MOTIVATIONAL AND SITUATIONAL INFLUENCES ON INEQUALITY AVERSION IN EARLY CHILDHOOD

by

Amanda Jane Williams

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DEDICATION PAGE

I would like to dedicate this body of work to my wonderfully supportive husband, Ryan, and daughter, Aaliyah, who have shared me with my work for the past several years, and my parents, Jane and Kent, who instilled the love and value of education in me from an early age. Finally, I would also like to dedicate this thesis to my grandfather, Robert Fraser, who always took a special interest in my research. If he were still with us today I know he would have been thrilled to be the first reader of this document. Thank you all for your love, support, understanding, and encouragement every step of the way.

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ABSTRACT

This body of work explores inequality aversion, and more generally prosociality in early childhood using the resource allocation task (RAT). Across a series of experiments, a number of different research questions are addressed by manipulating the trials included in the RAT or experiences that occur prior to the RAT. Insight into the development of underlying motivations and situational influences on inequality aversion in children is obtained. In Study 1 a longitudinal approach is used to explore the development of aversion to both advantageous and disadvantageous inequality. Results suggest that aversion to these types of inequality develop differentially and preferences for equality are influenced by different motivations. Importantly, reliability of children's responses as well as validity for the conceptualization of these two different types of inequality is also established. Study 2 attempted to determine if fairness norms or social comparison concerns was the primary motivation underlying preferences for equality in situations of disadvantageous inequality. The results provide support for the influence of social comparison concerns particularly in costly situations, and particularly for older children (6-year-olds) as opposed to younger children (4-year-olds). Finally, in Study 3 the influences of empathic concern and personal distress are explored in children 5-6 years of age (Study A) and 3-years of age (Study B) by assigning children to watch either an empathy inducing video of a little girl upset that her dog has run away, or a neutral control video of the same girl preparing for a yard sale. Across both studies increased prosociality was observed in the emotion induction group as children shared more in situations of advantageous inequality and showed less envious behaviour in situations of disadvantageous inequality. Prosocial behaviour was correlated with empathic concern (emotion ratings of the stimulus character) but not personal distress (ratings of own emotion). Together, this body of work provides a breadth of information regarding how, why, and when inequality aversion develops in childhood, as well as what factors may motivate or influence decision-making. Importantly, such information may allow us to better encourage and support the development of positive social behaviours and prosociality.

LIST OF ABBREVIATIONS USED

ANOVA	Analysis of Variance
AI	Advantageous Inequality
DI	Disadvantageous Inequality
FAS	Facial Affective Scale
LD	Large Discrepancy
RAT	Resource Allocation Task
SD	Small Discrepancy
TOM	Theory of Mind

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CHAPTER 1

INTRODUCTION

1.1 Prosocial Behaviour

From a young age children engage in prosocial actions (Zahn-Waxler, Radke-Yarrow, & Wagner, 1992; Damon, 1977; Eisenberg & Fabes, 1998; Hay, Castle, Davies, Demetriou, & Stimson, 1999; Paulus, 2014). For example, by 18 months of age, toddlers will pick up out-of-reach or dropped objects (Warneken & Tomasello, 2006), help their parents with household chores (Rheingold, 1982), and share toys with others (Rheingold, Hay & West, 1976). Prosociality is an important aspect of social development, and behaving prosocially is important in many regards. It helps establish social bonds, aids in maintaining interpersonal relationships, and is collectively beneficial to one's social group. The study of prosocial behaviour has been a topic of interest to developmental researchers for many years with research encompassing topics such as sharing, helping, cooperation, altruism and comforting. However, while a large body of work has explored when these behaviours emerge, much less is known regarding why children engage in them.

The term prosocial behaviour is broadly defined as any behaviour intended to benefit another (Eisenberg, 1986). However, it has been argued that prosocial behaviours can be categorized into three general categories (sharing, helping, and comforting) depending on the need being responded to (Dunfield et al., 2011; Dunfield, 2014). Though related to one another under the broad umbrella of prosociality, these behaviours have unique developmental trajectories and supporting mechanisms, require different skills, and serve different social functions (Dunfield et al., 2011; Dunfield, 2014).

Helping alleviates instrumental need (Dunfield, et al., 2011; Dunfield, 2014), for example, retrieving an out-of-reach object may aid someone experiencing difficulty in completing a goal directed behaviour (Warneken & Tomasello, 2006). Simple helping behaviours, such as reaching for a dropped or out-of-reach object, have been observed in infants as young as 14 months of age (Warneken & Tomasello, 2007). An additional range of instrumental helping behaviours has been observed consistently in infants as young as 18-months of age across a variety of situations; for example, opening a closed cabinet for someone who is unable to do so themselves or helping stack books after another individual's failed attempt (Warneken & Tomasello, 2006).

In contrast, comforting behaviour occurs when one recognizes that another individual is experiencing some type of emotional distress or negative emotional state, and they are motivated to alleviate this negative state (Dunfield, Kuhlmeier, O'Connell & Kelley, 2011; Dunfield, 2014). The development of comforting behaviour is complex, and it has been proposed that children's responses to others in distress progress in stages (Hoffman 1982). However, it is generally agreed that true comforting emerges after both helping and sharing behaviours.

Finally, sharing is generally defined as letting someone else have or use something that belongs to you, or dividing something into parts with each person taking or using a part (Merriam-Webster Dictionary). Such behaviours are observed in many different settings with a variety of resources and partners. For example, a child may share by offering a toy they are playing with to a playmate, breaking off a piece of their own cookie for a sibling, or choosing to allocate some stickers to another child in an experimental setting. Though naturalistic sharing behaviour emerges around 18 months of

age (Rheingold, Hay & West, 1976) children do not necessarily share consistently from this young age. Interestingly, while young children endorse the importance of fairness norms and equal sharing from a young age, their own behaviour often does not reflect the norms of fairness they endorse until 7-8 years of age (Smith, Blake, & Harris, 2013). Research suggests that increases in sharing behaviour and fairness as children grow older may be partially explained by a concern with appearing fair to others (Shaw, Montinari, Piovesan, Olson, Gino, & Norton, 2013).

Many factors have been shown to influence sharing behaviour in young children. For example, the expression of need seems to be a necessary motivator for young children around two years of age to share resources (Brownell, Svetlova, & Nichols, 2009), and the amount of resources available can also influence behaviour (Hay, Caplan, Castle, & Stimson, 1991). The relationship between the self and the partner with whom one is sharing can also influence the degree of prosociality observed (Fehr et al., 2008; Moore, 2009). Children will behave more generously with a friend than a non-friend or stranger (Moore, 2009), and with in-group members than out-group members (Fehr et al., 2008). Whether sharing requires a cost to self also influences generosity, and while children will share under both conditions, more generous sharing is observed when no cost to self is required (Thompson, Barresi, & Moore, 1997; Moore, 2009). Whether children are able to see the recipient, and whether recipients are aware of the allocation options can also influence generosity, with children behaving more prosocially when their actions are more transparent (Leimgruber, Shaw, Santos, & Olson, 2012). Interestingly, while the majority of research exploring sharing in children has focused on dyadic interactions, there is evidence that by five years of age children will also often

engage an advantaged third party to negate situations in which resources are distributed unfairly (Paulus, Gillis, Li, & Moore, 2013).

Although a large body of research has been dedicated to exploring the nuances of sharing in childhood, many questions surrounding the motivational and situational influences on prosocial resource distribution remain. It can be argued that all variations of prosociality are influenced by either one's own individual predisposition to behave prosocially, or situational influences, which either positively or negatively impact one's behaviour. These 'situational determinants' can be unique events that alter one's personality, or conditions, experiences, moods or emotions that temporarily influence the individual (Eisenberg & Mussen, 1989). Given the importance and relevance of prosociality to human social development it is important to study not just when prosocial behaviours emerge, but to study prosociality under as many conditions as possible. Further, it is critical to consider why prosocial behaviours develop, as well as what the motivations underlying these actions may be. Notably, by better understanding why children engage in these behaviours we can learn how to better encourage and support the development of prosociality.

This work explores motivational and situational influences on aspects of social behaviour related to prosociality in early childhood: specifically inequality aversion, sharing, and envy. Importantly, this work will allow us to gain insight into a largely understudied area within the field of prosocial development: the motivations underlying children's prosocial resource allocation decisions. Motives will be explored in the absence of situational primes, which may reflect more individualistic preferences, as well as under the situational influence of empathic concern for another individual experiencing

sadness. Before introducing the issues of theoretical importance to the present work, central concepts and methodologies will be introduced. Subsequently, the overall objectives are explained, and the research questions and methodological approaches to be used will be discussed.

1.2 Approaches to Studying Sharing

Early sharing research mainly focused on naturalistic observations of sharing behaviour. Traditionally, children in these early studies would be placed in a room with a variety of toys and a partner (often a parent but sometimes a stranger) and naturally occurring sharing related behaviours would be observed, coded, and analyzed (e.g. Rheingold, Hay, & West, 1976; Hay, 1979; Rheingold, 1982). As several studies have established that sharing behaviours indeed emerge in these contexts by 18 months of age (Rheingold, Hay, & West, 1976; Hay, 1979), more recent sharing research has favored a variety of resource allocation paradigms. These paradigms allow preferences and performance to be explored under different controlled conditions, and provide some insight into the motivations underlying sharing behaviour in early childhood. Popular resources include stickers and candies - with research demonstrating these two resources do not produce differential results (Prencipe & Zelazo, 2005), and commonly used resource allocation paradigms include the dictator game (e.g., Benenson, Pascoe, & Radmore, 2007; Gummerum, Hanoch, Keller, Parsons, & Hummel, 2010), ultimatum game (e.g., Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010), inequity game (Blake & McAuliffe, 2011; McAuliffe, Blake, Kim, Wrangham, & Warneken, 2013), and

forced choice resource allocation task (RAT) (e.g., Fehr et al., 2008; Moore, 2009; Thompson, Barresi & Moore, 1997; Paulus & Moore, 2014).

In the dictator game (e.g., Benenson, Pascoe, & Radmore, 2007; Gummerum, Hanoch, Keller, Parsons, & Hummel, 2010), children are presented with a number of resources and asked if they would like to keep all of the resources for themselves, or allocate some (or all) resources to their partner. While this approach provides insight into how much children will share, it is limited in the sense that additional social constructs related to resource allocation (e.g., inequality aversion, disadvantageous inequality) cannot be explored. Further, the number of possible outcomes is much larger than other approaches in which children are presented with two options and asked to choose one. Finally, including more than one trial would mean presenting the same scenario multiple times.

In contrast, in the ultimatum game (e.g., Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010), one player proposes a distribution of resources for themselves and a partner. The recipient can then choose to either accept or reject the offer. If the offer is accepted, both parties receive the amount of resources that was proposed to them. However, if the offer is rejected, neither party receives anything. Similarly, in the inequity game the experimenter proposes a distribution between the participant and partner, and the participant can decide whether to accept or reject the offer (Blake & McAuliffe, 2011; McAuliffe, Blake, Kim, Wrangham, & Warneken, 2013). While both the ultimatum and inequity games offer two defined choices to the child, the choices are limited to all or nothing, and the option that prevents inequality requires an absolute

sacrifice of resources. Thus, while one allocation option can be varied across trial types, there is no flexibility with the second option.

Finally, in the RAT (e.g., Fehr et al., 2008; Moore, 2009; Thompson, Barresi & Moore, 1997; Paulus & Moore, 2014) children are presented with two alternative distributions and asked which way they would like to distribute resources between themselves and their partner. These two distributions can be manipulated in many ways to produce an infinite number of trial types designed to address specific research questions. The RAT method also allows researchers to easily include several repetitions of varying trial types that explore children's preferences in multiple different situations. Given the relevance of these benefits to the questions being addressed in the current research program, the RAT was employed in all studies included in this thesis.

1.3 Inequality aversion

Inequality aversion in children has become a topic of interest within the literature relatively recently. The framework and tasks upon which this literature is based have been largely influenced by work done in the fields of social psychology and behavioral economics in adults. Similarly, recent work in comparative psychology has also adopted these methodological approaches to explore analogous phenomena in primates.

Importantly, while inequality refers more simply to the unequal distribution or rewards, most previous work has focused on the concept of inequity, which in contrast takes into account one's inputs, outputs, and merit, and relates to concepts of injustice or unfairness (Adams, 1963). Several observational (Homans, 1953; Clark, 1958) and experimental studies (Loewenstein, Thompson, & Bazerman, 1989) have shown that

situations of advantageous inequity and disadvantageous inequity elicit different reactions, behaviours and decisions in adults. Therefore, while studying inequity aversion in children is a relatively new area of interest, the asymmetry that situations of AI and DI present and negative consequences associated with inequity in situations of social exchange has been discussed and documented in the literature dating back several decades (Adams 1963; 1965; Loewenstein, Thompson, & Bazerman, 1989).

Importantly, Fehr and Schmidt (1999) have been credited as being among the first to propose an equation of inequity differentiating between advantageous and disadvantageous inequity. They suggest that when one has more than another individual they will behave altruistically in order to achieve equity. In contrast, when one has less than another they will react with feelings of envy. They further propose that the negative reaction resulting from inequity is greater in situations in which one has less (as opposed to more) than the other (Fehr & Schmidt, 1999). This theory can therefore explain a variety of generous and selfish behaviours across a number of social games.

Inequality and inequity have also been considered from an evolutionary perspective, drawing largely on work done exploring the phenomena of inequity aversion in primates (see Brosnan & De Waal, 2014 for a review). Interestingly, inequity aversion is most apparent in species that cooperate beyond the contexts of mating and kinship (Brosnan & De Waal, 2014). There is also evidence of asymmetry between situations of AI and DI in primates. Notably, while evidence of DI has been documented in several different species, there is very little evidence of AI (Brosnan & De Waal, 2014).

However, one criticism facing the majority of experiments is that the inequity paradigms used differ from those used with human children and adults in a key way.

While in the human research rejecting a DI offer reduces the level of equality between self and partner as the partner also loses their reward, in many experiments with primates a rejection influences only the subject's allocation, therefore increasing the level of inequity between subject and partner. Importantly, in a recent task modeled after paradigms used with human participants (in which rejecting one's own reward also resulted in the rejection of one's opponent) no evidence for either DI or AI was observed (McAuliffe et al., 2015).

In sum, while results have been mixed within the animal literature there is some evidence of DI and very little of AI in primates suggesting that DI has deeper phylogenetic roots than AI (Brosnan & de Waal, 2014). In contrast, the work that has been done with humans clearly demonstrates that humans dislike inequality. Though research suggests AI and DI differentially affect humans, evidence of both has been documented (Fehr & Schmidt, 1999; Adams, 1963; Adams, 1965; Loewenstein, Thompson, & Bazerman, 1989).

1.4 Inequality aversion in Children

A large body of work has demonstrated that children dislike inequality (Fehr et al., 2008; Blake & McAuliffe, 2011; LoBue et al., 2011; Shaw & Olson, 2012). More recently, research has demonstrated that even infants demonstrate sensitivity to inequality and will attend differently to unequal vs. equal distributions of rewards between two individuals (Geraci & Surian, 2011; Sloane, Baillargeon, & Premack, 2012; Schmidt & Sommerville, 2011; Sommerville, Schmidt, Yun, & Burns, 2012). These studies, measuring this type of looking time behaviour, offer insights into infant's expectations of

fairness. However, work with older children using paradigms such as the RAT is able to provide more detailed information regarding children's preferences.

Commonly used trials using the RAT approach include presenting the options one resource for self and one for partner, or one for self and none for partner (1,1 vs. 1,0) as well as 1,1 vs. 2,0 (Fehr et al., 2008; Moore, 2009). In these scenarios, when children opt for the equal choice (1,1), the default motivation assumed to be underlying this preference is an aversion to inequality, or more plainly a dislike for the unequal distribution of rewards (Fehr et al., 2008). It is critical to note however, that while inequality aversion driven by fairness norms is one potential motive underlying preferences for equality in these contexts, other possible motives also exist.

In a RAT situation, consider if one presented a child with the option of choosing either one sticker for themselves and one sticker for their partner, or two stickers for themselves and zero for their partner (1,1 vs. 2,0). Choosing the option in which both parties receive one sticker indeed can be evidence of inequality aversion, but it could also reflect true sharing preferences in which children are motivated to behave prosocially and deliver a benefit to their partner. Regardless of the motive- which will be further discussed shortly, in this situation children would be showing an aversion to inequality that favors themselves and places them at an advantage in comparison to their partner- also known as advantageous inequality (AI). However, children also show aversion to inequality that favors another individual and places themselves in a disadvantageous position in comparison to their partner- also referred to as disadvantageous inequality (DI). For example, if presented with the choice of one resource for self and one for partner, or one resource for self and two for partner (1,1 vs. 1,2), choosing the option in

which each party receives one resource over the unequal option that advantages the partner would be showing evidence of aversion to DI.

Research suggests that these two forms of inequality aversion (AI and DI) develop at different time points and are influenced by different underlying mechanisms (Blake & McAuliffe, 2011; LoBue et al., 2011). For example, while young children aged 3-5 years will rarely object to having more than a peer (AI) they are quick to protest situations in which they receive less than a peer (DI) (LoBue et al., 2011). Thus children react in very different ways depending on the type of inequality they are faced with (LoBue et al., 2011). Other work looking at resource distribution in 4-8 year-olds using an inequity game shows supporting results. While children of all ages often seek to avoid situations of DI, it is not until age eight that children begin to show aversion to situations of AI and will actually sacrifice their own rewards to prevent inequality that advantages themselves (Blake & McAuliffe, 2011). Together, this research provides evidence that aversion to AI and DI emerge along different developmental trajectories and are influenced by distinct mechanisms.

1.5 Alternative motivations for equality

Though several different experiments have established evidence that indeed children display aversion to inequality, little is known about the mechanisms that underlie this aversion. As previously mentioned, children could simply dislike inequality based on internalized norms of fairness (e.g., everyone should be treated equally). However, the differences between preferences for equality in situations of AI and DI that have been observed in multiple experiments (e.g. Blake & McAuliffe, 2011; LoBue et al, 2011)

suggest otherwise. Alternatively, mechanisms other than fairness norms or a generalized aversion to inequality could be driving decision-making in situations of AI versus situations of DI. It could be the case that in situations of AI children choose equality based on a prosocial orientation or a social welfare preference in which one seeks to deliver resources to those who are disadvantaged or maximize the total number of resources distributed (Charness & Rabin, 2002; Shaw & Olson, 2012). Children could also be seeking to maximize their own relative advantage over their partner, a strategy observed in 5-6 year olds (Skeskin, Bloom, & Wynn, 2014) or be influenced by reputation concerns (Shaw et al., 2014). In contrast, in situations of DI children could prefer equality due to feelings of envy or spite evoked by negative social comparisons (Shaw & Olson, 2012; McAuliffe, Blake, & Warneken, 2014). While some of these concerns are not the focus of this thesis and are not explicitly tested in this body of work (particularly alternative motives for equality in situations of AI) it is important to note that multiple mechanisms could be influencing decision-making depending on the context.

Social comparison however, was explored as being a potentially influential concern in situations of DI. As social beings, humans make social comparisons often, with self-directed social comparisons consuming approximately 7% of daily thoughts (Summerville & Roese, 2008). Social comparisons are made in a wide variety of contexts, and this tendency to compare oneself to others emerges early on. Even kindergarten-aged children will seek out information regarding a peer's performance in relation to their own, and the desire for this comparative information seems to grow stronger with age (Ruble, Feldman, & Boggiano, 1976).

Social comparisons allow one's own abilities or outcomes to be evaluated in terms of how they compare to the abilities or outcomes of another, and can be upwards or downwards in nature (Wood, 1989). Upwards comparisons occur when we compare ourselves to someone who has performed at a higher level, or achieved a greater outcome than ourselves. In contrast, downwards comparisons occur when we compare ourselves to someone who has performed at a lower level, or achieved a lesser outcome than ourselves. Unsurprisingly, depending on the directionality of these comparisons our affect, self-esteem, and behaviours are differentially affected. While downwards comparisons serve to improve our mood and protect our self-esteem, upwards comparisons often result in negative affect, decreased self-esteem, and envy (Yip & Kelly, 2013; Salovey & Rodin, 1984; Wheeler & Miyake, 1992; Steinbeis & Singer, 2013).

Envy has been shown to influence behaviour, and has been linked to a willingness to make personal sacrifices to prevent an advantage to another (e.g., Zizzo & Oswald, 2001). Envy, therefore, must be considered as a potential factor underlying children's decision-making in situations of DI. While envy can be dispositional, reflecting a more generalized predisposition towards feeling envious, it can also be episodic. In contrast to dispositional envy, episodic envy is specific to a particular person or situation and typically stems from wanting something that someone else has. Episodic envy has both a feeling component, characterized by negative, hostile emotional experiences, as well as a cognitive component, witnessed through negative social comparisons (Cohen-Charash, 2009).

In sum, various potential motivations could underlie preferences for equality in

situations of AI and DI. In addition to fairness norms and generalized inequality aversion, social welfare concerns, prosociality, social comparison concerns, and feelings of envy could also influence resource allocation. Currently, relatively little is known regarding what truly drives decision-making in different situations of inequality, and how these motivations may change throughout development. More work is needed to better understand motivations and situational influences on inequality aversion in early childhood.

1.6 Overall Objectives

This thesis explores inequality aversion, and more generally, aspects of prosociality, sharing, envy, and fairness from a variety of different angles. The central methodology employed is the resource allocation task (RAT). In the RAT, children are presented with two options as to how they would like to distribute a number of stickers between themselves and a partner, and are asked to decide which way they would like to allocate the resources. Situations of AI as well as DI, in which equality comes both with and without a cost are included in this body of work.

While the RAT is used consistently across studies to answer a variety of different questions, what comes before, during, and/or after the RAT is varied across studies. For example, before the RAT, emotional experiences may be primed, or not primed. During the RAT, various resource allocation situations are presented, and after the RAT, additional measures such as emotional ratings may be collected. Although age groups vary across studies, all of the research described in this thesis explores decision-making in children between three years of age and six years of age. Therefore, this work provides

a breadth of information surrounding the development and presentation of inequality aversion and prosociality in these early years.

The central questions asked in this body of research involve the *what, why, when, and how*'s surrounding inequality aversion in early childhood. For example, *what* decision-making in situations of AI and DI looks like, as well as *what* relationships between these two types of inequality (if any) exist, and *how* they change with time, are all questions of interest. Further, this research explores *why* children choose equality in situations of DI- specifically, investigating whether the evidence supports inequality aversion motives based on fairness norms, or rather motives more strongly related to social comparison and feelings of envy. Finally, *how* empathic concern and personal distress influence inequality aversion (in the context of prosocial behaviour) is investigated. Hopefully, better understanding factors influencing prosociality can provide us with insight regarding how we can better support and encourage its development.

Though research suggests aversion to AI and DI develop differently from one another (Blake & McAuliffe, 2011), the research that has examined both AI and DI situations simply provides snapshots as to what children's preferences are at different points in development (e.g. Fehr et al., 2008; Blake & McAuliffe, 2011). Further, previous longitudinal work has focused only on situations of AI (e.g. Moore & Macgillivray, 2004). Therefore in Study 1, a longitudinal approach was employed to assess *what* decision-making in the RAT looked like at different points in development. Children were tested at 4.5 years, five years, and 5.5 years of age in AI and DI trials both with and with no cost to self, yielding four distinct trial types. This specific combination of trials allowed for exploration of several specific research questions. First, the validity

and reliability of the four trial types (both costly and no cost variations of AI and DI situations) were tested to ensure the RAT was methodologically sound. Secondly, potential relationships between these two types of inequality were explored. While consistent relations between preferences for equality in AI and DI situations would suggest that fairness norms or a generalized aversion to inequality were driving decision-making, the absence of such relations would suggest that different motives were at play in situations of AI and DI. Finally, consistency over time within AI trials, and consistency over time in DI trials were also examined to explore whether motivations underlying preferences for equality changed with time in either or both situations.

Though Study 1 offered insight as to whether AI and DI are similarly or differentially motivated, as well as whether motivations are consistent over time for AI and DI independently, it could not speak conclusively to what those motivations may be. Therefore, in Study 2, the goal was to gain insight into the specific motivations underlying preferences for equality in situations of disadvantageous inequality. When children choose inequality over giving their partner a larger reward, they could prefer an equal distribution of rewards due to established norms of fairness, or because of feelings of envy resulting from upwards social comparisons (Shaw & Olson, 2012). Therefore, in the four different disadvantageous inequality trial types used in the RAT, both the cost associated with equality and the size of the discrepancy between the payoff to the participant and partner were manipulated. The expectation was that a preference for equality motivated by fairness norms would be unaffected by cost and discrepancy. In contrast, a preference for equality motivated by social comparison concerns would be stronger when the discrepancy between participants' own rewards and those of their

partner was large as opposed to small. In order to further explore whether underlying motives for equality changed with age, both four- and six-year-olds were tested.

Finally, Study 3 began to examine what other factors may influence inequality aversion, or prosociality in young children- if indeed resource distribution is influenced by more than fairness norms, or a generalized aversion to inequality. To begin to address this question, a priming methodology was introduced prior to the RAT to explore the potential influence of empathic concern and personal distress on prosocial behaviour in 5-6 year-olds as well as 3-year-olds. During the priming phase, children watched either a video of a young girl upset that her dog had run away (experimental condition) or a video of the same young girl preparing for a yard sale (control condition). Between the priming phase and the RAT children were asked to rate how they thought the little girl from the video felt, providing a measure of empathic concern. They were also asked to rate how they themselves felt, proving a measure of personal distress. Finally, children engaged in the RAT with the little girl from the video as their partner. Rates of prosociality were compared across groups, and correlated with emotion ratings for both the self and other.

Across studies, efforts at consistency have been made where possible to allow for cross study comparisons, and a more general discussion of results. However, necessary discrepancies also exist. For example, in both studies one and two, participants made decisions as to how they would like to allocate resources between themselves and a friend of their choosing. However, in Study 3 their partner was the little girl from the video who had either lost her dog or been preparing for a yard sale. This design was chosen as it was important to establish the effects of the emotion induction affected behaviour towards the target before attempting to generalize it to other recipients.

Further, with the exception of Study 2, the same four trial types were used in all studies- both costly and no cost variations of AI and DI. While Study 2 did include costly and no cost versions of DI situations, the costly situations required an absolute sacrifice. Additional trials manipulated the discrepancy between participant and partner to address the research question being examined.

Finally, the statistical approach remained quite consistent across all studies. As Study 1 focused mainly on relational questions, the main analyses conducted were correlational. However, an ANOVA and t-tests exploring potential main effects and interactions of cost, position (AI/DI), and age, were also included. ANOVA and t-test analyses were used exclusively in Study 2, while ANOVA, t-tests, and correlations were used to explore the various questions of interest in Study 3.

Together this body of research will contribute to a deeper and broader understanding of situational and motivational influences on resource distribution in and across situations of both AI and DI. It will contribute to our knowledge by showing what relationships between AI and DI look like, and how aversion to AI and DI change over time independently. Further, it will explore specific motives underlying preferences for equality in situations of DI, how these motivations may change over time, and how factors such as empathic concern and personal distress may influence rates of prosociality.

Importantly, this work will contribute to an area in the literature that has not received much attention. It will help us understand when and why children show social preferences for equality or sharing, as well as when and why envy and social comparison may be especially influential. In turn, we will be able to better understand under what

conditions or in what situations prosocial behaviour may be more or less likely, and why this is the case. This information may not only help us better support the development of positive social behaviours, but also inhibit the manifestations of negative aspects of social behaviour such as envy.

CHAPTER 2

A LONGITUDINAL EXPLORATION OF ADVANTAGEOUS AND DISADVANTAGEOUS INEQUALITY AVERSION IN CHILDREN

Amanda Williams and Chris Moore

This chapter has been submitted for publication

Abstract

Unfairness in resource allocation situations can present itself in two ways, with one receiving either less or more than another. Research suggests that aversion to situations of disadvantageous inequality (DI) in which a child receives less than a peer develops differently than aversion to advantageous inequality (AI) in which children receive more than their partner. However, little is known about how the developmental trajectories of AI and DI compare and whether they are related to one another. In this short-term longitudinal study, two forms of AI and DI (in which equality was either costly or not costly) were examined. Using a forced choice resource allocation task children's decision making was compared across three time points; 4.5 years, 5 years, and 5.5 years of age. In both AI and DI situations, cost and no cost trials were correlated at each time point establishing construct validity within trial types. A positive relationship (indicating a preference for fairness) was observed between AI and DI at Time 1, whereas no relationships were observed later in development. Finally, correlations across all time points were observed in AI trials and grew stronger with age, while only one relationship was observed (between Time 1 and Time 2) in DI trials. Taken together these results suggest that decision-making in AI and DI situations is distinct from one another and that the relationship between them changes with age. Importantly, this research suggests that motivations for fairness and equality differ depending on context, and an undifferentiated aversion to inequality is not primarily guiding decision-making throughout childhood.

Keywords: resource allocation, inequality aversion, children

2.1 Introduction

Although human beings are sensitive to fairness norms from a young age (Sommerville, Schmidt, Yun, & Burns, 2012; Smith, Blake & Harris, 2013), situations of inequality are common across cultures, contexts, and throughout development. One way in which inequality is manifested is in the unequal distribution of resources. As previously mentioned, within unfair or unequal distributions, there is one party who receives more and is placed in a situation of advantageous inequality (AI) and one party who receives less and is placed in a situation of disadvantageous inequality (DI). By middle childhood children's behaviour seems to reflect a generalized principle of inequality aversion in both situations of AI and DI (Fehr, Bernhard, & Rockenbach, 2008; Blake & McAuliffe, 2011; Shaw & Olson, 2012). Nevertheless, how young children react to situations of inequality often differs depending on whether they are the advantageous or disadvantageous recipient (Birch & Billman, 1986; Fehr et al., 2008; Blake & McAuliffe, 2011; LoBue, Nishida, Chiong, DeLoache, & Haidt, 2011).

For example, imagine you are preparing a snack for two small children. You break a cookie unevenly- passing a small piece to one child while handing a much larger piece to the second. You might expect that objections from the child receiving the small piece would ensue, while the second child would be unlikely to protest. Indeed, this phenomenon has been empirically demonstrated; while children between 3-5 years of age will often object to being given less than a peer, they rarely object to being given more (Birch & Billman, 1986; LoBue et al., 2011). This differential responding suggests that children react in different ways to different situations of inequality for different reasons, and that the motivation to seek equality may differ depending on whether the inequality is

advantageous or disadvantageous to them. While by 8-years of age children show a preference for equality in both situations of inequality that benefit and disadvantage themselves (Fehr et al., 2008; Blake & McAuliffe, 2011), such preferences for equality may still be driven by different mechanisms.

Consider the example of the cookie distribution. The child who receives the larger piece may break off some of their own cookie and hand it to the other child because they want the distribution to be fair or because they are motivated to behave generously. The objection of the child who received the smaller piece may also occur because they want the cookie to be distributed fairly, however the child may simply dislike receiving less in comparison to their peer and feel envious of the advantage held by the other child. Thus, children may avoid inequality in AI situations because of a prosocial orientation but may avoid inequality in situations of DI due to social comparison and envy (Shaw & Olson, 2012; Williams & Moore, 2014). In neither case may a general consideration of equality be motivating the response. Therefore, as opposed to reacting to situations of inequality in accordance with generalized norms of fairness, young children may instead be motivated by different concerns in different situations.

The current study employed a within-subjects and longitudinal correlational approach to examine whether similar or differential motivations underlie equal decision-making in AI and DI situations. This approach also allowed us to examine both consistencies and inconsistencies in children's resource allocation to help elucidate the validity, reliability and structure of the processes underlying decision-making in resource allocation contexts. The overall rationale was that if children are motivated by a general principle of fairness then their decisions in different AI and DI situations should be

correlated both across situation and across age. In contrast, if different motivations underlie decisions in different situations or across age, then children's decisions will be unrelated both across situation and across time. Here we review the extant research on resource allocation in both AI and DI situations across age.

Existing research exploring inequality aversion in children has provided a series of snapshots as to how children make decisions in various AI and DI situations across a range of ages (Thompson, Barresi, & Moore, 1997; Moore & Macgillivray, 2004; Fehr et al., 2008; Moore, 2009; Blake & McAuliffe, 2011; Shaw & Olson, 2012). Traditionally, such resource allocation experiments have relied on ANOVA (analysis of variance) to explore the data; an approach which is effective at exploring differences in variance and between means across different factors but not able to address relational questions. Though a variety of resource allocation tasks have been used, one popular approach is the forced choice task in which children choose one of two options presenting different allocations for themselves and another recipient (e.g., Fehr et al., 2008; Moore, 2009; Thompson, Barresi, & Moore, 1997; Williams & Moore, 2014). Both situations of AI and DI have been explored using this approach, and there is typically one equal option and one option in which the child receives either more (AI) or less (DI) than the other recipient (e.g. Thompson, Barresi, & Moore, 1997; Moore & Macgillivray, 2004; Moore, 2009; Fehr et al., 2008; Williams, O'Driscoll, & Moore, 2014). Common AI forced choice allocations include no cost trials in which there is no personal cost associated with equality, for example- one sticker for self and partner, or one sticker for self and none for partner (1,1, vs. 1,0) as well as costly allocations in which the child must incur a personal cost to achieve equality (e.g. 1,1 vs. 2,0). In DI situations both no cost (1,1 vs. 1,2) and

costly (1,1 vs. 2,3) choices have also been employed (e.g Fehr et al., 2008; Williams, O'Driscoll, & Moore, 2014). While research has shown some similarities between AI and DI choices, for example in both situations children prefer equality more when there is no cost associated with it (Fehr et al., 2008; Moore, 2009; Williams & Moore, 2014), work examining both AI and DI in early childhood suggests that aversion to AI and DI develops along differential trajectories (Blake & McAuliffe, 2011; LoBue et al., 2011; Birch & Billman, 1986).

In one experiment, Blake and McAuliffe (2011) employed an inequity game in which children could accept or reject offers made by an experimenter on behalf of themselves and a partner. Preferences were compared across AI and DI trials in 4- to 8-year-old children. In AI trials, children could choose to accept or reject four candies for themselves and one for their partner, while in DI trials they could accept or reject one candy for themselves and four for their partner. While 4- to 8-year-old children consistently preferred to reject unequal offers in DI trials (opting to forfeit all resources rather than deliver a larger reward to their partner), different results emerged in AI trials. Four-year-olds almost always accepted the larger reward for themselves, however 8-year-olds also rejected offers that delivered a larger reward to themselves in comparison to their partner. The differential emergence of inequality aversion in AI and DI situations indeed suggests that children make decisions in these situations independently of one another, and that different motivations underlie preferences for equality in AI and DI contexts, at least early in development.

Fehr and colleagues (2008) also explored the development of inequality aversion in 4 to 8-year old children. Using forced choice costly and no cost AI trials as well as no

cost DI trials preferences for equality were found to increase with age across all trial types. Their findings were presented in terms of a developing generalized aversion to inequality, however different rates of equality were observed across trials; specifically lower rates of equality were present in costly AI trials across all age groups. Unfortunately, no correlational analyses reflecting consistency across trial types were presented.

Taken together, these studies suggest that aversion to AI and DI may represent two unique forms of inequality aversion and that before age eight, decision-making is not influenced by a general aversion to inequality. However, there are many limitations to the existing body of research, and methodologies and trial types have varied across experiments exploring resource distribution in children. For example, in some trials equality requires a cost while in others it does not. Some experiments employ only AI (Moore & Macgillivray, 2004) or only DI trials (Williams & Moore, 2014), some rely more heavily on trials of one position (Fehr et al., 2008) while others include only one variation of each (e.g. Blake & McAuliffe, 2011). It is important to validate that within AI trials and within DI trials, costly and no cost trials are indeed tapping into the same construct regardless of cost - especially with so much variation within the literature. Within AI trials one would expect preferences in costly and no cost trials to be related if indeed these are just two variations of one form of inequality aversion, and the same pattern would be expected in situations of DI as well. However, no such comparisons have been conducted. Therefore, research demonstrating consistent relationships between preferences for equality across costly and non-costly variations of both AI and DI situations is necessary to establish construct validity.

Further, no longitudinal work has explored the developmental trajectories of AI and DI choices. Importantly, a longitudinal approach would allow the examination of consistency of preferences over time in both AI and DI situations. In the only longitudinal study of choice-based resource allocation of which we are aware, Moore and Macgillivray (2004) examined resource allocation in AI situations (sharing behaviour) and delay of gratification in children at three time points: 3.5 years, 4 years, and 4.5 years of age. Their main focus was on how material costs were related to temporal costs in children of this age, but they did examine children's willingness to pay a cost to avoid inequality. In their AI trials, children chose between two stickers for themselves or one sticker for both self and partner. The results demonstrated that sharing at 3.5 years was not correlated with sharing at 4 or 4.5 years of age, but that sharing behaviour at the latter two time points was correlated; therefore by four years of age there is evidence of stability in children's decision-making in AI choices.

To our knowledge, no research has explored consistency in children's decision making in AI trials over time beyond 4.5 years of age, and no research has looked at longitudinal consistency in decision-making for DI situations. Furthermore, no research has explored the relationship between these two forms of inequality, and how this relationship may change with age. Exploring AI and DI longitudinally would determine if decision-making is consistent and reliable over time. It would also provide insight as to whether differential or similar mechanisms underlie decision-making in situations of AI and DI and if the relationship between AI and DI changes with age.

Therefore, in the current study a longitudinal approach was employed to explore children's preferences for equality in both AI and DI situations over time. A forced

choice, resource allocation choice task was used as it allowed for multiple presentations of four different trial types: both costly and no cost variations of AI and DI trials. AI cost and no cost trials, as well as DI no cost trials that have been well established within the literature (e.g. Moore, 2009; Fehr et al., 2008; Steinbeis & Singer, 2013; Sheskin, Bloom, & Wynn, 2014; Williams, O'Driscoll, & Moore, 2014) were chosen. The particular DI cost trial included has been employed in one other study to our knowledge (Williams et al., 2014) and allowed for the equal option to be 1,1 across all trials. Also consistent with the other trials, it presented a discrepancy of one sticker between self and partner in the unequal option, with a cost of one sticker being required to achieve equality. Though some asymmetry between the AI and DI trials is present, based on the nature of the research questions and the previous literature these trials were best suited to the current design.

Children were tested at 4.5 years (Time 1), 5 years (Time 2), and 5.5 years of age (Time 3). These time points were chosen for several reasons. Firstly, we were interested in exploring inequality aversion before age eight, which is when a more generalized aversion to inequality has been shown to emerge (Blake & McAuliffe, 2011). Further, as previous research suggests that in situations of disadvantageous inequality underlying motivations change between four and six years of age (Williams & Moore, 2014), the period between these ages was of particular interest. Finally, to best facilitate retention of the sample, visits were spaced six months apart, as opposed to a year or longer.

Our primary questions of interest were threefold. First, we were interested in establishing construct validity for AI and DI trials by assessing consistency in performance within AI and within DI trials. To achieve this we presented children with

both costly and no cost trials in both AI and DI situations and explored the relationship between costly and non-costly variations for each type of inequality. It was hypothesized that if cost and no cost trial types tap into the same form of inequality aversion responses within AI trials would be correlated at each time point, and the same pattern of results would be observed in DI trials.

Secondly, we wished to explore potential relationships between AI and DI trials to gain insight as to whether aversion to AI and DI is motivated by differential or similar concerns. Given past work demonstrating differential trajectories of inequality aversion in AI and DI situations (Blake & McAuliffe, 2011; Birch & Billman, 1986; LoBue et al., 2011), we did not expect to see uniformly consistent relationships between preferences for equality between AI and DI trials. However, it is possible that a relationship exists at one or more time points, which would suggest that a more general aversion to inequality guides decision-making in both AI and DI situations at some point in development.

Finally, we wanted to investigate whether performance in AI and DI situations would show consistency across time, a pattern which would suggest that the same underlying mechanisms were at play at different ages. Here, it was hypothesized based on previous research (Moore & Macgillivray, 2004) that in AI trials there would be significant relationships across all time points. However, as there is some evidence that 4- and 6-year-olds decision-making is differentially motivated in situations of DI (e.g. Williams & Moore, 2014), no consistency over time was expected in DI trials. Together, the answers to the questions in the current experiment will offer important insights into motivation in resource allocation decisions and provide a more comprehensive picture of how aversion to AI and DI develop in early childhood.

2.2 Method

2.2.1 Participants

Sixty-one typically developing children (31 males, 30 females) were recruited for this study, which was approved by the University's research ethics board. Children visited the lab for the first part of the study at approximately 4.5 years of age (Time 1). Six months later, 56 of these children (28 males, 28 females) returned for a second visit. Finally, an additional six months later, at approximately 5.5 years of age, 54 children (26 males, 28 females) returned for a third visit. One male was excluded for incomplete participation leaving a sample of 53 children: 25 males, and 28 females. Only data collected from the 53 children who successfully completed all three visits were included in the following analyses. At the first visit, the ages of the final sample ranged from 52 months and12 days to 56 months and 27 days (M= 54 months and 18 days). At Time 2 ages ranged from 58 months and 22 days to 63 months and 15 days (M= 60 months and 26 days). At Time 3 ages ranged from 64 months and 23 days to 69 months and 30 days (M= 66 months and 26 days). Participants were drawn from a predominately white middle class neighborhood.

2.2.2 Resource-allocation task

This task adopted the method used by Fehr and colleagues (2008) and Moore (2009). At each of their three visits, children chose a friend with whom they enjoyed playing, and drew a picture of themselves and the partner of their choosing on blank 6' by 4' cards. The picture of the participant was placed beside the picture of the partner at the

top of a board on which the two alternative resource distributions were placed (see Figure 1).

Children then completed the resource allocation task, which consisted of 17 trials; one practice trial in which children could choose one or two stickers for themselves (demonstrating the format of the task), followed by four repetitions of each test trial.

Each test trial offered the child a forced choice between two alternative distributions of stickers for themselves and their partner. Advantageous and disadvantageous inequality trials were blocked and counterbalanced with blocks separated by a distracter task (colouring a picture, or completing a 'dot to dot' activity).

In each trial there was an equal option: one for self, and one for partner (1,1) and an unequal option. In AI trials the unequal option was one sticker for themselves and none for their partner (1,0) in no cost trials, and two stickers for self and none for partner (2,0) in cost trials. In DI trials, the unequal option was one for self and two for partner (1, 2) in no cost trials, and two for self and three for other (2,3) in cost trials. Thus, while the unequal option favored the participant in AI trials, it favored the partner in DI trials.

In all trials, the experimenter presented the choices by asking, "*Would you like one sticker for yourself and one sticker for (friend's name) or would you like {x} sticker(s) for yourself and {x} sticker(s) for (friend's name)?"* However, the order of the presentation of the equal and unequal options was randomized. The chosen stickers were then placed into separate paper bags, which had been designated for each recipient (participant and partner).

Figure 2.1. Method of trial presentation showing the disadvantageous, no cost trial type.

Self Partner

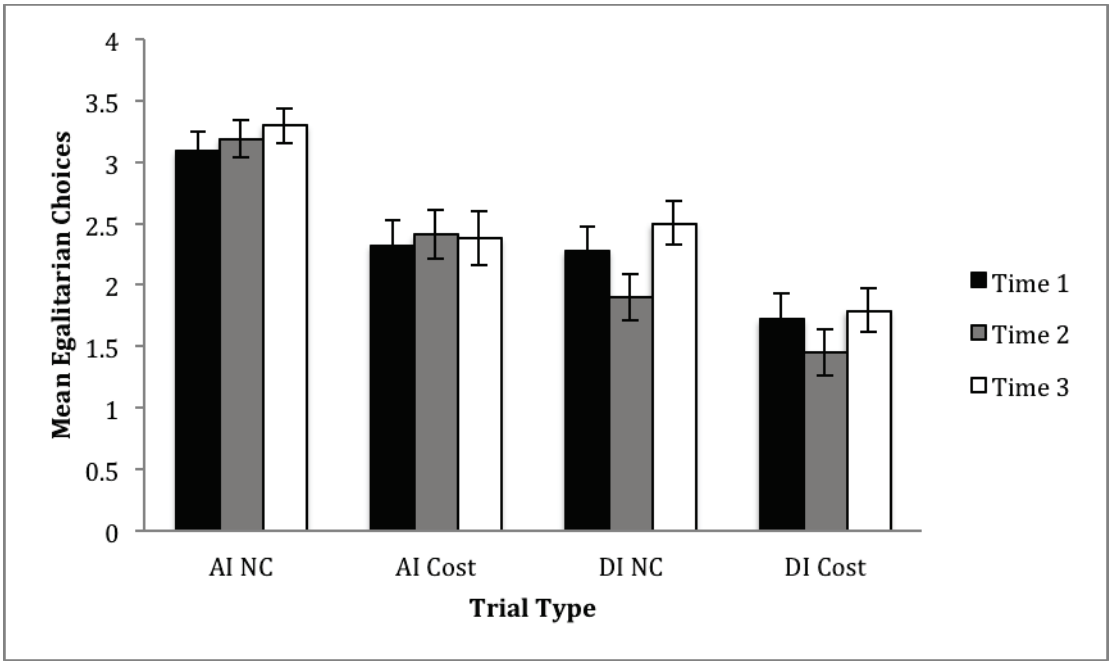
2.3 Results

Children received one point for each equal choice made (see Figure 2 for mean scores). First, a 3-way ANOVA was used to analyze the data for main effects of position (AI vs. DI), cost (costly or no cost) and age. While ANOVA (which reveals differences in mean scores across conditions) has been traditionally used with similar data, the current experiment was focused on investigating a variety of relations between and within trials not suited to this analytic strategy. Therefore, in order to best address the questions of interest, next bivariate correlational analyses were used to first assess reliability for each of the four trial types employed, and subsequently to explore the specific questions of interest regarding relationships within and across trial types, both within and across time points. Importantly, by incorporating both approaches, differential information obtained from each analysis as well as the potentially different stories each reveal can be compared and contrasted.

2.3.1 3 way Repeated Measures ANOVA

No effect of age was observed, $F(2,104)=1.721$, $p=.184$, $\eta_p^2 = .032$, however significant main effects of both cost: $F(1,52)=67.504$, $p <.001$, $\eta_p^2 = .565$, and position, $F(1,52)=24.714$, $p <.001$, $\eta_p^2 = .322$ were observed. A paired samples t-test following up the main effect of cost revealed that across all time points, children preferred equality significantly more when there was no cost (M= 16.38, SD= 3.56) compared to when there was a cost (M= 12.09, SD= 4.99), $t(52) = 8.047$, $p<.001$. Following up the effect of position, a subsequent paired samples t-test revealed that children preferred equality more

Figure 2.1 Average egalitarian decisions made in costly and no cost, AI and DI trials at each time point, with standard error bars.



in AI situations (M= 16.69, SD=5.48), than in DI situations (M= 11.68, SD= 5.28), $t(52) = 4.97$, $p<.001$.

There were no two way interactions between time and cost, $F(2,104)=.567$, $p =.569$, $\eta_p^2 = .011$, time and position, $F(2,104)=1.756$, $p =.178$, $\eta_p^2 = .033$, or position and cost: $F(1,52)=2.763$, $p =.1024$, $\eta_p^2 = .050$. There was also no three way interaction between time, cost, and position, $F(2,104)=.055$, $p =.946$, $\eta_p^2 = .001$.

2.3.2 Correlational Analyses

To establish reliability of performance within each trial type, the first half of the trials were correlated with the second half of trials for AI and DI cost and no cost trials independently at each time point. Significant relationships were found at Time 1 for AI trials with no cost, $r = .444$, $p =.001$, and with a cost, $r = .667$, $p <.001$, as well as DI trials with no cost, $r = .604$, $p <. 001$, and with a cost, $r = .785$, $p <. 001$; at Time 2 for AI trials with no cost, $r = .500$, $p <. 001$, and with a cost, $r = .605$, $p <. 001$, as well as DI trials with no cost, $r = .492$, $p <. 001$, and with a cost, $r = .374$, $p =. 006$; and also at Time 3 for AI trials with no cost, $r = .385$, $p =. 004$, and with a cost, $r = .623$, $p <. 001$, as well as DI trials with no cost, $r = .470$, $p <. 001$, and with a cost, $r = .421$, $p =.002$.

Having established reliability of performance for each trial type, we examined correlations between cost and no cost trials separately for AI and DI trials. Correlations were consistently observed between cost and no cost trials in both AI ($r= .575$, $p > .001$), and DI trials ($r= .640$, $p < .001$) trials at Time 1, Time 2 (AI; $r= .520$, $p < .001$; DI: $r= .536$, $p < .001$) and Time 3 (AI: $r= .397$, $p = .003$; DI: $r= .466$, $p < .001$). Given these

patterns of relations, cost and no cost scores were aggregated into one score out of four for AI and DI trials at each time point for subsequent analyses.

Next, relationships between responses in AI and DI trials were explored at each time point. At Time 1, a positive relationship between equal decisions in AI and DI trials was discovered (r= .373, p = .006). At Time 2 (r= -.148, p =.291), and Time 3 (r= -.126, p =.368) no relationships between AI and DI trials were observed.

Finally, to address the question of whether there was consistency across time in performance on AI and DI trials, relationships among responses across the three time points were examined. AI scores were correlated between Time 1 and Time 2 (r= .359, p = .008), between Time 1 and Time 3 (r= .480, p < .001), and between Time 2 and Time 3 (r= .514, p < .001). In short, strong relationships were observed across all time points in AI trials, and, if anything, these relationships seemed to grow stronger with age. Performance in DI trials demonstrated a different pattern of results. Scores were correlated between Time 1 and Time 2 (r= .452, p = .001). However, there was no relationship between Time 3 performance and that at earlier points in time (Time 1 and Time 3: r= .129, p =.357; Time 2 and Time 3: r= .202, p =.147). Therefore there was consistency across all three time points for AI performance but not for DI performance.

2.4 Discussion

The goal of the current study was to explore advantageous and disadvantageous inequality aversion in children across three time distinct points; 4.5 years, 5 years, and 5.5 years of age. In order to compare and contrast information from two different analytical approaches - one traditionally used with similar data, and one better suited to

answer the questions of interest, both ANOVA and correlational analyses were employed. The ANOVA revealed overall effects of position and age, while an initial correlational analysis demonstrated strong reliability between the first and second half of responses in each of the four trial types. Importantly, this finding established that the data obtained in this experiment reflects real and reliable preferences in each of the trial types used. Continuing on with the correlational approach several relational questions were then addressed. We were interested in establishing construct validity for both AI and DI trial types- specifically determining whether cost and no cost variations of AI trials were related across each time point, and also whether the same pattern was present in DI trials. Also of interest was whether preferences for equality were related across AI and DI trials at any of the three tested time points, and finally, whether equal decision-making was consistent within situations of AI and within situations of DI over time. Interestingly, the results obtained from these two approaches told somewhat different stories, with the results from the correlational analyses offering much more insight into the questions of interest.

2.4.1 ANOVA

The ANOVA revealed significant effects of cost and position. The first t-test following up the effect of cost determined that children preferred equality more when there is no cost associated with it; a finding that supports previous findings (e.g. Fehr et al., 2008; Moore, 2009; Williams & Moore, 2014). A subsequent t-test following up the effect of position revealed that overall children were more likely to choose equality in situations of AI compared to situations of DI; an effect which seems to be partly driven by near ceiling rates of equality in no cost AI trials, and low rates of equality in costly DI

trials. No overall effect of age was observed establishing that across all trial types mean scores did not change significantly between ages 4.5, and 5.5 years of age. Finally, no two, or three way interactions between cost, position, and age were observed.

2.4.2 Establishing validity

The first research question aimed to determine whether the proposed constructs of AI and DI were indeed valid. If children's preferences in AI trials were influenced by the same mechanism regardless of cost (and the same for DI trials) consistent relations between cost and no cost trials should be observed at each time point. Such a finding would make it more feasible to compare and discuss inequality aversion more generally across experiments but more importantly, is necessary in order to validate the way in which AI and DI have been conceptualized in the current experiment- with cost and no cost variations being two alternative presentations of one construct. With regards to this question, it was found that at each of the three time points AI cost and no cost trials were correlated with one another, as hypothesized. Also as expected, and following the same pattern of results, it was found that costly and no cost DI trials were correlated at each time point. Importantly, these findings provide evidence of construct validity in both situations of AI and DI and support the conceptualization that cost and no cost trials are influenced by the same underlying mechanism in both situations of inequality. Due to these findings, all repetitions of costly and no cost trials were collapsed across for subsequent analyses.

2.4.3 Relationships between AI and DI

The next research question explored whether advantageous and disadvantageous inequality aversion were related to one another. While consistent relationships between AI and DI would suggest general norms of fairness were driving preferences, the absence of such relations would instead suggest that different motivations underlie preferences, and AI and DI are uniquely motivated by factors beyond fairness concerns. As research suggests that AI and DI operate independently- at least before age eight (e.g. Fehr et al, 2008; Blake & McAuliffe, 2011) no consistent relationships between the two were expected. An interesting pattern of results emerged, which partially supported our hypothesis.

At Time 1, a positive relationship between AI and DI trials was observed. Thus, 4.5-year-old children who preferred the equal option in AI trials and chose to fairly distribute resources even though it was necessary to forfeit their advantage were more likely to also prefer the equal option in DI trials. Interestingly, at Time 2 and Time 3 this relationship was no longer present. Therefore during these times children's preferences in AI and DI trials appear to be independent of one another. These findings suggest that early in development (i.e. at 4.5 years of age) some general preference for equality may be guiding preferences. Research suggests that by age eight children's resource allocation decisions may again operate in accordance with norms of fairness (Fehr et al., 2008; Blake & McAuliffe, 2011; Shaw & Olson, 2012). However it appears that around age five children go through a period during which this generalized aversion to inequality and tendency to make decisions in accordance to fairness norms dissipates and the motives behind their decision-making become more context specific.

2.4.4 Relationships over time

The final research question explored whether preferences for equality would be consistent over time in AI trials and also in DI trials. Based on previous research (e.g. Moore & Macgillivray, 2004) showing that sharing behaviour at 4 years of age, and 4.5 years of age (the last two time points in their longitudinal study) was related, it was expected that performance in AI trials would be correlated across all of our time points. As hypothesized, this was the pattern of results observed, and relationships between every possible combination of AI time points were observed (i.e. between Time 1 and Time 2, Time 2 and Time 3, and Time 1 and Time 3). It was noted that the correlation coefficients became larger over time, suggesting that the predictability of prosocial behaviour in AI situations may grow stronger with age.

A different pattern of results was expected in DI trials, given research suggesting that 4- and 6-year olds preferences for equality are differentially motivated in situations of DI (Williams & Moore, 2014). As expected, in DI trials a different pattern of behaviour than that observed in AI trials emerged. While performance at Time 1 and Time 2 was correlated, no other relationships were observed between subsequent visits. Therefore while one initial relationship was observed between the two earliest time points, consistency in DI trials disappeared at 5 years of age.

These results suggest that the motivation underlying preferences for equality may remain constant in situations of AI, but change through development in situations of DI. Further, the finding that distinct and essentially opposite patterns emerged for AI and DI over time supports the notion that these are two distinct forms of inequality aversion that

present very differently, and show distinct developmental trajectories and suggests that aversion to AI and DI perhaps become even more independent from one another with development.

When considering what may be driving equal decision making in DI trials two potential explanations are apparent. One motive could be a generalized aversion to inequality, while alternatively other factors such as social comparison could be influencing decision-making- if children are seeking to prevent someone from receiving more than themselves as opposed to simply trying to achieve equality. Given the lack of performance consistency observed over time within DI trials, it seems that motives for equality are shifting between 4.5- 5.5 years of age and subsequent relational patterns provide insight into what these motives may be. As a relationship between AI and DI preferences was observed at Time 1 but not at later time points, children may be shifting from being motivated by fairness norms, to being increasingly influenced by social comparison concerns. Previous research supports the notion that particularly in costly DI situations, 6-year-olds (but not 4-year-olds) are indeed primarily driven by social comparison concerns as opposed to fairness norms (Williams & Moore, 2014). Thus this shift in motivation observed is in line with previous work.

It makes sense that as children begin to develop more sophisticated cognitive abilities they may become more sensitive to contextual factors, and thus increasingly influenced by social comparison concerns when they are 5-6 years of age. However, as they continue to develop and begin to enter the late childhood period, children may become better able to overcome negative feelings associated with social comparison. Such a shift could account for the more normative behaviour exhibited by 8-years-of age,

which has been observed in other experiments (e.g. Fehr et al., 2008; Blake & McAuliffe, 2011). However more work is needed to better understand how motives may continue to shift and change across a wider period of development.

2.4.5 Results across analyses

It is interesting to note that for each trial type, the three time points did not differ in terms of the overall number of equal decisions made (Figure 2). Conversely the performance on the different trials types differs greatly. While the relational questions addressed clearly suggest that the motivation underlying preferences for equality across these different trial types differ, the findings also suggest that at different points in development the same decision may be driven by different motivations. Had analyses of these data focused only on overall levels of performance (which similar experiments often do) the reasons or motives underlying performance would have been masked. In contrast the correlational approach used in the current experiment demonstrates that exploring relations across different trial types and time points can provide an additional level of insight into the motivations behind children's resource allocation decisions. Further, the differences between the two analytic approaches also demonstrate that while one approach may show significant differences between two trial types (e.g. cost and no cost trials using ANOVA) another approach (correlational) may show that while different, the preferences shown in these trials are actually strongly related to one another.

The consideration of these results in relation to one another demonstrates that each approach revealed a somewhat different story. The correlational approach was

undoubtedly more insightful and better suited to address the research questions in the current experiment, and had a correlational approach not been used the relations and motivational differences observed would have gone undiscovered. However, aspects of the ANOVA were also informative, especially in combination with the correlational analyses.

2.4.6 Conclusion

The current experiment supports previous research suggesting that at certain points in development aversion to AI and DI, may operate independently and not in accordance with general fairness norms (Blake & McAuliffe, 2011). Importantly, it also offers novel insights into children's decision making in both AI and DI situations, as well as interesting motivational shifts during the age period under study. Early on (at age 4.5 years) we observed a relationship between preferences for equality in these two different inequality situations, so it could be the case that at this age decision-making is based on a more generalized aversion to inequality. At all subsequent time points however, no relationships between aversion to AI and DI were observed, therefore it seems aversion to AI and DI develop along different developmental paths. In contrast to aversion to AI, which seemed to become more stable with age, aversion to DI became less predictable over time, perhaps reflecting a tendency for children to become more attuned to social comparison concerns during this period of development.

This work makes important contributions to our understanding of the development of aversion to inequality in early childhood, as well as the motivations underlying this aversion. Future research exploring inequality aversion in children should

consider both AI and DI situations, while recognizing that the underlying motives behind preferences for equality may be very different – especially in children between 5 and 6 years of age. The literature would also benefit from more work looking at how social comparison concerns influence decision-making, and what other motivational factors may be playing a role. Importantly, by understanding what is driving children's behaviour across different situations of inequality and unfairness, we may be better able to support the development of prosocial behaviors across a variety of situations and contexts.

2.5 Addendum

Some previous work exploring resource allocation in young children has used a categorical approach in order to gain further insight into children's decision-making (Fehr et al., 2008; Sheskin et al., 2014). A similar attempt was made in the current study in order to gain further insight into children's decision-making strategies and how these strategies may influence the results. Specifically, we were interested in whether children's decision-making strategies showed consistency over time. Children were categorized by their decision-making strategy as outlined in Table 2.1.

Decision-making strategies included strongly egalitarian in which children choose the equal option at least three times (out of four) in each trial, and weakly egalitarian in which children chose the equal option at least three times in no cost trials and less than three times in costly trials. Strongly generous children were categorized as those that chose the prosocial option (equal in AI, and unequal in DI) at least three times, while weakly generous children were categorized as those who chose the prosocial choice (again, equal in AI and unequal in DI) at least three times in no cost trials and less than three times in costly trials. Finally, selfish children were categorized as those who chose the egalitarian option less than three times in no cost trials, and less than two times in costly trials.

The distributional proportions of decision-making strategies yielded by this categorization can be observed in Table 2.2. The planned analytic strategy was to run correlational analyses exploring consistency of strategies over time. However, despite relatively relaxed categorical criteria, fewer than half of participants could be categorized.

Based on the low frequency with which children were categorized and the nature of the analyses we planned to conduct there was insufficient power to further analyze these groups in a statistical way.

It is worth noting that 13 children were categorized as strongly egalitarian at Time 1. However, only two of these children were also categorized as strongly egalitarian, and two at Time 3. No children were categorized as strongly egalitarian across all three time points. Interestingly, this pattern supports reported correlational analyses suggesting that a general aversion to inequality may be present at Time 1, however seems to disappear later on.

Table 2.1 Criteria used to categorize children based on decision-making strategies in each trial type with the numbers in each cell representing the number of equal choices made in each trial type. Children were able to be categorized if they met the criterion in all four trial types for any of the five mutually exclusive categories listed.

	AI: No cost	AI: Cost	DI: No cost	DI: Cost
Strongly Egalitarian	3,4	3,4	3,4	3,4
Weakly Egalitarian	3,4	0,1,2	3,4	0,1,2
Strongly Generous	3,4	3,4	0,1	0,1
Weakly Generous	3,4	0,1,2	0,1	0,1,2
Selfish	0,1,2	0,1	0,1,2	0,1

Table 2.2 The number and proportion of children who met the criteria for each of the following categories; strongly egalitarian, weakly egalitarian, strongly generous, weakly generous, selfish. The number of uncategorized children is also included.

Weakly Egalitarian	1	1.9	4	7.5	3	5.7
Strongly Generous	4	7.5	9	17	5	9.4
Weakly Generous	6	11.3	9	17	3	5.7
Selfish	6	11.3	1	1.9	0	0
Uncategorized	23	43.4	25	47.2	36	67.9

CHAPTER 3

EXPLORING DISADVANTAGEOUS INEQUALITY AVERSION IN CHILDREN: HOW COST AND DISCRAPNCY INFLUENCE DECISION-MAKING

Amanda Williams and Chris Moore

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Abstract

This research examined disadvantageous inequality aversion in 4- and 6-year-old children. Using the resource allocation paradigm, we explored how inequality aversion was influenced by whether a cost was associated with the equitable choice. We also investigated whether preferences for equality differed depending on whether the inequitable choice presented a small or large discrepancy between the payoff of the participant and their partner. The results demonstrated that cost plays a large role in decision-making, as children preferred equality more when there was no cost associated with it compared to when there was a cost. Interestingly, the effect of cost also affected discrepancy, with children more likely to choose equality when the discrepancy was large as opposed to small, in cost trials but not in no cost trials. Finally, the effect of discrepancy also interacted with age, with older children being more sensitive to the discrepancy between themselves and their partner. Together, these results suggest that children's behaviour is not indiscriminately guided by a generalized aversion to inequality or established fairness norms. Alternate motives for inequality aversion are discussed.

3.1. Introduction

A concern for fairness is important in motivating human cooperation and prosocial behaviour. By understanding how this concern emerges in development, we may be better able to support and encourage the development of important social behaviors. Children appear to be sensitive to fairness from a very young age; for example, children as young as 15 months of age will look longer at an unfair distribution of rewards than a fair distribution (Sommerville, Schmidt, Yun, & Burns, 2012). Young children also demonstrate a sensitivity to inequality in resource distribution situations in which they are one of the recipients. It is now well documented that children begin to share resources early in the preschool period (e.g. Damon, 1975, Rheingold, Hay, & West, 1976; Eisenberg & Fabes, 1998).

When given the opportunity to share resources with others to establish an equal distribution, children will often do so even when a material cost to themselves is required (Fehr, Bernhard & Rockenbach, 2008; Thompson, Barresi, & Moore, 1997; Moore, 2009). By 3-years of age, children will also object when a peer or partner receives more than them (LoBue, Nishida, Chiong, & DeLoache, 2011). However, whether children are motivated by fairness concerns in such situations remains unclear. Alternatively, children may be motivated by prosociality in situations where they can forgo a reward in order to deliver a benefit to a partner or by envy resulting from social comparison in situations where they can act to prevent another receiving more than themselves (Shaw & Olson, 2011). The present study examines possible motivations underlying children's resource allocation, particularly in situations in which they are potentially at a disadvantage

compared to a partner. Before elaborating on the particular approach used in the current study, we first briefly describe related work on children's decision-making in such situations.

As previously noted, situations in which children are asked to react to an inequitable distribution of resources that favors the partner are said to involve 'disadvantageous inequality' (DI). In contrast to advantageous inequality (AI) situations in which an inequitable distribution favours the child, DI situations have received less attention in the literature. However DI situations offer an interesting case for comparing differing motivations underlying fairness. When children show preference for an equal distribution of resources rather than allowing a partner to have more, they may be motivated by a desire for fairness but alternatively they may be motivated by envy resulting from social comparison (Shaw & Olson, 2012). While assessing fairness requires a comparison in the sense that one must compare one's own resources to the partner's, in the current study, as in Shaw and Olson's, 'social comparison' refers to the desire to not have less than a partner.

In order to study inequality aversion in a way that eliminated social comparison as a potential motive, Shaw and Olson (2012) used a third party design in which 3 to 8-year-old children decided how to allocate resources to two unknown participants. They found that even younger participants would discard an extra resource when asked to split an uneven amount of resources between two recipients. These results revealed a principle of inequality aversion governing children's decisions in third party situations, but cannot inform us about how such concerns may operate when children's own interests are at stake. We know that children as young as 3-4 years of age understand fairness norms,

and will report that resources should be split equally, however it is not until age 7-8 that their sharing behaviour aligns with the norms of fairness they endorse (Smith, Blake, & Harris, 2013).

Research on DI aversion when children's own interests are at stake has largely been carried out to examine the origin and development of DI aversion in children and much of it has compared children's reactions in DI and AI situations (e.g., Fehr et al., 2008; Blake & McAuliffe, 2011; LoBue, et al., 2011). In general, this work shows that aversion to these two forms of inequality develops along distinct developmental trajectories, with children demonstrating a dislike for inequality that disadvantages themselves several years before they exhibit aversion towards inequality that favors themselves. For example, LoBue and colleagues found that children as young as 3 years of age would object when an experimenter distributed resources in a way that disadvantaged themselves in comparison to a partner (LoBue, et al., 2011). However children were less likely to object to unequal distributions that placed them at an advantage in comparison to their partner. This finding suggests that children's motives in DI situations are at least in part motivated by envy resulting from negative social comparison.

In the study by LoBue et al., (2011), children responded to unfair resource distributions imposed by an adult. However, when children have the opportunity to decide themselves how resources are distributed across self and a partner, there is also evidence that children will avoid DI. In perhaps the first experiment on DI situations in children, Fehr et al. (2008) used a forced choice resource allocation task to introduce an 'envy' decision in which 3- to 8-year-olds chose between an equal distribution of rewards

(one candy for both self and partner) and an unequal distribution of rewards that disadvantaged themselves (one candy for self and two for the partner). Equitable choices in this DI trial were compared with two AI trials, in which equality came with either a cost or no cost. Though preferences for equality differed across trials, an overall increase in equitable decisions with age was observed, and the authors cast this development in terms of a principle of inequality aversion general to both AI and DI situations. There was however, no direct evidence that the same concerns were motivating decision-making in the different trials types. The increase in equitable choices observed in the DI choices is particularly ambiguous because the level of preference for the equal choice at the younger age was no different from chance. Because the DI choice did not involve a cost, it is entirely possible that the younger children were only paying attention to their own rewards and were unaffected by the disadvantageous comparison between their rewards and those of their partner. Without a condition in which avoiding DI comes at a cost, it is not possible to determine whether these younger children really are avoiding inequality, or what, if any, motive they have for doing so.

Subsequent work has shown that a preference for equality sometimes presents itself even when there is a cost associated with removing the comparative disadvantage. Blake and McAuliffe (2011) presented 4- to 8-year-olds with an unequal number of candies for themselves and a partner, and asked them if they would like to accept or reject the offer (in which case neither party received anything). In DI trials children were offered one candy for themselves, and four for their partner, while in AI trials children were offered four candies for self and one for partner. While children did not show inequality aversion to AI until 8 years of age, children across all age groups commonly

rejected DI offers. As in the case of LoBue et al., (2011) discussed earlier, the different developmental patterns suggest that avoidance of AI and DI are differentially motivated at least in young children (Blake & McAuliffe, 2011). The results also suggest that when the other stands to get a much larger reward than the self, children are strongly motivated to reject the resource allocation.

The two studies just described remain the only two that have directly examined children's self-involved DI decisions in resource allocation contexts across different age groups. However comparison across the two studies is difficult because they differed in two key aspects. Fehr et al. (2008) presented DI choices for which there was no cost to making the equitable choice (the children received the same reward either way) and the potential discrepancy between self and partner was relatively small (one vs. two). In contrast, Blake & McAuliffe (2011) presented choices for which there was a cost to avoiding DI (both participants lost everything), and the potential inequality was relatively large (one vs. four). It is conceivable that both of these variables have an impact on children's decisions in DI contexts. Younger children may have a tendency to focus on their own rewards exclusively, and therefore a cost choice could lead to a lower level of inequality aversion compared to a no cost choice, for which children may choose essentially randomly. The size of the discrepancy between self and other may also have an effect in that the larger discrepancy, the greater the potential for a negative social comparison and resultant feelings of envy. So, if envy is motivating decisions in DI situations, children may avoid inequality to a greater extent when the discrepancy is large compared to when it is small.

To generate a clearer picture of how young children's decisions in DI situations

are motivated, we presented 4- and 6-year-old children with a series of decisions, each involving a choice between an equal distribution of resources and an unequal distribution that favored the partner. We varied both the cost of making an equitable decision and the size of the discrepancy between the rewards for self and other in the DI case. First, we compared the type of DI trial introduced by Fehr et al. (2008) in which there was no cost to the participant for either choice, with a costly trial type in which the child would have to give up their own resource to avoid inequality (cf. Blake & McAuliffe, 2011). Although how cost influences DI has not been systematically explored, cost has been shown to influence behaviour in other social contexts. In situations of AI, children demonstrate weaker preferences for equality when it comes with a cost (Thompson, et al, 1997; Fehr et al., 2008; Moore, 2009). Children also judge others less harshly for not helping someone in need when there are high costs associated with helping, compared to when costs are low (Sierksma, Thijs, Verkuyten, & Komter, 2014). Given these established cost effects across other social domains, it was hypothesized that cost would also influence decision-making in situations of DI. Specifically, it was expected that children would show a stronger preference for equality when there was no cost associated with it, partially because those children who only paid attention to their own payoff would be more likely to choose the equal option. While the absence of a cost effect would provide support for inequality aversion motives, an effect of cost would suggest children's decision making is influenced by what is in their own best interest, as opposed to fairness norms.

Second, we compared children's decisions in DI situations involving two different discrepancies between the participant's and the other recipient's resources in the unequal

option. In half the trials the discrepancy was small (one for self; two for partner) and in half the trials the discrepancy was larger (one for self; five for partner). The reasoning here was that if children are primarily concerned with maintaining equality, in accordance with fairness norms, then there should be little or no difference between egalitarian choices in these two trial types. However, if they are responding more to the envy engendered by social comparison between self and other, then the larger the discrepancy, the more they may be inclined to reject it. Therefore, in line with the idea that children's decisions in DI situations may be motivated by social comparison and envy concerns, we predicted more egalitarian choices would be made in large discrepancy trials compared to small discrepancy trials.

To summarize, combining these two variables yielded four types of trials: no cost with a small discrepancy (1,1,vs. 1,2); no cost with a large discrepancy (1,1 vs. 1,5); cost with a small discrepancy (0,0 vs. 1,2); and cost with a large discrepancy (0,0 vs. 1,5). Children of 4 and 6 years of age were tested because evidence of increasing inequality aversion in the envy trial type has been observed in this age range (e.g., Fehr et al., 2008), but previous research has not adequately explored motives underlying decision-making in DI situations in children of these ages. Given that inequality aversion has been observed to increase with age in multiple resource allocation situations (e.g Fehr et al., 2008; Blake & McAuliffe, 2011; Shaw & Olson, 2012), it was predicted that older children would make more egalitarian decisions compared to younger children. In view of the limited background literature on DI, no specific predictions were made regarding interactions between age, cost and discrepancy.

3.2 Method

3.2.1 Participants

Forty-two typically developing children drawn from a predominately white middle-class neighborhood in a small Canadian city participated in this study, which was approved by the University's research ethics board. Participants were recruited from a database, as well as a variety of community classes and events. Two participants were excluded due to incomplete participation leaving a sample of 40 children. The 4-year-old group (10 males, 10 females) had a mean age of 52 months, 6 days (ranging from 42 months, 17 days to 57 months, two days). The 6-year-old group (eight females, 12 males) had a mean age of 75 months, 29 days (ranging from 68 months, 6 days to 82 months, 24 days).

3.2.2 Procedure

All testing took place in the lab, and began once parental consent and participant assent was obtained. Following the approach introduced by Moore (2009), children were asked to think of, and name a friend they enjoyed playing with. Children were then asked to draw themselves and their friend from memory on individual 4" by 6" inch blank cards. Before testing started children were asked to identify their drawings, and were corrected if either drawing was misremembered.

The researcher then faced the child and said, "*We're going to play a choosing game. In this game, sometimes you might choose stickers for you and (friend's name) and sometimes you might choose not to take any stickers. The stickers you choose for yourself will go here, and the stickers you choose for (friend's name) will go here."*

Brightly coloured stickers portraying popular television characters that children found attractive, and appealing, were used as the resource. A variety of different stickers was used with each participant to ensure that the stickers remained salient and attractive rewards throughout the duration of the task. Children were given a sticker book to place stickers they chose for themselves, and stickers chosen for their friend were placed in a paper bag.

Before the test trials began, each child participated in one practice trial (choosing between one or two stickers for themselves) to familiarize them with the format of the game. Responses were recorded but not analyzed. There were four trial types and children participated in three trials of each, for a total of 12 test trials. Trials were presented in three blocks. Each block contained one of each of the four different trials types. The order of the trial types was varied within block, and the order of the blocks was varied across participants to ensure no order effects contributed to the findings. In each trial the picture of the participant and their partner were placed on a piece of paper, and the two alternative distributions were laid out below each picture, and divided by a line (see Figure 1). Children were told, "*Here you are and here is (partner's name).*"

In each trial children were asked "*Would you like to choose (n) sticker(s) for yourself, and (n) for (friend's name), or would you like to choose (n) sticker(s) for yourself and (n) for (friend's name)?"* In cost trials the choices were (0,0 vs. 1,2) in SD trials, and (0,0 vs. 1,5) in LD trials. In no cost trials the choices were (1,1 vs. 1,2) in SD trials, and (1,1, vs. 1,5) in LD trials. Participation for each child lasted approximately 15 minutes. Each session for which parental consent to videotape was obtained was recorded for verification and coding purposes.

Figure 3.1 Method of trial presentation, showing the small discrepancy, no cost trial type.

Self Partner

3.3 Results

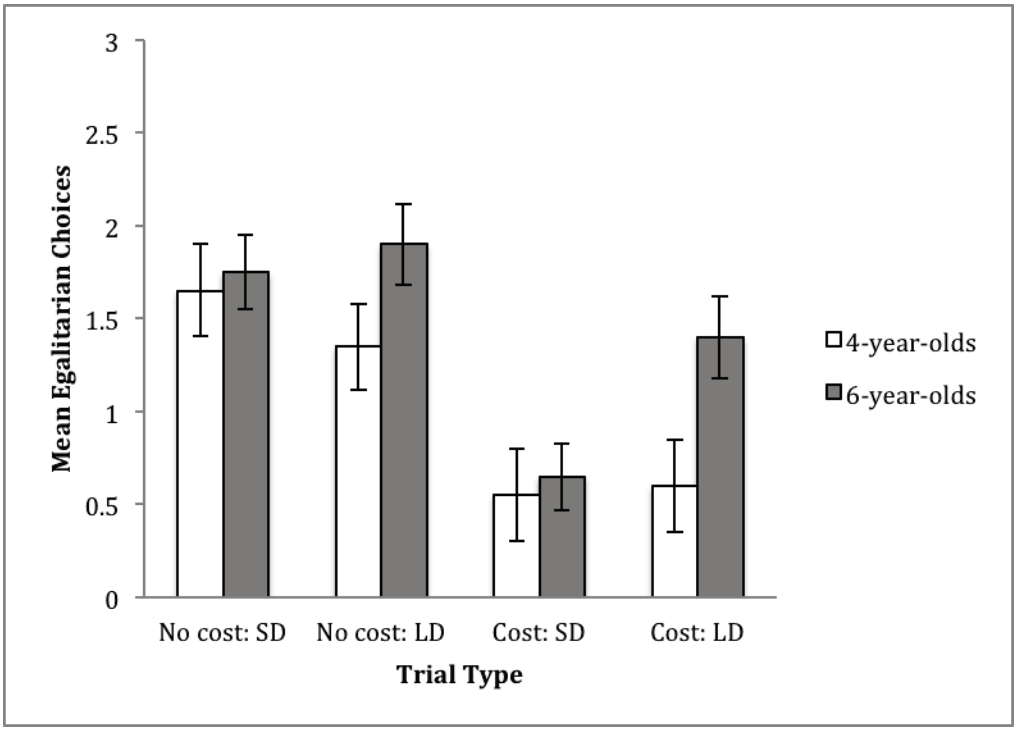
Children received one point for each egalitarian choice made (0,0 in cost trials and 1,1 in no cost trials), therefore receiving an overall score ranging from "0" to "3" for each trial type. Descriptive statistics can be seen in Figure 3.2.

A 2 X 2 X 2 mixed model repeated measures ANOVA with cost (cost, no cost) and discrepancy (SD, LD) as within subject factors, and age as a between subjects factor was performed with the number of egalitarian choices as the dependent variable. Between subjects, no significant main effect of age was observed, $F(1,38) = 2.410$, $p = .129$, $\eta_p^2 = .060$. There was a significant main effect of cost, $F(1,38) = 37.272$, $p = .000$, $\eta_p^2 = .495$, with more egalitarian decisions overall in no cost trials (M= 3.33, SD= 1.64) compared to cost trials (M= 1.6, SD= 2.01) . There was no significant interaction between cost and age, $F(1,38) = .196$, $p = .661$, $\eta_p^2 = .005$.

Although there was no significant main effect of discrepancy, $F(1,38) = 2.018$, $p = .164$, $\eta_p^2 = .050$, and no significant three-way interaction between cost, discrepancy, and age, $F(1,38) = .400$, $p = .531$, $\eta_p^2 = .010$, two significant interactions involving discrepancy emerged. There were significant interactions between cost and discrepancy, $F(1,38) = 5.778$, $p = .021$, $\eta_p^2 = .132$, and between discrepancy and age, $F(1,38) = 6.317$, $p = .016$, $\eta_p^2 = .143$. These interactions were explored using follow-up paired samples t-tests.

To follow up the interaction of cost and discrepancy, paired t-tests showed that for cost trials, children were more likely to choose the egalitarian option when the discrepancy was large (M= 1.0, SD=1.13) than when it was small (M= 0.6, SD=.98),

Figure 3.2 Average egalitarian decisions (with standard error bars) made by 4 and 6-year-old children in no cost and cost trials with small and large discrepancies.



$t(39) = -3.766$, $p = .001$, but there was no difference between the large (M= 1.63, SD=1.03) and small (M= 1.7, SD=1.01) discrepancy for no cost trials, $t(39) = .386$, $p = .701$. In line with the main effect of cost, children preferred equality more in no cost, compared to cost trials in both small discrepancy, $t(39) = -6.169$, $p = .000$, and large discrepancy trials, $t(39) = -3.838$, $p = .000$.

To examine the interaction involving age, the discrepancy effect was examined for each age. It was found that the younger (4-year-old) group showed no significant effect of discrepancy, $t(19) = .925$, $p = .367$, choosing the egalitarian option with equal frequency whether the discrepancy was small (M= 2.2, SD=1.88) or large (M= 1.95, SD=1.99) . In contrast, there was a significant effect of discrepancy for the 6-year-olds, $t(19) = -2.438$, $p = .025$, who chose the egalitarian option more often when the discrepancy was large (M= 3.3, SD=1.59) compared to when it was small (M= 2.4, SD=1.43).

Independent samples t-tests were run comparing 4-year-olds and 6-year-olds preferences in small and large discrepancy trials. While no differences between 4 and 6-year-olds were observed in small discrepancy trials, $t(38) = -.379$, $p = .707$, a significant difference was observed in large discrepancy trials , $t(38) = -2.371$, $p = .023$, with 6-year-olds choosing the equitable option more often than 4-year-olds.

3.4 Discussion

The goal of the current study was to explore how cost, discrepancy, and age influenced young children's decision-making in DI situations, and to gain insight as to whether inequality aversion or social comparison was motivating their behaviour. Four-

and 6-year-old children were presented with resource allocation choices in which one option delivered a greater benefit to a friend, and the other option was egalitarian. Across trials, egalitarian choices entailed either a cost to the children's own payoff, or no cost. Trials also differed in terms of the discrepancy between the resources available to self and other in the inequitable option, yielding four distinct trial types; small discrepancy no cost trials (1,1 vs. 1,2), large discrepancy no cost trials (1,1 vs. 1,5), small discrepancy cost trials (0,0 vs. 1,2), and large discrepancy cost trials (0,0 vs. 1,5). We expected that children would prefer equality more when there was no cost associated with it, and that older children would demonstrate a stronger aversion to inequality. It was proposed that if a generalized aversion to inequality or fairness norms motivated decision-making, discrepancy would not influence preferences for equality. However, if social comparison was influencing decision-making, children would show a stronger preference for equality in LD trials compared to SD trials. The findings demonstrated that both cost and discrepancy influenced children's decisions. Therefore there does not appear to be a simple or undifferentiated aversion to inequality operating in these children. Here we discuss the key results in more detail, and offer an account of the development of inequality aversion in DI situations.

The results demonstrated that as hypothesized, children preferred equality more in no cost trials compared to cost trials; more often choosing to prevent their partner from receiving a larger reward when they were not required to sacrifice their own reward to do so. This finding was consistent in both SD and LD trials, and suggests that an important determinant of children's decisions in DI situations is whether a sacrifice is needed to achieve equality. Like Fehr et al. (2008), we found that when there was no cost to the

egalitarian choice children chose this option over 50% of the time, and there was no strong difference between 4- and 6-year-olds to act in this way. However, we found that when there was a cost to the egalitarian choice, and children had to sacrifice their resources, this option was chosen much less frequently. Equality alone is therefore not the issue for these children; if equality comes at a cost it will be largely forgone.

Nevertheless, our results do not suggest that children are completely unwilling to pay a cost to avoid DI. Whereas no overall effect of discrepancy was observed, the effect of cost was influenced by the size of the discrepancy between the resources for the child and their friend. Discrepancy did not influence decision-making in no cost trials, however in costly trials children were more likely to choose the egalitarian option when the discrepancy was large compared to when it was small. This suggests that in cost trials, social comparison was influencing decision-making. Although Blake and McAuliffe (2011) did not explore different discrepancies, our observation in large discrepancy cost trials is consistent with their claim that 4-8 year-olds will sacrifice resources to prevent DI in which the other received four times as many resources. Our results extend theirs in showing that the size of the discrepancy makes a difference to children's tendency to pay the cost of preventing DI – children are more likely to pay to avoid a large discrepancy, compared to a small discrepancy. However, a single motivation based on social comparison cannot explain preferences for equality across all decisions as there was no overall effect of discrepancy and in particular no effect of discrepancy in no cost trials. Interestingly, research suggests that when costs are low children perceive prosociality as morally obligated, while in costly situations they may take other factors into consideration (Sierksma et al., 2014). Therefore, it could be that when there is no cost

associated with equality, choosing the equitable decision is an easy or even default decision regardless of discrepancy. However when a cost is associated with equality children may be more sensitive to other considerations such as the comparison between themselves and their partner making a larger discrepancy more likely to motivate a sacrifice. This could explain why a discrepancy effect was observed in cost trials, but no overall effect of discrepancy was observed.

Finally, although no overall age effect was observed, the interaction between age and discrepancy provided evidence of a developmental change in the conditions under which children seek to prevent DI. It was argued that an increase in equitable decisions corresponding with a larger discrepancy would provide support for social comparison motives. An effect of discrepancy was indeed observed but only for the older children. The 4-year-old children's preferences for equality did not differ depending on whether the discrepancy between their own resources and their partner's was small or large. This pattern of behavior is entirely consistent with a simpler account of their decision-making: younger children were only paying attention to their own payoff, and ignoring the payoff for their partner. Thus, in no cost trials where both options resulted in one sticker for the self, 4-year-olds chose each option in about half the trials no matter what the reward conferred to the other was. In cost trials where one option resulted in a smaller reward, they made the more rewarding choice on the large majority of trials, again regardless of the other's payoff. Therefore, it is likely that social comparison and envy played little or no role for these children.

The 6-year-olds showed a different pattern of choices. They were significantly more likely than younger children to avoid DI in the large discrepancy trials. Clearly

they were more reluctant than the younger children to let their friend have many more resources than them, although they showed similar equanimity to the younger children when the discrepancy between self and friend was small. The older children therefore, were displaying an aversion to the large discrepancy between own and other's resources, but because this aversion did not extend similarly to the small discrepancy trials it appeared not to reflect a general inequality aversion or fairness norm. Therefore, it seems that for older children the large discrepancy led to a more negative social comparison, and subsequently increased associated feelings of envy.

Age related changes have previously been documented in DI resource allocation contexts (Fehr et al., 2008; Blake & McAuliffe, 2011; Shaw & Olson, 2012). However, earlier studies have not systematically manipulated different aspects of the DI decisions. If we are correct that different processes are underlying the decisions at different ages in the current experiment, then this would explain why, with different variables manipulated, we did not observe an overall main effect of age. The number of equitable choices made in some trial types may not have differed across age groups, but it is possible that the processes underlying these choices differed from those underlying other trial types. For example, the fact that no overall age effect was observed could be partly due to the robust cost effect that was consistent across both age groups. As evidence of a more generalized aversion to inequality has been observed in older children's decision making (e.g. Blake & McAuliffe, 2011; Shaw & Olson, 2012) it could be the case that social comparison continues to play a role in making fairness evaluations, but children become better able to overcome being influenced by negative feelings with age.

One limitation of the current study is that a variety of different stickers was used

for each child and there was no pretest to determine how much each child liked the various stickers. This approach was taken to ensure that the stickers remained novel and attractive over the course of the testing. However, it is possible that the children may have found some stickers more attractive than others, and this variability might have influenced the results, although not in a systematic way. It should also be noted that the inferences from the current study are limited in that the children made their choices with a friend as the recipient, and these results may not generalize to other partners outside of the context of a friendship. It is possible that using friends as partners could have produced more variability in terms of the nature of the relationship between the children and their partners than would have been observed had we used anonymous or unknown partners. As friends have been shown to elicit more generous behaviour (e.g. Moore, 2009), it is possible that with a different partner less prosociality would have been observed. Future research would benefit from exploring how preferences for equality in situations of DI differ depending on whether a partner is known or unknown, or a friend or non-friend (cf. Moore, 2009, for AI situations). Future research should also further investigate factors that may influence preferences for equality in DI situations, and the motivations behind such preferences. Exploring how discrepancy influences decision-making in older age groups, as well as the inclusion of additional measures (for example, asking children to explain the reasoning behind their decisions) could help shed more light on how motivations underlying decision-making change throughout development.

In summary, we found no evidence of generalized inequality aversion in 4- and 6-year-olds' decisions in DI situations. Most obviously, cost and no cost choices elicited different levels of egalitarian choices, with children preferring equality more when there

was no cost associated with it. In cost trials discrepancy also played a role, as children were more likely to sacrifice their own resources to prevent their partner from receiving many more stickers than them, as opposed to just one more. Further, the finding that 6-year-olds choose the equitable option more in LD trials compared to the 4-year-olds suggests that children at this age may be particularly sensitive to social comparison, and their desire for equality may be more influenced by social comparison, as opposed to a more generalized aversion to inequality. Taken together, our findings suggest that between 4 and 6 years children become more attuned to the social comparison between self and other when allocating resources in potentially disadvantageous inequality situations. Whereas 4-year-olds appear to want to maintain a degree of equality between self and other, they are not willing to pay for it. This pattern can be characterized perhaps as a weak inequality aversion in that equality is preferred when nothing is at stake personally (cf Shaw & Olson, 2012). By 6 years, children are sensitive to the social comparison such that a desire for equality is increased in accordance with possible size of the negative comparison and even if there is a cost. Interestingly, this age difference is inconsistent with an increasing adherence with age to a social norm of fairness, as the older children showed even less 'normative' behavior than the younger children. So, although children do seem to reach a point at about 8 years where their resource allocation decisions are organized in relation to a fairness norm (Fehr et al., 2008; Blake & McAuliffe, 2011; Shaw & Olson, 2012), it appears they first undergo a developmental shift that makes them more prone to social comparison and envy. It is even possible that this shift is a necessary stage in the development of more normative behavior. Social comparison may set up the motivational conditions for fairness, and while DI situations

may elicit envy, AI situations may elicit social welfare concerns such as altruism (Shaw & Olson, 2012). The resolution of these incompatible experiences resulting from inequality situations may come, with appropriate cultural support, through an adherence to a more general norm of equality.

CHAPTER 4

THE INFLUENCE OF EMPATHIC CONCERN ON PROSOCIAL BEHAVIOR IN CHILDREN

Amanda Williams, Kelly O'Driscoll, and Chris Moore

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[1] The published version on this chapter used the term inequity, as opposed to inequality and was published prior to the publication of subsequent experiments. For the purposes of consistency and clarity in this body of work, the term inequity has been changed to inequality.

Abstract

This research explored the influence of empathic distress on prosocial behaviour in a resource allocation task with children. Children were randomly assigned to one of two conditions before engaging in a sticker sharing task; watching either a video of a girl upset that her dog had gone missing (emotion induction condition), or a video of the same girl preparing for a yard sale (control condition). In Study A, 5-6 year old children in the emotion induction condition rated the emotional state of both the protagonist and the self more negatively, and also exhibited more prosocial behaviour; sharing more in advantageous inequality trials, and less often withholding a benefit in disadvantageous inequality trials, than the control group. Prosocial behaviour was significantly correlated with ratings of the emotional state of the protagonist but not with own emotional state, suggesting that empathic concern rather than personal distress was the primary influence on prosocial behaviour. In Study B, 3-year-olds were tested on advantageous inequality trials alone, and like the 5 and 6-year-olds, showed more prosocial behaviour in the emotion induction condition than the control.

Keywords: empathy; prosocial behaviour; children

4.1. Introduction

It is well established that prosocial behaviour such as helping and sharing emerges early in development (e.g. Warneken & Tomasello, 2006; Rheingold, Hay, & West, 1976). A common approach to the study of sharing is to examine children's resource allocation to self and others under various conditions. Preschool aged children will share valued resources and before long seek to establish fair allocations of resources across individuals (Brownell, Svetlova, & Nichols, 2009; Fehr, Bernhard, & Rochenbach, 2008; Moore, 2009; Blake & McAuliffe, 2011; Thompson, Barresi, & Moore, 1997). Although we know that preschool children will share, little is known about the mechanisms underlying such prosocial behaviour (Hepach, Vaish, & Tomasello, 2012). By understanding these mechanisms, it should be possible to support and encourage the development of these highly valued, and critically important social behaviours.

Here we examine the role of empathic distress on young children's decisions to allocate resources to another person. It is important to note that definitions of empathy in previous research have varied considerably across laboratories. Generally however, empathy is believed to be a complex, and multifaceted construct consisting of a variety of components such as perspective taking, empathic concern, and personal distress (Davis, 1980). While empathic concern refers to the individual's other oriented feelings of sympathy and concern for someone in distress, personal distress refers to experiencing unpleasant feelings oneself, in response to witnessing another in distress (Davis 1980; 1983). In the context of this research, by empathic distress, we are referring to both personal distress and empathic concern. Our measure of personal distress is children's own emotional reactions in response to a fictitious character's situation (i.e. the tendency

to experience the same negative emotion as another who is observed to be in distress). Our measure of empathic concern is children's attributions of emotion to another who is observed to be in distress, without necessarily experiencing sadness themselves.

Empathy emerges early on, with infants exhibiting simple forms of global empathy by responding with reactive or contagious crying to observed distress in others (Sagi & Hoffman, 1976). At this young age however, children lack the ability to differentiate between their own and others feelings (Hoffman, 1975; Hoffman, 1977). With time however, children learn to distinguish and separate their own reactions from another individual's distress. Around two years of age, children begin to develop the ability to understand the emotional states of others, experience and share their emotions, and make attempts to alleviate observed distress (Zahn-Waxler & Radke-Yarrow, 1990). As children continue to develop, they become increasingly sophisticated in their ability to understand and respond to the psychological states of others (Selman, 1980), and cultivate the ability to empathize with others in a more complex manner (Hoffman, 1975; Hoffman, 1977).

A large body of research has explored relationships between empathic distress, and various social behaviours or characteristics, and results have been mixed, varying in part according to how empathy and the behaviours or characteristics in question have been measured (Eisenberg & Miller, 1987). There is however, evidence for a relation between empathic distress, or experiencing concern for others and prosocial behaviour in children (e.g., Eisenberg, McCreath, & Ahn, 1988; Strayer & Roberts, 1997; Vaish, Carpenter & Tomasello, 2009; Zahn-Waxler & Radke-Yarrow, 1990; Malti, Gummerum, Keller, & Buchmann, 2009; see Eisenberg, Spinard, & Sadovsky, 2006 for a review). For

example, a relation has been found between children's degree of facial sadness while watching a video of a child falling and hurting themselves, and later spontaneous sharing behaviour with a partner (Eisenberg, et al., 1988). In one study, empathy was found to be positively related to prosocial and social behaviours, and negatively associated with anger and aggression (Strayer & Roberts, 2004).

Batson (1981) found that, in a sample of undergraduate students, helping behaviour differed depending on the degree to which they experienced empathic concern, and the 'ease of escape' or the cost to the subject for not helping the individual in distress. It was found that the helping behaviour of participants high in empathic emotion was unaffected by ease of escape, suggesting their motivation was more purely altruistic and focused on alleviating the distress of the victim. In contrast, participants motivated to reduce their own distress were more likely to help when escape was difficult, and less likely to help when escape was easy. Similarly, with both adults and children, Eisenberg and colleagues (1989) also found that outward expressions of concern were positively related to prosociality, while personal distress was not.

In one of the few experimental studies exploring the effects of witnessing another individual in distress on prosocial behaviour (Vaish, Carpenter & Tomasello, 2009), children were assigned to either a harm (witnessed one experimenter destroying or breaking something of value to another experimenter) or no harm condition (experimenter destroyed or broke an item not of value to the second experimenter). It was found that children in the harm condition exhibited more prosocial behaviour towards the experimenter in a subsequent task, and that children's facial concern in response to the experimenter in distress correlated with subsequent helping behaviour, even without the

experimenter exhibiting overt behavioural cues of distress. This research demonstrates that witnessing another individual in a distressing situation facilitates helping behaviour in young children, and suggests that feeling concern for the distressed individual may be motivating this behaviour.

With few exceptions (e.g., Vaish, et al., 2009), much of the research in this area is correlational and such findings do not allow the conclusion that empathic distress leads to increased prosocial behaviour. Also, as previously mentioned, research in the past has often not clearly differentiated between the effects of personal distress and empathic concern. A need exists, therefore, for experimental manipulation of emotional experience to examine, and distinguish between, the effects of personal distress and empathic concern on prosocial behaviour in children. Further, although some research has explored how empathy is negatively related to anger or aggression (Strayer & Roberts, 2004) the literature focuses mainly on how empathy motivates positive facets of prosocial behaviour. We were interested in exploring not only the positive effects of empathy on prosocial behaviour in situations of advantageous inequality (AI) such as sharing (where the child can choose more resources for themselves, or to split resources equally between themselves and their partner), but also the potential mediating effects of empathy on potential non-prosocial behaviour that is often observed in situations of disadvantageous inequality (DI) (Fehr et al., 2008). As described previously, in situations of DI children must decide whether they would like to withhold resources from their partner to ensure they receive the same number of resources as themselves, or alternatively they can choose to deliver the extra resources to their partner. Within the literature, trials of disadvantageous inequality have been referred to as 'envy trials' (Fehr et al., 2008), with

children who choose to withhold resources from their partner to prevent them from receiving more in DI trials believed to be exhibiting envious behaviour. Envy is broadly conceptualized as a painful or resentful emotional experience associated with longing for, or wanting something that someone else has. Although the effects of empathy on envy have not been previously explored, one might predict that empathy could neutralize any negative or hostile emotions triggered in an inequitable context, thereby decreasing non-prosocial behaviour, and encouraging prosocial behaviour.

4.2 Study A

In this work, we adapted an approach previously used with adults to examine how induced emotion affects resource allocation. Barraza and Zak (2009) assigned participants to watch either a sadness inducing video of a father describing his experiences with his terminally ill son, or a neutral control video of a father and son at the zoo. Participants rated the degree to which they felt different emotions after watching the video, and then took part in an ultimatum game before being asked if they would like to donate their earnings to charity. Participants who watched the sadness inducing video later reported higher levels of negative emotion than those who watched the control video, which corresponded with more generous donations. Following this approach, we randomly assigned children to watch either a sadness inducing video of a young girl named Jenny upset that her dog had gone missing, or a neutral control video of the same girl preparing for a yard sale. Importantly, some potential limitations of the Barraza & Zak (2009) study were addressed by ensuring the videos were closely matched across conditions, inducing empathy for the recipient as opposed to an unrelated stranger, and

exploring how empathy increased prosociality in a variety of resource allocation situations.

Our goal was to explore whether inducing a negative emotion, leading to empathetic distress, increases children's prosocial behaviour in a choice based resource allocation task. We asked children to rate their own emotion, as well as Jenny's emotion to ensure that the emotion induction was inducing empathic distress, and also to explore if prosocial behaviour was more strongly tied to either the empathic concern or personal distress aspect of empathy. The resource allocation task was chosen in order to explore the effects of empathic distress across both AI and DI decisions. Five and six-year-old children participated in the resource allocation task, drawn from previous research by Fehr et al. (2008) and Moore (2009), which explored pre-school and early school aged children's behaviour in sharing, prosocial, (AI) and envy (DI) trials. Over a series of four repetitions of four different trial types, children made decisions about how to allocate resources to themselves and a fictional partner (Jenny) by choosing one of two options. In each trial there was an equal option (participant and partner both received one sticker) and an unequal option. In AI trials (one with a cost, and one with no cost) the unequal option in both trial types benefited the participant alone, therefore the equal option was the prosocial choice. In contrast, in DI trials (again, with both a no cost and cost format) the unequal option delivered a greater benefit to Jenny, rendering the unequal option the prosocial choice. For the purpose of this study, therefore, envious behaviour in DI trials was defined as making decisions in a way that prevents one's partner from receiving a larger reward than the self, or withholding a benefit from one's partner (e.g., when offered a choice between one sticker each or one for self and two for partner, the

participant chooses the former option). By not exhibiting envy in DI trials, one would be exhibiting prosocial behaviour. Our hypothesis was that children who were primed to feel empathy for their partner would be more likely to deliver a benefit to their partner in AI trials, and less often withhold a benefit from their partner in DI trials.

4.3 Method

4.3.1 Participants

Fifty typically developing, five and six-year old Canadian children drawn from a predominately white middle-class neighbourhood participated in this study, which was approved by the University's research ethics board. Children were randomly assigned to the emotion induction or control conditions, with 16 males and nine females in each group. The emotion induction group ranged in age from 61 months, six days, to 81 months, 29 days (M= 68 months, 24 days). The control group ranged in age from 60 months, six days, to 81 months, 25 days (M= 68 months, 26 days).

4.3.2 Emotion Induction Manipulation

Two videos were constructed for the purposes of this study. Both videos begin with a young girl, Jenny, playing in the backyard with her dog. In the emotion induction video, the dog runs away, and Jenny makes 'lost dog' posters, which she hangs around her neighbourhood. Jenny narrates in a sad tone and is visibly upset. In the control video Jenny is called inside, and makes and distributes 'yard sale' posters for an upcoming yard sale while narrating in a neutral tone, and maintaining neutral facial expressions. The videos were matched on a number of pertinent factors: both were roughly 130s in length, contained similar scenes and scene sequences, and were narrated according to scripts with

almost identical structures and word counts. The prominent difference between the videos is the negative emotion displayed by the protagonist in the emotion induction video.

4.3.3 Procedure

Parental consent was obtained for each participant prior to testing. All children were tested in the laboratory in a session lasting roughly 20-25 minutes. The session included two phases: emotion induction followed by a resource-allocation task.

Emotion induction. Children sat in front of a 15-inch computer screen. The experimenter then briefly introduced the video's content. Children were asked to focus on how Jenny felt, and how her story made them feel. They then watched the video.

At the end of the video, children were asked to express how Jenny felt during the video. Children were then shown the Facial Affective Scale (FAS; McGrath, deVeber, & Hearn, 1985 as cited in Perrott, Goodenough, & Champion, 2004). The FAS is a 9-point measure that includes a range of happy and sad facial expressions, with a neutral face at its center point. Children were asked to point to a face that showed how they felt while viewing the video (emotion rating for self, providing a measure of personal distress) and a face that showed how they thought Jenny felt (emotion rating for Jenny, providing a measure of empathic concern). Potential scores on the FAS ranged from zero (happiest face) to eight (saddest face).

Resource-allocation task. This task adopted the method used by Fehr and colleagues (2008) and Moore (2009). The task consisted of 17 trials; one practice trial in which children could choose one or two stickers for themselves (demonstrating the format of the task), followed by four repetitions of each test trial, which offered the child a forced choice between two alterative distributions of stickers. AI and DI trials were

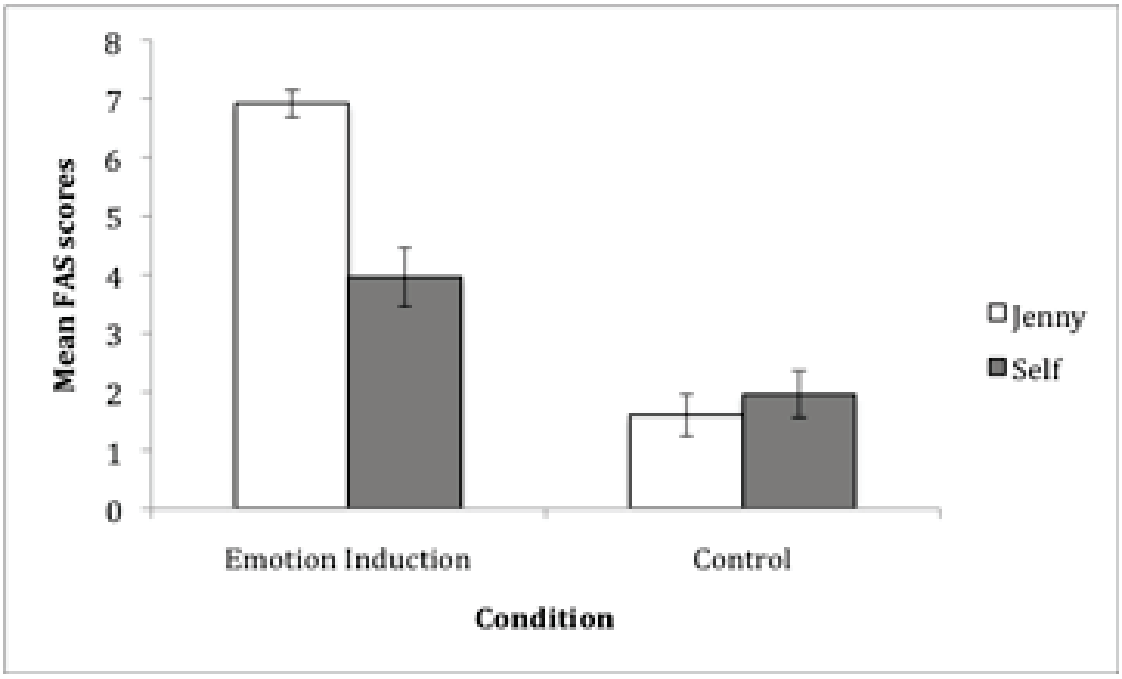
blocked and counterbalanced with blocks separated by a distracter task (colouring a picture). In AI no cost trials, children chose between the allocation (1, 1) and (1, 0) – (one sticker for themselves and one for Jenny or one for themselves and none for Jenny). In AI cost trials, children chose between (1, 1) and (2, 0), in DI no cost trials, between (1, 1) and (1, 2), and in DI cost trials between (1, 1) and (2, 3). In all trials, the experimenter presented the choices by asking, "*Would you like one sticker for yourself and one sticker for Jenny or would you like {x} sticker(s) for yourself and {x} sticker(s) for Jenny?"* Upon completion, children in the emotion induction condition were told that Jenny's dog returned home in order to neutralize any feelings of sadness.

4.4 Results

4.4.1 Manipulation Check

To ensure the emotion induction video was producing the desired effect, FAS scores for Jenny and self were compared across conditions (see Figure 4.1 for mean scores). Independent samples t-tests showed that children in the emotion induction condition rated both Jenny's and their own emotion as more negative than those in the control group (Jenny's emotion, $t(48) = 12.21$, $p < .01$; own emotion $t(48) = 3.11$, $p < .01$). The mean score for Jenny's emotion was 6.92 (SD=1.18) in the emotion induction group and 1.6 (SD=1.8) in the control group, while the mean score for own emotion was 3.96 (SD=2.5) in the emotion induction group and 1.96 (SD=2.0) in the control group. The differences between groups in both self-reported emotion, and perceptions of Jenny's emotion show that the manipulation was successful, and empathy was induced by the emotion induction video. Further, a Pearson correlation between ratings for Jenny and

Figure 4.1 Mean ratings for Jenny and self on the Facial Affective Scale (FAS), with standard error bars, for the emotion induction and control group in Study A (5-6 year-olds). Possible scores ranged from "0" (very happy) to "8" (very sad).



self showed a strong positive relationship, r= .529, p <.01, demonstrating that children who rated Jenny's emotion as negative also rated their own emotion more negatively.

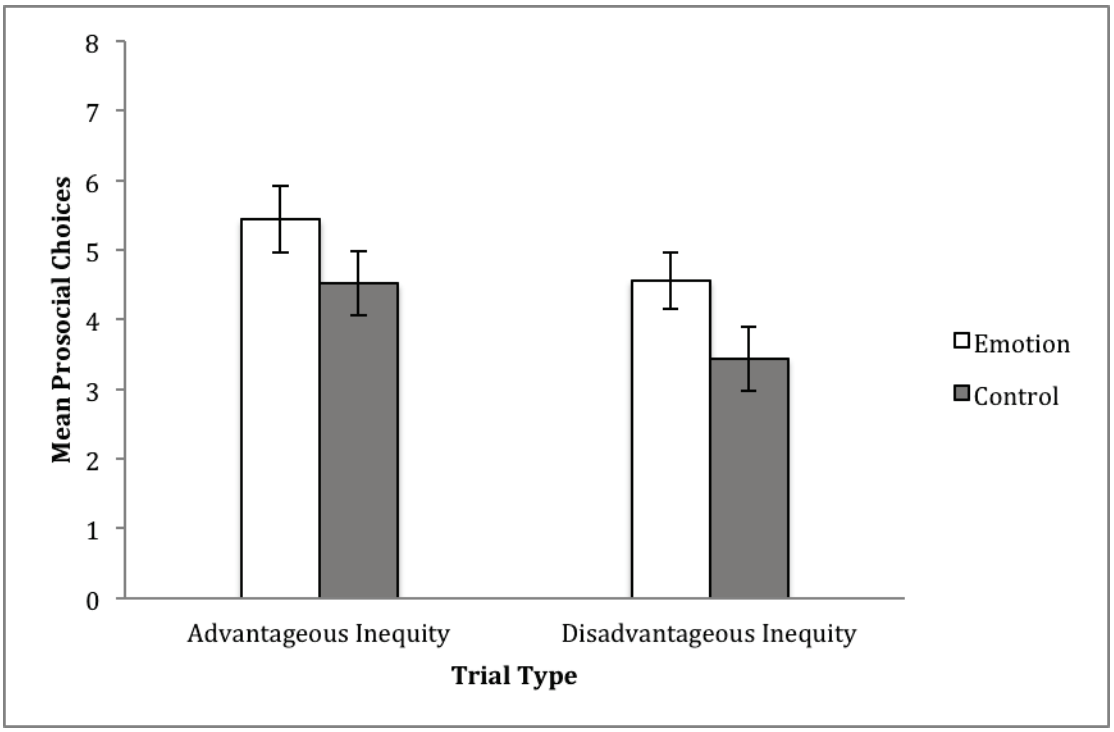
4.4.2 Main Analysis

Children received one point for each prosocial choice made in the resource allocation task. A preliminary analysis of performance on cost versus no cost trials showed no difference between these trials so they were pooled for subsequent analysis (No cost mean = 4.68, SD = 2.02; Cost mean = 4.30, SD = 2.08). For sharing trials, prosocial responses were (1,1) choices; for envy trials, prosocial responses were choices in which the partner received more than the self. Children thereby received a score ranging from "0" to "8" for each trial type (see Figure 4.2 for mean scores).

A 2 X 2 mixed model repeated measures ANOVA with trial type (AI vs. DI) as the within subjects factor, and condition (emotion induction vs. control) as the between subjects factor revealed a significant effect of condition, F(1,48)=4.074, $p < .05$, η_p^2 = .078, with children making overall more prosocial allocations in the emotion induction condition (M=10.00, SD =3.32) compared to the control (M=7.96, SD = 3.80). A main effect of trial type, $F(1,48) = 5.995$, $p < .05$, $\eta_p^2 = .111$ was also observed, with children making more prosocial allocations in AI trials, as opposed to DI trials. No interaction between trial type and condition, $F(1,48) = .062$, $p = .804$, $\eta_p^2 = .001$, was observed.

Finally, to examine associations among prosocial decisions, personal distress, and empathic concern, bivariate and subsequent partial correlational analyses were conducted. An initial bivariate correlational analysis showed that while there was no relationship between prosocial decisions and emotion ratings for self, r=.079, p=.588, there was a significant relation between prosocial decisions and ratings of Jenny's emotional state,

Figure 4.2 Mean prosocial choices on the resource allocation task with standard error bars, for the emotion induction, and control group, in AI and DI trials in Study A (5-6 year-olds). Possible scores ranged from "0" (no prosocial behaviour) to "8" (consistent prosocial behaviour).



r=.388, p=.005. When controlling for rating of Jenny's emotion there was no relation between overall prosociality and personal distress (emotional ratings for self), r=-.062, p=.266. However when controlling for emotion ratings for self, the significant relation between prosociality and empathic concern (ratings of Jenny's emotional state), r=.409, p=.003, remained.

4.5 Discussion

The goal of the current study was to explore experimentally the effects of empathic distress on resource allocation in children. Following work with adults by Barraza and Zak (2009), we predicted that children would exhibit more prosocial behaviour towards a protagonist when they were primed by a movie showing the protagonist in distress than when the prime was a neutral movie involving the protagonist. Specifically, we predicted that children in the emotion induction condition (who were primed to experience empathy for their sharing partner) would share more in AI trials, and exhibit less envy in DI trials, thereby showing more generosity in both kinds of trials.

A significant effect of condition in the resource allocation task demonstrated that as hypothesized, children in the emotion induction condition exhibited more prosocial behaviour. Children who had been primed with the emotion induction movie shared more in AI trials (more often delivering a benefit), and exhibited less envious behaviour in DI trials (less often withholding a benefit), than children in the control condition. Although

there was a main effect of trial type with more prosocial behaviour in AI trials compared to DI trials, this effect may well reflect the near ceiling response rate in AI trials with no cost to self (the only trial type in which delivering an equitable amount of resources to Jenny was both prosocial, and at no cost to oneself). Significantly, there was no interaction between condition and trial type.

The effect of emotion induction on prosociality appeared to be unaffected by type of decision (AI vs. DI). In other words, the positive effects of the emotion induction on prosocial behaviour seems to be consistent across all trial types; having both a positive impact in AI trials - leading to increases in sharing behaviour - as well as a neutralizing effect, or negative impact on non-prosocial behaviour and consequently producing a decrease in envious behaviour in DI trials.

It was important to verify that the specially constructed videos did elicit differences in empathy. Our manipulation check showed that indeed children who watched the emotion induction video reported feeling sadder themselves (evidence of personal distress) and also rated the protagonists emotional state more negatively in comparison to children who viewed the control video (evidence of empathic concern). The relationship between FAS ratings for own emotion, and Jenny's emotion provide further support that the emotion induction video did elicit empathy, however, the finding that prosociality was correlated with ratings of Jenny's emotional state, but not with emotional ratings for self suggests that empathic concern more so than personal distress was driving decision making. Despite showing an elevated level of distress after watching the emotion induction video compared to the control video, children's own level of distress was not significantly related to resource allocation. In contrast, their

rating of the protagonist's distress was. Previous research has also found that personal distress and outward expressions of empathic concern differ in terms of their relation to prosociality- specifically that prosocial intentions and behaviour are linked to empathic concern, but not personal distress (e.g. Batson, Duncan, Ackerman, Buckley, & Birch, 1981;.Eisenberg, Fabes, Miller, Fultz, Shell, Mathy, & Reno, 1989).

4.6 Study B

The results of Study A demonstrated that experiencing empathy for another individual increased subsequent prosocial behaviour towards them in children of 5 to 6 years of age. As a next step, we were interested in exploring whether younger children would show a similar effect. It has been argued that earlier in development, there is a less clear differentiation of personal distress and empathic concern (e.g., Hoffman, 1975, 1982) in situations in which children observe another person in distress. According to Hoffman's theory, it is around 2 to 3 years of age that children begin to understand that others have thoughts and feelings different from their own. To explore whether empathy also increases prosocial behaviour in younger children, and also whether this potential relationship is linked to personal distress or empathic concern, Study A was replicated with 3-year-old children, which is the youngest age for which the task demands of the resource allocation task are appropriate. Pilot testing revealed that 3-year-olds had a difficult time understanding the DI trials, and therefore these trials were excluded.

4.7 Method

4.7.1 Participants

Fifty typically developing, three-year old Canadian children were drawn from a predominately white middle-class neighbourhood and randomly assigned to the emotion induction or control conditions. Like the 5-6 year-olds, there were 16 males, and nine females in each group. The emotion induction group ranged in age from 36 months to 47 months and 28 days (M= 43 months, 17 days). The control group ranged in age from 36 months and one day to 47 months, 30 days (M= 43 months, 10 days).

4.7.2 Procedure

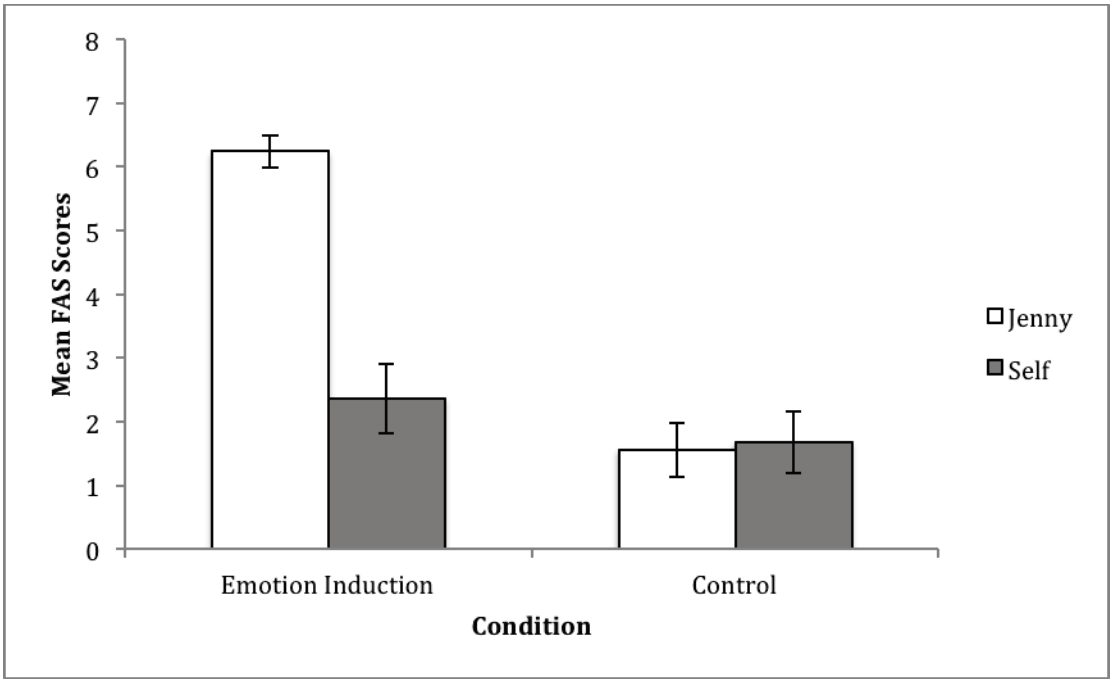
The protocol was identical to Study A, with one exception. In this study, the DI trials were excluded from the resource allocation task as some younger children struggled with these trial types. Therefore the 3-year-olds participated in a total of eight trials; four AI with cost, and four AI with no cost.

4.8 Results: Study B

4.8.1 Manipulation Check

To assess the effectiveness of the emotion induction video FAS scores for Jenny and self were compared across conditions (see Figure 4.3 for mean scores). Independent samples t-tests showed that children in the emotion induction condition rated Jenny's emotion more negatively than children in the control, $t(48)= 9.464$, $p <.01$. In contrast to the 5-6 year-olds, no difference between ratings for own emotion was observed, $t(48)= .973$, $p >.05$. The mean score for Jenny's emotion was 6.24 (SD=1.27) in the emotion induction group and 1.56 (SD=2.12) in the control group, while the mean score for own

Figure 4.3 Mean ratings for Jenny and self on the Facial Affective Scale (FAS), with standard error bars, for the emotion induction and control group in Study B (3-year-olds). Possible scores ranged from "0" (very happy) to "8" (very sad).



emotion was 2.36 (SD=2.77) in the emotion induction group and 1.68 (SD=2.13) in the control group.

Unlike the older children, a Pearson correlation showed no relationship, r= .153, p >.05, between emotion ratings for Jenny and self.

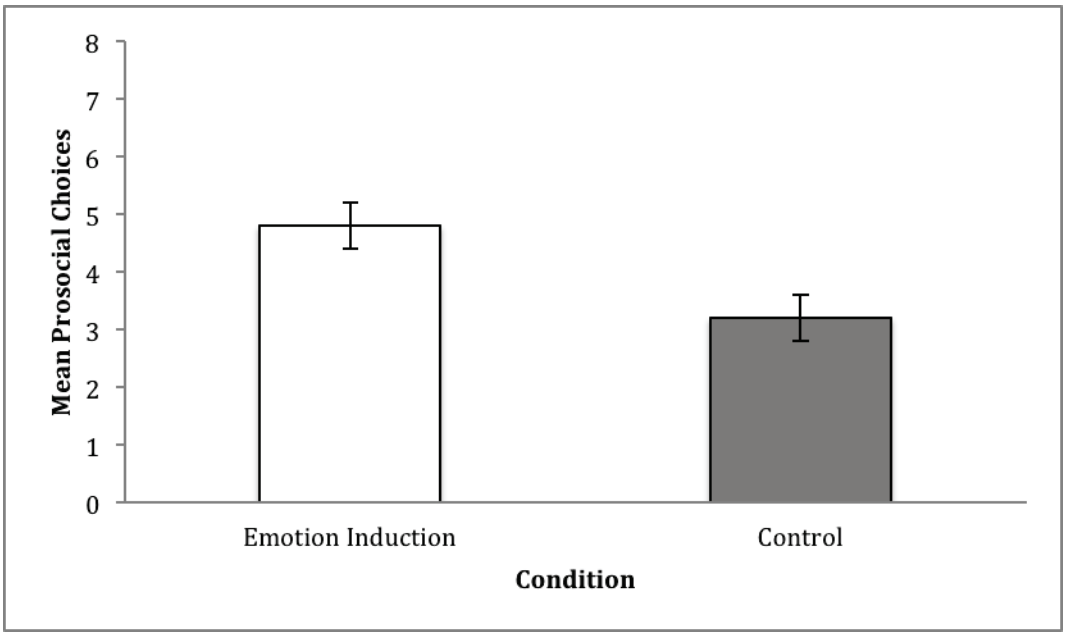
4.8.2 Main Analysis

Children received one point for each prosocial choice made in the resource allocation task (1,1 in both AI trials). Children thereby received a score ranging from "0" to "4" for each trial type, and an overall prosocial score ranging from "0" to "8" (see Figure 4.4 for mean scores).

A 2 X 2 mixed model repeated measures ANOVA with trial type (cost vs. no cost) as the within subjects factor, and condition (emotion induction vs. control) as the between subjects factor revealed a significant effect of condition, $F(1,48)=6.869$, $p < .05$, $\eta_p^2 = .125$, with children making overall more prosocial allocations in the emotion induction condition (M=4.8, SD= 2.06) compared to the control (M=3.2, SD= 2.0). A main effect of cost, $F(1,48) = 34.505$, $p < .01$, $\eta_p^2 = .418$ was also observed, with children making more prosocial allocations in no cost trials (M=2.5, SD= 1.31), as opposed to cost trials (M=1.5, SD= 1.2). No interaction between cost and condition, $F(1,48) = .129$, p >.05, $\eta_p^2 = .003$, was observed.

Finally, correlations between prosocial decisions, and emotion ratings for self, as well as Jenny, were conducted. In contrast to the older children there was no strong relation between overall prosociality and emotion ratings for self, r=.074, p=.609, or Jenny, r=.179, p=.215. Further, no relationships were observed between self reported emotion and prosociality when controlling for ratings of Jenny's emotion, r=.048, p=.742

Figure 4.4 Mean prosocial choices on the resource allocation task with standard error bars, for the emotion induction, and control group, in AI trials in Study B (3-year-olds). Scores in cost and no cost trials were pooled into one overall prosocial score, and possible scores ranged from "0" (no prosocial behaviour) to "8" (consistent prosocial behaviour).



or between prosociality and ratings of Jenny's emotional state, r=.170, p=.244 when controlling for rating's of one's own emotion.

4.9 Discussion

The purpose of Study B was to explore whether the positive effects of empathy on prosociality extended to a younger age group, and whether the effects were more closely tied to personal distress or the empathic concern component of empathy. It was hypothesized that empathy would increase prosociality in 3-year-olds, as it did with 5-6 year-olds, but what was of particular interest was whether personal distress would be a stronger influence in younger children, who may be less able to distinguish their own emotions from those of another individual in distress. The method from Study A was slightly modified to accommodate the younger children, as the DI trials were found to be difficult for them to understand, and were therefore excluded.

Consistent with Study A, an effect of condition was observed with 3-year-olds making more prosocial allocations in comparison to children in the control group. This finding supports the hypothesis that empathy leads to increased prosocial behaviour in young, 3-year-old children (at least in AI trials) in addition to older, school aged children.

Explorations of how 3-year-olds rated Jenny's emotion showed that our experimental manipulation produced group differences in empathic concern, as children in the emotion induction condition rated Jenny as feeling sadder than children in the control. However, no differences in self-rated emotion were found between groups. It could be the case that younger children are just not as skilled at recognizing or articulating how they themselves feel in response to witnessing another in a distressing

situation, which is perhaps the most likely explanation. These difficulties in using self-report measures with young children have been recognized in the literature (Eisenberg & Fabes, 1990). Difficulty comprehending self-report questions, as well as accurately identifying one's own emotional state, and differentiating between closely related emotional states, have been identified as concerns to be aware of with this population. However, it could simply be the case that our manipulation was not successful in inducing personal distress in younger children.

Finally, correlational analyses showed that prosociality was correlated with neither ratings of Jenny's emotion or ratings of own emotion. One potential contributor to this discrepancy with findings for the older children could be a lack of power, as 5-6 year olds participated in double the number of trials (both AI and DI, as opposed to AI alone). Alternatively, if younger children are less able to accurately identify, or verbalize their own, and others' emotions as previously suggested, this inability could also be contributing to the null finding. Including a measure of facial distress would be useful to include in subsequent research with this age group, to more accurately gauge personal distress if it is suspected that 3-year-old children are too young to accurately express their own emotions.

4.10 General Discussion

The current studies explored the relationship between empathy and prosocial behaviour in children. It was hypothesized that experiencing empathy towards one's partner would both increase prosocial behaviour, and decrease non-prosocial behaviour. As hypothesized, both 5- to 6-year-olds, and 3-year-olds showed increased prosocial

behaviour, and 5- to 6-year-olds showed decreased non-prosocial behaviour towards their partner, if they had first been primed to feel empathy for them. It is important to note that the induced emotion in these experiments was negative, and more specifically, sadness. Empathic experiences of other emotions, or psychological, or physical states in others, such as happiness, fear, pain, etc., may not influence prosociality in the same way, although it is worth exploring how empathic experiences of other negative emotions or states, as well as positive emotions or states, influence prosociality.

As the stimulus videos were created for the purpose of this research, it was important to validate their effectiveness. The fact that children in both studies rated the character as sadder after watching the emotion inducing video than after watching the neutral video provides important validation for the emotion induction manipulation.

Also of interest was whether personal distress or empathic concern could be specifically linked to increases in prosociality. Though the condition effect was consistent across age groups, differences in self-reports of own emotion, and the relationship between prosociality and empathic concern differed between studies one and two. Specifically, in Study A, group differences were observed for both personal distress, and empathic concern, and prosociality was correlated with empathic concern (but not personal distress) in 5- to 6-year-old children. This finding is in line with previous research (e.g. Batson, Duncan, Ackerman, Buckley, & Birch, 1981;.Eisenberg, Fabes, Miller, Fultz, Shell, Mathy, & Reno, 1989) suggesting that an outward orientation of empathic concern is related to prosociality, whereas personal distress is not.

In contrast, in Study B there was no group difference observed in self-rated emotions, and neither personal distress or empathic concern were correlated with

prosocial behaviour for the 3-year-olds. These differences across age groups could reflect the inability of younger children to accurately reflect on their own emotion, as well as the methodological differences between experiments. As children behaved differently following exposure to the emotion induction vs. control video, and the videos produced group differences in reports of both personal distress and empathic concern - with the exception of personal distress in 3-year-olds - we feel confident that the videos were effective in inducing empathy in both experiments.

Overall, our experiments support the findings of Barraza & Zak (2009) that experiencing empathy for sadness leads to more prosocial behaviour, and extends this finding to children across two distinct age groups. Although similar in concept, it is important to note that our studies differ from Barraza & Zak's (2009) study in a number of ways. First, our videos were closely matched across conditions. Participants both saw a little girl named Jenny playing with her dog, making posters, and hanging them around her neighbourhood. They heard her narrate the video, which was matched for factors such as word count, and length. The primary difference between videos was the negative emotion Jenny portrayed in the emotion induction video. Further, the use of the Resource Allocation task allowed for multiple trials, and an exploration of the effects of empathy on both AI and DI trial types so the potential of empathy to reduce non-prosocial behaviour could also be examined in 5-6 year-olds. Finally, in this study the partner with whom participants shared was the individual towards whom they were primed to feel empathy, as opposed to an unrelated partner. Whether empathic concern for sadness towards one person would lead children to behave more prosocially with an unrelated partner is unknown at this point and is a question for future research.

It may be noted that our measures of empathy were both self-report and so might be open to concerns about validity. However, similar (verbal) self-report approaches have been commonly used in related research (e.g. Feshbach & Roe, 1968; Eisenberg, Fabes, Karbon, Murphy, Carlo, & Wosinski, 1996; Strayer & Roberts, 1997). Importantly, we found that 5-6 year old children's attribution of emotion to a partner in a distressing situation predicted sharing behaviour with this individual, thereby providing some validation of the usefulness of this self-report measure.

In both experiments, children were first asked to identify how Jenny felt, and then to express how they themselves felt. As ratings of Jenny's emotion were obtained first, this measure was unaffected by how children may have felt themselves. Recall ratings of Jenny's emotion differed across groups in both experiments, and were correlated with prosociality in Study A. Ratings for participants' own emotion were collected subsequently, allowing all children to first reflect on how Jenny felt before communicating their own emotional state. These ratings of own emotion were not correlated with prosociality, and did not differ between groups in Study B. Although it is unlikely that the order in which the questions were asked influenced the results (especially since it would be the second question influenced by the first which does not seem to be the case), it is worth mentioning that further explorations may benefit from counterbalancing the order of these two questions.

Although the relation between empathy and sympathy and prosocial behaviour has been explored in earlier work (e.g., Eisenberg, McCreath, & Ahn, 1988; Zahn-Waxler & Radke-Yarrow, 1990), this is the first experimental demonstration to our knowledge of empathy for sadness, and specifically empathic concern being shown to influence

resource allocation in young children. Furthermore, our results suggest empathic concern for sadness can promote sharing, but perhaps the most novel contribution of this work is the finding that it also has a counteracting, or neutralizing effect on the negative consequences of envy.

In sum, these experiments show that empathic concern for sadness does lead to prosocial resource allocation in young children both by promoting sharing and decreasing envy. Understanding the development of prosocial behaviour is important in many regards. Prosocial development is both important in creating and sustaining personal relationships, and on a larger scale, a critical component in maintaining a functioning society. By understanding the mechanisms, such as empathy, that influence prosocial behaviour, we can better support and encourage the development of prosocial behaviours such as sharing, and learn how to inhibit or neutralize more negative aspects of social behaviour such as envy.

4.11 Study 3A Addendum

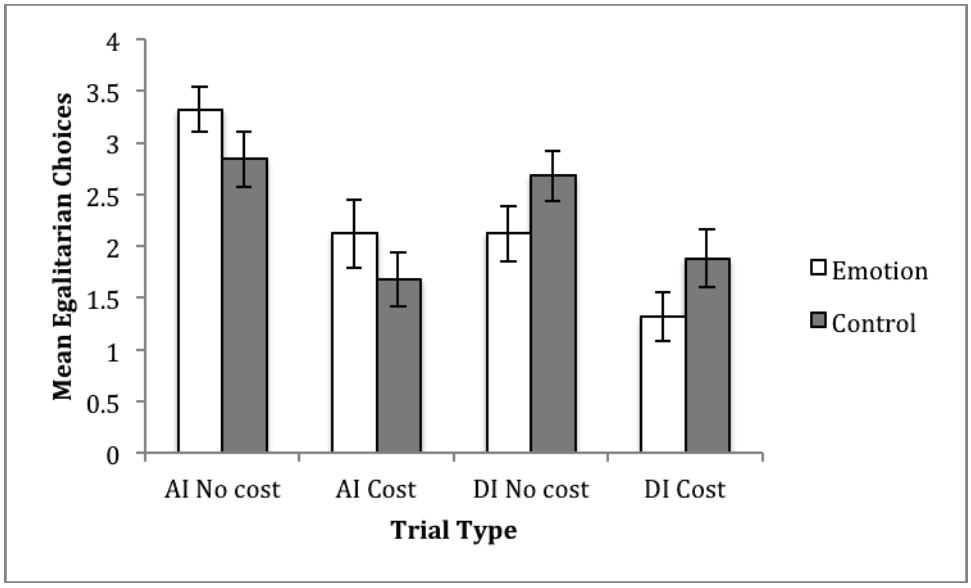
The data from Study 3A was recoded to be consistent with Study 1 and Study 2. Therefore children received one point for each equal choice (1,1 in all trials) made in the resource allocation task. While the coding for AI trials remained consistent, the coding for DI was reversed in order to explore the effects of the emotion induction on inequality aversion and allow for a more general comparison of results across studies. Children thereby received a score ranging from "0" to "4" for each trial type (see Figure 4.5 for mean scores).

A 2 X 2 x 2 mixed model repeated measures ANOVA with trial type (AI vs. DI) and cost (no cost vs. costly) as the within subjects factors, and condition (emotion induction vs. control) as the between subjects factor revealed no significant effect of condition, F(1,48)=.062, $p > .05$, $\eta_p^2 = .001$. An effect of cost was observed, $F(1,48) = 49.793$, $p < .001$, $\eta_p^2 = .509$, with children making more egalitarian allocations when there was no cost (M=5.48, SD=1.50) associated with equality compared to when there was a cost (M=3.5, SD=1.89), t(49)= 7.129, p <.001. An effect of trial type approaching significance, $F(1,48) = 3.760$, $p = .058$, $\eta_p^2 = .073$, was also observed, with children making marginally more equal allocations in AI trials (M= 4.98, SD=2.38) as opposed to DI trials (M=4.00, SD=2.24), t (49)= 1.881, p=.066.

There was a significant interaction between trial type and condition, $F(1,48) = 4.074$, $p = 049$, $\eta_p^2 = .078$, as children in the emotion induction group made more equal choices in AI trials (M=5.44, SD=2.39) compared to the control group (M=4.52, SD=2.32) but less equal choices in situations of DI (3.44, SD=2.06) than the control group (M=4.56, SD=2.31). No significant interactions between cost and condition,

$F(1,48) = .005$, $p = .943$, $\eta_p^2 = .000$, trial type and cost, $F(1,48) = 2.142$, $p = .150$, $\eta_p^2 = .043$, or trial type, cost and condition, $F(1,48) = .006$, $p < .939$, $\eta_p^2 = .000$ were observed. These results are discussed in relation to the other studies in the general discussion.

Figure 4.5 Mean egalitarian choices on the resource allocation task with standard error bars, for the emotion induction, and control group, in AI and DI trials in Study A (5-6 year-olds). Possible scores ranged from "0" (no egalitarian choices) to "4" (consistent egalitarian choices) for each of the four trial types.



CHAPTER 5

GENERAL DISCUSSION

5.1 Comparison of Results Across Studies

This body of research broadly explored aspects of prosociality- or more specifically, inequality aversion in children between three and six years of age. Topics examined include the development of aversion to different types of inequality, as well as situational and motivational influences on inequality aversion. Study 1 explored whether motivations underlying preferences for equality were similar or different in situations of advantageous inequality (AI) and disadvantageous inequality (DI). It also investigated whether motivations were consistent over time within each type of inequality. Motivations for equality were more closely examined in situations of DI in Study 2, while the influences of empathic concern and personal distress on inequality aversion (in the context of prosociality) were explored in Study 3. Together, the results offer novel insights into motivational and situational influences on prosociality and inequality aversion in early childhood. The findings also point to potential areas of future research that can both extend the current research and lead in new directions.

In Study 1, two different types of inequality, AI and DI, were examined. As a first step, it was important to ensure performance in the RAT was reliable and eliciting real preferences from children at each age tested. This confirmation of reliability was especially important since variations of this task were used in each of the studies included in this thesis. It was also important to establish construct validity for the trial types used and ensure that regardless of cost, both AI trials were tapping into the construct of AI and both DI trials were tapping into the construct of DI. Reliability of responses was

confirmed by establishing relationships between the first and second half of responses for each of the four trial types, at each of the three visits. Several relational questions were then addressed.

First, relationships between cost and no cost trials were explored in both situations of AI and DI. As hypothesized, consistent relations were found at each time point for both AI and DI. This finding validated our conceptualization of the constructs of these two forms of inequality – AI and DI, and allowed for cost and no cost trials to be collapsed across for subsequent analyses.

Also of particular interest was whether preferences for equality between AI and DI trials would be correlated at all, some, or no time points. Such a relationship between preferences in AI and DI trials would suggest that similar motivations – such as general concerns for fairness- underlie decision-making. In contrast, an absence of relations would instead suggest that different motivations drive preferences for equality in situations of AI and/or DI, for example prosociality in AI contexts and envy induced by negative social comparisons in DI contexts. Interestingly, while responses in situations of AI and DI were related at Time 1, no subsequent relationships were observed at Time 2 or Time 3. Therefore, it seems that while early in development fairness norms or a more general aversion to inequality may be driving decision-making, as children grow older their decision-making may become more strongly influenced by factors beyond norms of fairness.

Finally, we were interested in exploring the consistency of responses over time in situations of AI and DI. Based on a longitudinal study by Moore and Macgillivray (2004), which showed that consistency in situations of AI emerges between four-and 4.5

years of age, relations were expected across all three time points. In contrast, based on Study 2 (Williams & Moore, 2014), which suggested that between four- and six-years of age motivations underlying preferences for equality in situations of DI change, consistent relationships across time points in DI trials were not expected. The hypothesized patterns of results were observed in both contexts of inequality. Consistent relationships were observed between all time points in situations of AI, with correlation coefficients becoming stronger over time. In contrast, in situations of DI a relationship between equal choices was observed between Time 1 and Time 2; however, no relationships were observed between preferences for equality between any subsequent time points.

The findings of Study 1 support previous work suggesting that aversion to AI and DI develop along different trajectories (Blake & McAuliffe, 2011; Birch & Billman, 1986; LoBue et al., 2011) by demonstrating that after age 4.5 years there are no consistent relationships between preferences for equality in these two different contexts of inequality. Further, it also demonstrates that the patterns of consistency for AI and DI over time differ. Recall that while consistency for equal choices in situations of AI grew stronger with time, consistency in situations of DI grew weaker. However, while this work suggests that different motivations underlie preferences for equality in situations of AI versus situations of DI, no conclusive statements regarding what these motivations are can be made. Since after age 4.5 years of age there is no evidence that fairness norms or a generalized aversion to inequality are guiding decision-making, it seems likely that (at least around ages 5-6 years) other factors such as prosociality in situations of AI, and social comparison or envy in situations of DI, are playing a role.

Following up on this idea, Study 2 aimed to determine motivations underlying preferences for equality in situations of DI. Specifically, it sought to answer whether a general aversion to inequality influenced primarily by fairness norms, or social comparison concerns and feelings of envy, was driving preferences. In order to explore this question both cost (costly vs. no cost) and the discrepancy between self and partner (large vs. small) were manipulated within the RAT, yielding four trial types.

It was predicted that, if fairness norms were influencing decision-making, no differences in the number of equitable choices made would result from the cost or discrepancy manipulations. However, if social comparison and resulting feelings of envy were influencing decision-making, larger discrepancies between the self and partner may result in a more salient comparison and stronger feelings of envy. Therefore, if social comparison and envy were influencing decision-making, a stronger preference for equality in large discrepancy trials compared to small discrepancy trials would be expected.

Recall the results of Study 1, which suggested that in situations of DI responses at 4.5 years, and 5.5 years were unrelated. This finding supports the idea that motives underlying preferences for equality likely change between four and six years of age. In order to explore the possibility of changing motivations across age, two age groups (4-year-olds and 6-year-olds) were tested.

Strong effects of cost were observed, with children preferring equality more when there was no cost associated with it. Results also indicated that 4-year-olds decision-making was unaffected by discrepancy. However, 6-year-olds preferred equality significantly more in large discrepancy trials compared to small discrepancy trials-

particularly in costly trials. These results do not support the idea that children's resource allocation is indiscriminately motivated by fairness norms. Instead, they suggest that, as children get older and develop more sophisticated cognitive abilities, social comparison concerns may become increasingly influential in situations of DI. These findings complement the results from Study 1 showing that as children grow older, any evidence that may suggest influence from fairness norms or a generalized aversion to inequality aversion dissipates. In contrast, with age social comparison concerns and resulting feelings of envy may become more influential in situations of DI.

Finally, with strong evidence that various factors (such as cost and discrepancy) influence decision-making, the question arises as to what other situational influences may influence inequality aversion, or more generally prosociality, in young children. Research suggests that experiencing empathy for another individual influences prosociality in adults (Barraza & Zak, 2009), and has linked empathy to prosocial behaviour in children (see Eisenberg et al., 2006 for a review). Based on these findings, it was hypothesized that experimentally inducing empathy may lead to increased prosociality in children as well. Therefore, in Study 3, the influence of empathic concern and personal distress on prosociality was investigated. This approach allowed for the influences of empathic concern to be tested in both situations of AI and DI. Specifically, it allowed us to determine whether experiencing empathic concern for another and/or personal distress increased sharing in situations of AI and decreased envy in situations of DI. These questions were addressed by comparing children's resource allocation behaviour across two different conditions. In the emotion induction condition, children watched an empathy inducing video portraying a little girl upset that her dog had run away, while

children in the control condition watched a video of the same little girl preparing for a yard sale in a neutral control video.

As expected, five- to six-year-old children in the emotion induction condition rated the little girl as feeling significantly sadder than children in the control condition, and also reported feeling sadder themselves. This finding validated the effectiveness of the emotion induction video, which was created for the purpose of this study, in inducing both empathic concern and personal distress. Also as hypothesized, children in the emotion induction condition shared more with the little girl in AI trials, and were less likely to withhold a benefit from her in DI trials, thus showing less evidence of envy in their decision-making. However, prosocial behaviour was correlated only with empathic concern (ratings of the little girl's emotion) and not with personal distress (ratings of their own emotion). Importantly, the finding that experiencing empathic concern for another individual in distress increases subsequent prosocial behaviour was replicated by extending this study to include a younger age group of three-year-old children. However, the correlation between prosociality and empathic concern as well as the group differences in personal distress observed in the older age group were not replicated, likely due to age related differences.

It is interesting to note that in Study 3A empathic concern for another in distress differentially influenced inequality aversion in situations of AI and DI. As shown in the addendum, when coded for egalitarian choices an interaction between trial type and condition was observed. Therefore while empathic concern increased inequality aversion in situations of AI, it decreased inequality aversion in situations of DI. As discussed, when coded for prosocial choices however a main effect of condition was observed

indicating that empathic concern increased prosociality across all trial types. The effects of the manipulation suggest that there is a common mechanism operating in both situations of AI and DI but not one simply related to inequality.

Across studies, some general patterns can be observed and converging evidence provides support for several claims. As the RAT was used in all three studies, performance across studies can be considered. However, key methodological differences must be noted. For example, while the partner was a friend in studies one and two, it differed in Study 3, and, while the same set of trial types was used in studies one and three, the content of the trials differed in Study 2.

One result found consistently across all studies was that cost influenced children's willingness to choose the equal or prosocial choice. Effects of cost were observed for both AI and DI in Study 1, and in situations of DI in Study 2 (which did not explore situations of AI). An effect of cost was also observed in the addendum to Study 3A (which coded for equal choices instead of prosocial choices) and in situations of AI in Study 3B (which was conducted with the three-year-old age group, who did not participate in DI situations). Therefore, an effect of cost was consistently observed across all studies demonstrating the strong and consistent tendency for children between the ages of 3-6 years to prefer equality more when there is no cost associated with it.

Another finding that was observed across the two studies which included both AI and DI trials (studies one and three) was that preferences for equal choices were stronger in situations of AI as opposed to situations of DI. This effect of position was shown to be statistically significant in Study 1 and marginally significant in the addendum to Study 3A. Though not a main research question, this finding was initially surprising as children

were essentially more likely to give their partner more resources than to take more for themselves. However, the intuition that children may show stronger inequality aversion in DI trials was based on research showing that young children are more likely to object to DI than AI (Birch & Billman, 1986; LoBue et al., 2011), and that children under eight years of age will reject DI offers often, but rarely reject offers in situations of AI (Blake & McAuliffe, 2011). While the work of Blake and McAuliffe (2011), Birch and Billman (1986), as well as LoBue and colleagues (2011) relates to the current study by suggesting that young children are more comfortable with AI than DI, it is important to note that they were conducted using different paradigms. More useful perhaps, would be to compare our results to those of Fehr et al. (2008), who explored preferences for equality across no cost AI and DI trials, and costly AI trials with anonymous partners. In Fehr and colleagues' work (2008), we see that 5-6 year-olds preferences for equality in no cost AI and DI trials were equal, with the equitable option being chosen in approximately 60% of trials. The equitable option in costly AI trials was chosen in approximately 25% of trials. Therefore, if our results were similar in these three trial types, an overall position effect would depend on children choosing the equitable option in DI cost trials (1,1 over 2,3) significantly more than in AI cost trials (1,1 vs. 2,0) to drive such an effect. However, in our novel DI cost trial children chose the equal option less than in the costly AI trial.

It could be the case that the costly DI trial was seen as being 'more costly' than the costly AI trial, as it incorporated not only a sacrifice of one of the child's own resources, but additionally two of their partner's resources. This could make choosing equality in costly DI trials more difficult, and therefore help explain why the egalitarian choice is overall more unlikely in DI trials. Further, in no cost trials, we observed more

equitable decisions in AI trials than in DI trials, which differed from the findings of Fehr et al., (2008).

Of relevance to this finding, it is critical to note that in Study 1, friends were used as partners instead of strangers. In contrast, in Study 3, a little girl whom participants were somewhat familiar with was used; however, she would still be considered a stranger. In Fehr and colleagues' (2008) study, anonymous out-group members who were also strangers were used, however here participants had no knowledge about, experience with, or familiarity towards their partner. Importantly, research has shown that children allocate resources to friends and strangers very differently in costly AI situations (Moore, 2009). Therefore, when drawing any type of comparison across the studies included in this thesis, or done by other researchers, how partner choice may play a role is an important factor to consider.

Another finding consistent across studies one and two was that no significant age differences concerning the number of equitable choices were observed. This was the case both between 4.5 and 5.5 years of age (in Study 1), as well as between four and six-year-olds (in Study 2) -aside from costly large discrepancy trials included in Study 2 alone. Both of these studies found no overall significant age differences in the number of equitable decisions made. However, both studies offered evidence suggesting that the way in which children make decisions, and the motivations underlying these decisions, change in very important ways between four and six years of age. As children age and develop more sophisticated cognitive abilities, they may become more attuned to social comparisons between themselves and others, and particularly in DI trials, these social comparison concerns may become increasingly influential.

5.2 Novel Contributions and Links to the Literature

The development of prosocial behaviour is complex and multifaceted. Sharing behaviour is influenced by a variety of factors, such as whether a need is expressed, the transparency of one's actions, and the relationship between participant and partner (Brownell et al., 2009; Leimgruber et al., 2012; Fehr et al., 2008; Moore, 2009). Other situational factors, such as the number of resources available and the cost associated with sharing, have also been shown to influence behaviour (Hay et al., 1991; Thompson et al., 1997; Moore, 2009). Thus, while some research has established that certain situational factors influence prosocial resource allocation in young children, a multitude of potentially influential situational factors remain to be explored. Prior to the current work, relatively little was known about how the situational influences of empathic concern and personal distress affected behavior in the resource allocation task. Little was also known concerning the motivational influences underlying preferences for equality in young children. This section will discuss the findings of the current research in terms of how it relates to the previous literature, and contributes novel information to our understanding of prosociality and inequality aversion in early childhood.

It is known that from a young age, even infants are sensitive to inequality (Geraci & Surian, 2011; Sloane et al., 2012; Schmidt & Sommerville, 2011; Sommerville et al., 2012). However, while even children as young as three years of age endorse norms of fairness, they do not act in accordance with these norms until 7-8 years of age (Smith et al., 2013). Interestingly, between the ages of three and six years of age, children will predict their own selfish behaviour even though they acknowledge that they, and others,

should share equally (Smith et al., 2013). Perhaps, despite the fact that children recognize fairness as an important social construct, they are aware that their own behaviour is influenced by factors beyond an accordance to fairness norms.

Previous research more specifically exploring inequality aversion in children has documented that young children respond differently to situations of AI and DI. Further, research has established that aversion to these two different situations of inequality develop along distinct developmental trajectories (LoBue et al., 2011; Blake & McAuliffe, 2011). For example, researchers have established that AI and DI seem to emerge at different time points in development and have suggested that aversion to inequality in these two different situations is influenced by differential mechanisms (Blake & McAuliffe, 2011; LoBue et al., 2011). These findings have led researchers to theorize that preferences for equality in situations of AI and DI are influenced by motives beyond generalized fairness norms. Supported, such differences would have important implications on the way research exploring sharing, fairness, inequality aversion, and more generally, prosocial development in children, is designed and interpreted. As this idea has been presented quite recently, there is currently not a large body of research that can address this possibility. However, the current body of work provides strong empirical support for this claim that different motivations underlie preferences for equality in situations of AI and DI.

Importantly, the longitudinal study addressed several questions and filled in several informational gaps in the literature. It established reliability of responses within the RAT and also provided evidence suggesting that costly and no cost trials indeed are influenced by the same mechanisms. These findings are relevant to the work presented in

this thesis, as establishing reliability of responses demonstrates that data obtained in these four trial types reflects real and reliable preferences. Therefore, this data indeed provides meaningful insights into children's decision-making. Further, our confidence in earlier work that has used these methods has increased, as we know now with more certainty that the data obtained in the RAT reflects valid and reliable responses. Finally, these findings are also beneficial to future work. Based on our findings, researchers may be more likely to choose the RAT and these established trial types to address their research questions when possible.

Study 1 also contributed strong evidence to the claim made by Blake and McAuliffe (2011) that different mechanisms indeed underlie preferences for equality in situations of AI and DI (at least after 4.5 years of age). This was achieved by showing that responses across AI and DI trials are not related at five and 5.5 years of age, and that different patterns of relations emerge over time in situations of AI and DI. In line with previous work (e.g. Moore & Macgillivray, 2004; Williams & Moore, 2014), the results demonstrated that, while responses in situations of AI show strong consistency over time, responses in DI trials do not. The strong consistency over time observed in situations of AI support previous longitudinal work by Moore and Macgillivray (2004), which showed sharing behaviour was correlated at their later two time points (four years and 4.5 years). Conversely, the pattern of results observed in situations of DI showed that while preferences were related at the earliest two time points (four and 4.5 years), there was no consistency between subsequent time points. This finding supports the published findings of Study 2 (Williams & Moore, 2014), which suggest that motivations in situations of DI

change between four and six years of age, and that preferences for equality in situations of DI are influenced by more than just norms of fairness.

Previous research has suggested varying potential motives underlying preferences for equality. For example, if factors other than a generalized preference for equality, or fairness norms are driving decision-making, a desire to maximize one's relative advantage over a partner (Skeskin, Bloom & Wynn, 2014), reputation concerns (Shaw et al., 2014), social welfare concerns, or a prosocial orientation may be underlying preferences in situations of AI (Shaw & Olson, 2012). In contrast, in situations of DI social comparison concerns and feelings of envy may be influencing decision-making (Shaw & Olson, 2012). Although motivations in situations of AI were not explored in detail, the results of Study 2 provide support for the influence of social comparison concerns and envy in situations of DI (Williams & Moore, 2014). This finding supports not only the theory that different motivations influence preferences for equality in situations of AI and DI, but also the literature discussing the salience and behavioral consequences of social comparisons and envy (Yip & Kelly, 2013; Salovey & Rodin, 1984; Wheeler & Miyake, 1992; Zizzo & Oswald, 2001; Steinbeis & Singer, 2013). As the majority of this research has been conducted in populations of adults, the current research extends the effects of social comparison and envy to children, and highlights the need for further exploration of these factors in children.

The insight gained in Study 2 - that particularly in costly situations, social comparison and envy become increasingly influential in DI situations around six years of age, is an important and novel contribution that follows up a main question raised in Study 1. The findings presented in Study 2 also support work done by Sierksma and

colleagues (2014), which suggests that when costs are low, the more prosocial decision may be expected and somewhat of a default choice. In contrast, in costly situations other factors may be more likely to be taken into consideration. In terms of cost effects, both studies one and two replicated previous work showing that children prefer equality more when there is no cost associated with it but that they are not completely unwilling to pay a cost to avoid inequality (e.g. Thompson et al., 1997; Fehr et al., 2008). Most importantly, these findings converge to show strong evidence that in resource allocation situations children do not make decisions indiscriminately based on norms of fairness. Cost, position, discrepancy, social comparison, and envy all seem to play a role in prosocial resource allocation, and while effects of age were not observed in either Study 1 or 2, the results suggest that motivations are changing in a critical way between four and six years of age.

Using a slightly different approach, Study 3 explored how the situational influences of empathic concern and personal distress influenced prosociality. Previous research has shown relations between empathy and prosocial behaviour in children (e.g. Eisenberg et al., 1988), and that children will show more prosocial helping behaviour towards an adult they witnessed being harmed by another individual (e.g. Vaish et al., 2009). Meanwhile, the adult literature shows that adults will make more prosocial allocations after witnessing an empathy inducing video as opposed to a neutral control video (e.g. Barraza & Zak, 2009). However, how the experience of empathic concern would influence prosocial resource allocation in children was unknown, as no similar experimental research had been conducted with children. This study supported previous research pointing to the relationship between empathy and prosociality, but contributed

uniquely as it provided the first evidence that experiencing empathic concern for another individual positively affects prosocial resource allocation in children. This work differentiated between the effects of empathic concern and personal distress- something that much previous research has often failed to do. It also provided support for previous research (e.g., Batson et al., 1981; Eisenberg et al., 1989), suggesting that the outward expression of empathy, but not personal distress, is linked to this positive effect. Further, it contributed the novel finding that not only does empathic concern increase prosocial resource allocation in situations of AI, but it also decreases more hostile resource allocation (or envy) in situations of DI. Finally, it presented a novel priming methodology, which effectively induced empathy across two age groups and has great potential to contribute to further work in this area.

The findings of this body of research highlight the complexities of the motivational and situational influences on inequality aversion and prosocial behaviour in early childhood. Taken together, these findings offer support to a number of previous experiments and suggestions that have been presented and discussed within the literature. However, this work has also contributed a substantial amount of novel and unique information to our understanding of what motivates equality in a variety of commonly used RAT trials, and addressed several areas in which little previous work has been done. While more work is needed exploring specific motivations in situations of AI, together this work provides evidence for the claim that different motivations are driving decision making in situations of AI and DI (e.g. Blake & McAuliffe, 2011). Social comparison and envy have been identified as influential motivators for children of 5-6 years of age in situations of DI, while the experience of empathic concern has been shown to positively

influence prosociality in 3-year-old, and 5-6-year-old children. Thus, as intended this work has provided insight into *what* decision-making in situations of AI and DI looks like, as well as *what* type of relationship exists between these two types of inequality, and *how* it changes with time. Further, this research offers an explanation as to *why* children choose equality in situations of DI and demonstrates *how* empathic concern (but not personal distress) influences prosociality and inequality aversion in early childhood.

The most significant overall contributions of this work are the findings that different motivations underlie preferences for equality in situations of AI and DI, and the evidence suggesting that in situations of DI, social comparison and envy are influencing decision-making. It must be noted however, that these findings do not provide a complete picture concerning what drives preferences for equality in early childhood, thus cannot necessarily theoretically inform our understanding of inequality aversion in a broader sense. Rather, these findings provide important pieces to the puzzle. However, missing pieces (particularly pertaining to motivational influences in situations of AI) remain. More work is necessary to develop a more complete picture of the development of inequality aversion in children.

5.3 Consideration of Potentially Influential Age Related Developments

Developmental changes potentially related to the change in motivational influences observed in Study 1 and Study 2, or discrepancies between 3-year-olds and 5-6 year-olds observed in Study 3A and Study 3B were not explicitly tested. However, there are several potentially influential developments that could be influencing the observed patterns of results as with age, children develop a variety of increasingly sophisticated

cognitive skills. For example, developing executive function skills could facilitate their ability to inhibit their own desires and interests when deciding how to allocate resources between themselves and a partner. Further, social comparison concerns seem to become increasingly influential during the early school years. Specifically, as demonstrated in Study 2 social comparison concerns appear to become especially influential around six years of age- a finding which is also supported by Sheskin et al. (2014).

The development of theory of mind (TOM) could also be potentially linked to the increased influence of social comparison concerns in the sense that children are becoming more sensitive to the perspective of the partner, who would have more compared to themselves in situations of DI. This mental state understanding, which develops around age four, has been linked to the development of prosocial resource allocation and is believed to be an important determinant in organizing social behavior (Moore & Macgillivray, 2004). TOM could also potentially be related to the absence of the relationship observed between ratings for Jenny and self on the FAS if young children are less sensitive to Jenny's feelings. However, given that group differences between the emotion induction and control conditions were observed on our measure of empathic concern but not on our measure of personal distress TOM may not be responsible for this difference between age groups. Rather, lack of power or reduced ability to reflect on one's own emotion could be more strongly influencing these results. However, TOM could play a role in children's growing concern for their own reputation (observed in 6-8 year olds) and this concern for appearing fair could also impact the way in which children make decisions as they grow older- particularly in situations of AI (Shaw et al., 2014).

The factors mentioned here were not tested in the current body of research therefore their direct relation to the results is unknown. However, it is important to note that during the preschool and early school age years a number of important developments are occurring. The possibility therefore exists that one or several of these changes could be related to some of the results observed.

5.4 Future Directions

The priming approach used in Study 3 was found to be successful and could be used to induce or prime a variety of feelings or experiences. New research avenues using priming methodologies similar to that used in Study 3 include work looking at various potential influences of other aspects of sociality on prosocial behaviour. For example, while Study 3 investigated the influence of empathy for sadness on prosocial behaviour, by filming another video portraying the same girl receiving a painful injection, the influence of empathy for pain has also been explored (Gennis, Parker, Williams, Chambers, & Moore, in prep).

In another priming study, by manipulating children's pre RAT experience to include either participating in a coloring contest against their partner, or simply coloring a picture to decorate a wall, we have been able to explore the influence of competition on prosocial behaviour in children. Our results demonstrate that competition increases envious behaviour in costly DI situations (Mallach, Williams, & Moore in prep)– a finding that fits well with the results of Study 2. Findings also show that a competitive context decreases prosocial behaviour that is directly linked to the competition outcome.

Specifically, it decreases the number of crayons participants are willing to provide to the next child.

In a final example of how the priming methodology can be applied to different contexts, we are using a wheel of fortune game to explore how social comparisons involving wealth influence prosociality. In this study children win either two, 20, or 50 stickers while their partner wins 20 stickers. Thus, we are able to prime children to engage in either an upwards comparison in which they have less than their partner (two for self vs. 20 for partner), or a downwards comparison in which they have more than their partner (50 for self vs. 20 for partner). Then we are able to compare these groups to a control condition, in which children and their partner both receive the same amount of 20 stickers.

Based on the interesting and informative findings of Study 1, the longitudinal study has also been extended to explore ongoing patterns and changes in (and across) situations of AI and DI at 6.5 years and 7.5 years of age. Though the remaining sample is significantly smaller than that included in the original study, a similar pattern of results as that observed in the original three visits has been observed. The ongoing findings will hopefully further inform our understanding of the development of aversion to AI and DI, the relationship between them, and consistency within each context of inequality over a more extended period of time

5.5 Limitations

One limitation to the current body of work is that only motivations underlying decision-making in situations of DI were followed up more closely (in Study 2). More

work is needed to further explore motivations underlying preferences for equality in situations of AI. Further, although the studies do include a variety of age groups, it would have been beneficial to extend the research to include older children as well in studies two and three. It would have also been beneficial to have had a larger sample in the longitudinal study with more extensive follow-up over time.

It also would have been ideal to have the costly trials in Study 2 more closely related to the costly DI trials used in Studies 1 and 3 (1,1, vs. 2,3 as opposed to 0,0 vs. 1,2). However, Study 2 was designed prior to the onset of Studies 1 and 3, and the decision to revise the degree of cost (which was absolute in Study 2, requiring a complete sacrifice of rewards in order to avoid inequality) was made to avoid floor effects in subsequent studies. In the context of Study 2, however, the trials used were indeed successful in exploring the research question and providing insight into the motivations underlying preferences for equality in situations of DI.

5.6 Conclusions

Taken together, this body of research provides valuable information and answers to questions regarding inequality aversion and early prosocial development that have not been previously explored. Study 1 gathered further evidence regarding what inequality aversion looks like at different points in development, and how it changes with age. It also explored consistency in preferences across situations of AI as well as DI, and how aversion towards these two forms of inequality relates to one another. Results suggested that the motivations underlying preferences for equality differ, but could not offer answers as to what specifically was motivating children's decisions.

In Study 2, the underlying motivations of equality were studied more in depth in situations of DI. The evidence suggests that social comparison (as opposed to fairness norms) influences decision-making, particularly in costly trials, and particularly with older children. This finding has influenced trial type selection in ongoing research. As costly and no cost trials are both tapping into the same construct (as evidenced in Study 1), yet costly situations seem to be more susceptible to factors such as social comparison or envy (further supported by Mallach, Williams & Moore, in prep), costly trials have been employed more often in subsequent experiments conducted in the lab.

Finally, this thesis provides evidence that inequality aversion, or prosocial behaviour, can be influenced by situational influences. Specifically, it demonstrates that experiencing empathic concern for one's sharing partner both increases sharing behaviour in advantageous inequality trials, and decreases envious behaviour in disadvantageous inequality trials. The findings of Study 3 support the idea that encouraging empathy has positive and more prosocial outcomes, and that doing more to encourage and promote the development of empathic concern in early childhood could be beneficial.

Importantly, all studies provide insight into different factors that influence prosocial behavior and inequality aversion in early childhood. This information could have potential applications in encouraging prosociality and inhibiting negative social behaviours in different social situations. Study 1 offered support for the idea that AI and DI are motivated by different factors. Study 2 suggested that social comparison and envy seem to play a role in resource distribution situations- specifically, increasing children's willingness to make sacrifices to prevent a partner from receiving more than themselves

in situations of DI. Finally, Study 3 highlighted the positive impact empathic concern can have on prosociality in both situations of AI and DI.

More work beyond the scope of this thesis must be done to explore questions that remain, and to provide further support for the claims made. For example, further exploration as to what drives preferences for equality in situations of AI, and how (and what types of) social comparisons influence prosociality is necessary. Ongoing investigations into how AI and DI are differentially motivated further throughout development will continue to expand our knowledge base of early prosociality and inequality aversion. However, the current body of work has made significant contributions to our understanding in this area and laid a solid foundation upon which future contributions can build. It has pointed to potential influences on behaviour, introduced a novel priming methodology for exploring contextual influences on prosociality in young children and importantly, has stimulated new avenues of research that are already underway.

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APPENDIX A

February 9th, 2015

Frontiers in Psychology
EPFL Innovation Park, Building I
CH – 1015 Lausanne
Switzerland

I am preparing my Doctor of Philosophy thesis for submission to the Faculty of Graduate Studies at Dalhousie University, Halifax, Nova Scotia, Canada. I am seeking your permission to include a manuscript version of the following paper(s) as a chapter in the thesis:

Title: The influence of empathic concern on prosocial behavior in children.
Authors: Amanda Williams, Kelly O'Driscoll, and Chris Moore.
Journal: Frontiers in Psychology. Volume: 5. Article: 425. Pages: 1-8. Published: May 2014.

Title: Exploring disadvantageous inequality aversion in children: how cost and discrepancy influence decision-making.
Authors: Amanda Williams and Chris Moore.
Journal: Frontiers in Psychology. Volume: 5. Article: 1088. Pages: 1-6. Published: September 2014.

A full citation of each of the original published articles will be included in the thesis.

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