I'll Share With You But Only If…

The influence of context, communication, and perspective taking on preschoolers' social behaviours

by

Alanna Valcke

A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Arts
in
Psychology

Waterloo, Ontario, Canada, 2017

Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

A key aspect of children's development is learning how to navigate the social world. To do so successfully, children must be able to adapt their social behaviours to the diverse social contexts and demands that they encounter (Bierman & Welsh, 2000). The current study explored preschool-aged children's sensitivity to cooperative and competitive social contexts, as well as their ability to flexibly adapt their sharing behaviour across the two social contexts. Furthermore, the current study examined how preschoolers modify their sharing behaviour based on social cues they receive as per communicative messages from their social partner within both contexts. Children (aged 4-6 years) completed a resource allocation task in which they determined who, between themselves and a (fictional) social partner would receive items that were important to winning a game. Participants also "interacted" with their social partners, as they were provided audio messages that conveyed whether or not their partner was willing to collaborate. The task was a 2X2 repeated measures design in which children's sharing behaviours were evaluated as a function of the social context (cooperative vs. competitive) and the type (team-oriented vs. self-oriented). Verbal responses to social partners' messages were also examined. Socio-cognitive skills (i.e., theory of mind and executive functioning), which are thought to facilitate children's sharing behaviours, were also examined. Children were found to shift their behaviour according to the context (i.e., more items were shared in the cooperative context), and the extent to which they were able to do so was predicted by their theory of mind ability. Theory of mind was also a predictor of children's sharing behaviours in cooperative contexts. Only the youngest age group (4-year-olds), were found to shift their behaviour according to message, although all participants' verbal responses conveyed a sensitivity to

message-type. Finally, executive functioning played a role in children's sharing behaviours in response to collaborative messages from their social partners.

Acknowledgements

Research is a collaborative effort, and as such, there are many people whose contributions helped shape this project. First and foremost, I would like to thank my supervisor, Dr. Elizabeth Nilsen, whose knowledge and expertise provided me with a solid foundation for the development of this research. Moreover, her skilful guidance and support were proffered generously from the inception of this project through its completion. I would also like to acknowledge the helpful suggestions generated by Dr. Tara McAuley and Dr. Heather Henderson, who acted as readers for this thesis. I am truly grateful for their assistance and valuable comments.

Given that this project was heavily reliant on technology, it would not have been possible to complete this research without the technical support and direction of Bill Eickmeier. Jackson Denny, who programmed the tablet application, was also instrumental in bringing the vision for this project to life. In addition, I would like to thank my colleagues in the Cognitive Development Lab and the Clinical Psychology Program at the University of Waterloo, for always having an open ear and offering words of encouragement. The lab's research coordinator, Janel Silva, deserves a special mention, as she assisted with the tedious task of coding data for this study. I would also like to extend my sincerest gratitude to the schools and families of the Waterloo Region who participated in this study.

Many thanks are also in order for Dr. Jonathan Fugelsang, my undergraduate research supervisor, who was a catalyst in my pursuit of graduate studies.

Finally, I would like to thank my parents, Tom and Paula Valcke, my brother Jaxon and my sister Mia, whose love and unwavering support means everything to me.

Table of Contents

Author's Declaration ii

Abstract iii

Acknowledgements v

List of Figures viii

List of Tables ix

Literature Review 1

Social Relationships and Prosocial Behaviour 3

Social Competence 6

Sharing 8

Influences on Sharing Behaviour 12

Summary and Thoughts for Future Directions 24

Introduction 27

Method 36

Participants 36

Procedure 37

Resource allocation task. 38

Executive function and theory of mind tasks. 42

Results 46

Preliminary Analyses 46

Social Task Analyses 47

Sharing behaviours 47

Participants' Verbal Responses to Messages 53

Discussion 57

References 78

List of Figures

Figure 1 71

List of Tables

Table 1 72

Table 2 73

Table 3 74

Table 4 75

Table 5 76

Literature Review

An individual's ability to form and maintain social relationships in childhood has longstanding implications not only related to future relationships, but also to psychological well-being and physical health (Ashiabi, 2007; Bond et al., 2007; Umberson & Montez, 2010). One method of achieving such connectedness with others is to engage in prosocial behaviour; which is defined as "any action that benefits others, or promotes harmonious relations with others" (Hay, 1994; Jackson & Tisak, 2001). It is clear that from a very young age, children enthusiastically engage in coordinated social exchanges (Paulus, 2016). Specifically, children show an emergence of a variety of prosocial behaviours such as sharing, cooperating, comforting, and helping between the ages of 8 months and 2 years (Carpendale, Kettner, & Audet, 2015; Dunfield, 2014; Dunn & Munn, 1986; Henderson & Woodward, 2011; Tomasello, 2007; Wu & Su, 2014). Although these behaviours are quite rudimentary (Paulus, 2016), as preschool-age children are not yet able to comfort, help, share, and cooperate with others at an adult level, children are learning to coordinate their actions with the needs of those around them.

While there are a variety of possible motivations for initiating prosocial behaviours during social interaction (e.g., altruistic concern for others, advancing social relationships, adhering to social norms, etc.), there are also compelling reasons to abstain from them. For example, enacting prosocial behaviours may involve incurring personal costs or risks. This is particularly true during the act of sharing, which often entails offering one's own, potentially valuable, resources to others (Malti et al., 2016). Against the backdrop of competition, for example, sharing important resources with an opponent may create the unfavourable position of having too little for oneself. Furthermore, in some scenarios, prosocial behaviour may actually counter what is deemed socially appropriate (e.g., 'sharing' the ball with the other team in a

game of soccer). Beyond potentially putting oneself at a disadvantage, sharing under these circumstances may also suggest that one does not fully understand the social rules and expectations of a competitive context.

Correspondingly, taking objects from others may be expected within the framework of a competitive game or sport. While this is an appropriate advancement strategy when competing, the same behaviour applied in a cooperative setting would breed dissonance amongst teammates. Thus, contrary to intuition, engaging in sharing behaviours or other prosocial actions may not always be the most suitable behaviour for a given scenario. Rather, what is considered appropriate, socially competent behaviour may be dictated by several other factors, including the social context and the nature of one's social partner.

In the pursuit of positive social interactions and maintaining social relationships, one needs to be careful not to completely dismiss one's own needs or welfare. The ability to achieve this delicate balance has been referred to as a key component of social competence (Green & Rechis, 2006; Rose-Krasnor, 1997). According to Bierman and Welsh (2000), social competence is the ability to use behavioural, cognitive, and affective skills to flexibly adapt to various social situations and norms. This must occur while simultaneously striving to meet one's own individual needs and preserve positive social relationships with others. Since one set of behaviours will not generalize to every social interaction, children must develop the ability to evaluate what is socially appropriate on a case-by-case basis, using information about the context and the social partner(s) as cues, and learn to tailor their actions accordingly.

With sharing as the main focus of the current study, this summary will review the contextual and partner-related factors that may drive children to share, or not, with others, as well as the socio-cognitive skills associated with children's sharing behaviours. But first, the

importance and development of social relationships and prosocial behaviour will be outlined, followed by a discussion about social competence.

Social Relationships and Prosocial Behaviour

Children are hardwired from infancy to form attachments with others (Elkins, 2016). From an evolutionary perspective, doing so is critical for survival. Infants begin their lives completely dependent on caregivers to meet their basic physiological and safety needs (Bowlby, 1951). However, children require much more from their caregivers in order to thrive. Attachment theory posits that children also must develop "warm, intimate, and enduring" relationships with caregivers and close others (Elkins, 2016). Aptly, the nature of children's social interactions evolves within the first few months of life. Infants quickly transition from being recipients of their caregivers' social behaviours to becoming active participants in early forms of social exchange. These early exchanges and social bonds are thought to serve as templates for future relationships (Elkins, 2016) and assist children with the essential task of learning to navigate their social world.

There are longstanding implications resulting from the formation and maintenance of early social relationships. Research has suggested that childhood environments that offer emotional support can "promote healthy development of regulatory systems such as immune, metabolic, and autonomic nervous systems" (Umberson & Montez, 2010). The consequences of social isolation, or the absence of social relationships, in childhood are of equal importance. Observations made by Renee Spitz offer insight into developmental gaps among children who lack opportunities for socialization (Elkins, 2016). Spitz noted that those who were raised, from birth, in environments of extreme social isolation showed signs of inferior intellectual and motor

development at the age of 1 year. Sadly, by the age of 2 years, these children had not met many age-appropriate, developmental milestones, including walking and talking (Elkins, 2016).

Across the lifespan, connectedness to others has also been tied to better outcomes related to psychological well-being and physical health (Corsano, Majorano, & Champretavy, 2006). For example, Parker and Asher's meta-analytic study (1987) revealed that previous work has commonly linked poor childhood social adjustment (e.g., low peer acceptance, aggressive behaviour) with difficulties later in life (e.g., dropping out of school, criminal behaviour). In an adolescent population, Corsano and colleagues (2006) found that psychological well-being (i.e., less intense feelings of loneliness and malaise) was dependent upon acceptance and integration into a peer group. This was particularly true for adolescents between the ages of 11 to 13 years (Corsano et al., 2006). Moreover, the quality and quantity of social relationships in adulthood have been linked to greater overall health and longer lifespan, as social support has been shown to reduce stress, provide purpose and meaning in life, and promote behaviours and habits that enhance physical health (e.g., exercise, improved diet, reduced alcohol consumption, etc.; Umberson & Montez, 2010). In light of the socio-emotional, psychological, and physical implications related to childhood social relationships, it is important to investigate how children come to learn, understand, and enact the social behaviours that allow them to foster close social relationships with others.

One method of achieving connectedness to others is to engage in prosocial behaviours, which have been defined as "the actions that benefit others or promote harmonious relations with others" (Jackson & Tisak, 2001). Sharing, cooperating, comforting, and helping are displayed in rudimentary forms during infancy (i.e., 8 months through 2 years; Carpendale et al., 2015; Dunfield, 2014; Dunn & Munn, 1986; Henderson & Woodward, 2011; Tomasello, 2007; Wu &

Su, 2014), often in the absence of rewards or direction from adults (Ulber, Hamman, & Tomasello, 2016). These prosocial behaviours become increasingly sophisticated as children reach school age. By the age of 3 years, children demonstrate a basic appreciation for the concept of complementary and coordinated actions, such as cooperating (Brownell & Carriger, 1990). Greater exposure to social interaction with parents, siblings, and same-aged peers encourages this development. For example, Howe and Ross found that firstborn children demonstrated more positive behaviours towards their younger siblings (and vice-versa), when their parents engaged them in discussions about their younger siblings' feelings (1990). Although infants and preschool-aged children are not comforting, helping, sharing, and cooperating in complex ways, these basic prosocial behaviours are fairly remarkable in that they represent children's early attempts to address others' needs through their actions.

In order to effectively respond to another's needs, one first must appreciate that this individual *has* needs or is having a negative experience (Dunfield, 2014). Dunfield (2014) has identified three broadly defined negative states that, when observed in others, may prompt prosocial responses: 1) undesirable emotional circumstances, 2) lack of resources, and 3) failure to fulfil a goal-directed behaviour. Furthermore, it has been argued that there must be a certain level of fit between the individual's needs and the solution that one generates to address it (Dunfield, 2014). Therefore, prosocial behaviours can be similarly broken down into three broad categories in alignment with the three different negative states: 1) comforting, 2) sharing, and 3) helping.

To be maximally effective, comforting, sharing, and helping should be implemented differentially according to the specific "negative state" with which it is corresponds (Dunfield, 2014). Comforting, for example, is "any deed that is enacted as a means of improving another

person's mood" (Jackson & Tisak, 2001), and therefore the provision of verbal or physical support may alleviate distress when a social partner is experiencing an undesirable emotional state (Dunfield, 2014; Paulus, 2014b). Sharing, which is the act of "giving up one's own resources to benefit another" (Tisak & Ford, 1986), may be employed as a means of resolving inequality in resource distribution. Finally, helping is defined as a "response to people who have incurred negative consequences which have been unintentionally produced" (Tisak & Ford, 1986). Failure to complete a goal-directed behaviour may prompt an offering of one's services in order to ensure that another's goal is accomplished (Dunfield, 2014). As such, effective prosocial behaviours are those that alleviate these states.

Social Competence

The common conceptualization of social competence is that it entails simply behaving in a friendly, cooperative, or prosocial manner (Eisenberg & Mussen, 1989) or exhibiting a "set of desirable social skills" (Rose-Krasnor, 1997). But, this viewpoint may be problematic. Children are faced with diverse social demands in each unique social encounter, and it is not always in their best interest, socially or economically, to behave prosocially. As an illustration, competitive games are embedded in the common social understanding that participants should be actively trying to win. Thus, to truly be competent in competition, one must abide by this expectation. Sharing valuable gameplay resources or helping competitors would be in direct opposition to this social convention, and may convey a lack of understanding of the rules and expectations of competitive games. Furthermore, having more resources often provides a competitive edge within the framework of competition, which can facilitate the individual goal of winning.

Further complicating the understanding of social competence is the way in which it has been measured. For instance, social status (e.g., popularity, social dominance), as evaluated by

peers, has been used as a metric for social competence. Examining peer ratings of a child's social successes can be a useful tool with respect to identifying whether or not children are experiencing shortfalls in social skills. However, this information cannot explain how these deficits manifested, nor can it predict a child's social trajectory (Rose-Krasnor, 1997). Despite clear-cut consequences of peer rejection, less is known about how popularity might predict later success (Rose-Krasnor, 1997). Furthermore, popularity does not convey social aptitude. Although a child may be admired or accepted by his or her peers, that peer group may hold social standards that differ from the norm (e.g., deviant or socially undesirable behaviour; Rose-Krasnor, 1997). Relatedly, children who are rated higher in social dominance may obtain social success (e.g., acquisition of resources, control over social interactions) without much objection from their meeker peers (Charlesworth & la Freniere, 1983). In this scenario, high levels of "social success" obtained in this manner suggest that one has disregarded others' needs (Rose-Krasnor, 1997). Conversely, too little social success implies that one prioritizes the needs of others at their own expense (Rose-Krasnor, 1997). Therefore, it is difficult to infer social competence by peer ratings of social success, popularity, or dominance alone.

Ultimately, demonstrations of appropriate social behaviour are the result of multi-step, socio-cognitive processes. It is not sufficient for a child to learn and apply only prosocial behaviours. Moreover, a seemingly positive social outcome, such as popularity, may be obtained through various means- some of which may not be as effective or socially desirable as others. Therefore, the most pertinent definition of social competence may be one that underscores both process and outcome.

Socially competent behaviour is complex; children must accurately appraise the social world (Putallaz & Sheppard, 1992), determine a relevant social goal, generate and select an

appropriate strategy based on the environment, implement it, and monitor the outcome in order to behave effectively (Rose-Krasnor, 1997). Moreover, children must simultaneously strive to maintain positive relations with others by showing awareness and concern for their needs and meet their own needs (Green & Rechis, 2006; Putallaz & Sheppard, 1992). Given that children encounter diverse social contexts and demands every day, they have to be able to use their behavioural, cognitive, and affective skills to flexibly adapt and modify their behaviours accordingly (Bierman & Welsh, 2000). Therefore, social competence is defined as children's adaptive functioning in the social environment (Ciairano, Visu-Petra, & Settanni, 2007).

Sharing

Within the range of prosocial behaviours, sharing holds a unique place since it is more costly and effortful than comforting or helping. By definition, sharing entails "giving up one's own resources to benefit another" (Tisak & Ford, 1986), whether this is for permanent or temporary use. While it can be difficult for individuals of all ages to part with valued items, this challenge may be amplified for young children whose understanding of social norms and socio-cognitive abilities are still developing (e.g., Brownell, 2013; Brownell, Svetlova, & Nichols, 2009). As such, sharing represents one of the most widely studied types of prosocial behaviour in children (Jackson & Tisak, 2001).

Researchers have used a number of different paradigms to study the development of children's sharing behaviour. One method used to assess children's spontaneous sharing involves introducing children to another agent(s) (e.g., adult investigator, puppet, toy, etc.) and either observing how the children allocate desirable resources amongst themselves and the agent(s) or asking the children how the agent(s) should divide the resources. Researchers can manipulate the behaviour (i.e., provide cues that he or she would like something) or characteristics (i.e.,

friendly, generous) of the agent to determine how children's understanding of fairness and/or willingness to share may vary according to various partner- and context-related factors. For example, one such study conducted by Olson and Spelke (2008) introduced children to a protagonist doll who had valuable resources in her possession. Several other dolls, described as either siblings, friends, or strangers of the protagonist were also presented. Children were then asked to help the protagonist distribute her resources among the dolls to investigate children's judgments of preferential sharing with close others (Olson & Spelke, 2008).

The Ultimatum Game (Güth, Schmittberger, & Schwarze, 1982) and the Dictator Game (Forsythe, Horowitz, Savin, & Sefton, 1994) are two commonly used bargaining games that also offer insight into how people allocate resources amongst themselves and another individual, as well as how people respond to equality and inequality (Camerer, 2003; Castelli, Massaro, Sanfey, & Marchetti, 2014; Roth, Prasnikar, Okuni-Fujiwara, & Zamir, 1991; Yamagishi et al., 2009). In the Ultimatum Game, one participant is responsible for divvying up desirable resources (i.e., stickers, candy, tokens). The second participant must decide if the offer is acceptable; if he or she agrees, then both participants receive the proposed allotment. However, if the second participant rejects the offer, then both parties receive nothing. The allocations proposed in the Dictator Game, on the other hand, are solely the decision of the first participant. The second participant is a passive recipient who is saddled with any offer proposed by first participant. Strategically, proposers in both games should try to maximize their earnings. When playing the Dictator Game, this would mean keeping all items for oneself. Yet, research with adult populations suggests that initial propositions in the Dictator Game are relatively generous. On average, adults will offer to share approximately 20% of the total available resources at the outset of the game (Forsythe et al., 1994). Those in the Ultimatum Game, however, must

consider that offers perceived as unfair may be rejected. Therefore, proposers should try to find the "sweet spot" in which they can give the smallest amount possible without the offer being rejected.

Research has documented that spontaneous sharing with parents first transpires in infancy (e.g., Hay, 1979; Hay & Murray, 1982; Rheingold, Hay, & West, 1976), however, it occurs much less frequently over the course of a child's preschool years than other prosocial behaviours such as helping, comforting, and collaborating (Eisenberg, 2005; Warneken & Tomasello, 2007). Indeed, children are often thought to be quite self-interested when it comes to resource distribution before the age of 5 years (Damon, 1975, 1980). Consequently, sharing often requires explicit cueing by prospective recipients during early childhood (e.g., Brownell, Iesue, Nichols, & Svetlova, 2013; Wu & Su, 2014). More spontaneous and fairer sharing behaviours eventually do follow, as young children develop a greater appreciation for social norms over time.

There have been consistent findings that demonstrate how children's understanding and application of fairness principles (as per their sharing behaviour) evolve. Mainly, their sharing behaviours are reported to increase in frequency as children age, and come to reflect increasingly complex fairness principles of equality, equity, reciprocity, and merit (Benenson, Pascoe, & Radmore, 2007; Blake & Rand, 2010; Gummerum, Hanoch, Keller, Parsons, & Hummel, 2010; Hook, 1978; Hook & Cook, 1979; Lerner, 1974; Leventhal, Popp, & Sawyer, 1973; Rochat et al., 2009; Thompson, Barresi, & Moore, 1997). Children also eventually consider the "rule of need" in their conceptualizations of fairness, which dictates that someone who is in greater need should receive a greater share (Hamann, Bender, & Tomasello, 2014). However, there is a period of time when children's ideas about fairness and their behaviours are not yet integrated. Young children understand, promote, and expect an equal or fair division of resources between two

parties; yet, they often have difficulty enacting these fairness principles before they reach school age (i.e., 7-8 years; Smith, Blake, & Harris, 2013). While children as young as 3 years of age will display emotional reactions to inequality (DeJesus, Rhodes, & Kinzler, 2014), there have been consistent findings suggesting that children under the age of 5 years will typically distribute objects in a manner that benefits their self-interest (Damon, 1975, 1980). In other words, they tend to keep more for themselves. Observational and experimental studies have found that this is particularly true when sharing is costly (Paulus, 2014a). For example, this may be the case if the objects are already in their possession (versus dividing up communal items; for a review, see Ulber, Hamann, & Tomasello, 2015) or in a competitive game where it is advantageous to have more items (Nilsen & Valcke, 2017). These disparate findings suggest that children may be struggling to balance their early preferences for equality and their desire to hold on to prized items.

Other experimental studies have found that being explicitly asked to share results in more generous offerings by children under 4 years of age (e.g., offering 1/3 of resources to a puppet with whom they were asked to collaborate; Ulber et al., 2016). Furthermore, young children rarely refuse to share if asked (Ulber et al., 2016). Although young children may appear greedy due to their reluctance to share spontaneously, explicit cueing can facilitate more generous behaviour.

Although they initially develop in parallel, children's expectations and evaluations of fairness become integrated with their own sharing behaviours (Paulus & Moore, 2014). Eventually, children's appreciation for social norms of reciprocity, fairness, and merit is reflected in their behaviour, which generally occurs as they complete preschool and approach school age. Between the ages of 5 and 7 years, children's behaviour reflects greater adherence to

the rules of equality, as they prefer to distribute equal amounts to all parties (Bereby-Meyer & Fiks, 2013; Hamann et al., 2014). Around the age of 7 years, norms of equity and reciprocity begin to take precedence, and children allocate resources in a manner that is proportional to the recipient's input (Bereby-Meyer & Fiks, 2013). If there is an imbalance in distributions among parties, children of this age will work towards restoring equity (Blake & McAuliffe, 2011). They will even go so far as to discard a valuable item to ensure that the distributions are fair- a behaviour that increases in frequency between the ages of 4 and 8 years (Blake & McAuliffe, 2011; Shaw & Olson, 2012). For example, Shaw and Olson found that, when deciding how to allocate five rewards between two deserving recipients, children aged 3 to 8 years chose to throw away the extra reward rather than create inequity (2012). Moreover, children between the ages of 6 and 8 years did so more frequently than 3- to 5-year-olds (Shaw & Olson, 2012). Thus, children pass through three broad phases of resource distribution (Damon, 1979): 1) selfish distribution, 2) equality-based distribution, and 3) equity-based distribution.

Unfortunately, these studies cannot provide direct insight into a child's true evaluations of fairness and prosocial behaviours, as they simply measure outcome. Therefore, this leaves much to interpretation. For example, two children who share the same number of resources with others may have very different motivations, such as genuine concern for another person, a feeling of obligation due to enforced societal rules and norms, the desire to leave a good impression on observers, or the potential for later reciprocity or rewards (Jackson & Tisak, 2001).

Influences on Sharing Behaviour

In addition to the age-related changes in sharing behaviour noted above, past work has highlighted a number of factors that influence the degree to which children share resources with

others, including who they are sharing with and under what circumstance. Preschool children's sharing behaviour may therefore be affected by factors such as the social context (i.e., cooperative versus competitive), their social history with the recipient, and the goals of the exchange (Paulus & Moore, 2014).

Effects of contextual factors. Children's sharing behaviour is affected by the context in which it occurs. For instance, when asked to allocate resources with others, children who are from collectivist cultures tend to show less selfish sharing than children from individualistic cultures (Henrich et al., 2005; Oosterbeek, Sloof & Van De Kuilen, 2004). Specifically, children from collectivist cultures (i.e., China, India) have been shown to share more willingly, more frequently, more generously, and more spontaneously with recipients compared to same-aged counterparts from individualistic cultures (i.e., America; Rao & Stewart, 1999). Furthermore, children from Western, middle class families tend to share resources spontaneously and equally relatively later in development compared to societies that promote collective values (Blake & McAuliffe, 2011; Fehr, Bernhard, & Rockenbach, 2008; Rao & Stewart, 1999; Rochat et al., 2009).

Outside of the broader cultural context, an important part of social competence is learning that the same behaviour applied under different circumstances may not be appropriate. Cooperation involves coordinating actions with another to obtain a specific goal (e.g., Nelson & Madsen, 1969). Conversely, competition involves working independently to achieve an individual goal (e.g., Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). Previous research has shown that children begin to develop an understanding of the difference between cooperation and competition around the age of 3 years (Schmidt, Hardecker, & Tomasello, 2016).

Typically, studies assessing children's behaviours in cooperative contexts involve a game in which rewards for both parties can be maximized when participants collaborate (Jackson & Tisak, 2001). By 3 years old, children's self-serving behaviours in these cooperative contexts decrease, and they begin to work together with a peer (Huyder, Nilsen, & Bacso, 2017). In fact, they will continue to help their partner reach a joint goal, even if they have already been rewarded (Hamann, Warneken, & Tomasello, 2012), which suggests that young children are not only concerned about winning or being rewarded, but that they want to help their teammates succeed as well.

While there is some evidence suggesting that collaborative behaviours in cooperative contexts increase with age, specifically during the second year of life (Hay, 1979), others have suggested that children become more competitive with age (Bryan, 1975; Cook & Stingle, 1974). In other words, as children become older, they become more driven by individual goals and therefore engage in less collaborative behaviour. Correspondingly, it has been found that children develop a greater appreciation for competitive contexts over time. In competitive contexts, children come to expect that their social partners will behave in a way that is conducive to winning. By the age of 5 years, they demonstrate an understanding that their competitors are working alone to reach their own goal (Schmidt et al., 2016).

Although previous research has shown that children are able to differentiate between cooperative and competitive contexts, and engage in different behaviours within the different contexts, few studies have looked at how children *modify* their social behaviour from context to context. One study that did look at children's ability to shift behaviours between contexts asked school-aged children to complete a puzzle either with a teammate or against a competitor. The results showed that school-aged children (aged 5 to 8 years) showed a context-appropriate

decrease in the proportion of cooperative behaviours (such as asking the other child if they need help, or giving the child a puzzle piece from the pile) from the cooperative to the competitive task (Huyder & Nilsen, 2012).

Within the realm of sharing, preliminary works suggest that preschool-age children are sensitive to the context in which resources are allocated. For example, children were more likely to share items required to complete a task when they were working collaboratively, as opposed to competitively with a (fictional) peer (Nilsen & Valcke, 2017). In this study, researchers employed a resource allocation task wherein children were asked to decide who, between them and a social partner, would receive items that were important to completing a task (e.g., building a tower with blocks, decorating a picture with stickers). In addition to a main effect of context, researchers found that while school-aged children's sharing did not differ significantly from an equal distribution between themselves and their peer, pre-school aged children kept significantly more items for themselves. This was the case in both the cooperative and competitive conditions (Nilsen & Valcke, 2017).

It would seem that behaving cooperatively in a cooperative situation and competitively in a competitive situation would suggest social competence. However, the way in which competition and cooperation are conceptualized can alter the way we interpret the effectiveness of a child's behaviour, and thus impact how we evaluate his or her social competence. Competition and cooperation may be defined as characteristics of a situation (i.e., the "rules") or characteristics of a set of behaviours, or a combination of both (Richard et al., 2002).

For example, a child's sharing behaviours may differ as a function of the rules associated with a given context. If a child exhibits competitive behaviour in a competitive game (i.e., abiding by the rules of competition), he or she may be perceived as socially competent regardless

of the outcome (i.e., winning or losing). Alternatively, a child may implement cooperative strategies (i.e., sharing, collaborating, negotiating, etc.) or competitive strategies (i.e., withholding resources, coercion, etc.) in a competitive game in order to ensure a particular outcome (i.e., winning). Although a child may not be operating within the bounds of competition, the desired outcome has been achieved. If the outcome is valued over the process, then a child might be considered socially competent. Under the latter conceptualization, a desired outcome may involve creating or maintaining friendships rather than winning the game. If a child has the overarching goal of being friendly, he or she might implement cooperative strategies in a competitive game to ensure this outcome is achieved. Thus, the context-driven goals (i.e., winning) may become of secondary importance. In this vein, social partner characteristics may require consideration.

Effects of one's social partner. Previous research has shown that there are many partner-related factors that influence children's sharing behaviours. Familiarity (Newcomb & Bagwell, 1995), social status (Charlesworth & la Freniere, 1983), and reciprocity (Berndt, 1977) are three such factors. Research has shown that children develop a partiality for sharing with their friends over time, despite their reported preferences for equality across the board (Cooley & Killen, 2015). Whereas 3- to 4-year-olds do not differentiate among strangers and friends when sharing, 5- to 6-year-old children show a strong preference for their friends (Yu, Zhu, & Leslie, 2016). Similar research has shown that 4- to 5-year old, but not 3-year old, preschoolers are more inclined to share with friends than with disliked peers, and expect others to do the same (Moore, 2009; Paulus & Moore, 2014). Sharing has the reverse effect as well; children are able to discriminate between preferential and impartial sharing behaviours, and subsequently infer

friendship between parties when they witness distributors demonstrating partiality towards their recipients (Liberman & Shaw, 2017).

Group membership also plays a role, as school-aged children are inclined to share more with in-group members than with out-group members (Fehr et al., 2008). In this vein, children have been shown to evaluate resource distributors who share equally across their own and another group under competitive circumstances as being subjectively "nicer" (i.e., evaluation), but do not expect people to behave in this manner (i.e., expectation; DeJesus et al., 2014). These divergent beliefs related to evaluation and expectation become more pronounced with age; across the ages of 4 to 10 years, children begin to adopt a "more complex view of others' actions and motivations" (DeJesus et al., 2014) and understand that their appraisals of what should occur may not align with reality. These studies of sharing amongst friends and in-group members suggest that children begin to weigh considerations for fairness and justice with obligations and concerns for social relationships, such as group identity, cohesion, and loyalty as they age (Killen, Margie, & Sinno, 2006; Rutland, Killen, & Abrams, 2010).

Children have also been found to share more resources with another person when that person has exhibited prosocial behaviour in the past, even if the behaviour was not directed towards them (Martin & Olson, 2015). This tends to become more prominent as children get older. Research has shown that 2 ½-year-olds help or share regardless of whether their partner returns the favour, but 3-year-olds share less over time if their partner never reciprocates (Martin & Olson, 2015)**.** Such findings extend beyond direct reciprocity. Children who witness indirect reciprocity (i.e., a mutual exchange between two people) are also more likely to share with those who were involved in the exchange. For example, 19-month olds prefer to reward an individual who helped, rather than hindered, a third party (Martin & Olson, 2015).

The element of reciprocity can also guide more self-serving motivation, meaning, if a social partner's resources are considered valuable, one might consider sharing with them in order to stimulate a future advantageous exchange. Research has found that children are more generous with their social partners when their partner's resources are highly valued (Xiong, Shi, Wu, & Zhang, 2016). They are also able to consider anticipated reciprocity in advance, and adjust their sharing behaviour according to whether or not the partner may potentially reciprocate. Furthermore, children are able to evaluate the value of the payback relative to the cost of the lost resources (Xiong et al., 2016). Taken together, these studies suggest that children's sharing behaviour becomes more selective over time based on the recipient (Hay & Cook, 2007).

It may be the case that children are able to modify their sharing behaviour in a flexible way based on their social partner's behaviour. Certainly, this flexibility is demonstrated in other aspects of social behaviour. For example, research has shown that children are able to dynamically shift their behaviours in response to the actions of another person during an interaction (Huyder & Nilsen, 2012). In other words, when a child's social partner is behaving more cooperatively (within both cooperative and competitive situations), the child will, in turn, behave more cooperatively. This aligns with Rapoport's tit-for-tat strategy (1973), whereby the benefit for both parties is maximized when an individual (or a computer program in the context of game theory) first cooperates with an opponent, then waits for the opponent's response, and subsequently replicates the opponent's move (Axelrod & Hamilton, 1981; Chadwick-Jones, 1976). If an individual cooperates, so too does his or her opponent. But when an individual stops cooperating, the social partner will also discontinue cooperative behaviours.

Effects of children's socio-cognitive skills. Given the developmental changes in children's sharing behaviour, it may be the case that, in order for more sophisticated sharing

behaviour to emerge, a child requires some prerequisite socio-cognitive and cognitive skills. Indeed, as more complex thinking and reasoning abilities come online, it has been found that children are better able to learn, understand, and apply social rules (Ding, Wellman, Wang, Fu, & Lee, 2015). Thus, it may be the case that variability in children's sharing behaviours can be accounted for by variability in their socio-cognitive and cognitive skills at any given age.

One such skill, theory of mind (ToM), is a socio-cognitive tool that allows for the attribution of mental states to oneself and others, and facilitates the understanding that others have mental states that differ from one's own. Skills central to theory of mind emerge in early childhood, and children show substantial improvement on ToM tasks between the ages of 3 and 5 years (Perner & Lang, 1999). These skills typically develop through natural interaction and play (Benson, Sabbagh, Carlson, & Zelazo, 2013). One way in which ToM development is facilitated is through parent-child conversations about emotions and mental states, particularly across a variety of contexts (Dunn, Brown, & Beardsall, 1991; Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Laranjo, Bernier, Meins, & Carlson, 2010).

Theory of mind ability is closely related to cooperation skills (Sidera et al., 2013). In fact, there is evidence from studies with adults suggesting that there are common underlying neurological processes that underlie ToM and prosocial beahviour. Functional magnetic resonance imaging (fMRI) revealed that the medial prefrontal cortex, which is the brain area related to ToM, was activated when adults participated in an activity that required cooperation (McCabe, Houser, Ryan, Smith, & Trouard, 2001). Studies with children have also shown that, regardless of age, ToM skills are linked to the effectiveness when participating in cooperative tasks (Sidera et al., 2013). In addition, some aspects of ToM understanding, specifically False Belief understanding (i.e., the understanding that another person may have a belief that differs

from reality), are related to sharing behaviours. Those who had less advanced abilities with respect to making inferences about others feelings and desires behaved more selfishly when distributing candies in an Ultimatum Game. It may be the case that these children's difficulty with adopting another's perspective impaired their ability to consider that the recipient might be disappointed or angry about the distribution, or even that retaliatory behaviours might ensue (Takagishi, Kameshima, Schug, Koizumi, Yamagishi, 2010).

Most studies focus on the positive role of ToM on children's behaviours, such as more generous and spontaneous sharing (Wu & Su, 2014) and fairer division of resources between peers (Takagishi et al., 2010). Although there is evidence supporting the suggestion that being able to explicitly consider what other people are thinking and feeling is positively related to children's tendencies to act in various prosocial ways (i.e., helping, cooperating, comforting; Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016), it is important to consider that ToM also enables the understanding of deception, pretence, and false beliefs about reality (Sidera et al., 2013). This implies that, there may be circumstances in which advanced ToM ability does not directly translate into prosocial behaviour, rather, it may allow for the use of a range of strategies such as deception, persuasion, coercion, and manipulation. For example, a recent study with preschool aged children showed that those who had received ToM training were more inclined to lie to experimenters to ensure that they receive a candy reward compared to those without training (Ding et al., 2015). In other words, those with higher ToM may have the mentalization abilities that allow them to become skilled and strategic competitors.

In addition to understanding the intentions of social partners, children may require cognitive skills that enable them to use the information in order to regulate their behaviours (Nilsen & Fecica, 2011). For instance, executive functioning (EF) skills, the controlled cognitive

processes that facilitate higher-order thinking skills (Thorell & Catale, 2014), may assist with the processing of social information and subsequent goal-directed social behaviour (Ciairano et al., 2007). These skills are particularly important in controlling, directing, monitoring and generally regulating lower-level thoughts, behaviour, and emotions (e.g., Carlson, Zelazo, & Faja, 2013). Executive functioning skills emerge early in life and continue to develop through to adulthood (Diamond, 2016; Huizinga, Dolan, & van der Molen, 2006). Specifically, initial forms of EF emerge between the ages of 3 to 5 years (Garon, Bryson, & Smith, 2008). Even this early in life, EF can predictive of school readiness (Blair & Peters, 2003), as well as success with respect to numeracy and literacy (Blair & Razza, 2007). Furthermore, deficits in EF have been associated with a variety of "negative developmental trajectories", including aggression, attention-deficit-hyperactivity disorder (ADHD), autism spectrum disorder (ASD), learning problems, and anxiety and mood disorders (Johnson, Humphrey, Mellard, Woods, & Swanson, 2010; Nilsen & Valcke, 2017).

Core executive functioning abilities are commonly thought to consist of three different components: inhibition (i.e. intentionally supressing an automatic response; Lee, Bull, & Ho, 2013) cognitive flexibility (i.e., shifting inferences or strategies in response to changing cues and task demands; Deák & Narasimham, 2003), and working memory (i.e., updating and monitoring information while holding it in mind; Garon et al., 2008). Factor analytic studies suggest that, while related, executive functioning abilities map onto these three distinct components (Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). These core EF competencies allow for more complex forms of mental control such as attentional control, planning, time management, and organization (Miyake et al., 2000). Others, however, suggest different configurations for EF. Some suggest that EF reflects a single construct with "partially dissociable components" (Brocki

& Bohlin, 2004; Hughes, Ensor, Wilson, & Graham, 2010; Wiebe, Espy, & Charak, 2008; Wiebe et al., 2011). In other words, the individual components load onto the same factor because they are so highly related. Recent work has found evidence for a two-factor framework consisting only of working memory and inhibition, with cognitive flexibility loading onto working memory ability (Miller, Giesbrecht, Müller, McInerney, & Kerns, 2012; Müller & Kerns, 2015). Some studies suggest a combination of the aforementioned structures, and propose that EF competencies are initially distinct until they become integrated during the preschool years. Later in development, they become separable again (Howard, Okely, & Ellis, 2015).

Whether one construct or several related abilities, executive functioning has been found to give rise to a host of social behaviours and positive social outcomes. Studies have also shown that weak inhibitory control at the age of 3 years was related to a greater number of negative peer exchanges at the age of 4.5, relative to those with good inhibitory control (Ciairano et al., 2007). Similarly, when completing a puzzle with another child, those with high levels of inhibitory control demonstrated more cooperative behaviours (Ciairano et al., 2007). Furthermore, children with poor inhibitory control show greater levels of externalizing behaviours (Nigg, Quamma, Greenberg, & Kusche, 1999).

Inhibitory control is not the only component of EF that enables positive social behaviours. Cognitive flexibility has been positively correlated with 7- to 9-year-old children's ability to cooperate (Bonino & Cattelino, 1999; Ciairano, Bonino, & Miceli, 2006). In addition, the ability to shift has been related to lower levels of aggressive behaviours and has been found to be predictive of later adjustment and positive peer relationships (Bonino & Cattelino, 1999; Ciairano et al., 2007). Greater working memory capacity better allows children to take in, mentally manipulate, and update information. It has been shown to facilitate social interactions

that require perspective taking, as it allows children to hold a social partner's perspective in mind for the duration of a social interaction (Mutter, Alcorn, & Welsh, 2006). Furthermore, when reasoning about another person's perspective, it is important to be able to contrast the social partner's perspective with reality (e.g., another may hold false beliefs about reality) or balancing it with one's own perspective (Mutter et al., 2006). It follows, then, that working memory might affect children's ability to engage in positive social interactions. Indeed, research has shown that low working memory performance has been associated with peer rejection (McQuade, Murray-Close, Shoulberg, & Hoza, 2013). Kindergarten students with low working memory scores at the beginning of the school year were reported to have strained relationships with their teachers one year later (i.e., increased teacher-child conflict, decreased teacher-child warmth; de Wilde, Koot, & Lier, 2016). Furthermore, low working memory scores were also linked to poorer outcomes with respect to peer-nominated "likeability" ratings, as they experienced decreases over the course of the school year (de Wilde et al., 2016).

While there is limited work in this area, there is some evidence that executive functioning is important for sharing behaviour specifically. Sharing may require that one inhibit the tendency to keep all limited or valuable resources for oneself (Paulus et al., 2015). In this vein, children with better inhibitory control at 30 months of age were found to share more stickers with others when they were 5 years old (Paulus et al., 2015).

Together, theory of mind and executive functioning skills appear to be critical to children's ability to engage in socially competent interactions, especially when sharing. Children must use their theory of mind and executive functioning skills to inhibit their own desires, hold another's desires or intentions in mind, and shift their behaviour accordingly.

Summary and Thoughts for Future Directions

In sum, children demonstrate a number of prosocial behaviours, which are actions that promote harmonious relations with others, quite early in their lives (Jackson & Tisak, 2001). Contrary to intuition, however, it is not always prudent to display prosocial behaviours. That is, prosocial actions are not always the most appropriate behaviour for a given scenario. Rather, what is considered appropriate behaviour is dictated by the social context as well as the nature of one's social partner. While there is preliminary evidence to suggest that sharing behaviour may also be impacted by context (e.g., Nilsen & Valcke, 2017), this has not been extensively researched. Furthermore, a child's ability to engage in prosocial behaviours is constrained by his or her own cognitive abilities, which may enable him or her to learn and apply social rules (Ding et al., 2015). Therefore, to be perceived as socially competent, children must learn to use their behavioural, cognitive, and affective skills to flexibly adapt to various social situations and social partners (Bierman & Welsh, 2000). Children's executive functioning has been found to relate to a number of social behaviours, such as collaborating and communicating (e.g., Ciairano et al., 2007), but there is limited work examining the extent to which executive functioning supports sharing behaviour (although see Paulus et al., 2015).

It may be that these factors (i.e., context, social partner, and socio-cognitive/cognitive skills) interact. That is, it may be the case that the set of skills needed for behaving in one context (or with one type of social partner) differs from behaving in another. For example, children's theory of mind has been shown to be an important prerequisite for sharing items with a stranger, but does not predict sharing behaviour towards friends (Yu et al., 2016). Related findings from Paulus and colleagues (2015) demonstrated that children's goal encoding at 7 months of age

predicted their sharing behaviours towards a disliked peer at age 5 years, however, this was not the case for sharing behaviours with friends.

It may also be the case that the same set of skills gives rise to different behaviours in different contexts. Indeed, previous research has shown that better theory of mind is related to more collaborative behaviours in preschoolers within a cooperative context than within a competitive context (Takagishi et al., 2010). Specifically, those who passed a ToM task made fair offers more frequently than those who had not passed the task. Conversely, when in a competitive context, those who had better theory of mind tended to engage in more "poaching moves" by taking more resources from a competitor during a resource allocation game (Priewasser, Roessler, & Perner, 2013). In addition, a study with adults found that while ToM was related to increased consideration of others' intentions and desires in a competitive context, it led to more selfish behaviour (Epley, Caruso, & Bazerman, 2006). In this case, participants assumed that their competitors would behave in a self-serving manner, and tailored their own actions accordingly. These studies suggest that context moderates the influence of ToM on the type of social behaviour elicited, however this notion has not yet been examined empirically.

Seeking to advance this literature, the current work examined the interplay between context, social partner, and socio-cognitive abilities using a sharing task. More specifically, it aimed to determine if preschoolers were able to shift their sharing behaviours across cooperative versus competitive contexts during a computerized resource allocation game, and, if so, whether such a difference is malleable to other factors such as receiving altruistic versus selfish messages from a social partner. Given that theory of mind may be particularly pertinent to a child's ability to flexibly adapt their behaviours across contexts (as social partners' intentions are quite different in cooperative contexts compared to competitive contexts), the current study included

several tasks that assess children's ability to reason about the mental states of others, as well as the executive functioning skills that support these mentalizing abilities.

Introduction

Sharing, helping, comforting, and cooperating behaviours emerge in their most basic forms very early in life. Between the ages of 8 months and 2 years, children are learning to coordinate their actions with the needs of those around them through these prosocial behaviours (Carpendale et al., 2015; Dunfield, 2014; Dunn & Munn, 1986; Henderson & Woodward, 2011; Tomasello, 2007; Wu & Su, 2014). Though the various forms of prosocial behaviour overlap in some respects (e.g., they benefit others, they advance social relationships, etc.), they all have unique features. Sharing is especially distinctive and intriguing, given that it entails a "costly and nonreciprocated allocation of personal resources" (Malti et al., 2016). While it can be difficult for individuals of all ages to part with prized items, this challenge may be magnified for young children whose socio-cognitive abilities and understanding of social norms (e.g., fairness, reciprocity, etc.) are still developing (e.g., Brownell, 2013; Brownell et al., 2009). The present study investigated the influence of contextual and partner-related factors on preschool-aged children's (4- to 6-year-olds) inclination to share or withhold resources from others, as well as the individual differences in thinking and reasoning skills that may independently predict sharing behaviour.

Highlighting the challenge of sharing, research has documented that sharing occurs much less frequently over the course of a child's preschool years than other prosocial behaviours such as helping, comforting, and collaborating (Eisenberg, 2005; Warneken & Tomasello, 2007). When children do share with others, their distributions are typically self-interested before the age of 5 years (i.e., they keep more for themselves; Damon, 1975, 1980). Moreover, sharing often requires explicit cueing by prospective recipients during early childhood (Svetlova, Nichols, & Brownell, 2010; Wu & Su, 2014).

Over time, as more complex thinking and reasoning abilities develop, children are better able to learn, understand, and apply social rules (Ding et al., 2015). As these socio-cognitive abilities come online, children's sharing behaviours start to shift. Children begin to develop an appreciation for social norms of reciprocity, fairness, and merit, and they demonstrate their understanding of these social rules through increasingly more spontaneous and generous sharing behaviours (Wu & Su, 2014). Between the ages of 5 and 7 years, for example, children abide by rules of equality by creating equal divisions of resources, as well as rejecting enticing offers made by others or discarding valuable items to prevent inequality (Blake & McAuliffe, 2011). Around 7 years of age, children begin allocating items based on rules of equity and merit, by offering more to individuals who are more deserving (i.e., greater demonstration of need, greater input; Hamann et al., 2014).

Past work has explored a number of factors that influence children's sharing behaviour, beyond their age. For instance, the context in which the behaviour occurs is important. Children encounter a variety of social contexts, including situations in which they must collaborate with others to achieve a common goal (i.e., cooperation; e.g., Nelson & Madsen, 1968) or work independently, perhaps against another person, to achieve an individual goal (i.e., competition; e.g., Johnson et al., 1981). Since one set of behaviours will not generalize to every social interaction, children must develop the ability to evaluate the social environment, determine a relevant goal, and generate an appropriate strategy to achieve it (Putallaz & Sheppard, 1992). Generally speaking, children's social behaviour is impacted by context in that they tend to engage in more collaborative behaviours towards others (i.e., asking if a partner needs help, offering to share with them) in a cooperative context versus a competitive context (Huyder & Nilsen, 2012).

Within the realm of sharing, preliminary work suggests that preschool-age children are sensitive to the context in which resources are allocated. For example, when asked to decide who, between them and a (fictional) social partner, would receive items that were important to completing a task, children were more likely to share if they asked to work collaboratively, as opposed to competitively with a (fictional) peer (Nilsen & Valcke, 2017).

While previous research has shown that children are able to differentiate between cooperative and competitive contexts, and engage in different behaviours within those contexts, few studies have looked at whether children are able to *shift* their social behaviour according to situational context. One study that did examine children's ability to shift behaviours between contexts asked school-aged children to complete two puzzles with a social partner. Children were required to complete the first puzzle while working in a cooperative context (i.e., as teammates). One week later, the same set of partners completed a second puzzle while working in a competitive context (i.e., as opponents). The results showed that school-aged children demonstrated a context-appropriate decrease in the proportion of cooperative behaviours (such as asking the other child if they need help, or giving the child a puzzle piece from the pile) from the cooperative to the competitive task (Huyder & Nilsen, 2012).

In addition, social partners may factor in to children's decisions about sharing. Previous research has shown that children come to be selective sharers over time, with partner-related factors such as familiarity, reciprocity, and social status playing a role (Harbaugh & Krause, 2000; Moore, 2009; Olson & Spelke, 2008). For example, 3- to 4-year-old children do not differentiate among strangers and friends when sharing, whereas 5- to 6-year-old children show a strong preference for their friends (Yu et al., 2016). Similarly, children become increasingly inclined to share with in-group rather than out-group members (DeJesus et al., 2014).

A social partner's potential for reciprocity is another important consideration for young children, as it could lessen the perceived costs associated with sharing (Sebastián-Enesco & Warneken, 2015). Between the ages of 2 and 3 years, children help or share regardless if their partner returns the favour, but 3-year-olds become less willing to share if their partner never reciprocates (Martin & Olson, 2015). Children who witness indirect reciprocity (i.e., an exchange between two other people) are also more likely to share with those who were involved in the exchange. For example, 19 month olds prefer to reward an individual who helped, rather than hindered, a third party (Martin & Olson, 2015). It may be the case that children are able modify their sharing behaviour in a flexible way based on their social partner's behaviour. For example, research has shown that children are able to dynamically shift their behaviours in response to the actions of another person during an interaction (Huyder & Nilsen, 2012). In other words, when a child's social partner is behaving more cooperatively (within both cooperative and competitive situations), the child will, in turn, behave more cooperatively.

The degree to which children will be impacted by subtle cues (i.e., as opposed to direct behaviours) from social partners, however, is unclear. For instance, if a child is presented with a message that suggests (indirectly) that his or her social partner has adopted a more cooperative stance (rather than one that is competitive or egocentric), will the child decide to share more? There is reason to believe that children may shift their sharing behaviours according to comments generated by their peers. A study by Underwood and colleagues looked at children's verbal and behavioural reactions to antagonizing comments made by social partners (i.e., actors) during a computer game task (Underwood, Hurley, Johanson, & Mosley, 1999). When 8-, 10-, and 12-year old children were provoked by their social partners during the game, they responded with more negative statements about the actor and more positive statements about themselves

(perhaps as a means of defending themselves). Moreover, a number of children were so bothered by their antagonistic social partners' remarks that they opted to stop playing the game altogether (Underwood et al., 1999).

The first aim of the current work was to address these gaps in the literature through an examination of the role of *context* and *message from a partner* (and the interaction between these two factors) in children's sharing behaviour. This aim was achieved through a task that altered the conditions under which children were asked to allocate resources between them and a (fictional) peer. It was anticipated that children would generally demonstrate sensitivity to the social context (i.e., cooperative versus competitive), and that messages from social partners would cause children to alter their sharing behaviours. Moreover, it was anticipated that the effects of context would be magnified under certain message conditions.

A second aim was to explore the socio-cognitive and cognitive skills that may facilitate children's sharing behaviour. Theory of mind (ToM) is a socio-cognitive tool that allows for the attribution of mental states to oneself and others, and facilitates the understanding that others have mental states that differ from one's own (Premack & Woodruff, 1978). ToM has been linked to sharing behaviours such that those who had less advanced abilities with respect to making inferences about others feelings and desires behaved more selfishly when distributing candies in an Ultimatum Game (Takagishi et al., 2010). Takagishi and colleagues propose that children's difficulty with adopting another's perspective may impair their ability to consider that the recipient might be disappointed or angry about the unfair distribution, or even that retaliatory behaviours might ensue (2010).

Another set of important socio-cognitive abilities are executive functions (EF). These are the controlled cognitive processes that facilitate goal-oriented thoughts and behaviours.

Processes central to EF abilities are commonly thought to consist of three components: inhibition (i.e. intentionally supressing an automatic response; Lee et al., 2013), cognitive flexibility (i.e., shifting inferences or strategies in response to changing cues and task demands (Deák & Narasimham, 2003), and working memory (i.e., updating and monitoring information while holding it in mind; Garon et al., 2008). While some believe that there is significant overlap among these core components (i.e., they represent a single construct; e.g., Brocki & Bohlin, 2004), others believe they are related, yet distinct constructs (Miyake et al., 2000). Regardless of structure, these skills are particularly important in controlling, directing, monitoring, and regulating lower-level thoughts, behaviour, and emotions (e.g., Carlson et al., 2013)

In addition to ToM ability, sharing may require the use of EF. Certainly, EF is important in facilitating a number of social behaviours and outcomes throughout the preschool and childhood years, such as increased levels of cooperation (Ciairano et al., 2007), fewer externalizing behaviours (e.g., aggression; Nigg et al., 1999), and more positive peer relationships (e.g., Bonino & Cattelino, 1999). Within the context of sharing, EF may also play a role, as one must inhibit the tendency to keep all limited or valuable resources for oneself in order to share with others (Paulus et al., 2015). In this vein, children with better inhibitory control at 30 months of age were found to share more stickers with others when they were 5 years old (Paulus et al., 2015).

A gap in this literature, however, is the degree to which such skills are required for particular sharing contexts. That is, it may be the case that the set of skills (i.e., ToM and/or EF) needed for behaving in one context (or with one type of social partner) *differs* from the skills needed for behaving in another. There is reason to believe this may be the case. For example,

children's theory of mind has been shown to be an important prerequisite for sharing items with a stranger, but does not predict sharing behaviour towards friends (Yu et al., 2016).

Although there is plenty of evidence supporting the suggestion that being able to explicitly consider what other people are thinking and feeling is positively related to children's tendencies to act in various prosocial ways (i.e., helping, cooperating, comforting; Imuta et al., 2016), it is important to consider that ToM also enables the understanding of deception, pretence, and false beliefs about reality (Sidera et al., 2013). This implies that, there may be circumstances in which advanced ToM ability does not directly translate into prosocial behaviour, rather, it may allow for the use of a range of strategies such as deception, persuasion, coercion, and manipulation. Indeed, previous research has shown that those who passed a ToM task made fair offers more frequently than those who had not passed the task. Conversely, when in a competitive context, those who have better theory of mind tend to engage in more "poaching moves" by taking more resources from a competitor during a resource allocation game (Priewasser et al., 2013). Moreover, a recent study with preschool aged children showed that those who had received ToM training were more inclined to lie to experimenters to ensure that they received a candy reward compared to those without training (Ding et al., 2015). In other words, those with higher ToM may have the mentalization abilities that allow them to become savvy competitors. Ultimately, these studies suggest that context moderates the influence of ToM on the type of social behaviour elicited, however this notion has not yet been examined empirically.

Finally, it may be the case that the set of skills needed for social behaviour differs for children of different ages. For instance, ToM was important for children's social behaviour

within a cooperative task at the preschool age, but not within the school age (Huyder et al., 2017).

In sum, the previous research has suggested that social context, information about social partner, and individual differences in thinking and reasoning skills independently impact preschoolers' sharing behaviour. However, less is known about how these factors may work together to influence how young children share. Adding to this line of work, the present study used a resource allocation task to assess how children determine who, between themselves and a (fictional) social partner, should receive items that were important to winning a game. Preschool aged children (4-6 years) were informed that they would be working with (i.e., cooperating) or playing against (i.e., competing) their social partner before they were asked to divide the gameplay items. I was interested in determining whether or not preschool-aged children are sensitive to contextual cues when sharing, as the previous research suggests they might be. More importantly, because all of the children were able to experience both contexts during the study, I was able to assess whether they are able to flexibly adapt their behaviour to reflect the competitive and cooperative contexts in which they are operating. It was predicted that (Hypothesis 1) *children would shift their behaviours across contexts, by allocating more resources to their teammates than their competitors*.

Participating children were also given the opportunity to "interact" with their social partners. Virtual players provided audio messages for the participants, which either conveyed a willingness to collaborate (i.e., team-oriented messages; e.g., "I hope *we both* do really well!"), or not (i.e., self-oriented messages; e.g., "I hope *I do* really well!"). Although the children were not specifically asked about their impressions of the other child, it was anticipated that they would make judgements about the other child based on the messages that they received and that

they would subsequently use these judgements to inform their decisions regarding the division of gameplay items. Therefore, I was also interested in determining how children's sharing behaviours changed depending on the nature of the messages they received from their social partner. It was predicted that (Hypothesis 2) *self-oriented messages from a social partner would generally lead to sharing of fewer resources*. Children's responses to their social partners' messages were also evaluated. It was predicted that (Hypothesis 3) *participating children would "match" the virtual players messages, by generating the same type of message (i.e., self-oriented or team oriented) in their responses.* In other words, self-oriented messages from virtual players would elicit self-focused statements from participating children, whereas team-oriented messages would elicit more collaborative, cooperative replies.

As it pertains to the specific contexts*, a context by message interaction was predicted* (Hypothesis 4). The self-oriented messages were hypothesized to be particularly damaging to the joint efforts associated with the cooperative context. It was anticipated that the off-putting tone of these messages would undermine cooperative contextual cues, leading to fewer sharing behaviours in a cooperative context than would be the case for team-oriented statements. In contrast, however, the competitive context was expected to be salient for the children (i.e., driving their sharing behaviours), so salient that team-oriented messages in this context may not impact sharing behaviours.

Addressing the second research aim, children's socio-cognitive abilities were also assessed. It was anticipated that thinking and reasoning skills might allow children to behave strategically according to the context in which they are operating. Particularly perceptive players may understand that the best strategy when cooperating would be to divide the resources equally, whereas it is advantageous to keep more resources for oneself when competing. Moreover, those

with higher ToM would have better access to the intentions of a competitor, and they may expect opponents to keep more for themselves. Thus, it was predicted that (Hypothesis 5) *greater socio-cognitive skills, particularly ToM, would be correlated with these increased sharing behaviours when children are working collaboratively with a peer, and fewer sharing behaviours when they are asked to compete*. Moreover, it was predicted that (Hypothesis 6) *the distinction between number of resources shared across the two contexts (i.e., the extent to which children shift across contexts) would be greatest for children with higher EF because they would be better able to regulate and shift their behaviour.*

Finally, developmental patterns were explored by examining the behaviour of children at three different age groups (4, 5, and 6 years old). As per previous research (e.g., Hamann et al., 2014), it was anticipated that (Hypothesis 7) *children within the older age group would show more adherence to rules of fairness in terms of equal distribution, particularly in the cooperative context.* It was unclear whether children of different ages would be equally impacted by the contextual and partner cues.

Method

Participants

Four- to 6-year-old children were recruited from elementary schools in a mid-sized Canadian city (N = 121; M_{age} = 64.3 months; SD = 7.35 months; 63 females). Participant data was excluded when there was examiner error (n = 1), when participants rescinded their assent to participate after hearing the initial instructions (n = 3), or when they did not complete all conditions within the resource allocation task (n = 7). Children who were under 48 months of age were also removed from analyses (n = 1). Participants who were reported to have been diagnosed with or who were suspected of having neurodevelopmental concerns were not included in the

analysis (n = 4). The data of those reported to have concerns with motor development (n = 2) were included in the analyses, as none of the administered tasks required significant motor coordination. Thus, 16 participants were removed from the analyses altogether, leaving N = 105 participants (M_{age} = 65.14 months*; SD* = 6.98 months; 58 females). Developmental patterns were explored by examining the behaviour of children at three different age groups: 4-year-olds (n=34; M_{age} = 56.78*; SD* = 2.38 months, 23 females), 5-year-olds (n=51; M_{age} = 67.10*; SD* = 3.33 months, 27 females), and 6-year-olds (n=20; M_{age} = 74.38*; SD* = 1.43 months, 8 females).

The majority of participants in the remaining sample (75%) were reported to have spoken English since birth (n = 79). Approximately 46% of participants were reported to only speak English at home (n =48), while the remaining 54% of participants also spoke another language in the home to varying degrees (n = 57). Spoken languages in the home included, but were not limited to, French, Spanish, Arabic, and Mandarin. In terms of parent education level, approximately 69.5% of mothers (n= 73) and 61.9% of fathers (n= 65) were reported to have a university degree or higher. Education information was not available for a small proportion of parents (n=7).

Procedure

Consent forms, which outlined the tasks involved in the study, were distributed in kindergarten classrooms and returned to the researchers by interested parents. Children provided their assent prior to testing following a description of the study. Those who agreed to participate completed the tasks individually in a quiet room within their school (or, if parents requested, at the research laboratory). The tasks were administered in a pre-determined order during one 45-60 minute session. The resource allocation task was first, followed by three executive functioning

tasks (i.e., the Red Dog/Blue Dog task, the Digit Span task, and the Object Classification Task), and finally a brief series of Theory of Mind tasks.

Resource allocation task.

The design. The resource allocation task was a 2 x 2 repeated measures design (Context x Message). Children experienced two gameplay contexts (i.e., cooperative and competitive) and received two types of messages from their gameplay partner (i.e., self-oriented and team-oriented). Each condition had 2 trials, such that there was a total of 8 trials. The trials were described to the children as games.

Introducing the task. Seated side-by-side at a table, the experimenter presented children with a series of 8 games (i.e., trials) on a Google Pixel C Tablet. During the study, the tablet was referred to as an "iPad", and these terms will be used interchangeably from this point forward. Initially, participants were informed that they would be playing a series of 8 games on the iPad (see Figure 1) with 4 other children of the same age and gender who attend different schools. It was explained to the participants that these 4 other children would be playing concurrently on their own iPads, while guided by other researchers at their respective schools. Unbeknownst to the participants, the 4 other players were merely virtual players. Under the guise that the participants had been the first to log on to the iPad, they were given the (exciting) responsibility of setting up the game prior to playing.

Task objective. The rules of the 8 games were explained individually so that the participants would understand how each game would need to be "set up". Each game entailed completing a task within a given time limit, wherein there were 25 game-related items. For example, one of the games involved replacing 25 fallen leaves to a barren tree (by moving leaves on to the branches by swiping one's finger across the screen, see Figure 1), while another

involved decorating a plain cupcake with 25 sprinkles. The children were able to practice using the touch screen by dragging the objects across the screen during a practice trial. Following the practice, the children were told that the items needed to be divided between both players (e.g., leaves, sprinkles, buttons, beads, etc.) prior to playing. The rationale for this division of items was that there would be a large number of gameplay items to work with and only a limited amount of time to play each game. An example of the script used follows:

> "You will be putting as many leaves back onto the tree as you can and you will have to work as fast as you can! But there probably won't be enough time to put *all* of the leaves back onto the tree. So, to set up the game, your job is to choose how many leaves to give to [partner] for the game and how many leaves you will keep for the game."

Gameplay partners and context. Each time a new game was initiated, the participants were informed of the context of the game (i.e., cooperative or competitive). They were also introduced to the virtual player with whom they would be cooperating or competing. In the cooperative context, the children were told that they would be completing the game with a teammate (i.e., the virtual player) and they were told that both teammates would win a prize if they win against another team of two same-aged children. In the competitive context, the children were told that they would be working independently against the virtual player and that only one person, the winner of the game, would win the prize.

For each condition, participants were paired with a new partner who was the same gender. A silhouette of a child of the same gender appeared on screen, and the children were reminded that this player was the same age as them (see Figure 1). They were told they would be playing with or against their gameplay partner for two trials. All participants encountered the virtual

partners in the same order (i.e., Mia, Ava, Emma, Sophia; Jack, Ethan, Liam, Noah; with alternate names used when the participant shared a name with the virtual player). Participants were assigned the same partners for two consecutive game set-ups, and that partner was consistently a teammate or a competitor for both games. The game pairings were presented in the same order (i.e., 1) Tree Game/Teddy Bear Game, 2) Puzzle Game/Flower Game, 3) Bead Game/Block Game, 4) Cupcake Game/Baby Bird Game), but the order of conditions (cooperative/competitive) was counterbalanced across participants and, within each condition, the order of tasks was counterbalanced.

Audio messages and responses. After being introduced to their partner, participants were shown a brief demonstration of the game and were provided the opportunity to practice the game. Prior to setting up for the game (i.e., distributing the gameplay items), participants received an audio message, accompanied by the player's image and the message, from the virtual player via the iPad (see Figure 1). Audio messages were created using the pre-recorded voices of 5- and 6-year-old children (4 boys and 4 girls). Eight recordings were created using each child's voice, such that the voices could be counterbalanced across the different conditions.

The messages were oriented to be either self-oriented (e.g., "I think I will win") or team-oriented (e.g., "I think we will win"). Across the orientations, the messages were matched for content other than the pronoun (e.g., "I" versus "we"). A total of 8 different messages were sent to participants (one for each game: "I am the best" / "We are the best"; "I am better than other kids at games" / "We are better than other kids at games"; "I hope I do really well" / "I hope we both do really well"; "I think I will win" / "I think we will win"). Prior to setting up each game, the participants heard the message from the virtual player. As each virtual player was the participant's partner twice (i.e., two games per condition), two messages were sent from each

virtual player that were always of the same orientation (i.e., self- or team-oriented). The messages were counterbalanced across the conditions such that participants heard messages from their gameplay partners that were both congruent with the context (i.e., cooperative messages in a cooperative context, competitive messages in a competitive context) and incongruent with the context (i.e., competitive messages in a cooperative context, cooperative messages in a competitive context).

Immediately following the receipt of each message, the participants were asked to generate a verbal response to be sent back to their gameplay partner, which was transcribed verbatim and coded later by a research assistant, who was blind to the research hypotheses and conditions. Participants generated one reply for each message they received, resulting in two responses per condition. Participants' responses were coded for gameplay-related statements and to whom the messages were directed, and were classified accordingly into 12 categories (i.e., each statement received a score ranging from 0 to 1 for each category; see Table 1 for detailed category descriptions). Gameplay-related coding categories included Pro-Team, Anti-Team, Pro-Self, Anti-Self, Pro-Other, and Anti-Other statements. In addition, responses that were not directly related to gameplay were categorized as Agreement or Disagreement with the original statement, Acknowledgement Only, Friendly Overtures, and/or Random/Off-Topic. Instances where children did not know how to respond, chose not to respond, or responses were not available were also noted (i.e., No Answer/Not Available).

With the exception of Acknowledgement and No Answer, the categories were not mutually exclusive. Responses could fall into multiple categories, such as Pro-Self and Anti-Other when participants made comparative statements (e.g., "I am better than you!"). Furthermore, these replies could be coded in multiple ways if the participants contradicted themselves. For example,

the statement, "A lot of games I win, but sometimes I lose still", would be coded as both Pro-Self *and* Anti-Self. Therefore, a given statement could receive the maximum score of 1 in more than one category. A second researcher, who was blind to the conditions, coded all of the responses (100%) to ensure reliability in coding. A high degree of reliability was found between coders (see Table 3).

Following the message generation, participants were asked to consider their partner's perspective by reflecting on what their partner might choose to do if the roles were reversed (i.e., how would the virtual player distribute gameplay items if setting up the task). The participants were shown a series of pie charts depicting 5 different resource allocation options (i.e., none, some, half, most, all; see Figure 1) and asked to select the choice that best demonstrated what their social partner would like to do.[1] Then, participants were asked to allocate the materials required for the game among themselves and the other player (see Figure 1). Reflecting the key measure of their sharing behaviour, participants received a tally out of 25 reflecting the number of items they kept for themselves on each task. This process was repeated for each of the 8 games.

Executive function and theory of mind tasks.

Inhibitory control. To assess children's inhibitory control, they were administered a computerized version of the Red Dog/Blue Dog task, which is a Stroop-like task (from Nilsen & Graham, 2009; modified from Beveridge, Jarrold, & Pettit, 2002). The Stroop paradigm is considered a classic measure of inhibition (Stroop, 1935) and tasks using this paradigm load on factors of inhibition when examined with other measures of executive function (Miyake et al., 2000). Participants were introduced to the task by viewing an image on the screen with two

[1] This data was not analyzed as part of this thesis.

[2] Prior to removing these participants from the analyses, recorded portions of the OCTC were re-watched to determine whether

cartoon images of dogs. The experimenter told them that the name of each dog was "Red" and "Blue". However, the dog named "Blue" was red in colour, while the dog named "Red" was coloured in blue ink. Children were told that they should call each dog by name as they appear individually on the screen. As the dogs' names were incongruent with their colours, children had to inhibit the strong impulse to respond with the dogs' colours in order to correctly answer with their names. Before beginning the task, children completed a practice trial. After it was clear that the participants understood the task, they were shown 28 pictures depicting red and blue dogs, one at a time. The images appeared on-screen at a consistent rate. Each picture remained on screen for 3 seconds, with 1 second between each trial. The children were asked to say each dog's name out loud, and were reminded to do so if they hesitated or touched the screen instead of responding aloud. Children's responses were recorded by the researcher and corrective feedback was not offered during the task. Any self-corrections made by participants were considered to be incorrect responses. Participants received a score ranging from 0 to 28, which reflected the number of dogs they had initially named correctly.

Working memory. Children's verbal working memory was assessed using the Digit Span subtest from the Wechsler Intelligence Scale for Children- Fourth Edition (WISC-IV; Wechsler, 2003). In factor-analytic studies, span tasks have been shown to load onto a working memory factor (Pennington, 1997; Wiebe et al., 2011). Participants were asked to repeat a series of orally presented digits. First, they were asked to repeat digits in the same sequence as they were heard (Digit Span Forwards). Once the task had been discontinued, participants were asked to repeat new series of digits in backwards order (Digit Span Backwards). Children heard a maximum of 16 strings of digits for each task, as there were 8 task items containing 2 trials. Each item increased in difficulty such that the strings of digits became longer across the items. The task

was discontinued when a child provided incorrect responses for both trials within the same item. Scores for both tasks were summed to create a total Digit Span score, ranging from a minimum of 0 and a maximum score of 32.

Cognitive Flexibility. The Object Classification Task for Children, which was developed for use with children aged 3- to 7-years-old (OCTC; Smidts, Jacobs, & Anderson, 2004), was used to examine participants' ability to shift mindset and think flexibly. In order to familiarize children with the task, children completed at least one practice trial. During practice trials, children were asked to sort four items, which consisted of two pairs of identical toys (i.e., two plastic crabs and two plastic turtles, two plastic fish and two plastic ducks). Children were asked to sort the toys into their pairs and place them on opposite ends of the table. Incorrect sortings were followed by corrective feedback and an additional practice trial. To move on to the test trials, children had to be able to sort the toys correctly during the second practice trial. Test trials consisted of sorting 6 test objects: a small yellow plane, a small red plane, a small yellow car, a large red plane, a large red car, and a large yellow car. Participants were asked to sort the toys into two groups, with something being the same about all of the toys in each group. The instructions remained ambiguous, as the toys could be successfully sorted in various ways based on colour, size, or function. If a child was initially unable to group the objects, two toys were removed such that the remaining four toys could only be sorted by colour and size. After successfully sorting the toys, children were asked to describe the similarity within each group. Children were asked to sort the toys again, but asked to create new groupings where "something else [had] to be the same about the toys." The procedure was repeated until either the toys were successfully grouped in 3 ways, or it became clear that the child was unable to create novel

groupings. Participants received three points for each correct sorting, and received an additional point for correctly labelling their sorting criteria, resulting in a total of 12 possible points.

If children were unable to create 3 groupings, the experimenter sorted the toys in the ways that were missed, and asked the child to identify what was the same about the toys in each group. Correct descriptions received a score of 2 points. If the children were unsuccessful in identifying the similarities amongst the groupings, they were explicitly asked to group the objects in the ways that were missed (e.g., "Can you put all of the big ones on this side of the table, and all of the small ones on that side of the table?). One point was awarded for each correct response. Combining performance across the conditions described above, participants received a total score ranging from 0 to 12.

Theory of Mind (ToM). Finally, children completed Wellman & Liu's battery of Theory of Mind tasks (2004). This task assessed 5 key components of ToM, namely children's understanding that two people may have different desires about objects (Diverse Desires), beliefs about a situation (Diverse Beliefs), or knowledge about something (Knowledge Access), as well as their understanding that a person may have a belief that differs from reality (Contents False Belief), and that a person may display emotions that differ from their internal state (Hidden Emotion). Each brief task included a control question along with at least one target question. Both the control and target questions had to be answered correctly to receive full credit for their response. Scores ranged from 0 to 1 on the Diverse Desires, Diverse Beliefs, and Knowledge Access tasks. The Contents False Belief and Hidden Emotion tasks were scored out of a possible 2 points. Thus, total ToM scores ranged from 0 to 7.

Results

Preliminary Analyses

First, the data were examined for outliers. Only one outlier (±3 SD) was revealed (Red Dog/Blue Dog Task), and was subsequently removed from analyses. Data was also excluded for participants who were unable to successfully complete the second practice trial for the Object Classification Task for Children (OCTC; n=3).[2] These data were handled in this way because children who did not understand the instructions after multiple practice trials would be expected to not understand the OCTC task itself.

Preliminary analyses revealed no significant differences in condition order (ps>.100) or gender (ps>.075) for any measures; therefore, these variables were not included in further analyses. Children's mean performance on the executive functioning tasks was as follows: Red Dog/Blue Dog (*n*=88): *M* = 22.35, *SD* = 3.82; Digit Span (*n*=90): *M* = 9.87, *SD* = 2.87; Object Classification Task (*n*=91): *M* = 8.62, *SD* = 2.22; Theory of Mind Task (*n*=95): *M* = 5.44, *SD* = 1.24. Inspection of the data revealed a negatively skewed distribution for the Red Dog/Blue Dog task (45.5% of participants had a score of 24 or higher, with the maximum possible score being 28). A reflected logarithmic transformation was performed, however, this did not significantly change the pattern of results.[3] Therefore, the untransformed data for the Red Dog/Blue Dog task was used for analyses.

Correlations between measures of executive functioning, theory of mind, and age are shown in Table 4. Children's working memory, cognitive flexibility, and inhibitory control were found to improve with age, whereas there was no significant correlation between theory of mind

[2] Prior to removing these participants from the analyses, recorded portions of the OCTC were re-watched to determine whether or not the data should be excluded. While 10 participants required two practice trials for this task, only 2 participants were confirmed to have failed the second practice trial. There was no video recording for the one of the participants who required a second practice attempt. Since this participant's OCTC data could not be reviewed, it was removed from analyses.

[3] The transformation did alter one finding when looking at the composite EF measure; a marginally significant correlation of team-oriented messages across context (*p*=.052) became statistically significant (*p*=.034).

and age. Among the measures of EF, only inhibitory control and working memory were significantly correlated. However, to capture the various aspects of EF within one measure (as per previous research suggesting that EF abilities within the preschool period are represented by a single construct; e.g., Brocki & Bohlin, 2004), a composite measure for EF was created for regression analyses by summing the standardized scores of the EF measures.[4]

Social Task Analyses

Sharing behaviours.

Context and message. The average number of items (out of 25 possible items per task) that the children kept for themselves in the cooperative and competitive conditions was examined. Results of a mixed ANOVA (Context x Message x Age Group) revealed a significant main effect of Context on the average number of items that children kept for themselves, $F(1, 102)= 22.48$, $p<.001$, $\eta_p^2=.18$, but not a main effect of Age Group ($p=.501$) or Message ($p=.155$). In addition, there was a marginally significant interaction between Message and Age Group (discussed below). No further significant interactions emerged from the data (ps > .1).

With respect to Context, as expected, participating children kept fewer items for themselves when in the cooperative condition ($M = 13.83$, $SD = 3.67$) than in the competitive condition ($M = 15.78$, $SD = 4.78$). This significant difference suggests that, in general, children modify their behaviour across contexts. There was not a significant interaction between Context and Age ($p=.231$), suggesting that context is a salient cue for children's sharing behaviour across this age range.

When children's sharing behaviour in each context was examined in relation to an equal distribution (i.e. 12.5 items), it was found that distributions in the cooperative context

[4] Due to the skewed distribution of the Red Dog/Blue Dog data, a composite EF score was also created without this measure of inhibitory control: EF (No IC).

significantly differed from equal (M= 13.83, SD=3.68), t(104)= 3.71, p<.001, with children keeping more for themselves. Similarly, in the competitive context, children did not distribute the items evenly and kept significantly more for themselves (M= 15.85, SD=4.78), t(104)= 7.17, p<.001. Although there was not an Age Group by Context interaction, allocations relative to chance were examined for each age group to explore any developmental trends. It was found that 4-year-olds kept significantly more for themselves compared to equal when playing in both the cooperative (M= 14.81, SD=4.58), t(33)= 2.95, p=.006, and competitive contexts (M= 15.85, SD=5.18), t(33)= 3.78, p=.001. Similarly, five-year-olds' sharing behaviour differed significantly from an equal distribution in the cooperative context (M= 13.63, SD=3.47), t(50)= 2.33, p=.024, and the competitive context (M= 15.97 SD=4.79), t(50)= 5.16, p<.001, as they opted to keep more for themselves. However, 6-year-olds shared equally among themselves and a teammate when in the cooperative context (p=.638), but differed from an equal distribution in the competitive context by keeping more items for themselves (M= 15.53, SD=4.24), t(19)= 3.19, p=.005.

As noted above, a main effect of message did not emerge (p=.155), indicating that the mean number of items that children kept after receiving a team-oriented message (M = 14.72, SD = 4.02) did not differ significantly from the average number of items they kept when they received a self-oriented message from the virtual player (M = 14.85, SD = 3.83). This being said, a marginally significant 2-way interaction between Message and Age Group emerged, F(2, 102)= 3.04, p=.052, η_p^2=.06.[5] Exploring this interaction further, paired-samples t-tests revealed a significant difference in the average number of gameplay items that 4-year-old children kept for themselves depending on the type of message that they had received. Across context, when 4-

[5] Removing the data for the 6-year-olds, as the n is relatively small, the interaction between message and age is statistically significant, p= 0.016.

year-old children received a team-oriented message, they kept fewer gameplay items for themselves (M=14.85, SD= 4.75) compared to when they received a self-oriented message (M=15.82, SD=4.21), t(33)=-2.05, p=.048. In other words, they shared more when they received a collaborative message from the other player. However, this was not the case for 5- and 6-year-old children, who did not modify their behaviour according to the statements they had received (ps=.26, .412, respectively). A series of independent t-tests were also conducted to determine whether the number of items kept after receiving a particular type of message, regardless of context, differed across the age groups. No significant differences were revealed (ps>.176).

Together, the results suggest context influences children's sharing behaviour (particularly for the older age group) and only younger children seem to shift their behaviours according to the type of message they received from their fictional social partners.

Executive functioning and theory of mind. Partial correlations, controlling for age, were calculated between measures of executive functioning, theory of mind, and average number of items kept are shown in Table 5. As can be seen in Table 5, the EF composite measure was significantly positively related to children's sharing behaviour in cooperative contexts, when receiving team-oriented messages, as well as when the data is collapsed across message type. Theory of mind was significantly positively related to children's sharing behaviour in cooperative contexts, particularly when receiving team-oriented messages, self-oriented messages, and when the data is collapsed across message type. Moreover, there was a significant positive relation between children's ToM and their sharing behaviour when receiving a team-oriented message.

Regression analyses were conducted to examine the unique contribution that EF and ToM made in children's sharing behaviour. As there was not a significant interaction between context

and message, the dependent variable for the regressions were children's behaviour in one condition collapsed across the other (i.e., cooperative context, collapsed across message type). The extent to which children's socio-cognitive skills contributed to shifts in children's sharing behaviours across contexts and social partners (as measured by difference scores in the average number of items kept) was also analyzed in this way. Thus, in the regressions, the dependent variable was 1) the average number of items kept in that particular condition (i.e., are children shifting across contexts?), or 2), assessing the extent of the shift in children's behaviour across context (i.e., difference scores of the mean number of items kept across contexts or social partners). To control for age (in months), this variable was entered into each regression as a first step. The socio-cognitive factors, ToM and the composite measure of EF, were entered simultaneously as a second step in each regression.

Predictors of allocation within different contexts.

Cooperative context. The regression revealed that, at step one, Age (β=-.26, p=.011) contributed significantly to the regression model, $F(1,93)=6.65$, p=.011, and accounted for 6.7% of the variance with respect to the average number of items kept in a cooperative context. Introducing ToM and the composite measure of EF explained an additional 14.3% of the variation in average number of items kept, and this change in R^2 was significant, $\Delta F(2,91)=8.22$, p=.001. Together, Age, EF, and ToM accounted for 21% of the variance in the average number of items kept in the cooperative context. This model was statistically significant, $F(3,91)=8.04$, p<.001. Upon examining the regression weights of the predictors, ToM (β=-.30, p=.003) was found to be a significant predictor, while neither Age (β=-.14, p=.186) nor EF (β=-.19, p=.084) was a significant predictor. These results suggest that, beyond Age and EF, ToM ability plays an important role in children's ability to share when working collaboratively with others.

Competitive context. Age was not a significant predictor of the average number of items kept in the competitive condition, $F(1,93)=0.08$, $p=.775$. The addition of ToM and the composite measure of EF in a second step did not improve the model, $F(3,91)=0.82$, $p=.487$.

Shift in allocation between cooperative and competitive context. Of interest was the degree to which individual differences in socio-cognitive and cognitive skills related to children's differential (or shift in) behaviour across situational context. Age alone ($\beta=.18$ $p=.079$) accounted for only 3.3% of the variance in terms of the extent to which children shifted their sharing behaviour across contexts (controlling for message type). This model was not statistically significant, $F(1,93)=3.15$, $p=.079$. When ToM and the composite measure of EF were entered into the regression, a 9.2% increase in the variance with respect to amount by which they shifted their sharing behaviour across contexts, and this change in R^2 was statistically significant, $\Delta F(2,91)=4.76$, $p=.011$. In addition, this overall model was statistically significant, $F(3,91)=4.30$, $p=.007$, with Age, EF, and ToM accounting for 12.5% of the total variance. When examining the regression weights of the predictor variables, ToM was a significant predictor ($\beta=.31$, $p=.003$) of the extent to which children shifted their sharing behaviour across contexts, but Age ($\beta=.18$, $p=.107$) and EF ($\beta=-.05$, $p=.676$) were not. In other words, children's ToM ability allows for greater sensitivity to context, leading children to shift their behaviour to a greater degree across contexts.

Predictors of allocation for messages.

Team-oriented message. Age was not a significant predictor of the average number of items kept upon receipt of a team-oriented message (across contexts; $\beta=-.11$, $p=.311$), $F(1,93)=1.04$, $p=.311$. However, when ToM and the composite measure of EF were entered into the regression, a 7.3% increase in the variance in the average number of items kept in this

condition was explained. This change in R^2 was significant, $\Delta F(2,91)=3.65$, $p=.03$. This model was also statistically significant, $F(3,91)=2.80$, $p=.045$, with Age, EF, and ToM accounting for 8.4% of the total variance. When examining the regression weights of the predictors, neither Age ($\beta=.01$, $p=.932$) nor ToM ($\beta=-.15$, $p=.139$) was a significant predictor. The composite measure of EF was only a marginally significant predictor of the average number of items kept ($\beta= -.21$, $p=.078$). These results suggest that, beyond Age, EF ability plays a role in children's ability to share with partners who had sent them team-oriented messages.

Self-oriented messages. Collapsing across context, Age was not a significant predictor of the average number of items kept after receiving a self-oriented message from a social partner, $F(1,93)=2.84$, $p=.095$. Adding ToM and the composite measure of EF did not improve the model, $F(3,91)=2.16$, $p=.099$.

Predictors of shift in allocation between team- and self-oriented messages. Of interest was the degree to which individual differences in socio-cognitive and cognitive skills related to children's differential behaviour depending on the type of message they had received from their social partner. The shift in children's sharing behaviour across messages (controlling for context) was not predicted by Age, $F(1,93)=.81$, $p=.370$. The second step of adding ToM and the composite measure of EF did not improve the model, $F(3,91)=1.23$ $p=.304$.

Overall, the results from all of the regressions suggest that ToM and EF, respectively, are unique predictors of children's s sharing behaviour when they are working in cooperative contexts (ToM) and when they receive team-oriented messages from their social partners (EF). Moreover, ToM ability uniquely predicts the extent to which children shift their sharing behaviours across cooperative and competitive contexts.

Participants' Verbal Responses to Messages

In order to examine children's verbal responses to their social partners' messages, a research assistant blind to the conditions coded the participants' replies to messages from the virtual players using the following categories: Pro-Team, Anti-Team, Pro-Self, Anti-Self, Pro-Other, and Anti-Other statements that were made. In addition, responses that were not directly gameplay related were also coded. The number of statements reflecting Agreement or Disagreement with the original statement, Acknowledgement, Friendly Overtures, and Random/Off-Topic statements were counted. When a response was not available or the participant chose not to respond, it was coded as No Answer. Each response received a score ranging from 0 to 1 per category. For the purpose of analyses, response scores for both trials within each condition were combined for every participant, resulting in total scores ranging from 0-2 for each category.

Each category of response was subjected to a mixed 2 (Context; cooperative/competitive) x 2(Message; team-oriented/self-oriented) x 3(Age Group; 4-, 5-, and 6-year-olds) ANOVA. In addition, paired samples t-tests were performed to elucidate the nature of any interactions that emerged in the data.

Pro-team. Main effects of Context and Message emerged from the data. With respect to context, across message, when children were operating within a cooperative context, they generated significantly more pro-team responses (M=.59 SD=.61) than they did in the competitive contexts (M=.27, SD=.42), $F(1,102)=29.96$, $p<.001$, $\eta_p^2=.23$. Qualifying this effect, there was a significant interaction between Context and Age Group, $F(2,102)=3.77$, $p=.026$, $\eta_p^2=.07$. While 4-year-olds' pro-team responses did not differ across context (p=.281), the responses of 5-and 6 year-olds did. Five-year-old participants generated more pro-team

responses in the cooperative context (*M*=.66, *SD*=.64) than they did in the competitive context (*M*=.27, *SD*=.46), *t(*50)=4.71, *p*<.001. Similarly, 6-year-olds produced more pro-team responses in the cooperative context (*M*=.73, *SD*=.53) than they did in the competitive context (*M*=.23, *SD*=.34), *t(*19)=3.82, *p*=.001.

Reflecting the main effect of message, across contexts, children responded with more pro-team responses when they had received team-oriented messages from their partners (*M*=.58, *SD*=.56), relative to when they received self-oriented messages (*M*=.27, *SD*=.46; $F(1,102)=31.44$, $p<.001$, $\eta_p^2=.24$).

No further interactions emerged from the data (*ps*>.399). It appears that older preschoolers (but not 4-year-olds) generally produce context-appropriate replies, and tailoring their statements to respond in-kind to their partners' messages.

Anti-team. Anti-team messages occurred extremely infrequently (0.6% of responses). Thus, this type of response was not included in the analyses.

Pro-self. When children received messages from teammates within the cooperative context, they generated significantly fewer pro-self responses (*M*=.26, *SD*=.40) than they did in the competitive contexts (*M*=.56, *SD*=.60), $F(1,102)=16.06$, $p<.001$, $\eta_p^2=.14$. Across contexts, children responded with fewer pro-self responses when they had just received team-oriented messages from their partners (*M*=.26, *SD*=.40), compared to when they received self-oriented messages (*M*=.61, *SD*=.60), $F(1,102)=49.12$ $p<.001$, $\eta_p^2=.33$. No interactions emerged from the data (*ps*>.206). These results suggest that children are abiding by the social expectations associated with context as they generate their messages by generating more pro-self statements during competition. Furthermore, children's pro-self statements reflect reciprocity in the tone of the message sent by their gameplay partner.

Anti-self. Anti-self messages were seldom generated (0.5% of responses), therefore, this type of response was not included in the analyses.

Pro-other. There were no significant main effects or interactions related to children's pro-other responses (*ps*>.122), which suggests that participants did not discriminate across contextual factors or the type of message they had received when sending well-wishes to their partners.

Anti-other. When children received messages from teammates in the cooperative context, they generated significantly fewer anti-other responses (*M*=.08, *SD*=.25) than they did in the competitive contexts (*M*=.24, *SD*=.50), $F(1,102)=10.32$, $p=.002$, $\eta_p^2=.09$. Across contexts, children responded with fewer anti-other responses when they had just received team-oriented messages from their partners (*M*=.11, *SD*=.31), compared to when they received self-oriented messages (*M*=.21, *SD*=.41), $F(1,102)=8.50$ $p=.004$, $\eta_p^2=.08$. No interactions emerged from the data (*ps*>.076). This pattern of results implies that children are using the context-related factors to generate anti-other responses to their partners' messages. Moreover, the results suggest that children are more critical or cutting towards their social partners via anti-other statements when they had first received self-oriented messages from their teammates or competitors.

Agreement. When children were in the cooperative context, they were found to agree more with their social partner (*M*=.46, *SD*=.58) than when they were working competitive contexts (*M*=.31, *SD*=.50), $F(1,102)=6.47$, $p=.012$, $\eta_p^2=.06$, regardless of the message that they had received. It appears that children are conveying a greater willingness for collaboration when working in the cooperative context. A caveat to this, however, is that agreement could reflect two very different sentiments. For example, children could "agree" with a partner who boasts, "I am the best" by replying (with a pro-other intention), "Yes, you are the best." Another form of

agreement for the same statement might be, "I am the best, too." The latter response would be intended to convey a pro-self sentiment. No further main effects or interactions emerged from the data (*ps*>.137)

Disagreement. There was no main effect of message (*p*=.232), but there was a main effect of context: when children were working in a cooperative context, they disagreed with their partners' messages significantly less (*M*=.01, *SD*=.07) than they did when working in a competitive context (*M*=.14, *SD*=.38), *F*(1,102)=11.89, *p*=.001, η_p^2=.10. This effect was qualified by a significant interaction between Context and Message, *F*(1,102)=5.88, *p*=.017, η_p^2=.06. Paired t-tests revealed that, when in the competitive context, children were more likely to disagree following the receipt of self-oriented messages (*M*=.18, *SD*=.52) relative to team-oriented messages (*M*=.10, *SD*=.34), *t*(104)= 2.10, *p*=.038. When in the cooperative context, however, there were no significant differences between children's levels of disagreement after receiving self-oriented messages (*M*=.00 *SD*=.00) and team-oriented messages (*M*=.02, *SD*=.14), *t*(104)= -1.42, *p*=.158.

Paired t-tests were also conducted to compare contexts for instances of disagreement following both self- and team-oriented messages. Following self-oriented messages, children were more likely to disagree in the competitive context (*M*=.18, *SD*=.52) relative to the cooperative context (*M*=.00 *SD*=.00), *t*(104)= 3.60, *p*<.001. Similarly, children were significantly more likely to disagree with their partners following team-oriented messages when they were working in a competitive context (*M*=.10, *SD*=.34) compared to a cooperative context (*M*=.02, *SD*=.14), *t*(104)= 2.36, *p*=.02. These results suggest that when children are working within a competitive context, they are particularly sensitive to self-oriented messages from others. Under

these circumstances, children may be primed by the context to be more aware of competitive cues. There were no other significant main effects or interactions found (*ps*>.087).

Acknowledgement Only. Analyses revealed a main effect of Message on children's acknowledgements, $F(1,102)=9.54$, $p=.003$, $\eta_p^2=.09$. Children more frequently acknowledged their partners' messages when the messages were team-oriented ($M=.18$, $SD=.43$) than they did when their partners' messages were self-oriented ($M=.10$, $SD=.36$). No further significant main effects or interactions were found (*ps*>.071).

Friendly Overtures. There were no significant main effects or interactions that emerged from the data (*ps*>.125), suggesting that children sent friendly overtures equally across contexts and message types.

No Answer/Not Available. There were no significant main effects or interactions found (*ps*>.584), indicating that this occurred across contexts and message types.

Random. There were no significant findings that emerged from the data (*ps*>.140).

Discussion

The aim of the present study was to explore the degree to which context and communication from social partners impacted children's sharing behaviour within the preschool period. Findings highlight the importance of context for preschool children's sharing behaviour, as well as the importance of messages from social partners for the younger (but not older) preschoolers' behaviour. Moreover, children's socio-cognitive skills predicted the degree to which they shared and shifted their sharing behaviour across contexts.

The first goal of the current work was to address gaps in the literature through an examination of the role of context and message from a partner in preschool-aged children's sharing behaviour. In line with the previous research (Huyder & Nilsen, 2012), it was predicted

that children would be sensitive to contextual cues when allocating important gameplay resources, such that they would dynamically shift their sharing behaviours across cooperative and competitive contexts. More specifically, it was anticipated that children would offer more gameplay items to other children identified as teammates compared to opponents. Across the age groups, children were found to shift their behaviour according to the context in a manner that would facilitate either joint or competitive goals (i.e., sharing more resources with a teammate, and fewer resources with an opponent). That is, children shared more with the other individual when the context was identified as being collaborative (as opposed to competitive). Thus, in addition to the broader cultural context, which has been shown to impact children's sharing behaviour (e.g., Rao & Stewart, 1999; Rochat et al., 2009), the nature of the specific situation influences the degree to which children share with others.

Strategically, children should share equally with a teammate in a cooperative context and share nothing with a competitor (i.e., keep all resources for themselves) to maximize their opportunity to win. To assess children's behaviour relative to such a strategy, their distributions were compared to an equal distribution (i.e., half for them, half for their partner). Although there was not an interaction between age groups and context, the findings hint to the use of different strategies as children get older, which may align with their understanding of, and ability to enact, principles of fairness. When compared to equal distributions among players, 4- and 5-year-old children kept more for themselves in both the cooperative and competitive conditions. This finding is generally consistent with research demonstrating that children's preference for equality develops sometime between the ages of 4 and 6 years, and that their allocations are generally self-interested until they more consistently equalize outcomes amongst themselves and a partner by the age of 6 years old (Benenson et al., 2007; Blake & Rand, 2010; Gummerum et al., 2010).

However, it would be beneficial to see if such trends remain in future studies using a wider age range.

In contrast, 6-year-olds' behaviour reflected sensitivity to fairness, but only in certain contexts. More specifically, when in the cooperative context, 6-year-old children's distributions did not differ significantly from equal, suggesting they recognize that it is fair to share equally with a teammate. Such a finding is consistent with past work, which demonstrates that between the ages of 5 and 7 years, children begin to demonstrate greater adherence to rules of fairness such as equality, equity, and merit (Bereby-Meyer & Fiks, 2013; Hamann et al., 2014). However, within the competitive context, 6-year-old children kept significantly more gameplay resources than would be considered an equal distribution. Thus, while these older children appreciate fairness, they do not adhere to such objectives when it is not conducive to reaching the independent goal of winning.

In addition to exploring children's sharing across contexts, another research aim was to determine whether children's sharing was influenced by the type of message received from a social partner. Though the children were not specifically asked about their impressions of the other child during the game, it was anticipated that the type of message they received from a social partner would affect their inclination to share. Contrary to this prediction, results demonstrated that it was only the youngest age group (4-year-olds) that was impacted by the message received from a social partner. That is, only this age group shifted its sharing behaviours according to the type of message offered by fictional sharing partners. When the message was self-oriented, 4-year-olds kept more gameplay resources for themselves relative to when they received a team-oriented message. This suggests that the children in this age group

may form judgments about their social partners based on the messages that they receive, and that these judgments drive their sharing behaviours.

This finding extends previous work exploring the reciprocity among social partners (e.g., Martin & Olson, 2015). For instance, Martin and Olson (2015) found that children were more willing to share resources with another person when that person has exhibited prosocial behaviour in the past, irrespective of whether this behaviour was directed towards them or a third party. Moreover, Huyder and Nilsen (2012) found that, regardless of the context, children dynamically shifted their behaviours in response to another person's actions. In this vein, they behave more cooperatively whenever their partner exhibited cooperative behaviour. However, in the current study, 4-year-olds shifted their behaviour based on a simple message from their partner rather than their partner's behaviour per se. That is, it is as if the message cued 4-year-olds as to how their partner *may* behave.

This finding also aligns with the existing literature suggesting that children are able to consider anticipated reciprocity in advance, and adjust their sharing behaviour according to whether or not the partner may potentially reciprocate (Xiong et al., 2016). Much like reactive egoism found in the adult literature (Epley et al., 2006), in which individuals pre-emptively draw conclusions about their partner and modify their behaviour according to their presumptions, it could be argued that 4-year-old children in this study were considering the likelihood that their partner would reciprocate or behave in self-serving ways based on the message they provided, and tailored their actions accordingly. It is also plausible that the younger children were more swayed by the information closest in temporal proximity to when the allocations were made (namely the message from the partner).

It is interesting to consider why the older preschool-age children (i.e., 5- and 6-year-olds) did not show a shift in their sharing behaviour following self versus team messages from their partner. There are a few reasons why this may be the case. The first explanation may be that as they age, children become so committed to principles of fairness (i.e., equality, deservingness) that the content of the messages plays a far less significant role. Alternatively, children's behaviour may have been motivated by potential to receive a material reward should they win the game. Previous research suggests that children's sharing behaviours may be motivated by material rewards (Bryan & London, 1970). For example, it has been found that children who had been incentivized with desirable prizes were more willing to share items with an unknown peer (Fischer, 1963).

Sharing tasks often require children to distribute highly desirable items between themselves and a social partner, with the expectation that both partners will get to keep the proposed distribution (e.g., Dictator Game, Ultimatum Game; Güth et al., 1982; Forsythe et al., 1994). In other words, the distributed items serve as the "reward" (which perhaps explains young children's tendency to behave self-servingly in previous studies). In the current study, however, children's distributions were a means to an end. Prizes were to be awarded based on the outcome of the game. Therefore, performing strategic distributions according to context (i.e., keeping fewer gameplay items in the cooperative contexts and keep more gameplay items in the competitive contexts) would allow children to win the game, and ultimately receive a prize. Had children opted to use message-related cues as a guide for their behaviour, their chances of winning may have been reduced. For example, sharing with seemingly 'nice' opponents would leave players with fewer resources to work with during competition. Similarly, withholding resources from a selfish teammate may reduce the team's chance of success, as only one

teammate would be able to contribute towards the goal of winning. Therefore, it would benefit the children to operate according to context, rather than being influenced by a social partner's message. The older children might have been sensitive to this strategy and behaved accordingly, whereas the younger children might have been pulled more by their impressions of the partner.

In addition to evaluating their sharing behaviour, children's responses to their social partners' messages were examined. Children's replies generally reflected sensitivity to the context. For instance, cooperative contexts incited significantly more pro-team (i.e., collaborative) responses compared to competitive contexts, and there were greater levels of agreement conveyed towards teammates. These responses communicate greater willingness to work in partnership, which is critical to the success of both parties within a cooperative context. Conversely, competitive contexts provoked significantly more pro-self (i.e., self-promoting) and anti-other (i.e., antagonistic) comments from participants. Moreover, children tended to disagree with their partners significantly more when they were expected to compete than when they were expected to cooperate. Given that competition entails working alone to achieve a goal, fostering a relationship with an opponent is not necessary for success and, therefore, children might be more inclined to assert themselves through disagreement. Alternatively, this disagreement could represent engagement in playful or friendly banter. This type of banter might be expected when competing against friends or known peers, as it is generally intended to further develop social rapport (for a review, see Mills & Carwile, 2009). However, in this case, participants did not have a pre-established relationship with their social partners. Therefore, if children were, in fact, engaging in this type of banter, they would be taking a social risk. Taken together, these results further underline children's sensitivity to context when interacting with a social partner. That is,

in addition to children modifying their *actions* according to context (e.g., Huyder & Nilsen, 2012), children's *communicative behaviour* is also impacted by context.

Of note, however, was the interaction between age and context on children's pro-team responses. Four-year-old children's responses were unaffected by contextual cues, as they generated the same number of pro-team remarks across both the cooperative and competitive contexts. Moreover, the average number of pro-team statements that 4-year-old children produced within cooperative contexts was seemingly low, compared to the mean number of pro-team statements made by children in the other age groups.

Interestingly, while children's sharing behaviour tended not to be impacted by the messages they received from others (with the exception of the 4-year-olds), their responses to their social partners were (e.g., as per children's pro-team, pro-self, anti-other messages). Namely, children generated significantly more pro-team responses when their partners offered team-oriented messages compared to self-oriented messages. In addition, they responded with more pro-self and anti-other comments when their partners sent self-oriented messages compared to team-oriented messages, which supports the original hypothesis that children would "match" the virtual players messages, by generating the same type of message (i.e., self-oriented or team oriented) in their responses.

The reciprocity shown by children in their communication extends previous work (e.g., Underwood et al., 1999), which has looked at the degree to which children's social behaviour is influenced by their partner. For example, when children were verbally provoked by a same-aged peer while playing a computer game together, their verbal responses contained more negative statements about the peer, and more positive statements about themselves (relative to when they were not being provoked; Underwood et al., 1999). Similarly, the current work found that

children were more likely to be self-promoting and/or antagonistic towards their partner when they received self-oriented messages from them (relative to when they received team-oriented messages). Children in the current study also conveyed greater willingness to collaborate with their partners (i.e., pro-team messages, agreement) when their partner had sent them team-oriented messages. Interestingly, though, when reflecting on children's verbal responses versus their behaviour, the findings suggest that children are in fact sensitive to the type of message they receive, but that their sharing behaviour is guided by something else (e.g., adherence to rules of fairness, context, etc.).

Addressing the second overarching goal of the study, the degree to which individual differences in children's socio-cognitive and cognitive skills related to sharing behaviour was explored. Given that social partners' intentions are quite different across contexts, it was predicted that thinking and reasoning skills would allow children to behave strategically according to the context in which they are operating, such that particularly shrewd players may understand that the best strategy when cooperating would be to divide the resources equally. Conversely, those with advanced thinking and reasoning skills may recognize that it is advantageous to keep more resources for oneself when competing. In the current study, theory of mind was found to play a unique and important role in children's sharing behaviour in cooperative contexts over and above the effects of age. That is, children's theory of mind ability allowed them to share more resources with their teammates (i.e., keeping fewer items for themselves). It is likely that children with greater ToM abilities were able to reason that their social partner has similar goals in mind as they do and, accordingly, sharing is advantageous. In addition to ToM facilitating children's social behaviour in other realms, such as helping,

cooperating, and comforting (Imuta et al., 2016), the present study highlights its unique role for sharing in anticipation of a collaborative task.

Although it was initially predicted that more advanced socio-cognitive abilities would be related to sharing behaviour in competitive contexts as well (as one might have better access to the intentions of a competitor or be better able to implement beneficial competitive strategies), this was not the case. Upon reflection, however, this result is not surprising. That is, in this context, better ToM could lead to two different behaviours. On the one hand, better ToM could, as predicted, lead children to better appreciate the possible competitive intentions of their social partner (leading to less sharing behaviour; e.g., Priewasser et al., 2013). However, better ToM could also help children implement the principles of fairness, as per previous work showing a correlation between these factors (Takagishi et al., 2010). Thus, better ToM may actually lead to more sharing on the part of the participants. From the current findings, these possibilities cannot be disentangled, but, if both processes were in place, they may have yielded the null findings.

Somewhat speaking to this issue, however, was the finding that ToM ability was related to children's ability to appropriately modify their behaviour across contexts. Specifically, more advanced theory of mind related to the extent to which children shifted their sharing behaviours when moving from context to context (i.e., greater ToM meant greater sensitivity to context, leading children to shift their behaviour to a greater degree across contexts). Children with better ToM may have had a greater appreciation for the potential intentions of their social partners. For example, Takagishi and colleagues (2010) found that better ToM was related to more collaborative behaviours in preschoolers when they were playing in a cooperative context than within a competitive context. However, theory of mind has also been linked to more competitive

behaviours, such as taking resources from others, when they were playing in a competitive context (Priewasser et al., 2013).

With respect to executive function skills, sharing is thought to require the capacity to hold another person's perspective in mind during the interaction (i.e., working memory), as well as the ability to supress the natural tendency to keep valuable items for oneself (i.e., inhibition) and to adjust behaviour according to various demands (i.e., cognitive flexibility). Children's executive function skills related to children's sharing behaviour in the cooperative context in the current study, but not uniquely once ToM was controlled in the regressions. Moreover, EF skills were found to be a marginally significant predictor of their ability to share with partners who sent them team-oriented messages. However, executive functions were not related to children's sharing behaviour in competitive contexts or when they received self-oriented messages from their partners. Perhaps, failing to share would represent succumbing to the natural tendency to behave in one's best interest (Houser, Montinari, & Piovesan, 2012). Therefore, it is conceivable that the use of these cognitive skills would not be necessary in situations in which it is beneficial to behave selfishly (i.e., competition, interacting with self-interested peers). The prediction that the distinction between number of resources shared across the two contexts (i.e., the extent to which children shift across contexts) would be greatest for children with higher EF (because, in theory, they would be better able to regulate their behaviour) was not supported.

The present findings have both theoretical and applied relevance. In terms of the former, the findings highlight the need for current models of children's social behaviour to integrate contextual factors. That is, the present results suggest that children's socio-cognitive skills are most relevant with cooperative contexts – and play less of a role within competitive contexts

where there may be competing processes at play. Moreover, findings suggest at different stages of development, children may rely on different cues to guide their behaviour.

The results also highlight two practical implications. First, possessing an understanding of the contextual factors associated with prosocial behaviour is relevant to social skills training. For instance, currently, social stories comprise a large component of the preschool and kindergarten curricula. Therefore, a comprehensive understanding of the interplay of social context, communication with a social partner, and individual differences in thinking and reasoning ability may assist educators in developing social skills programs. In this vein, incorporating contextual cues into conversations about sharing may facilitate social teaching at home or in the classroom. Children's sensitivity to context may allow them to appreciate that the goal of a competitive game is to win and that it is advantageous to have more resources under these circumstances. To encourage more equal distributions, however, one might leverage this contextual understanding by suggesting that competition requires an even playing field in order to win "fair and square". Thus, children may come to appreciate that the decks need to be stacked equally, even within a competitive context.

Second, given the important role that ToM played in children's sharing behaviour it may be useful for parents and educators to spend time developing these skills with their children and students. Although ToM skills typically develop through natural interaction and play, previous work has shown that the tasks designed to assess ToM in young children can also be used to teach them (Allen & Kinsey, 2013; Appleton & Reddy, 1996; Ding et al., 2015; Kloo & Perner, 2008; Slaughter & Gopnik, 1996). Certainly, it would be interesting to implement a training paradigm in future work, to determine whether sharing behaviour increases as ToM improves.

Moreover, a training study would elucidate the direction of the relations between ToM and sharing behaviours.

Although this research offered insight into the factors that influence children's sharing behaviours, it is not without limitations. One such limitation was the artificial nature of the interaction between children and their (virtual) social partners. This may have impacted the results in one of two ways. First, children may have suspected that their partners were not real. However, the statements that children generated in response to the messages they had received suggest that this was not the case. Second, previous studies have found that children perceive selfish behaviour to be "more shameful" when they are in a public, rather than a private, environment (Houser et al., 2012). Therefore, the presence of the examiner may have influenced their behaviour. As well, when among peers in a more naturalistic setting (such as a classroom), children might be more inclined to behave differently.

An additional limitation was the negatively skewed distribution of scores in the Red Dog/Blue Dog Task. This ceiling effect may have prevented significant correlations between this task and the other measures of executive functioning from emerging. Moreover, the use of an EF composite measure composed of tasks that were only weakly or nonsignificantly correlated reflects another weakness of this study. Ideally, multiple tasks would have been used to assess each EF construct, however, this was not possible due to time limitations. In order to reduce the amount of class time that participants missed, the scope of study was condensed as much as possible.

Another limitation is reflected in the unequal sample sizes for each age group. Relatively few 6-year-olds participated in the current study, so ensuring that 6-year-olds are adequately represented in the sample would be an important step in subsequent studies. In addition, the age

span was somewhat limited. It would be interesting to include older age groups in future studies to determine if school-aged children modify their sharing behaviours in the same way, and whether or not the same set of socio-cognitive and cognitive skills are being relied upon. Certainly, past work has found that theory of mind skills predict different behaviours depending on the age of the children (Im-Bolter, Agostino, & Owens-Jaffray, 2016).

A further limitation is that the reported regression models left a considerable amount of variance unexplained, which implies that there are other factors (beyond ToM, inhibition, working memory, and cognitive flexibility) which were not investigated that may contribute to children's sharing and shifting behaviours. One possibility might be that children's exposure to social interaction influences their ability to share differentially across social contexts and partners. In this vein, research has shown that children's social experiences (as measured by having siblings and having attended early child care), rather than their ToM or affective perspective taking abilities, were related to their tendency to share differentially based on need (Paulus & Leitherer, 2017). Children's language skills (not assessed here) may also relate to their sharing behaviour. For instance, it may be that children with more sophisticated pragmatic language skills are more sensitive to the messages (and message to context fit) from their social partners.

Within the current study, the findings were discussed in terms of children's ToM and EF abilities yielding sharing behaviours, however, the direction of effects cannot be determined. There are arguments for the reverse direction, that is, that the experience of interacting with others enhances children's social understanding (Carpendale & Lewis, 2004). A longitudinal study would be required to say with certainty whether ToM leads to sharing behaviour, or whether the act of sharing contributes to ToM ability.

In conclusion, this study contributed to the existing literature by examining preschool-aged children's sensitivity to social and contextual cues by examining their sharing behaviours across social contexts and following different communicative utterances from social partners. The extent to which children's sharing behaviours differed (represented by shifting across contexts and partners) was studied in relation to their socio-cognitive abilities, and the developmental patterns associated with the various factors were examined. The findings serve to highlight children's use of context as a means of guiding their social behaviour, as well as the age-dependent effect of messages from a social partner. Moreover, the results offer greater insight into the way in which children's socio-cognitive abilities might impact the extent to which they can share and shift their behaviours across contexts.

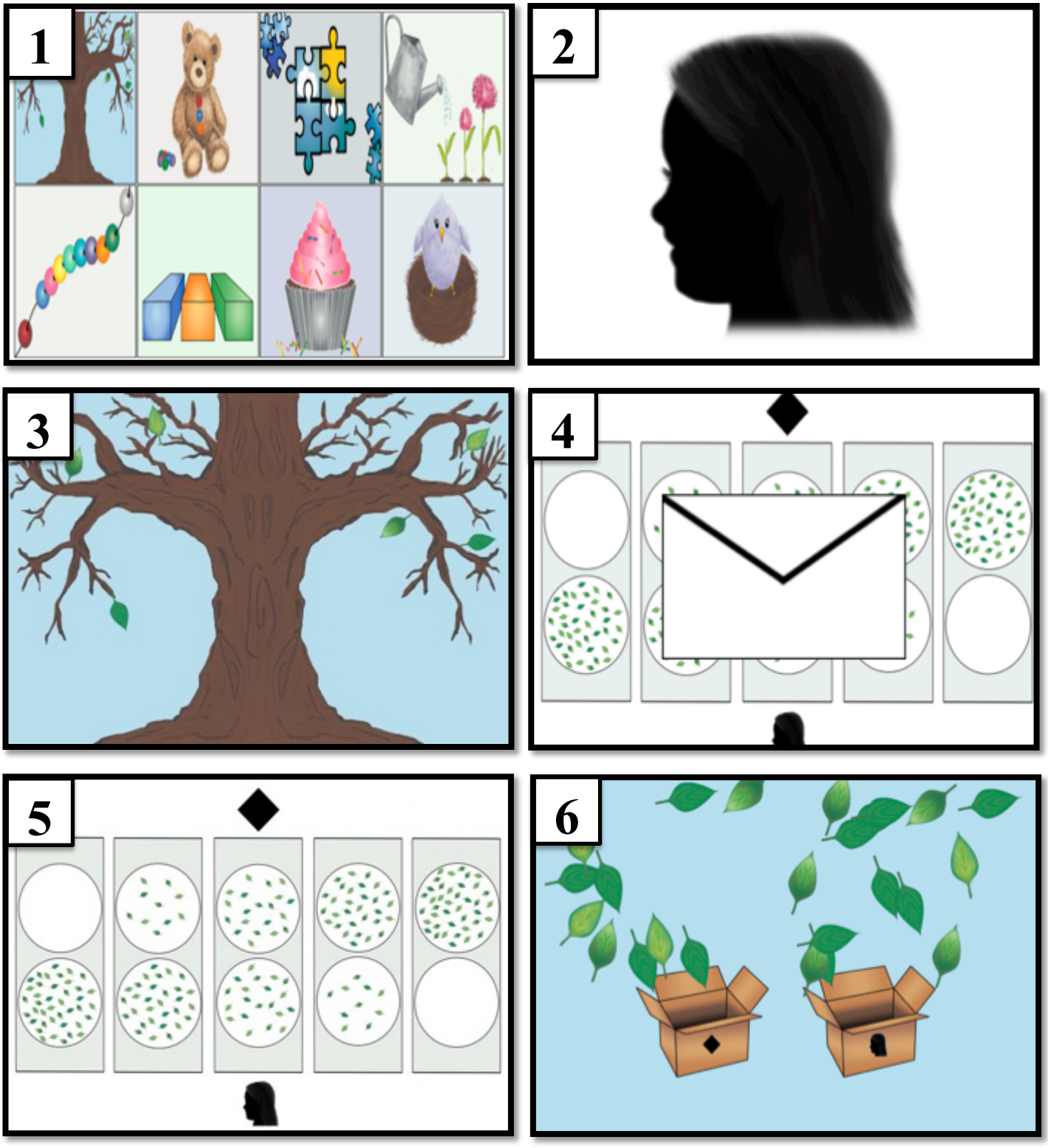

Figure 1. Sequence of screens in the resource allocation task: 1) home screen, 2) example of partner silhouette, 3) example of practice screen, 4) example of message notification screen, 5) example of perspective taking screen, 6) example of resource allocation screen.

Table 1

Coding categories for participant responses, gameplay-related categories

	Category Description
Pro-Team	Any message that made reference to playing on teams (i.e., used words such as "we", "us", "together", "team", etc.) and intimated that they hoped or believed that they would be successful during the game. **Example:** "We can do it!"
Anti-Team	Any message that made reference to playing on teams (i.e., used words such as "we", "us", "together", etc.) and suggested that they believed that they would fail during the game or implied that the participant did not want to be on a team with the other player **Example:** "I think the other team will win the prize."
Pro-Self	Any message that made reference to playing alone (i.e., used words such as "I" and "me"), and conveyed desires or beliefs about succeeding at the game **Example:** "I think I can win!"
Anti-Self	Any message that made reference to playing on alone (i.e., used words such as "I" and "me") and suggested that they believed that they would not do well during the game **Example:** "I'm not very good because it's my first time."
Pro-Other	Any message that made reference to the other player (i.e., used words such as the virtual player's name, "you", "he", or "she") and intimated that they hoped or believed that he or she would be successful during the game **Example:** "I actually think you are going to win."
Anti-Other	Any messages that made reference to the other player (i.e., used words such as the virtual player's name, "you", "he", or "she") and suggested that they believed that he or she would not do well during the game or suggested that the other person was not being very kind **Example:** "I think he won't win." "She's a bit sassy!"

Table 2

Coding categories for participant responses, non-gameplay-related categories

	Category Description
Agreement	Any message using words such as "yes", "too", "sure", and "I know" was coded as having agreed with the other player. Agreements were coded in addition to the other content (e.g., gameplay related statements). For example, messages could reflect agreement with the message content (e.g., responding with "I know" to the statement "We are the best."), or agreement with the tone of the message (e.g., responding "I am the best, too." to a social partner's self-interested message). In the latter example, the message would be coded as both Pro-Self *and* Agreement. **Example:** "I think so, too."
Disagreement	Children who responded to messages using words such as "no", "wrong", "don't", and "never" were coded as having disagreed with the other player. Typically, disagreement represented a difference in opinion relating to the message context (e.g., responding with "No you aren't!" to the statement "I am the best"). **Example:** "I don't think so!" "No you won't!"
Acknowledgement Only	Children who chose to only acknowledge receipt of the message rather than generating a response that reflected their beliefs about the game or social partner. Responses such as "Thank you" or "OK" were coded as acknowledgements. No other response (gameplay-related or otherwise) was generated. **Example:** "Thanks."
Friendly Overture	Any message in which children offered a kind comment or extended an invitation to their partner. Friendly overtures did not reference gameplay. **Examples:** "You're the kindest friend."
No Answer/ Not Available	Any message that indicated that a child did not know how to respond, chose not to respond, or was unable to respond. When a response was not available, it was also coded as No Answer.
Random/ Off-Topic	Any message that included off-topic comments or questions (i.e., they did not refer to the game and were not typical friendly overtures or acknowledgments) **Example:** "Monkey. Dog. Cat. Cow. Moose."

Table 3

Mean number of responses across conditions and coder interrater reliability

	Total Number of Responses per Category (across all conditions)	Interrater Reliability	
		Interclass Correlation Coefficient	p-value
Pro-Team	179	.999	<.001
Anti-Team	5	1.00	<.001
Pro-Self	172	.994	<.001
Anti-Self	4	1.00	<.001
Pro-Other	49	.999	<.001
Anti-Other	67	.999	<.001
Agreement	162	.999	<.001
Disagreement	31	1.00	<.001
Acknowledgement	58	.999	<.001
Friendly Overture	64	.998	<.001
No Answer/Not Available	189	.999	<.001
Random/Off-Topic	42	.999	<.001

Table 4

Bivariate and partial correlations between measures of EF and ToM

	Theory of Mind	Digit Span	Red Dog/ Blue Dog	Object Classification Task
Age (in months)	0.07	.28**	.32**	.30**
Theory of Mind	-	.40** (.40**)	.21 (.20)	-.05 (-.08)
Digit Span	-	-	.38**(.33**)	.19 (.12)
Red Dog/Blue Dog	-	-	-	.05 (-.04)

Notes. Partial correlations controlling for age (in months) are in parentheses.

*$p \leq .05$; **$p \leq .01$

Table 5

Bivariate and partial correlations between EF, ToM, and resource allocation outcome measures

		R/B	DS	OCTC	EF	EF (No IC)	ToM
Cooperative Context	Team Message	-.14 (-.06)	-.23* (-.18)	-.29** (-.22*)	-.36** (-.26**)	-.36** (-.29**)	-.37** (-.36**)
	Self Message	-.08 (-.02)	-.11 (-.06)	-.20 (-.16)	-.23* (-.15)	-.21* (-.15)	-.28** (-.28**)
	Across Message	-.12 (-.05)	-.19 (-.13)	-.27* (-.20)	-.32** (-.23*)	-.32** (-.24*)	-.36** (-.35**)
Competitive Context	Team Message	.01 (.02)	-.10 (-.11)	-.19 (-.21*)	-.08 (-.10)	-.15 (-.18)	-.04 (-.05)
	Self Message	-.13 (-.08)	-.05 (-.01)	-.20 (-.17)	-.16 (-.12)	-.16 (-.13)	.07 (.08)
	Across Message	-.06 (-.03)	-.08 (-.06)	-.21* (-.21*)	-.13 (-.12)	-.17 (-.17)	.01 (.02)
Across Both Contexts	Team Message	-.06 (-.02)	-.18 (-.16)	-.27* (-.25*)	-.23* (-.19)	-.28** (-.26**)	-.21* (-.21*)
	Self Message	-.13 (-.07)	-.09 (-.04)	-.24* (-.20)	-.23* (-.16)	-.22* (-.16)	-.10 (-.09)

	Team Message	.11 (.06)	.07 (.02)	.02 (-.07)	.18 (.09)	.12 (.02)	.24* (.23*)
Context Shift	Self Message	-.07 (-.06)	.04 (.04)	-.04 (-.05)	.02 (-.001)	.02 (-.01)	.30** (.30**)
	Across Messages	-.03 (.001)	.06 (.03)	-.01 (-.07)	.12 (.05)	.08 (.01)	.31** (.31**)
	Cooperative Context	-.06 (.036)	.12 (.11)	.09 (.06)	.13 (.11)	.16 (.15)	.08 (.08)
Message Shift	Competitive Context	-.18 (-.13)	.07 (.13)	-.001 (.07)	-.10 (-.01)	.003 (.09)	.16 (.17)
	Across Contexts	-.09 (-.07)	.14 (.18)	.05 (.09)	.01 (.06)	.11 (.16)	.17 (.17)

Notes. Partial correlations controlling for age (in months) are in parentheses.

*$p \leq .05$; **$p \leq .01$

References

Allen, J. R., & Kinsey, K. (2013). Teaching theory of mind. *Early Education and Development, 24*(6), 865-876. doi:10.1080/10409289.2013.745182

Appleton, M., & Reddy, V. (1996). Teaching three year-olds to pass false belief tests: A conversational approach. *Social Development, 5*(3), 275-291. doi:10.1111/j.1467-9507.1996.tb00086.x

Ashiabi, G. S. (2007). Play in the preschool classroom: Its socioemotional significance and the teacher's role in play. *Early Childhood Education Journal, 35*(2), 199-207. doi:10.1007/s10643-007-0165-8

Axelrod, R., & Hamilton, W. D. (1981). The evolution of cooperation. *Science, 211*(4489), 1390-1396. doi:10.1126/science.7466396

Benenson, J. F., Pascoe, J., & Radmore, N. (2007). Children's altruistic behavior in the dictator game. *Evolution and Human Behavior, 28*(3), 168-175. doi:10.1016/j.evolhumbehav.2006.10.003

Benson, J. E., Sabbagh, M. A., Carlson, S. M., & Zelazo, P. D. (2013). Individual differences in executive functioning predict preschoolers' improvement from theory-of-mind training. *Developmental Psychology, 49*(9), 1615-1627. doi:10.1037/a0031056

Bereby-Meyer, Y., & Fiks, S. (2013). Changes in negative reciprocity as a function of age. *Journal of Behavioral Decision Making, 26*(4), 397-403. doi:10.1002/bdm.1768

Berndt, T. J. (1977). The effect of reciprocity norms on moral judgment and causal attribution. *Child Development, 48*(4), 1322-1330. doi:10.2307/1128490

Beveridge, M., Jarrold, C., & Pettit, E. (2002). An experimental approach to executive fingerprinting in young children. *Infant and Child Development, 11*(2), 107-123. doi:10.1002/icd.300

Bierman, K. L., & Welsh, J. A. (2000). Assessing social dysfunction: The contributions of laboratory and performance-based measures. *Journal of Clinical Child Psychology, 29*(4), 526-539. doi:10.1207/S15374424JCCP2904_6

Blair, C., & Peters, R. (2003). Physiological and neurocognitive correlates of adaptive behavior in preschool among children in head start. *Developmental Neuropsychology, 24*(1), 479-497. doi:10.1207/S15326942DN2401_04

Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development, 78*(2), 647-663. doi:10.1111/j.1467-8624.2007.01019.x

Blake, P. R., & McAuliffe, K. (2011). "I had so much it didn't seem fair": Eight-year-olds reject two forms of inequity. *Cognition, 120*(2), 215-224. doi:10.1016/j.cognition.2011.04.006

Blake, P. R., & Rand, D. G. (2010). Currency value moderates equity preference among young children. *Evolution and Human Behavior, 31*(3), 210-218. doi:10.1016/j.evolhumbehav.2009.06.012

Bond, L., Butler, H., Thomas, L., Carlin, J., Glover, S., Bowes, G., & Patton, G. (2007). Social and school connectedness in early secondary school as predictors of late teenage substance use, mental health, and academic outcomes. *Journal of Adolescent Health, 40*(4), e9-e18. doi:10.1016/j.jadohealth.2006.10.013

Bonino, S., & Cattelino, E. (1999). The relationship between cognitive abilities and social abilities in childhood: A research on flexibility in thinking and co-operation with peers.

International Journal of Behavioral Development, 23(1), 19-36. doi:10.1080/016502599383982

Bowlby, J. (1951). Maternal care and mental health. *World Health Organization Monograph Series, 2*, 179-179.

Brocki, K. C., & Bohlin, G. (2004). Executive functions in children aged 6 to 13: A dimensional and developmental study. *Developmental Neuropsychology, 26*(2), 571-593. doi:10.1207/s15326942dn2602_3

Brownell, C. A. (2013). Early development of prosocial behavior: Current perspectives. *Infancy, 18*(1), 1-9. doi:10.1111/infa.12004

Brownell, C. A., & Carriger, M. S. (1990). Changes in cooperation and self-other differentiation during the second year. *Child Development, 61*(4), 1164-1174. doi:10.2307/1130884

Brownell, C. A., Iesue, S. S., Nichols, S. R., & Svetlova, M. (2013). Mine or yours? development of sharing in toddlers in relation to ownership understanding. *Child Development, 84*(3), 906-920. doi:10.1111/cdev.12009

Brownell, C. A., Svetlova, M., & Nichols, S. (2009). To share or not to share: When do toddlers respond to another's needs? *Infancy, 14*(1), 117-130. doi:10.1080/15250000802569868

Bryan, J. H. (1975). Children's cooperation and helping behaviors. In E. M. Hetherington (Ed.), *Review of child development research.* Oxford, England: U Chicago Press.

Bryan, J. H., & London, P. (1970). Altruistic behavior by children. *Psychological Bulletin, 73*(3), 200-211. doi:10.1037/h0028744

Camerer, C. F. (2003). Behavioural studies of strategic thinking in games. *Trends in Cognitive Sciences, 7*(5), 225-231. doi:10.1016/S1364-6613(03)00094-9

Carlson, S. M., Zelazo, P. D., & Faja, S. (2013). Executive function. In P. D. Zelazo (Ed.), *Oxford library of psychology. The Oxford handbook of developmental psychology (Vol. 1): Body and mind* (pp. 706-743). New York, NY, US: Oxford University Press.

Carpendale, J. I. M., Kettner, V. A., & Audet, K. N. (2015). On the nature of toddlers' helping: Helping or interest in others' activity? *Social Development, 24*(2), 357-366. doi:10.1111/sode.12094

Carpendale, J. I. M., & Lewis, C. (2004). Constructing an understanding of mind: The development of children's social understanding within social interaction. *Behavioral and Brain Sciences, 27*(1), 79-151. doi:10.1017/S0140525X04000032

Castelli, I., Massaro, D., Sanfey, A. G., & Marchetti, A. (2014). "What is fair for you?" judgments and decisions about fairness and theory of mind. *European Journal of Developmental Psychology, 11*(1), 49-62. doi:10.1080/17405629.2013.806264

Chadwick-Jones, J. K. (1976). Social Exchange Theory: Its structure and influence in social psychology. In H. Tajfel (Ed.), *European Monographs in Social Psychology* (Vol. 8, pp. 400–417). London, UK: Academic Press.

Charlesworth, W. R., & la Freniere, P. (1983). Dominance, friendship, and resource utilization in preschool children's groups. *Ethology & Sociobiology, 4*(3), 175-186. doi:10.1016/0162-3095(83)90028-6

Ciairano, S., Bonino, S., & Miceli, R. (2006). Cognitive flexibility and social competence from childhood to early adolescence. *Cognitie Creier Comportament, 10*(3), 343-366.

Ciairano, S., Visu-Petra, L., & Settanni, M. (2007). Executive inhibitory control and cooperative behavior during early school years: A follow-up study. *Journal of Abnormal Child Psychology, 35*(3), 335-345. doi:10.1007/s10802-006-9094-z

Cook, H., & Stingle, S. (1974). Cooperative behavior in children. *Psychological Bulletin, 81*(12), 918-933. doi:10.1037/h0037431

Cooley, S., & Killen, M. (2015). Children's evaluations of resource allocation in the context of group norms. *Developmental Psychology, 51*(4), 554-563. doi:10.1037/a0038796

Corsano, P., Majorano, M., & Champretavy, L. (2006). Psychological well-being in adolescence: The contribution of interpersonal relations and experience of being alone. *Adolescence, 41*(162), 341-353.

Damon, W. (1975). Early conceptions of positive justice as related to the development of logical operations. *Child Development, 46*(2), 301-312. doi:10.2307/1128122

Damon, W. (1979). *The social world of the child.* Jossey-Bass.

Damon, W. (1980). Patterns of change in children's social reasoning: A two-year longitudinal study. *Child Development, 51*(4), 1010-1017. doi:10.2307/1129538

de Wilde, A., Koot, H. M., & Lier, P. A. C. (2016). Developmental links between children's working memory and their social relations with teachers and peers in the early school years. *Journal of Abnormal Child Psychology, 44*(1), 19-30. doi:10.1007/s10802-015-0053-4

Deák, G. O., & Narasimham, G. (2003). Is perseveration caused by inhibition failure? evidence from preschool children's inferences about word meanings. *Journal of Experimental Child Psychology, 86*(3), 194-222. doi:10.1016/j.jecp.2003.08.001

DeJesus, J. M., Rhodes, M., & Kinzler, K. D. (2014). Evaluations versus expectations: Children's divergent beliefs about resource distribution. *Cognitive Science, 38*(1), 178-193. doi:10.1111/cogs.12093

Diamond, A. (2016). Why improving and assessing executive functions early in life is critical. In J. A. Griffin, P. McCardle, & L. S. Freund (Eds.), *Executive function in preschool-age children: Integrating measurement, neurodevelopment, and translational research* (pp. 11-43). Washington, DC, US: American Psychological Association. doi:10.1037/14797-002

Ding, X. P., Wellman, H. M., Wang, Y., Fu, G., & Lee, K. (2015). Theory-of-mind training causes honest young children to lie. *Psychological Science, 26*(11), 1812-1821. doi:10.1177/0956797615604628

Dunfield, K. A. (2014). A construct divided: Prosocial behavior as helping, sharing, and comforting subtypes. *Frontiers in Psychology, 5*, 958. doi:10.3389/fpsyg.2014.00958

Dunn, J., Brown, J., & Beardsall, L. (1991). Family talk about feeling states and children's later understanding of others' emotions. *Developmental Psychology, 27*(3), 448-455. doi:10.1037/0012-1649.27.3.448

Dunn, J., Brown, J., Slomkowski, C., Tesla, C., & Youngblade, L. (1991). Young children's understanding of other people's feelings and beliefs: Individual differences and their antecedents. *Child Development, 62*(6), 1352-1366. doi:10.2307/1130811

Dunn, J., & Munn, P. (1986). Siblings and the development of prosocial behaviour. *International Journal of Behavioral Development, 9*(3), 265-284. doi:10.1177/016502548600900301

Eisenberg, N. (2005). The development of empathy-related responding. In G. Carlo & C. P. Edwards (Eds.), *Vol. 51 of the Nebraska Symposium on motivation. Moral motivation through the life span* (pp. 73-117). Lincoln, NE, US: University of Nebraska Press.

Eisenberg, N., & Mussen, P. H. (1989). *The roots of prosocial behavior in children*. New York, NY, US: Cambridge University Press. doi:10.1017/CBO9780511571121

Elkins, D. N. (2016). Attachment theory and social relationships research: The power of human connection and social interaction. In D. N. Elkins, *The human elements of psychotherapy: A nonmedical model of emotional healing* (pp. 33-51). Washington, DC, US: American Psychological Association. doi:10.1037/14751-003

Epley, N., Caruso, E. M., & Bazerman, M. H. (2006). When perspective taking increases taking: Reactive egoism in social interaction. *Journal of Personality and Social Psychology, 91*(5), 872-889. doi:10.1037/0022-3514.91.5.872

Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature, 454*(7208), 1079-1083. doi:10.1038/nature07155

Fischer, W. F. (1963). Sharing in preschool children as a function of amount and type of reinforcement. *Genetic Psychology Monographs, 68*(2), 219-245.

Forsythe, R., Horowitz, J. L., Savin, N. E., & Sefton, M. (1994). Fairness in simple bargaining experiments. *Games and Economic Behavior, 6*(3), 347-369.

Garon, N., Bryson, S. E., & Smith, I. M. (2008). Executive function in preschoolers: A review using an integrative framework. *Psychological Bulletin, 134*(1), 31-60. doi:10.1037/0033-2909.134.1.31

Green, V. A., & Rechis, R. (2006). Children's cooperative and competitive interactions in limited resource situations: A literature review. *Journal of Applied Developmental Psychology, 27*(1), 42-59. doi:10.1016/j.appdev.2005.12.002

Gummerum, M., Hanoch, Y., Keller, M., Parsons, K., & Hummel, A. (2010). Preschoolers' allocations in the dictator game: The role of moral emotions. *Journal of Economic Psychology, 31*(1), 25-34. doi:10.1016/j.joep.2009.09.002

Güth, W., Schmittberger, R., & Schwarze, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior & Organization, 3*(4), 367-388.

Hamann, K., Bender, J., & Tomasello, M. (2014). Meritocratic sharing is based on collaboration in 3-year-olds. *Developmental Psychology, 50*(1), 121-128. doi:10.1037/a0032965

Hamann, K., Warneken, F., & Tomasello, M. (2012). Children's developing commitments to joint goals. *Child Development, 83*(1), 137-145. doi:10.1111/j.1467-8624.2011.01695.x

Harbaugh, W. T., & Krause, K. (2000). Children's altruism in public good and dictator experiments. *Economic Inquiry, 38*(1), 95-109.

Hay, D. F. (1979). Cooperative interactions and sharing between very young children and their parents. *Developmental Psychology, 15*(6), 647-653. doi:10.1037/0012-1649.15.6.647

Hay, D. F. (1994). Prosocial development. *Child Psychology & Psychiatry & Allied Disciplines, 35*(1), 29-71. doi:10.1111/j.1469-7610.1994.tb01132.x

Hay, D. F., & Cook, K. V. (2007). The transformation of prosocial behavior from infancy to childhood. In C. A. Brownell & C. B. Kopp (Eds.), *Socioemotional development in the toddler years: Transitions and transformations* (pp. 100-131). New York, NY, US: Guilford Press.

Hay, D. F., & Murray, P. (1982). Giving and requesting: Social facilitation of infants' offers to adults. *Infant Behavior & Development, 5*(3), 301-310. doi:10.1016/S0163-6383(82)80039-8

Henderson, A. M. E., & Woodward, A. L. (2011). “Let’s work together”: What do infants understand about collaborative goals? *Cognition, 121*(1), 12-21. doi:10.1016/j.cognition.2011.05.008

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., . . . Tracer, D. (2005). "Economic man" in cross-cultural perspective: Behavioral experiments in 15 small-scale societies. *Behavioral and Brain Sciences, 28*(6), 795-855. doi:10.1017/S0140525X05000142

Hook, J. (1978). The development of equity and logico-mathematical thinking. *Child Development, 49*(4), 1035-1044. doi:10.2307/1128743

Hook, J. G., & Cook, T. D. (1979). Equity theory and the cognitive ability of children. *Psychological Bulletin, 86*(3), 429-445. doi:10.1037/0033-2909.86.3.429

Houser, D., Montinari, N., & Piovesan, M. (2012). Private and public decisions in social dilemmas: Evidence from children’s behavior. *Plos One, 7*(8) doi:10.1371/journal.pone.0041568

Howard, S. J., Okely, A. D., & Ellis, Y. G. (2015). Evaluation of a differentiation model of preschoolers’ executive functions. *Frontiers in Psychology, 6*

Howe, N., & Ross, H. S. (1990). Socialization, perspective-taking, and the sibling relationship. *Developmental Psychology, 26*(1), 160-165. doi:10.1037/0012-1649.26.1.160

Hughes, C., Ensor, R., Wilson, A., & Graham, A. (2010). Tracking executive function across the transition to school: A latent variable approach. *Developmental Neuropsychology, 35*(1), 20-36. doi:10.1080/87565640903325691

Huizinga, M., Dolan, C. V., & van der Molen, M.W. (2006). Age-related change in executive function: Developmental trends and a latent variable analysis. *Neuropsychologia, 44*(11), 2017-2036. doi:10.1016/j.neuropsychologia.2006.01.010

Huyder, V., & Nilsen, E. S. (2012). A dyadic data analysis of executive functioning and children's socially competent behaviours. *Journal of Applied Developmental Psychology, 33*(4), 197-208. doi:10.1016/j.appdev.2012.05.002

Huyder, V., Nilsen, E. S., & Bacso, S. A. (2017). The relationship between children's executive functioning, theory of mind, and verbal skills with their own and others' behaviour in a cooperative context: Changes in relations from early to middle school-age. *Infant and Child Development,*

Im-Bolter, N., Agostino, A., & Owens-Jaffray, K. (2016). Theory of mind in middle childhood and early adolescence: Different from before? *Journal of Experimental Child Psychology, 149*, 98-115. doi:10.1016/j.jecp.2015.12.006

Imuta, K., Henry, J. D., Slaughter, V., Selcuk, B., & Ruffman, T. (2016). Theory of mind and prosocial behavior in childhood: A meta-analytic review. *Developmental Psychology, 52*(8), 1192-1205. doi:10.1037/dev0000140

Jackson, M., & Tisak, M. S. (2001). Is prosocial behaviour a good thing? developmental changes in children's evaluations of helping, sharing, cooperating, and comforting. *British Journal of Developmental Psychology, 19*(3), 349-367. doi:10.1348/026151001166146

Johnson, D. W., Maruyama, G., Johnson, R., Nelson, D., & Skon, L. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin, 89*(1), 47-62. doi:10.1037/0033-2909.89.1.47

Johnson, E. S., Humphrey, M., Mellard, D. F., Woods, K., & Swanson, H. L. (2010). Cognitive processing deficits and students with specific learning disabilities: A selective meta-analysis of the literature. *Learning Disability Quarterly, 33*(1), 3-18. doi:10.1177/073194871003300101

Killen, M., Margie, N. G., & Sinno, S. (2006). Morality in the context of intergroup relationships. In M. Killen, & J. G. Smetana (Eds.), *Handbook of moral development* (pp. 155–183). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Kloo, D., & Perner, J. (2008). Training theory of mind and executive control: A tool for improving school achievement? *Mind, Brain, and Education, 2*(3), 122-127. doi:10.1111/j.1751-228X.2008.00042.x

Laranjo, J., Bernier, A., Meins, E., & Carlson, S. M. (2010). Early manifestations of children's theory of mind: The roles of maternal mind-mindedness and infant security of attachment. *Infancy, 15*(3), 300-323. doi:10.1111/j.1532-7078.2009.00014.x

Lee, K., Bull, R., & Ho, R. M. H. (2013). Developmental changes in executive functioning. *Child Development, 84*(6), 1933-1953. doi:10.1111/cdev.12096

Lerner, M. J. (1974). The justice motive: "equity" and "parity" among children. *Journal of Personality and Social Psychology, 29*(4), 539-550. doi:10.1037/h0036206

Leventhal, G. S., Popp, A. L., & Sawyer, L. (1973). Equity or equality in children's allocation of reward to other persons? *Child Development, 44*(4), 753-763. doi:10.2307/1127720

Liberman, Z., & Shaw, A. (2017). Children use partial resource sharing as a cue to friendship. *Journal of Experimental Child Psychology, 159*, 96-109. doi:10.1016/j.jecp.2017.02.002

Malti, T., Ongley, S. F., Peplak, J., Chaparro, M. P., Buchmann, M., Zuffianò, A., & Cui, L. (2016). Children's sympathy, guilt, and moral reasoning in helping, cooperation, and sharing: A 6-year longitudinal study. *Child Development, 87*(6), 1783-1795. doi:10.1111/cdev.12632

Martin, A., & Olson, K. R. (2015). Beyond good and evil: What motivations underlie children's prosocial behavior? *Perspectives on Psychological Science, 10*(2), 159-175. doi:10.1177/1745691615568998

McCabe, K., Houser, D., Ryan, L., Smith, V., & Trouard, T. (2001). A functional imaging study of cooperation in two-person reciprocal exchange. *Proceedings of the National Academy of Sciences of the United States of America, 98*(20), 11832-11835. doi:10.1073/pnas.211415698 [doi]

McQuade, J. D., Murray-Close, D., Shoulberg, E. K., & Hoza, B. (2013). Working memory and social functioning in children. *Journal of Experimental Child Psychology, 115*(3), 422-435. doi:10.1016/j.jecp.2013.03.002

Miller, M. R., Giesbrecht, G. F., Müller, U., McInerney, R. J., & Kerns, K. A. (2012). A latent variable approach to determining the structure of executive function in preschool children. *Journal of Cognition and Development, 13*(3), 395-423. doi:10.1080/15248372.2011.585478

Mills, C. B., & Carwile, A. M. (2009). The good, the bad, and the borderline: Separating teasing from bullying. *Communication Education, 58*(2), 276-301. doi:10.1080/03634520902783666

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., & Howerter, A. (2000). The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. *Cognitive Psychology, 41*(1), 49-100. doi:10.1006/cogp.1999.0734

Moore, C. (2009). Fairness in children's resource allocation depends on the recipient. *Psychological Science, 20*(8), 944-948. doi:10.1111/j.1467-9280.2009.02378.x

Müller, U., & Kerns, K. (2015). The development of executive function. In L. S. Liben, U. Müller, & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science: Cognitive processes* (pp. 571-623). Hoboken, NJ, US: John Wiley & Sons Inc.

Mutter, B., Alcorn, M. B., & Welsh, M. (2006). Theory of mind and executive function: Working-memory capacity and inhibitory control as predictors of false-belief task performance. *Perceptual and Motor Skills, 102*(3), 819-835. doi:10.2466/PMS.102.3.819-835

Nelson, L., & Madsen, M. C. (1969). Cooperation and competition in four-year-olds as a function of reward contingency and subculture. *Developmental Psychology, 1*(4), 340-344. doi:10.1037/h0027696

Newcomb, A. F., & Bagwell, C. L. (1995). Children's friendship relations: A meta-analytic review. *Psychological Bulletin, 117*(2), 306-347. doi:10.1037/0033-2909.117.2.306

Nigg, J. T., Quamma, J. P., Greenberg, M. T., & Kusche, C. A. (1999). A two-year longitudinal study of neuropsychological and cognitive performance in relation to behavioral problems and competencies in elementary school children. *Journal of Abnormal Child Psychology, 27*(1), 51-63. doi:10.1023/A:1022614407893

Nilsen, E. S., & Fecica, A. M. (2011). A model of communicative perspective-taking for typical and atypical populations of children. *Developmental Review, 31*(1), 55-78. doi:10.1016/j.dr.2011.07.001

Nilsen, E. S., & Graham, S. A. (2009). The relations between children's communicative perspective-taking and executive functioning. *Cognitive Psychology, 58*(2), 220–249. doi:10.1016/j.cogpsych.2008.07.002

Nilsen, E. S., & Valcke, A. (2017). *Children's sharing with teammates versus competitors: The impact of theory of mind and executive functioning.* Manuscript in preparation.

Olson, K. R., & Spelke, E. S. (2008). Foundations of cooperation in young children. *Cognition, 108*(1), 222-231. doi:10.1016/j.cognition.2007.12.003

Oosterbeek, H., Sloof, R., & Van De Kuilen, G. (2004). Cultural differences in ultimatum game experiments: Evidence from a meta-analysis. *Experimental Economics, 7*(2), 171-188.

Parker, J. G., & Asher, S. R. (1987). Peer relations and later personal adjustment: Are low-accepted children at risk? *Psychological Bulletin, 102*(3), 357-389. doi:10.1037/0033-2909.102.3.357

Paulus, M. (2014a). The early origins of human charity: Developmental changes in preschoolers' sharing with poor and wealthy individuals. *Frontiers in Psychology, 5*

Paulus, M. (2014b). The emergence of prosocial behavior: Why do infants and toddlers help, comfort, and share? *Child Development Perspectives, 8*(2), 77-81. doi:10.1111/cdep.12066

Paulus, M. (2016). The development of action planning in a joint action context. *Developmental Psychology, 52*(7), 1052-1063. doi:10.1037/dev0000139

Paulus, M., & Leitherer, M. (2017). Preschoolers' social experiences and empathy-based responding relate to their fair resource allocation. *Journal of Experimental Child Psychology, 161*, 202-210. doi:10.1016/j.jecp.2017.03.005

Paulus, M., Licata, M., Kristen, S., Thoermer, C., Woodward, A., & Sodian, B. (2015). Social understanding and self-regulation predict pre-schoolers' sharing with friends and disliked peers: A longitudinal study. *International Journal of Behavioral Development, 39*(1), 53-64. doi:10.1177/0165025414537923

Paulus, M., & Moore, C. (2014). The development of recipient-dependent sharing behavior and sharing expectations in preschool children. *Developmental Psychology, 50*(3), 914-921. doi:10.1037/a0034169

Pennington, B. F. (1997). Dimensions of executive functions in normal and abnormal development.. In N. Krasnegor, G. Lyon, & P. Goldman-Rakic (Eds.), *Development of the Prefrontal Cortex: Evolution, Neurobiology, and Behavior* (pp. 265–282). Baltimore, MD, US: Paul H Brookes Publishing.

Perner, J., & Lang, B. (1999). Development of theory of mind and executive control. *Trends in Cognitive Sciences, 3*(9), 337-344. doi:10.1016/S1364-6613(99)01362-5

Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences, 1*(4), 515-526. doi:10.1017/S0140525X00076512

Priewasser, B., Roessler, J., & Perner, J. (2013). Competition as rational action: Why young children cannot appreciate competitive games. *Journal of Experimental Child Psychology, 116*(2), 545-559. doi:10.1016/j.jecp.2012.10.008

Putallaz, M., & Sheppard, B. H. (1992). Conflict management and social competence. In C. U. Shantz & W. W. Hartup (Eds.), *Cambridge studies in social and emotional development.*

Conflict in child and adolescent development (pp. 330-355). New York, NY, US: Cambridge University Press.

Rao, N., & Stewart, S. M. (1999). Cultural influences on sharer and recipient behavior: Sharing in chinese and indian preschool children. *Journal of Cross-Cultural Psychology, 30*(2), 219-241. doi:10.1177/0022022199030002005

Rapoport, A. (1973). *Two-person game theory* Courier Corporation.

Rheingold, H. L., Hay, D. F., & West, M. J. (1976). Sharing in the second year of life. *Child Development, 47*(4), 1148-1158. doi:10.2307/1128454

Richard, J. F., Fonzi, A., Tani, F., Tassi, F., Tomada, G., & Schneider, B. H. (2002). Cooperation and competition. In P. K. Smith, & C. H. Hart (Eds.), *Blackwell handbook of childhood social development* (pp. 515−532). Oxford, England: Blackwell Publishers Ltd.

Rochat, P., Dias, M. D. G., Liping, G., Broesch, T., Passos-Ferreira, C., Winning, A., & Berg, B. (2009). Fairness in distributive justice by 3- and 5-year-olds across seven cultures. *Journal of Cross-Cultural Psychology, 40*(3), 416-442. doi:10.1177/0022022109332844

Rose-Krasnor, L. (1997). The nature of social competence: A theoretical review. *Social Development, 6*(1), 111-135. doi:10.1111/j.1467-9507.1997.tb00097.x

Roth, A. E., Prasnikar, V., Okuno-Fujiwara, M., & Zamir, S. (1991). Bargaining and market behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: An experimental study. *The American Economic Review,* , 1068-1095.

Rutland, A., Killen, M., & Abrams, D. (2010). A new social-cognitive developmental perspective on prejudice: The interplay between morality and group identity. *Perspectives on Psychological Science, 5*(3), 279-291. doi:10.1177/1745691610369468

Schmidt, M. F. H., Hardecker, S., & Tomasello, M. (2016). Preschoolers understand the normativity of cooperatively structured competition. *Journal of Experimental Child Psychology, 143*, 34-47. doi:10.1016/j.jecp.2015.10.014

Sebastián-Enesco, C., & Warneken, F. (2015). The shadow of the future: 5-year-olds, but not 3-year-olds, adjust their sharing in anticipation of reciprocation. *Journal of Experimental Child Psychology, 129*, 40-54. doi:10.1016/j.jecp.2014.08.007

Shaw, A., & Olson, K. R. (2012). Children discard a resource to avoid inequity. *Journal of Experimental Psychology: General, 141*(2), 382-395. doi:10.1037/a0025907

Sidera, F., Serrat, E., Serrano, J., Rostan, C., Caño, A., & Amadó, A. (2013). Let's share perspectives! Mentalistic skills involved in cooperation. *International Journal of Educational Psychology, 2*(3), 325-352.

Slaughter, V., & Gopnik, A. (1996). Conceptual coherence in the child's theory of mind: Training children to understand belief. *Child Development, 67*(6), 2967-2988.

Smidts, D. P., Jacobs, R., & Anderson, V. (2004). The object classification task for children (OCTC): A measure of concept generation and mental flexibility in early childhood. *Developmental Neuropsychology, 26*(1), 385-401. doi:10.1207/s15326942dn2601_2

Smith, C. E., Blake, P. R., & Harris, P. L. (2013). I should but I won't: Why young children endorse norms of fair sharing but do not follow them. *PloS One, 8*(3), e59510.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18*(6), 643-662. doi:10.1037/h0054651

Svetlova, M., Nichols, S. R., & Brownell, C. A. (2010). Toddlers prosocial behavior: From instrumental to empathic to altruistic helping. *Child Development, 81*(6), 1814-1827. doi:10.1111/j.1467-8624.2010.01512.x

Takagishi, H., Kameshima, S., Schug, J., Koizumi, M., & Yamagishi, T. (2010). Theory of mind enhances preference for fairness. *Journal of Experimental Child Psychology, 105*(1-2), 130-137. doi:10.1016/j.jecp.2009.09.005

Thompson, C., Barresi, J., & Moore, C. (1997). The development of future-oriented prudence and altruism in preschoolers. *Cognitive Development, 12*(2), 199-212. doi:10.1016/S0885-2014(97)90013-7

Thorell, L. B., & Catale, C. (2014). The assessment of executive functioning using the Childhood Executive Functioning Inventory (CHEXI). In S. Goldstein & J. A. Naglieri (Eds.), *Handbook of executive functioning* (pp. 359-366). New York, NY, US: Springer Science + Business Media. doi:10.1007/978-1-4614-8106-5_20

Tisak, M. S., & Ford, M. E. (1986). Children's conceptions of interpersonal events. *Merrill-Palmer Quarterly, 32*(3), 291-306.

Tomasello, M. (2007). Cooperation and communication in the 2nd year of life. *Child Development Perspectives, 1*(1), 8-12. doi:10.1111/j.1750-8606.2007.00003.x

Ulber, J., Hamann, K., & Tomasello, M. (2015). How 18- and 24-month-old peers divide resources among themselves. *Journal of Experimental Child Psychology, 140*, 228-244. doi:10.1016/j.jecp.2015.07.009

Ulber, J., Hamann, K., & Tomasello, M. (2016). Extrinsic rewards diminish costly sharing in 3-year-olds. *Child Development, 87*(4), 1192-1203. doi:10.1111/cdev.12534

Umberson, D., & Montez, J. K. (2010). Social relationships and health: A flashpoint for health policy. *Journal of Health and Social Behavior, 51*(1), S54-S66. doi:10.1177/0022146510383501

Underwood, M. K., Hurley, J. C., Johanson, C. A., & Mosley, J. E. (1999). An experimental, observational investigation of children's responses to peer provocation: Developmental and gender differences in middle childhood. *Child Development, 70*(6), 1428-1446. doi:10.1111/1467-8624.00104

Warneken, F., & Tomasello, M. (2007). Helping and cooperation at 14 months of age. *Infancy, 11*(3), 271-294. doi:10.1111/j.1532-7078.2007.tb00227.x

Wechsler, D. (2003). *Wechsler Intelligence Scale for Children* (4th ed.) San Antonio, TX: Psychological Corporation.

Wellman, H. M., & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development, 75*(2), 523-541. doi:10.1111/j.1467-8624.2004.00691.x

Wiebe, S. A., Espy, K. A., & Charak, D. (2008). Using confirmatory factor analysis to understand executive control in preschool children: I. latent structure. *Developmental Psychology, 44*(2), 575-587. doi:10.1037/0012-1649.44.2.575

Wiebe, S. A., Sheffield, T., Nelson, J. M., Clark, C. A. C., Chevalier, N., & Espy, K. A. (2011). The structure of executive function in 3-year-olds. *Journal of Experimental Child Psychology, 108*(3), 436-452. doi:10.1016/j.jecp.2010.08.008

Wu, Z., & Su, Y. (2014). How do preschoolers' sharing behaviors relate to their theory of mind understanding? *Journal of Experimental Child Psychology, 120*, 73-86. doi:10.1016/j.jecp.2013.11.007

Xiong, M., Shi, J., Wu, Z., & Zhang, Z. (2016). Five-year-old preschoolers' sharing is influenced by anticipated reciprocation. *Frontiers in Psychology, 7*

Yamagishi, T., Horita, Y., Takagishi, H., Shinada, M., Tanida, S., & Cook, K. S. (2009). The private rejection of unfair offers and emotional commitment. *PNAS Proceedings of the*

National Academy of Sciences of the United States of America, 106(28), 11520-11523. doi:10.1073/pnas.0900636106

Yu, J., Zhu, L., & Leslie, A. M. (2016). Children's sharing behavior in mini-dictator games: The role of in-group favoritism and theory of mind. *Child Development, 87*(6), 1747-1757. doi:10.1111/cdev.12635