler, & Emde, 2001). While children are more likely to respond to their mothers (rather than unfamiliar adults) at this time (e.g., Robinson et al., 2001), it is important to note that some children do begin to show prosocial responses to both parents and unfamiliar adults as early as 24 months of age (Young, Fox, & Zahn-Waxler, 1999).

While the general construct of empathy has been extensively studied over the past few decades, parallel investigations into empathy specifically for pain experiences have been virtually neglected. In the past, research on empathy has primarily relied on laboratory-based studies in which children are exposed to confederates feigning "distress". These laboratory-based empathy studies, although often involving pain-expressive scenarios, did not attempt to tease apart the confederate's pain response from his or her general distress (and therefore, the child's reaction to each). Many empathy

studies have used the term distress to refer to a broad range of experiences including strain, anxiety, sadness, anger, fear, fatigue, and pain (e.g., Zahn-Waxler, Radke-Yarrow, & King, 1979). Further breaking down these empathy-evoking situations into types of distress (e.g., sadness, pain) may provide additional understanding of other layers of empathy development.

Historically, a great deal of empathy research has focused on the biological bases of the phenomenon (for a review, see Preston & de Waal, 2002). In particular, biologists and evolutionary theorists have typically focused on the ultimate causes of altruistic behaviour (i.e., what it means for the fitness of the species), while psychologists and others have typically focused on the more proximate causes of altruistic behaviour (e.g., the trigger of the behaviour, the role of learning; de Waal, 2008). Across both research domains, a common misperception exists that humans are the only species to exhibit true altruism (i.e., behaviour that benefits another at a cost to oneself; de Waal, 2008). However, this claim has been questioned by the emergence of both naturalistic and experimental investigations that have highlighted truly altruistic-like behaviours across nonhuman species (e.g., chimpanzees, dolphins, elephants; de Waal, 2008). Empathy, specifically, is believed to play an especially important role in connecting individuals of a species together and promoting prosocial and altruistic behaviours. Empathic concern for others is believed to have arisen, evolutionarily, from parental rearing practices (in which caregivers felt connected to their young and were responsive to their needs) to evolving into a much broader role in social relationships within conspecifics (de Waal, 2008). The expression of pain, specifically, is thought to serve the evolutionary purpose of not only warning others of potential mutual dangers, but also signalling to others that assistance is

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needed (Williams, 2002). Preston and de Waal (2002) propose empathy (for others' pain among other experiences) can be explained by the perception-action mechanism (PAM). Briefly, this mechanism allows an observer access to the subjective nature of the others' experience by experiencing similar neural and bodily representations. These representations arise in the observer automatically and unconsciously upon attending to the other's experience. This shared experience is believed to promote prosocial responses on part of the observer to the others' needs (Preston & de Waal, 2002). The PAM is supported by human imaging studies, especially with the field of pain research (reviewed later in this chapter), showing a shared neural response between first-hand and vicarious experiences.

Beyond the evolutionary perspective, recent research in empathy for pain from the adult social neuroscience and psychology literature suggests that it is an evolving research field. This increased interest is due, in part, to a recent shift in the literature integrating the psychological and social features of the pain experience. For instance, in his Social Communication Model of Pain, Craig (2009) highlights important biological, psychological, and social influences in the sufferer's expression of and the observer's response to pain. Via their model of pain empathy, Goubert and colleagues (2005) specifically describe not only the complex judgments made by the observer of pain in deciding whether or how to respond, but also the factors that moderate their affective and behavioural responses. This model (see Figure 1) highlights the interpersonal/social functions of pain (rather than the intraindividual determinants of pain) and describes the adult experience of observing, and consequently responding to, pain in others. While the model is meant to describe the reactions of caregivers (e.g., health professionals) to

Figure 1. Model of Pain Empathy.
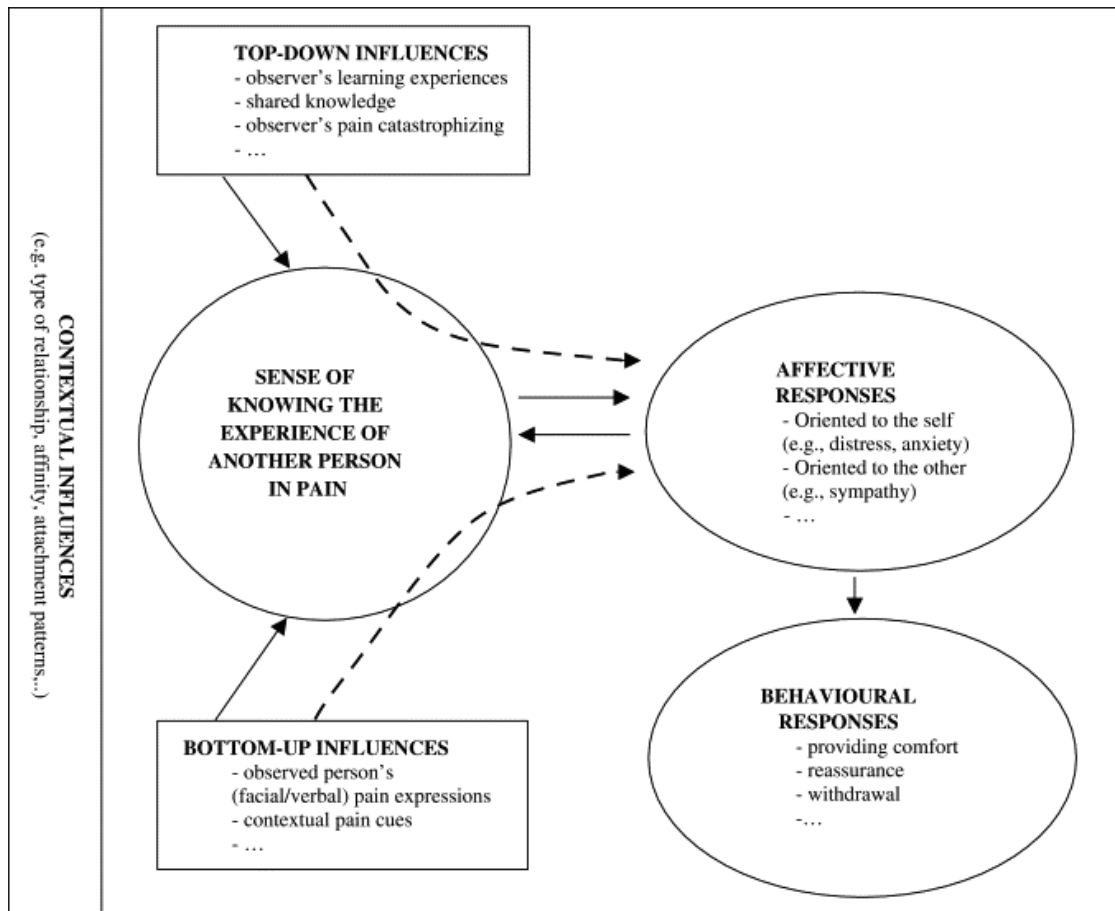
Directly from Goubert, L., Craig, K. D., Vervoort, T., Morleya, S., Sullivan, M. J. L., Williams, A. C de C., Cano, A., & Crombez, G. (2005). Facing others in pain: The effects of empathy. Pain, 118, 285-288.

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others' pain, it also hints at the cognitive, affective, and behavioural skills specifically

required to accurately and effectively respond to another person's pain. The model is

composed of not only the typical affective responses, but also the typical behavioural

responses stemming from an empathic reaction. In this conceptualization, witnesses of

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others' pain can have affective responses that are oriented to self (e.g., distress or anxiety) or are oriented to the other (e.g., sympathy). Likewise, resulting behavioural responses can be self-focused (e.g., withdrawal) or other-focused (e.g., providing comfort). In addition, this model provides examples of factors that may moderate these affective and behavioural responses. Possible moderators within the model include contextual factors (e.g., the relationship between the person in pain and the observer), top-down influences (e.g., shared knowledge between the person in pain and the observer), and bottom-up influences (e.g., the varying vocal and facial expressions of pain). These moderating variables create interplay between the vicarious emotional response of empathy and the affective responses resulting from it. Ultimately, the final outcome may be a behavioural response that can vary dramatically (i.e., from choosing to ignore the other's pain to deciding to take action to reduce the other's pain; Goubert et al., 2005). Because this model describes the adult experience of pain empathy, important developmentally relevant interindividual variables (e.g., temperament) are not considered. An examination of children's empathy for pain, specifically, would highlight important child-specific variables of empathy development and expression. Research on children's expressions of pain empathy would contribute to the creation of an empirically driven and developmentally appropriate version of this model, thereby providing a more comprehensive description of the complex construct of empathy in the child population.

Recently, a new approach to studying empathy has emerged in the adult and, to some extent, the child literature. Social neuroscience research has started using imaging methodology (e.g., functional Magnetic Resonance Imaging, fMRI; transcranial magnetic stimulation) to shed light on the possible social, affective, and cognitive aspects described

in this model of pain empathy. In one of the earliest examples of this line of research,

Morrison, Lloyd, di Pellegrino, and Roberts (2004) used fMRI to determine which areas

of the brain showed activity when participants were either pricked with a pin themselves

or watched a video of another person receiving a pinprick (not showing that person's

face). The findings showed that similar areas of the brain were activated for both

experiencing and witnessing a painful event, suggesting that the experience of feeling

pain is neurologically similar to witnessing another in pain. This type of empathic neural

activation has successfully been elicited using a variety of stimuli including viewing a

victim's facial expression of pain (e.g., Lamm, Batson, & Decety, 2007), viewing only

the painful event without an accompanying facial expression (e.g., Decety, Michalska,

Akitsuki, & Lahey, 2009), and even by receiving an arbitrary signal solely indicating that

the other person was undergoing a painful stimulus (e.g., Singer et al., 2004). Recent

exchanges in the journal *Pain*, however, suggest that these types of imaging studies may

oversimplify the complexity of the construct of empathy by equating any somatosensory

imaging resonance with empathy. In particular, Decety (2009) argues that vicarious

emotion (as shown in brain activation) does not itself determine whether or not the

observer of distress has any insight into the victim's internal state. In other words, a

possibly automatic neural response to witnessing the pain of another cannot be

undeniably identified as empathy and therefore, may not be a reliable marker for

empathic responding and prosocial behaviour. Outside of pain imaging research, other

investigations of general adult empathy have identified similar definitional and

measurement issues (e.g., empathy in the field of nursing; Yu & Kirk, 2008; 2009).

Although empathy for pain is building momentum in the adult literature, measurement

issues in imaging and questionnaire tools, as well as inconsistent definitions of the construct itself, highlight significant challenges within this area of research.

In the first imaging study examining pain empathy with children, Decety, Michalska, and Akitsuki (2008) showed typically developing children (7- to 12-years-old) short videos of others experiencing nonpainful and painful (both intentionally inflicted and accidental) events. Consistent with findings from the adult literature, the areas of the children's brains activated while watching a video of an individual experiencing pain were similar to those activated when experiencing pain first-hand. Furthermore, when this pain was intentionally inflicted, areas of the brain typically associated with social interaction and moral behaviour were also activated. A follow-up to this study compared the neural responses of adolescents with conduct disorder to those of matched control adolescents without aggressive behaviours (Decety et al., 2009). In line with previous imaging investigations, similar areas of the brain were activated for both groups watching a video of an individual experiencing pain. Interestingly, however, the children with conduct disorder (unlike the control sample) showed atypical neural responses when watching the videos of individuals experiencing intentionally inflicted pain. Areas of the brain usually associated with reward or enjoyment were activated in the conduct disorder group, but not the control group, when videos showing intentionally inflicted pain were viewed. One possible interpretation of this finding (as offered by the authors of the study) is that highly aggressive children may actually enjoy watching pain be inflicted on others. Another interpretation suggests that aggressive children may be overaroused by others' pain and may be unable to regulate their negative emotional response towards them (Decety et al., 2009). Research investigations conducted with

aggressive/antisocial youth suggest that callous-unemotional children may even be less likely to attend to the emotionally salient cues of another person's facial expression (i.e., his/her eyes) and often show deficits in emotion recognition and empathy (e.g., Dadds & Rhodes, 2008). Together, these findings provide evidence for neural and behavioural differences in how aggressive or callous youth respond to emotionally charged stimuli.

As highlighted in the model of pain empathy (Goubert et al., 2005), the development of this construct is particularly important in determining why some children grow up to be responsive to others' pain and why other children grow up to be either overly distressed by or more likely to be unresponsive to others' pain. Examining how individuals develop empathy and under which circumstances they express empathy for others may contribute to the current understanding of the significant challenges that continue to exist in appropriately assessing and adequately managing pain in both the child (e.g., Schechter, 2006) and adult populations (Brennan & Cousins, 2004). While this model provides a comprehensive description of pain empathy in adults (Goubert et al., 2005), it does not adequately describe the developmental nature of this construct among children. For instance, research has yet to be conducted investigating the importance of bottom-up influences in children's expressions of empathy. One particular area of interest in this regard is whether children express their empathy for pain differently than for other more commonly studied constructs such as emotions (e.g., sadness). No prior research has purposely examined whether the incoming stimuli of the empathy-evoking simulation create different empathy-related responses in children. In addition to examining these intraindividual differences (i.e., how children respond to pain versus sadness), additional interindividual influences need to be further explored in

young children's empathy-related responses. To this end, child characteristics shown to be predictive of children's general empathy-related responses (e.g., temperament, social-emotional variables) may influence children's expressions of empathy for pain and empathy for sadness in different ways. Additional developmentally relevant variables (e.g., age, sex) would also likely be incorporated in any model describing the empathic experience of children. This dissertation study aims to answer these questions and in doing so, to suggest a more developmentally appropriate model for children's empathy.

The remainder of this chapter reviews the most relevant and current research on the development of empathy in young children. This discussion begins with definitions of the construct of empathy, as well as related, but different, constructs (i.e., sympathy and personal distress). Next, a review of the reigning theory of empathy development (Hoffman, 2000) is presented. A brief description of the various methods of measuring empathy follows, including limitations previous measurement tools have created in reliably interpreting many research findings. Finally, relevant empathy research findings specific to the developmental period of interest and possible correlates of empathy will be synthesized. The review will conclude with rationale for the present study and a description of the primary and secondary research questions under examination in this dissertation.

Overview of Moral Development in Children

Kohlberg (1968) once described children as "moral philosophers". In using this description, Kohlberg was not implying that children explicitly employ theories of morality in their daily lives, but rather that the seed of morality is planted and continues to develop based on experiences in early childhood. For this reason, and not surprisingly,

developmental psychologists have long been interested in the development of moral reasoning and behaviour. Moral reasoning refers to how individuals think about and justify their own behaviour and the behaviour of others (Kohlberg, 1984; Piaget, 1932). Moral behaviour is typically characterized as a response to benefit another person, rather than oneself (Eisenberg, Spinrad, & Sadovsky, 2006). Research has shown that children's development of moral reasoning stems from interactions with both parents and with peers (Walker, Hennig, & Krettenauer, 2000). Furthermore, research on moral development has shown positive associations between children's moral reasoning and behaviour and children's cognitive, social, and emotional development (Killen & Smetana, 2006). However, particular focus on children's moral development has lagged behind the research focused on the more commonly investigated areas of cognitive, social, and emotional development. Thus, the process of moral development in children continues to be explored in many new and different ways.

The research that has been conducted over the past three decades has served to increase knowledge regarding children's moral development and understanding of the development of children's ability to perceive others' emotions. Briefly, the specific ability to accurately perceive, and consequently feel, someone else's feelings and emotions is referred to as *empathy*. The development of empathy requires children to not only accurately view the world through their own eyes, but also through the eyes of another person. Taken a bit further, an empathic response requires a child to understand the situation of another and to be able to communicate that understanding in an appropriate way. Often times, these types of responses are regarded as prosocial behaviour. Not surprisingly, empathy and sympathy are positively correlated with

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engaging in prosocial behaviour (Eisenberg, Fabes, & Spinrad, 2006). Although this linkage has not always been supported (Underwood & Moore, 1982) in the literature, many believe the development of empathy remains an important aspect of children's prosocial development.

Defining Empathy and Related Constructs

Although a widely understood construct, defining empathy in precise words has remained somewhat difficult. Eisenberg, Fabes, and Spinrad (2006) provide the following definition of empathy: "an affective response that stems from the apprehension or comprehension of another's emotional state or condition, and which is identical or very similar to what the other person is feeling or would be expected to feel" (p. 647). Inherent in this definition are three critical aspects of empathy: 1) the affective response is actually triggered from another's emotional state or condition, 2) empathy is an affective response, which implies that 3) empathy is not a behavioural response. Prevalent in previous research are studies relying on behavioural responses of participants to measure empathy (e.g., Bischof-Köhler, 1991; Kiang, Moreno, & Robinson, 2004). While empathy is often associated with prosocial behaviour, the true definition of this construct reflects solely feeling what another individual is feeling, not necessarily acting on this feeling. Specifically, within the context of pain, empathy requires one to simply feel, to some extent, the pain of the other, not necessarily to attempt to relieve the pain of the other. However, it makes intuitive and theoretical sense that empathy (often moderated by sympathy, explicitly defined later) would be positively associated with prosocial behaviour (i.e., communicating the understanding of another's emotion; Eisenberg, 2000). Finally, when defining empathy, it is important to note that although Eisenberg,

Fabes, and Spinrad's (2006) definition encompasses empathy for negative and positive emotions or conditions, attention is typically focused solely on responses towards others' negative emotional states (e.g., sadness, pain, anger, distress). While children's empathy for others' positive emotions has been studied (e.g., Sallquist, Eisenberg, Spinrad, Eggum, & Gaertner, 2009), empathy for negative emotional experiences is the particular focus of the present dissertation and thus, the discussion that follows is centred on children's responses to others' negative (versus positive) states or conditions.

Empathy is frequently used interchangeably with other related, but slightly different, vicarious emotional responses. Such constructs as empathy, sympathy, and personal distress are similar to each other in that they each commonly result from one's emotional reaction to another individual's distress (Eisenberg, Spinrad et al., 2006). Likewise, each construct can be considered a *vicarious* emotional response to varying extents (e.g., sympathy and personal distress can both stem from empathic vicarious responding; Eisenberg, Fabes et al., 2006). However, the motivation behind each reaction and the ultimate outcome of each response is quite different. In an effort to clarify the definition of empathy in particular, a discussion of the related constructs of *sympathy* and *personal distress* is included below.

Sympathy. Sympathy, a moral emotion closely related to empathy, is defined as "an emotional response stemming from the apprehension of another's emotional state or condition, that is not the same as the other's state or condition but consists of feelings of sorrow or concern for the other" (Eisenberg, Spinrad et al., 2006, p. 518). In this definition, the hallmark of sympathy is a feeling of sorrow or concern for the other. Like empathy, a sympathetic response requires an understanding of the other's pain or distress

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(Spinrad et al., 1999). However, unlike empathy, sympathy does not require the element of feeling the same emotion of the individual in pain or distress. For instance, one can feel concern towards another's physical pain, yet not truly experience or feel the pain of the other.

In terms of the focus of the behavioural response, sympathy tends to be other-oriented (e.g., attempts to decrease the other person's distress) whereas empathy may not extend to anyone outside of the individual (e.g., merely experiencing the distress of the other, but not acting on it; Findlay, Girardi, & Coplan, 2006; Spinrad et al., 1999). However, it is generally accepted that a sympathetic response may originally stem from an initial empathic response (Eisenberg, Spinrad et al., 2006). In this way, empathy may exist as a precursor to sympathy. It is important to note, however, that sympathy is not always triggered by empathy as sympathetic concern can exist without an initial empathic response. Regardless, the constructs of empathy and sympathy are very closely related and appear to have a causal, if not synergistic, relationship. Intuitively, people who feel another individual's pain/distress and have genuine concern for them are expected to help and not to hurt them. Therefore, children's empathy-related and sympathy-related responses have been associated with positive outcomes such as prosocial behaviour (e.g., helping or sharing). Empathy is thought to produce a prosocial response because the child is feeling what the other person is feeling (e.g., distress), whereas sympathy is thought to produce a prosocial response because the child is feeling sorrow, pity, or concern for the other person.

Personal Distress. Just as empathy can lead to sympathy in some individuals, empathy can also trigger personal distress for other individuals. Personal distress is

described as a self-focused, aversive, and vicarious emotional reaction to another individual's emotion. In these cases, children have trouble recognizing that their own affective response is, in reality, based on another's negative experience and not their own experience. This type of reaction is often manifested in the individual as discomfort or anxiety (Batson, 1991, as cited in Eisenberg, Spinrad et al., 2006). Described as resulting from empathic overarousal, individuals who respond to empathy-evoking situations with personal distress are often thought to be unable to regulate their own emotional response (Eisenberg, Spinrad et al., 2006). In this way, young children who have not yet developed the capacity to control their own reactions to another person's distress will become very distressed themselves (Eisenberg & Fabes, 2006). Specifically, the same response is seen in some children's response to others' pain. The evidence of someone else in pain may be too overwhelming for the child, rendering him or her unable to assist in helping to reduce the pain experienced by the other individual.

In terms of the focus of a behavioural response, personal distress reactions tend to be solely self-directed. Like sympathy, personal distress often results from empathy. However, because children high in personal distress are overaroused by their own empathic response, they must find ways to comfort themselves and tend to ignore the distress of the other individual. Consequently, personal distress has been either unrelated or negatively related to positive outcomes like prosocial behaviour (Eisenberg, Fabes et al., 2006).

Empathy and Moral Behaviour. Moral behaviour is generally characterized as a response to benefit another person, rather than oneself (Eisenberg, Spinrad et al., 2006). Understanding the morality of behaviour through this perspective relies on the underlying

motivation of an individual's actions. When addressing the constructs of sympathy and personal distress, empathy is considered the base of the response and therefore is viewed as value neutral. Sympathy, on the other hand, is considered an emotional component of morality. Therefore, sympathy (described as "an important source of moral motivation"; Eisenberg, Spinrad et al., 2006, p. 518) is believed to lead to moral behaviour. Conversely, personal distress is a reaction that is self-focused and ignores the other individual's pain or distress. Therefore, a response of personal distress is not characterized as leading to moral behaviour (Eisenberg, Spinrad et al., 2006).

The constructs of sympathy and personal distress clearly highlight the challenge young children have in differentiating between self and other. As empathy and empathy-related responses continue to develop, so too does the distinction between oneself (and one's own emotions) and others (and their distinct emotions). However, it is important to note that sympathy and personal distress are not restricted to the toddler or preschool years. Some children will continue to be overly distressed by others' pain or distress well into childhood and even adolescence or adulthood.

Differentiating between Sympathy and Personal Distress. Several indices have been used to differentiate between sympathy and personal distress in children including self-report questionnaires and physiologic, facial, and behavioural markers. Heart rate is one of the most frequently used physiologic markers. Sympathy, an other-oriented response, is typically associated with heart rate deceleration. Personal distress, on the other hand, is usually self-focused resulting in heart rate acceleration (for a review, see Hastings, Zahn-Waxler, & McShane, 2006). For facial indices, sympathy is exhibited by a facial display of concern or even sadness. For personal distress, facial responses tend to

exhibit anxiety or distress (e.g., Eisenberg, McCreath, & Ahn, 1988). As for self-report

markers, sympathetic children would likely express concern or sorrow for the other while

personally distressed children would likely express anxiety or fear (Eisenberg & Fabes,

1990). Research examining the reliability of these markers in differentiating sympathy

and personal distress has largely supported these descriptions (e.g., Eisenberg, Schaller et

al., 1988). With respect to behavioural indices, research conducted with preschoolers

(Eisenberg et al., 1990), school-aged children, and adults (e.g., Eisenberg et al., 1989) all

provide evidence for reliable correlations between the previously described markers and

associated behavioural responses. Specifically, prosocial responses are positively

correlated with heart rate deceleration, facial concern (for children) or sadness (for

adults), and self-reported concern for the other. Conversely, prosocial responses are

negatively correlated with heart rate acceleration, facial distress or anxiety, and self-

reported feelings of distress.

The Development of Empathy: Hoffman's Theory

Soon after birth, humans appear to possess the ability to display varying degrees

of empathy. These displays can range from imitation in the form of facial responses in

newborns to an outright display of feeling another individual's distress or pain. Even

during infancy, humans are able to match another individual's facial expression. In one

such investigation, Meltzoff and Moore (1977) showed that newborns as young as 12 to

21 days of age were able to imitate an adult experimenter's facial movements (i.e.,

tongue protrusion, mouth opening, and lip protrusion) and manual gestures (i.e.,

sequential finger movement). Additional research has shown that newborns as young as 2

days of age (Field, Woodson, Greenberg, & Cohen, 1982) and 10-week-old infants

(Haviland & Lelwica, 1987) are able to discriminate between facial displays of emotions (e.g., surprise, joy, anger, sadness) and, under some circumstances, may even be able to match certain features of these facial expressions (Field et al., 1982; Haviland & Lelwica, 1987). Beyond simple imitation, research has even shown that infants will tend to cry at the sound of another infant in distress (Sagi & Hoffman, 1976; Simner, 1971). This type of response, typically referred to as reflexive crying, is generally perceived as a rudimentary empathic response and not merely imitative. These initial incidents of emotion-matching and reflexive crying occurring during infancy are believed to develop into true empathic reactions for others as infants mature neurologically and cognitively. Coupled with an increase in social interactions, the increased cognitive maturity develops into an empathic understanding and an awareness of others' needs (Brothers, 1989).

Although many kinds of theories (e.g., biological, social) have been proposed to explain the progression of empathy development, Hoffman (1982; 2000) provides one of the more inclusive accounts. Hoffman describes a theoretical model that begins with infants' self-concern in response to another individual's distress and ends with true empathic reactions towards others (mostly observed as prosocial behaviour). According to Hoffman, this development into true and meaningful empathy in children occurs during the first few years of life. A description of the major stages in Hoffman's theory of empathy development is reviewed next.

Global Empathy: First Year. The first major developmental stage proposed by Hoffman (1982; 2000) occurs during the first year of life. Commonly referred to as *global empathy*, this stage of development is first seen in infants and describes their tendency to feel the distress of another in a global manner. Infants at this stage are unable

to distinguish others as physical entities different from the self. Furthermore, emotional states of others are not differentiated from emotional states of the self. Therefore, the distress of another infant elicits discomfort in the individual, making the true source of the distress indistinguishable.

Over the years, there has been much empirical support for Hoffman's theory of global empathy during the first year of life. Considerable evidence suggests that young infants will tend to cry in response to another infant's distress, typically referred to as reflexive crying (e.g., Sagi & Hoffman, 1976; Simner, 1971). This display of global empathy suggests that humans may even be hard-wired to respond to others empathically, even if initially the response is quite rudimentary. However, it should be noted that some researchers have refuted this statement suggesting that newborns and infants may just be conditioned to find the sound of distress aversive (e.g., Thompson, 1987) or simply a signal that something may be wrong. Interestingly, one study examining reflexive crying showed that children cried more in response to another newborn's cry than to their own (G. B. Martin & Clark, 1982). Nevertheless, research has consistently shown that infants are responsive to the emotional signs of others. In a study conducted by Termine and Izard (1988), 9-month-old infants were confronted with their mothers' facial and vocal display of either an expression of sadness or an expression of joy. Infants in the sad expression condition responded with more negative emotional facial expressions (i.e., sadness, anger) and ultimately, tended to look away from their mothers. Conversely, infants confronted with their mother's happy expression were more likely to express similar joyful facial expressions. Interestingly, children engaged in significantly less play during the sadness condition suggesting that children may have actually experienced the

sadness expressed by their mother in a vicarious manner. Taken together, these incidences of global empathy are considered precursors to true empathy.

Egocentric Empathy: Second Year. The second level of empathy development, as proposed by Hoffman (1982; 2000), is characterized as *egocentric empathy* or *quasi-egocentric empathy* (Hoffman, 2000). Unlike global empathy, this second stage of development incorporates the distressed individual in a more inclusive manner. The self-distress existent in global empathy gradually begins to diminish and the understanding that someone outside the self is in distress begins to increase. Children at this stage, however, continue to have difficulty in completely teasing apart the self from the other. For this reason, children considered to have egocentric empathy usually attempt to comfort the distressed individual in a way that they would like to be comforted in the same or a similar situation. This stage of development is believed to coincide developmentally with object permanence and self-other differentiation during the second year (Hastings et al., 2006). This linkage may be a direct result of children at this particular stage recognizing that emotional states can be directed towards objects (either present or not). This transition reflects an important step in developing social competence (Moore, 2006).

According to Hoffman, children transition to egocentric empathy as early as the second year of life. This stage is typically considered the foundation of true empathy. As a result, much of the empathy research has been conducted with this young age group. Between the ages of 12 and 18 months, children begin to react to others' distress by orienting towards them or by displaying distress reactions themselves. Although a less consistent finding, children at this stage may also attempt to respond to the others'

distress in a prosocial manner (e.g., by attempting to verbally reassure them). Over the course of this age span, children began to display less self-focused reactions (e.g., becoming distressed themselves) and increasingly attempt to respond to the others' needs and feelings. In a study examining the development of empathy in monozygotic and dizygotic twin pairs (Zahn-Waxler, Robinson et al., 1992) determined that concern for others increased between 14 and 20 months of age for both monozygotic and dizygotic twin pairs.

Empathy for Another's Feelings: Third Year and Beyond. During the third year of life and continuing into the preschool years, children become more aware of the diversity of psychological relations – that other individuals may experience internal states different from their own. Consequently, this stage of empathy development is thought to coincide with the emergence of role-taking abilities. Hoffman (1982; 2000) refers to this stage of empathy development as *empathy for another's feelings* or as *veridical empathy* (Hoffman, 2000). With a growing understanding that others' needs and feelings may be different than one's own needs and feelings, children in this stage are increasingly able to take an other-oriented approach. During this stage of development, children also begin to make large strides in their cognitive and social maturity. The awareness of others' needs coupled with increased exposure to a variety of people and situations, results in children in this stage being better equipped to recognize a variety of emotions and comfort the distress of others in a variety of prosocial ways. In fact, during this time, there is an increased tendency to not only recognize the distress of the other (as also seen in the second year of life), but also to respond to the distressed other in an attempt to reduce their distress and to comfort them. Consequently, this stage of empathy development is

characterized by the increasing likelihood for a child to respond to another's distress in a variety of prosocial ways (e.g., hugging them, sharing a toy).

Empathy for Another's Experience: Late Childhood. Hoffman (2000) refers to the final stage of empathy development as *empathy for another's experience*. This level of empathy requires a form of abstraction and mental representation in which children are able to show empathy for those not physically present. For example, children in this stage have the ability to empathize for collective groups of people in a similar challenging situation (e.g., the homeless). Hoffman (1982; 2000) suggests that while this final stage of empathy may first begin to unfold at around ten years of age, empathy for another's life condition continues to develop well into adolescence.

Measuring Empathy

As with many areas of developmental research, measuring a construct such as empathy in children has proved to be methodologically challenging. An early reliance on faulty self-report methods using picture-story indexes of empathy and inadequate differentiation between empathy and other empathy-related responses (i.e., sympathy, personal distress) resulted in confusing and often inaccurate findings. Advances in the use of self-report measures of empathy and the incorporation of nonverbal measures of empathy (e.g., facial, gestural/behavioural) have served to alleviate these earlier challenges. Although some progress has been made in the use of physiological measures of empathy (e.g., skin conductance, heart rate), these specific approaches have not always resulted in reliable findings and will not be reviewed. Instead, a brief review of three other, more commonly used approaches to measuring empathy will be provided: self-report, facial, and behavioural measures. While not all of these approaches have been

successfully used across developmental periods, each technique provides a unique

perspective from which to study the development of empathy and empathy-related

responding.

Self-report. Self-report has long been the most popular method to measure

empathy and empathy-related responses in both children and adults (Eisenberg & Fabes,

1990). Earlier empathy research relied almost exclusively on a story-book measure of

empathy (e.g., Feshbach & Roe, 1968). This type of measure of empathy involved

presenting a child with a series of short stories (usually illustrated) about an emotional

event (e.g., a child losing his or her dog). Upon hearing the story, the child would then be

asked, "How do you feel?". If the child responded that he or she felt an emotion similar

to what the child in the story would be feeling (e.g., sad), it was considered that he or she

was empathizing (Eisenberg & Lennon, 1983). However, many researchers questioned

the use of this type of self-report measure of empathy suggesting the instrument was

more likely assessing a child's inclination to respond in a socially acceptable or desirable

way versus actually measuring empathy (Eisenberg & Lennon, 1983; Eisenberg-Berg &

Lennon, 1980).

Since this time, more sophisticated self-report instruments have been commonly

used to measure empathic responses to an emotionally charged video or story. In these

types of approaches, children are provided an emotion (e.g., sadness) and asked to rate

their reactions using a scale (e.g., 1 = *don't feel that way at all*; 5 = *feel that way a whole*

lot). In some cases, these self-report measures have been further enhanced for young

children by providing the scale visually (e.g., stacks of checkers of varying heights;

Eisenberg, Fabes, Schaller, Carlo et al., 1991). These approaches have also been used to

measure dispositional empathy or, in other words, empathic tendencies. Examples of these types of measures have been provided in the form of Bryant's (1982) empathy scale for children and adolescents and Davis's (1983) Empathic Concern subscale (one of four subscales in the Interpersonal Reactivity Index). Example child/adolescent items include: "I get upset when I see an animal being hurt", "Even when I don't know why someone is laughing, I laugh too", and "I really like to watch people open presents, even when I don't get a present myself" (Bryant, 1982). In young children, however, these self-report measures have commonly failed to produce a significant association between empathy and prosocial responses (Eisenberg & Miller, 1987), possibly because they fail to distinguish between empathy, sympathy, and personal distress reactions. In general, children's self-reports appear to be particularly influenced by demand characteristics as well as child-specific factors (e.g., the sex of the child; Eisenberg & Lennon, 1983) that do not consistently emerge in other measurements of empathy. Furthermore, these measures of empathy are not appropriate for young children unable to provide self-report. Developmental issues would suggest children under a certain age may have difficulty assessing and reporting their own internal states (Eisenberg & Fabes, 1998). For these reasons, researchers in the field of empathy have made attempts to incorporate nonverbal measures of empathy, such as facial and behavioural responses, described next.

Facial Indexes of Empathy. Since empathy is described as a vicarious emotional response, facial expressions of empathy would tend to look similar to the emotion that was used to induce empathy (e.g., sadness). Extensive research has served to establish universal and reliable facial displays of variety of emotions, as well as pain (e.g., Ekman & Friesen, 1975; Izard & Dougherty, 1982). Facial indices of empathy involve coding

children's emotional reactions (e.g., distress, concern) to emotionally charged stimuli (e.g., video showing a child in distress). While previous research has shown some positive associations between facial indices of empathy and measures of prosocial behaviour (e.g., Roberts & Strayer, 1996), there has been less convergence between individual indices of empathy (e.g., facial and self-report measures of empathy; Eisenberg, McCreath et al., 1988).

In a study conducted by Strayer and Roberts (1997), 5-, 9-, and 13-year-old children's facial reactions of empathy to emotionally evocative videotapes were assessed using Izard's Facial Coding System (Izard & Dougherty, 1982). For the purpose of this particular study, facial empathy was defined as exact matches in the facial features of the participants and the characters in the various videotaped stories. In addition to this facial index of empathy, children were asked to describe the emotions they attributed to both the person in the video and to themselves. Thus, a verbal index of empathy was also obtained, determined by exact matches between children's attributed and self-identified emotions. Findings showed that there was little convergence between these facial and verbal indices of empathy ($r = 0.08$), suggesting these indices of empathy are essentially independent.

In a more recent study conducted by Holmgren, Eisenberg, and Fabes (1998), facial responses of empathy were coded for kindergarten to third-graders using a modified version of Ekman and Friesen's (1978, as cited in Holmgren et al., 1998) work developed by Eisenberg and colleagues (1989). In this study, children's faces were recorded while watching an empathy-evocative film. These videotapes were then coded for three different facial reactions (i.e., distress, concerned attention, and sadness) using a

5-point system (1 = *no display of the emotion*; 5 = *strong display of the emotion*). Additionally, ratings of children's dispositional prosocial behaviour were provided by teachers, parents, and peers. As hypothesized, children rated by their teachers as prosocial showed higher levels of empathic facial reactions (i.e., facial sadness) and lower levels of facial distress to the video. However, this association did not emerge for either the parent or the peer ratings of children's dispositional prosocial behaviour.

To date, past research relying on the facial indices of empathy has focused exclusively on children preschool-aged and older (e.g., Eisenberg et al., 1990; Holmgren et al., 1998; Strayer & Roberts, 1997). While it has been suggested that children's facial responses of empathy would be more reliable with age, a study examining empathy in 5- to 13-year-old children failed to show any relation between age and a facial index of empathy even though a much stronger relation emerged between age and a verbal index of empathy (Strayer & Roberts, 1997). In fact, researchers using facial indices of empathy in school-aged children have reported that facial measures may even underestimate the level of empathy (Eisenberg, Schaller et al., 1988; Strayer & Roberts, 1997) when compared to verbal indices. Collectively, these findings suggest that facial indices are not the most reliable way to measure empathy in young children.

The Behavioural Expression of Empathy. Behavioural expressions have frequently been used to measure empathy in children. In fact, because children in the first few years of life are unable to provide a self-report of empathy, and because facial indices of empathy have yet to be proven valid methods by which to measure empathy, behavioural expressions have been the primary approach used to observe and measure young children's empathy development. Thus, the behavioural expression of empathy is

an important aspect in the continued examination of empathy development. As a result, the relation between empathy and prosocial behaviours is reviewed next.

Prosocial behaviour has been an important construct of investigation in many empathy studies. Measurement of prosocial behaviour in empathy research has varied widely from ratings provided by the participating child (i.e., self-report) to ratings of the participating child by others (e.g., parents, teachers, peers) to more observational indices of behaviour (e.g., solicited and unsolicited incidences of helping, sharing, and comforting verbalizations of caring responses towards others in the lab, home, or school/daycare setting; Eisenberg & Miller, 1987).

As mentioned earlier, a link between empathy and prosocial behaviour has been theoretically proposed. However, inconsistent results and methodological challenges have made this claim less definitive. A meta-analytic review conducted by Underwood and Moore (1982) concluded that empathy was not significantly associated with prosocial behaviour. However, many of the studies included in their review used the problematic picture-story measure of empathy (Feshbach & Roe, 1968). In a follow-up review of the literature, Eisenberg and Miller (1987) discovered that there was no significant relation between this measure and prosocial behaviour, suggesting that the validity of this sort of instrument to measure empathy was indeed questionable.

Since this time, research has made strides in further defining the links between empathy and prosocial tendencies and/or behaviour. The particular relation between empathy and prosocial tendencies has been well established. Children high in empathy also tend to be high in comforting, altruistic, and responsive behaviours toward peers (e.g., P. A. Miller & Jansen op de Haar, 1997). Secondly, the specific relationship

between empathy and prosocial behaviour, although possibly more modest than originally posited, also appears to exist (Eisenberg & Miller, 1987). For example, a study conducted by P. A. Miller, Eisenberg, Fabes, and Shell (1996) investigated the relations between moral reasoning, empathy, and prosocial behaviours toward peers and adults. Their sample consisted of 4- and 5-year-old children who were shown videos of other children hurting themselves while playing. Participating children's facial reactions were recorded and self-reports of their own emotional states were gathered. Additionally, children were given the opportunity to engage in prosocial behaviour directed at the children in the films (i.e., creating boxes of crayons for the children to colour with while in hospital). Children's responses to simulations of adult (i.e., their mothers, an experimenter) pain were also recorded and coded for an array of behaviours (e.g., facial concern, personal distress, prosocial acts). Moral reasoning was assessed through children's responses to vignette dilemmas in which they had to choose between their own interests and the needs of another. Results indicated that facial and self-report indications of vicarious emotion were positively associated with higher levels of moral reasoning. Additionally, both empathy and other-oriented moral reasoning showed positive associations with prosocial behaviour toward peers and adults. In fact, children high in empathy and moral reasoning were the most likely to assist a peer in distress.

Conceptually speaking, the ties between empathy and prosocial behaviour make intuitive sense. Without understanding the other's distress (e.g., perspective-taking), having emotional regulation (e.g., feeling moderately empathic versus overaroused), and engaging in social initiative (e.g., being prepared to take action), prosocial behaviour would not be enacted (P. A. Miller et al., 1996). Not surprisingly, children high in

prosocial behaviour and who show high levels of social competence tend to also have well-established perspective-taking abilities and exhibit well-developed moral reasoning (P. A. Miller et al., 1996), excel academically (Welsh, Parke, Widaman, & O'Neil, 2001), and have high self-understanding/worth (Bosacki, 2003). In this way, prosocial behaviour is associated with emotional and social competence, including positive relations with fellow peers (Eisenberg, Fabes et al., 2006).

Review of the Child Empathy Literature

In an effort to gather information about children's emotional and behavioural responses to other's distress, researchers have relied on diverse forms of empathy-inducing stimuli. While these stimuli have varied in format (e.g., videotaped excerpts of other's distress, simulated scenarios of other's distress), the purpose has generally been the same – to elicit empathy and its related responses. In the following section, a series of research studies that have relied on this methodology will be reviewed. These studies were selected based on their use of these methods, as well as their focus on a limited age range of participating children (12-36 months). Because the primary purpose of this dissertation was to examine the role of bottom-up influences on children's empathic reactions (i.e., to others' pain versus others' sadness), these studies were divided into two categories: 1) studies that used solely emotion-based stimuli to induce empathy and, 2) studies that used solely pain-based stimuli (or a combination of emotion-based and pain-based stimuli) to induce empathy in children between 12 and 36 months of age. After these relevant studies are described, two final studies are reviewed that examined preschoolers responses to both pain and sadness, conducted separately. These latter studies are reviewed separately as they are the only studies that conducted analyses

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separately for different types of negative "emotion", for which the researchers included both sadness and pain.

Studies Using Emotion-based Stimuli to Induce Empathy. In one of the first longitudinal examinations of empathy development, Ungerer and colleagues (1990) sought to examine individual differences in the early formation of empathy. Forty-five mothers and their first-born children were recruited in order to determine individual differences in rudimentary empathy at 12 months, and whether early self-regulatory behaviour could predict empathy at 12 months. Self-regulatory behaviour was assessed at 4 months using a combination of a parent-reported sleep-activity record and a lab-based still-face paradigm. At approximately 12 months of age, the infants were brought into the lab and shown a 1-minute videotaped display of a peer smiling and laughing, followed by a 1-minute videotaped display of the same peer "fretting & crying" (p. 100). Children's responses to the video were coded for infant distress, defined as the child sucking part of his or her body, clothing, and/or an object. The duration of this sucking behaviour was used as a measure of overall infant distress. Using this criterion, distress was exhibited by one third of the children in the sample. No significant differences on the physiological indices of self-regulation (i.e., feeding, sleep) emerged between children who exhibited self-distress during the video and those that did not. However, results from the still-face paradigm revealed that 12-month-old children who were distressed while watching the video were less likely to show a well-regulated response (e.g., avert gaze) at 4 months of age.

Bischof-Köhler (1991) examined the role of sociocognitive maturation, namely the skill of self-recognition, in empathy development. Self-recognition refers to a child's

ability to view oneself as an objective agent (Moore, 2006). Self-recognition is classically assessed using the mirror self-recognition task (also known as the rouge-test), in which children are placed in front of a mirror after being surreptitiously marked on their face with coloured make-up. Bischof-Köhler performed this task with 36 16- to 24-month-old children. These toddlers were also observed in a play session during which a newly-familiar adult broke a teddy bear's arm and began to cry for approximately 150 seconds. Children were described in terms of their responses to the distressed individual. Eleven children were described as "helpers" (e.g., trying to comfort the distressed adult). Seven children were described as "blocked helpers" (e.g., attempting to help after the coding period). Ten children were described as "perplexed" (e.g., stopped playing, but did not attempt to help). Finally, eight children were described as "indifferent" (e.g., briefly orienting towards the distressed adult, but resuming play without her involvement). Findings showed that all children who attempted to comfort the adult (i.e., helpers and blocked helpers) also showed evidence of self-recognition. Conversely, the children who did not show self-recognition in the mirror test responded indifferently to the adult or were observed as being puzzled by the situation entirely. Surprisingly, no children in the sample were described as showing personal distress reactions.

  Studies Using Pain-based Stimuli to Induce Empathy. Zahn-Waxler and colleagues (1979) conducted one of the first studies to examine empathy using both naturalistic observations and home-based simulations. Using a longitudinal design, researchers sought to examine the role of maternal child rearing on children's empathy and prosocial behaviour. Data were collected from 16 children (half entering the study at 15 months of age, half entering the study at 20 months of age) over the course of 9

months. Participating mothers were trained to dictate incidents of distress into a tape recorder while at home. During these incidents, mothers were asked to describe the incident (e.g., the expression of emotion, the distressed individual's reaction), the child's response to the incident, and the mother's own response to both the child and the distressed individual. Additional records were kept describing whether the child was the cause of the distress or simply a bystander to the distressing incident. In addition to these naturalistic observations, both the mother and an experimenter simulated incidents of pain (e.g., bumping an ankle), physical discomfort (e.g., choking), fatigue, anger (i.e., during a phone conversation), and sorrow. Mothers were trained in the "circumstances for the simulations" (p. 321). Once all of the data were collected, responses of the child were coded as one of the following: physical and/or verbal displays of sympathy, provision of objects to the distressed individual (e.g., toy), locating another individual to help (e.g., mother), protecting the distressed individual, or giving physical assistance. Mothers' rearing behaviour was coded as one of the following: neutral (e.g., "Tom is crying because you pushed him.") and/or affective explanations (e.g., "It was bad for Jim to hit Mary."), suggestions to the child of positive responses (e.g., "Why don't you give Jeffy your ball?"), unexplained verbal prohibition (e.g., "Stop that!"), physical restraint (e.g., "I just moved him away from the baby."), physical punishment (e.g., "I swatted her a good one."), modeling altruism (e.g., picking up and patting the distressed child), reassurance or support of her own child (e.g., "Don't worry, it's okay."). In addition to these codes of maternal rearing behaviour, experimenters visiting the home were asked to rate the mothers' empathic caregiving. Results indicated that mothers' use of affectively delivered explanations (e.g., "People are not for hitting.") was associated with children's

empathy in terms of both altruism (helping as a bystander to the event) and reparations (helping after having caused the distress). Empathic caregiving (as rated by the visiting experimenters) was also associated with children's altruism and reparative behaviour (Zahn-Waxler et al., 1979).

In one of the first studies to select solely pain stimuli (without explicitly highlighting this distinction in empathy responding; Zahn-Waxler, Robinson et al., 1992), researchers examined the development of empathy in twins during the second year of life. Specifically, the study included 94 monozygotic and 90 dizygotic twin pairs. At 14 and 20 months, participating children were exposed to four different simulations of pain conducted by both the mother and a female experimenter, both at home and within a laboratory setting. The painful simulations included closing a finger in a briefcase, hurting a knee while getting up from the floor, pinching a finger with a clipboard, and bumping into a chair. Mothers and female experimenters were instructed to assume a "pained facial expression" and to express "pain vocalizations" at low to moderate volumes over a 30-second period, with gradual subsiding over the subsequent 30-second period. In addition, participating adults were instructed to avoid eye contact with the child during the simulations. Children's reactions were videotaped and placed into the following categories: 1) prosocial acts (e.g., spontaneously attempting to intervene), 2) hypothesis testing (i.e., attempting to understand the reason for the distress), 3) empathic concern (e.g., looking worried, expressing sorrow), 4) self-distress (e.g., sobbing), and 5) unresponsive-actively indifferent (e.g., ignoring/withdrawing from victim, responding aggressively towards victim). Results indicated that although some components of empathy (i.e., empathic concern, hypothesis testing) increased in frequency between 14

and 20 months, the frequency of prosocial acts was relatively low when compared to other studies with similarly-aged singletons (e.g., Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Additional findings indicated a significant effect of age (older children displayed more hypothesis testing and empathic concern and less unresponsiveness-indifference) and sex (girls displayed more hypothesis testing, empathic concern, prosocial acts, and self-distress; boys displayed more unresponsiveness-indifference). Prosocial patterns of behaviour (as measured by maternal report) indicated that girls engaged in more prosocial acts than boys. A significant interaction between age and sex also emerged in this final analysis suggesting that sex differences in prosocial behaviours increased with age. Finally, modest evidence for heritability emerged in this investigation, particularly for empathic concern responses. Follow-up publications of the continued longitudinal data collection of this sample at 24 and 36 months of age (Zahn-Waxler, Schiro, Robinson, Emde, & Schmitz, 2001) continued to support the findings described above.

An additional study by the same research team (Zahn-Waxler, Radke-Yarrow et al., 1992) sought not only to determine the role of self-recognition in empathy, but also to examine children's prosocial responses to distresses they caused (i.e., reparative behaviour) or witnessed. Twenty-seven 1-year-old children and their mothers were observed during the second year of life. Children's responses were observed during naturalistic observations at home, as well as mother-simulated scenarios at both home (at the rate of approximately one per week) and within the laboratory setting (a total of three times). Additionally, children's responses were observed during six experimenter-simulated scenarios conducted within a laboratory setting. For the simulations, mothers

and experimenters were trained using scripts of various emotion- and pain-based scenarios. For example, pain was described as bumping one's head or foot, exclaiming "ouch", and rubbing the corresponding injured part for approximately 10-15 seconds. Sadness, on the other hand, was described as audible sobbing for approximately 5-10 seconds. Other scenarios included respiratory distress (e.g., coughing or choking) and listlessness (e.g., 10-15 minutes of fatigued behaviour). Similarly to the previous study, children's responses were coded as one of the following: prosocial behaviour, empathic concern, hypothesis testing, self-referential behaviour (e.g., imitations of the others' distress), self-distress, aggressive behaviour (e.g., hitting the distressed individual), or positive affect (e.g., laughing, smiling). Assessments of children's self-recognition were conducted numerous times throughout the duration of the study at families' homes. Findings suggested that children's altruistic and reparative behaviour increased with age (as shown in naturalistic observations) and that, as before with Bischof-Köhler's (1991) results, self-recognition was marginally correlated with empathic concern and significantly correlated with prosocial behaviour. Interestingly, at age 2, children were most responsive to their mothers' distress, but also displayed some sensitivity to the distress of an unknown female experimenter.

Young and colleagues (1999) investigated the role of temperament (measured at 4 months and at 24 months) in the prediction of empathic responding at 24 months of age. Fifty children were assessed for their temperament at 4 months (i.e., motor activity and positive/negative affect) and at 24 months (i.e., behavioural/social inhibition). Similar to previously described studies (Zahn-Waxler, Radke-Yarrow et al., 1992; Zahn-Waxler, Robinson et al., 1992), children (at 24 months of age) witnessed their mother and a

female experimenter feign injury (i.e., bumping into a chair, clipping a finger in a clipboard). The simulations both took place during free play. Again, similarly to previous investigations, the simulation consisted of 30 seconds of pain followed by 30 seconds of a gradual subsiding of the pain. Children's subsequent responses were coded for hypothesis testing, prosocial behaviour, concerned expressions, and distress. Children's responses were also given a global rating of empathy as well as a rating of arousal level (i.e., body tension). Results indicated that children, although significantly more responsive to their mother's distress, did show empathic responses towards the experimenter. In the experimenter's simulation, children characterized as low motor/low affect were less aroused than children characterized as high motor/high negative affect. Additionally, children with low motor/low affect showed less global empathy than did their high motor/high positive affect counterparts during the experimenter's simulation. Interestingly, these effects of infant temperament did not emerge for children's responses to their mothers' distress. At 2 years of age, behaviourally inhibited children were less likely to show global empathy or engage in prosocial behaviour towards an experimenter in distress. However, as with the indices of infant temperament, no associations between inhibition and empathy toward children's mothers emerged.

Robinson and colleagues (2001) relied on pain-based stimuli in their examination of toddlers' reactions to their mothers' and an experimenter's feigned injury at 14, 20, and 24 months of age (at the laboratory and at home), as well as at 36 months of age (solely at home). Participants included 250 twin pairs and their mothers who were trained in two pain scenarios including pretending to injure her knee and pinching her finger in a clipboard. In separate simulations, the experimenter pretended to close her finger in a

briefcase and pretended to hurt her foot by dropping a chair on it. Both the mother and the experimenter were instructed to vocalize their pain in a moderate tone for approximately 30 seconds followed by a period of assurance that the injury no longer hurt. Children's responses were coded for instances of approach behaviour, hypothesis testing (in which social referencing was also considered), concern, arousal, and prosocial acts. As expected, the results indicated that as children increased in age, so did the frequency of their responses and expressions of concern (e.g., gestures, facial, and vocal responses). Overall, children's empathic responses to their mothers were stronger or occurred with greater frequency at all ages when compared to their empathic responses towards the experimenter. With regards to the effects of hereditability and environmental influences, examiner-directed responses were more typically associated with heritable influences while mother-directed responses reflected a mix of hereditable and environmental influences. The authors concluded that, as predicted, children's relationship status (i.e., mother or unfamiliar adult) with the distressed victim may moderate the influence of both hereditary and environmental factors on children's empathic responses.

In their investigation of empathy in aggressive toddlers (further described in the social-emotional competencies section), Gill and Calkins (2003) classified 2-year-olds as either high or low in externalizing behaviour. Children were exposed to two empathy-eliciting tasks: 1) an audiotape of another toddler crying, and 2) a female researcher pretending to injure herself (i.e., catching her finger in a closet door) and their behaviours were coded for a variety of empathy-related responses. Results indicated that aggressive children displayed more empathy-related responses (Gill & Calkins, 2003).

In a recent study of children's empathy development during the second and third years of life, Kiang and colleagues (2004) examined the influence of maternal preconceptions about parenting on children's temperament and maternal sensitivity. Furthermore, the researchers in this study sought to determine whether all three variables (maternal preconceptions about parenting, temperament, and maternal sensitivity) predicted children's empathy. A total of 175 mothers and their children participated. Prior to giving birth, mothers' preconceptions about parenting were measured using the Adult-Adolescent Parenting Inventory (Bavolek, 1984, as cited in Kiang et al., 2004). Temperament was measured at 6 months of age using the Infant Characteristics Questionnaire (Bates, Freeland, & Lounsbury, 1979). Maternal sensitivity was measured through mother-child play sessions both at home (at 12 months) and in the lab (at 15 months). Finally, children's empathy was measured at 21 and 24 months using a behavioural coding system. Empathy-inducing simulations were conducted at home and in the lab with both the participating mothers and an experimenter. These scenarios were conducted at approximately 21 months of age (at home) and at 24 months of age (in the lab) and included painful situations (i.e., pinching one's finger, pretending to hurt one's knee). Using a previously developed system (Robinson & Zahn-Waxler, 2002), children's responses to others' distress were coded using the following indices: 1) prosocial empathy (i.e., positive, prosocial concern), 2) indifference (i.e., negative, rejecting responses), and 3) inquisitiveness (i.e., hypothesis testing, social referencing). Results indicated that maternal preconceptions about parenting significantly predicted difficult temperament, maternal sensitivity, and child empathy. In brief, mothers who reported more negative attitudes prenatally rated their children as having more difficult

temperaments at 6 months of age and were overall less sensitive to their children at 12 and 15 months of age. Additionally, more negative preconceptions were related to higher levels of indifference toward mother distress.

In the most recent examination of toddlers' empathy-related responding, Spinrad and Stifter (2006) investigated the predictive value of a number of variables (i.e., negative emotionality, sex, and maternal responsivity) on children's empathy-related responses. Specifically, children's empathic responses were assessed in three different contexts: 1) an unfamiliar female researcher feigning pain (i.e., dropping a basket of toys on her foot), 2) another researcher carrying a crying baby doll (used to simulate a more similarly-aged peer in distress versus an adult), and 3) the child's mother feigning pain (i.e., pretending the child accidentally injured her finger with a toy hammer). Ninety-eight infants and their mothers participated in the study and were tested at 10 months and at 18 months of age. At 10 months, children and their mothers were observed during free-play. This playtime was coded for maternal sensitivity and maternal intrusiveness. Additionally, mothers completed questionnaires assessing their children's negative emotionality during the 10-month visit. At 18 months, children were assessed for their empathy-related responses to the three distress situations (each lasting approximately 90 seconds). Children's responses were coded for: 1) concerned awareness (e.g., stopping play, staring at distressed individual), 2) personal distress (i.e., comfort seeking and self-comforting behaviour), 3) negative affect (e.g., frowning, crying), and 4) prosocial behaviour (e.g., sharing, hugging). Only one sex difference emerged for children's empathy-related responses indicating that girls showed more concerned attention than boys. Correlations between the three simulations revealed some cross-context stability for

concerned awareness and personal distress reactions. Additionally, infant fear predicted higher levels of concerned awareness towards both the stranger and mothers and higher levels of personal distress responses towards mothers. Maternal responsivity was positively related to concerned attention (for both strangers and mothers) and negatively related to personal distress reactions (for the baby doll and mothers). Interestingly, neither infant fear nor maternal responsivity significantly predicted negative affect or prosocial behaviour. Finally, significant context effects were found across all three simulations for concerned awareness, personal distress, negative affect, and prosocial behaviour. For instance, toddlers in this study were more prosocial towards their mothers than the stranger or the crying baby doll and were more prosocial towards the baby doll than the stranger.

Studies Examining Pain and Sadness Separately. As previously described, only two studies could be found that examined children's empathy-related responses to pain and sadness separately. Denham and Couchoud (1991) investigated various social-emotional predictors of children's responses to three different negative "emotions" (anger, sadness, and pain) in unfamiliar adults. While the researchers used hierarchical regressions to examine each emotion separately, this was not the purpose of their investigation. Rather, they were interested in ascertaining whether various developmental (i.e., age) and social-emotional (i.e., emotion knowledge, assertiveness, classroom prosocial behaviour) variables could reliably predict children's prosocial reactions to adults in distress. Facial and verbal displays of each emotion were presented during natural play sessions with 39 children ($M = 43.72$ months, $SD = 6.36$ months). Each emotion was presented twice through two different scripted vignettes. Within each

vignette, each emotion was displayed three times. First, the researcher displayed the emotion. After 20 seconds, the researcher again displayed the emotion, this time also labelling how she felt. After another 20 seconds, the researcher again displayed the emotion and said the phrase, "Will you help me?". Children's responses to each of the three trials of adult distress were rated on a 7-point scoring system ranging from "non-involvement to sophisticated prosocial behavior" (p. 599). The scores were weighted (based on the presentation order of the three trials) and combined across the two vignettes for each emotion. Additionally, an aggregate score of prosocial behaviour across all three emotions was created.

Although they were not directly compared, the mean prosocial scores in response to the researcher's sadness were higher ($M = 55.59$, $SD = 12.84$) than their mean prosocial scores in response to the researcher's pain ($M = 47.41$, $SD = 15.72$). Qualitatively, the total prosocial scores were in the low to moderate range for both pain and sadness. However, hierarchical analyses conducted separately for each of three emotions revealed differences. Age predicted children's prosocial scores for each of the three emotions and the aggregate score with older children engaging in more prosocial responses. Beyond the variance explained by age, children's emotion knowledge (as assessed by having children choose the correct face expressing the emotion of a puppet in a vignette) was significantly predictive of responses to sadness and the prosocial aggregate, but not responses to pain. With the variance explained by both age and emotion knowledge removed, prosocial response to peers was significantly predictive of all criterion variables (i.e., children's responses to sadness, anger; the prosocial aggregate) except pain. Finally, after the variance of all other variables was removed,

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assertiveness was predictive of children's prosocial responses towards anger. Follow-up

regression analyses revealed that gender moderated the effect of age on children's

responses to pain. Thus, analyses were repeated separately for boys and for girls. These

analyses revealed that, for boys, response to adult pain was uniquely predicted by their

prosocial responses to peers in the classroom. For girls, age was uniquely predictive of

their response to adult pain. Sex did not have a moderating effect on the prediction of

children's responses to adult sadness. The results from this study suggest that predictors

of prosocial responses vary among negative emotions. The authors of this study

concluded that attention needed to be paid to each negative emotion in future prosocial

research with children.

In a follow-up publication, Denham, Mason, and Couchoud (1995) present data

collected from two studies using a similar methodology, again with preschoolers (first

study: $M = 44.16$ months, $SD = 6.04$ months; second study: $M = 50.84$ months, $SD = 7.18$

months). As with the first study, preschoolers' responses to the same adult expressions of

negative emotions (sadness, anger, pain) were rated for prosocial behaviour using the

same procedures (i.e., expression of emotion, expression of emotion plus labelling

emotion, expression of emotion plus requesting help from child). Whereas the prior study

was an investigation of the social-emotional predictors of prosocial behaviour, this study

was specifically interested in the scaffolding nature of the procedures (i.e., labelling

emotion; requesting help). A secondary goal of the study was to examine children's

prosocial responsiveness to different emotions and whether the scaffolding effects varied

across emotions. Although the procedures were the same for both studies, the first study

relied on a within-subjects design and the second relied on a between-subjects design.

This was done to rule out children's possible sensitization to repeated displays of adult negative emotions.

Results from these studies support Denham and Couchoud's original work (1991). In the within-subjects sample, children were rated as being significantly more prosocial in response to another's anger than either their sadness or their pain. Furthermore, children were more responsive to another's sadness than their pain. Interestingly, while the effects of scaffolding were significant for both anger and sadness, they were not significant for pain. While the effect of scaffolding did not reach significance in the between-subjects sample, the pattern of prosocial behaviour in response to the negative emotions closely resembled the findings in the within-subjects design. Children were significantly more responsive to another's sadness or anger than they were to another's pain. In other words, even when the pain was labelled and when help was requested, children were still less responsive to pain. The authors posited that the children's lack of response to pain could be due to a lack of responsibility (e.g., "No, you hafta fix it.", p. 501) or a feeling of incompetence (e.g., "I can't help you.", Denham, Mason, & Couchoud, 1995, p. 501).

The studies described above examined pain and sadness (among other emotions) separately. However, the methods used to measure children's prosocial responses limit the conclusions that can be drawn from these investigations. In all three studies, children's prosocial responses were rated on a simple mutually exclusive 7-point scale with the following rough gradations: actively avoiding the situation (e.g., physically turning away, verbally refusing to help), ignoring the situation entirely, displaying some attention (i.e., looking or laughing), acknowledging the problem (e.g., inquiring about

distress, identifying the problem), providing maladaptive solutions (e.g., directing the distressed individual to solve the issue, denying the individual's distress, providing inappropriate assistance), offering a simple verbal solution (e.g., "Try again"), and engaging in appropriate prosocial behaviour (e.g., physical comfort; Denham & Couchoud, 1991). This crude rating of children's prosocial expressions does not encompass the rich array of behaviours that characterize children's empathy-related responses, nor does this type of measurement provide a description of children's responses to others' pain and to others' sadness or how these specific responses may differ based on the type of distress the adult expresses. Additionally, due to the objectives of the studies, the victim's distress was labelled and the children's responses were solicited not allowing for a clear examination of children's spontaneous responses to others' distress. Furthermore, these two studies were conducted with preschool-aged children. Examinations of how young children (e.g., toddlers) express empathy for pain and sadness, investigated separately, would provide additional information on how children's responses to these two constructs may vary from an early age.

Developmental and Interindividual Influences on Empathy Expression

While much of the previous research has sought to determine the general development of empathy, recent studies have shifted the focus to developing a list of the individual differences associated with the expression of empathy in young children. In fact, many child characteristics have emerged in the literature as important correlates and were, therefore, included in the present study to determine their value in predicting children's empathic responses to others' pain and others' sadness. Developmental research from infancy through young adulthood suggests that as children age, their

sociocognitive and affective processes naturally become more sophisticated, resulting in more mature empathic responses (Eisenberg, Spinrad et al., 2006). However, beyond age, other critical variables are also important to consider as possible determinants of empathic expression including sex (which has yielded mixed findings), temperament (which has important ties to emotion regulation, and therefore, empathy), and general social-emotional development (e.g., internalizing and externalizing behaviour problems and competencies). One final factor, although not examined in previous studies, is children's knowledge of both pain and emotion words. The next section will review these relevant developmental and interindividual factors of interest in children's empathy.

Sex. A prevalent stereotype in empathy research is one describing girls as significantly more empathic than boys. The belief that females possess more empathic characteristics (e.g., warmth, compassion, sympathy) is also supported in the broader research examining sex stereotyping (e.g., C. L. Martin, 1987). While this particular stereotype continues to persist, research supporting it has been somewhat mixed. Meta-analyses conducted by Eisenberg and Lennon (Eisenberg & Lennon, 1983; Lennon & Eisenberg, 1987) and more recently, by Eisenberg and Fabes (1998) have served to more fully elucidate the discrepancies between female and male empathy and prosocial behaviour patterns present in the research literature. While some of the studies included in their analyses showed very large effect sizes between sexes, others showed small or nonsignificant effect sizes. These inconsistent findings spurred Eisenberg and colleagues (Eisenberg, Fabes et al., 2006) to propose that the variance in effect sizes might be directly linked to the specific methods used in each of the studies versus actual sex differences. In general, sex differences (favouring girls) and even some gender-

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orientation differences (again, favouring feminine traits) are more pronounced in studies

relying on self-report or observer-report measures (in which the participant or observer

has some control over his or her response; Eisenberg, Zhou, & Koller, 2001; Karniol,

Gabay, Ochion, & Harari, 1998; Olweus & Endresen, 1998), than in studies relying on

more nonverbal/unobtrusive measures of empathy (e.g., behavioural coding; Eisenberg &

Lennon, 1983) in which participants' responses may be less easily controlled or less

susceptible to demand characteristics or social desirability influences. In other words,

with self-report, girls may be more likely to report empathy than boys (not necessarily be

more empathic than boys). These data suggest that the particular measure used to elicit

empathy may bear great influence on whether sex differences result from the findings.

The present study examines whether sex differences emerge in children's behavioural

responses to empathy-evoking scenarios (i.e., for both pain and sadness).

Temperament. Temperament is a factor considered very important in many

aspects of children's development. In terms of moral development, temperament has

repeatedly been shown to be related to social behaviours such as empathy (Rothbart,

2007). Temperament is defined as a child's individual tendency to react in a certain way

to other people and situations, as well as their unique ability to regulate their own

emotional responses (Rothbart & Derryberry, 1981). Temperament is generally

considered to have both biological and environmental influences, and is thought to be a

precursor of an individual's later personality in adulthood (e.g., Hastings et al., 2006).

As previously described, temperament is largely based on children's ability to

regulate their emotions and emotional responses towards others. Thus, emotion regulation

has been viewed as playing a significant role in children's empathy-related responses. In

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their review of the effect of emotion regulation on children's socioemotional competence, Eisenberg and Fabes (2006) describe the construct of emotion responsivity as further being divided into two relatively similar, but different, constructs – emotionality and emotion-related regulation. Emotionality is described as "the intensity and frequency with which [children] experience negative emotions" (p. 360). As with others (Larsen & Diener, 1987; Rothbart & Bates, 2006), Eisenberg and Fabes view emotionality as being relatively stable over time and as being a part of one's temperament. Emotion-related regulation is described as "the process of initiating, avoiding, inhibiting, maintaining, or modulating the occurrence, form, intensity, or duration of internal feeling states, emotion-related physiological, attentional processes, motivational states, and/or the behavioral concomitants of emotion in the service of accomplishing affect-related biological or social adaptation or achieving individual goals" (p. 360). Therefore, emotion-related regulation modulates or modifies the response to empathy-evoking situations. Dispositional emotion-related regulation is further defined as a relatively stable ability throughout childhood and into adulthood (Eisenberg, Spinrad et al., 2006).

In general, children characterized as temperamentally inhibited/slow-to-warm are less likely to show prosocial responses towards others' distress (e.g., Farver & Branstetter, 1994) and instead, tend to display consistent patterns of shyness, anxiety, distress, and avoidance when approached by unknown persons or when in novel/strange situations. In addition, once these children are aroused or distressed, they tend to be difficult to calm or soothe. Children with these characteristics are seen as unable to effectively regulate their own responses to another individual's distress. This tendency, coupled with their avoidance of others, is believed to block their ability to assist another

person in distress. Research investigations have shown negative correlations between children with this temperamental style and empathy-related responding. In one such study, shy preschoolers (as described by their mothers) were less likely than their outgoing peers to help an unfamiliar adult in the laboratory, although they were just as likely to show helpful behaviours at home (Stanhope, Bell, & Parker-Cohen, 1987). These findings were further supported by a longitudinal study conducted by Young and colleagues (1999). In their analyses, children who were more inhibited were less likely to respond prosocially or empathically to an unfamiliar experimenter in distress at 2 years of age. However, these associations disappeared when the children's own mothers were in distress (Young et al., 1999). A second longitudinal study conducted by Hastings and colleagues (Hastings, Rubin, & DeRose, 2005) failed to find the same direct relationship between the degree of inhibition in toddlers and prosocial responses to unfamiliar experimenters two years later. However, this relationship did emerge for female children when childrearing practices were used as a moderator. Surprisingly, girls who were highly inhibited at 2 years of age were more likely to help the experimenter if they had authoritarian mothers and were less likely to help the experimenter if they had authoritative mothers. Interestingly, the exact opposite pattern emerged for less-inhibited girls. Taken together, these results suggest that children who are temperamentally inhibited may find another's distress personally distressing and consequently, may be unable to respond to the other's needs in an appropriate manner. However, the relation between inhibition and prosocial behaviour has not consistently emerged suggesting other factors also contribute to the development of prosocial behaviour in young children (e.g., sex of the child, parenting practices; Hastings et al., 2005).

Children characterized as temperamentally sociable/easy-going tend to display a consistent pattern of ease around others and in novel situations. When aroused, they tend to be calmed easily. Towards others, these children tend to be interested in others, display positive interactions with peers, and generally are quite sociable. Not surprisingly, empathy research with this type of children has suggested they are more likely to approach the distressed individual and to attempt to comfort or reduce their distress. Research with preschool and school-aged children shows a strong positive relationship between sociability and helping/comforting behaviours (e.g., Eisenberg, Pasternack, Cameron, & Tryon, 1984; Eisenberg-Berg & Hand, 1979; P. A. Miller & Jansen op de Haar, 1997). The influence of sociability on prosocial responding appears to be especially strong when children are confronted with unfamiliar adults (Stanhope et al., 1987), suggesting that being outgoing and extroverted may be especially helpful when confronted with an unknown individual in distress.

Children characterized as temperamentally difficult/negatively-reactive tend to display consistent patterns of negative emotional reactivity. They tend to get easily frustrated, easily angered and are difficult to soothe when aroused. While research with children with this temperamental style has been scant, the data available do suggest an inverse relationship between difficult/negatively-reactive children and empathy and related prosocial responses (e.g., Denham, 1986; Eisenberg et al., 1996). Considerably more work has been done indirectly connecting these two variables through aggression. Children who are emotionally dysregulated tend to also be aggressive (e.g., Rubin, Hastings, Chen, Stewart, & McNichol, 1998). Not surprisingly, oppositional, aggressive children tend to also display lower levels of concern for others (e.g., Hastings, Zahn-

Waxler, Robinson, Usher, & Bridges, 2000), although this finding does not consistently emerge until children are school-aged and older (Eisenberg, Spinrad et al., 2006). Nevertheless, a reasonable inference could be made that difficult temperament leads to aggression and reduced concern/care for others (Hastings et al., 2006).

Research from the child clinical literature has provided additional evidence for the link between aggression and reduced empathy, especially through the presence of callous-unemotional traits. Investigators (e.g., Frick & Ellis, 1999; Hawes, Brennan, & Dadds, 2009) now believe there are two distinct groups of aggressive youth. One group of aggressive youth, as described above, may actually possess the abilities to emotionally connect with others, but have an over-reactive temperament and are unable to regulate their emotional arousal (Frick & Morris, 2004). The second subgroup of aggressive youth consists of children with callous-unemotional traits (i.e., a "cold" temperamental form of aggression; Dadds & Rhodes, 2008). Examinations of children high in aggression/ antisocial behaviour and high in these callous-unemotional traits suggest not only a genetic link between the two characteristics (e.g., Viding, Jones, Frick, Moffitt, & Plomin, 2008), but also that these children are less amenable to treatment (Frick & Dickens, 2006), show hyporesponses to facial expressions of emotion (Dadds & Rhodes, 2008), and have clear deficits in empathy (Anastassiou-Hadjicharalambous & Warden, 2008; Frick & Dickens, 2006) and emotion recognition (e.g., fear and sadness; Stevens, Charman, & Blair, 2001). Collectively, this area of research highlights the importance of early identification and treatment of children with particularly difficult temperaments, especially with high levels of callous-unemotional traits.

Taken together, empathy research has numerous examples of solid links between

temperament and empathic behaviour. The extent to which a child can regulate his or her own emotional response appears to be a critical component of their overall empathic tendencies. Therefore, the present study examined whether factors of temperament in this age group (i.e., Negative Affectivity, Effortful Control, and Surgency/Extraversion) were predictive of behavioural responses to empathy-evoking scenarios and whether these relations differed between simulations of pain and simulations of sadness. Because many aspects of emotion regulation are perceived as being temperamentally based (Rothbart & Bates, 2006), these temperament factors were conceptualized as proxy measures of emotion regulation in the present study. Specifically, Negative Affectivity served as a proxy for the construct of emotionality and Effortful Control served as a proxy measure for the larger conceptualization of emotion-related regulation (Eisenberg & Spinrad, 2004). The third temperament factor (i.e., Surgency/Extraversion) was also included in the present study as an indication of children's tendency to be outgoing and extraverted in novel situations.

Social-emotional Variables. In addition to temperament, children's social and emotional competencies are variables that arise with some frequency in empathy research. As previously described, empathy is considered not only an important factor in motivating prosocial behaviour (e.g., voluntarily helping, comforting another person; Eisenberg & Miller, 1987), but also in inhibiting or protecting against undesirable social behaviour (e.g., aggression, externalizing, and antisocial behaviours; Hastings et al., 2000; P. A. Miller & Eisenberg, 1988). However, studies conducted with young children (especially those using nonquestionnaire based methods to assess empathy) have failed to show significant negative correlations between children's aggressive behaviour and

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empathy-related responding (P. A. Miller & Eisenberg, 1988). These studies of young children's externalizing behaviours are reviewed next, followed by a description of research with children experiencing internalizing challenges (e.g., shy-inhibited children) and how these issues impact empathy-related responses.

It makes theoretical sense that children high in empathy would tend to respond positively (e.g., prosocial behaviour) towards peers, whereas children low in empathy would tend to respond negatively (e.g., aggressive behaviour) towards peers. However, this negative correlation between children's aggressive behaviours and empathic responding does not appear to emerge until approximately 6 years of age (Eisenberg, Spinrad et al., 2006). Prior to this time, clear associations between aggression and empathy are not documented in studies with toddlers and preschoolers. For instance, Hastings and colleagues (2000) conducted a longitudinal study of children at varying levels of risk (i.e., low, moderate, or high) for developing disruptive behaviour disorders. Children were assessed (using lab-based distress simulations) throughout the course of the study for their level of concern for others, defined as a "broad, inclusive term for the coordinated and correlated behavioral, affective, and cognitive factors associated with empathic and prosocial reactions" (p. 531). Children were assessed at 4-5 years of age, again at 6-7 years of age, and finally at 9-10 years of age. At the beginning of data collection, the preschoolers with and without disruptive behaviour problems did not show significantly different levels of concern for others (Zahn-Waxler, Cole, Welsh, & Fox, 1995), as supported by prior investigations with young children (e.g., MacQuiddy, Maise, & Hamilton, 1987). However, by 6-7 years of age, children with clinically significant behaviour problems showed significant decreases in their concern for others and were

reported (by their mothers, teachers, and even by themselves) to show significantly less concern for others. As expected, the findings indicated that children who showed more concern for others as preschoolers were less likely to exhibit behavioural problems two years later, suggesting that empathic concern early in childhood may actually protect children from developing externalizing behaviour problems later on.

In one of the first studies to show a positive association between aggression and empathy in young children, Gill and Calkins (2003) classified 2-year-olds as either high ($n = 49$, 24 males) or low ($n = 50$, 25 males) in externalizing behaviours (using the Child Behavior Checklist; Achenbach, Edelbrock, & Howell, 1987). Children were exposed to two empathy-eliciting tasks (listening to an audiotape of a toddler crying and witnessing a researcher pretending to hurt herself). Children's behaviours were coded for empathy-related responses (i.e., latency to respond, self-comforting, arousal, hypothesis testing, concerned affect, and global concern). In addition, children's heart rates were recorded during the first empathy task (i.e., the audiotape of crying) to provide physiological markers of arousal and regulation. Results indicated that aggressive children displayed more hypothesis testing, greater concern, greater global empathy, as well as responded more quickly, than did the nonaggressive children in the sample. These differences were noted across both empathy-eliciting situations suggesting that children with externalizing problems were actually more empathically responsive than children without externalizing problems (Gill & Calkins, 2003). Furthermore, analyses of the physiological markers partially indicated that physiological regulation was associated with less empathy-related responses. This particular finding, although unexpected, suggests that young children who are less able to regulate their physiological response to another's distress may

actually be more likely to respond empathically to that person's distress. This study supports previous studies (e.g., Kienbaum, 2001) indicating that aggressive preschoolers do respond prosocially to others in need and, in fact, may respond at greater levels than nonaggressive preschoolers, although the physiological correlates associated with these responses require further replication.

It has been hypothesized that aggressive children show more assertiveness and that is why they are likely to respond to a distressed individual (Eisenberg, Spinrad et al., 2006). Past research with preschoolers has highlighted a relationship between empathy-related responses and these types of characteristics. Eisenberg and colleagues (1990) examined the relation between preschoolers' vicarious emotional responding in the laboratory setting (while watching empathy-eliciting videos) and their prosocial and defensive behaviour in the classroom setting. As expected, there were significant relations between children's vicarious emotional responding and requested prosocial (compliance) and defensive (assertive) behaviours in the classroom. Children exhibiting personal distress responses in the laboratory setting were relatively compliant and nonassertive in the classroom setting. Children exhibiting higher levels of sympathy in the laboratory setting were relatively less compliant and more assertive in the classroom setting (Eisenberg et al., 1990). Interestingly, some more recent work has shown that children's assertiveness may only impact their responses towards certain negative emotions. In their investigation of social-emotional predictors of preschoolers' prosocial responses, Denham and Couchoud (1991) discovered that, when compared to other negative emotions (i.e., sadness, pain), children's assertiveness only predicted their prosocial responses towards an adult's anger.

The findings from the studies described above suggest that the affective responses of sympathy and personal distress provide the "conceptual link" (Findlay et al., 2006) between empathy and social interactions with peers. As described earlier, a sympathetic response may result from a moderate reaction of empathy. Children who tend to respond sympathetically are generally described as more assertive and less compliant. Not surprisingly, these children are more likely to take action and attempt to respond to another individual's distress. In contrast, a personal distress response may result from a much stronger vicarious reaction, typically described as empathic overarousal. Children high in personal distress are described as nonassertive and compliant. In an attempt to deal with the anxiety or distress resulting from the empathic overarousal, children high in personal distress may simply avoid social situations. Previous work has, however, also shown that children high in personal distress reactions may assist others in real-life situations where the request for assistance cannot be denied (Eisenberg et al., 1990). In fact, assisting others may be a way in which to reduce their own distress or may reflect their inability to assert themselves.

While most empathy research examining the broader social-emotional domain has focused on externalizing behaviours (e.g., aggression), some research has investigated empathy-related responses from children experiencing internalizing difficulties (e.g., shyness, inhibition, anxiety). Building on the previously described research indicating that compliant and nonassertive children were more likely to show personal distress reactions, it makes theoretical sense that shyness and inhibition are negatively correlated with sympathy/empathic concern and positively correlated with personal distress reactions. For instance, in their study examining the relations between temperament and

empathy in 2-year-olds, Young and colleagues (1999) discovered that behaviourally inhibited 2-year-olds showed less prosocial behaviour and less global empathy during simulations of an unfamiliar adult in distress.

While primarily conducted with preschoolers, research on shy children supports these established connections to children's empathy-related responses. There is some initial evidence to indicate that children who exhibit high levels of empathy are relatively low in shyness. In one study, mothers of high empathy 2- to 8-year-old children (as identified by childcare staff) consistently described their children as exhibiting very low levels of shyness (P. A. Miller & Jansen op de Haar, 1997). Furthermore, there is evidence that sociable children are more likely to respond prosocially to an unfamiliar adult in distress in the laboratory setting (Stanhope et al., 1987). While it is hypothesized that shy children do feel empathy, it is believed that they may have difficulty expressing empathy. In their examination of the links between empathy and socially competent behaviours and social understanding, Findlay and colleagues (2006) investigated children's understanding and response to others in need. A total of 136 kindergartners and first-graders ($M = 75.94$ months, $SD = 9.03$ months) were rated by their parents for empathy, shyness, aggression, and prosocial tendencies. Findings indicated that children who were rated as high in empathy (using a median split) were also rated by their parents as being less shy-withdrawn than their classmates. These results suggest that shy-withdrawn may be less likely to respond empathically to others in need. One explanation offered by the authors of this study is that shy children may be more likely to withdraw from or simply avoid emotionally charged social situations. This possibility supports previous claims (Eisenberg & Fabes, 1990) that children who experience high personal

distress reactions towards others' distress may try to avoid the situation to reduce their own discomfort. A second explanation offered by the authors describes shy children as perfectly capable of feeling empathy, but unable to respond behaviourally from an empathic reaction likely due to increased anxiety, especially in a social setting.

When examined collectively, the previously described research highlights important links between children's social-emotional competencies and children's abilities to relate to others' distress. Therefore, the present study included a parent-report assessment of children's social-emotional problem areas and general competencies. Specifically, the standardized measure assessed three areas of problem behaviours (i.e., xternalizing, internalizing, dysregulation). These three domains were specifically designed to assess children's abilities to regulate their emotional and behavioural responses. In addition to an assessment of potential social-emotional difficulties, the same measure assessed overall social-emotional competencies (e.g., compliance, empathy, prosocial peer relations) to gather an estimation of each child's social-emotional abilities and skills.

Language. While not typically included within investigations of empathy, the present examination includes a measurement of language acquisition, specifically participants' use and understanding of emotion words (e.g., sad, happy) and pain words (e.g., owie, hurt). Although past research suggests children may require an understanding of another's situation to be able to respond to them appropriately (e.g., Bischof-Köhler, 1991), no previous empathy research has explored the possibility that children need to be able to verbally identify with an emotion or pain word in order to accurately respond to the emotional or painful experience of another. However, a recent exchange of editorial

comments in the journal *Pain* suggests that the development of language may facilitate children's use of other-oriented responses by allowing children to symbolize the pain in a less-threatening manner (van Rysewyk, 2009).

Previous investigations of the emergence of emotion and pain words suggest that the development of empathy during the second year of life overlaps with the acquisition of these particular types of words into children's vocabulary. In their review of the development of emotion language, Bretherton, Fritz, Zahn-Waxler, and Ridgeway (1986) provide important milestones including the acquisition of emotion words at approximately 18 to 20 months, as well as more complex features (e.g., labelling others' emotions, discussing past and future emotions, talking about the antecedents and consequences of various states of emotion) emerging between 18 and 36 months (Bretherton et al., 1986). Using parental report, a normative analysis of children's understanding and use of emotion-descriptive adjectives was conducted by Ridgeway, Waters, and Kuczaj (1985). Results indicated that by 18 to 23 months, at least one third of the children understood the most basic emotion words (i.e., happy, afraid, angry, mad, sad) with estimates ranging from 36.7% (for *mad*) to 76.7% (for *happy*). However, at this age range, far less than one third of the children in the sample were spontaneously using the same words with estimates ranging from 6.7% (for *sad*) to 36.7% (for *happy*). By 30 to 35 months, the awareness of these common emotion words had increased substantially. At this age range, 80.0% or more of the sample understood these basic emotion words with estimates ranging from 80.0% (for *mad*) to 96.7% (for *sad*). Additionally, at least 70.0% of 30- to 35-month-olds in the sample spontaneously used these common emotion words with estimates ranging from 70.0% (for *angry*) to 86.7% (for *happy*). Of particular

interest in the present study, the word *sad* was understood by 50.0% of 18- to 23-month-olds, 63.3% of 24- to 29-month-olds, and 96.7% of 30- to 35-month-olds. *Sad* was used spontaneously by 6.7% of 18- to 23-month-olds, 50.0% of 24- to 29-month-olds, and 73.3% of 30- to 35-month-olds (Ridgeway et al., 1985).

In a similar set of analyses, Stanford, Chambers, and Craig (2005) completed a normative analysis of the development of pain-related vocabulary in children using both a transcript database and retrospective parent reports. In the first study, the Child Language Data Exchange System (CHILDES) database was used to collect transcripts from previous unrelated studies. These transcripts were searched for children's use of seven pain word-stems: *ache*, *boo-boo*, *hurt*, *ouch*, *ow*, *pain*, and *sore*. In the second study, parental report of their own children's frequency of use and age of emergence of the same seven pain word-stems was also assessed. Findings from the two investigations produced similar results. The most frequently used pain word-stems were *hurt*, *ouch*, and *ow*. These words emerged as early as 17 months of age. While there was some disagreement between data from the database and parental report, all seven pain word-stems appeared to be well-established between the ages of 36 and 72 months (Stanford et al., 2005).

Recent research linking language and emotional understanding indicates a likely relation between these two variables. Pons, Lawson, Harris, and de Rosnay (2003) examined this very relation in an effort to further investigate individual differences in emotional understanding. Eighty children in four age groups (4-5 years, 6-7 years, 8-9 years, and 10-11 years) were assessed for their language ability (using the Test for the Reception Of Grammar; Bishop, 1989, as cited in Pons et al., 2003) and their emotional

understanding (using the Test of Emotion Comprehension; Harris & Pons, 2003, as cited in Pons et al., 2003). The results showed a clear association between language ability and emotional understanding. The correlation between the two variables was highly significant ($r = 0.81$) even after controlling for age and sex ($r = 0.52$). The high degree of positive association between language ability and emotional understanding emerged within each age group suggesting that, regardless of age, children's emotional understanding covaried with their language abilities. Furthermore, in a regression analysis, age and language ability together accounted for 72% of the variance in the sample's emotional understanding. Furthermore, when examined separately, age accounted for 20% and language ability accounted for 27% of the total variance in emotional understanding (Pons et al., 2003). While there has been no direct evidence linking the expression and receptive use of certain words to the expression of empathy, these findings, as well as the importance of language in other areas of development, indicate this is an important variable to consider. Thus, the current study included measurements of both general language abilities and pain-/emotion-specific language abilities.

The Present Study

  Rationale. Empathy is an important aspect of children's moral and emotional development, as well as overall social competence. In essence, understanding and feeling the emotions and experiences of another individual is a valuable component of what it means to be human. More specifically, empathy for another individual's pain is an important human capacity. Based on research studies conducted with newborns (e.g., Sagi & Hoffman, 1976), humans may be hard-wired to respond to others empathically.

While newborns' reflexive crying at the sound of another in distress may be empathy at its most rudimentary form, true empathy appears to develop once children have matured in other developmental domains (e.g., social, cognitive, emotional). True empathy (in which a child is able to distinguish another's pain or distress from his or her own) first emerges in the second year of life and continues to develop well into the third year of life and beyond. Incidences of some components of empathy, namely empathic concern and hypothesis testing, increase dramatically between 14 and 20 months of age in most children (Zahn-Waxler, Robinson et al., 1992). In fact, some research findings have suggested that children may show empathy-related responses to others' distress during this time (e.g., Ungerer et al., 1990). Interestingly, contextual factors appear to play a role in the emergence of these prosocial acts. Although limited, research has suggested that empathic responses to familiar individuals (e.g., mothers) appear in the second year, whereas empathic responses to unfamiliar individuals (e.g., experimenters) may not emerge until the third year of life (Zahn-Waxler, Radke-Yarrow et al., 1992). Additional research has even suggested that empathic responses to others' pain may also appear at approximately this time and in the same manner with children responding with stronger and more frequent responses to mothers than unfamiliar adults (e.g., Robinson et al., 2001). While some research has used both sadness and pain to elicit children's empathy-related responses (e.g., Zahn-Waxler, Radke-Yarrow et al., 1992) and a few studies have even examined children's general prosocial responses to others' sadness and pain separately (Denham et al., 1995; Denham & Couchoud, 1991), no research has explicitly examined the differences that may exist in the behavioural expressions of children's empathy for others' pain versus children's empathy for others' emotions.

While many studies have relied on a painful scenario to elicit empathic responses from the participating children, only a few (Denham & Couchoud, 1991; Denham et al., 1995) have done so in an attempt to learn about how children responded to others' pain specifically (as opposed to the broader concept of distress or negative emotion). Generally, pain scenarios were used to generate empathic responses, not to study empathy for pain. In fact, most of these studies may have even confused the resulting findings by combining both painful and sad scenarios when attempting to answer one research objective. When pain and sadness have been examined separately (Denham & Couchoud, 1991; Denham et al., 1995), children's responses were coded for a general prosocial response using a 7-point scale (ranging from nonresponsive to sophisticated prosocial engagement). To date, no research has attempted to investigate how children behaviourally express their empathy differently depending on whether the victim is in pain or is showing emotional distress (e.g., sadness). A thoughtful examination of the constructs of pain and emotion suggests that differences may lie in not only their expression, but also in how others may respond behaviourally to witnessing their display in others.

Pain, as defined by the International Association for the Study of Pain, is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Merskey & Bogduk, 1994, p. 210). As part of the body's defense system, pain serves as a warning that someone may be in danger. Therefore, to an observer, pain may be viewed as self-threatening. In this way, pain can serve as an outward message, signaling to others that danger may exist. This, not surprisingly, has an evolutionary basis. Pain, although frequently accompanied by

emotion, is predominately a sensory experience present from birth onwards. In fact, despite past inaccuracies and misjudgments, it is now firmly believed that children experience pain in various degrees from birth (Schechter, Berde, & Yaster, 2003) and therefore, by the toddler and preschool years, have had numerous experiences of pain (Chambers et al., 2010; Fearon et al., 1996; von Baeyer et al., 1998) and have likely had equally numerous experiences of witnessing others in pain.

Sadness, on the other hand, is solely an emotional experience (versus the emotional and sensory experience of pain). While it is unknown when children first experience sadness, it is likely not immediately upon birth when other, more instinctually motivated drives (e.g., hunger) are paramount. As children age, their experience with and knowledge of emotions increase. Emotional knowledge and expression, therefore, can be conceptualized as more abstract and complex constructs than pain. Developmentally speaking, children's understanding of their own and others' emotions may not emerge until early childhood and beyond.

Whereas pain can sometimes serve as a message to another (that is important for the other's own safety; Williams, 2002), sadness is a message to the other that is about the self (and not necessarily of importance to the other; D. Simon, Craig, Gosselin, Belin, & Rainville, 2008). When viewing 1-second film clips of prototypical emotion (e.g., sadness) and prototypical pain faces, adult participants rated the pain face as significantly more unpleasant than any of the other basic emotions (i.e., anger, sadness, surprise, disgust, fear, happiness). Additionally, the pain face received the highest ratings of arousal. Sadness, on the other hand, was perceived as no more arousing than a neutral face and was significantly less arousing than the other basic emotions and pain. Together,

these findings suggest that pain may be more noticeable and possibly more difficult to ignore than other basic emotions, like sadness (D. Simon et al., 2008).

Although much research has been conducted looking at the general construct of empathy, the procedures used have been inconsistently designed. While many of the scenarios/situations used to elicit empathy in children have relied on adult experimenters and parents to produce reactions of a variety of emotions (e.g., sadness, distress) and/or pain (usually clumped together as "distress"), no research has examined how the specific behavioural empathy-related responses may differ based on displays of pain versus other more emotion-based constructs such as sadness. The present study addresses this particular distinction by assessing the behavioural expression of empathy in response to lab-based simulations of sadness and pain. In addition, individual differences that have emerged as important correlates of empathy and empathy-related responding in the literature are examined including age (Eisenberg, Spinrad et al., 2006), sex (females tend to display greater levels of empathy, sympathy, and prosocial behaviour; Eisenberg, Fabes et al., 2006), temperament (children with more difficult temperaments display lower levels of empathy; Hastings et al., 2006), and general social-emotional developmental domains (e.g., internalizing/externalizing problems). The additional variable of language abilities was also examined in this dissertation as a possible factor of importance in predicting young children's empathic responses.

Objectives and Hypotheses. The present study builds on the existing child empathy literature by examining and describing the relationship between children's empathic expressions and various bottom-up, developmental, and interindividual factors. This was achieved by behaviourally coding young children's responses to adult

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simulations of pain and sadness, conducted separately during natural play. The primary objective of this investigation focused on the bottom-up factors important in children's expression of empathy towards others, specifically whether the different incoming stimuli (i.e., expressions of pain or sadness) would impact children's responses. Thus, specific goals of the present study were to provide a detailed behavioural description of young children's responses to others' pain and to others' sadness and to compare behavioural responses between simulations of pain and simulations of sadness. It was hypothesised that children would display different behavioural expressions to others' pain versus others' sadness. As an innate, sensory experience, children's understanding of and response to pain is likely very different than the understanding of and response to other more complex and abstract emotional states (e.g., sadness). Additionally, the only prior research examining children's prosocial responses to pain and sadness separately (Denham & Couchoud, 1991; Denham et al., 1995) discovered that children generally showed less concern and less prosocial behaviour towards others' pain than other's sadness. Based on these previous findings, it was hypothesized that children would be less responsive to another's pain than another's sadness (i.e., would use less prosocial behaviours such as helping, sharing, and distracting and would engage in more unresponsive behaviour such as ignoring or continuing to play).

Beyond the goals of describing and comparing children's detailed behavioural expressions to pain and sadness, another major objective of this examination was to identify and describe broader conceptual categories between empathic expressions of pain and sadness. Based on a review of the child empathy literature, it was expected that three broad categories would emerge for both pain and sadness simulations: 1) empathic

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concern, 2) personal distress, and 3) unresponsive or disengaged.

In addition to the aforementioned focus on bottom-up factors in children's expressions of empathy, the present study also focused on developmental and interindividual factors. Specifically, in regards to developmental variables of interest, this research set out to determine whether age or sex differences emerged in children's empathic expressions to others' pain or others' sadness. It was predicted that empathy would have age-related influences (supported in past research with pain and emotion-based simulations combined), such that older children would be more likely to respond in empathic, other-oriented behaviour and less likely to respond in distressed, self-focused behaviour. With regards to sex differences, past research has shown inconsistent findings for the impact of child sex on empathy. Studies showing marked differences have mostly been self-report or observer-report in nature and frequently these methods have been conducted with older children. Studies relying on more nonverbal methods to measure empathy have been less likely to show sex-related findings. Because this study is relying on behavioural coding and is conducted with much younger children, it was not suspected that sex findings would emerge for either simulation.

With regards to interindividual factors, the present study examined the value of additional variables of interest (i.e., temperament and social-emotional development) as predictors of children's empathic behavioural responses. These variables were examined separately for scenarios designed specifically to elicit empathy for sadness, as well as scenarios designed specifically to elicit empathy for pain. Based on previous findings, it was predicted that less difficult temperamental styles (children low in negative affectivity, high in effortful control, and moderately low in surgency/extraversion) would

be associated with greater incidences of situational empathic responses, regardless of elicitation situation (i.e., pain versus sadness). Additionally, based on past research, it was expected that children with greater externalizing behaviours would show more empathic behaviour (Gill & Calkins, 2003). Conversely, it was hypothesized that children with high levels of internalizing behaviours and dysregulation would show less empathic behaviour (Findlay et al., 2006). Similarly, children with fewer social-emotional competencies would display less empathic behaviour.

Finally, an additional interindividual factor, children's language abilities, was examined in the present study. Specifically, this final objective sought to examine the possible association between children's general language abilities and children's specific understanding of pain and emotion words (analyzed separately) and children's empathic responses to others' pain and to others' sadness, respectively. While language had not been previously explored in empathy research, it was hypothesized that, like other cognitive correlates of empathy (e.g., self-recognition), children's understanding of words for pain and words for emotion would be important (and significant) factors in children's responses to others' pain and others' sadness, respectively. Specifically, children with greater general and either pain- or emotion-specific vocabularies would be more likely to show empathic expressions in response to others' pain or to others' sadness, respectively.

Chapter 2: Method and Procedures

Participants

The participants were 120 healthy children (60 boys, 60 girls) between the ages of 18 and 36 months ($M = 26.44$; $SD = 5.17$) and one of their parents/guardians. A cross-sectional design was used to recruit children evenly distributed between 18 and 36 months of age. Using this approach, participants were recruited in 12 age- and sex-defined groups, each consisting of 10 participants: 18- through 20-month-old girls, 18- through 20-month-old boys, 21- through 23-month-old girls, 21- through 23-month-old boys, 24- through 26-month-old girls, 24- through 26-month-old boys, 27- through 29-month-old girls, 27- through 29-month-old boys, 30- through 32-month-old girls, 30- through 32-month-old boys, 33- through 35-month-old girls, and 33- through 35-month-old boys.

As reported by their parents, the ethnic distribution of the children was as follows: Euro-Canadian (82.5%; $n = 99$), Asian-Canadian (1.7%; $n = 2$), Indo-Canadian (0.8%; $n = 1$), and other (i.e., Canadian, Euro-Canadian/Latin American, Tunisian/Lebanese; 6.7%; $n = 8$). Ten parents (8.3%) did not answer this question. Participating parents included 107 (89.2%) mothers and 13 (10.8%) fathers with a collective mean age of 32.33 years ($R = 22\text{-}49$; $SD = 4.61$; $n = 118$). Two parents did not provide their age. The self-identified ethnic background of the participating parents was as follows: Euro-Canadian (80.0%; $n = 96$), African-Canadian (0.8%; $n = 1$), Indo-Canadian (0.8%; $n = 1$), and other (e.g., Canadian, American, Filipino, Mexican-Canadian; 12.5%; $n = 15$). Seven parents (5.8%) did not answer this question. Parents reported having the following relationship statuses: married (83.3%; $n = 100$), divorced/separated (2.5%; $n = 3$),

remarried (4.2%; *n* = 5), common-law (4.2%; *n* = 5), never married (3.3%; *n* = 4), or

other (e.g., single; 2.5%; *n* = 3). Educational levels varied among participating parents

with most of the sample having completed either university (37.5%; *n* = 45) or graduate

school/professional training (28.3%; *n* = 34). The remaining participating parents

reported attaining the following educational levels: partial university training (9.2%; *n* =

11), trade school or community college (19.2%; *n* = 23), and high school (5.8%; *n* = 7).

Using the Hollingshead Two Factor Index of Social Position (D. C. Miller, 1983),

participating families were best characterized as upper-middle class (*M* = 25.36; *SD* =

12.18; Class 2; *n* = 120).

In order to be eligible to participate, children had to be healthy, typically

developing (as assessed by informal parent report and a formal developmental screen),

and between the ages of 18 months, 0 days and 36 months, 0 days. There were several

exclusion criteria for this study. Firstly, children and/or parents had to be able to speak

and understand English. This was important due to the nature of the tasks. Parents had to

be able to read and respond to questions in English and children had to be able to, if

possible, understand the utterances of the researcher during the play simulations. In

circumstances where English was not identified as the family's first language,

participating parents had to be able to read and answer questions in English and

participating children had to be exposed to English on a daily basis (e.g., by one of their

parents, through an English daycare setting). Secondly, children and/or parents with

significant hearing or vision impairments were excluded for this study. Again, this

criterion was based on the need for parents to be able to respond to written questions and

children to be able to see and hear the play simulations. Thirdly, children and/or parents

with developmental delays were excluded from participation. This criterion was based on the difficulties that may have arisen when children and/or parents were completing the study/questionnaires when these disabilities were present. Finally, children with a medical condition that involved multiple painful procedures (e.g., diabetes, cancer) were excluded from this study. This was due to the postulation that children who have undergone frequent exposure to painful procedures may develop their understanding of pain (both in themselves and in other individuals) in a different way than healthy children.

Data from nine interested families were never collected for the following reasons: the family withdrew prior to study date ($n = 7$) or the cameras failed on the day of testing ($n = 2$). In addition, the data from seven participants were excluded after testing for the following reasons: English was not spoken/understood at a sufficient level (as determined by the principal researcher during the family's visit to the lab; $n = 3$), the child was too distressed by the first simulation to continue ($n = 2$), the child was unable to separate from their parent ($n = 1$), or the participant's questionnaires were never returned after the lab visit ($n = 1$).

Measures

Participating parents were asked to complete a number of questionnaires designed to briefly summarize their family's sociodemographic status and their child's social-emotional development, temperament, and language abilities. Parents also completed a brief questionnaire assessing their child's general development for the purpose of ensuring each child's development fell within the range of what would be expected at his or her age. These measures are discussed below. A comprehensive description of the

behavioural coding scheme used to identify and summarize children's empathy-related responses to the lab-based simulations of pain and sadness is presented within the following section outlining the present study's procedures.

Infant-Toddler Social and Emotional Assessment (ITSEA). The ITSEA (Carter & Briggs-Gowan, 2006) is designed to assess the normal feelings and behaviours of children between 12 and 36 months of age and includes 126 questions with Likert-type responses. Parents are asked to choose the response that best describes their child's feelings and behaviour in the past month. Responses are grouped into three broad Problem domains (Externalizing, Internalizing, and Dysregulation) designed to assess a child's ability to regulate his or her own behaviours and emotions, and a Competence domain, a scale designed to assess a child's social-emotional skills and abilities. Specifically, subscales composing the Externalizing domain include activity/impulsivity, aggression/defiance, and peer aggression. Subscales composing the Internalizing domain include depression/withdrawal, general anxiety, separation distress, and inhibition to novelty. Subscales composing the Dysregulation domain include negative emotionality, sleep, eating, and sensory sensitivity. Finally, the Competence domain includes subscales assessing compliance, attention, mastery motivation, imitation/play, empathy, and prosocial peer relations. Past investigations of the psychometric properties of the ITSEA have provided strong evidence for its validity and reliability (Carter & Briggs-Gowan, 2006; Carter, Briggs-Gowan, Jones, & Little, 2003). For the purposes of the present study, *T*-scores for the four domains were calculated and included in the analyses. High *T*-scores in the Problem domains represent concerning levels of the assessed problems (externalizing, internalizing, and dysregulation), whereas a low *T*-score in the

Competence domain represents a concerning deficit in overall social-emotional abilities.

Early Childhood Behavior Questionnaire (ECBQ). The ECBQ was developed and validated to measure temperament in toddlers between 18 and 36 months of age, and has shown adequate levels of reliability and validity (Putnam, Gartstein, & Rothbart, 2006). The 201-item parent-report questionnaire assesses 18 dimensions of temperament: discomfort, fear, motor activation, sadness, perceptual sensitivity, shyness, soothability, frustration, impulsivity, activity level, high-intensity pleasure, sociability, positive anticipation, inhibitory control, attention shifting, low-intensity pleasure, cuddliness, and attention focusing. These 18 dimensions load onto three broader factors: Negative Affectivity (comprised of discomfort, fear, motor activation, sadness, perceptual sensitivity, shyness, soothability, and frustration), Surgency/Extraversion (comprised of impulsivity, activity level, high-intensity pleasure, sociability, and positive anticipation), and Effortful Control (comprised of inhibitory control, attention shifting, low-intensity pleasure, cuddliness, and attention focusing). These three factors emerged for the same age group as included in the present study and therefore, scores on these three factors were included in the analyses.

The MacArthur-Bates Communicative Development Inventories (CDI). The MacArthur-Bates CDI (Fenson et al., 2007; 2000) are parent-report measures designed to assess the general language abilities of young children. Because of the age range of the sample in the present study, the toddler CDI (short form; designed to assess 16- to 30-month-olds) and the CDI-III (designed to assess 30- to 37-month-olds) of the MacArthur-Bates CDI were used. The short-form version of the toddler CDI has correlated highly with the longer version ($r = 0.99$) and has demonstrated excellent validity and reliability

(Fenson et al., 2000). The CDI-III, while a newer measure, has also shown adequate levels of validity and reliability in the early stages of its development and use (Fenson et al., 2007). For the purposes of the present study, the percentile rank of each participant's score on the 100-item vocabulary checklist was included in the analyses.

Pain and Emotion Words Questionnaire. In addition to the MacArthur-Bates CDI (which provided measures of general language abilities), parents were asked to report on their children's expression and reception of both pain words and emotion words. The pain and emotion words questionnaire was partly based on a questionnaire used to examine the emergence of pain words in children's vocabularies (Stanford et al., 2005). The questionnaire in the present study was used to determine the use and the understanding of pain and emotion words. In addition, if parents reported their child understanding or using any of the words, they were additionally asked to retrospectively report the age at which their child first used and first understood each pain and each emotion word. The pain words were taken directly from the questionnaire used by Stanford and colleagues (2005) and included: *hurt*, *boo-boo*, *ow/owie*, *pain*, *ache*, *sore*, and *ouch*. The emotion words were drawn from a similar study conducted by Ridgeway and colleagues (1985) assessing the emergence of emotion words. The emotion words included in the questionnaire were: *afraid*, *angry*, *happy*, *mad*, and *sad*.

While the reliability of this questionnaire is presently unknown, previous research with the pain words questionnaire (on which the present questionnaire is based) have established convergent validity between parent's self-report of their child's language and recordings taken from a database of transcripts of children's spontaneous speech (Stanford et al., 2005). Additional information on validity and reliability has been

established for the emotion words, specifically, showing that the self-report of children's emotion vocabulary is consistent with other methodologies including diaries and transcripts of spontaneous language (Bretherton et al., 1986).

For the purposes of the present study, mean frequency ratings were created for both the pain words and the emotion words, separately, across expressive and receptive abilities. In other words, each child received a rating of their general awareness of pain words and a rating of their general awareness of emotion words.

Child Development Inventory. During the telephone screening procedures (further described below), parents were asked if their child had any developmental delays or disabilities. In order to confirm these informal descriptions, all participating parents were asked to complete the Child Development Inventory (Ireton & Glascoe, 1995), a parent-report questionnaire that has demonstrated adequate validity and reliability. The questionnaire is specifically designed to assess a child's development across a variety of domains: social, self-help, gross motor, fine motor, expressive language, language comprehension, letters, numbers, and general development. For the purposes of this study, however, only the questions that contributed to the score summarizing the child's general development were used. The purpose of this instrument was to confirm that each child fell within the typically developing range when compared to similarly-aged peers, as described by parents over the telephone. Only data from children who fell within two standard deviations of the average scores for their age were included in the study.

Demographics and Descriptive Information. Parents were also asked to complete a demographic questionnaire assessing various demographic variables of interest (e.g., socioeconomic status) and relevant correlates (e.g., age, sex).

Procedure

  Recruitment and Screening Procedures. Participants within the appropriate age range were recruited primarily from the community through the posting of advertisements within the hospital and surrounding area, including children's groups and community centres. Advertisements were also placed on the Halifax Regional Municipality (HRM) parent website, an online community for families with kids under 6 years of age living in the city, and on Kijiji, an online classifieds website. A postal mailing was also sent to families in selected neighbourhoods across the HRM. Finally, small handouts were created and distributed at local events or placed at local, family-oriented establishments (e.g., recreation facilities).

  Interested parents were asked to call the Centre for Pediatric Pain Research at the IWK Health Centre at the telephone number provided in the advertisements. Once parents called, a telephone script and screening was used to fully explain and answer any questions about the study to the parent or guardian, as well as to determine eligibility. During this telephone contact, parents were asked: 1) if they spoke, wrote, and read English well enough to answer some written questions in English, 2) if English was the most spoken language at home (i.e., to the child) or if the child spent multiple days per week in the care of someone who spoke English with them, 3) if they or their child had any hearing or vision impairments that were not corrected for by the use of glasses/contact lenses or a hearing aid, and finally, 4) if their child had any developmental delays or chronic health conditions that affected what he/she did or how he/she felt, or that he/she took medication for on a regular basis.

Questionnaire Distribution and Informed Consent Procedures. If a family was determined to be eligible to participate and they indicated they were interested in participating in the study, an appointment was made for them to come into the research centre. Prior to this visit, families received a package of materials containing all of the questionnaires (i.e., the ITSEA, the appropriate version of the MacArthur-Bates CDI, the ECBQ, the pain and emotion words questionnaire, the Child Development Inventory, and the demographic and descriptive information questionnaire), as well as the informed consent documents. Parents were contacted by phone approximately one week after the package was sent to ensure its arrival, to review the informed consent documents, and to answer any questions about the materials within the package or the study itself. At this time, families were given the opportunity to complete the questionnaires prior to the first visit. However, if they preferred to wait until the completion of their visit to the research centre, they were given the option of completing the questionnaires after the visit and sending them back to the research centre in a self-addressed and pre-stamped envelope provided by the research team.

Lab-based Play Simulations. Once participating families came into the research centre at the IWK Health Centre, each child's empathy-related responses to another's distress were assessed. This was accomplished by creating a simulation of an adult expressing pain and sadness, shown separately, during a natural play session with the child (further described below). For this component of the study, all children were brought into a separate room where they were engaged in play with the same female researcher. An unfamiliar adult, versus a parent, served as the "victim" in an effort to make the simulations as standardized as possible. However, one parent was able to

accompany the child into the play room, although he/she was instructed not to verbalize or respond unless asked (e.g., "Mommy, look!") or prompted to do so (e.g., motioning to be picked up) by their child. Parents were seated facing the corner of the room away from the play mat. In addition, they were given a magazine to look through, so as to avoid directly looking at the child or the researcher during the play session. Children's behavioural and vocal responses were recorded using two Sanyo digital surveillance-type cameras (model number VCC-9000INC/INS) that streamed video and audio directly to a Sanyo digital video recorder (model number DSR-M800). The cameras were placed in two opposite corners of the testing room. One camera was positioned near the ceiling facing downwards (to allow for a broader view of the entire play area) and one camera was positioned approximately half-way up the wall, towards the seated parent (to allow for a more detailed view of the child's possible interactions with his/her parent).

Two scripted simulations of distress were created for the purpose of the study, one in which a female researcher simulated a painful response and the other in which the same female researcher simulated a response of sadness. Both simulations of distress were presented to the child during the play session. The play sessions consisted of five components: 1) positive play with the researcher, 2) incorporation of the sadness scenario (i.e., the researcher breaking a toy, showing a response of sadness), 3) resumption of positive play with the researcher, 4) incorporation of the pain scenario (i.e., researcher hurting herself with the fake hammer, showing a pain response), and finally, 5) positive play with the researcher to end the play session. The order of presentation of the pain and sadness scenarios was counterbalanced across participants by age and by sex. Scripts and guidelines for these simulations were developed based, in part, on those used in previous

studies examining empathy in similarly-aged populations (e.g., Kiang et al., 2004; Zahn-Waxler, Radke-Yarrow et al., 1992; Zahn-Waxler, Robinson et al., 1992). Each presentation of both pain and sadness started with 30 seconds of distress (e.g., rubbing injured spot for pain simulation, quietly crying for sadness simulation), followed by 30 seconds of a recovery period in which the pain or sadness gradually subsided and the researcher spoke about the distress being better (e.g., "That really hurt but it's feeling better now."). In creating the script for each simulation, every effort was made to keep the elements between the simulations of pain and sadness the same (i.e., the duration and intensity of facial, behavioural, and vocal displays; please see Table 1). For the full script used in the simulations of pain and sadness, please see Appendix A.

Debriefing and Feedback. Upon completion of the play session, the child was given the opportunity to choose a small toy to take home as a token of appreciation for participating in the study. At this time, the researcher provided parents with an award of participation for their child and a brief research participation questionnaire (designed to assess each family's experience participating in the study). Parents were asked to complete the questionnaire at home and to return it in the self-addressed and pre-stamped envelope provided. Finally, the parent was provided with $10 for his or her time and to cover the costs of transportation and/or parking.

As recommended by previous research (Lefaivre, Chambers, & Fernandez, 2007), parents were given the option within the informed consent documents to receive feedback on two of the clinical measures they completed for the study (i.e., the MacArthur-Bates CDI and the Child Development Inventory). If the parent was interested in receiving feedback on how his or her child scored on these measures of general language abilities

Table 1

The Facial, Behavioural, and Vocal Displays for Pain and Sadness Simulations

	Pain simulation	Sadness simulation
Initial event (i.e., hitting finger with hammer or teddy breaking)	*vocal*: • "Ow!"	*vocal*: • "Oh!"
Distress period (first 30 seconds)	*behavioural*: • grabbing hand • rubbing "injured" hand *vocal*: • "mmmm" • stating "That hurt" 3 times • stating "Ow" 5 times *facial*: • looking up 3 times with pain expression • no eye contact with child	*behavioural*: • dropping teddy • slight heaving of shoulders *vocal*: • crying quietly • stating "I'm sad" 3 times • distinct sniffling 5 times *facial*: • looking up 3 times with sadness expression • no eye contact with child
Recovery period (next 30 seconds)	*vocal*: • stating "That really hurt but it's feeling better now" 2 times	*vocal*: • stating "I was really sad but I'm feeling better now" 2 times

and general development, he or she was sent a feedback letter approximately two weeks

following participation. Due to the brief nature of these screening instruments, parents

were only given broad classifications for their children's scores on the MacArthur-Bates

CDI (i.e., below average, average, above average) and the Child Development Inventory

(within normal limits, outside normal limits). As described within the letters, parents

were encouraged to contact either the author (NFB) or her supervisor (Dr. Christine

Chambers) if they had questions. Additionally, parents were encouraged to retain the letter for their records in case their children were to receive a speech-language or developmental assessment at any point in the future, as the results could be informative for the assessor.

Behavioural Coding. Children's responses to the others' distress were coded using a modified version of a coding scheme that combined the Malts-Fetzer Empathy Coding for Children, a scheme used in previous empathy studies with similarly-aged populations of children (e.g., Zahn-Waxler, Radke-Yarrow et al., 1992; Zahn-Waxler, Robinson et al., 1992), and a modified version of a rating scale of children's global concern (Hastings et al., 2000; see Appendix B). This behavioural coding system was chosen based on its previous use with children within the appropriate age range, as well as previously documented high levels of coder reliability (Zahn-Waxler, Radke-Yarrow et al., 1992; Zahn-Waxler, Robinson et al., 1992; Zahn-Waxler et al., 1995). Furthermore, studies combining multiple methodologies (e.g., physiological measures) with this behavioural coding scheme have shown some evidence of validity (Zahn-Waxler et al., 1995). While almost the entire coding scheme was used in its original form, a few modifications and extensions were made for the present study to clarify issues that emerged during coding training and to include aspects of interest unique to the present study.

In an effort to confirm the meaningfulness of the categories in the existing coding scheme, as well as to determine any behaviours not included in the coding scheme that emerged in the present study, 15 randomly selected children's videos were watched by the author (NFB). A complete listing of various behaviours and verbalizations was

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created based on these observations and compared with the existing coding scheme. In collaboration with the author of the most recently-revised version (P. Hastings), the behaviours seen in the 15 videotapes were categorized within the groupings of the existing scheme. Adaptations were made and additions were included in the final coding scheme used for this study to accommodate behaviours/vocalizations that were not able to be categorized with the original coding scheme. Specifically, a rating of the child's concern for the victim was dropped due to the need for this particular code to have a clear and focused image of the child's face at all times. This type of recording was not possible because of the large area in which the child was free to move. Therefore, recording was focused on the entire playroom (versus a small area) in order to capture all of the child's responses. The possibility of capturing facial images was sacrificed in order to capture children's entire range of behavioural responses. In addition, the global rating scale of concern was shortened from a list containing seven ratings to a list containing five ratings, due to the limited range of responses from the young sample in the present study. Additional descriptions were also added for remaining codes/ratings to improve clarity and ease of coding. Finally, two codes were added because parents were included in the present study: one code for when a child looked to his or her parent for information on how to respond (named "social referencing") and one code for when a child sought comfort from their parent for themselves (named "seeks comfort"). The resulting scheme contained codes for three phases: 1) the two minutes prior to the first simulation, 2) the entire 60-second simulation including the distress and recovery periods for each scenario, and finally, 3) the two minutes following each of the simulations. Presence/absence or a rating of the following codes was assessed for each child based on these phases.

Two minutes prior to the initiation of the first simulation, coders rated the peak level of engagement each child exhibited leading up to the first simulation. The ratings were chosen from a 4-point scale ranging from 1 = *child stayed close to mother*, to 2 = *child played alone by experimenter (e.g., solitary or parallel play)*, to 3 = *child played with experimenter, but only when experimenter initiated play*, and finally to 4 = *child fully engaged with experimenter in an interactive way; child initiated play with experimenter*.

During the first 30 seconds of each simulation (the distress period), coders rated whether or not the following actions occurred: *ignoring* (minimal disruption of child's ongoing behaviour for at least 15 seconds consecutively); *active play* (child was actively involved in play; object, or game engaged child's full attention for at least 5 seconds (cumulatively); and *self-soothing* (rocked, stroked self; mouthed an object or self). In addition, coders rated the child's following emotional responses: *positive affect*, *anger*, and finally, *distress/fear*.

During the entire 60 second simulation (the distress and the recovery periods), coders rated whether or not the following actions occurred: *distracts* (child tried to divert victim's attention away from distress through various means, may bring toy or draw attention to self), *shares* (child gave something to victim which seemed to be in response to the distress, must be a toy/object child had possession of first), *helps* (child performed an action to relieve distress, suggested actions to relieve distress), *offending object* (defensive action or verbalization toward hammer or teddy bear), *imitation* (imitated sounds, facial expressions, or gestures of victim), *vocal or verbal sympathy* (concerned tone in voice), *seeks comfort* (child went to his or her parent to seek comfort for self), and

social referencing (child looked to parent for cues about how to respond to the victim). In addition, coders rated the child's following responses: *proximity to victim*, *hypothesis testing* (attempts to understand or determine the distress of the victim), *callous or hostile behaviour*, *self-referencing*, and *number of prosocial acts.* Additionally, coders were asked to give a *global rating of concern*.

Although parents were asked not to prompt their child to return to play or to help the victim, these behaviours occasionally happened. For this reason, coders also indicated when *prompts to resume play from parent* (parent verbally and/or physically prompts the child to return to the victim) or *prompts to help from parent* (parent verbally and/or physically prompts the child to help the victim) occurred.

Finally, coders provided a rating describing the amount of time after each of the 60-second simulations it took for the child to reengage (if ever) with the researcher at the level determined prior to the first simulation. This was done as an effort of describing children's ease with the researcher, both before and after the simulations of distress. The ratings were chosen from a 5-point scale ranging from 1 = *within 15 seconds*, to 2 = *within 30 seconds*, to 3 = *within 45 seconds*, to 4 = *within 2 minutes*, and finally to 5 = *child did not return to pre-simulation level of engagement in the first 2 minutes post-simulation*.

In addition to the codes used in the aforementioned phases, additional information was captured and coded for each video including: the length of the play session, the length of each simulation, whether or not the simulation was ended prematurely, and the total time each child spent with his or her parent during each 60-second simulation.

Coder Training. In total, three coders were trained to use the described behavioural coding scheme. Two coders (blinded to the specific objectives and hypotheses of the study) served as the primary coders and were each responsible for coding one simulation (either the pain or the sadness, but not both) per child so that coding of each child's response was independent. The third coder (NFB) coded a randomly selected group of 20% of the pain simulations and a randomly selected group of 20% of the sadness simulations for reliability. All three coders initially met to review the coding scheme and to watch three randomly selected videotapes to discuss the behaviours and verbalizations that emerged. Following this introduction to the coding scheme, each primary coder coded the same five randomly selected videos independently. The coders then met to discuss the codes/ratings given for the training videos. Differences in coding were resolved through discussion and led to further refinement in the details and descriptions of the coding scheme. The remaining videos were coded independently by the primary coders. In order to assist in consistency, five videos of the same simulation (pain or sadness) were coded at a time. The secondary coder coded a randomly determined 20% of the videos at an interval of one pain and one sadness simulation for every five videos coded.

Chapter 3: Results

The present investigation examined whether children's empathy-related responses differed when witnessing someone else's pain versus sadness. The research objectives were examined using a variety of analytic techniques. The primary research objective was to provide a detailed description and comparison of young children's behavioural expressions of empathy for pain and for sadness. To examine this particular objective, individual behaviours from the coding scheme were directly compared between pain and sadness simulations using paired-samples *t*-tests and McNemar (Siegel, 1956) chi-square analyses. In addition to describing and comparing children's behavioural expressions of empathy for pain and for sadness, another major objective of this investigation was to empirically identify broader conceptual categories of children's empathy-related responses to pain and to sadness. To this end, all behavioural codes were subjected to principal component analyses conducted separately for pain and sadness simulations. Component scores were created for each participant using the results of these analyses. Using these component scores, subsequent analyses examined the predictive value of several variables for pain and sadness separately. Specifically, age (as both a categorical and continuous variable) and sex differences were examined using both multivariate analyses of variance and hierarchical regression analyses. Finally, several other variables (i.e., temperament, social-emotional competencies/problems, language) were examined for their value in predicting children's empathy-related responses using hierarchical regression analyses. Of note, all relevant assumption checks were conducted for the aforementioned analyses. With large sample sizes, the techniques used in the current examination are typically robust to violations of normality. However, when relevant,

analyses were conducted with outliers removed and results did not change significantly. Thus, the analyses presented include all participants' data. Due to the exploratory nature of the present study and the fact that general hypotheses were established suggesting differences between children's expressions of empathy for pain and sadness, no corrections were made for multiple comparisons with the *t*-test and chi-square analyses. This decision is supported by discussions in the research literature (e.g., Perneger, 1998; Rothman, 1990; Schulz & Grimes, 2005) suggesting that adjustments to the alpha level (e.g., Bonferroni corrections) are too conservative and unfairly increase the risk of Type II errors. Finally, measures of effect size are provided for each of the *t*-test (using eta^2) and chi-square (using odds ratios) analyses comparing the behavioural codes allowing for greater interpretive value beyond significance testing.

Prior to presenting the results from the primary and secondary analyses, interrater reliability estimates are provided for the behavioural coding scheme. Next, information specifically related to the simulations is provided including results of the manipulation checks and descriptive data (e.g., length of the simulations). Following these descriptions, the direct comparisons between children's individual behavioural responses between pain and sadness simulations are presented. An overview of the rationale and the completion of the principal component analyses are then presented including a description of how participants' component scores were created. Following this discussion, the results of the multivariate analyses of variance and the hierarchical regression analyses are presented highlighting age and sex differences, as well as the predictive value of several other variables (i.e., temperament, social-emotional problems/competencies, and language) between children's behavioural responses to others' pain and to others' sadness. Finally,

the results section ends with a brief examination of order effects.

Coding Reliability

Interrater agreement for each behavioural code was analyzed using percent agreement (i.e., the percentage of concordant ratings between primary and secondary coders). For the purpose of this study, percent agreement was chosen as the interrater reliability estimate instead of Cohen's Kappa. A number of the behavioural codes (e.g., callousness/hostility, anger, self-referencing) occurred very infrequently creating the possibility that one disagreement would cause the Kappa value to be deceptively low and therefore, misleading (Cicchetti & Feinstein, 1990; Feinstein & Cicchetti, 1990; P. Simon, 2006). Cicchetti & Showalter (1997) classify percent agreements as *excellent* (90-100%), *good* (80-89%), *fair* (70-79%), and *poor* (below 70%). Using prior guidelines, only variables with at least 70% agreement were used in analyses beyond basic descriptive information (Carr, Kenney, Wilson-Barnett, & Newham, 1999). Overall, as shown in Table 2, percent agreement for the behavioural codes was quite good with most of the codes falling in the excellent range and no codes falling in the poor range. Thus, all behavioural codes were included in the following analyses.

Manipulation Check

As a manipulation check, the primary coders assessed for credibility (1 = *not credible*; 2 = *appears believable, probably would not strike a child as fake*). The independent coders rated all 120 of the pain simulations and all 120 of the sadness simulations as credible. Additionally, the primary coders assessed for whether or not prompting (e.g., calls child's names, points to hammer/teddy bear, visually engages child) accidentally occurred by the female researcher performing the simulations (1 = *no*

Table 2

Percent Agreement between Primary and Secondary Coders for the Behavioural Codes

Behavioural code	Percent agreement
Prosocial acts	
Distraction (absent/present)	93.8%
Sharing (absent/present)	100%
Helping (absent/present)	97.9%
Offending object (absent/present)	100%
Verbal/Vocal sympathy (absent/present)	93.8%
Rating of prosocial behaviour (0-3)	75.0%
Attempts to understand the distress	
Social referencing (absent/present)	85.4%
Hypothesis testing (0-3)	72.9%
Self-distress	
Self-soothing (absent/present)	100%
Seeks comfort (absent/present)	100%
Distress/Fear (0-4)	91.7%
Proximity to victim (0-3)	83.3%
Unresponsive/Inappropriate affect	
Ignoring (absent/present)	97.9%
Actively playing (absent/present)	91.7%
Anger (absent/present)	100%
Positive affect (0-3)	87.5%
Callous/Hostile (0-2)	97.9%
Miscellaneous	
Imitation (absent/present)	95.8%
Self-referencing (0-2)	100%
Global Rating of Concern (0-4)	77.1%

prompts/directives used; 2 = *one prompt*; 3 = *two prompts*; 4 = *three or more prompts*).

Prior to data collection, it was decided that simulations containing more than one prompt would be removed from the dataset because of concerns of guiding the child's behaviour with repeated prompts from the researcher during the distress period. Overall, no simulations contained more than one prompt. In fact, no pain simulations contained any prompting behaviour on part of the researcher. However, four of the sadness simulations (3.3%) contained one prompting incident on part of the researcher (i.e., pointing to the teddy bear's "injured" arm). The frequency of the occurrence of prompts between simulations could not be compared in this instance because there was no variability within the pain simulations (i.e., no pain simulations contained prompting behaviour on the part of the researcher). Nonetheless, in general, these data suggest that the simulations were conducted in a credible manner without significant prompting on part of the researcher.

Simulation Descriptives

Overall, the play sessions with children lasted approximately 19.86 minutes ($SD =$ 4.69 seconds). On average, the sadness simulations lasted approximately 59.84 seconds ($SD = 2.11$ seconds) and pain simulations lasted approximately 59.61 seconds ($SD = 2.61$ seconds). A paired-samples t-test showed the length of the simulations did not differ significantly between pain and sadness, $t(118) = 0.73$, $p = 0.47$. At times, children went to their parents (who were in the playroom) during the researcher's distress. During the pain simulations, 20.0% ($n = 24$) of the children went to their parents for at least some period of time. On average, these children spent 36.96 seconds ($SD = 17.82$ seconds) by their parents during the pain simulation. Three children (2.5%) spent the entire simulation

period with their mother or father. During the sadness simulations, 32.5% ($n = 39$) of the children went to their parents. On average, these children spent 31.82 seconds ($SD = 19.20$ seconds) by their parents during the sadness simulation. Five children (4.2%) spent the entire simulation period with their mother or father. Overall, the results of a McNemar chi-square calculation showed that significantly more children went to their parents during the sadness simulation ($N = 120$, exact $p < 0.01$) than the pain simulation. A subsequent paired-samples t-test showed that, overall, children spent marginally more time with their parents in the sadness simulation than in the pain simulation, $t(119) = 1.84$, $p = 0.07$. In rare circumstances, the simulation ended a few seconds prematurely (e.g., due to researcher error, child distress). This occurred at the same frequency for both the pain and the sadness simulations (2.5%; $n = 3$ for each of the simulation types), ending, on average, 16.33 seconds early for pain ($SD = 3.22$ seconds) and 11.33 seconds early for sadness ($SD = 4.73$ seconds) with no significant difference between the two simulations when compared using an independent-samples t-test, $t(4) = 1.52$, $p = 0.20$.

In addition, coders provided a rating describing the amount of time after each of the 60-second simulations it took for the child to reengage (if ever) with the researcher at the level determined prior to the first simulation. Specifically, these ratings were collected in the 2 minutes prior to the first simulation and in the 2 minutes following each of the simulations. Prior to the simulations, most children (75.8%; $n = 91$) interacted easily with the researcher when she initiated play. A total of 12.5% ($n = 15$) of the children were fully engaged with the researcher and initiated play with her on their own. The rest of the children either played alone near the researcher (10.0%; $n = 12$) or stayed close to their parent (1.7%; $n = 2$). After the pain simulation, most children reengaged

with the researcher at their pre-simulation level within 15 seconds (69.2%; $n = 83$). Most of the remaining children reengaged within 30 seconds (11.7%; $n = 14$), within 45 seconds (7.5%; $n = 9$), or within 2 minutes (7.5%; $n = 9$) after the pain simulation. A smaller percentage of children (4.2%; $n = 5$) did not reach their pre-simulation level of engagement in the first 2 minutes post-pain simulation. After the sadness simulation, most children reengaged with the researcher at their pre-simulation level within 15 seconds (62.5%; $n = 75$). Most of the remaining children reengaged within 30 seconds (15.0%; $n = 18$), within 45 seconds (4.2%; $n = 5$), or within 2 minutes (10.0%; $n = 12$) after the sadness simulation. As with the pain simulation, a smaller percentage of children (8.3%; $n = 10$) did not reach their pre-simulation level of engagement in the first 2 minutes post-sadness simulation. While the frequencies of these levels of engagement post-simulation could not be compared in this instance due to inadequate cell frequencies in 18 of the 25 cells (72.0%), the proportion of children at each level appear to be similar regardless of simulation type.

Finally, coders indicated whether parents attempted to prompt their child to either help the researcher or to resume play with the researcher during the 60-second coding period. As previously described, parents were asked not to prompt their children during the simulations and thus, both types of prompts occurred very infrequently. During the pain simulation, no parents prompted their child to help the researcher and only one parent (0.8%) prompted her child to resume play with the researcher. During the sadness simulation, two parents (1.7%) prompted their child to help the researcher and three parents (2.5%) prompted their child to resume play with the researcher. Statistical tests of the differences in these prompting behaviours between pain and sadness simulations

could not be conducted because there was no variability within the pain simulations for prompts to help the researcher (i.e., no parent prompted their child to help the researcher during the pain simulation) and because of inadequate cell frequencies in three of the four cells (75%) for prompts to resume play with the researcher. In general, these data suggest that prompting behaviour occurred very infrequently for either simulation type.

In summary, the simulations did not differ significantly on a number of descriptive elements including credibility, duration, level of the child's engagement with the researcher post-simulation, or parental prompts. The only differences that emerged were that children were significantly more likely to go to their parents during the sadness simulations and spent marginally more time beside their parent during the sadness simulation. This difference suggests that children were more likely to seek comfort from their parent during the sadness simulation.

Behavioural Responses to Pain versus Sadness Simulations

In total, the behavioural coding scheme coded/rated each participant for 20 different behaviours. The frequencies and descriptive statistics for all coded behaviours are provided in Table 3. As can be seen in the table, the most common individual behaviours (occurring greater than 20% of the time) in response to another's pain were, in order of most frequent, hypothesis testing (97.5%), social referencing (35.0%), distraction (25.8%), and actively playing (22.5%). The most common responses to the sadness of another were hypothesis testing (100%), helping (43.3%), social referencing (40.0%), seeking comfort from a parent (24.2%), and showing distress/fear (20.5%). The behavioural responses shown least frequently (less than 5% of the time) in response to another's pain were, in order of least frequent, taking action against the offending object

Table 3

Percentages, Frequencies, and Means (SDs) of Behavioural Codes for Pain and for Sadness Simulations with Corresponding Significance Values (N = 120)[a]

Behavioural code	Pain simulations			Sadness simulations			t (df)	p	McNemar exact p
	n (present)	% (present)	*M (SD)*	*n* (present)	% (present)	*M (SD)*			
Prosocial acts									
Distraction (absent/present)	31	25.8%		19	15.8%				0.05[†]
Sharing (absent/present)	7	5.8%		4	3.3%				0.51
Helping (absent/present)	20	16.7%		52	43.3%				<0.001***
Offending object (absent/present)	0	0.0%		2	1.7%				–
Vocal sympathy (absent/present)	9	7.5%		16	13.3%				0.09[†]
Rating of prosocial behaviour (0-3)	52	43.3%	0.60 (0.80)	67	55.8%	0.81 (0.88)	2.60 (119)	0.01*	
Attempts to understand the distress									
Social referencing (absent/present)	42	35.0%		48	40.0%				0.46
Hypothesis testing (0-3)	117	97.5%	1.63 (0.70)	118	100%	1.74 (0.53)	1.49 (117)	0.14	
Self-distress									
Self-soothing (absent/present)	4	3.3%		10	8.3%				0.07[†]
Seeks comfort (absent/present)	19	15.8%		29	24.2%				0.05[†]
Distress/Fear (0-4)	13	10.9%	0.13 (0.40)	24	20.5%	0.34 (0.84)	2.81 (115)	<0.01**	
Proximity to victim (0-3)[b]			2.38 (0.75)			2.40 (0.77)	0.32 (119)	0.75	

Table 3 (continued)

Behavioural code	Pain simulations			Sadness simulations			t (df)	p	McNemar exact p
	n (present)	% (present)	M (SD)	n (present)	% (present)	M (SD)			
Unresponsive/Inappropriate affect									
Ignoring (absent/present)	7	5.8%		1	0.8%				0.07†
Actively playing (absent/present)	27	22.5%		5	4.2%				<0.001***
Anger (absent/present)	1	0.8%		0	0.0%				–
Positive affect (0-3)	21	17.9%	0.21 (0.49)	21	17.8%	0.23 (0.53)	0.58 (114)	0.57	
Callous/Hostile (0-2)	1	0.8%	0.01 (0.09)	2	1.7%	0.02 (0.13)	0.58 (119)	0.57	
Miscellaneous									
Imitation (absent/present)	8	6.7%		2	1.7%				0.11
Self-referencing (0-2)	2	1.7%	0.03 (0.20)	0	0.0%	0.00 (0.00)	-1.35 (119)	0.18	
Global Rating of Concern (0-4)	114	95.0%	1.98 (0.88)	120	100.0%	2.32 (0.80)	3.81 (119)	<0.001***	

[a]In some cases, the child left the recording area of the camera and the coding could not be completed, resulting in some missing data.
[b]scale unable to be collapsed into absent/present dichotomy (See Appendix B).
–a statistical test of difference could not be conducted because there was no variability for at least one of the simulations.
†$p < 0.10$. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

(i.e., the hammer; 0.0%), anger (0.8%), callousness/hostility (0.8%), self-referencing

(1.7%), and self-soothing behaviours (3.3%). The behaviours that emerged with the

lowest frequency in response to another's sadness were self-referencing (0.0%), anger

(0.0%), ignoring the individual's distress (0.8%), callousness/hostility (1.7%), imitation

(1.7%), taking action against the offending object (i.e., the teddy bear; 1.7%), sharing

(3.3%), and continuing to actively play despite the other's sadness (4.2%).

In order to compare children's behavioural responses to others' pain versus

sadness, inferential statistical tests were conducted. Specifically, paired-samples *t*-tests

and McNemar chi-square tests were used to examine differences in children's responses

to pain and sadness simulations (see Table 3). Additionally, effect sizes for the *t*-tests

were calculated using eta^2 values. Effect sizes for the chi-square analyses were calculated

manually using odds ratios (Field, 2009). Eta^2 values are interpreted using the following

conventions (0.01 = small effect, 0.06 = medium effect, 0.14 = large effect; Cohen,

1988). Finally, to simplify the presentation of the individual results of these coded

variables and to ease in the interpretation of them, summary statistics are presented

within the following groupings: *prosocial acts*, *attempts to understand the distress*, *self-

distress*, *unresponsive or inappropriate affect*, *miscellaneous responses*, and *global

concern*. This same structure is also used in the tables summarizing these descriptive

findings.

Prosocial Acts. Prosocial responses to simulations of distress included the

presence versus absence of a variety of attempts to comfort the distressed victim

including distracting the victim (e.g., trying to draw the victim's attention to a new toy),

sharing a toy with the victim, helping the victim (e.g., showing her how to use the

hammer carefully), taking retaliatory action on the offending object (i.e., the hammer or the teddy bear), and verbal/vocal sympathy (e.g., saying "Are you ok?" in a soothing tone). In addition, each participant was rated on an overall scale of prosocial behaviour. Overall, children showed significantly less prosocial behaviour in response to an individual in pain than in response to an individual experiencing sadness, $t(119) = 2.60$, $p = 0.01$, $eta^2 = 0.05$. With respect to specific prosocial responses, children used marginally more distraction when the other individual was in pain than when they were experiencing sadness (N = 120, exact $p = 0.05$). According to the resulting odds ratio, children were only 1.85 times more likely to use distraction in response to pain than in response to sadness. Conversely, children used significantly more helping techniques (e.g., trying to reaffix the teddy bear's arm) when responding to another's sadness versus pain (N = 120, exact $p < 0.001$). The odds ratio suggests that children were 4.59 times more likely to help someone experiencing sadness than someone in pain. In addition, children were marginally more likely to provide verbal/vocal sympathy in response to another's sadness than in response to another's pain (N = 120, exact $p = 0.09$). The odds ratio indicates that children were only 1.90 times more likely to provide vocal/verbal sympathy in response to sadness than pain. In terms of other specific prosocial behaviours, children did not differ in the frequency with which they shared a toy/object between the two simulations (N = 120, exact $p = 0.51$) with an odds ratio indicating children were only 1.80 times more likely to share with someone in pain than with someone experiencing sadness. Finally, a statistical test of difference could not be conducted for children's reactions to the offending object because there was no variability for one of the scenarios (i.e., no child took action on the offending object in the pain simulation).

Attempts to Understand the Distress. Participants were rated/coded on a variety of behaviours aimed at trying to understand the distress of the victim. These behaviours were primarily represented on a 4-point scale that rated the intensity of hypothesis testing behaviour. In addition, the presence/absence of social referencing was coded. No differences emerged in children's responses between the pain and sadness simulations for either hypothesis testing [$t(117) = 1.49$, $p = 0.14$, eta$^2 = 0.02$] or social referencing (N = 120, exact $p = 0.46$). The resulting odds ratio indicates that children were only 1.24 times more likely to social reference during the sadness simulation.

Self-distress. Self-distress behaviours included distress/fear responses, the child's proximity to the victim, whether or not the child sought comfort from his or her parent during the simulation, and any self-soothing behaviour. Children were marginally more likely to seek comfort from their parent (N = 120, exact $p = 0.05$) during the sadness simulation. The odds ratio suggests they were only 1.69 times more likely to seek comfort during the sadness simulation than during the pain simulation. Additionally, children showed significantly more distress/fear [$t(115) = 2.81$, $p < 0.01$, eta$^2 = 0.06$] in response to an individual's sadness than to an individual's pain. Similarly, children were marginally more likely to use self-soothing behaviours (N = 120, exact $p = 0.07$) in response to another's sadness than to another's pain. According to the resulting odds ratio, children were 2.64 times more likely to self-sooth during the sadness simulation than the pain simulation. There was no difference in children's proximity to the victim between the pain and sadness simulations, $t(119) = 0.32$, $p = 0.75$, eta$^2 < 0.001$.

Unresponsive/Inappropriate Affect. The behaviours in this category included those in which the child showed little concern for the distress of the victim including:

ignoring the victim and/or actively playing during the victim's distress. In addition, this category included responses of inappropriate affect: showing anger, callousness/hostility, and/or positive affect during the victim's distress. Children were marginally more likely to ignore (N = 120, exact p = 0.07) and were significantly more likely to continue actively playing (N = 120, exact p < 0.001) when the victim was in pain than when she was sad. The corresponding odds ratios indicate children were 7.37 times more likely to ignore and 6.68 times more likely to actively play during someone's pain than someone's sadness. Children did not differ in the presence of positive affect [$t(114)$ = 0.58, p = 0.57, eta^2 < 0.01] or callousness/hostility between the pain and sadness simulations, $t(119)$ = 0.58, p = 0.57, eta^2 < 0.01. Finally, a statistical test of difference could not be conducted for children's responses of anger because there was no variability for one of the scenarios (i.e., no child showed anger in response to the victim's sadness).

Miscellaneous Responses. In addition to the above behavioural codes, children were rated for the presence/absence of imitation, as well as any instances of self-referential behaviour (e.g., referring to one's own injuries, self-blaming statements). Children did not differ in imitative actions (N = 120, exact p = 0.11). However, the odds ratio suggests children were actually 4.21 times more likely to imitate pain than sadness. Children did not differ significantly in their displays of self-referential behaviours [$t(119)$ = -1.35, p = 0.18, eta^2 = 0.01] during the pain and sadness simulations.

Global Concern. Finally, each participant was rated on a scale of global concern representing their overall response and concern for the victim. Overall, children showed less global concern for someone in pain than for someone feeling sad, $t(119)$ = 3.81, p < 0.001, eta^2 = 0.11.

In summary, the expression of children's empathy to pain versus their empathy to sadness showed some differences at the level of individual behaviours. With the exception of the odds ratio for one behavioural code (i.e., imitation), effect sizes were in line with the results from corresponding significance tests and, in general, showed medium to large effects for differences between pain and sadness simulations. For imitation, a non-significant finding emerged despite an odds ratio indicating children were relatively more likely to imitate pain than sadness. Overall, children were rated as showing significantly more global concern and significantly more prosocial responses to another's sadness than to another's pain. The frequency of specific prosocial acts (i.e., helping and verbalizing sympathy) occurred more frequently in response to another's sadness, while distraction occurred less frequently in response to another's sadness. When children responded to another's pain, their behaviours most frequently were characterized as: hypothesis testing, social referencing, distraction, and actively playing. For sadness, the behaviours most frequently coded were: hypothesis testing, helping, social referencing, seeking comfort, and distress/fear. Children appeared more distressed by someone's sadness than pain, as seen by children being marginally more likely to seek comfort from their parent, marginally more likely to show self-soothing behaviours, and showing significantly more distress/fear in response to someone's sadness than to someone's pain. Furthermore, it appeared that children were more likely to be unresponsive to someone's pain than to someone's sadness as seen by children being significantly more likely to continue actively playing during another's pain and marginally more likely to simply ignore another's pain.

Reduction of Data for Behavioural Responses to Pain and Sadness Simulations

As previously described, three conceptual categories were identified based on a review of the literature and available theory. These a priori categories were: 1) empathic concern, 2) personal distress, and 3) unresponsive or disengaged behaviour. It was hypothesized that these broad conceptualizations would be the same for both pain and sadness simulations. The specific behavioural codes composing these conceptual categories were not determined a priori. However, it was postulated that the behavioural codes composing the categories would vary between pain and sadness simulations. In addition to this conceptual approach, the data were subjected to an empirical approach in order to create data-driven categories.

Thus, in order to: 1) reduce the large quantity of data points into meaningful categories, and 2) to examine the structure of underlying constructs within the behavioural coding scheme, the above codes were subjected to two exploratory factor analyses using principal component analysis with varimax rotation. Only variables that occurred at least some of the time were included in the component analysis. Therefore, behaviours that never emerged in either simulation were removed prior to conducting the components analysis for that simulation. These variables included one behavioural code for the pain simulation (i.e., taking action on the offending object) and two behavioural codes for the sadness simulation (i.e., anger, self-referencing). Additionally, variables with Kaiser-Meyer-Olkin (KMO) values of less than 0.5 were dropped from the analyses prior to applying the rotation and throughout subsequent iterations (Brace, Kemp, & Snelgar, 2003). In general, KMO values below 0.5 imply that the variable is inappropriate for component analyses (i.e., its relationship with other variables cannot be

explained through other variables in the analyses). These variables included eight

behaviours for the pain simulation (i.e., anger, distraction, helping, imitation,

callousness/hostility, self-referencing, social referencing, and positive affect) and nine

behaviours for the sadness simulation (i.e., ignoring, actively playing, positive affect,

distraction, sharing, taking action on the offending object, imitation, callousness/hostility,

and hypothesis testing). Finally, only variables with component loadings greater than 0.5

were retained in the final rotated solutions. This specific cut-off was used because of

previous research identifying loadings of at least 0.5 as having practical significance

(Hair, Tatham, Anderson, & Black, 1998). Variables that had inadequate loadings

included two behaviours for the pain simulation (i.e., sharing, self-soothing) and no

behaviours for the sadness simulation. This method was followed for the coded variables

for both pain and sadness simulations, each conducted separately. By following these

methods, a three-component model emerged for each simulation.

Pain Components Analysis. Retained codes and their loading values for the pain

principal component analysis are provided in Table 4. The final three-component solution

for the pain simulation consisted of nine behavioural codes (KMO Measure of Sampling

Adequacy = 0.66; Bartlett's Test of Sphericity = 333.79, $df = 36$, $p < 0.0001$). The total

variance explained was 68.2%, with Component One accounting for 24.2%, Component

Two accounting for 23.4%, and Component Three accounting for 20.6%. Components

were named based on the underlying constructs of the variables composing them.

Component One was labelled *Empathic Concern for Others' Pain*. Three

behaviours/ratings loaded onto this component including vocal/verbal sympathy, overall

prosocial behaviour, and the global rating of concern such that, children who vocalized or

Table 4

Component Loadings for Pain Codes in Final Component Solution with the Percent Variance Explained by Each Component

	Factor loading
Empathic Concern for Others' Pain (24.2%)	
Verbal or vocal sympathy (absent/present)	0.86
Rating of prosocial behaviour (0-3 scale)	0.89
Global rating of concern (0-4 scale)	0.76
Personal Distress to Others' Pain (23.4%)	
Distress/Fear (0-4 scale)	0.78
Proximity to victim (0-3 scale)	-0.74
Seeks comfort (absent/present)	0.89
Unresponsive to Other's Pain (20.6%)	
Ignoring (absent/present)	0.78
Actively playing (absent/present)	0.73
Hypothesis testing (0-3 scale)	-0.72

verbalized sympathy, had greater overall prosocial behaviour, and had high ratings of

global concern also had high scores on Component One (i.e., Empathic Concern).

Component Two was labelled *Personal Distress to Others' Pain* and reflected a self-

oriented (versus other-oriented) distress response. Three behaviours loaded onto this

component including distress/fear, seeking comfort from the parent, and proximity to the

victim, such that children who showed higher distress/fear responses, tried to seek

comfort from their parent, and tried to stay away or avoid the victim had high scores on

Component Two (i.e., Personal Distress). Finally, Component Three was labelled

Unresponsiveness to Others' Pain and included three items, all reflecting a low degree of

concern for the other's distress. These items included ignoring, actively playing, and

hypothesis testing behaviour, such that children who ignored the victim's pain, continued to actively play during the victim's distress, and showed few attempts to try and understand the distress of the victim also had high scores on Component Three (i.e., Unresponsiveness). Correlations between all the variables in the final solution for the pain codes are provided in Table 5.

Sadness Components Analysis. Retained codes and their loading values for the sadness principal component analysis are provided in Table 6. The final three-component solution for the sadness simulation consisted of nine behavioural codes (KMO Measure of Sampling Adequacy = 0.75; Bartlett's Test of Sphericity = 320.82, $df = 36$, $p < 0.0001$). The total variance explained was 64.2%, with Component One accounting for 33.5%, Component Two accounting for 19.5%, and Component Three accounting for 11.1%. Component One was labelled *Empathic Concern for Others' Sadness*. Five behaviours/ratings loaded onto this component including helping, vocal/verbal sympathy, proximity to the victim, overall prosocial behaviour, and the global rating of concern such that, children who helped, vocalized/verbalized sympathy, stayed close to or came towards the victim, had greater overall prosocial behaviour, and had high ratings of global concern also had high scores on Component One (i.e., Empathic Concern). Component Two was labelled *Personal Distress to Others' Sadness* and reflected a self-oriented (versus other-oriented) distress response. Two behaviours loaded onto this component including distress/fear and seeking comfort from the parent such that, children who showed higher distress/fear responses and tried to seek comfort from their parent had high scores on Component Two (i.e., Personal Distress). Finally, Component Three was labelled *Social Referencing in Response to Others' Sadness* and included two items,

Table 5

Correlation Matrix for Items in Final Factor Solution for Pain

	Vocal sympathy (0/1)	Prosocial behaviour (0-3)	Global concern (0-4)	Distress/ Fear (0-4)	Proximity to Victim (0-3)	Seeks comfort (0/1)	Ignoring (0/1)	Actively playing (0/1)	Hypothesis testing (0-3)
Empathic Concern									
Vocal sympathy	1	.657**	.511**	-.090	.197*	-.124	-.071	-.078	.153
Prosocial behaviour	.657**	1	.637**	-.133	.295**	-.240**	-.098	-.080	.135
Global concern	.511**	.637**	1	-.015	.065	-.066	-.276**	-.302**	.420**
Personal Distress									
Distress/Fear	-.090	-.133	-.015	1	-.329**	.607**	-.079	-.170	.016
Proximity to victim	.197*	.295**	.065	-.329**	1	-.557**	.114	.185*	.159
Seeks comfort	-.124	-.240**	-.066	.607**	-.557	1	-.108	-.179	-.127
Unresponsive									
Ignoring	-.071	-.098	-.276**	-.079	.114	-.108	1	.462**	-.326**
Actively playing	-.078	-.080	-.302**	-.170	.185*	-.179	.462**	1	-.283**
Hypothesis testing	.153	.135	.420**	.016	.159	-.127	-.326**	-.283**	1

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Table 6

Component Loadings for Sadness Codes in Final Component Solution with the Percent Variance Explained by Each Component

	Factor loading
Empathic Concern for Others' Sadness (33.5%)	
Helping (absent/present)	0.78
Vocal or verbal sympathy (absent/present)	0.69
Proximity to victim (0-3 scale)	0.52
Rating of prosocial behaviour (0-3 scale)	0.90
Global rating of concern (0-4 scale)	0.83
Personal Distress to Others' Sadness (19.5%)	
Distress/Fear (0-4 scale)	0.78
Seeks comfort (absent/present)	0.84
Social Referencing in Response to Others' Sadness (11.1%)	
Self-soothing (absent/present)	-0.64
Social referencing (absent/present)	0.72

together reflecting an attempt to gauge the situation by looking for the response of the parent. These items included self-soothing and social referencing such that children who did not engage in self-soothing, but rather engaged in social referencing had high scores on Component Three (i.e., Social Referencing). Correlations between the variables in the final solution for the sadness behavioural codes are provided in Table 7.

In summary, two principal component analyses (one for pain and one for sadness) were conducted to reduce the amount of data for ease of interpretation and to determine the underlying constructs within the behavioural coding scheme. Each analysis resulted in three components. For pain, these components were labelled Empathic Concern for Others' Pain, Personal Distress to Other's Pain, and Unresponsive to Others' Pain. For

Table 7

Correlation Matrix for Items in Final Factor Solution for Sadness

	Helping (0/1)	Vocal sympathy (0/1)	Proximity to victim (0-3)	Prosocial behaviour (0-3)	Global concern (0-4)	Distress/ Fear (0-4)	Seeks comfort (0/1)	Self- soothing (0/1)	Social referencing (0/1)
Empathic Concern									
Helping	1	.300**	.464**	.727**	.582**	-.132	-.219*	-.081	-.096
Vocal sympathy	.300**	1	.211*	.532**	.522**	-.133	-.107	-.118	-.120
Proximity to victim	.464**	.211*	1	.472**	.311**	-.255**	-.345**	-.039	.040
Prosocial behaviour	.727**	.532**	.472**	1	.707**	-.215*	-.254**	-.106	-.151
Global concern	.582**	.522**	.311**	.707**	1	-.064	-.176	-.158	-.068
Personal Distress									
Distress/Fear	-.132	-.133	-.255**	-.215*	-.064	1	.536**	-.041	-.022
Seeks comfort	-.219*	-.107	-.345**	-.254**	-.176	.536**	1	-.170	-.103
Social Referencing									
Self-soothing	-.081	-.118	-.039	-.106	-.158	-.041	-.170	1	.000
Social referencing	-.096	-.120	.040	-.151	-.068	-.022	-.103	.000	1

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

sadness, the resulting components were Empathic Concern for Others' Sadness, Personal

Distress to Others' Sadness, and Social Referencing in Response to Others' Sadness.

While the first two components to emerge for each analysis were labelled similarly and

described similar constructs, it is important to note that the underlying behavioural codes

composing these components differed.

Exploring Age and Sex Differences in Empathy for Pain and Sadness

In order to explore age and sex differences, as well as the possible influence of

other important factors, in children's responses towards others' pain and towards others'

sadness, component scores were created for each participant using the three-component

solutions for both pain and sadness simulations.[1] In total, six component scores were

created for each participant: three scores reflecting each of the three pain components and

three scores reflecting each of the three sadness components. Component scores were

created by multiplying the component loading for each variable by each participant's

score on that variable. This was done to create a composite score for each of the

participant's on the derived components from the principal component analyses for pain

and sadness, respectively. The resulting scores were then summed (but not averaged)

across all variables for each factor separately. In this method, the absolute value of each

component loading was used. Additionally, participant's rescaled scores were used so

that all the variables were weighted on the same metric (i.e., 0-10) ensuring that resulting

component scores (and the weight of them) were based on the factor loadings and not the

scale of the particular variable.

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[1] The presentation order of the simulations was entered as a covariate for all MANOVA and regression
analyses to investigate the possibility of order effects. Analyses did not change significantly.

The influences of age and sex on empathy for pain and empathy for sadness were examined in two ways: 1) using age as a categorical variable (with three age groups: 18-23 months, 24-29 months, 30-35 months) and 2) using age as a continuous variable. This was achieved through the application of two 2 (Sex) x 3 (Age Group) multivariate analysis of variance (MANOVA) and a series of six hierarchical regressions (i.e., one hierarchical regression for each pain and sadness component score) using age and sex as the first step of the model. The MANOVA findings are presented first. Effect sizes for the multivariate and univariate findings in these analyses are presented using partial eta^2. As before, the effect sizes are interpreted using the same conventions (0.01 = small effect, 0.06 = medium effect, 0.14 = large effect; Cohen, 1988). Following the presentation of the MANOVA results, the findings from the hierarchical regressions are provided for the pain and sadness simulations, again presented separately.

Analysis for Pain Simulation. Descriptive statistics for the pain component scores for both boys and girls as a function of age group are presented in Table 8.

Table 8

Means (SDs) of Pain Component Scores by Age Group and Sex

	Empathic Concern: Pain		Personal Distress: Pain		Unresponsiveness: Pain	
	Boys	Girls	Boys	Girls	Boys	Girls
18-23 months	4.46 (2.87)	5.31 (3.47)	8.07 (3.07)	9.77 (4.37)	6.73 (5.34)	5.44 (3.24)
24-29 months	6.62 (5.19)	4.30 (2.90)	6.41 (2.19)	7.98 (3.62)	6.74 (3.12)	6.65 (4.10)
30-35 months	8.51 (7.89)	7.94 (7.28)	6.68 (2.13)	6.24 (1.72)	6.31 (4.57)	4.33 (2.92)

A two-way between-groups 2 (Sex) x 3 (Age Group) MANOVA was performed to investigate age and sex differences in children's empathy-related responses to others' pain. The three pain component scores created for each participant were used as the dependent variables: Empathic Concern for Others' Pain, Personal Distress to Others' Pain, and Unresponsiveness to Others' Pain. The independent variables were age group (18-23 months, 24-29 months, 30-35 months) and sex. There was no significant difference between girls and boys on the combined dependent variables, $F(3, 111) = 1.68$, $p = 0.17$; Wilks' Lambda = 0.96; partial eta^2 = 0.04. However, there were significant differences between the age groupings on the combined dependent variables, $F(6, 220) = 4.13$, $p < 0.01$; Wilks' Lambda = 0.81; partial eta^2 = 0.10. There were no age group differences for Unresponsiveness to Others' Pain (i.e., component three). However, the age groups differed for both of the other components, specifically in their Empathic Concern for Others' Pain [$F(2, 113) = 4.46$, $p = 0.01$; partial eta^2 = 0.07] and in their Personal Distress to Others' Pain [$F(2, 113) = 7.06$, $p < 0.01$; partial eta^2 = 0.11]. Post-hoc comparisons using the Tukey HSD test showed a trend of increasing Empathic Concern for Others' Pain from the lowest age group (18-23 months) to the oldest age group (30-35 months) with a significant increase between the two older age groups (24-29 months and 30-35 months; $p < 0.05$). Conversely, post-hoc comparisons using the Tukey HSD test showed a trend of decreasing Personal Distress to Others' Pain from the lowest age group (18-23 months) to the oldest age group (30-35 months) with a significant decrease between the two younger age groups (18-23 months and 24-29 months; $p = 0.04$). See Figure 2 for a graphical depiction of these trends and significant differences. Finally, there was no significant Age Group x Sex interaction on the

Figure 2. Mean Pain Component Scores by Age Group.

Pain Components by Age Group

☆ Denotes a statistically significant difference ($p < 0.05$)

combined dependent variables for pain, $F(6, 222) = 1.07$, $p = 0.38$; Wilks' Lambda = 0.94; partial eta^2 = 0.03.

Analysis for Sadness Simulation. Descriptive statistics for the sadness component scores for both boys and girls as a function of age group are presented in Table 9.
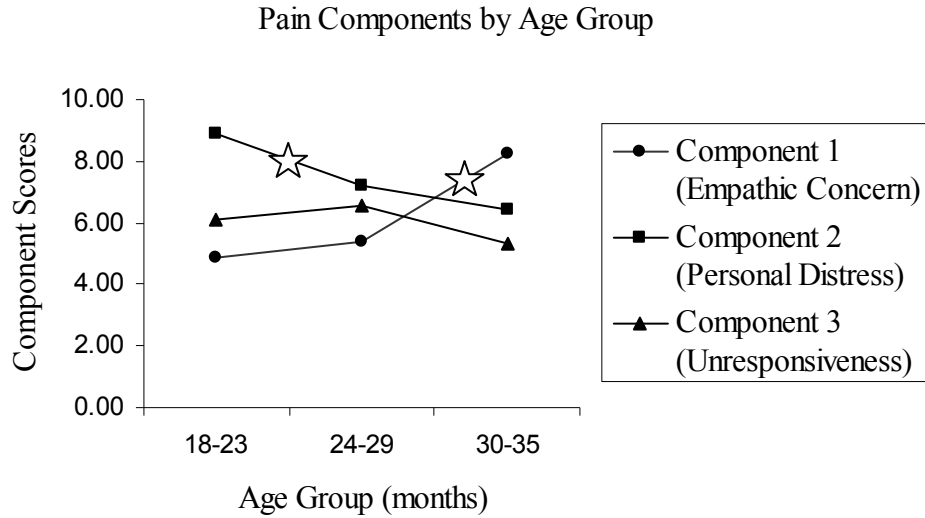
Table 9

Means (SDs) of Sadness Component Scores by Age Group and Sex

	Empathic Concern: Sadness		Personal Distress: Sadness		Social Referencing: Sadness	
	Boys	Girls	Boys	Girls	Boys	Girls
18-23 months	15.00 (8.39)	15.29 (8.92)	2.89 (4.75)	4.09 (5.76)	3.89 (4.24)	1.86 (3.92)
24-29 months	16.49 (9.25)	13.24 (9.96)	2.50 (4.59)	3.83 (5.63)	3.61 (3.70)	3.17 (3.60)
30-35 months	18.22 (10.84)	16.18 (8.86)	1.54 (3.66)	1.19 (2.98)	4.10 (4.25)	3.72 (4.28)

As with the pain simulations, a two-way between-groups 2 (Sex) x 3 (Age Group) MANOVA was performed to investigate age and sex differences in children's empathy-related responses to others' sadness. The three pain component scores created for each participant were used as the dependent variables: Empathic Concern for Others' Sadness, Personal Distress to Others' Sadness, and Social Referencing in Response to Others' Sadness. The independent variables were age group (18-23 months, 24-29 months, 30-35 months) and sex. There were no significant differences between girls and boys on the combined dependent variables, $F(3, 109) = 1.09$, $p = 0.36$; Wilks' Lambda = 0.97; partial eta^2 = 0.03, nor between the age groups on the combined variables, $F(6, 218) = 1.01$, $p = 0.42$; Wilks' Lambda = 0.95; partial eta^2 = 0.03. There was also no significant Age Group x Sex interaction, $F(6, 218) = 0.37$, $p = 0.90$; Wilks' Lambda = 0.98; partial eta^2 = 0.01. See Figure 3 for a graphical depiction of these data.

Figure 3. Mean Sadness Component Scores by Age Group.

Sadness Components by Age Group
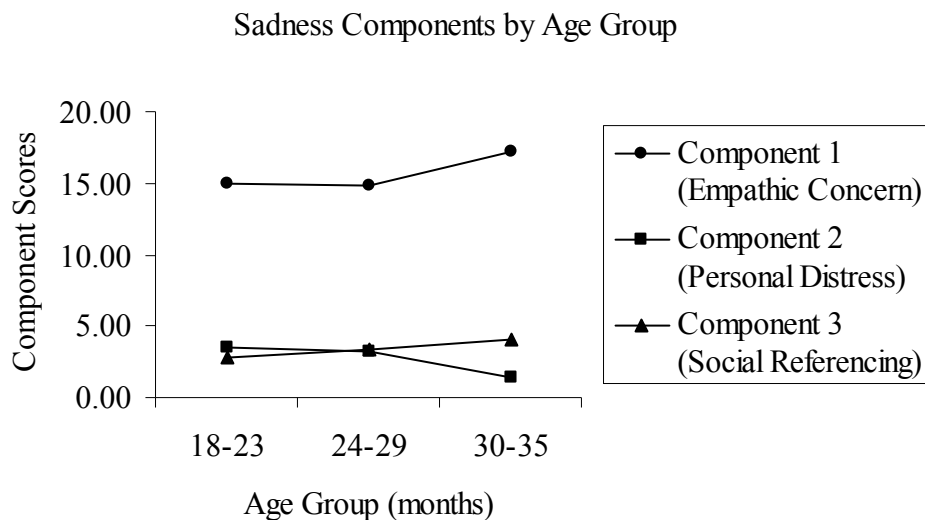
In summary, MANOVA analyses showed no sex differences for either the pain components or the sadness components. No age differences emerged for the sadness components, but age differences did emerge for two of the three pain components: Empathic Concern for Others' Pain and Personal Distress to Others' Pain. Post-hoc comparisons revealed that the differences were in the directions expected (i.e., older children were more likely to show empathic concern and less likely to show personal distress reactions in response to an individual's pain).

Exploring Interindividual Differences in Empathy for Pain and Sadness

Hierarchical regressions were conducted to determine how interindividual factors previously documented in the literature influenced children's empathic responding to others' pain and others' sadness. In particular, developmental (i.e., age and sex) and interindividual variables (i.e., temperament, social-emotional problems and competencies, and language) were investigated for their utility in predicting children's responses to others' pain and others' sadness. A series of six hierarchical regressions were performed, one for each of the component scores (three for pain, three for sadness). Four blocks of variables were entered into the analysis for each hierarchical regression. The first block of predictors contained the child's age and his or her sex. The second block of the regression was dedicated to the child's temperament and included the three factors from the ECBQ (Negative Affectivity, Effortful Control, Surgency/Extraversion). The third block consisted of the three social-emotional domains (i.e., describing Externalizing, Internalizing, and Dysregulation problems) and the social-emotional Competencies domain derived from the ITSEA. The final block of the hierarchical regressions consisted of language-based variables including a measure of general

language abilities (taken directly from the MacArthur CDI) and a pain- or emotion-specific language measure (the mean frequency ratings of children's use and understanding of pain or emotion words). The hierarchical regressions were conducted exactly the same for all of the pain and sadness components, with the exception of the mean frequency pain words rating used for predicting the pain components and the mean frequency emotion words ratings used for predicting the sadness components[2].

Analysis for Pain Simulation. In line with the MANOVA findings, age emerged as a significant predictor of children's responses to others' pain. As before, this significant finding only emerged in the hierarchical analyses predicting Empathic Concern for Others' Pain ($\beta = 0.27$, $p < 0.01$) and Personal Distress to Others' Pain ($\beta = -0.27$, $p < 0.01$). These findings were in the direction expected, such that the older children were more likely to show empathic concern for other's pain and less likely to show personal distress reactions. Unlike the MANOVA findings, sex did emerge as a marginally significant predictor of one of the three components. Sex was marginally predictive of Personal Distress to Others' Pain ($\beta = -0.16$, $p = 0.08$), with girls showing more personal distress behaviour than boys in response to others' pain. Beyond the predictive value of the variables of age and sex, two temperament factors showed some predictive value of pain components of empathic responding. Specifically, Negative Affectivity was marginally predictive of Empathic Concern for Others' Pain ($\beta = -0.19$, $p = 0.06$), such that children who showed more empathic concern were also rated by their parents as having lower negative affect. An additional temperament factor, Effortful Control, was marginally predictive of Personal Distress to Others' Pain ($\beta = -0.17$,

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[2] While not used in the regression analyses, parents were also asked to report the age their children first expressed and understood each of the pain and emotion words in the language questionnaire (see Table 10).

Table 10

Means, Standard Deviations, and Age Ranges (in months) Children First Expressed and Understood Pain and Emotion Words

	Expression			Understanding		
	M (SD)	*R*	*n*	*M (SD)*	*R*	*n*
Pain words						
Ache	25.27 (3.97)	18.0-30.0	15	24.99 (4.81)	14.5-34.0	36
Boo-boo	19.43 (4.29)	12.0-29.0	61	17.97 (4.62)	9.5-29.0	83
Hurt	21.89 (4.55)	12.0-32.0	71	19.41 (4.87)	9.5-32.0	100
Ouch	21.12 (3.84)	12.0-30.0	76	18.56 (4.70)	9.5-30.0	102
Ow/Owie	19.79 (4.08)	12.0-31.0	73	17.85 (4.69)	9.5-31.0	92
Pain	23.93 (3.25)	18.0-28.0	14	22.86 (5.40)	12.5-34.0	46
Sore	24.28 (4.13)	15.0-33.0	51	22.65 (5.04)	9.5-34.0	69
Emotion words						
Afraid	25.75 (4.68)	15.0-34.0	40	22.49 (4.98)	9.5-34.0	72
Angry	26.05 (4.18)	18.0-34.0	39	22.21 (4.64)	9.5-30.0	80
Happy	21.83 (4.49)	12.0-33.0	77	19.31 (4.76)	8.5-30.0	104
Mad	23.99 (3.90)	16.5-32.0	46	21.52 (4.94)	9.5-34.0	88
Sad	22.80 (4.42)	12.0-32.0	61	20.26 (4.49)	8.5-31.0	95

Note. Because parents were only asked to report the age of emergence if their child used or understood the word at some level, sample sizes vary.

$p = 0.09$), such that children who showed more personal distress reactions were also rated by their parents as having less control. After controlling for age, sex, and temperament in the regression models, two social-emotional domains showed value in predicting one of the three pain components, Empathic Concern. Specifically, the Internalizing Domain was significantly predictive of Empathic Concern for Others' Pain ($\beta = -0.28$, $p = 0.02$), such that children who showed more empathic concern were also rated by their parents as having low internalizing behaviour problems. An inspection of correlations between the

Internalizing Domain (and the subscales composing the Internalizing Domain) and Empathic Concern for Others' Pain revealed two significant correlations driving this significant regression finding: 1) a significant correlation between the Internalizing Domain and Empathic Concern for Others' Pain ($r = -0.19$, $p = 0.04$) and 2) a significant correlation between the subscale measuring inhibition to novelty and Empathic Concern for Others' Pain ($r = -0.22$, $p = 0.02$). In other words, children who showed less empathic concern to others' pain were rated by their parents as having overall more internalizing challenges and more inhibition to novelty. Additionally, the Dysregulation Domain was significantly predictive of Empathic Concern for Others' Pain ($\beta = 0.21$, $p = 0.04$), such that children who showed more empathic concern were also rated by their parents as having high dysregulation behaviours. This unusual relationship was made clearer by one significant correlation between the subscale measuring negative emotionality and Empathic Concern for Others' Pain ($r = -0.20$, $p = 0.03$), indicating that children who showed less empathic concern for others' pain were rated by their parents as having more negative emotionality. Finally, after controlling for child age, sex, temperament, and general social-emotional behaviours and competencies, one language variable showed predictive value for one of the three pain components. Mean frequency ratings for pain words was the only variable to show any predictive value for Unresponsiveness to Others' Pain ($\beta = -0.27$, $p < 0.05$), such that children who were more responsive (i.e., had lower scores on the Unresponsiveness Component) were also rated by their parents as having a greater knowledge of pain words.

Overall, the hierarchical regressions produced significant models for two of the three pain components: Empathic Concern [$F(11, 104) = 2.58$, $p = 0.01$] and Personal

Distress [$F(11, 103) = 1.90$, $p < 0.05$]. For Empathic Concern for Others' Pain, at least marginally significant predictive increases were gained by blocks one (age, sex; R^2 change = 0.08, $p = 0.01$), two (temperament factors; R^2 change = 0.06, $p = 0.06$), and three (social-emotional domains; R^2 change = 0.08, $p = 0.04$). For Personal Distress to Others' Pain, a significant increase in predictive value was only produced by block one (age, sex; R^2 change = 0.10, $p < 0.01$). The results of the hierarchical regressions for the pain simulations are summarized in Table 11.

Analysis for Sadness Simulation. The results of the hierarchical regressions for the sadness simulations provided mixed support for the MANOVA findings. As with the MANOVA findings, sex did not emerge as a significantly predictive variable and age was not significantly predictive for two of the three factors (i.e., Empathic Concern for Others' Sadness, Social Referencing in Response to Others' Sadness). In contrast, age was marginally predictive of Personal Distress to Others' Sadness, such that older children were less likely to show personal distress reactions to others' sadness ($\beta = -0.16$, $p = 0.09$). After controlling for age and sex, two of the temperament factors emerged as significantly predictive of Empathic Concern for Others' Sadness: Negative Affectivity ($\beta = -0.31$, $p < 0.01$) and Surgency/Extraversion ($\beta = 0.18$, $p = 0.04$). Specifically, children who showed more empathic concern for others' sadness were rated by their parents as showing low negative affect and high surgency/extraversion. After controlling for child age, sex, and temperament, a few significant findings emerged for social-emotional behaviour problems. Specifically, the Externalizing Domain was significantly predictive of Empathic Concern for Others' Sadness ($\beta = 0.22$, $p = .03$) and of Personal Distress to Others' Sadness ($\beta = -0.24$, $p = .04$), such that children who were high in

Table 11

Hierarchical Multiple Regression Analyses Predicting Children's Empathic Concern, Personal Distress, and Unresponsive Reactions to Others' Pain

	Pain components					
	EC		PD		U	
Predictor	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	0.08*		0.10**		0.03	
Age in months (18-36)		0.27**		-0.27**		-0.10
Sex		0.07		-0.16†		0.14
Step 2	0.06†		0.04		0.00	
Negative affectivity (1-7)		-0.19†		-0.14		0.03
Surgency/Extraversion (1-7)		-0.02		0.04		0.01
Effortful control (1-7)		0.15		-0.17†		-0.05
Step 3	0.08*		0.02		0.01	
Externalizing domain (32-99)		0.16		-0.18		0.00
Internalizing domain (20-99)		-0.28*		0.01		0.07
Dysregulation domain (15-99)		0.21*		-0.02		-0.09
Competence domain (10-73)		-0.06		-0.03		-0.04
Step 4	0.00		0.01		0.04	
General language (5-99)		-0.01		-0.02		0.16
Pain-specific language (0-4)		0.08		-0.14		-0.27*
Total Adjusted R^2	0.13**		0.08*		-0.02	
n	116		115		116	

Note. EC = Empathic Concern; PD = Personal Distress; U = Unresponsive. The standardized regression coefficient (β) for each variable is presented at the step in which that variable was entered.
$^\dagger p < 0.10$. $*p < 0.05$. $**p < 0.01$.

externalizing behaviour were more likely to show empathic concern and less likely to show a personal distress reaction in response to someone's sadness. An inspection of correlations between the Externalizing Domain (and the subscales composing the

Externalizing domain) and Personal Distress to Others' Sadness revealed no significant

correlations between the two. However, an inspection of correlations between this

Domain (and its subscales) and Empathic Concern for Others' Sadness revealed a

marginally significant correlation with the subscale measuring activity/impulsivity ($r =$

0.17, $p = 0.07$) and Empathic Concern for Others' Sadness indicating that children who

showed more empathic concern for others' sadness were rated by their parents as being

more active/impulsive. Finally, the Internalizing Domain was significantly predictive of

Social Referencing in Response to Others' Sadness ($\beta = 0.30$, $p = 0.01$), such that

children who scored higher in social referencing were also rated by their parents as

having greater internalizing behaviours. Correlations between this Domain and its

subscales and Social Referencing in Response to Others' Sadness revealed three at least

marginally significant correlations between this component and the Internalizing Domain

($r = 0.24$, $p = 0.01$), the subscale measuring general anxiety ($r = 0.27$, $p < 0.01$), and the

subscale measuring inhibition to novelty ($r = 0.16$, $p = 0.08$). In other words, children

who showed more social referencing behaviour in response to the sadness simulation

were also rated by their parents as having greater overall internalizing challenges, greater

anxiety, and more inhibition to novelty.

Overall, the hierarchical regressions produced at least marginally significant

models for two of the three sadness components: Empathic Concern [$F(11, 104) = 2.80$, p

< 0.01] and Social Referencing [$F(11, 104) = 1.65$, $p = 0.10$]. For Empathic Concern for

Others' Sadness, a significantly predictive increase was gained only by block two

(temperament factors; R^2 change $= 0.15$, $p < 0.001$). For Personal Distress to Others'

Sadness, no significant increases were gained by any block. For Social Referencing in

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Response to Others' Sadness, a marginally predictive increase was gained only by block three (social-emotion domains; R^2 change = 0.08, p = 0.06). The results of the hierarchical regressions for the sadness simulations are summarized in Table 12.

In summary, the hierarchical regressions produced overall significant (or marginally significant) models for four of the six pain and sadness components (i.e., Empathic Concern for Others' Pain, Personal Distress to Others' Pain, Empathic Concern for Others' Sadness, and Social Referencing in Response to Others' Sadness). Although direct statistical comparisons were not possible between the pain and sadness components (because they were composed of different variables), general similarities and differences based on the conceptualizations of the components in the respective models (pain or sadness) emerged. In general, the variables included in the regression analyses showed more predictive value for the pain components than the sadness components. Age and sex, together, were significantly predictive of Empathic Concern for Others' Pain and Personal Distress to Others' Pain. After controlling for child age and sex, temperament was only marginally predictive of Empathic Concern for Others' Pain and was significantly predictive of Empathic Concern for Others' Sadness. After controlling for child age, sex, and temperament, social-emotional behaviour problems and competencies were significantly predictive of Empathic Concern for Others' Pain and marginally predictive of Social Referencing in Response to Others' Sadness. Finally, after controlling for all other variables, language did not add any significant predictive value for any of the pain or sadness components. However, language variables were close to reaching significance for Unresponsiveness to Others' Pain (p = 0.11).

Table 12

Hierarchical Multiple Regression Analyses Predicting Children's Empathic Concern, Personal Distress, and Social Referencing Reactions to Others' Sadness

| | Sadness components | | | | | |
| | EC | | PD | | SR | |
Predictor	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	0.02		0.03		0.03	
Age in months (18-36)		0.11		-0.16†		0.11
Sex		0.09		-0.08		0.13
Step 2	0.15**		0.02		0.02	
Negative affectivity (1-7)		-0.31**		0.06		0.07
Surgency/Extraversion (1-7)		0.18*		-0.06		0.08
Effortful control (1-7)		0.05		-0.11		-0.11
Step 3	0.06		0.05		0.08†	
Externalizing domain (32-99)		0.22*		-0.24*		-0.02
Internalizing domain (20-99)		-0.17		-0.01		0.30*
Dysregulation domain (15-99)		-0.08		-0.03		0.08
Competence domain (10-73)		0.09		0.07		-0.05
Step 4	0.01		0.01		0.02	
General language (5-99)		-0.01		0.00		-0.11
Emotion-specific language (0-4)		-0.11		0.17		0.25
Total Adjusted R^2	0.15**		0.01		0.06†	
N	116		113		116	

Note. EC = Empathic Concern; PD = Personal Distress; SR = Social Referencing. The standardized regression coefficient (β) for each variable is presented at the step in which that variable was entered.
$^\dagger p < 0.10$. $^* p < 0.05$. $^{**} p < 0.01$. $^{***} p < 0.001$.

Order Effects

An examination of order effects was conducted to ascertain whether important variables of interest in the present study were equally distributed to the two presentation

orders (i.e., either pain or sadness simulation first). No differences in the

independent variables of interest emerged between the group of children who saw the

pain simulation first (and the sadness simulation second) and the group of children who

saw the sadness simulation first (and the pain simulation second) suggesting there was

equal distribution of children across presentation orders. An additional examination of the

effect of order on the dependent variables (i.e., the component scores) also showed no

differences between the groups suggesting that the presentation order of the simulations

did not affect children's empathic responses. Thus, independent variables of interest were

successfully counterbalanced across presentation orders and when examined as a variable

itself, order did not impact the subsequent findings. A summary of the results of these

independent-samples t-tests is provided in Table 13. Two independent variables, sex and

age group (as used in the multivariate analyses of variance), are not included in this table

as boys and girls of each age group were equally distributed across the presentation order

of the simulations prior to the start of data collection.

Table 13

Descriptive Statistics and Corresponding Presentation Order Effects of the Pain and Sadness Simulations

	Pain first, sadness second		Sadness first, pain second			
	n	M (SD)	n	M (SD)	t(df)	p
Independent variables of interest						
Age in months (18-36)	60	26.40 (5.18)	60	26.48 (5.20)	-0.09(118)	0.93
Negative affectivity (1-7)	59	2.66 (0.46)	60	2.68 (0.50)	-0.27(117)	0.79
Surgency/Extraversion (1-7)	59	4.86 (0.58)	60	4.85 (0.49)	0.14(117)	0.89
Effortful control (1-7)	59	4.69 (0.53)	60	4.77 (0.56)	-0.74(117)	0.46
Externalizing domain (32-99)	59	48.53 (7.97)	60	47.00 (6.89)	1.12(117)	0.27
Internalizing domain (20-99)	59	46.73 (11.28)	60	43.10 (9.19)	1.93(117)	0.06
Dysregulation domain (15-99)	59	45.14 (12.08)	60	43.10 (10.67)	0.98(117)	0.33
Competence domain (10-73)	58	48.40 (8.86)	59	50.29 (7.92)	-1.22(115)	0.23
General language abilities (5-99)	60	41.31 (27.21)	60	44.92 (30.30)	-0.69(118)	0.49
Emotion-specific language (0-4)	60	1.74 (1.07)	60	1.74 (1.08)	-0.01(118)	0.99
Pain-specific language (0-4)	60	1.62 (0.79)	60	1.55 (0.74)	0.47(118)	0.64

(Table 13 continued)

	Pain first, sadness second		Sadness first, pain second			
	n	*M (SD)*	*n*	*M (SD)*	*t(df)*	*p*
Component Scores						
Empathic Concern for Others' Pain (0.00-25.10)	60	5.75 (4.40)	60	6.58 (6.36)	-0.84(118)	0.40
Personal Distress to Others' Pain (0.00-24.08)	59	7.66 (3.76)	60	7.41 (2.53)	0.43(117)	0.67
Unresponsiveness to Others' Pain (0.00-22.34)	60	5.92 (3.49)	60	6.07 (4.47)	-0.21(118)	0.83
Empathic Concern for Others' Sadness (0.00-37.12)	60	15.29 (9.08)	60	16.04 (9.68)	-0.44(118)	0.66
Personal Distress to Others' Sadness (0.00-16.19)	59	2.93 (5.18)	58	2.43 (4.18)	0.58(115)	0.56
Social Referencing to Others' Sadness (0.00-13.64)	60	3.53 (4.18)	60	3.32 (3.79)	0.29(118)	0.77

Chapter 4: Discussion

Overview of Results

While the general construct of empathy in children has been widely studied over the past three decades, specific investigations into the construct of empathy for pain have not been conducted within the child developmental literature. A model of pain empathy provided in the adult literature, though comprehensive, does not adequately describe how children respond to others' in pain (Goubert et al., 2005). With the recent surge in research examining pain empathy in adult populations, especially using imaging technology (e.g., Lamm et al., 2007; Morrison et al., 2004), a newfound interest has emerged in how children first develop their concern for others' pain. In past studies on the general construct of empathy in children, little attention was paid to whether or not children responded differently to pain versus emotional distress. The features of these types of simulations (e.g., the different facial, vocal, and behavioural expressions of the "victim"; see Table 1) used to evoke empathy in young children may, in fact, bear influence on children's empathy-related responses. Prior investigations have grouped these varying types of simulations together and generally referred to them as "distress". However, without specific examinations of these important differences, it is unclear what impact they may have on children's empathic responses. Thus, the primary objective of the present study was to examine the influence of bottom-up processes (i.e., expressions of pain or expressions of sadness) on children's empathy and empathy-related responses. Additionally, developmental (i.e., age and sex) and interindividual (i.e., temperament and social-emotional problems and competencies) influences shown to be important in general empathy studies were examined to determine whether these variables assumed

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different roles in children's expressions of empathy to others' pain and others' sadness. Finally, an initial exploration into the significance of pain and emotion language in empathic responding in children was conducted.

In general, the present investigation revealed important differences in children's expressions of empathy for others' pain versus empathy for others' sadness, suggesting incoming stimuli from the victim do play an important role in empathic expression as highlighted in Goubert's pain empathy model (2005). Ultimately, children do appear to respond to others' pain differently than they respond to others' sadness. While children are more distressed by another's sadness, they are actually more likely to respond prosocially to it. Conversely, children at this age are more likely to simply ignore or actively play during another's pain. Some age-related trends (in the directions expected) emerged in children's behavioural expressions of empathy for pain, but not consistently for sadness. Specifically, older children were more likely to show empathic concern and less likely to show personal distress reactions in response to another individual's pain. Only sex differences emerged in children's personal distress reactions to pain, with girls showing marginally more personal distress reactions than boys in these simulations. Temperament and social-emotional problems predicted empathy-related reactions for both pain and sadness, although the relationships between these variables and the simulations differed. Lastly, language showed little predictive value in children's empathic expressions. A thorough discussion of the findings on these bottom-up, developmental, and interindividual factors is presented below, followed by the proposal of a model of empathy development that incorporates all of these influences in young children's growing understanding and behavioural expressions of empathy.

Bottom-Up Influences in Children's Expressions of Empathy

Despite the recent focus on bottom-up influences (e.g., the varying vocal and facial expressions of the distressed individual) on empathy in the adult literature (Goubert et al., 2005), little attention has been paid to whether children express their empathy differently based on the information coming from the person in distress (e.g., expressions of pain versus sadness). In the present study, 18- to 36-month-old children's responses to simulations of pain and sadness were coded for individual empathy-related behaviours to examine whether differences would emerge between children's expressions of empathy to other's pain versus others' sadness.

When individual behaviours were compared between the simulations, interesting differences emerged. As hypothesized, children showed more prosocial behaviours and were rated as having greater global concern in response to another's sadness than in response to another's pain. In fact, a number of specific prosocial behaviours (i.e., helping, vocal/verbal sympathy) occurred more frequently in response to the sadness simulation. Only one specific prosocial act, distraction, occurred more frequently in response to another's pain than another's sadness. In addition to differences in prosocial responses, children in the present study appeared more distressed and fearful of another's sadness than another's pain. Of note, children were marginally more likely to seek comfort from their parents and to attempt to soothe themselves (e.g., by sucking their thumb), and were significantly more likely to have distress/fear responses to another individual's sadness than to another individual's pain. Finally, as originally hypothesized, children were more likely to either ignore or actively play during the victim's pain.

In contrast to these differences in children's specific behaviours, a few similarities

emerged across both pain and sadness simulations. A handful of specific behaviours occurred infrequently (i.e., less than 5% of the time) across both types of simulations including: showing anger, retaliating against the offending object (i.e., either the teddy bear or the hammer, depending on the simulation), showing callousness/hostility, and showing self-referential behaviour. Although these behaviours did occur occasionally, their relatively low frequencies support previous findings with this age population (e.g., Zahn-Waxler, Radke-Yarrow et al., 1992). Additionally, almost all children (97.5% in the pain simulations, 100% in the sadness simulations) showed some level of hypothesis testing. Together, these particular variables do not appear to differentiate between young children's empathy-related responses based on the bottom-up processes of the empathy-evoking simulations. In other words, regardless of simulation type, these behaviours occurred very infrequently (or even not at all) or, in the case of hypothesis testing, almost all of the time.

As previously described, children in this sample appeared to be more upset by another individual's sadness than another's pain, engaging in more behaviours representative of personal distress (i.e., distress/fear reactions, self-soothing behaviours, and attempts to seek comfort from parents) during the sadness simulation. This particular finding is somewhat unexpected given the limited research with adults suggesting that pain is actually perceived as more unpleasant and more arousing than basic emotions like sadness and that sadness, in particular, is perceived as no more arousing than a neutral face (D. Simon et al., 2008). This counterintuitive phenomenon also goes against the notion that children would be less distressed by someone else's sadness than pain, as pain is more typically a signal to others that a potential and mutual threat may exist and

sadness may be more of an internal type of distress, only meaningful to the victim (D. Simon et al., 2008; Williams, 2002). One possible explanation for this surprising finding is that there was some element of the sadness simulation (e.g., crying) that was especially distressing for children in the present study. While 18- to 36-month-old children would certainly have seen other children cry (i.e., peers, siblings), watching an adult cry (especially a stranger) may have been a novel occurrence and, therefore, especially distressing or scary for them to witness. The relatively high rate of social referencing in both simulations (35% in the pain simulations, 40% in the sadness simulations) fits with this interpretation. Social referencing literature (e.g., Mumme, Fernald, & Herrera, 1996) has documented the importance of parental reactions to infant behaviour in novel situations. In the sadness simulation, specifically, it may have been even more distressing for children to look to their parents and not be given any indication of how to respond emotionally or behaviourally. Furthermore, because parents were asked not to get involved unless specifically requested to do so by their child, many children were, essentially, left on their own to respond to the adult in distress. This could have led to an increased level of distress for children already upset by the stranger's crying. Conversely, in the pain simulations, children (who were already less distressed by the painful expression) may have looked to their parents, seen no reaction, and been more likely to continue to simply ignore the researcher's distress.

Given that children were more distressed by another's sadness than by another's pain, it is somewhat unexpected that children were also rated as showing significantly more global concern and responded with more prosocial behaviours (e.g., helping, verbal/vocal sympathy) to sadness than to pain. Despite the documented high levels of

personal distress in the sadness simulations, many children were still more likely to respond to sadness than to pain. This could be a representation of the phenomenon described in the literature (Batson, 1998) whereby children upset by someone else's distress respond to it as a way of reducing their own distress. In this way, children who have overly empathic responses and/or are unable to differentiate another individual's distress from their own may be more likely to engage in any sort of behaviour (even prosocial behaviour) as a way of comforting themselves. Another possible interpretation of these differences in prosocial responses may be a direct result of inherent differences in the simulations themselves. As an attempt to prevent children from being able to easily fix or solve either simulation of distress, the teddy bear's arm was purposely created to be impossible for an 18- to 36-month-old to reattach. Regardless, many children tried repeatedly to reaffix the teddy bear's arm during the sadness simulation. Consequently, many children's responses were coded as instances of helping (i.e., trying to fix the toy) and were rated as very prosocial (i.e., showing repeated/prolonged attempts to fix the toy). What remains unclear, however, is whether these attempts to fix the toy were actually directed in a prosocial way towards the victim (i.e., trying to reduce her distress) or were more self-focused (i.e., wanting to fix the toy, wanting to reduce his or her own distress). In the pain simulation, conversely, nothing was able to be fixed by the children. In this simulation, distraction was attempted more frequently suggesting that, children, when unable to solve the pain, tried to divert the individual's attention from it. However, outside of the present study, this phenomenon may not emerge so uniformly. One can imagine instances of sadness that cannot be fixed (e.g., the death of a pet) and instances of pain that can be solved (e.g., the removal of a noxious stimulus). Therefore, the

differences between children's prosocial responses to another's pain versus sadness may, in fact, be a result of the simulations in the present study and may not be as easily generalized to other sadness or pain situations children may witness.

As just described, children were more distressed by, but also more responsive to, another's sadness. Interestingly, almost the opposite pattern appeared in the pain simulations. Children, in response to another individual's pain, were not only less likely to be distressed, but were also more likely to completely ignore the person's painful reactions entirely or to continue playing throughout them. In fact, although actively playing during the individual's distress was one of the least frequently occurring behaviours in the sadness simulations, it was one of the most frequently occurring behaviours in the pain simulations. These findings are surprising for a number of reasons. From an evolutionary perspective (de Waal, 2008; Preston & de Waal, 2002; Williams, 2002), it would be expected that children might find another individual's pain a sign of a possible threat to their own well-being and therefore, be either very responsive to it in a self-focused way (e.g., seeking comfort from the parent) or responsive to it in an other-focused way (e.g., through prosocial behavioural responses). It is possible, however, that the pain simulation used in this study (i.e., a finger hit by a hammer) did not represent a real threat to anyone other than the victim in distress.

The finding that children in the present study were more likely to ignore or play during another's pain than another's sadness is additionally surprising given the frequency with which children are exposed to painful events in childhood (Chambers et al., 2010; Fearon et al., 1996; von Baeyer et al., 1998). Past research on everyday pain in young children indicates that children have frequent opportunities to not only experience

pain themselves, but also to observe others experiencing pain (e.g., falling down). Due to the frequency of these types of events in childhood, there would also be multiple opportunities to receive help or comfort for one's own pain, as well as to watch peers receive assistance for their pain. It is possible, however, that due to the frequency with which painful events occur in childhood, children become inured to seeing the pain experienced by others and are less likely to be distressed by it or be responsive to it. Another interpretation is that children are rarely responsible for assisting peers or others in pain. Whereas children may have experience helping sad peers, hurt peers are almost always attended to by someone else, usually an older child or an adult (Denham & Couchoud, 1991). A third interpretation, however, is that young children are not readily receptive to others' pain expressions. In their investigation of the development of sensitivity to others' pain, Deyo and colleagues (2004) revealed that by 5 years of age (the youngest children included in the study), children are able to identify clear expressions of pain in others. However, investigations of this ability in preschool-aged children have not been completed. Thus, it is unclear whether the 18- to 36-month-olds in the present study were as sensitive to the painful expressions of the victim as they were to, perhaps, the more salient expressions of sadness (e.g., crying) in the victim. In this way, children's greater likelihood to ignore the pain of the other individual may be a result of this growing awareness of others' pain versus a disregard for others' pain. This notion is further supported by the very high levels of hypothesis testing in both simulations. Almost every child (97.5% in the pain simulations, 100% in the sadness simulations) showed some level of hypothesis testing, indicating that children, regardless of simulation type, were at least aware of the victim's expressions. It is possible that, at

this age, children were simply less able to recognize the pain expression as distress and were, therefore, less likely to act on that individual's pain. This interpretation, however, is contrary to the notion that perceiving pain in others (especially when the expression of pain is reflexive in nature, as in the present study) likely initiates an involuntary emotional response in the observer automatically (Craig, Versloot, Goubert, Vervoort, & Crombez, 2010).

Although little is known about the age at which children first gain the ability to accurately identify expressions of pain in others, research from the emotion-recognition literature provides a clearer picture of children's abilities to recognize others' emotions. Children's emotion development may explain the differences noted in children's responses to others' sadness and to others' pain in the present study. As early as the first few months of life, infants appear to show sensitivity to changes in facial expressions of others (Saarni, Mumme, & Campos, 1998). By 1 year of age, infants not only express their own emotions (for a review, see Saarni et al., 1998), but also show an awareness of the negative and positive emotions expressed by others (e.g., Charlesworth & Kreutzer, 1973; Mumme et al., 1996). By 3 years of age, many children are able to recognize and name the facial expressions of the basic emotions of happiness, sadness, fear, and anger when presented visually as photographs (for a review, see Harris, 2000). In fact, by the time they enter school, young children are very accurate at labelling emotion-inducing events using both matching facial expressions (i.e., photographs) and emotion labels (e.g., *happy*, *sad*). Furthermore, sadness is one of most accurately identified emotions by preschoolers (e.g., Camras & Allison, 1985; MacDonald, Kirkpatrick, & Sullivan, 1996) suggesting that the children in the present study were not only aware of the sadness

expressed by the researcher, but would also have been likely to identify the researcher's distress as sadness. This may, in part, explain why children in the present study were more likely to be distressed by and more responsive to others' sadness than others' pain.

Ultimately, one possible interpretation that takes into account all of these differences emerges when one looks at the defining features of empathy. Empathy for pain may, at its truest form, be quite different than empathy for sadness (or any other emotion). As previously defined, empathy is "an affective response that stems from the apprehension or comprehension of another's emotional state or condition, and which is identical or very similar to what the other person is feeling or would be expected to feel" (Eisenberg, Fabes et al., 2006, p. 647). For sadness, this commonly cited definition makes perfect sense. Empathy for someone's sadness is defined as an affective response for the witness (namely, feeling sad). For pain, on the other hand, an affective response does not entirely encapsulate the pain experience felt by the victim. Pain has both affective and sensory components. As such, one's true empathic response to pain would include both an affective and a sensory/bodily response. Singer and colleagues (2004) conducted an imaging study examining this very notion. In their investigation, they compared the brain activation of participants experiencing a painful stimulus and also observing a signal that their loved one was experiencing a similarly painful stimulus. As with other imaging studies in the empathy literature (e.g., Morrison et al., 2004), similar areas of the brain were activated in both situations. However, the specific area of the brain associated with the sensory components of pain was only activated when the participant was actually feeling the painful stimulus him/herself. These findings suggest that while some neural overlap between experiencing and witnessing pain exists, the entire "pain matrix" is not

involved in empathic neural reactions. The authors of the study concluded that pain empathy is associated with the affective, but not the sensory/bodily, qualities of the pain experience (Singer et al., 2004). In this way, children may not be having vicarious responses to others' sadness and others' pain at the same level of intensity. In addition, because the presence of an empathic reaction for pain may not be as similar as feeling pain, they may be less likely to respond to it. This understanding could provide an explanation for why the children in this sample (and at this age group) were more likely to ignore or actively play during another's pain and were more likely to respond to another's sadness (as well as become distressed by it). Understanding pain empathy in this way suggests that it is not, in and of itself, an exact vicarious emotional response, but rather a sense of knowing the experience of the other, as described in the pain empathy model (Goubert et al., 2005).

In addition to direct comparisons between individually coded behaviours, the present study sought to examine broader conceptualizations of empathic expressions to pain and sadness in 18- to 36-month-old children. As previously described, children's responses to simulations of pain and sadness were coded for empathy-related behaviours using a coding scheme designed to examine empathy in children the same age (Zahn-Waxler, Radke-Yarrow et al., 1992; Zahn-Waxler, Robinson et al., 1992). Studies relying on this coding scheme (Zahn-Waxler, Radke-Yarrow et al., 1992; Zahn-Waxler, Robinson et al., 1992; Zahn-Waxler et al., 1995) have grouped the resulting data into categories (e.g., *prosocial behaviour*, *hypothesis testing*, *empathic concern*) based primarily on the structure of the coding scheme itself. In this study, however, conceptual categories of empathy development were created a priori as a method of identifying

possible groupings based on theory and the available literature. Prior to completing the principal component analyses, these categories were: 1) empathic concern, 2) personal distress, and 3) unresponsive or disengaged behaviour. The principal component analyses, for the most part, supported these a priori conceptualizations of empathy expression, further providing evidence for the importance of these components of empathy expression. For the pain simulations, in fact, the component analysis confirmed these conceptual categories exactly. The resulting components were: 1) Empathic Concern for Others' Pain, 2) Personal Distress to Others' Pain, and 3) Unresponsiveness to Others' Pain. For the sadness simulation, the component analysis provided mixed support for the conceptual categories and included: 1) Empathic Concern for Others' Sadness, 2) Personal Distress to Others' Sadness, and 3) Social Referencing in Response to Others' Sadness. Interestingly, two components for either analysis were very similar, suggesting that, regardless of the individual behavioural differences between expressions of pain and sadness, empathic concern and personal distress are robust components of young children's empathic expression. Indeed, these two conceptual categories emerged as the first two components for both the pain and sadness simulations accounting for between 19.5% and 33.5% of the variance in either analysis. This particular finding is not surprising given that previous research using self-report, facial, and sometimes physiological markers (i.e., skin conductance, heart rate) have also successfully differentiated between these two constructs in both adult and child studies on empathy (Eisenberg & Fabes, 1990; Eisenberg, Fabes, Schaller, Carlo et al., 1991; Eisenberg, Fabes, Schaller, Miller et al., 1991; Eisenberg, Schaller et al., 1988). In contrast, the third and final components that emerged for each analysis described very different phenomena

of children's empathic expressions to others' pain and others' sadness. For pain, this component was labelled Unresponsiveness to Others' Pain, accounted for 20.6% of the variance, and included the following behavioural codes: ignoring the victim's distress, actively playing throughout the victim's distress, and hypothesis testing. For sadness, on the other hand, the component was labelled Social Referencing in Response to Others' Sadness, accounted for 11.1% of the variance, and included the following behavioural codes: self-soothing and social referencing. These final components to emerge for each analysis (and therefore accounting for the least amount of variance) were strikingly different between the simulations. For pain, this third component described a child's general disinterest in the other's distress. For sadness, this third component described a child's strong desire to gauge his or her response by the reaction of the parent. However, despite these differences in the resulting components for each simulation, and the different variables composing each component, it appears that the categorical responses of empathic expression in young children do share some broad similarities across both pain and sadness.

In summary, the findings from the present study indicate that bottom-up influences of the empathy-evoking situation do, in fact, play an important role in determining children's subsequent expressions of empathy. Specifically, children in this study showed different behavioural responses to an individual based on whether they were expressing pain or sadness. At the level of individual behaviours, key differences emerged showing that children in the present study were more likely to be distressed by, but also more likely to be responsive to another's sadness than to another's pain. The additional finding that children were more likely to simply ignore or continue to play

during another's pain contributes to the overall understanding of differences in children's responses to pain versus sadness. Whether it is inherent differences in the expressions of pain and sadness themselves (e.g., differences in the ability to fix or solve the distress, not viewing the distress as personally threatening), developmental changes occurring during this period of childhood (e.g., becoming more aware of others' pain), or, more likely, a combination of these factors, children's empathic responses in the current study highlight important differences in children's development of empathy for sadness and empathy for pain.

In addition to the differences that emerged at the level of individual behaviours, a few broader similarities and differences were also noted across simulation types. Although direct statistical comparisons were not possible between the pain and sadness components (because they were composed of different variables), general similarities and differences based on the conceptualizations of the components in the respective models (pain or sadness) are apparent. Regardless of whether the child was responding to pain or sadness, responses best conceptualized as empathic concern and personal distress emerged. While these categorical responses were comprised of slight variations in specific behaviours, they provided support for these empathy-related responses across contexts. In addition, broad components also emerged that differentiated between children's behavioural expressions of empathy to other's pain and sadness. In particular, a component emerged for the pain simulations indicating general unresponsiveness to another's pain and a component emerged for sadness indicating a need for children in these situations to look to their parents for help in determining how to respond emotionally and behaviourally to the individual's distress. Thus, while children's

responses to others' pain and sadness show some broad similarities, specific behavioural and broader conceptual differences do exist.

Age and Sex Differences in Children's Expressions of Empathy for Pain and Empathy for Sadness

In addition to bottom-up factors in children's expressions of empathy, the present study also focused on developmental factors of particular interest. While previous empathy investigations have documented both age and sex differences, it was unclear if these factors would carry the same significance across both pain and sadness simulations when examined separately. For the present study, age and sex were examined through two separate analyses: 1) multivariate analyses of variance (in which age was entered as a categorical variable based on the 6-month span age groups), and 2) hierarchical multiple regressions (in which age was entered as a continuous variable). Overall, the findings from the two analyses were mostly congruent. However, subtle differences did emerge. For the pain simulations, both multivariate analysis of variance and regression findings revealed age-related differences for both Empathic Concern for Others' Pain and Personal Distress to Others' Pain. These findings were always in the direction expected, such that older children were more likely to show empathic concern and less likely to show personal distress in the face of another individual's pain. Specifically, the multivariate analysis of variance findings showed that there was a significant increase between 24 and 29 months and 30 and 35 months in empathic concern, suggesting that this time period represents a significant gain in empathic responses to others' pain. The multivariate analysis of variance findings also showed a significant decrease in personal distress reactions between 18 and 23 months and 24 and 29 months, a finding that has been shown in previous research (Zahn-Waxler et al., 2001). This suggests that children

make considerable gains in controlling their own distress in response to others' pain during this early time period.

Somewhat unexpectedly, then, is the fact that the age differences seen in the pain simulation did not emerge in the sadness simulation. Multivariate analysis of variance findings showed no significant difference in children's responses to another's sadness across age for any of the three sadness components. The regression analyses did, however, reveal one marginally significant finding, indicating that older children were marginally less likely to show personal distress reactions to another individual's sadness.

A possible interpretation of the lack of age differences in the sadness simulations is that the period of development of empathy for sadness may, in fact, occur at a different time or across a greater timeframe than children's development of empathy for pain. Past studies have typically supported an increase in empathic concern and a decrease in personal distress as children age (e.g., Zahn-Waxler et al., 2001). There is no evidence to suggest that children do not follow these general patterns for empathy for sadness. A closer examination of these age-related changes in the pain (see Figure 2) and the sadness (see Figure 3) simulations suggests that while significant increases in empathic concern and significant decreases in personal distress are apparent in the context of pain, no such changes are occurring between 18 and 36 months of age for sadness. As depicted in Figure 3, empathic concern for others' sadness and personal distress in response to others' sadness remain relatively stable across the age groups. This lack of age-related findings in the sadness simulations, suggests that the 18-36 month age period may not be one of great change in empathy and empathy-related responses to sadness. Conversely, the significant age-related findings for the pain simulation, suggests that this same age

period may be, in fact, one of great change in empathy and empathy-related responses to pain. These developmental trends are likely due, in part, to children's increasing capabilities of differentiating between self and other (Bischof-Köhler, 1991), as well as their increasingly accurate abilities to understand the thoughts and feelings of other individuals (Eisenberg, Murphy, & Shepard, 1997). Furthermore, children's increased mobility during the second year provides ample opportunities to learn about and to receive comfort for one's own pain, as well as opportunities to witness pain behaviour and responses to pain in others. This period of development may naturally coincide with the age-related changes in children's awareness and understanding of, as well as response to, others' pain.

With the results of the current study, it is uncertain whether these types of changes in empathic concern and personal distress have already occurred in children's responses to sadness or are still going to occur as children mature and develop. A third possibility is that these changes are occurring over the 18-36 month period but that, for sadness, may take place over a greater timeframe. In other words, while the data suggest the 18- to 36-month-old period is one of growth in children's responses to pain, it could be that this same type of growth happens across a greater period of time and, therefore, significant changes would not emerge in this narrow age period.

With regard to sex differences, only one significant finding emerged across both pain and sadness simulations for either multivariate analysis of variance or regression analyses. Regression analyses for the pain simulation showed a marginally significant finding for one of the three components. Specifically, girls were marginally more likely to show personal distress reactions to pain than were boys. This finding for pain only

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provides some support for the possibility of sex differences in children's responses to others' pain (Denham & Couchoud, 1991). In the only other study examining prosocial responses to adult expressions of sadness and pain separately, a moderating effect of sex emerged only for pain indicating that prosocial responses increased by age, but only for girls. In the current study, no age by sex interaction emerged for either simulation.

Within society, it is commonly assumed that females possess more empathic qualities than males (e.g., C. L. Martin, 1987). However, the child empathy field of research has yet to collectively produce a definitive finding related to child sex and empathy-related responses. Prior to the 1980s, research examining sex differences in "empathy" provided mixed findings with some reviews showing no differences (e.g., Maccoby & Jacklin, 1974) and others showing differences favouring girls (e.g., Hoffman, 1977). However, the findings of these reviews were questionable due to definitional inconsistencies and because they were often based on very heterogeneous studies using a wide variety of measurement approaches. Meta-analyses conducted by Eisenberg and colleagues in the late 1980s (Eisenberg & Lennon, 1983; Lennon & Eisenberg, 1987) and again in 1998 (Eisenberg & Fabes, 1998) showed a wide variety of effect sizes ranging from very small to extremely large. These inconsistent findings spurred Eisenberg and colleagues to propose that the variance in effect sizes might be directly linked to the specific methods used in each of the studies (Eisenberg, Fabes et al., 2006).

In general, sex and gender differences (favouring females and femininity) appear to be more pronounced in studies relying on self-report or observer-report measures (Eisenberg, Zhou et al., 2001; Karniol et al., 1998; Olweus & Endresen, 1998). In these types of approaches, social desirability and demand characteristics, as well as an overall

perception that girls are more empathic than boys, are likely contributing to findings of differences in empathic responding between the sexes. In contrast, studies relying on more nonverbal or unobtrusive measures of empathy (e.g., behavioural coding, facial coding, physiological measures; Eisenberg & Lennon, 1983) tend to show little or no significant sex differences. These data suggest that the particular measure used to elicit empathy may bear great influence on whether sex differences emerge in subsequent findings. The discrepancy is most typically explained by children and observers' abilities to control their responses in self-report and observer-report measures and their inability to consciously control their responses in more nonverbal measures of empathy (e.g., facial or behavioural coding, physiological measures; Eisenberg, Spinrad et al., 2006). While the sole significant sex finding in the current study supports limited research relying on nonverbal indices of empathy (Eisenberg & Fabes, 1998; Zahn-Waxler et al., 2001), most empathy studies relying on behavioural observation have not reported significant sex differences. Nonetheless, when sex differences have emerged (regardless of methodology used), they have almost always been in the direction of girls having more empathic responses or empathic concern than boys. This suggests that, while the extent or degree of this relationship is often based on the method used to measure empathy, sex differences likely exist at some level (Eisenberg, Spinrad et al., 2006).

A possible alternative explanation, however, is the age-related differences in the use of various empathy measures. Self-report measures of empathy produce the largest effect sizes for sex differences. Nonverbal measures of empathy, conversely, tend to produce the most modest effects (if any at all). While this has been explained by the degree of conscious control of the participant in using these types of methodologies, it

may also be explained by true sex differences that emerge or become more apparent over time as children age (e.g., Zahn-Waxler, Robinson et al., 1992) and are not only socialized to behave in more gender-specific ways (Hastings, McShane, Parker, & Ladha, 2007), but are also more likely to adhere to sex-defined stereotypical roles (Ruble, Martin, & Berenbaum, 1998). Under this interpretation, self-report measures may not be overexaggerating sex differences, but are, rather, showing sex differences in the age group for which these types of measures are appropriate. Nonverbal measures, on the other hand, are typically used with younger children who cannot provide self-report. For children of this age, facial (and more appropriately, behavioural) measures are the most appropriate. Thus, while one interpretation may be that the various measures differ in the degree of conscious control the participant can have using them, another interpretation is that age is accounting for the differences in empathy-related responses and that the measures used are on account of the age of the groups, not issues within the measures themselves. Some evidence has, in fact, shown that sex differences do become more apparent as children age (Eisenberg & Fabes, 1998).

In summary, age and, to a limited extent, sex showed some value in predicting children's expressions of empathy for others' pain, but not in predicting children's expressions of empathy for others' sadness. With regards to the pain simulations, age-related findings were in the direction expected, such that older children were more likely to show empathic concern and less likely to show personal distress in response to another individual's pain. The significant decrease in personal distress to others' pain occurred between 18 and 23 months and 24 and 29 months. The significant increase in empathic concern for others' pain occurred between 24 and 29 months and 30 and 35 months.

Combined, these significant trends illustrate the increasing ability for children to regulate their own distress and to instead respond to another's distress during this period of development. However, these same findings did not emerge for sadness. Possible interpretations for this interesting difference may lie in children's growing understanding of pain during this developmental period as mobility increases and interactions with others in pain (e.g., peers, siblings) occur more frequently. In this way, the age range used in the present study could have coincided with a period of growth in children's empathic expressions to pain. However, this same age range could have also limited the possibility of examining the same developmental patterns in children's responses to others' sadness. With the current findings, it is unclear whether changes in children's empathic responses to sadness may have already occurred in development (i.e., prior to 18 months) or have yet to occur (i.e., after 36 months) and could, therefore, account for the lack of age-related findings in the present sample.

With regards to sex differences, only one marginally significant difference emerged showing that girls were marginally more likely to show personal distress reactions in response to others' pain. As with the age-related trends, this finding only emerged for pain and not for sadness. The lack of sex differences not only supports the hypotheses for this study, but also previous meta-analyses suggesting that behavioural measures fail to show differences in empathic expressions between the sexes. However, as summarized above, other methods (e.g., self-report scales) have shown marked sex differences almost always favouring girls. It is unclear whether these mixed findings, then, are a function of differences in methodologies (e.g., verbal reports showing differences, nonverbal measures showing no differences) or a function of age (e.g., sex

differences do not emerge until later in childhood when self-report indices could be
utilized).

Interindividual Differences in Children's Expressions of Empathy for Pain and Empathy for Sadness

Finally, to examine the importance of interindividual factors in children's responses to others' pain and others' sadness, information regarding several variables was gathered during the course of the study. In particular, parents completed questionnaires assessing their children's temperament, social-emotional problems and competencies, and their language abilities. While temperament and social-emotional variables have documented associations with empathy-related responses, pain and emotion language was explored for the first time in this investigation. In brief, these variables were examined for their individual value in predicting children's responses to others' pain and others' sadness. To this end, six hierarchical regressions were conducted in which four blocks of variables were entered: 1) age and sex, 2) the three temperament factors from the ECBQ (i.e., Effortful Control, Surgency/Extraversion, and Negative Affectivity), 3) the four social-emotional domains from the ITSEA (i.e., Externalizing, Internalizing, Dysregulation, and Competence), and finally, 4) general language abilities and pain- or emotion-specific language awareness (depending on the simulation). The dependent variables for these regression analyses were the six component scores (three for pain, three for sadness) created for each participant.

The hierarchical regressions produced significant models for two of the three pain components: Empathic Concern for Others' Pain and Personal Distress to Others' Pain. For Empathic Concern, temperament and social-emotional domains added significant predictability to the overall model. Specifically, beyond the predictive value of the

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variables of age and sex, one temperament factor was marginally predictive for Empathic Concern (i.e., Negative Affectivity). This was in the direction expected, such that children who were rated by their parents as having high negative affect were less likely to show empathic concern for another individual's pain.

In addition to the predictive value of temperament on Empathic Concern for Others' Pain, two social-emotion domains (i.e., Internalizing and Dysregulation) showed predictive value. Specifically, children who were rated by their parents as having few internalizing problems and high levels of dysregulatory behaviour were more likely to respond empathically to someone in pain. For Personal Distress, only the block containing age and sex was significantly predictive overall. However, one temperament factor (i.e., Effortful Control) was marginally predictive of Personal Distress to Others' Pain, such that children who were rated by their parents as having low effortful control were more likely to show personal distress reactions in the pain simulation. For the final pain component (Unresponsiveness to Others' Pain), only one variable showed predictive value. Specifically, children who had more general awareness of pain language were more likely to be responsive to someone else's pain.

The hierarchical regressions produced at least marginally significant models for two of the three sadness components: Empathic Concern and Social Referencing. For Empathic Concern for Others' Sadness, only temperament added significant predictive value to the model (after controlling for age and sex). Specifically, Negative Affectivity and Surgency/Extraversion were significantly predictive of Empathic Concern for Others' Sadness. These effects were in the directions expected, such that children who were rated by their parents as having low negative affect and high surgency/extraversion

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were more likely to show empathic concern for someone else's sadness. In addition, the Externalizing Domain showed predictive value for empathic concern. This relationship was in the expected direction, such that children who were rated as having high externalizing problematic behaviours were more likely to show empathic concern for someone else's sadness. While no blocks of the regression showed significant predictive value for Personal Distress to Others' Sadness, one social-emotional domain (Externalizing Domain) did reach significance showing that children who were rated by their parents as having high externalizing problematic behaviours were less likely to show personal distress reactions to someone else's sadness. For Social Referencing in Response to Others' Sadness, marginally predictive value was gained by social-emotion domains. Specifically, after controlling for child age, sex, and temperament, the Internalizing Domain reached significance showing that children who were rated by their parents as having greater internalizing behaviours were more likely to social reference in response to someone else's sadness.

The Role of Temperament. The relationship between temperament and children's empathy and empathy-related responding has been studied extensively in the literature. The primary reason for including temperament as a variable in the present study was not only because of the empirical support for it in past empathy investigations, but specifically because of its conceptualization under a broader emotion-regulation framework. Temperament is believed to represent children's biologically-determined differences in reactivity (i.e., a child's arousability) and self-regulation (i.e., a child's ability to moderate his or her arousal) that, over time, may be influenced by a combination of maturity and experiences (Rothbart & Derryberry, 1981). Past research

has documented that as children mature, their abilities to regulate their own emotional responses also refine allowing them to maintain an optimal level of arousal in a variety of environments (Rothbart & Bates, 2006).

With respect to contributing to the understanding of empathy-related responses, emotion regulation has been hypothesized and shown to have a strong influence. As described earlier, children's abilities to regulate their vicarious emotional response to another's distress largely impacts whether their behavioural response will be self- versus other-oriented. Specifically, children who have empathic overarousal (i.e., who are unable to modulate their emotional response) will likely become distressed themselves. This distress often leads to a self-focused reaction in which the observer's needs are attended to and the victim's needs are often disregarded. On the other hand, children who have moderate empathic arousal (i.e., who are able to modulate their emotional response) are more likely to direct their behaviour towards the victim (e.g., in a prosocial way).

As aforementioned, the construct of emotion responsivity is further divided into two relatively similar, but different, constructs – emotionality and emotion-related regulation (Eisenberg & Fabes, 2006). Negative emotionality is defined as how frequently children experience negative emotions and emotion-related regulation is defined as children's ability to modulate or modify their responses to emotionally charged situations. In the present study, these two constructs were represented by the Negative Affectivity and Effortful Control temperament factors, respectively. While Negative Affectivity largely encompasses the concept of negative emotionality, it is important to note that Effortful Control represents a single construct within the broader conceptualization of emotion-related regulation (Eisenberg & Spinrad, 2004).

Nevertheless, the significant findings relating children's empathy-related responses for pain and for sadness to temperament fit nicely into this broader framework. The finding that children low in negative affectivity were more likely to respond with empathic concern in this sample (regardless of simulation type) supports previous research in this area (Hastings et al., 2006) and the broader empirical evidence on the role of children's emotion-related regulation in empathy-related responding (Eisenberg & Fabes, 2006). Specifically, children who are rated by their parents as having lower levels of negative affect are more likely to respond in an other-oriented manner. Surprisingly, then, is the fact that the opposite finding did not emerge in relation to children's personal distress reactions to others' pain and sadness – that children high in negative affectivity would be more likely to be personally distressed by another individual's pain or sadness. These lack of relations between negative emotionality and personal distress in both simulations may reflect the generally weaker and more complex relations noted in the broader literature on situational (versus dispositional) empathy-related responding and emotion-regulation (Eisenberg & Fabes, 2006).

As with the aforementioned finding about negative affectivity, the specific result of the effect of effortful control may be explained under the broader umbrella of emotion-related regulation. Eisenberg and Fabes (2006) hypothesize that children who are low in effortful control (e.g., attentional/behavioural control) are expected to be associated with higher levels of personal distress. The rationale for this hypothesis is that personal distress reactions are a result of unmodulated negative affect and that children who are unable to control this negative affect (and become overwhelmed by it) are more likely to have aversive emotional responses. Not surprisingly, then, is the finding in the current

study that children who were rated as having low effortful control were more likely to respond with personal distress reactions in the pain simulation. This finding supports previous investigations linking strong effortful control (i.e., emotion regulation) to empathy/sympathy and prosocial behavioural responses (e.g., Eisenberg et al., 2007; Valiente et al., 2004). The reason for this finding not to emerge in the sadness simulations is unclear. However, with the frequent occurrence of unresponsive behaviour (i.e., ignoring or actively playing during the researcher's distress) in the pain simulations, it is possible that only children with very low levels of effortful control had personal distress reactions, suggesting a possibly overall lower threshold for personal distress reactions to pain for some children.

Finally, one last temperament factor, Surgency/Extraversion, was shown to be predictive of children's empathic concern for others' sadness. As with the previous findings, this was in the direction expected, such that children who were rated by their parents as having higher levels of surgency/extraversion were also more likely to show empathic concern for others. This finding is consistent with previous empathy research linking sociability (Eisenberg et al., 1984; Eisenberg-Berg & Hand, 1979; Stanhope et al., 1987) and assertiveness (Eisenberg et al., 1990) with empathic concern or prosocial behaviours in young children. It is surprising this finding did not emerge for the pain simulations. Because children in this sample were more likely to ignore the pain of the victim, one possible interpretation is that children require relatively high levels of scalability and assertiveness to respond to another individual's pain.

The Role of Social-emotional Variables. The present study included a parent-report questionnaire of social-emotional functioning to ascertain whether social-

emotional variables had any predictive utility in determining children's empathy-related responses. Specifically, domain scores (*T*-scores) were obtained summarizing children's externalizing and internalizing behaviour problems, as well as dysregulation tendencies and overall social-emotional competencies. In general, social-emotional variables did not provide incrementally significant predictive value to most of the models created by the hierarchical regressions. However, the findings that did emerge in the current study support previous investigations examining the relations between children's social and emotional competencies and empathy-related responding.

With regard to parent-reported externalizing problems, two findings from this study highlight the documented associations between empathy-related responding and variables such as aggression, defiance, and impulsivity. However, the significant findings were limited to the sadness simulations. As expected, children who were rated by their parents as having high externalizing problems were also more likely to show empathic concern and less likely to show personal distress reactions to another individual's sadness. The relation between externalizing behaviour and empathic responding supports previous findings with toddlers and preschoolers (Gill & Calkins, 2003; Kienbaum, 2001). This positive association, though counterintuitive, appears to only emerge for young children. In fact, it is hypothesized that aggressive children may also be more assertive and able to approach a person in distress (Eisenberg, Spinrad et al., 2006). Additionally, children with externalizing behaviours may be more likely to respond because they are more emotionally reactive themselves and overall less emotionally and behaviourally regulated (Calkins & Dedmon, 2000; Eisenberg, Cumberland et al., 2001; Eisenberg et al., 2005; Eisenberg et al., 2009). Thus, in the age range of this sample, a

significant positive association between externalizing behaviours and empathic concern makes sense.

As previously mentioned, it is hypothesized that aggressive children may be more assertive and therefore, more likely to assist others in need (Eisenberg, Spinrad et al., 2006). This possibility provides an interesting explanation for why children with higher externalizing scores in the present sample were also more likely to respond prosocially and less likely to respond with personal distress. The interpretation is supported by past research showing that children who are more assertive and less compliant are more likely to show sympathy or empathic concern and children who are less assertive and more compliant are more likely to show personal distress (e.g., Eisenberg et al., 1990). Along a similar line, a marginally significant correlation between one of the subscales of the Externalizing Domain (i.e., activity/impulsivity) and empathic concern for sadness suggests that children who were rated as more active or impulsive were more likely to show concern. This suggests that children unable to regulate their own behaviour may actually respond impulsively in situations in which their roles and responsibilities are not clearly defined (Gill & Calkins, 2003). Interestingly, these noted patterns only emerged within the sadness simulations suggesting that children's externalizing behaviour did not impact their empathy-related responses for pain in any way in the present sample.

In addition to these significant findings related to externalizing problems, predictive value also emerged for parent-reported levels of children's internalizing problems for both pain and sadness simulations. For pain, children who were rated as having greater internalizing issues were less likely to show empathic concern. The significant regression finding appeared to be driven by significant negative correlations

between empathic concern for pain and the overall Internalizing Domain, as well as the inhibition to novelty subscale. Interestingly, while past research (Spinrad & Stifter, 2006) have shown a positive relation between distress to novelty and concerned attention (e.g., stopping play, staring at the distressed individual), the results of the current study suggest that children in this sample were unable to act on this concern in an effort to actually relieve the distress of the other individual. For sadness, children who were rated as having greater internalizing problems were more likely to display social referencing. The significant regression finding appeared to be driven by significant positive correlations between social referencing in response to sadness and the overall Internalizing Domain, as well as the general anxiety and the inhibition to novelty subscales within the Internalizing domain. Empathy research studies conducted with shy-inhibited children provide support for these findings. Shy children are characterized as having internalizing challenges (e.g., anxiety, social fear; Coplan, Prakash, O'Neil, & Armer, 2004). In general, children who show high levels of empathy show low levels of shyness (e.g., P. A. Miller & Jansen op de Haar, 1997). Not surprisingly, then, shy/inhibited toddlers (Young et al., 1999), preschoolers (Stanhope et al., 1987), and school-aged children (Findlay et al., 2006) have all been shown to engage in less prosocial behaviour or to provide less empathic responses towards others in need. Additional research conducted with toddlers has shown a positive relation (examined both concurrently and longitudinally) between fear and shyness assessed at 18 and 30 months of age (Eggum et al., 2009). As suggested by Eisenberg and Fabes (1990), children higher in personal distress reactions (e.g., shy or anxious children) may attempt to reduce their negative emotional responses by avoiding the distressed individual (and therefore, not providing

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assistance). It is also expected, then, that children high in internalizing difficulties would look to their parent during an emotionally provoking situation with an unfamiliar adult. Given the relatively high rates of distress/fear in the sadness simulations, it would be expected that children distressed by the sadness simulation (i.e., internalizing children) would look to their mother or father for assistance. Additionally, the findings related to internalizing challenges in children in the present sample are also supported by the literature showing that children who are less assertive and more compliant are less likely to show empathic concern/sympathy and more likely to show personal distress reactions (e.g., Eisenberg et al., 1990). Overall, children in the current study were less likely to respond to pain. These findings suggest that children with more internalizing behaviour problems were even less likely to show empathic concern for others' pain. While internalizing behaviours did not have the same impact on children's responses to sadness, they do appear to explain why some children in the sadness simulations looked to their parents for guidance on how to respond to the researcher's distress.

One final finding emerged related to children's social-emotional problems and competencies. A significant finding emerged for pain showing that children who showed more dysregulation were also more likely to show empathic concern. While this finding was unexpected, an examination of the correlations between the subscales composing the domain and children's empathic concern for others' pain reveals an important association. Specifically, a significant negative correlation between the negative emotionality subscale and children's empathic concern for others' pain highlights the expected relationship – that children who were rated by their parents as having high levels of negative emotionality were less likely to show empathic concern. This finding is

supported by much of the literature already reviewed in the temperament section showing that children with high levels of negative affectivity have difficulty regulating their emotional response and therefore, respond less frequently to others' distress (Eisenberg & Fabes, 2006). Although there has been mixed support for this finding based on the type of empathy measured (dispositional or trait), the measure used (parent-report, facial, behavioural), and the emotion displayed (Eisenberg, 2000), most studies using lab-based simulations of distress with young children have shown negative associations between empathic/sympathetic responses and parent-reported child negative emotionality (for a review, see Eisenberg, 2000).

The Role of Language. The only finding that emerged for language was that children with a greater overall awareness of pain language were more responsive to the pain of another individual. This finding, although in the direction expected, did not emerge in any other of the regression analyses for any of the other pain components or for any of the sadness components. Despite the overlap between the developmental gains in empathy during the second and third years of life and the surge in children's pain (Stanford et al., 2005) and emotion (Ridgeway et al., 1985) language during the second and third years of life, language-related variables generally did not emerge as significant predictors of children's empathy-related responses in the current study. While language has been cited as having an important influence on children's emotion understanding (Bretherton et al., 1986; Pons et al., 2003), it did not appear to translate into children's responses to others' sadness or others' pain.

Beyond the overlap in the development of empathy and emotion and pain words, it would be expected that children's general language abilities (at the very minimum)

would be predictive of children's abilities to respond to others' distress. Language abilities would seem to provide children an opportunity to further understand the experience of the other without necessarily sharing the full distress of the other. Pons and colleagues (2003) describe language as "an instrument of cognitive representation" (p.352). With the acquisition of language, emotions become objects and are represented more abstractly. In his recent letter to the editor of *Pain*, van Rysewyk (2009) describes a similar effect of pain language. He suggests that the ability to use cognitive symbols is required for an individual to distance him/herself from another individual's pain and that, with normal development of language, children learn to symbolize pain. Within this explanation, a witness to the pain of another can reflect on the pain as a symbol and can modulate his/her own emotional response. In this letter, van Rysewyk proposes that an individual's self-regulatory capacities are positively related to the degree to which the witnessed pain can be symbolized. Conversely, without this emotional regulation, the vicarious response can overwhelm the witness of pain and result in an aversive (and typically self-focused) response. In short, by children acquiring the ability to symbolize the pain of another, an other-oriented response becomes much more likely. With the emergence of empathic concern and personal distress as robust components in both pain and sadness simulations, it is especially surprising that language did not show more of a predictive value. Under the symbolic benefit of language, it would be expected that children with greater language capacities (either generally or pain-/emotion-specific) would be better able to distance themselves from the distress of the other individual and would show greater empathic concern and less personal distress.

Overall Summary

Overall, the findings from the present study supported many of the hypotheses originally proposed. As expected, the children in this study responded differently in response to others' pain than others' sadness. Specifically, children in this sample were more likely to be distressed by, but also more responsive to, others' sadness. Conversely, they were more likely to simply ignore or play during someone's pain. Also in support of the hypotheses, there were broad conceptual similarities across simulation type. Both empathic concern and personal distress emerged as robust components for both pain and sadness in the principal component analyses, although composed of different behaviours. Interestingly, age-related findings, although expected for both simulations, only emerged for the pain simulations. As expected, sex did not emerge as a significant variable. Only one marginal finding (suggesting that girls were marginally more likely to show personal distress reactions in response to pain) emerged in the six hierarchical regression analyses. With respect to temperament, significant findings supported not only the proposed hypotheses, but also past research showing strong associations between negative affect and emotionality and empathy-related responses. Interestingly, these relationships (though logical) did not emerge across both pain and sadness simulations. Findings related to social-emotional variables partially supported the proposed hypotheses indicating that children high in externalizing behaviours were more likely to show empathic concern and less likely to show personal distress reactions (but only for sadness) and that children high in internalizing behaviours were less likely to show empathic concern (but only for pain). Internalizing behaviours were also positively related to social referencing in the sadness simulations. Unexpectedly, dysregulation was

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positively related to empathic concern for pain. This significant finding appeared to be largely driven by a significant (and expected) negative correlation between the subscale measuring negative emotionality and empathic concern for others' pain. Finally, language variables generally did not emerge as significant variables in the regression analyses.

Strengths and Limitations

Within the field of empathy research, the current study had several strengths. For the first time in child empathy research, children's detailed behavioural expressions to others' distress were examined with the consideration of bottom-up processes. Specifically, children's responses to others' pain and others' sadness were investigated and, when possible, directly compared. In prior investigations, little to no attention has been given to context. When lab- or home-based simulations were used to evoke empathy, the behavioural responses were generally analyzed in aggregate form without consideration of how children's responses to different types of distress might vary. In the concluding remarks of their recent book chapter on empathy-related responding in children, empathy researchers Eisenberg, Spinrad, and Sadovsky (2006) state that more attention to context is required in furthering the understanding of children's empathic responses. In their words: "Relatively little is known about situational variables that stimulate or evoke empathy and sympathy and the conditions under which children are likely to experience personal distress" (p. 538). The present study provides an initial exploration on how children vary their behavioural empathic expressions based on the situation. In fact, children in this sample were rated as having more prosocial behaviour and more personal distress reactions when confronted with others' sadness, but were more likely to simply continue playing when confronted with others' pain. These striking

differences suggest that previous investigations summarizing home- or lab-based simulations of pain and sadness to make broad-based conclusions may be missing important pieces of information or, worse yet, may be drawing inaccurate conclusions about how children express empathy towards others. The findings of the current study provide support for the continued exploration of context in empathy research.

An additional strength of the present study was its convergence of conceptual and empirical categories of empathic expression in young children. While previous studies have predominately relied on conceptual categories (created using theory rather than the structure of the data) to analyze and interpret findings, the present investigation undertook a two-pronged approach: an a priori identification of conceptual empathy-related responses and an empirical examination of empathy-related responses using principal component analyses. The components that emerged in the analyses were very similar (in the case of the sadness simulations) or nearly identical (in the case of the pain simulations) to the conceptual categories identified a priori. The similarity of the conceptual and empirical categories in the current study provides additional construct validity for two of the frequently identified empathy-related responses (i.e., personal distress, empathic concern/sympathy) in the child empathy literature, thereby contributing to the overall strength of these conceptualizations.

A final strength worth noting here is the creation of the simulations themselves in the current study. Careful consideration and attention was paid to the formation of the simulations not just in terms of content, but also in the overall duration and intensity of their features. From the outset of the current approach, care was taken to ensure that elements between the simulations of pain and sadness were as similar as possible (while

still credibly differentiating between the two). Particularly, the duration and intensity of facial, behavioural, and vocal displays in each of the simulations were equally displayed by the female researcher (see Table 1 and Appendix A for details). Furthermore, by combining facial, behavioural, and vocal displays, children were given the opportunity to attend and respond to multiple facets of human expression (versus relying on one aspect of the expressions of pain or sadness). Additionally, the empathy-evoking simulations created for the present study were representative of situations an 18- to 36-month-old child would have experienced, likely many times. In this way, the simulations were at a level that could be understood by the children participating in the study. Additionally, these relatable simulations were conducted during natural play, further providing children with a sense of familiarity. Findings from the research of infant imitation highlight the importance of self-experience in understanding (and responding to) another's situation (Meltzoff & Brooks, 2008).

Despite the many strengths of the current study, several limitations need to be considered when interpreting these findings. Firstly, as previously discussed, the narrow age range of participants is a limitation of the current study. While the age range was carefully chosen based on research showing the second year as being a time of growth in children's empathy development (Zahn-Waxler, Robinson et al., 1992), this choice also limits the resulting conclusions. The findings from this study suggest that differences exist in children's empathic expressions in response to others' pain and others' sadness. However, due to the limited age range, it is unclear how these differences unfold and if the development of empathy for pain and empathy for sadness overlap at some point in children's development. These intriguing questions were not answerable within the

narrow confines of this age group. Additionally, the cross-sectional design, while useful for ensuring even distribution of the sex and age of children across simulation types, also has important drawbacks to consider in interpreting conclusions from this research. Because the same children were not followed over time (as in a longitudinal design), one can only infer that the differences (or lack of differences) in the current data were, in fact, a result of development. As such, the research questions of interest in this study were limited to differences between age groups and not developmental changes (e.g., the age at which empathy for pain/sadness emerges in young children). Similarly, the cross-sectional design did not allow for the examination of cause-and-effect relationships that would have been interesting to examine (e.g., does empathic expression change when children first gain emotion/pain language?). Furthermore, the use of a cross-sectional design limits one's ability to generalize the findings to the greater population of children.

As already described, children's empathy-related responses were assessed through the use of empathy-evoking lab-based simulations. This particular paradigm, although used extensively with this age group, presents some important limitations to consider. Past research exploring children's concern for others during the second year of life has shown that children during this developmental period are more likely to respond to their mother than to an unfamiliar person (Zahn-Waxler, Radke-Yarrow et al., 1992). To try to minimize this effect, the researcher spent several minutes prior to the first simulation engaging in warm-up, child-directed play. The first simulation was not completed until it was felt by the researcher that the child was comfortable in the setting. In fact, the majority of children (88.3%; $n = 106$) were rated as interacting easily with the researcher prior to the first simulation. The choice to use an unfamiliar researcher (versus a parent)

was based on the objective of making the simulations as standardized as possible (and thereby increasing internal validity). Nevertheless, it is expected that children's overall responses may have been more suppressed than if they had witnessed their mother/father or even a peer or sibling in a similar situation. In this way, the standardized approach used in this study may affect its generalizability to children's empathy-related responses at home or at school/daycare with familiar peers and adults. Along a similar line, parents were asked to stay within the playroom during the simulations and were told to only respond to their child when he/she verbally or behaviourally requested attention or help. Although this was done to avoid separating children from their mother or father, it is also entirely possible that having parents in the room may have impacted children's responsiveness or attention to the researcher's distress or may have exacerbated some children's own uneasiness or distress during the simulation. Under the framework of social referencing, if a child (during another individual's distress) noticed that his/her parent was not responding, the child may not think the distress was something worth attending or responding to. Conversely, if a distressed child looked to his/her parent during the simulation and that parent showed no response, the child could become even more distressed or frightened.

One last limitation of the present study addresses a common issue in empathy research. Empathy is a construct that is often defined inaccurately and/or confused with other similar, but different constructs (e.g., sympathy, personal distress). Because the present study relied on empathy-related behavioural responses to measure empathy, resulting conclusions can only be made on children's expressions of empathy, not empathy itself. Along a similar vein, it can only be assumed that children's responses in

the play sessions were stemming from empathic arousals. As described by Eisenberg and Lennon (1983), and as highlighted in the proposed model of child empathy (see Figure 4), when an individual's affective response is operationalized as vocal, gestural, and/or behavioural responses to another individual's distress (as in the present study), it cannot be absolutely determined whether the response is stemming from a vicarious emotional state (i.e., empathy), from concern/pity (i.e., sympathy), from personal distress, or from another variable altogether. In this way, the behavioural coding scheme is somewhat of an imperfect measurement of the construct of empathy. However, it is also important to note that other tools used to measure empathy were either not amenable to this age group (e.g., self-report) or, as in the case of all other approaches (i.e., self-report, physiological markers, facial responses, imaging), had the same challenging measurement issues. In this way, no current methodology can provide a completely accurate measure of empathy itself and can only, at best, describe its expressions or manifestations.

Theoretical Implications

In their model of pain empathy in adults, Goubert and colleagues (2005) propose several factors that may moderate an observer's response to the pain of another. In this model, empathy depends on several bottom-up (e.g., the expression of the person in pain) and top-down (e.g., shared knowledge between the observer and the victim) processes. Reciprocal influences between an observer's sense of knowing the experience of the person in pain and typical affective responses are highlighted as important determinants of subsequent behavioural responses. In this conceptualization, if witnesses of others' pain cannot differentiate their own affective response (e.g., are personally distressed by the others' pain) from their sense of knowing the experience of the other, the resulting

Figure 4. Model of Empathy Development in Children.
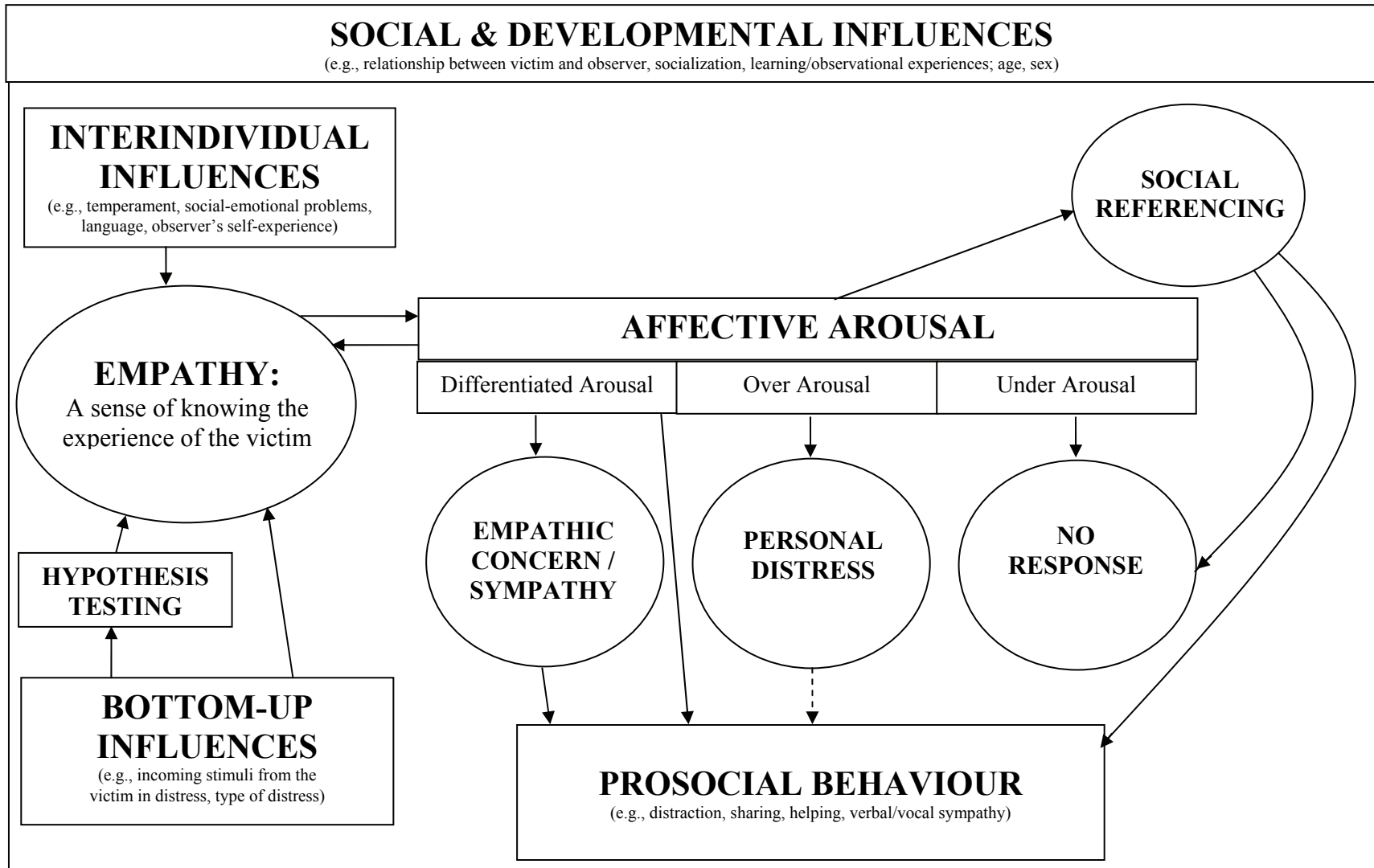
behavioural response may be more self-focused (e.g., an attempt to reduce their own distress). Conversely, if witnesses of others' pain can successfully regulate their own affective response (e.g., feel sympathy for the other), the resulting behavioural response may be more other-focused (e.g., helping to reduce the victim's distress). In this model, contextual influences (e.g., the relationship between the victim and the observer) also impact the interplay between empathy-related affective and behavioural responses.

While Goubert's model provides a comprehensive description of the adult experience of pain empathy, the findings from the present study indicate important differences (but also similarities) between the empathic expression of adults and the empathic expression of young children. Building on this model of pain empathy, Figure 4 depicts a preliminary model of empathy in children. The presented model is based on the findings from the current study, as well as the available literature and theory. Although the current study did not provide empirical support for each of the variables within the proposed model, it is hypothesized that, across development, many of the factors within it are important in children's empathy development.

As with adults, the present study provided some preliminary evidence for the importance of bottom-up stimuli in children's responses to others. As shown in the direct comparisons of individual empathy-related behaviours, as well as the subsequent principle component analyses, children appear to respond differently to another's distress based on the features of the incoming stimuli (e.g., whether the victim is expressing pain or sadness). Additionally, hypothesis testing is included in the model as part of how children understand others' distress because it was exhibited by almost every child in this study, regardless of simulation type. Child-specific top-down or interindividual

influences (e.g., temperament) shown to be predictive of children's expressions of empathy are also included in the presented model. While social-emotional and language variables showed less predictive value in the current study, they are included in the model as important variables to consider with children outside of the narrow age range included in this research. In addition to the variables examined in the present study, additional interindividual influences are included in the model as potentially important in children's empathy development (e.g., self-experiences; Meltzoff & Brooks, 2008).

As with the adult model, a reciprocal relationship is proposed between empathy and affective responses. In the proposed model, affective responses are described in terms of arousal and further divided into three types – differentiated arousal (in which children are able to differentiate their affective response from the distress of the victim), overarousal (in which children are unable to differentiate their affective response from the distress of the victim), and underarousal (in which children are not aroused or underaroused by the distress of the victim). The affective responses are then conceptualized as the components resulting from the analyses for both pain and sadness. Specifically, these components are: empathic concern (for children able to regulate their arousal), personal distress (for children unable to regulate their arousal), and no response (for children underaroused or not aroused at all). As depicted in the model, empathic concern typically results in prosocial behaviour (e.g., helping, sharing a toy) and personal distress rarely results in prosocial behaviour (except perhaps as an effort to reduce the child's own distress, not the victim's distress). Social referencing is also included as a possible behavioural response that, in the present sample, resulted in either no response (especially within the pain simulations) or in a prosocial response. Finally, as broad-

reaching influences on children's empathy and empathy-related responses, social and developmental factors are highlighted in the proposed model. As with all areas of maturation, empathy development changes and grows as children age and experience a wider range of distressing situations and the social responses to them.

Clinical Implications

      Empathy-related Implications. The current findings provide the first investigation of how children express empathy differently based on the contexts of the empathy-evoking situation. Children's empathic concern for others has long been viewed as an important aspect of children's social, emotional, and moral development. Of direct relevance to children's social-emotional development, recent empathy research continues to highlight associations between empathy and many positive social outcomes (e.g., comforting others in need; Eisenberg, Spinrad et al., 2006). Empathy, especially in early childhood, has also been shown to have a protective effect in reducing many negative outcomes (e.g., externalizing behaviour problems; Hastings et al., 2000) that are becoming increasingly concerning in today's school systems. In fact, recent imaging research (Decety et al., 2009) has indicated that aggressive youth display atypical patterns of neural responses in which they appear to enjoy viewing others in pain rather than empathize with others in pain or may be unable to regulate highly negative emotional responses (e.g., aggression) towards others in pain. These findings suggest that some aggressive children may not develop the same capacity to empathize as their peers, providing valuable insight into the importance of early empathy development and the prevention of later bullying and aggressive behaviour. Fortunately, a number of meta-analyses reviewing the effectiveness of parenting interventions for youth with aggression

or antisocial behaviour (e.g., Serketich & Dumas, 1996) have provided promising data even for programs specifically designed for preschoolers and young children (e.g., *The Incredible Years*; Webster-Stratton, 2005). Furthermore, research with conduct disorder, specifically, suggests that the emergence of behavioural problems early in the preschool or elementary school years (versus during adolescence) is especially problematic in terms of chronic delinquent behaviour (Frick & Dickens, 2006). Because many of these aggressive traits remain stable over childhood and adulthood, the need to adequately develop empathy early in life becomes an increasingly critical component of children's overall development. Programs specifically aimed at supporting children's development of empathy in the early years (e.g., the *Roots of Empathy* program) are beginning to have a presence in many Canadian classrooms and are producing impressive results (Gordon, 2009). Beyond the social-emotional and moral benefits, empathy has even been shown to have positive academic associations (Bonner & Aspy, 1984; Welsh et al., 2001). Furthering our understanding of empathy as a construct, and the variables that moderate and predict empathy expressions, leads to a greater awareness of its impact on children's overall development. Targeting specific empathy-related responses (e.g., helping young children identify distress in others) clearly impacts children's larger developmental gains in many positive ways.

Pain-specific Implications. This study contributes not only to the field of empathy research, but also to the field of pain research. Over the last few decades, research studies exploring the biological and psychological underpinnings of pain have provided a solid foundation in the overall understanding of pain as a complex phenomenon. These research advancements have led to the creation of psychometrically

sound pain assessment tools and the discovery of effective pharmacological and nonpharmacological pain management strategies. Despite these dramatic changes, many people continue to suffer needlessly. Regardless of valid and reliable assessment tools and refined management strategies, appropriate action is often contingent on an observer's (e.g., caretaker, health professional) accurate perception of the victim's pain. While sufferers of pain have clearly benefited from multiple explorations into the biological and psychological features of the pain experience, less research has focused on these social features important to the adequate treatment of pain (Craig, 2009). In his Social Communication Model of Pain, Craig (2009) illustrates the complex interplay between biological, psychological, and social features that influence sufferers' expressions of pain and, subsequently, observers' reactions to pain. More pointedly, the model of pain empathy (Goubert et al., 2005) illustrates the possible variables that moderate one's response to another's pain. Empathy is illustrated as a central feature of an observer's affective and behavioural response to the pain of another. In this way, empathy has important implications for furthering the understanding of the social response to pain and may even shed light on why some people choose to ignore, disregard, or question the pain of another individual.

The current research examined how children first develop and express empathy for other's pain. The findings from this study indicate that children 18-36 months of age are less distressed by the pain of others than they are by the sadness expressed by others. Not only were the children in this study less distressed by pain, but they were also significantly less likely to respond to others' pain. This was reflected in children's significantly reduced prosocial response to pain as well as children's greater tendency to

simply ignore or actively play during someone's pain. Evolutionary theorists (e.g.,

Williams, 2002) would suggest that attending to and responding to another's pain would

have important personal benefits to the observer (e.g., warning of a mutual threat,

survival of concomitants). Surprising, then, is the general finding in the current study that

children are actually less likely to respond to or be distressed by another's painful

experience. The possibility exists that humans, as a species, are not necessarily born to be

empathic to others' pain (i.e., do not naturally have vicarious responses to watching

someone else in pain). While imaging studies have shown similar neural reactions to

either experiencing pain or watching someone else experience pain (e.g., Morrison et al.,

2004), the findings from this research suggest that experiential learning may play a more

important role than originally thought. Social learning is thought to play a significant role

in how individuals acquire pain-related beliefs (Craig, 2009) and as the data from this

study suggest, likely plays an equally significant role in how individuals learn to respond

to others' pain. These findings further the understanding of the factors associated with

accurate (or inaccurate) assessment of pediatric pain, and consequently issues of

prevention of untreated or ignored pain. Further understanding the emergence and

expression of children's empathy provides insight into the developmental seeds of this

construct in adults, especially in areas of clinical significance (e.g., underestimates or

overestimates of pain in the medical setting).

Future Research

The current study focused on the importance of context on children's expressions

of empathy. Additional individual variables (e.g., age, sex, temperament, social-

emotional variables, language abilities) were also explored for their potential impact on

children's empathy-related expressions. However, as the proposed empathy model (Figure 4) depicts, the variables under investigation in the present study are just a few of the potentially important factors associated with children's development and expression of empathy. Thus, many areas described in the model warrant additional research focus.

As shown in the proposed empathy model, social and developmental factors likely play an influential role in children's recognition of and reaction to others' distress. The present study explored the relationship between children's age and sex and their empathy-related responses. Despite some support in the empathy literature, sex and, to some extent, age did not emerge as powerfully significant variables in the present analyses (especially for the sadness simulations). The lack of sex and age-related findings in the current analyses may reflect the limited age range of the participants and should, therefore, be reinvestigated with children across a broader age range. Furthermore, some empathy research has indicated empathic biases based on the sex (Eisenberg & Lennon, 1983) and even race (Xu, Zuo, Wang, & Han, 2009) of the distressed individual, such that individuals may be more likely to react empathically to a member of the same sex and/or same race. In research conducted by Olweus and colleagues (1998), grade/age-related trends in the empathic responsiveness of adolescents only emerged when accounting for the sex of the hypothetical victim in distress. In their sample, both females and males responded to females more empathically (in contrast to the same-sex findings discussed above; Eisenberg & Lennon, 1983). Although the current study showed no Age Group x Sex interaction, future research should take into account these factors of the simulations, especially when conducted with older children.

As highlighted in the proposed model and in previous investigations (Hoffman,

2000), social factors impact children's empathy and empathy-related responding. Children at this age are socialized by the important adults in their lives (e.g., parents, daycare providers) to attend to others' distress and to respond accordingly. To no surprise, prior investigations have already provided evidence for positive relations between parent and child empathy (Eisenberg et al., 1992; Eisenberg & McNally, 1993; Fabes, Eisenberg, & Miller, 1990). There is also some evidence for the importance of the sibling relationship in empathy expression in children (Tucker, Updegraff, McHale, & Crouter, 1999). While past research has examined these important family variables within the general construct of empathy, investigations into the impact of these variables on how children respond to someone's pain versus someone's sadness would provide additional support for the importance of socialization on children's empathy development. Investigations exploring how children are socialized to respond to others' pain versus sadness may provide additional insight into why children respond differently to others' pain than they do others' sadness.

In regard to the interindividual influences highlighted in the proposed model, further research is warranted to examine the influences of temperament, social-emotional development, and language on children's empathic expressions. Specifically, examining aspects of children's temperament (e.g., emotion regulation), as well as internalizing (e.g., fear) and externalizing (e.g., aggression) behaviour problems, using multiple modalities (e.g., physiological indices; Gill & Calkins, 2003; Liew et al., in press) would contribute greatly to the empathy literature and to the understanding of the biological underpinnings of children's expressions of empathy. Furthermore, the current investigation recruited healthy, typically developing children. Future investigations

would benefit from specifically recruiting children across the range of temperaments and abilities (e.g., temperamentally more difficult children, children with externalizing or internalizing difficulties, children with language delays). By investigating the impact of these variables in a more focused manner, future studies may provide additional support for the importance of these variables. In addition to the interindividual variables already included in this study, it will be important to consider children's past experiences with pain in future investigations. As previously mentioned, self-experience is important in children's understanding of and responsiveness to another's situation (Meltzoff & Brooks, 2008). Only healthy children were recruited for participation in the present investigation. Children with a medical condition that involved multiple painful procedures (e.g., diabetes, cancer) were excluded from participating in this study. This exclusion criterion was based on the assumption that children who have undergone frequent exposure to painful procedures may develop a different understanding of pain in themselves and in others. Including children who have had experience in dealing with pain beyond the everyday occurrences would provide interesting and important insights into children's typical development of pain expression and empathy.

In terms of additional research focused on bottom-up processes, the findings from the present study highlight the dearth of research available examining how young children recognize and respond, specifically, to pain. While developmental researchers have long been interested in how children first respond to emotions, no research has investigated when children are first accurately able to recognize or label the expression of pain in others. A downward extension of the work done by Deyo and colleagues (2004) is essential in learning when children are accurately able to recognize pain and would

contribute to the understanding of how children learn to respond to others' pain. In this regard, future investigations would also benefit from a finer analysis of which bottom-up processes (i.e., vocal, facial, or behavioural) children use in recognizing and identifying pain expressions. A more thorough investigation into the role of hypothesis testing in this type of examination would be extremely beneficial in understanding how children recognize and attend to others' distress. Taking a developmental approach to examining how children first learn about pain in others will be a critical next step.

Beyond the areas of future investigation highlighted in the proposed model, modifications to the current study would be an important avenue for further exploration. Firstly, using a longitudinal approach would be essential in determining how children's expressions of empathy develop over time. In a similar way, recruiting children from a greater age range would ensure that important developmental changes in children's responses to others' pain and others' sadness would not be missed. Examining the variables in the present study using a longitudinal approach would provide an invaluable opportunity to explore the impact of developmental (e.g., sociocognitive maturation) and interindividual (e.g., self-experiences, language acquisition) variables in a sequential manner. Additionally, because prior research has indicated that children respond differently to parents' and strangers' distress (Robinson et al., 2001), replicating the present study with a child's parent expressing the pain or the sadness (instead of a stranger) would be an important modification to consider. Along a similar line, conducting similar simulations of pain and sadness in a more natural environment (e.g., at home) may yield different findings. The novelty of the research environment and the researcher in distress may have impacted the findings significantly. Combining at-home

(with parents) and lab-based (with researchers) distress simulations, as has been done in other studies would provide additionally useful information on how, when, and to whom children respond empathically. Finally, repeating this study using a between-subjects design would be important to ensure that repeated displays of negative emotion did not impact children's empathy-related responses (Denham et al., 1995).

While, the current investigation focused on the bottom-up, developmental, and interindividual factors influencing children's empathic expressions, the proposed developmental model of empathy displays a wide range of additional areas for further exploration in not just the individual influences of other variables, but more importantly their interplay with bottom-up and interindividual influences. Furthermore, modifications to the current study would provide valuable contributions to the initial understanding of children's empathy-related responses to others' pain and how they differ from their responses to others' sadness.

Overall Conclusions

Ever since Kohlberg (1968) first described children as "moral philosphers", researchers have shown considerable interest in how children develop and express their empathy for others' experiences. Through separate analyses of children's responses to lab-based simulations of pain and sadness, the present study provides an initial examination of the differences between and similarities among young children's behavioural expressions of empathy for pain and sadness. The findings provide initial evidence for empathy for pain as a separate construct than empathy for sadness. Specifically, children's expressions of empathy for pain and sadness differed based on both their personal vicarious experiences (children were more distressed by sadness), as

well as their prosocial responses towards others (children showed more prosocial behaviours and global concern for sadness). Interestingly, children were more likely to ignore pain. Despite these important differences, the broader conceptualizations of empathic concern and personal distress emerged across simulations supporting prior evidence of the robustness of these empathy-related responses in children's empathic expressions. Age-related findings, though limited to pain, were in the directions expected showing that older children were more likely to show empathic concern and less likely to show personal distress. Sex did not consistently emerge as a significant predictor of children's empathic expressions for either pain or sadness. As highlighted in previous studies, children's temperament and externalizing/internalizing behaviours showed predictive value for both expressions of empathy for pain and sadness, although these relationships differed across simulations. Regardless of simulation type, however, children's negative affect and emotion-regulation emerged as important correlates of children's empathic expressions. Collectively, these findings support the need for a developmentally appropriate model of children's empathy that considers both bottom-up and interindividual influences. The proposed model integrates the variables from the present study, as well as variables of potential importance in future examinations of child empathy. Most importantly, the model highlights the significance of the features of the stimuli used to elicit empathy in children and empathy research would be best pursued in the future by acknowledging this finding. Finally, these findings contribute to the field of pain research by showing that children from a very early age respond quite differently to others' pain than others' sadness. These differences provide valuable insight into how individuals learn to recognize, understand, and ultimately react to others' pain.

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Appendix A
Script for Pain and Sadness Simulations

Positive Play

All play sessions will begin with free play with the child. When possible, this play session will be directed by the child and therefore, will not be scripted. This free play will continue until the child appears to be comfortable in the setting (a minimum of 5 minutes in duration).

Simulation: Empathy for Pain*

Once the child appears comfortable with the research assistant/experimenter, the first of the two simulations will occur. The simulation of pain will begin with the introduction of a small toolset. During free play with the tool set, the research assistant/experimenter will pretend to hit herself with the plastic hammer and verbalize a pained expression ("Ow!") to grab the child's attention. At this time, she will drop the hammer, express pain ("mmm") and grab the "injured" part (her hand) continuing to rub it for 30 seconds. During this period, she will also exclaim "That hurt" 3 times and repeat "Ow" 5 times. She will also look up 3 times during the simulation with a facial expression of pain. However, no eye contact will be made with the child (so as not to elicit a response). Following this period, the research assistant/experimenter will spend an additional 30 seconds "recovering" from the injury. Over this time, the rubbing and murmuring will subside, and one additional phrase will be uttered twice ("That really hurt, but it's feeling better now.") This simulation will be the same for all participants.

Positive Play

Following the first simulation (of either pain or sadness), the research assistant/experimenter will resume free play with the child. The time between simulations will vary depending on the individual child. Actors will be instructed to continue positive play until it is clear the child is again comfortable and engaged.

Simulation: Empathy for Sadness*

Once the child again appears comfortable with the research assistant/experimenter, the second of the two simulations will occur. The simulation of sadness will begin with the introduction of a small stuffed animal. During free play with this new toy, the research assistant/experimenter will pretend to break the toy (e.g., the arm will come off) and verbalize a surprised expression ("Oh!") to grab the child's attention. At this time, she will drop the toy and begin to cry quietly, slightly heaving her shoulders for 30 seconds. During this period, she will also exclaim "I'm sad" 3 times, and make distinct sniffling noises 5 times. She will also look up 3 times during the simulation with a facial expression of sadness. However, as with the pain simulation, no eye contact will be made with the child (so as not to elicit a response). Following this period, the research assistant/experimenter will spend an additional 30 seconds "recovering" from the sadness. Over this time, the heaving of the shoulders and the crying will subside, and one additional phrase will be uttered twice ("I was really sad, but I'm feeling better now.") This simulation will be the same for all participants.

Positive Play
Finally, the session will end with positive free play and will continue until the child is comfortable and again engaged in a positive play experience with the research assistant/experimenter.

* *Please note*: simulations of pain and sadness are counterbalanced across participants

Appendix B
Behavioural Coding Scheme for Simulations of Pain and Sadness

<u>MALTS-FETZER EMPATHY CODING FOR CHILDREN</u>
JoAnn Robinson & Carolyn Zahn-Waxler; Paul D. Hastings revision, 2005
Nancy F. Bandstra revision, 2008

Experimenter pretends to 1) hurt herself and later, 2) break a teddy bear and become upset. The episode is 60 seconds long. The first 30 seconds are the "distress" period and the final 30 seconds are the "recovery" period.

The following codes pertain to the <u>child's</u> behavior during the 2 minutes **leading up to the first simulation**.

Rate the peak level of the engagement of the child with the experimenter during the two minutes prior to the <u>first simulation</u>:

1. child stays close to mother
2. child plays alone by experimenter (e.g., solitary or parallel play)
3. child plays with experimenter, but only when experimenter initiates play
4. child fully engaged with experimenter in an *interactive* way; child initiates play with experimenter

The following codes pertain to the <u>child's</u> behaviour during the 2 minutes **after the first simulation** (i.e., after the first simulation).

Rate during which time period, if at all, the child returns to the level of engagement noted prior to the first simulation:

1. within 15 seconds
2. within 30 seconds
3. within 45 seconds
4. within 2 minutes
5. child does not return to pre-simulation level of engagement in the first two minutes post-simulation

The following codes pertain to the <u>child's</u> behaviour during the 2 minutes **after the second simulation** (i.e., after the second simulation).

Rate during which time period, if at all, the child returns to the level of engagement noted prior to the <u>first simulation</u>:

1. within 15 seconds
2. within 30 seconds
3. within 45 seconds
4. within 2 minutes
5. child does not return to pre-simulation level of engagement in the first two minutes post-simulation

*If level of engagement post- is actually higher than pre-, please make a note in the *Notes* section.

The following codes pertain to the <u>child's</u> behavior during the exact length of the "distress" portion only – stop coding for these once the victim starts to recover.

Specific behaviors – circle any and all that occurred during the distress portion only.

    a. **Ignores** – minimal disruption of child's ongoing behavior for at least 15 seconds consecutively
    b. **Active play** – child is actively involved in play, object or game engages child's full attention for at least 5 seconds (cumulatively).
    c. **Self-soothing** – rocking, stroking self, mouthing an object or self

Code all of the above as '99' if unable to see/hear child

Assign the child a score on EACH of the following scales for the distress portion only (i.e., the first 30 seconds):

1. POSITIVE AFFECT (do not include if happy to see experimenter's distress reduced)
    0. Does not occur
    1. Tenuous smile
    2. Broad smile, laughs briefly
    3. Broad smile, lusty laugh
    99. Unable to see/hear child

2. ANGER
    0. Does not occur
    1. Anger apparent in some form (e.g., child has tight lips, may also bang or throw toy)
    99. Unable to see/hear child

3. DISTRESS/FEAR
    0. Does not occur
    1. Fear clearly apparent from behaviour, wide eyes, open mouth wariness or shock
    2. Grimacing, teeth bared; fear more clearly apparent in intensity than a coding of 1 would represent
    3. Whimpering, whining
    4. Full blown crying
    99. Unable to see/hear child

The following codes are to be assigned during <u>THE ENTIRE 60 SECONDS</u>.

Specific behaviors – circle any and all that occurred during the entire 60-second episode.

    a. **Distracts** – tries to divert victim's attention away from distress through various means, may bring toy, bring attention to self
    b. **Shares** – child gives something to victim which seems to be in response to the distress (must be a toy/object child had possession of first)
    c. **Helps** – child performs an action to relieve distress ("I will put a band-aid on"), suggests actions to relieve distress ("You need a band-aid" or "Do you want a band-aid?"), child attempts to soothe, patting victim, this may include child trying to help through motioning to or talking with parent; code also when actions/verbalizations appear prosocial but unclear.

d. **Offending object** – defensive action or verbalization toward hammer or teddy bear (e.g., hits teddy bear or says "bad hammer")
e. **Imitation** – imitates sounds, facial expressions or gestures of victim (e.g., mouthing "ow"), count if behaviors are performed on dolls
f. **Vocal or verbal sympathy** – concerned tone in voice; statements with questioning intonation should be scored as **Hypothesis Testing**

Code all of the above as '99' if unable to see/hear child

Assign the child a score on EACH of the following scales for the entire 60-second episode:

4. PROXIMITY TO VICTIM (peak incidence in 60 seconds)
   0. Avoids victim, turns away, attempts to leave the room (even if the victim must be passed in order to do so); turns away from victim and goes to parent
   1. Withdraws from victim, backs away, recoils, goes to parent (but does not turn away)
   2. Stationary, child neither approaches or withdraws, simple gaze aversion without physically turning away is scored a 2
   3. Approaches victim with at least one step toward, or child touches victim. If seated, child leans toward the victim. Child stands up (but not from fear)
   99. Unable to see/hear child

5. HYPOTHESIS TESTING (attempt to cognitively understand/interpret the distress circumstances)
   0. None
   1. Brief, non-verbal gestures, touches on own body parts analogous to victim, looks back and forth from victim's face/teddy bear to hurt part/bear arm or other adult, looking very intently (head does not need to move)
   2. Same as above but prolonged (more than 10 seconds) OR one or more moderate non-verbal attempts OR Looking plus at least one clear verbal attempt. (if only looking at victim, code as 1)
   3. Repeated and/or relatively intense/sophisticated attempts to understand the distress, both verbal, e.g., "Owie?" "Fix?" "Okay?" and non-verbal attempts such as looking at another person in the room, intent looking at own or victim's injured body part, teddy bear etc.
   99. Unable to see/hear child

6. CALLOUS OR HOSTILE
   0. Does not occur
   1. Child hits nearby object, throws something on the floor intentionally, a callous laugh (not just embarrassed giggling)
   2. Child is judgmental or hostile, may hit victim, say "You shouldn't have done that" or "That was stupid"; may also emerge as protectiveness over teddy bear/hammer (with anger towards victim)
   99. Unable to see/hear child

7. SELF-REFERENCING (referring to own injuries or self-blaming)
   0. No self-referencing
   1. One brief self-reference or attempt to draw attention to self
   2. Several self-references or one prolonged one
   99. Unable to see/hear child

8. NUMBER OF PRO-SOCIAL ACTS (must include help-oriented content towards victim to reduce distress (versus teddy bear), not just hypothesis-testing or approaching; count *trying* to fix the teddy bear; showing how to use the hammer appropriately; trying to get parent's attention or goes to parent to get help <u>for the victim</u> (versus him/herself))
  0. None, hypothesis-testing only, nothing help-oriented
  1. Brief assistance, one pat, verbalization, or helping act
  2. Moderate assistance, more than one pro-social verbalization or help-oriented act
  3. Prolonged assistance to victim using two or more types of prosocial verbalizations or help-oriented acts for more than 5 seconds.
  99. Unable to see/hear child

The following codes are to be assigned during <u>THE ENTIRE 60 SECONDS</u>.

Specific behaviors related to parent – circle any and all that occurred during the entire 60-seconds

  a. **Seeks comfort** – child goes to his/her parent <u>to seek comfort for self</u> (versus victim and/or teddy bear)
  b. **Social referencing** – child looks to parent for cues about how to respond to the victim; if gaze towards parent is within a sequence of looking at the object or victim, code as **Hypothesis Testing**
  c. **Prompts to resume play from parent** – parent verbally (e.g., "Go and play") and/or physically (e.g., gently pushing child back towards play mat) prompts the child to return to the victim
  d. **Prompts to help from parent** – parent verbally (e.g., "Go and hug her") and/or physically (e.g., gently pushing child back towards victim, pointing towards victim while encouraging him/her to help victim) prompts the child to help the victim

9. GLOBAL RATING OF CONCERN FOR OTHERS
  0. No concern evident. (May ignore, or be uninterested, amused, callous, angry.)
  1. Interested, some attention but little evidence of concern. Any questions or statements are factual, for gathering information (e.g., "What happened?").
  2. Child sobers, sustains attention for at least 10 sec; *or* mild or brief facial concern; *or* isolated act of assistance (e.g., picking up dropped object, without accompanying expression of concern, although may look "pleasant" [e.g., small smile]).
  3. Sustained attention *with* some expression of concern (facial [e.g., eyebrows raised and drawn together], vocalic [e.g., "Oooh!" or "Are you okay?"], or physical [e.g., approach or touch] concern); *or* mild concern combined with single act of assistance.
  4. Displays a variety of responses clearly indicating concern (e.g., coordinated assistance [more than a single act]); *or* strong concern with a single act of helping; *or* combined expressions of strong concern (e.g., vocalic and physical). *Absence* of any selfish, callous, or angry responses.

The following codes pertain to the <u>VICTIM'S</u> behavior during the 30-second distress:

Assign the victim a score on EACH of the following scales.

10. CREDIBILITY
  1. Not credible, victim breaks character (e.g., laughs)
  2. Appears believable, passable, probably would not strike a child as fake

11. PROMPTING
1. No prompts used, no directives made to child
2. One prompt, perhaps calls child's name or visually engages child (do not count brief glances)
3. Two prompts
4. Three or more prompts