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The Effects of Own and Others' Emotion on Prosocial Behavior in Childhood

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Psychology

by

Christina Alexandra Nicolaides

June 2018

Dissertation Committee:
Dr. Elizabeth Davis, Chairperson
Dr. Rebekah Richert
Dr. Misaki Natsuaki

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The Dissertation of Christina Alexandra Nicolaides is approved:

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DEDICATION

This dissertation is dedicated to my mother and to my παπού, the two people I tell my good news to first.

ABSTRACT OF THE DISSERTATION

The Effects of Own and Others' Emotion on Prosocial Behavior in Childhood

by

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Doctor of Philosophy, Graduate Program in Psychology
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Dr. Elizabeth Davis, Chairperson

Children interact with peers in their daily lives and sometimes help, share, or otherwise do something to benefit someone else. The opportunities they encounter to engage in prosocial behavior often overlap with their own and their peers' experiences of a range of emotions. The current study investigated the effects of children's own negative emotion and the effects of peer emotion on prosocial behavior. Children participated in one of four different emotion conditions in this study which had a 2 (child emotion: neutral or negative) x 2 (peer emotion: neutral or negative) factorial design. Children either played a version of a game designed to make them feel negative emotion or to feel neutral (child emotion) and then watched a version of a video of a peer who either expressed negative emotion or described feeling neutral (peer emotion). Children had multiple subsequent opportunities to behave prosocially towards the peer. Parent reports of children's emotion regulation and six different aspects of children's social cognition were used to investigate individual differences that relate to prosocial behavior that would potentially be moderated by own and other emotion. Results supported the hypothesis that children's own negative emotion experiences hinder prosocial behavior, though contrary to what

was hypothesized, exposure to a peer's negative emotion had no effect on prosocial behavior. In addition, the links between individual differences in emotion regulation and social cognition and prosocial behavior were moderated by own and other emotion. Specifically, when children played the negative emotion version of the game, better social cognition was associated with greater sharing and lower social cognition was associated with less sharing. However, when children played the neutral version of the game, greater social cognition skills were associated with less prosocial behavior, and greater emotion regulation was associated with slower prosocial behavior. These findings are discussed in terms of how they advance our understanding of children's social information processing and subsequent prosocial behavior in different emotion contexts. Findings also indicate the importance of ecologically valid investigations of prosocial behavior, including examination of the emotion context, to better understand how children engage in prosocial behavior towards peers in their daily lives.

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Chapter 1

Children interact with peers in their daily lives and sometimes help, share, or otherwise do something to benefit someone else. The opportunities they encounter to engage in prosocial often overlap with their own and their peers' experiences of a range of emotions, which may have an influence on the process of prosocial behavior following negative emotion experiences. Their prosocial behavior occurs in real-world contexts that are often riddled with a range of emotions, including negative emotions; however, how emotions impact prosocial behavior often investigated only with toddlers and has rarely been investigated in older children. Emotions are defined here as processes that are biologically based and allow for both rapid appraisals of situations and preparedness to sustain favorable conditions and to manage unfavorable conditions and can be driven by goals (Cole, Martin, & Dennis, 2004; Gross & Thompson, 2007; Saarni, Campos, Camras, & Witherington, 2006). Because children's prosocial behavior develops and plays out in their daily lives, it is important to understand how children engage in prosocial behavior in contexts characterized by negative emotions.

Recent research has demonstrated that children are more prosocial when they see someone in distress (i.e., experiencing negative emotion; Williamson, Donohue, & Tully, 2013), which builds upon a long history acknowledging the importance of the role of this kind of distress in prosocial behavior (Radke-Yarrow & Zahn-Waxler, 1984). However, whether and how children engage in prosocial behavior when they are experiencing their own distress is unknown. A clearer understanding of how children's experiences of their own and other people's negative emotion influence prosocial responding will contribute

to a more complete picture of children's social development in ecologically valid contexts, which is important because by engaging in these prosocial behaviors (Eisenberg & Fabes, 1990), children inadvertently maintain well-being, avoid harm, and may ultimately be contributing to adaptive functioning (Campos, Camras, & Witherington, 2006).

The current study was designed to investigate these unanswered questions about the effects of own and others' emotion on prosocial behavior. Because prosocial behavior facilitates harmony among social partners who must solve diverse problems (Warneken, 2015), including those rife with negative emotions, it is particularly important to understand how this occurs beginning in early childhood.

Development and Dimensions of Prosocial Behavior

Prosocial behavior is a broad term that refers to voluntary behavior intended to benefit others (Eisenberg & Fabes, 1990). It includes any helping, sharing, or empathic behavior, such as picking up a dropped pen, sharing a toy, or giving a hug when someone feels bad. Prosocial behavior has also been conceptualized as proactive and reactive responses to the needs of others that serve to promote the well-being of others (Hastings et al., 2007). The ways in which children can engage in prosocial behavior broaden and become more complex as they gain practice helping and sharing with others and as they develop the underlying skills supporting prosocial behavior (Thompson & Newton, 2013). Though these definitions of prosocial behavior are very broad, they provide a framework that is amenable to the incorporation of the role of emotion processes in prosocial behavior.

Significance of Prosocial Behavior

Prosocial behavior plays an important role in development beginning early in life. Children's prosocial behavior has been linked to greater social competence and more frequent positive peer interactions (Denham et al., 2003). For young children in low-income families, and particularly for girls, prosocial behavior has been linked to better literacy and mathematics skills (Bierman, Torres, Domitrovich, Welsh, & Gest, 2009). In other samples, prosocial behavior has been strongly associated with school readiness and academic achievement (Vittorio et al., 2000). Taken together, this evidence suggests that prosocial behavior contributes to child development in a number of ways.

Engaging in prosocial behavior affords children opportunities to practice skills that are important for their long-term development, including socioemotional development (Warneken, 2015). For example, children's socioemotional development is positively impacted by interventions promoting prosocial behavior. In a 5-year longitudinal study beginning in kindergarten, children in a classroom that promoted prosocial behavior demonstrated higher cognitive problem-solving skills compared to children in a control classroom (Battistich, Solomon, Watson, Solomon, & Schaps, 1989). Specifically, children in the prosocial classroom demonstrated higher interpersonal sensitivity, consideration of others' needs, and means-end thinking. These children also used resolution strategies that were more prosocial than the control group. Through behaving prosocially, children gain a better understanding of goal-directed behavior and how to achieve goals, and learn to be responsive to the needs, including emotional needs, of others. Though children's prosocial behavior may start off focused

on helping with smaller tasks, such as retrieving a fallen object, the skills they develop become the foundation for competency in completing larger, more complex tasks, such as inferring someone's intent to tighten a wobbly table and finding the correct size wrench to give to the person to help him/her complete the task.

Though prosocial behavior has been linked to greater academic success, this link may be indirect. In a large-scale longitudinal study following children as they transitioned to school (beginning at age 5 when children were in kindergarten through age 7), children who were less aggressive and more prosocial had less peer rejection, more peer acceptance, and greater child-teacher closeness (Ladd & Burgess, 2001). Greater peer success was also associated with greater classroom success, including more liking of school, less disobedience, and more cooperation in the classroom. These findings suggest that even though prosocial behavior is not directly contributing to greater classroom success, it is supporting the skills necessary for classroom success. Another possible explanation is better social skills improve prosocial behavior and interactions with peers, and help children get in less trouble. When children get into less trouble, it helps them to focus more on lessons and do better in class overall.

In addition to promoting socioemotional development, prosocial behavior has been linked to greater resiliency and well-being, and has also been linked to lower psychopathology (Day-Vines & Terriquez, 2008; Eisenberg, 2003; Weinstein, & Ryan, 2010). In one study of physical aggression in 5-year-olds, higher social cognition skills were linked to higher aggression, but only for children who had low levels of prosocial behavior (Renouf, et al., 2010). Thus, children's prosocial behavior is important in

guiding their behavior in other domains. Prosocial behavior also buffers against the use of social cognitive skills for aggressive purposes (Lonigro, Laghi, Baiocco, & Baumgartner, 2014). For example, a child with better social cognition might use it in a "nasty" way to threaten to tear a book while the teacher is gone because the child knows s/he can blame the other child and get him/her in trouble, which has implications for children's social and academic lives.

Thus, prosocial behavior has real-world implications for children's lives. It can support healthy trajectories, such as those characterized by academic achievement, resilience, and high well-being. Prosocial behavior has been identified as a buffer against less healthy trajectories because of its links to lower psychopathology. In this way, prosocial behavior can contribute to the foundation for children's life-long development.

Development of prosocial behavior. Prosocial behavior emerges early in life and can be observed in young children. For example, toddlers will retrieve objects that someone has dropped and share items such as food and toys (Call & Tomasello, 1998). This early emergence has been taken as evidence that prosocial behavior is a fundamental part of human development. It may be so important because it supports human ecology (i.e., the relationship between humans and their environments, including social contexts) and creates connectedness among humans to foster social harmony (Sober & Wilson, 1998; Warneken, 2015).

There is generally agreement among developmental psychologists that precursors of prosocial behavior (e.g., social cognition, executive functions, emotion regulation; to be detailed later) continue to develop as prosocial behavior develops (Denham et al.,

2003; Eisenberg, Fabes, & Spinrad, 2006; Thompson & Newton, 2013; Warneken & Tomasello, 2013) They also agree that prosocial behavior is an important part of socioemotional competence during childhood, and that prosocial behavior is impacted by the social environment. This tells us that individual differences in these precursors may influence prosocial behavior differentially throughout childhood. Sharing and helping are kinds of prosocial behavior that can be characterized by their instrumental and empathic dimensions. These dimensions intersect such that there is instrumental sharing, instrumental helping, empathic sharing, and empathic helping (Brownell et al., 2013; Warneken & Tomasello, 2009). Sharing and helping will be compared first, and then instrumental and empathic dimensions of these prosocial behaviors will be described.

Sharing and helping. Sharing and helping are dimensions of prosocial behavior that are distinguished by the cost of engaging in either behavior. Sharing behavior is costly to the individual because it requires giving some resource to another. Helping is less costly and involves behaviors such as retrieving an object someone dropped. When a child shares a toy they are playing with, it is more costly than helping someone get something that is out of their reach because it requires the child to sacrifice their own resources to do so (Brownell et al., 2013; de Waal, 2008). Though arguably less costly, helping is not a zero-cost behavior either because of the time, effort, and thought it requires.

Children are aware of the variable costs to engaging in prosocial behavior. Multiple studies have found convergent evidence that children as young as 18-months-old engage in prosocial behavior more often when it is less costly than when it is more

costly (Paulus et al., 2015; Paulus, 2014; Svetlova, Brownell, & Nichols, 2010; Warneken & Tomasello, 2009). The target behavior for helping and sharing in these studies required similar behavior (e.g., helping by passing a block that is out of reach or sharing by passing one's own block), making it unlikely that children discriminated between helping and sharing because one was physically easier to do than the other. The pattern that children engage in sharing less often than helping because it is costlier is likely continues into later childhood. Because of this, I focused on sharing rather than helping in this study, because sharing is more costly (requires more of children's own resources) and thus represents a more conservative index of prosocial behavior.

In addition to the differences in prosocial behavior toddlers demonstrate when tasks are more or less costly, whether children decide to share also depends on the partner. In a study on the emergence of contingent reciprocity of 2- and 3-year-olds' prosocial behavior, children met a puppet and they each played with toys that required blocks (Warneken & Tomasello, 2013). There were three phases of the game, including a warm-up phase, a helping phase, and a sharing phase. The sharing and helping phases were counter-balanced. In the first part of the sharing and helping phases, children always ran out of blocks to play with the toy before the puppet ran out. In order to keep playing, the child needed blocks that were out of their reach (helping phase) or that only the puppet had (sharing phase). When the child ran out of blocks, the puppet did one of three things: a) cooperated by giving the child blocks, b) did not help, but looked silently from the blocks to the child, or c) did not help and verbally expressed that they were not going to give the child any of the blocks. In the second part of the study, the puppet ran of

blocks before the child. At this point, the puppet needed blocks that were only within reach of the child (helping phase), or that only the child had (sharing phase). Children could help the puppet by handing the puppet blocks that were out of the puppet's reach (i.e., low cost) and could share by giving the puppet some of the child's own blocks.

In the helping phase, children of all ages were likely to help the puppet, even if the puppet had not previously helped them either silently or verbally. However, in the sharing phase, when the puppet needed the toys that the child also needed, older children (i.e., 3-year olds) were more likely to share only if the puppet had previously shared with them. 3-year-olds were less likely to share with a puppet who was silent and did not share, and least likely to share with a puppet who verbally expressed that they were not sharing. This finding of differential sharing was not found for the younger children (2-year-olds). These findings suggest that children initially engage in prosocial behavior regardless of a partner's behavior and then become more selective and careful in engaging in prosocial behavior based on iterative feedback about the partner's behavior. As children enter formal schooling around ages 4 to 6 years old, it is likely that they continue to refine their selectivity in who they decide to help and share with. Empirical evidence on children's prosocial behavior later in childhood mainly utilizes informant reports of prosocial behavior as a broad construct and has not looked at the developmental pattern of who children decide to share with.

More broadly, findings from Warneken and Tomasello's (2013) study of reciprocity in prosocial behavior suggest that children are sensitive to their sharing partner's actions. Specifically, children take their partners' actions into account when

they act and take into account the different costs between helping and sharing. As children gain more experience with social interactions, including prosocial behavior, they become more discriminatory about who they will share with when there is a cost to sharing.

In another study that used a puppet-sharing paradigm, children were instructed to think of the puppet as a representation of their peer (Paulus et al., 2015). 5-year-old children were instructed to think of a friend and a disliked peer, then told them to imagine that the puppets in the study represented either the friend or the disliked peer. In this study, low-cost prosocial behavior (doing something to benefit someone) was distinguished from high-cost prosocial behavior (prosocial behavior with a personal cost).

In the low-cost prosocial trials, children could choose to give themselves one sticker and give the peer no stickers, or they could choose to give one sticker to themselves and one sticker to the puppet, with the former coded as not prosocial and the latter coded as prosocial. That is, regardless of whether the child chose to have the puppet receive a sticker (i.e., engage in prosocial behavior), the child would still receive a sticker. In the high-cost sharing trial, children could choose to give themselves two stickers (i.e., no sharing), or they could choose to give themselves one sticker and give one sticker to the puppet (i.e., sharing).

Children were more likely to share with the puppet that represented the friend than with the puppet who represented the disliked peer. Regardless of whether the puppet represented a friend or disliked peer, the amount children shared still varied by how costly it was to do share. Specifically, children were more likely to give one sticker in the

low-cost prosocial trial (i.e., when they would also receive a sticker themselves, whether they gave a sticker or not) than in the high-cost sharing trial (i.e., when they could either get 2 stickers themselves or keep one sticker and share one sticker). If this study had been conducted with children as the recipient of help, rather than a puppet, the results may have varied in important ways due to the way children think about the recipient's cognition and emotional capacity, how much they keep in mind who the puppet represents (i.e., since it still requires the child to imagine that the puppet is someone they know), and the consequences of their prosocial behavior for the puppet and their relationship with the puppet (e.g., will the puppet want to be friends with them afterwards?).

The results are similar to those of the previously-described study (Tomasello & Warneken, 2013) because puppets were treated like children by the researchers. However, this study by Paulus and colleagues (2015) differs because the method required that children project their thoughts about other children (with whom they have a prior history) onto the puppet. Both studies suggest that children's discriminatory prosocial behavior has implications for later prosocial behavior because children's experiences with peers influence how they respond and whether they help or share.

In sum, many studies have used puppets to represent children's peers in order to mimic children's prosocial behavior with peers (e.g., Tomasello & Warneken, 2013; Robbins, Rochat, Rossano, Rakoczy, & Tomasello, 2011; Rossano, Rakoczy, & Tomasello, 2011) in order to address the limited generalizability of methods that utilize an adult as the sharing partner. Even with these clever methods, work is needed with

children thinking that they are actually helping other children. It is needed particularly beyond the preschool and early childhood years because peer interactions help shape children's moral development (Piaget, 1932). Their motivation for engaging in prosocial behavior, along with their decision about whether to engage in prosocial behavior, is likely impacted by this. One aim of the current study was to use a new paradigm to make children think there is really a same-aged peer with whom they can decide to share or not share, in order to mimic children's sharing with peers.

Instrumental prosocial behavior. Instrumental prosocial behavior is focused on helping someone to achieve a task-oriented goal (Call & Tomasello, 1998). Instrumental helping includes behaviors such as picking up something that was dropped and making sure there are enough blocks for someone else to play with. There is evidence that children engage in instrumental helping beginning in toddlerhood (e.g., Warneken & Tomasello, 2013). The helping and sharing behavior examined by Warneken and Tomasello (2009) was always instrumental prosocial behavior, rather than emotionally-based empathic prosocial behavior. Around 18 months, children helped by retrieving a pen that had been accidentally dropped (Paulus et al., 2015). However, toddlers are still learning to discriminate when help is needed in a situation and to help competently (i.e., only when help is needed). 60% of children in this study retrieved the pen even when the experimenter intentionally threw it across the room and did not indicate needing it. That kind of helping was considered "incompetent" because the experimenter did not express or indicate that s/he wanted the pen back. Competent helping, or helping when it is needed (in this case, only when the experimenter accidentally dropped a pen out of her

reach), is more sophisticated and develops as children gain more experience with different prosocial opportunities and adjust their prosocial responding in response to feedback and better intention understanding. These findings suggest that instrumental prosocial behavior emerges along with intention understanding, an aspect of social cognition, and though these skills begin developing in the toddler years, they continue to develop throughout childhood.

Emotionally-motivated prosocial behavior. In contrast to instrumental prosocial behavior, empathic prosocial behavior is focused on emotion or affect-based helping (Eisenberg, Fabes, & Spinrad, 2006), such as comforting someone who is distressed. Empathy supports prosocial behavior because it facilitates understanding that someone else is in distress and needs help to alleviate their distress (e.g., Eggum et al., 2011; Thompson &Newton, 2013; Svetlova, Nichols & Brownell, 2010; Ornaghi, Pepe, & Grazzani, 2016).

Young children learn empathic prosocial behavior through observation. In one study, 2.5-year-old children were randomly assigned to one of three conditions: experimental, no-video control, or no-distress control (Williamson, Donohue, & Tully, 2013). In the experimental condition, children watched a video of an actor who bumped her knee and expressed verbal and physical distress. Then, a second actor in the video said, “I’ll help you,” and proceeded to pat her in a novel way with a hand mitt. After the second actor stopped patting the first actor, the first actor said, “I feel better now.” When the video was over, children’s parents pretended to bump their knee and expressed distress using lines from the distress script of the video.

In the no-video control condition, children did not see the video demonstration of the novel way of helping with a hand mitt, but their parents pretended to bump their knee and expressed distress in the same way as in the experimental condition. In the no-distress control condition, children watched the same video as in the experimental condition, but parents did not bump their knee or express distress. Instead, parents of children in the no-distress condition acted out a neutral script that involved noticing their shoe had slipped off and bending down to fix it. In all conditions, children's empathic helping was measured by whether they used the novel mitt that had been used in the video to help their parent. Children helped more using the mitt when the parent expressed distress than when the parent did not express distress. Children who saw the video learned how to provide empathic help in a novel way (i.e., patting a distressed person with a mitt in a novel way).

Instrumental and empathic prosocial behavior have commonly been categorized as distinct kinds of prosocial behavior, based on differences in the underlying motivation to engage in helping or sharing behaviors. However, instrumental helping can also involve emotion processes because it may be affectively motivated even if no emotions are displayed. For example, when children retrieve a pen, they may do it to prevent someone from feeling sad. Further, children begin to demonstrate both empathic and instrumental prosocial behavior around 18 months of age (Brownell et al., 2013).

"Hot" or emotional problem-solving contexts, such as when a child has to figure out how to calm down after being uninvited to a birthday party, can be contrasted with "cool" contexts that are more cognitively based, such as when a child has to figure out

how to wrap a present for the party. This terminology is borrowed from research on executive functions, which are meta-cognitive skills used to manage thinking (Zelazo & Carlson, 2012). Children encounter opportunities to engage in prosocial behavior in their daily lives and these opportunities include both "hot" and "cool" elements. One example of this is when a child's peer needs a piece of paper for a drawing, which is a typical occurrence for school-aged children. Whether the child decides to help or not could play out in many ways. The child may be distressed themselves because they, too, need a piece of paper or are upset about something that happened earlier in the day (i.e., making the context "hot") and as a result, not notice that the peer needs paper. Another possibility is that the child previously felt distress, but regulated it, and was able to notice that the peer needs a piece of paper and share with him. If the child notices that the peer is distressed (i.e., peer emotion makes this a "hot" problem-solving context), she might share paper to help him feel better. It could also be the case that the child notices the peer in distress and becomes distressed herself. The different ways this could play out illustrate why it is important to investigate the role of emotion in prosocial behavior across contexts, including when the helper feels negative emotion.

The reason for the sharing is what defines the prosocial behavior as empathic or instrumental. If the paper was shared for the purpose of solving a "cool" problem (e.g., shared because the peer was not showing signs of distress, but needed paper for a drawing), then it would be defined as instrumental prosocial behavior. If the paper was shared for the purpose of solving a "hot" problem (e.g., to comfort a peer who was distressed that he did not have paper to draw on), then it would be defined as empathic

prosocial behavior. As highlighted by Vaish and colleagues (Vaish, Carpenter, & Tomasello, 2009), even though the prosocial behavior may look the same, the reason why the child engaged in prosocial behavior, that is whether or not their prosocial behavior was emotionally motived or not, determines whether it is empathic or instrumental. This highlights how emotion could impact prosocial behavior in many situations beyond the typical empathic prosocial situations, and how the distinction between instrumental and empathic prosocial behavior may be somewhat artificial because empathic and instrumental prosocial behavior can both involve emotion processes.

In summary, prosocial behavior can involve varying degrees of helping and sharing behaviors that are motivated by instrumental and empathic elements of the context. While it has been useful for methodological and theoretical purposes to make these distinctions, it is also important to interpret findings within the broader context of prosocial sharing opportunities. Conceptualizing these dimensions as existing on a continuum from lower to higher cost may aid in deepening our understanding of prosocial behavior. Researchers are careful to design tasks to measure particular dimensions of prosocial behavior, in order to understand how they relate to and differ from one another. Within any given social interaction, there are often multiple opportunities to engage in prosocial behavior. Research with younger children has utilized cleverly designed tasks that pull for one dimension or another, and these have revealed important findings about how each develops, though they have not considered whether children may be helping and sharing for both instrumental and empathic reasons simultaneously. Moving forward, measures of prosocial behavior that vary in cost and the

dimensions involved are needed in order to increase the ecological validity of these studies.

Age-related differences in prosocial behavior. Prior research focusing on the helper's response to someone else's distress in empathic helping contexts, and not on the helper's own emotion in these contexts, have found age-related differences in children's ability to engage in prosocial behavior. In a study comparing empathic and instrumental helping in 18- and 30-month-olds, children saw an experimenter who was distressed or not distressed and needed help (Svetlova, Nichols, & Brownell, 2010). Both 18- and 30-month-olds were equally prosocial at instrumental helping tasks. They handed an adult experimenter a clip that was dropped out of reach. However, even when the target behavior was the same (i.e., handing an experimenter a clip), the younger group was less likely than the older group to help the experimenter when she was distressed because she had messy hair (which could be alleviated with a clip). This suggests that younger children are still learning how to respond to emotion cues and their skill in helping when someone is distressed is developing in early childhood. The authors suggested that the difference in prosocial behavior between the 18- and 30-month-olds was because empathic helping was more difficult for the younger group because the social cognition requirements for empathic helping (e.g., understanding emotions) are more advanced than for instrumental helping (e.g., intention understanding). Because these cognitive and socioemotional skills are continuing to develop throughout childhood, developmental changes in children's prosocial behavior in emotion contexts would potentially be moderated by individual differences in these underlying skills. However, empirical work

has not addressed this issue for children beyond the preschool ages, a notable gap in our understanding of prosocial behavior.

Age-related findings from Svetlova and colleagues (Svetlova, Nichols, & Brownell, 2010; Brownell, Svetlova, & Nichols, 2009) are theorized to reflect developmental differences in the social cognition and emotion skills that children rely on to carry out prosocial behavior. Emotion understanding, an aspect of social cognition, is not developed enough to enable children to carry out such emotion-oriented prosocial behavior until children approach 3 years of age (Pons, Harris, & de Rosnay, 2004). As a result, the ease of carrying out different types of problem-solving in prosocial contexts cannot be considered equal. Evidence from these studies and others with younger children provide evidence that prosocial behavior would change as children develop social cognition and emotion skills, which are skills that continue to develop throughout childhood.

Taken together, these findings suggest that children's experiences shape the age-related changes in prosocial behavior that have been documented. As children gain more experience with social interactions and continue to develop cognitive (e.g., social cognition) and socioemotional skills (e.g., emotion regulation) throughout childhood and beyond, the ways in which they can demonstrate prosocial behavior become more sophisticated (Hay & Cook, 2007; Svetlova, Nichols, & Brownell, 2010). Emotion regulation and social cognition are still developing, the way these skills influence prosocial behavior and moderate the effects of negative emotion on prosocial behavior would change as children develop. Measurement of individual differences in these skills

provides a better understanding of children's experiences and how much development has occurred beyond what we can learn from age alone (Wohlwill, 1970). As a result, an investigation centered around individual differences, and less around age, may help us understand why children respond differently in prosocial contexts.

To extend empirical work that has utilized observational measures of prosocial behavior, the current study focused on an age range beyond the toddler years and was guided by existing work using observational measures of prosocial behavior. I investigated prosocial behavior development in children ages 4 to 6 years, because they are able to engage in prosocial behavior and have developed some competence in social cognitive and socioemotional skills, though these skills are still developing. The current study is also focused on this age range because what we know about prosocial behavior development from behavioral observation beyond about age 3 is limited, there is limited work on the effect of peer distress for this age group, and no known work on the effects of one's own distress on prosocial behavior.

Gender differences in prosocial behavior. Few gender differences in prosocial behavior have been found in early childhood. Brownell and colleagues (Brownell, Svetlova, & Nichols, 2010), found no gender differences in empathic helping, and Warneken and Tomasello (2013) found only a weak gender effect for instrumental helping (girls were more helpful than boys), though boy and girls were equally prosocial when responding to a recipient's negative emotion cues. These findings are representative of prosocial behavior findings in early childhood, though some evidence suggests that context plays a role in the detection of such differences (Warneken & Tomasello, 2009).

Beyond early childhood, gender findings for prosocial behavior are more mixed (e.g., Eisenberg, Fabes, & Spinrad, 2006). These mixed findings may be attributable to several factors, such as variation in how boys and girls are socialized to be helpful and compliant or differences in self-regulation. Additionally, the methods used to measure prosocial behavior might also contribute to mixed gender findings.

Studies of prosocial behavior in early childhood commonly utilize behavioral measures of prosocial behavior, whereas studies middle and later childhood often rely on parent or teacher report. Empirical evidence demonstrates that when others (often mothers and/or teachers) report on children's behavior, girls are rated as more prosocial than boys. In a study that relied on mother and teacher ratings of children's prosocial behavior, girls were rated more prosocial than boys at grades 3, 5, and 6 (Newton, Laible, Carlo, Steele, & McGinley, 2014). However, few, if any, gender differences were found when behavioral measures of prosocial behavior were utilized (Grusec, Goodnow, & Cohen, 1996; Hastings, Rubin, & DeRose, 2005). Gender differences in prosocial behavior may also be accounted for in part by cultural norms, including the cultural perception of prosocial behavior as more feminine and as such, is more reinforced for girls than for boys (Hastings, McShane, Parker, & Ladha, 2007; Hastings, Utendale, & Sullivan, 2007; Grusec, Hastings, & Almas, 2011). As articulated by Hastings, Utendale, and Sullivan (2007), findings about girls being more prosocial than boys may be "as much of a function of perception as reality: a culturally shared belief that girls are made of 'everything nice.'" Mindfulness of measurement bias on gender findings for prosocial behavior may help shed light on this relationship.

More empirical research utilizing both behavioral and parent/other-report measures of prosocial behavior is needed to better understand the role of gender in prosocial behavior beyond the preschool years. Gender differences will be explored in the current study, though they are not expected to emerge in the behavioral measures of prosocial behavior utilized in the current study.

Though children's social cognition skills have been associated with observed prosocial behavior in early childhood, most of the empirical work beyond the early years utilizes parent and teacher report. There are still questions as to how social cognitive skills relate to observed prosocial behavior after the preschool years as these skills continue to develop.

Social Information Processing

Children often help and share when someone is in need, but not all children help. Individual differences in how children process information and make decisions in social contexts, including prosocial contexts, may help explain this variability in responding. When children encounter other people, they engage in social information processing to encode the cues in the social environment, interpret those cues, evaluate their goals in the situation, and ultimately, decide on what to do next (Crick & Dodge, 1994). Social information processing theory provides a framework through which we can understand the cognitive processes involved in how prosocial behavior can occur. Crick and Dodge highlight the underlying suite of cognitive skills that are used to encode, interpret, make decisions, and ultimately, act upon the social information around them. Children go into situations with these skills that influence and drive how they process social information.

Emotion regulation (managing emotions) may be particularly important for children in emotionally-laden prosocial opportunities and social cognition (understanding that one's thoughts are different from those of someone else), which children also utilize while engaging in social information processing that may also be particularly pertinent for how children interpret and make prosocial decisions because sharing with someone else may be impacted by how the child understands the other person.

Prosocial behavior, like all social interactions, occurs in real-world contexts. These contexts often, if not always, involve emotions and the effects emotions have on people's thoughts and behavior. As such, a framework that includes the emotion context within which prosocial behavior occurs is needed. Information about the social world is processed using emotion processes *in addition to* cognitive processes in contemporary theories (Lemerise & Arsenio, 2000). Early iterations of social information processing theory framed children's social interactions as including only "cool" aspects of problem-solving. Contemporary social information processing theorists Arsenio and Lemerise (2000; Arsenio & Lemerise, 2004) have clearly defined and highlight the role of emotion process in social information processing, and this also includes the role of the "hot" cognitive processes, such as emotion and emotion regulation, involved in problem-solving to be considered as well. Their explicit incorporation of the role of emotion has spawned more investigation in developmental psychology that investigates the intricate connection and interplay between emotion and cognition (Blankson, O'Brien, Leerkes, Marcovitch, & Calkins, 2012; Bell & Calkins, 2012; Saarni et al., 2006). This

contemporary framework is well-suited to elucidate the role of emotion in prosocial behavior because of its incorporation of emotion at every step in the process.

I argue that prosocial behavior is a form of social problem-solving that draws on a constellation of cognitive and emotion processes. Negative emotion can interfere with, or in some cases, support prosocial behavior by influencing social information processing so that the outcome is one that may or may not result in prosocial behavior. For example, in the previous scenarios where help was not provided, the problem-solving (i.e., prosocial behavior) process was stopped at some point and not completed, or it ended in a decision that did not involve helping. As such, the social information processing model is applied here to highlight the possible effects of emotion on prosocial behavior, and the moderating role of individual differences on the effects of emotion on prosocial behavior.

Individual differences in children's social information processing have long-lasting effects on their development and influence children's behavior. For example, a bias to encode and interpret ambiguous cues as threatening helps explain why behavioral inhibition early in childhood is linked to social withdrawal later in childhood (Pérez-Edgar et al., 2011). In turn, withdrawing from social contexts may limit children's socioemotional development, including their prosocial behavior and emotional regulation skills. Less prosocial behavior at age 3 has been linked to worse emotional and behavioral outcomes such as internalizing and externalizing problems from ages 3 to 7 (Flouri & Sarmadi, 2015). This is evidence of how prosocial behavior can influence emotion over time, though more work is needed to fully establish this connection.

Emotion in Prosocial Behavior

Emotions, like prosocial behavior, have been theorized to be adaptive (Campos, Camras, & Witherington, 2006). Emotions originate from these appraisals and serve an adaptive function through the preparedness they facilitate (Thompson, 1994). Emotions are, in effect, problems that need to be solved. One must solve the problem of how to respond to the appraisals and cues within their environment. As such, emotion regulatory processes are conceptualized here as a type of problem-solving.

Contemporary social information processing theorists proposed that emotion processes are involved in every step of social information processing such that when individuals encounter information, the cues they encode and their interpretation of them is influenced by emotion processes. The first step in social information processing involves attending to and encoding information. Because emotion cues can direct attention (Levine & Pizarro, 2004), emotion, and thereby emotion regulation as well, these cues can begin influencing social information processing even at the first step.

Specifically, in emotionally charged contexts where there are opportunities to engage in prosocial behavior, how one encodes cues that are relevant for prosocial behavior in this context may be impacted by emotion. Encoding of and attention to the emotion cues of others may also be impacted because emotion can also influence where attention is drawn (Fox, Bowles, & Dutton, 2001). Thus, if a peer is displaying emotion, it may be an attentional cue for the child to attend to and process this information.

When emotion cues are more salient, the social information one attends to, and therefore processes, may be more limited to the specific aspects of the problem that will help to alleviate one's own negative emotion (van Steenbergen, Band, & Hommel, 2011).

In turn, this could influence which problems are identified, and ultimately, which problems are solved.

Ultimately, negative emotion could affect prosocial behavior in multiple ways. First, since negative emotion can narrow attention to information relevant to the negative emotion (Levine & Pizarro, 2004), it may be that the child's own distress hinders prosocial behavior because the child may be focused on their own negative emotion rather than on distress cues from someone else. The child may feel bad for the person in need who is experiencing distress and, as a result, decides to help.

Alternatively, the child may have empathy for the person in need and become distressed herself, a phenomenon known as emotional contagion (Arizmendi, 2011). As a result, the child may become so upset that she is not able to provide help because she is focused on trying to regulate her own distress. If both the agent and the person in need are experiencing distress, prosocial behavior could increase because the helper is able to understand the emotion and wants to help, or, alternatively, it could be too overwhelming and hinder helping. The primary aim of the current study proposed here is to investigate the effects of a match or mismatch between child and peer emotion to better understand the impact of negative emotion on prosocial behavior.

Emotion Regulation

Children can engage in emotion regulation to change or maintain the type, duration, or intensity of emotion (Koole, 2009). Emotion regulation refers to the set of skills used to manage one's own emotion experiences, which are developing during early infancy and continue to develop into adulthood. Children develop emotion regulatory

skills beginning in early childhood (Bamford & Lagattuta, 2011) and can use them to help manage their emotional experiences (Levine, Kaplan, & Davis, 2013). Emotion regulation is at the core of social information processing and can be drawn upon throughout the process. As children process information about the social world, they draw upon their emotion regulation skills to manage their emotions. These individual differences have consequences for children's functioning, especially when considering how existing regulatory skill and emotion may jointly influence this kind of processing.

When children experience emotion, whether it is positive or negative in nature, it is regulated (e.g., through physiology, behavior, or cognition, emotion can be changed and managed in some way) because emotion regulation is a process that is inseparable from emotion itself (Campos, Mumme, Kermoian, & Campos, 1994). The ways in which emotion regulation occurs (e.g., negative emotion is effectively regulated and its intensity is reduced, or it is not effectively regulated and its intensity is increased) change over time. These changes occur as a result of the development of emotion regulatory skills and other skills that support emotion development.

A reduction in the length or intensity of negative emotion can influence the decisions made at each step in the process because emotion regulation is a core skill children can draw upon as they engage in social information processing (Arsenio & Lemerise, 2000; Izard, Stark, Trentacosta, & Schultz, 2008). For example, if a child is feeling very sad, they may not think of a solution to help a peer, or may not think. they can implement a solution (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003). However, if they effectively regulate their sadness (e.g., by reducing its intensity and

duration), they may feel more self-efficacy to implement that solution, and ultimately carry it out. Another aim of this dissertation was thus to examine how individual differences in emotion regulation might influence the way emotion (both one's own and other people's emotion) shapes prosocial behavior.

Emotion regulation can also be conceptualized as a form of problem-solving. While younger children use more distraction and support-seeking strategies, older children use more advanced and sophisticated emotion regulation strategies, such as cognitive reappraisal, to aid in their emotional problem-solving. Recent evidence suggests that younger children also endorse these more sophisticated strategies (Davis, Levine, Lench, & Quas, 2010; Thompson & Meyer, 2007). Essentially, children are able to describe strategies that aid their emotional problem-solving.

Children develop skill in using different emotion regulatory strategies throughout childhood, though there is no one "right" way to regulate in any given context. Examining children's emotion regulatory skill as a global skill set can provide insight into how children's emotion regulatory toolbox plays a role in prosocial behavior. Children are engaging in problem-solving for emotions and become more strategic as they gain experience and skill in this kind of problem-solving.

Emotion and emotion regulation influence social information processing patterns, which have consequences for social interactions. As a result, individual differences in emotion regulation may also lead to individual differences in prosocial behavior over time. Specifically, experience regulating one's own negative emotion may support noticing other people's negative emotions, a greater understanding of their emotions, and

ultimately feeling as though there is something one can do to help the other. If the negative emotion is too great, or it is not effectively regulated, then it could hinder helping others because the child becomes focused on their own negative emotions and deals with their emotions in unhealthy ways (e.g., internalizing and externalizing disorders).

Negative emotion can change the course of social information processing at each step. At the first step of social information processing, peer negative emotion cues can draw the attention of the child; however, if the child is too focused on their own negative emotions, they may not attend to these cues. Alternatively, the child may effectively regulate their own negative emotion using their emotion regulatory skills, which allows them to broaden their attention. Because their attention is broadened, they may begin to attend to their peer's affective cues.

How the child interprets his/her peer's affective cues and desires (step 2 of social information processing) is affected by children's own emotion experiences and social cognition skills. If the child interprets the peer cues as a sign that the peer needs help, s/he may make it their goal to help (step 3 of social information processing). How the child interprets and sets goals to help also depends on his/her perceptions of the peer and his/her relationship to the peer.

Alternatively, if the child does not interpret the peer as needing help, they may not make it their goal to help. How children problem-solve (step 4 of social information processing) and how effective they anticipate their solution will be (step 5 of social information processing) is influenced by their own experiences, knowledge, and skill set.

Ultimately, children must decide whether to engage in prosocial behavior (step 6 of social information processing). Because emotion regulation influences how children process prosocial information, it is expected that differences in children's skill in regulating their emotions would be moderated by their own emotions and those of their peers during opportunities to behave prosocially.

While it seems clear that prosocial behavior inherently involves emotion processes, including the effects of negative emotion, the empirical work in this area has only investigated the role of negative emotion experienced by the potential recipient of prosocial behavior. For example, there is ample evidence that children are more likely to help when someone is in need and is experiencing distress than when someone is in need but not exhibiting signs of distress (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013). However, it is unknown how the agent's own distress influences their prosocial behavior in this situation, how the agent's distress influences prosocial behavior when someone in need is not experiencing distress, or how the agent's own distress interacts with the distress of someone in need.

Contemporary theories of prosocial behavior remain segmented and largely focus on the role of emotion processes only when investigating empathic helping. In particular, the role of emotion processes has rarely been considered in theory or in empirical work regarding instrumental prosocial behavior. Incorporating emotion and its effects on prosocial behavior into theories and conceptualizations of all types of prosocial behavior would enhance understanding this aspect of socioemotional development.

Social Cognition

As children process social and emotional information, they also draw upon their social cognition skills to better understand their peer, the situation, and possibilities for helping. Understanding others' thoughts and feelings (i.e., different aspects of social cognition) may be what is crucial for helping.

Social cognition is the ability to cognitively understand another person's point of view, including their desires and intentions as separate from one's own desires and intentions (Flavell, 1992). It requires sophistication because it involves separating out one's own perspective from another and draws upon the development of mental representations and mental processes relevant, which are important for social development. Social cognition skills have been identified as particularly relevant to successful social functioning and prosocial behavior.

There is a positive relationship between prosocial behavior and social cognition (Eisenberg & Eggum, 2009; Eisenberg, Fabes, & Spinrad, 2006). Specifically, prosocial behavior increases as understanding of others' thoughts increases (i.e., social cognition). Additionally, Paulus and colleagues (2015) found that overall social cognition in toddlerhood predicted prosocial behavior at age 5 above and beyond inhibitory control, a regulatory skill used in demonstrating restraint. This suggests that as children gain a better understanding of the thoughts of others, they begin to problem solve by drawing upon what they think the other person knows along with their own knowledge of the problem. Ultimately, children can use this information to support their prosocial behavior.

Positive associations between prosocial behavior and social cognition have not been consistently found; however, negative associations between social cognition and prosocial behavior are infrequent (Eisenberg et al., 2006). Each of the six aspects of social cognition may contribute differentially to prosocial behavior because each is unique in what it offers in different contexts (Tahiroglu, Moses, Carlson, Mahy, Olofson, & Sabbagh, 2014).

Emotion, belief, knowledge, perception, desire, and intention understanding are six aspects of social cognition that help children navigate their social worlds. Greater understanding in each of these aspects could promote or hinder prosocial behavior depending on a number of aspects of the context. If this is the case, then the lack of consistent relations between social cognition broadly and prosocial behavior may be an artifact of previous studies focusing on different or more global aspects of social cognition.

A recent meta-analysis found that that better performance on false belief tasks is linked to more prosocial behavior across childhood (Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016). False belief tasks draw heavily on belief understanding (people can hold different, false, and changing beliefs about a situation) and knowledge understanding (people have varying levels of knowledge, and that this knowledge can come from different sources). In other work, higher performance on a false belief task at age 5 was linked to greater prosocial behavior at age 5 and age 7; however, when a more global measure of social cognition was used at age 7, social cognition was negatively associated with age 7 prosocial behavior (Caputi, Lecce, Pagnin, & Banerjee, 2012). Knowledge

understanding may support children's understanding that they know of a solution and can provide help that their peer does not have knowledge of, which may be particularly relevant in some prosocial contexts.

False belief understanding has also been linked to more cooperative pretend play with a peer, which may set the stage for more prosocial behavior (Dunn & Cutting, 1999). In this same study, emotion understanding (people can feel different and mixed ways about the same situation, and that facial and vocal cues provide emotion information) was also linked to more cooperative pretend play. This provides additional support that aspects of social cognition play important roles in children's social lives that may in turn support their prosocial behavior.

Emotion understanding, another aspect of social cognition, provides some support for prosocial behavior in emotionally laden contexts (Newton, Goodman, & Thompson, 2014). In this study, toddlers did not help an adult more when the adult was expressing sadness (i.e., a distress cue); however, they were marginally more prosocial in this context when they had better emotion understanding (which was indexed by measuring the size of children's emotion vocabulary). Higher emotion understanding may support prosocial behavior because it helps the child interpret emotion cues from others and understand that their own emotions differ from the emotions of others.

Perception understanding (people's perceptions can be directed by others, and people's perceptions of a situation vary) could support children's understanding of how they can help someone achieve their goal. Multiple studies have found that when children perceive someone is engaging in goal directed behavior, but is unable to complete the

action, children are more likely to help them achieve their goal (e.g., Svetlova, Nichols, & Brownell, 2010; Warneken & Tomasello, 2006).

Perception understanding could useful in other prosocial contexts as well. For example, if a peer is upset because they lost an item, the child could direct the peer's attention to look in a new place. Perceiving that someone is in distress can also cue prosocial behavior. In a study of younger children, children voluntarily gave up a valued possession to assist an adult recipient when the adult showed signs of distress (Vaish, Carpenter, & Tomasello, 2009). These children shared because they perceived that someone else needed the object to alleviate the other person's distress. However as described previously, emotion distress cues implying need for help alone are not always enough to elicit prosocial behavior, and this may be because emotion understanding is also necessary.

Intention understanding (people's actions are based on their intentions, which can result in various intended and unintended outcomes) begins to develop early and has consequences for how children learn (Meltzoff, 1995). There is evidence that this extends to how children navigate their social worlds, and in particular, their prosocial behavior. Young children were more likely to help an adult who had unintentionally harmed another adult, but they avoided helping adults who had intentionally harmed another adult (Vaish, Carpenter, & Tomasello, 2010). Children were able to distinguish intention and respond accordingly. Children's intention understanding can also aid in identifying what another person needs help with, such as pointing out where a lost object is (Liszkowski, Carpenter, Striano, & Tomasello, 2006).

Desire understanding (people have different desires that can change over time, and that may or may not be satisfied) can aid in prosocial behavior as well. In a study of how young children respond to others' needs, 3-year-olds shared more with an adult when the adult expressed their desire for something, though 2-year-olds did not (Brownell, Svetlova, & Nichols, 2009). Children's desire understanding could continue to support prosocial behavior later in childhood by aiding understanding of their peers' desires; however, it could also undermine their decision to engage in prosocial behavior because greater desire understanding also involves an understanding that desires are fleeting and may soon change. Taken together, these findings of the different aspects of social cognition suggest that investigation the specific roles of distinct aspects of social cognition, beyond a global measure of social cognition, is warranted.

Consider the skills that support prosocial behavior that have been previously described. Social cognition and emotion regulatory skills are hypothesized to influence social information processing. The effects of personal distress and peer distress (i.e., negative emotion) on prosocial behavior are investigated in this dissertation, and I expect these effects to be contingent on children's emotion regulation and social cognition skills, whether the negative emotion originates from their own experience with something upsetting or through emotion contagion. Given this, a final aim of this study was to investigate whether individual differences in children's social cognition and emotion regulation skill influences the effects of emotion on prosocial behavior.

Current Study

The primary goals of this dissertation were to a) investigate the effects of negative emotion, both personal distress and the distress of someone else, on prosocial behavior and to b) investigate these emotion effects as moderators of the relation between individual differences and prosocial behavior towards other children in a more ecologically valid paradigm than has been used in prior research. Previous investigations of emotion and prosocial behavior have focused primarily on the role of prosocial behavior in response to distress cues from the person in need. There are unanswered questions about how personal distress, and its interaction with peer emotion, affects children's prosocial behavior.

This dissertation investigated the impact of negative emotion on prosocial behavior to answer three primary research questions: 1) how does one's own experience of negative emotion (i.e., personal distress) affect prosocial behavior? 2) how does someone else's negative emotion (i.e., peer distress) affect prosocial behavior? 3) how does the interplay between one's own negative emotions and someone else's negative emotions affect prosocial behavior?

I proposed two ways that a child's experience with negative emotion may impact later engagement in prosocial behavior. First, negative emotion may impact prosocial behavior negatively, such that negative emotion can disrupt prosocial behavior by changing the outcome of one's social information processing that would otherwise result in prosocial behavior. Negative emotion could stop a child from noticing cues of someone in need in the first place, thinking flexibly about solutions, or feeling able to

provide effective help if it persists. Any of these disruptions would result in the same behavioral output (i.e., not engaging in prosocial behavior). This negative emotion could originate from one's own emotional experiences, or from an inability to effectively regulate distress that arises from experiencing another person's negative emotion (i.e., emotion contagion). Regardless of the origin, experienced negative emotion could decrease the helper's prosocial behavior.

Experiencing negative emotion could also serve to facilitate prosocial behavior by helping the prosocial actor to understand the other person's plight and in turn, which cue the helper to problem-solve to find a solution. Own's one negative emotion s could promote this kind of empathic perspective taking even if the prosocial act is not directly related to the event that made the person upset because the helper could still identify that the person is in need of emotion related help and feel motivated the help with whatever is needed to make the recipient feel better. Negative emotion from one's own experiences or that is observed in someone in distress can both facilitate prosocial behavior. If the potential helper has experienced negative emotion and recognizes that someone else has experienced negative emotion, too, they may be more inclined to help. Evidence from previous studies suggests that seeing someone else in distress may increases children's prosocial behavior towards puppets and adults. If the potential helper sees someone in distress, they may be more likely to help. However, little is known about how children respond to other children who are in distress and need more task-based help.

The second goal of this dissertation was to investigate how skills that have been identified as possible contributors to prosocial behavior, including emotion regulation

and social cognition, are moderated by the effects of own and others' negative emotion during early childhood. Numerous studies have highlighted the important role of social cognition in prosocial behavior (e.g., Eisenberg et al., 2006; Paulus et al, 2015), though the evidence is mixed and few studies have investigated the role of specific aspects of social cognition on prosocial behavior or how they influence prosocial behavior after children have experienced their own negative emotion. Specifically, no studies have investigated this with observational measures of prosocial behavior in children beyond toddlerhood. Additionally, because emotion regulation is intertwined with emotion processes (Cole, Martin, & Dennis, 2004) and the primary goal of the current study was to investigate the effects of emotion on prosocial behavior, it was particularly important to understand how emotion regulation relates to prosocial behavior based on the emotion context.

Hypotheses

Main effect of child distress. It was expected that there would be a main effect of child distress such that children who experienced their own distress were expected to engage in less prosocial behavior than children who did not experience distress.

Main effect of peer distress. It was expected that there would be a main effect of peer distress. Specifically, it was predicted that children who saw a distressed peer would engage in more prosocial behavior compared to children who saw a peer who was not distressed.

Interaction effects. In addition to the hypothesized main effects, I expected that these main effects would be qualified by an interaction between child and peer emotion.

Specifically, it was hypothesized that children who saw a peer in distress only (i.e., child neutral/peer negative) would be the most prosocial. Children who did not experience negative emotion or see a peer in distress (i.e., child neutral/peer neutral) were expected to be the second most prosocial. Specifically, children who experienced negative emotion were hypothesized to be less prosocial than the first two groups. Children who experienced negative emotion and saw a distressed peer were expected to be the least prosocial.

Emotion regulation and social cognition. It was hypothesized that children's own and others' emotion would moderate the relation between children's emotion regulation and prosocial behavior. Better emotion regulation was expected to be associated with more prosocial behavior, but I also expected that this relation would be subsumed by the interaction of emotion regulation and emotion condition. Specifically, it was hypothesized that for children who experienced their own negative emotion, saw a peer in distress, or both, better emotion regulation would be associated with more prosocial behavior, and that poorer emotion regulation would be associated with less prosocial behavior for children in these conditions.

It was also hypothesized that better social cognition would be associated with more prosocial behavior, though I also expected that own and other emotion would moderate the association between children's social cognition and prosocial behavior. For children who experienced their own negative emotion, saw a peer a in distress, or both, I expected that better social cognition would be associated with more prosocial behavior, and that lower social cognition skills would be associated with less prosocial behavior.

For children who experienced their own negative emotion, it was expected that better social cognition would be associated with more prosocial behavior, and lower social cognition skills would be associated with less prosocial behavior. These effects, of own and other emotion moderating the association between social cognition and prosocial behavior were expected to hold for each of the six aspects of social cognition investigated, which were belief understanding, intention understanding, perception understanding, emotion understanding, knowledge understanding, and desire understanding. Specifically, better understanding of each aspect was expected to be associated with more prosocial behavior when children experienced their own negative emotion, saw a peer in distress, and/or experienced both their own negative emotion and saw a peer in distress.

I decided to explore the roles of different aspects of social cognition in prosocial behavior in these different emotion contexts, instead of examining these six social cognitive skills as a composite measure, because they do not emerge simultaneously within development. As a result, children may have more experience with the earlier emerging aspects of social cognition, including perception, intention, emotion, and desire understanding; whereas other aspects are later-emerging, such as knowledge and belief understanding (Astington & Gopnik, 1995). Thus, around the time children enter formal schooling, children have developed some skill in each aspect, though there is variation in the degree to which each child has developed them. These variations in social cognition may impact how children process social information from peers. As such, this is a particularly important time in children's life for their school readiness because it impacts

their peer relations with the children they interact with daily in school and contributes to social competency (Bierman et al., 2008). This approach to investigate different aspects at a more fine-grained level allowed for closer investigation of how social cognition contributes to prosocial behavior and could be particularly important in understanding how these skills relate to prosocial behavior differentially based about the emotion context during this transitional time in childhood.

Gender differences. It was expected that there would be no, or at most marginal, gender differences in behavioral measures of prosociality. It was expected that there would be gender differences in parent perceptions of prosocial behavior, specifically it was predicted that parents would rate girls as more prosocial than boys.

Chapter 2

Methods

Participants

One hundred and thirty-two children ages 4 to 6 years old (M = 5.42; SD = .89; 69 girls) and one of their parents (120 mothers) participated in this study. A power analysis, using a factorial ANOVA, with a 2 (child emotion: negative or neutral) x 2 (peer emotion: negative or neutral) design, an estimated effect size of f = 0.25, an alpha level of α=.05, a beta level of β=.20, indicated a minimum of 128 participants were required to find a medium sized effect. The original planned analyses were to conduct a factorial ANOVA, and though the actual analyses used were changed because the outcome variables were count variables, this sample size was still sufficient.

Participants were recruited from community events, word of mouth, or by phone from a participant database of families who were recruited at previous community events and indicated interest in participating in research studies. The sample reflects the socioeconomic and ethnic/racial diversity of the Southern California region from which it was recruited. Parents reported their children's race and ethnicity information: 40% Caucasian, 6% African American, 34% Hispanic, 2% Asian American, 13% mixed or other races, and 5% did not report. Parents reported their own race and ethnicity: Caucasian (30%), African American (8%), Hispanic (36%), Asian American (4%), 12% mixed or other races (12%), and 10% did not report (10%). Parents reported their highest level of education completed: grade school (3%), middle school (2%), attended some high school, but did not obtain degree (8%), high school graduate (30%), trade, technical,

or vocational degree (16%), college degree (20%), Master's degree (7%), doctoral degree (9%), and did not report (5%). Parents reported total annual family income: less than $20,000 (19.4%), $21,000-40,000 (13.2%), $41,000-60,000 (17.1%), $61,000-80,000 (15.5%), $81,000-100,000 (10.1%), above $100,000 (10.9%), and did not report (14%). The median income was $41,000-60,000.

As compensation for participating, families received $20, and child received four small prizes (e.g., a small can of Play-Doh, sticky hand, whistle) at the end of the study. All study procedures were approved by the University Institutional Review Board.

Design

This study used a 2 (child emotion: negative, neutral) x 2 (peer emotion: negative, neutral) between-subjects factorial design. Children were randomly assigned to one of the four resulting unique conditions (see Figure 1). The current study explored the impact of negative emotion on children's prosocial behavior by comparing four different emotion contexts: the child and the peer experienced negative emotion (*Both Negative*), the child experienced negative emotion and the peer did not (*Child Negative Only*), the child experienced neutral emotion and the peer experienced negative emotion (*Peer Negative Only*), and neither the child nor the peer experienced negative emotion (*Neutral*).

Child Emotion Manipulation	*Peer Emotion*		
		Negative Emotion Peer Video	Neutral Emotion Peer Video
	Negative Emotion Version of Cyberball	*Both Negative*	*Child Negative Only*
	Neutral Emotion Version of Cyberball	*Peer Negative Only*	*Neutral*

Figure 1. The four experimental conditions.

Procedure

At the beginning of the study, parent consent and child assent were obtained. Parents completed survey measures in a separate room. All children were told that a gender-matched peer, Jamie, was participating in the study activities in a different room in the laboratory as a cover story for the subsequent prosocial tasks. Children were provided with a box containing 17 stickers that had their name written on it. Twelve of these were bunny stickers. Children self-reported their emotions using 4-point pictorial scales of faces depicting neutral faces and increasingly sad, angry, or happy faces (Appendix A). Children were trained to point to one of four faces on each of the scales to indicate how sad, angry, and happy they felt on each of the scales. For training purposes, the experimenter explained what each face represented (i.e., ranging from not at all sad/angry/happy to very sad/angry/happy) and asked the child to show where s/he would point if s/he felt not at all sad, a little sad, pretty much sad, or very sad. This was repeated for the angry and happy scales to ensure that children understood how to use the emotion

report scales. Children reported on their own emotions at seven different times throughout the study (see Figure 2). After training on the emotion report scales, children completed the initial emotion self-report.

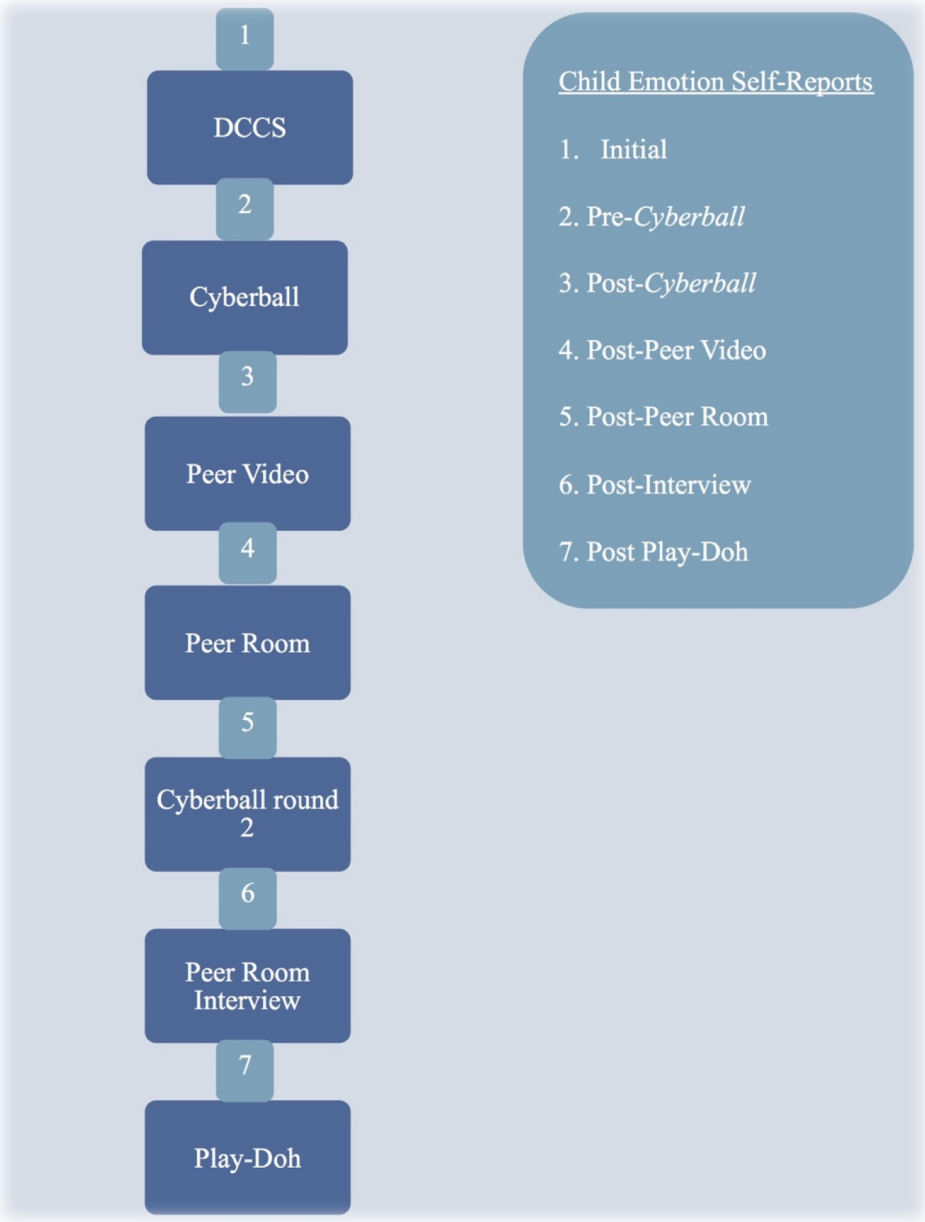

Figure 2. Flow-chart of when child emotion self-reports (in light blue) occurred in relation to study activities (in dark blue).

DCCS

Next, children's cognitive flexibility, a component of executive functioning, was assessed using a computerized version of the *Dimensional Change Card Sort* (DCCS). The DCCS is a computerized card-sorting rule-switch task which had 32 counter-balanced trials with varying instructions to sort by cards by shape or color. This task was selected as a measure because it is age-appropriate for children in this study, and while it has primarily been used to assess cognitive flexibility, it also has demands on working memory, planning, and inhibition, and is regarded as a measure of global executive functioning (Zelazo, 2006). The target card (e.g., an image of a blue rabbit) appeared in the center of the screen. Two other cards, that represented where the card could be sorted, were on the screen. One in the bottom left corner, and the other was in the bottom right corner of the screen. The child completed training and had to correctly sort six cards before beginning the task. There were three rounds of the task, each with a different sorting rule. In round 1, cards were to be sorted by color. In round 2, cards were to be sorted by shape. In round 3, cards with stars on them were to be sorted by shape and cards without stars on them were to be sorted by color. The child pressed computer keys to indicate where the target card should be sorted. Reaction time (RT) and accuracy were automatically recorded by the *DCCS* computer program. The program did not advance until children sorted the on-screen card. The task ended when children completed all of the trials. Next, children completed the pre-*Cyberball* emotion self-report.

Cyberball

Children then played *Cyberball,* a computerized ball tossing game, in one of two randomly assigned versions to evoke negative or neutral emotion (Williams, Yeager, Cheung, & Choi, 2012). This social exclusion paradigm has been used in previous studies to elicit negative emotion (Wesselmann & Williams, 2013). *Cyberball* has specifically been found to reliably elicit negative emotion in children 7-years-old and older (Scheithauer, Alsaker, Wölfer, & Ruggieri, 2013). It was expected to evoke negative emotion in the current study, which investigated a younger sample (ages 4 to 6), because the Cyberball paradigm was found to effectively elicit negative emotion during pilot testing. In the game, the participant played with two other "children," who were in fact computer players, named Taylor and Morgan.

There were two different versions of the *Cyberball* game. In the neutral version of the game, the other players passed the ball between the participating child and other player throughout the game. This version of the game was played by children in the *Peer Negative Only* and *Neutral* conditions. In the negative emotion version of the *Cyberball* game, the other players passed the ball to the participating child twice at the beginning of the game and then subsequently passed the ball only to each other, leaving out the participating child for the remainder of the game. This negative emotion version of the game was played by children in the *Both Negative* and *Child Negative Only* conditions.

Peer Video

After playing *Cyberball*, children completed the post-*Cyberball* emotion self-report. Then children watched a video of an off-screen experimenter interviewing a

gender-matched peer named Jamie about the *Cyberball* game the peer had ostensibly just played. The videos were approximately 2 minutes long and created for this study by child actors who served as confederates. Four videos were created in total (a neutral and a negative version for each gender) to manipulate other's emotion. In the neutral video, Jamie described the game as fair, claiming the other kids passed the ball fairly. By this the peer meant that the other players passed the ball between the participating child and other player throughout the game and that s/he felt good. This video was used for children assigned to *Child Negative Only* and *Neutral* experimental conditions. A second, negative version of the video showed Jamie describing the game as "pretty unfair." The peer said the other kids passed the ball to him/her at first, but then stopped and that s/he felt pretty upset. This video was used for children assigned to the *Both Negative* and *Peer Negative Only* experimental conditions.

The last segment of every video was the same for all conditions. Jamie explained that s/he had been working on a drawing (Appendix B) and wanted bunny stickers to finish it but did not have any of those stickers. Then Jamie pointed to the three blank circles on his/her drawing where s/he wanted to put the bunny stickers. This part of the video thus showed participants the unfinished picture that they would see in the other room of the laboratory shortly thereafter and introduced the idea that Jamie wanted bunny stickers but did not have enough. The videos ended with the off-screen experimenter telling Jamie it was time to go to the other room to do the next activity. Children completed the post-peer video emotion self-report when the video ended and were ask

"What did Jamie want to finish his/her drawing?" If children answered incorrectly, they were told "Jamie wanted bunny stickers to play in the grass and eat the carrots."

Next, the experimenter told the child s/he could play in the peer's room and prompted the child to bring their sticker box with them. A copy of the peer's drawing, which contained carrots, grass, and trees, along with three blank circles, was on the table (Appendix B). First introduced to the peer drawing in the peer video, the children had the opportunity to see it on a table and place stickers on it while they were in the peer's room.

This sharing opportunity was used to derive measures of the number of bunny stickers shared initially and children's latency to share stickers, both indices of prosocial behavior. The initial sharing score was calculated by counting the number of bunny stickers the child shared during the bunny sticker prosocial task, while in the peer's room. Children could share bunny stickers by leaving the stickers near the peer drawing or by putting the stickers on the peer drawing. Children received one point for every bunny sticker shared and could have shared up to twelve bunny stickers. The total number of bunny stickers shared resulted in a score ranging from 0 (no prosocial behavior) to 12 (maximum prosocial behavior).

The latency to share bunny stickers was calculated by measuring the time between entering the peer's room and beginning to share (e.g., how long until the child started taking stickers out of their sticker box to share with the peer). Latency to share scores could be a maximum of 130 seconds, the maximum amount of time allotted for the

sharing while in the peer's room, consistent with prior work (Vaish, Carpenter, & Tomasello, 2009).

When children returned from the peer's room they completed the post-peer room emotion self-report. Next, children played *Cyberball* a second time. All children played the neutral version this time (i.e., where the other players in the game included the participating child throughout the game). Children were interviewed about their thoughts and behaviors while they were in the peer's room during the peer room interview (Appendix C) and completed the post-interview emotion self-report.

For the last activity, children were given four cans of Play-Doh in their sticker box as a prize for participating. The experimenter told the child that there were not enough cans of Play-Doh left to give any to Jamie (the peer), and opened Jamie's sticker box, which was also on the table, to show that Jamie did not have any Play-Doh. The experimenter explained that the participating child could keep all the Play-Doh or give 1, 2, 3, or 4 to Jamie by putting it in Jamie's box and closing the lid. The experimenter then told the child she would close her eyes until the child was all done. Next, the experimenter closed her eyes while the child shared or decided not to share. The experimenter re-opened her eyes when the child indicated s/he was all done. Next, the child completed the post Play-Doh emotion self-report and was interviewed about their thoughts and behavior during the Play-Doh sharing opportunity (Appendix D). The total number of Play-Doh cans shared with the peer while the experimenter's eyes were closed and during the interview resulted in the number of play-doh shared variable. The number of Play-Doh cans shared variable could range from 0 (no Play-Doh shared) to 4

(maximum number of Play-Doh shared). At the end of the study, parents and children were debriefed about the study and told that all of the other children in the study were really actors like they have seen on television or in movies and these children were only pretending to be participating in the study.

The final index of prosocial sharing behavior was the total number of bunny stickers ever shared. This was calculated by counting the number of bunny stickers shared with the peer at any point during the study, including while in the peer's room and any subsequent time in the study (i.e., during the second round of *Cyberball*, interview, and during the Play-Doh sharing opportunity). The total number of bunny stickers shared at any point in the study resulted in an overall bunny sticker sharing score, ranging from 0 (no prosocial behavior) to 12 (maximum prosocial behavior).

Measures

Demographics

Parents reported on family demographics, including child age and gender, their own and their child's race/ethnicity, household income, and family composition on the *General Information Questionnaire* (GIQ).

Child Emotion Regulation

Parents reported on their children's emotion regulation on the 24-item *Emotion Regulation Checklist* (ERC; Shields & Cicchetti, 1997). This scale has high internal consistency for emotion regulation in other published studies (.80-.83; Shields & Cicchetti, 1997; Zeman, Cassano, Suveg, & Shipman, 2010). Parents reported on how often each item applied to their child's behavior on a 4-point scale, ranging from

rarely/never (1) to *almost always* (4). The emotion regulation subscale was calculated by averaging ten items (e.g., *Can recover quickly from upset or distress*; Cronbach's α = .48). Higher scores indicated better emotion regulation, and lower scores indicated worse emotion regulation. Because of the low alpha in this sample, analyses were conducted to investigate whether the alpha would be improved by deleting any items. One item, "*Displays appropriate negative emotions (anger, fear, frustration, distress) in response to hostile, aggressive or intrusive acts by peers*", was found to be contributing to this low reliability. To address the subscale's low reliability, this item was removed, and an adjusted score was re-calculated for this subscale using the remaining nine items (Cronbach's α = .65). The adjusted subscale was used in analyses.

Social Cognition

Parents reported on six core facets of children's social cognition on the *Children's Social Understanding Scale* (CSUS; Tahiroglu, et al., 2014). In Tahiroglu and colleagues' (2014) validation study, this scale had very strong internal consistency (average αs = .94) and strong test–retest reliability, *r*s (29) .88, *p*s < .001. Parents rated how true each statement about social understanding was for their child on a 4-point scale ranging from 1 (*definitely untrue*) to 4 (*definitely true*) or reported that they did not know (*don't know*). Parents reported on six aspects of children's social cognition, divided into six subscales: belief understanding (e.g., "*Talks about what other people think and believe*"; Cronbach's α = .74), knowledge understanding (e.g., "*Can tell you how she/he found out about things*"; Cronbach's α = .70), perception understanding (e.g., "*Talks about what other people can see and hear*"; Cronbach's α = .54), desire understanding

(e.g., "*Talks about the difference between what people want and what they actually get*"; Cronbach's α = .69), intention understanding (e.g., "*Understands that hurting people on purpose is worse than hurting others accidentally*"; Cronbach's α = .60), and emotion understanding (e.g., "*Tries to understand the emotions of other people*"; Cronbach's α = .63). Averages for each subscale were calculated. A higher score on each subscale indicated better understanding for that aspect (e.g., higher emotion understanding).

Data Reduction and Coding

Observed Emotion

Observed positive and negative emotion were coded from videos of children as they played *Cyberball* the first time, which served as an emotion manipulation.

Observed emotion was coded in two segments by trained coders who were blind to study condition. The first segment was consistent across all conditions and included the ball being fairly passed between all players. Coding the first segment was meant to ensure that there were no pre-existing differences in emotion across conditions before the manipulation took place. The second segment included the manipulation, in which half of the children were passed the ball fairly by the other players and the other half of the children were unfairly not passed the ball. For both segments, emotion was globally rated for intensity and duration on a scale of 0 (not at all positive/negative emotion) to 5 (high positive/negative emotion). This coding resulted in four codes: first segment positive emotion, first segment negative emotion, second segment positive emotion, and second segment negative emotion.

Research assistants were trained by the author to code for observed emotion. They were trained on 25% of the data and then independently coded videos. Coders discussed segments that were difficult to code with the author to calibrate and reduce drift throughout coding. All discrepancies were resolved by the author. 100% of videos were double-coded by the trained research assistant coders. Inter-rater reliability was determined using Cohen's κ. There was strong agreement between coders for first segment positive emotion, $\kappa = .93$, $p < .001$, and first segment negative emotion, $\kappa = .85$, $p < .001$. There was moderate agreement between coders for second segment positive emotion, $\kappa = .73$, $p < .001$, and second segment negative emotion, $\kappa = .77$, $p < .001$.

Chapter 3

Results

Overview

The results are organized into five sections. In the first section, I describe preliminary tests that were run to investigate correlations among variables of interest, age, and gender. The second section examined the effectiveness of the child emotion manipulation. The third section described the exploratory analyses that were conducted to investigate the effects of the novel peer video manipulation. The fourth section reports analyses that were conducted to test the research questions about the effects of own and others' emotion on prosocial behavior. The final section assessed the moderating role of own and others' emotion on the associations between individual differences and prosocial behavior. Poisson regressions were conducted for models with a count variable as the outcome (sticker sharing counts) because these dependent variables violate the normality assumption in an ordinary least squares regression and in ANOVAs. Linear regressions were conducted for models with the latency to share outcome because it did not violate the normality assumption.

To test research questions 1, 2, and 3, separate regression models were conducted to test the main effect of own emotion condition (research question 1), the main effect of others' emotion condition (research question 2), and their interaction (research question 3) on each of the four prosocial behavior outcomes (i.e., the number of bunny stickers shared initially, latency to share bunny stickers, the number of bunny stickers shared overall, and the number of Play-Doh shared). Next, hypothesized moderation effects of

child and peer emotion on the associations between individual differences in emotion regulation and social cognition and prosocial behavior were investigated (research question 4).

Preliminary Analyses

Three children were unable to complete all of the study tasks (e.g., child repeatedly expressed concern about the parent hearing their responses, clicked indiscriminately on the computer, or gave irrelevant responses to interview questions) and data for these children were excluded from analyses. All other children who had missing data for a small number of variables because of any other reason (e.g., camera malfunction) were included in analyses whenever data were available.

There were 33 children in the *Neutral* condition, and 32 children in each of the remaining conditions. Associations among child age and the main prosocial behavior outcomes, as well as means and standard deviations for each variable, are displayed in Table 1. Age was not significantly associated with any of the prosocial behavior outcomes or emotion regulation, though it was positively associated with all six aspects of social cognition. Though emotion regulation and each aspect of social cognition was expected to be positively associated with prosocial behavior, this hypothesis was not supported. With the exception of the negative associations between number of Play-Doh shared and emotion and intention understanding, none of the prosocial behavior outcomes were associated with any of the aspects of social cognition or with emotion regulation. The six aspects were positively associated with each other and the strength of these associations varied from moderate to strong. Means and standard deviations for each

condition are displayed in Table 2. Results for differences among the conditions are presented and discussed later. Correlations among self-reported emotion variables with observed positive and negative emotion are displayed in Table 3, along with means and standard deviations for these variables. Children's pre-*Cyberball* sadness and anger were positively associated with each other, and with all subsequent self-reports of these emotions. Their pre-*Cyberball* self-reported anger was positively associated with observed negative emotion during *Cyberball*, this may reflect that some children were more apt to report and display more negative emotion. Pre-*Cyberball* happiness was positively associated with all subsequent self-reports of happiness. Post-*Cyberball* happiness was negatively associated with Post-*Cyberball* sadness. Post-*Cyberball* happiness was positively associated with observed positive emotion during *Cyberball*, though this association was weak and may reflect

Correlations among self-reported emotion, observed emotion, and individual difference variables are displayed in Table 4. More self-reported sadness pre-*Cyberball* was associated with less perception understanding, but it was not associated with post-*Cyberball* sadness. More self-reported sadness after playing *Cyberball* was associated with lower belief and knowledge understanding. More self-reported sadness after watching the peer video was only associated with less belief understanding. Children who self-reported more anger after watching the peer video were lower in belief, knowledge, perception, and desire understanding. More observed positive emotion while playing *Cyberball* was associated with higher belief and perception understanding and better

emotion regulation. More observed negative emotion while playing *Cyberball* was only associated with lower perception understanding.

T-tests were performed to check for gender differences between boys and girls on the main study outcomes. As shown in Table 5, parents reported higher prosocial behavior for girls than for boys, and there were otherwise no significant differences between boys and girls on any of the prosocial behavior or emotion variables. As such, gender was collapsed and is not considered further in the main study analyses.

Table 1

Descriptive Statistics and Associations among Child Age and Main Prosocial Behavior Outcomes

	Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1	Age	5.44	.89	—											
2	How many shared initially	1.26	2.23	-.02	—										
3	Latency to Share Bunny Stickers	98.78	49.15	.01	-.69**	—									
4	Number of Bunny Stickers Shared Overall	2.30	2.72	-.08	.64**	-.40*	—								
5	Number of Play-Doh shared	1.25	.92	.10	-.05	-.13	-.14	—							
6	Belief understanding	3.10	.57	.30**	.09	-.07	.14	-.17†	—						
7	Knowledge understanding	3.36	.47	.25**	-.03	-.07	.003	-.13	.62**	—					
8	Perception understanding	3.16	.45	.18*	.10	-.16†	.03	.007	.42**	.46**	—				
9	Desire understanding	3.25	.45	.26**	-.04	.003	.09	-.07	.60**	.74**	.44**	—			
10	Intention understanding	3.23	.42	.25**	.06	-.04	.14	-.21*	.50**	.67**	.37**	.71**	—		
11	Emotion understanding	3.28	.44	.27**	-.05	.03	.08	-.19*	.57**	.68**	.47**	.72**	.68**	—	
12	Emotion regulation	3.52	.36	-.03	.04	-.02	.12	-.09	.33**	.46**	.45**	.40**	.33**	.47**	—

Note. † $p < .10$; * $p < 0.05$; ** $p < 0.01$ level.

Table 2

Means and Standard Deviations of Study Variables by Condition

	Condition	*Both Negative*		*Child Negative Only*		*Peer Negative Only*		*Neutral*	
	Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1	Age	5.70	.82	5.49	.98	5.17	.90	5.46	.81
2	Initial number of bunny stickers shared	1.16	2.32	1.06	1.87	1.31	2.32	1.52	2.44
3	Latency to share bunny stickers (*s*)	108.50	40.46	101.44	48.04	99.88	49.86	86.39	55.94
4	Overall number of bunny stickers shared	1.88	2.55	1.84	2.19	3.13	3.02	2.39	2.97
5	Number of Play-Doh shared	1.44	.62	1.28	1.14	1.03	.82	1.24	1.00
6	Belief understanding	3.04	.59	3.10	.57	3.12	.43	3.14	.70
7	Knowledge understanding	3.43	.39	3.35	.47	3.38	.44	3.28	.56
8	Perception understanding	3.15	.45	3.21	.46	3.17	.45	3.09	.46
9	Desire understanding	3.29	.43	3.14	.45	3.30	.45	3.27	.47
10	Intention understanding	3.28	.34	3.08	.58	3.28	.34	3.28	.48
11	Emotion understanding	3.29	.45	3.17	.52	3.40	.34	3.26	.44
12	Emotion regulation	3.29	.45	3.50	.29	3.49	.40	3.66	.36

Table 3

Associations Among Self-Reported Emotions and Observed Emotion

		M	*SD*	1	2	3	4	5	6	7	8	9	10	11
1	Sad[a]	1.64	1.07	—										
2	Angry[a]	1.54	1.05	.78**	—									
3	Happy[a]	3.38	.99	-.04	.05	—								
4	Sad[b]	1.83	1.13	.68**	.65**	.02	—							
5	Angry[b]	1.63	.99	.60**	.66**	.07	.63**	—						
6	Happy[b]	3.05	1.17	-.10	-.06	.43**	-.25**	-.16†	—					
7	Sad[c]	1.66	1.09	.66**	.53**	-.02	.56**	.68**	-.07	—				
8	Angry[c]	1.55	.98	.67**	.70**	.03	.60**	.71**	.01	.74**	—			
9	Happy[c]	3.08	1.15	-.05	.06	.48**	-.04	-.04	.55**	-.10	.00	—		
10	Positive emotion[d]	.41	.81	-.03	-.04	.05	-.10	-.05	.06	-.15†	-.09	.17*	—	
11	Negative emotion[d]	.38	.84	.13	.20*	.09	.16†	.13	-.03	.13	.11	.11	-.13	—

Note. † p < .10; * p < 0.05; ** p < 0.01 level. [a] pre-*Cyberball* emotion report; [b] post-*Cyberball* emotion report; [c] post-peer video emotion report; [d] observed emotion during *Cyberball*

Table 4

Associations Among Individual Difference Variables, Self-Reported Emotions, and Observed Emotion

	Pre-*Cyberball* Sad	Pre-*Cyberball* Angry	Pre-*Cyberball* Happy	Post-*Cyberball* Sad	Post-*Cyberball* Angry	Post-*Cyberball* Happy	Post-Peer Video Sad	Post-Peer Video Angry	Post-Peer Video Happy	Positive emotion during *Cyberball*	Negative emotion during *Cyberball*
Belief	-.17†	-.16†	.09	-.18*	-.18†	.14	-.25**	-.25**	.17†	.32**	-.12
Knowledge	† -.15	-.14	-.05	-.20*	-.13	.02	-.12	-.19*	-.02	.17†	-.15†
Perception	-.24**	-.15†	.00	-.16†	-.10	-.11	-.20*	-.24**	-.10	.31**	-.20*
Desire	-.15	-.14	-.05	-.16†	-.11	.07	-.07	-.21*	.09	.16†	-.05
Intention	-.04	-.03	-.08	-.08	-.04	.04	-.04	-.09	-.01	.11	.01
Emotion	-.17†	-.12	-.05	-.14	-.05	.02	-.10	-.16†	.00	.15	.05
Emotion Regulation	-.05	-.01	-.12	-.16†	-.03	.07	-.04	-.05	.02	.23**	-.08

Note. † p < .10; * p < 0.05; ** p < 0.01 level.

Table 5

Descriptive Statistics and T-Test Comparisons by Gender

Variable	Boys		Girls				
Prosocial Behavior Variables	*M*	*SD*	*M*	*SD*	*t*	*p*	*r*
Whether or Not Bunny Stickers were Shared	.03	.44	.39	.49	-1.58	.12	.14
Number of Bunny Stickers Shared Initially	1.08	1.23	1.43	2.23	-.90	.37	.08
Number of Bunny Stickers Shared Overall	2.50	3.00	2.07	2.45	.89	.38	.08
Latency to Share Bunny Stickers	105.63	45.10	92.55	52.11	1.50	.14	.13
Number of Play-Doh Shared	1.23	.95	1.27	.90	-.26	.79	.02
Parent Reported Prosocial Behavior	1.21	.40	1.40	.34	2.90	.004	.25
Emotion Variables							
Sad Post-*Cyberball*	1.94	1.19	1.73	1.07	1.03	.31	.09
Angry Post-*Cyberball*	1.74	1.01	1.52	.91	1.27	.21	.11
Happy Post-*Cyberball*	2.90	1.20	3.18	1.13	-1.35	.18	.12
Sadness Post-Peer Video	1.56	1.05	1.75	1.13	-.94	.35	.08
Angry Post-Peer Video	1.50	.97	1.60	.99	-.56	.58	.05
Happy Post-Peer Video	3.15	1.11	3.01	1.19	.64	.52	.06

Was the Manipulation of Children's Own Emotion Effective?

T-tests were conducted to test the effect of the emotion manipulation (i.e., *Cyberball*) on children's own emotion. These tests were conducted to compare self-reported emotion before and after the child emotion manipulation between children who played the neutral and negative emotion versions of the game, T-tests were also conducted to compare children who played the neutral version of *Cyberball* to those who

played the negative emotion version on their observed emotion during the manipulation as children played *Cyberball.*

Child Self-Report of Positive and Negative Emotion. Children who played the negative emotion version of *Cyberball* (i.e., *Both negative*, and *Child Negative Only* conditions) reported more sadness after playing the game (M = 1.94, SD = 1.11) than before (M = 1.63, SD = 1.03), $t(63) = -2.57$, $p = .013$, $r = .31$. There was no change in anger from before *Cyberball* (M = 1.59, SD = 1.12) to after (M = 1.69, SD = .99), $t(63) = -.73$, $p = .47$, $r = .09$. However, children reported a decrease in happiness after playing *Cyberball* (before happiness: M = 3.52, SD = .84; after happiness; M = 2.80, SD = 1.262), $t(63) = 4.59$, $p < .001$, $r = .50$.

Children who played the neutral emotion version of *Cyberball* (i.e., *Peer Negative Only*, and *Neutral* conditions) were included fairly in the game, and, as expected, did not report any significant changes in sadness, anger, or happiness from pre- to post-*Cyberball* (sadness, $t(64) = -.80$, $p = .43$, $r = .10$; anger, $t(64) = -2.57$, $p = .30$, $r = .31$; happiness, $t(64) = -.41$, $p = .68$, $r = .05$).

Observed positive and negative emotion. Observed emotion for children who played the neutral version of *Cyberball* was compared to observed emotion for children who played the negative version of *Cyberball*. First, positive and negative emotion during the first segment of *Cyberball*, when no differences were expected because the exclusion manipulation had not occurred yet, were examined. As expected, there were no differences between the two groups on positive or negative emotion during the first segment of the game, ts < -1.43, ps > .16, rs < .13.

Second, positive and negative emotion in the second segment of *Cyberball*, during and after the exclusion, were examined. As expected, children who played the negative version of the game showed less positive emotion (M = .46; SD = .77) than children who played the game in the neutral condition (M = 1.48; SD = 1.48), $t(122) = 4.79$, $p < .001$, r = .40. Further, children who played the negative version of the game showed more negative emotion (M = 1.97; SD = 1.67) than children who played the neutral version of the game (M = .97; SD = 1.436), $t(124) = -3.61$, $p < .001$, r = .31.

In summary, children who played the negative emotion version of *Cyberball* reported less happiness after playing *Cyberball*. They displayed more negative emotion and less positive emotion compared to children who played the neutral version of *Cyberball*. Thus, as expected, the manipulation of children's own emotion was effective.

Did Exposure to Others' Distress Influence Children's Emotion?

To explore the effects of the novel manipulation of others' emotion, the peer video, paired samples t-tests were conducted to compare children's self-reported sadness, anger, and happiness before and after the video. For children in the *Child Negative Only* condition, there was a marginal decrease in sadness from before watching the peer video (M = 2.03; SD = 1.12) to after watching the peer video (M = 1.63; SD = 1.01), $t(31) = 1.89$, p = .068, r = .32. For the children in the *Neutral* condition, there was also a marginal decrease in sadness from before watching the peer video (M = 1.67; SD = 1.11) to after watching it (M = 1.36; SD = .82), $t(32) = 1.90$, p = .067, r = .32. There were no additional significant changes in sadness, anger, or happiness from pre- to post-peer

video for any of the conditions, *t*s < 1.79, *p*s > .08, *r*s < .30. Thus, there was no effect of the peer video or others' emotion on children's self-reported emotion.

Did the Experience of Own Emotion, Others' Emotion, or their Interaction Affect Children's Prosocial Behavior?

The effects of own emotion, others' emotion, and their interaction on prosocial behavior were tested using regressions. Three separate models were set up in the same way to test for the effects on a) initial prosocial behavior (i.e., the number of bunny stickers shared initially), b) delayed prosocial behavior (i.e., the number of bunny stickers ever shared), and c) the number of Play-Doh shared. In Step 1, own emotion condition and others' emotion condition were entered. In step 2, the interaction was entered. An ANOVA was conducted to investigate these effects on latency to share because the outcome was not a count variable.

Modeling strategy. Effects coding of the experimental conditions was employed because this allows for a more direct interpretation of the interaction terms (Cohen, Cohen, West, & Aiken, 2003). Each level of the experimentally manipulated variables was coded as negative emotion present (1) or negative emotion absent/neutral (-1). Each condition was given one code for the children's own emotion condition (neutral emotion *Cyberball* = -1; negative emotion *Cyberball* = 1) and one code of the others' emotion condition (neutral emotion peer video = -1; negative emotion peer video = 1). Next, the effects-coded own emotion condition was multiplied by the effects coded others' emotion condition to create an interaction term. As a result, there was a unique pattern of codes for each of the four conditions.

Initial bunny sticker sharing. The overall model predicting number of bunny stickers shared initially was not significant, Likelihood Ratio χ^2 (3) = 3.00, p = .39, nor were any of the predictors, Wald χ^2s < .52, ps > .47.

Latency to Share. There were no significant effects; child emotion, F(1, 122) = 1.84, p = .18, η_p^2 = .015; peer emotion, F(1, 122) = 1.37, p = .24, η_p^2 = .011; interaction, F(1, 122) = .13, p = .72, η_p^2 < .001.

Overall bunny sticker sharing. The model predicting number of bunny stickers shared overall was significant, Likelihood Ratio χ^2 (3) = 14.23, p = .003. There was a main effect of children's own emotion condition, b = .51, Wald χ^2 = 9.72, p = .020 (95% CI[.19, .83]). Children who played the neutral version of *Cyberball* shared significantly more bunny stickers overall, and children who played the negative emotion version of *Cyberball* shared less. This is in line with the hypothesis that children who experienced their own negative emotion would be less prosocial. There were no other significant predictors, Wald χ^2s < 1.11, ps > .29.

Play-Doh sharing. The overall model predicting number of Play-Doh shared was not significant, Likelihood Ratio χ^2 (3) = 2.19, p = .53, nor were any of the predictors, Wald χ^2s < .2.12, ps > .15.

Summary. The emotion manipulations impacted children's self-reported happiness and observed negative emotion, and they did have some of the predicted impact on children's prosocial behaviors. It was expected that there would be a main effect of children's own emotion such that children who experienced distress would engage in less prosocial behavior than children who did not experience distress, and this

was true for children's initial prosocial behavior. However, the hypothesized main effect of others' emotion and interaction effect of own and others' emotion were not supported. As such, I next examine the individual differences that may help contextualize children's prosocial behavior in this study.

Did the Experience of Own or Others' Emotion Moderate the Associations Between Individual Differences and Prosocial Behavior?

Regressions were conducted to test for the moderating role of children's own and others' emotions on the association between individual differences and each of the four prosocial variables. Conditions were effects coded as described above. The individual differences that were tested were emotion regulation, from the Emotion Regulation Checklist, and each of the six facets of social cognition from the Children's Social Understanding Scale: belief, knowledge, desire, intention, perception, and emotion understanding. Continuous predictor variables were mean-centered. Each model was structured as follows: In Step 1, main effects of children's own emotion condition, others' emotion condition, and the selected individual difference variable were entered. In Step 2, all two-way interactions were entered (i.e., children's own emotion x others' emotion; children's own emotion x individual difference; others' emotion x individual difference). Then in Step 3, the three-way interaction between children's own emotion, others' emotion, and individual difference was entered. Simple slopes tests were conducted to probe interactions.

Individual Differences in Emotion Regulation

Latency to share bunny stickers. When the effects of own and other emotion were tested as moderators of the link between emotion regulation and latency to share, the overall model predicting latency to share was not significant, $F(7, 115) = 1.45$, $p = .19$, though the final model F change was, $F(1, 115) = 6.32$, $p = .013$, $R^2 = .08$, adjusted $R^2 = .03$. There was a main effect of emotion regulation, $b = 257.38$, $SE = 128.36$, $t = 2.01$, $p = .05$. There was a two-way interaction between emotion regulation and children's own emotion condition, $b = -185.63$, $SE = 79.22$, $t = -2.34$, $p = .021$. There was a two-way interaction between emotion regulation and others' emotion condition, $b = -183.51$, $SE = 85.15$, $t = -2.16$, $p = .033$. These effects were qualified by a three-way interaction among emotion regulation, children's own emotion condition, and others' emotion condition, $b = 128.60$, $SE = 51.17$, $t = 2.51$, $p = .013$ (*Figure 3*). There were no other significant predictors, ts < -.49, ps > .63.

For the *Neutral* condition, there was a positive association between emotion regulation and latency to share, $b = 257.38$, $t = 2.01$, $p = .047$. The other three conditions did not have significantly sloping lines, bs < 73.87, ts < 1.33, ps > .19.

These results suggest that when children experienced neither their own nor others' negative emotion, they were slower to share when they had better emotion regulation and were faster to share when they had poorer emotion regulation.

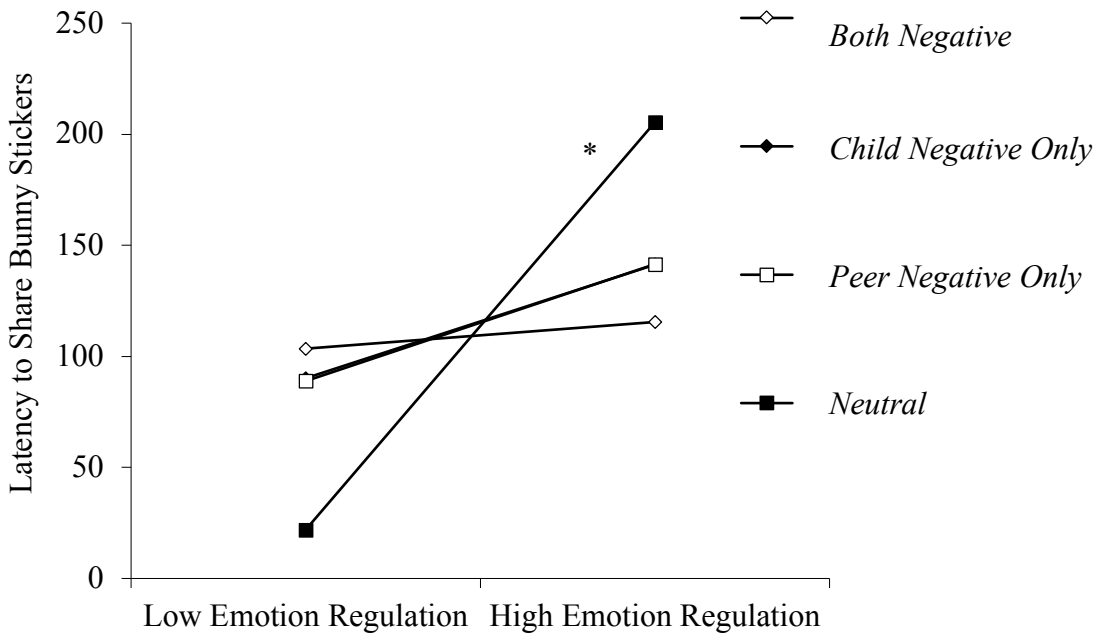

Figure 3. The three-way interaction of emotion regulation, children's own emotion condition, and others' emotion condition predicted the latency to share bunny stickers.

Initial bunny sticker sharing. The overall model predicting the number of bunny stickers shared initially was significant, likelihood ratio $\chi^2(7) = 23.09$, $p = .002$. There was a main effect of emotion regulation, $b = .64$, $SE = .29$, Wald $\chi^2 = 5.02$, $p = .025$ (95% CI[.08, 1.21]). There were no other main effects or two-way interactions, Wald χ^2s < 2.73, ps $> .10$. There was a three-way interaction between children's own emotion condition, others' emotion condition, and emotion regulation, $b = -1.01$, $SE = .29$, Wald $\chi^2 = 12.44$, $p < .001$ ([95% CI[-1.58, -.45]; *Figure 4*).

For children in the *Both Negative* condition, there was no association between emotion regulation and the number of bunny stickers shared initially, $b = .09$, $t = .19$, $p = .85$. For children in the *Child Negative Only* condition, there was a positive association

between emotion regulation and the number of bunny stickers shared initially, $b = 1.72$, $t = 2.35$, $p = .021$. For children in the *Peer Negative Only* condition, there was a positive association between emotion regulation and the number of bunny stickers shared initially, $b = 1.60$, $t = 2.42$, $p = .017$. For children in the *Neutral* condition, there was negative association between emotion regulation and the number of bunny stickers shared initially, $b = -.82$, $t = -2.22$, $p = .028$.

Thus, there were associations between emotion regulation and the number of bunny stickers shared initially for all conditions except *Both Negative*. For children in the *Peer Negative Only* and *Neutral* conditions, there was a positive association between emotion regulation and the number of bunny stickers shared initially; lower emotion regulation was associated with a lower number of bunny stickers shared initially. In contrast, for children in the *Child Negative Only* condition, there was a negative association; poorer emotion regulation was associated with a greater number of bunny stickers shared initially.

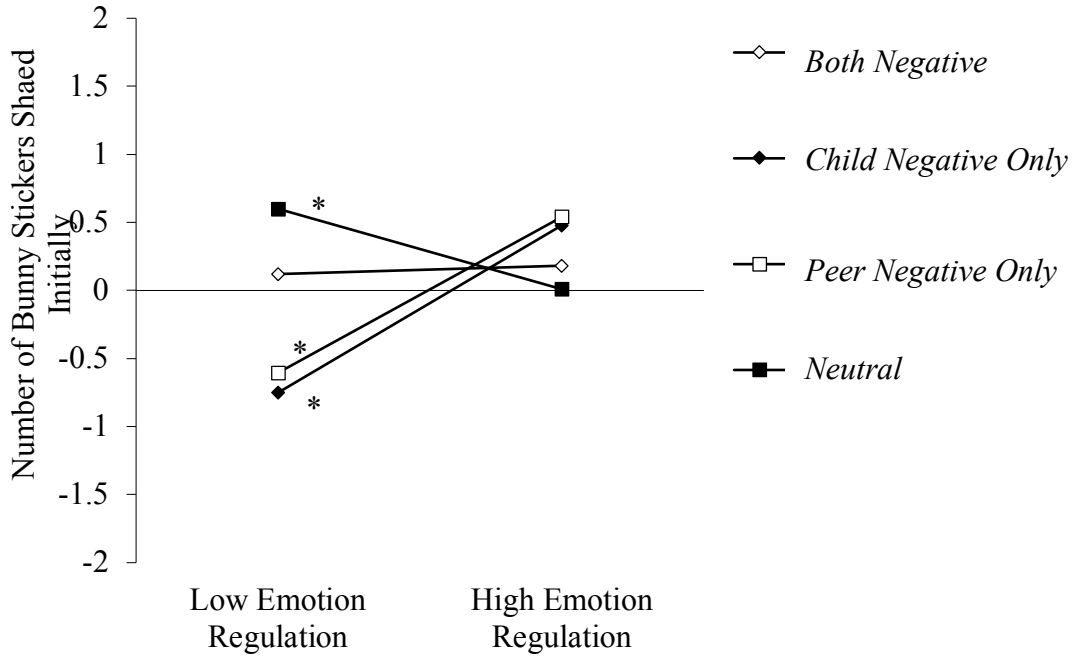

Figure 4. The three-way interaction of emotion regulation, child emotion condition, and peer emotion condition predicted the number of bunny stickers shared initially.

Overall bunny sticker sharing. The overall model predicting the total number of bunny stickers shared was significant, likelihood ratio $\chi^2(7) = 27.55$, $p < .001$. There was a main effect of children's own emotion condition, $b = -.19$, $SE = .07$, Wald $\chi^2 = 8.52$, $p = .004$ (95% CI [-.32, -.06]), and a main effect of emotion regulation, $b = .43$, $SE = .20$, Wald $\chi^2 = 4.72$, $p = .03$ (95% CI[.04, .82]. These main effects were qualified by the three-way interaction among children's own emotion condition, others' emotion condition, and emotion regulation, $b = -.54$, $SE = .20$, Wald $\chi^2 = 7.51$, $p = .006$ (95% CI[-.93, -.16]; *Figure 5*). There were no other significant predictors, Wald χ^2s (1) < 1.23, ps > .27.

For children in the *Both Negative* condition, there was no association between emotion regulation and the number of bunny stickers shared overall, b = -.08, t = -.23, p = .82. For children in the *Child Negative Only* condition, there was a positive association between emotion regulation and the number of bunny stickers shared overall, b = 1.29, t = 2.48, p = .015. For children in the *Peer Negative Only* condition, there was no association between emotion regulation and the number of bunny stickers shared overall, b = -.14, t = -.49, p = .63. For children in the *Neutral* condition, there was a marginal association between emotion regulation and the number of bunny stickers shared overall, b = .66, t = 1.74, p = .084.

For this model, there was a positive association between emotion regulation and the number of bunny stickers shared overall for children in the *Child Negative Only* condition and no associations for the remaining three conditions. For children in the *Neutral* condition, lower emotion regulation was associated with a lower number of bunny stickers shared overall.

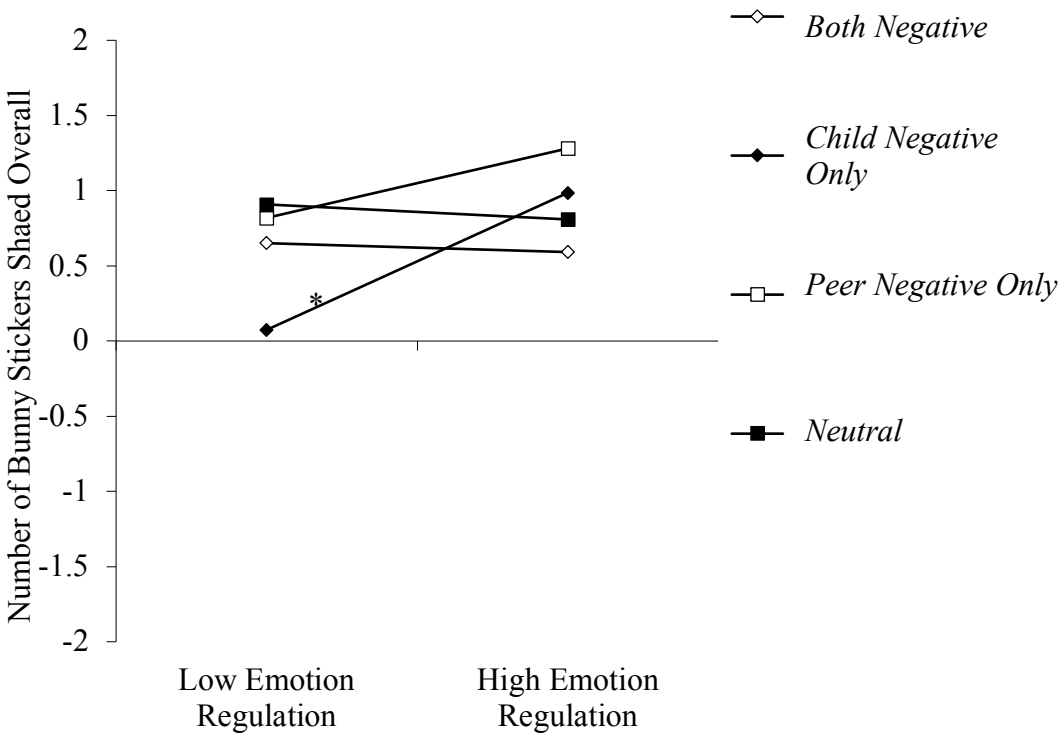

Figure 5. The three-way interaction of emotion regulation, children's own emotion condition, and others' emotion condition predicted the number of bunny stickers shared overall.

Play-Doh sharing. The overall model predicting the number of Play-Doh shared was not significant, likelihood ratio $\chi^2(7) = 2.80$, $p = .90$, nor were any of the predictors, Wald χ^2s (1) < .84, ps > .36.

Summary. I hypothesized that children with better emotion regulation skill would be more prosocial than children with poorer emotion regulation skill for children in the *Child Negative Only*, *Peer Negative Only*, and *Both Negative* conditions. This hypothesis was partially supported by the findings from the model testing children's own and others' emotion as moderators of emotion regulation predicting the number of bunny stickers

shared initially. Children who experienced no negative emotion were more prosocial when they had poorer emotion regulation, which could reflect that they used prosocial behavior in an attempt to regulate their own discomfort caused by seeing a peer in need, even when that peer was not displaying distress cues.

When children experienced either their own distress or saw a peer in distress, better emotion regulation supported prosocial behavior. In contrast, children in this condition with poorer emotion regulation demonstrated less prosocial behavior. Children with better emotion regulation who experienced only their own distress shared similarly as children in other emotion contexts; however, when they had poorer emotion regulation and experienced their own distress, they tended to share less than children in other emotion conditions. Additionally, these children were less prosocial when they had poorer emotion regulation.

In contrast to this hypothesis, but in line with findings from the model predicting the number of bunny stickers shared initially, children who did not experience own or others' negative emotions shared faster when they had poorer emotion regulation and shared slower when they had better emotion regulation.

Individual Differences in Social Cognition

Belief understanding

Latency to share bunny stickers. When the effects of own and other emotion were tested as moderators of the link between belief understanding and latency to share, the overall model predicting latency to share was not significant, $F(7, 114) = .59$, $p = .77$, $R^2 = .04$, adjusted $R^2 = -.03$, nor were any of the predictors, ts < 1.33, ps $> .19$.

Initial bunny sticker sharing. The overall model for the number of bunny stickers shared initially was significant, likelihood ratio $\chi^2(7) = 17.31$, $p = .015$. There was a marginal main effect of children's own emotion condition, $b = -.17$, $SE = .09$, Wald $\chi^2 = 3.76$, $p = .052$, 95% CI [-.33, .002]. This marginal main effect was qualified by a two-way interaction between children's own emotion condition and belief understanding, $b = .41$, $SE = .17$, Wald $\chi^2 = 6.04$, $p = .014$, 95% CI [.083, .737] (*Figure 6*).

Simple slopes were conducted to probe the two-way interaction. For children who played the neutral version of *Cyberball*, there was no association between belief understanding and the number of bunny stickers shared initially, $b = -.16$, t = -.62, p = .54. For children who played the negative emotion version of *Cyberball*, there was a positive association between belief understanding and the number of bunny stickers shared initially, $b = .66$, $t = 3.21$, $p = .002$. Children with higher belief understanding who played the negative emotion version of *Cyberball* shared similarly to children who played the neutral version of *Cyberball*, but children with lower belief understanding who played the negative emotion version of *Cyberball* shared less than children who played the neutral version of the game. There were no other significant predictors, Wald χ^2s (1) < 2.29, ps > .13.

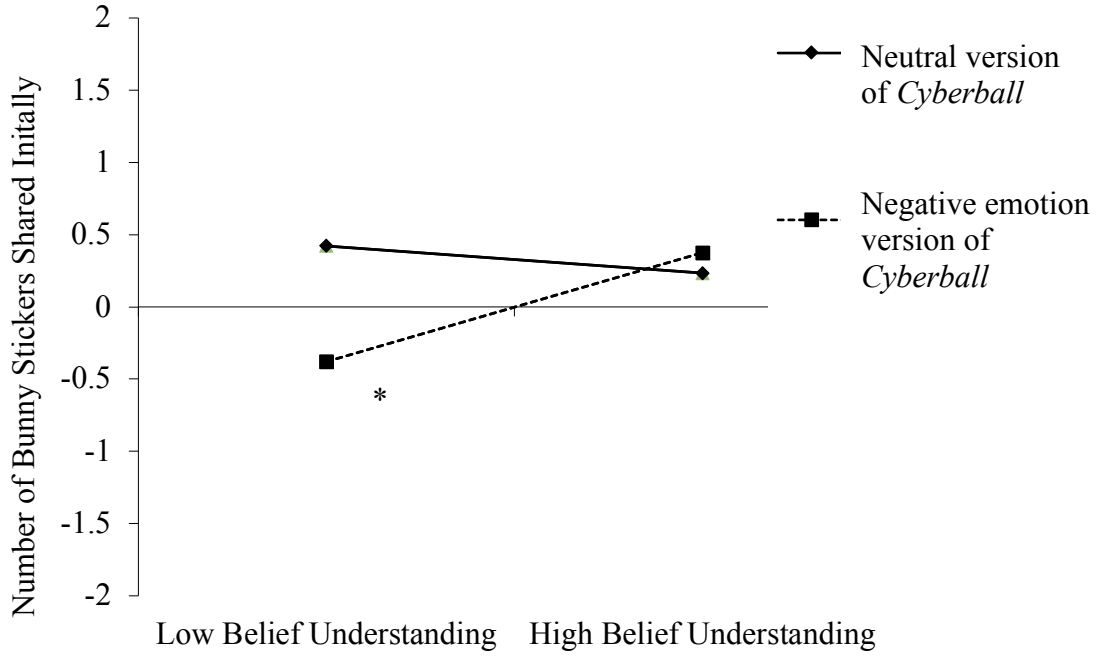

Figure 6. The two-way interaction between child emotion condition and belief understanding predicted the number of bunny stickers shared initially.

Overall bunny sticker sharing. The overall model was significant, likelihood ratio $\chi^2(7) = 33.58$, $p < .001$. There was a main effect of children's own emotion condition, $b = -.25$, $SE = .06$, Wald χ^2 (1) = 15.46, $p < .001$, 95% CI [-.372, -.124]. There was also a main effect of belief understanding, $b = .41$, $SE = .13$, Wald $\chi^2 = 10.60$, $p = .001$ 95% CI [.10, .59].

These main effects were qualified by a two-way interaction of children's own emotion condition and belief understanding, $b = .34$, $SE = .13$, Wald $\chi^2 = 7.38$, $p = .007$, 95% CI[.095, .59] (*Figure 7*). For children who played the negative emotion version of *Cyberball*, there was a positive association between belief understanding and the number

of bunny stickers shared overall, $b = .75$, $t = 3.70$, $p < .001$. For children who played the negative emotion version of *Cyberball*, higher belief understanding was associated with a greater number of bunny stickers shared overall. Children in this condition shared less overall when they had lower belief understanding, but when they had higher belief understanding, their sharing was similar to children in other conditions. For children who played the neutral emotion version of *Cyberball*, there was no association between desire understanding and the number of bunny stickers shared overall, $b = .07$, $t = .46$, $p = .65$. There were no other significant main effects or interactions in the model, Wald $\chi^2 < 2.50$, $p > .11$.

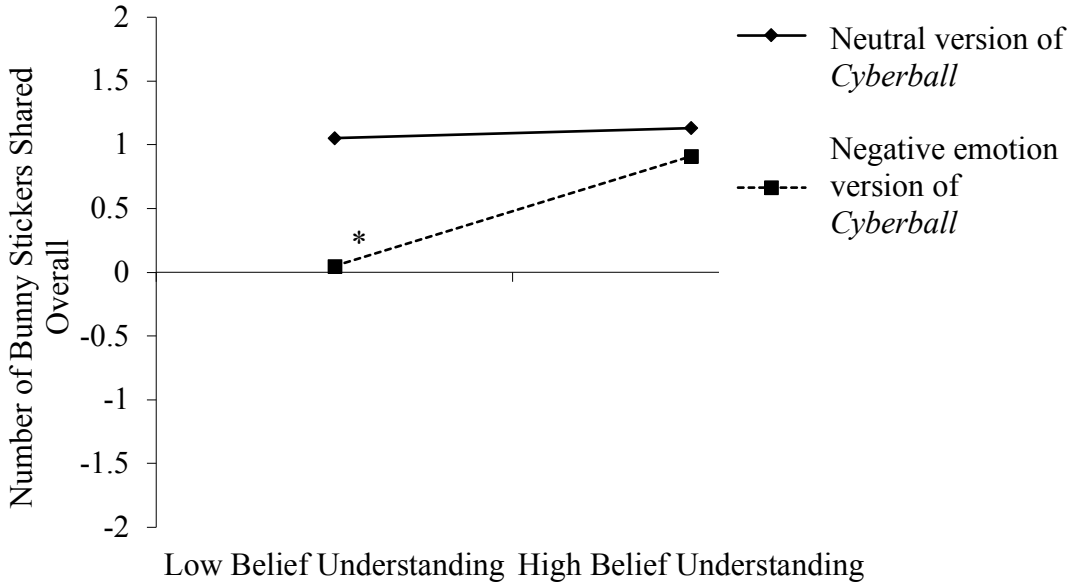

Figure 7. The two-way interaction of belief understanding and child emotion condition predicted the number of bunny stickers shared overall.

Play-Doh Sharing. The overall model was not significant, likelihood ratio $\chi^2(7) = 7.49$, $p = .38$, nor were any of the predictors, Wald χ^2s (1) < 2.08, ps > .15.

Summary. The hypothesis that children with better belief understanding would be more prosocial than children with lower belief understanding across conditions was partially supported. When children played the negative emotion version of *Cyberball*, regardless of whether they saw a distressed peer or not, lower belief understanding was associated with sharing less initially and overall. Belief understanding was positively associated with initial and overall sharing, however, for children who played the negative emotion version of *Cyberball*. Thus, higher belief understanding supported prosocial behavior initially and overall when children were exposed to a negative emotion elicitation.

Knowledge understanding

Latency to share bunny stickers. When the effects of own and other emotion were tested as moderators of the link between knowledge understanding and latency to share, the overall model predicting latency to share was not significant, $F(7, 114) = 1.10$, $p = .37$, $R^2 = .06$, adjusted $R^2 = .01$, nor were any of the predictors, ts < 1.80, ps > .07.

Initial bunny sticker sharing. The overall model was significant, likelihood ratio $\chi^2(7) = 17.38$, $p = .015$. There was a main effect of children's own emotion condition, $b = -.19$, $SE = .09$, Wald $\chi^2 = 4.85$, $p = 028$, 95% CI [-.361, -.021], and a two-way interaction between others' emotion condition and knowledge understanding, $b = -.59$, $SE = .204$, Wald $\chi^2 = 8.26$, $p = .004$, 95% CI [-.98, -.19]. The main effect and two-way interaction were qualified by a three-way interaction among knowledge understanding,

children's own emotion condition, and others' emotion condition, b = -.53, SE = 2.04, Wald χ^2 = 6.80, p = .009, 95% CI[-.93, -.132] (*Figure 8*). There were no other significant predictors, Wald χ^2s (1) < 1.70, ps > .19.

Simple slopes were conducted to probe the interaction. For children in the *Both Negative* condition, there was a negative association between knowledge understanding and the number of bunny stickers shared initially, b = -.87, t = -2.18, p = .031. Children in this condition showed a similar level of initial sharing as children in other contexts when they had lower knowledge understanding, but shared less when they had higher emotion knowledge. For children in the *Child Negative Only* condition, there was a positive association between knowledge understanding and the number of bunny stickers shared initially, b = 1.36, t = 2.43, p = .017. Children in this condition shared less initially when they had lower knowledge understanding, but when they had higher knowledge understanding, their sharing was similar to children in other contexts. This finding mirrors this study's previous finding that children's belief understanding supported initial sharing. For children in the *Peer Negative Only* condition, there was no association between knowledge understanding and the number of bunny stickers shared initially, b = -.25, t = -.71, p = .48. For children in the *Neutral* condition, there was no association between knowledge understanding and the number of bunny stickers shared initially, b = -.14, t = -.54, p = .59.

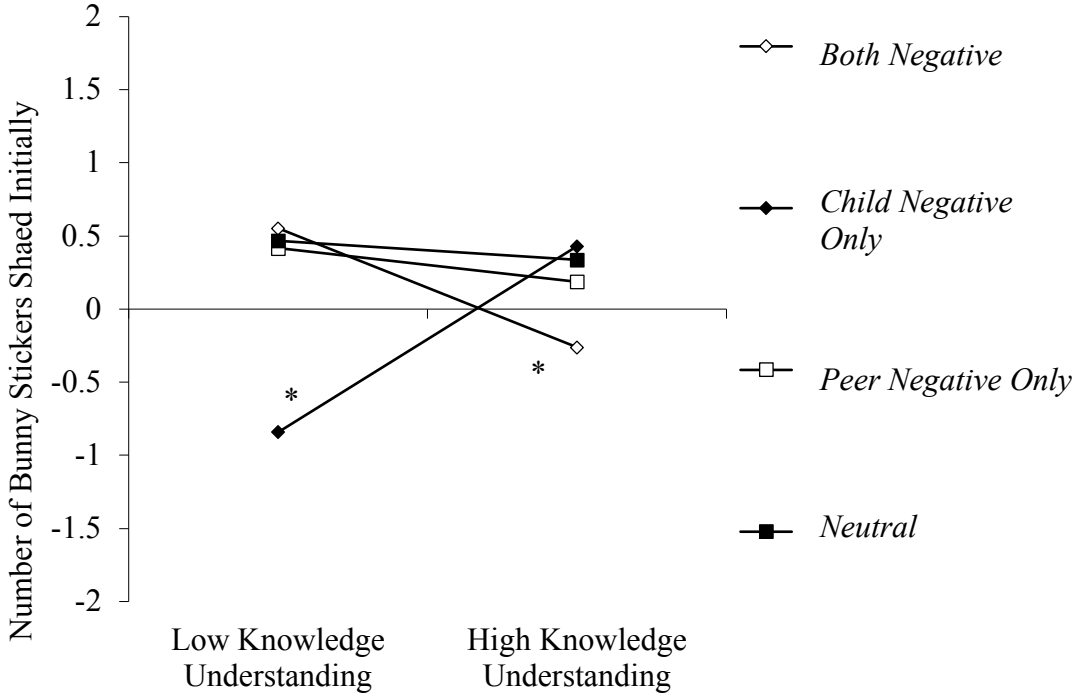

Figure 8. The three-way interaction among knowledge understanding, child emotion condition, and peer emotion condition predicted the number of bunny stickers shared initially.

Overall bunny sticker sharing. The model predicting the number of bunny stickers shared overall was significant, likelihood ratio $\chi^2(7) = 35.34$, $p < .001$. There was a main effect of children's own emotion condition, b = -.22, *SE* = .03, Wald $\chi^2 = 12.32$, p < .001, 95% CI [-.34, -.10], and a marginal interaction between others' emotion condition and knowledge understanding, *b* = -.26, *SE* = .14, Wald $\chi^2 = 3.19$, *p* = .074, 95% CI[-.54, .03]. These effects were qualified by a three-way interaction between children's own emotion condition, others' emotion condition, and knowledge understanding, *b* = -.59, *SE* = .14, Wald $\chi^2 = 16.40$ *p* < .001, 95% CI [-.865, -.30] (*Figure 9*).

For children in the *Both Negative* condition, there was a negative association between knowledge understanding and the number of bunny stickers shared overall, b = -.92, t = -2.94, p = .004. This finding mirrors the pattern of moderation for children's initial sharing in this context such that children with lower knowledge understanding shared similar amounts as children in other contexts, but children with higher knowledge understanding shared less. For children in the *Child Negative Only* condition, there was a positive association between knowledge understanding and the number of bunny stickers shared overall, b = .76, t = 2.09, p = .038; they shared less overall when they had lower knowledge understanding, but when they had higher knowledge understanding, their sharing was similar to children in other conditions. This finding mirrors this study's previous findings that children's belief understanding and knowledge understanding supported initial sharing for children who played the negative emotion version of *Cyberball*. For children in the *Peer Negative Only* condition, there was a marginal positive association between knowledge understanding and the number of bunny stickers shared overall, b = .44, t = 1.77, p = .079. For children in the *Neutral* condition, there was no association between knowledge understanding and the number of bunny stickers shared overall, b = -.22, t = -1.07, p = .29). There were no other significant effects, Wald χ^2 s < 2.37, ps > .12.

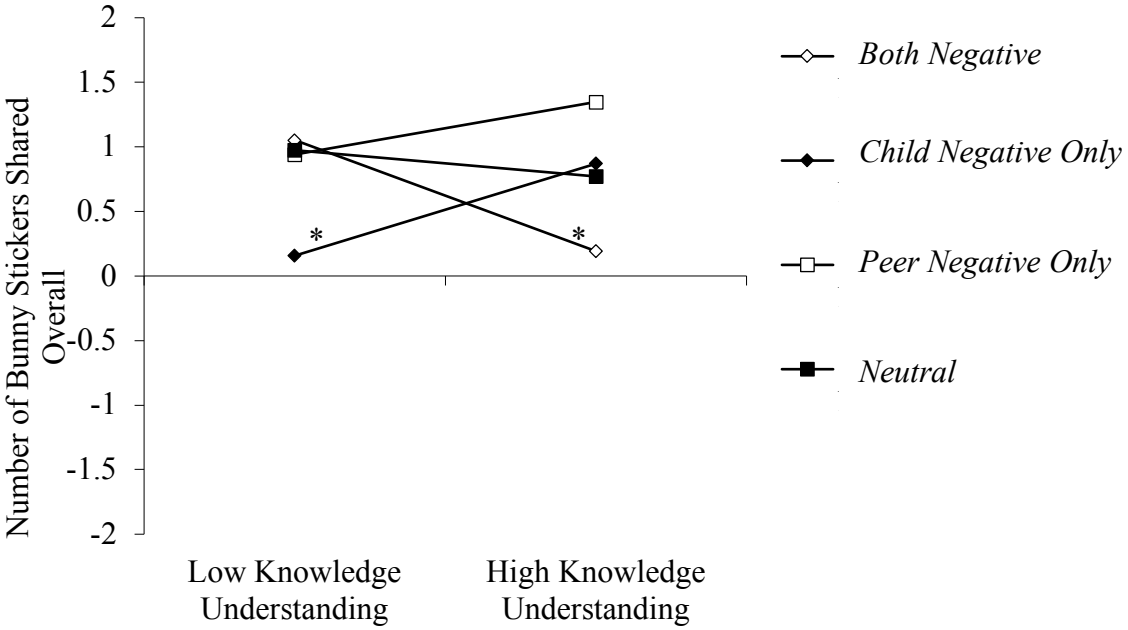

Figure 9. The number of bunny stickers overall was predicted by the three-way interaction between child emotion condition, peer emotion condition, and knowledge understanding.

Play-Doh Sharing. The overall model was not significant, likelihood ratio $\chi^2(7) = 7.04$, $p = .42$, nor were any of the predictors, Wald χ^2s (1) < 1.81, ps > .18.

Summary. It was hypothesized that children with higher knowledge understanding would be more prosocial if they were in the *Child Negative Only*, *Peer Child Negative Only*, and *Both Negative* conditions. This hypothesis was partially supported by the models predicting initial and overall sharing. When children played the negative emotion version of *Cyberball*, those with lower knowledge understanding shared less initially and overall, whereas those with better knowledge understanding shared more initially and overall.

Children's knowledge understanding did not play a role in how quickly they engaged in prosocial behavior, or in how many Play-Doh they shared. Thus, higher knowledge understanding supported prosocial behavior when children were exposed to a negative emotion elicitation, but it hindered prosocial behavior when children were exposed to a negative emotion elicitation and saw a peer in distress.

Perception understanding

Latency to share bunny stickers. When the effects of own and other emotion were tested as moderators of the link between perception understanding and latency to share, the overall model predicting latency to share was not significant, $F(7, 114) = 1.22$, $p = .30$, $R^2 = .07$, adjusted $R^2 = .01$, nor were any of the predictors, ts < 1.45, ps > .15.

Initial bunny sticker sharing. The overall model predicting the initial number of bunny stickers shared was significant, likelihood ratio $\chi^2(7) = 16.53$, $p = .021$, and there was a main effect of perception understanding, $b = .45$, $SE = .20$, Wald $\chi^2 = 5.46$, $p = .019$, 95% CI [.07, .82]. Higher perception understanding was associated with greater bunny sticker sharing. There were no other significant predictors, Wald χ^2s (1) < 2.05, ps > .15.

Overall bunny sticker sharing. The overall model predicting the number of bunny stickers shared overall was significant, likelihood ratio $\chi^2(7) = 22.38$, $p = .002$. There was a main effect of children's emotion condition, $b = -.23$, $SE = .06$, Wald $\chi^2 = 2.90$, $p < .001$, 95% CI [-.35, -.11], and a marginal main effect of others' emotion condition, $b = .11$, $SE = .06$, Wald $\chi^2 = 2.90$, $p = .09$, 95% CI [-.02, .23]. Children in the

negative emotion condition shared fewer bunny stickers overall. There were no other significant predictors, Wald χ^2s (1) < 2.23, *p*s > .14.

Play-Doh sharing. The overall model predicting Play-Doh sharing was not significant, likelihood ratio $\chi^2(7) = 3.95$, $p = .79$, nor were any of the predictors, Wald χ^2s (1) < 1.06, *p*s > .30.

Summary. Children's perception understanding supported initial sharing, which was in line with the hypothesis that children with better perception understanding would be more prosocial than children with lower perception understanding. However, it was hypothesized that the association between perception understanding and prosocial behavior would be moderated by the effects of own and others' emotion and this was not supported. Perception understanding did not play a role in overall sharing, Play-Doh sharing, or how quickly children shared.

Desire understanding

Latency to share bunny stickers. When the effects of own and others' emotion were tested as moderators of the link between desire understanding and latency to share, the overall model predicting latency to share was not significant, $F(7, 114) = .68$, $p = .69$, $R^2 = .04$, adjusted $R^2 = -.02$, nor were any of the predictors, *t*s < 1.26, *p*s > .21.

Initial bunny stickers shared. The overall model predicting the number of bunny stickers shared initially was significant, likelihood ratio $\chi^2(7) = 14.56$, $p = .042$. There was a marginal main effect of children's own emotion condition, $b = -.16$, $SE = .08$, Wald $\chi^2 = 3.51$, $p = .061$, 95% CI [-.321, .007]. This marginal main effect was qualified by a

two-way interaction between children's own emotion condition and desire understanding, $b = .51$, $SE = .18$, Wald $\chi^2 = 7.62$, $p = .006$, 95% CI [lower = .148, .871] (*Figure 10*).

For children who played the neutral version of *Cyberball*, there was a negative association between desire understanding and the number of bunny stickers shared initially, $b = -.58$, $t = -2.65$, $p = .009$. Lower desire understanding supported initial prosocial behavior for children who initially played the neutral version of *Cyberball*. For children who played the negative emotion version of *Cyberball*, there was no association between desire understanding and the number of bunny stickers shared initially, $b = .44$, $t = 1.47$, $p = .14$. There were no other predictors, Wald χ^2s (1) < .38, ps > .54.

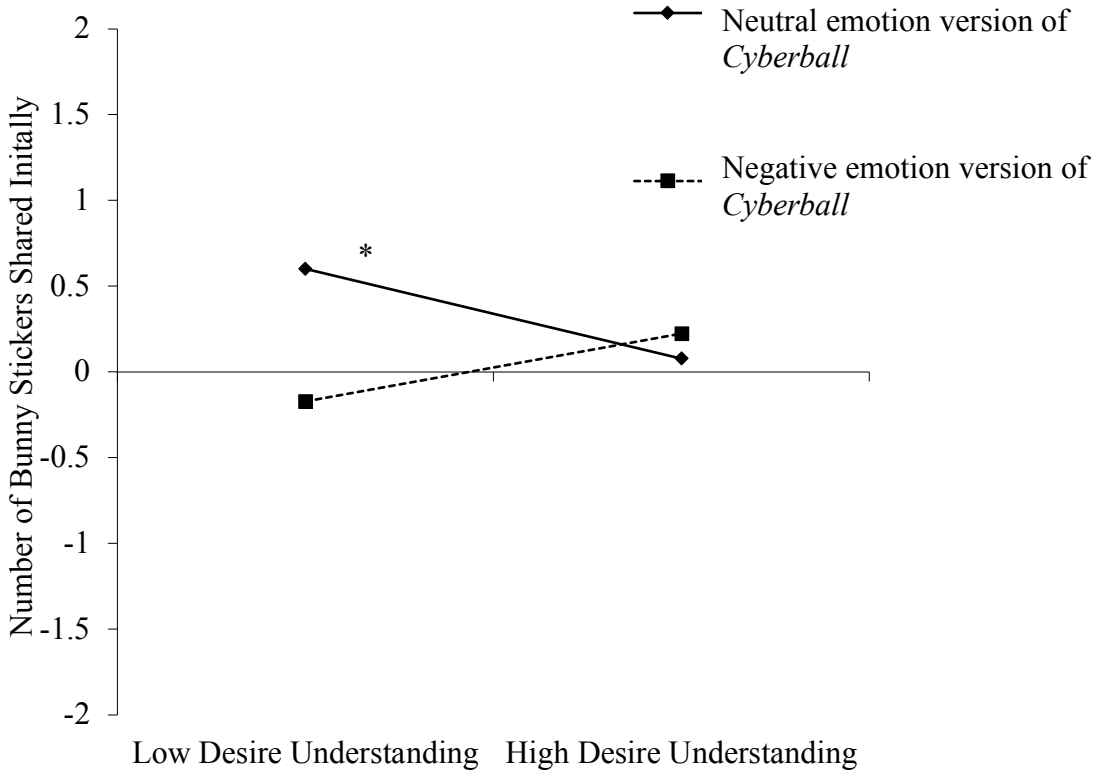

Figure 10. The two-way interaction between desire understanding and child emotion condition predicted the number of bunny stickers shared initially.

Overall bunny sticker sharing. The model predicting the number of bunny stickers shared overall was significant, likelihood ratio $\chi^2(7) = 23.01$, $p = .002$. There was a main effect of children's own emotion condition, $b = -.22$, $SE = .06$, Wald $\chi^2 = 12.89$, $p < .001$, 95% CI [-.34, -.10), a marginal main effect of desire, $b = .25$, $SE = .14$, Wald $\chi^2 = 3.02$, $p = .082$, 95% CI [-.031, .52), and a marginal interaction of children's own emotion condition with desire, $b = .25$, $SE = .14$, Wald $\chi^2 = 3.15$, $p = .076$, 95% CI [-.026, .53). Children in the negative emotion condition shared fewer bunny stickers overall. There were no other significant predictors, Wald χ^2s (1) < 1.47, ps > .22.

Play-Doh sharing. The overall model predicting Play-Doh sharing was not significant, likelihood ratio $\chi^2(7) = 9.43$, $p = .22$. There was a two-way interaction between peer emotion condition and desire understanding, $b = .37$, $SE = .18$, Wald $\chi^2 = 4.28$, $p = .038$, 95% CI [.02, .72] (*Figure 11*). Neither slope was significant, ts < 1.67, ps > .097, and as such though Play-Doh sharing varies by children's desire understanding, the simple slopes may reflect that this interaction was driven by children who were extremely high or low on desire understanding. There were no other significant interactions or main effects, Wald $\chi^2 < .12$, ps > .144.

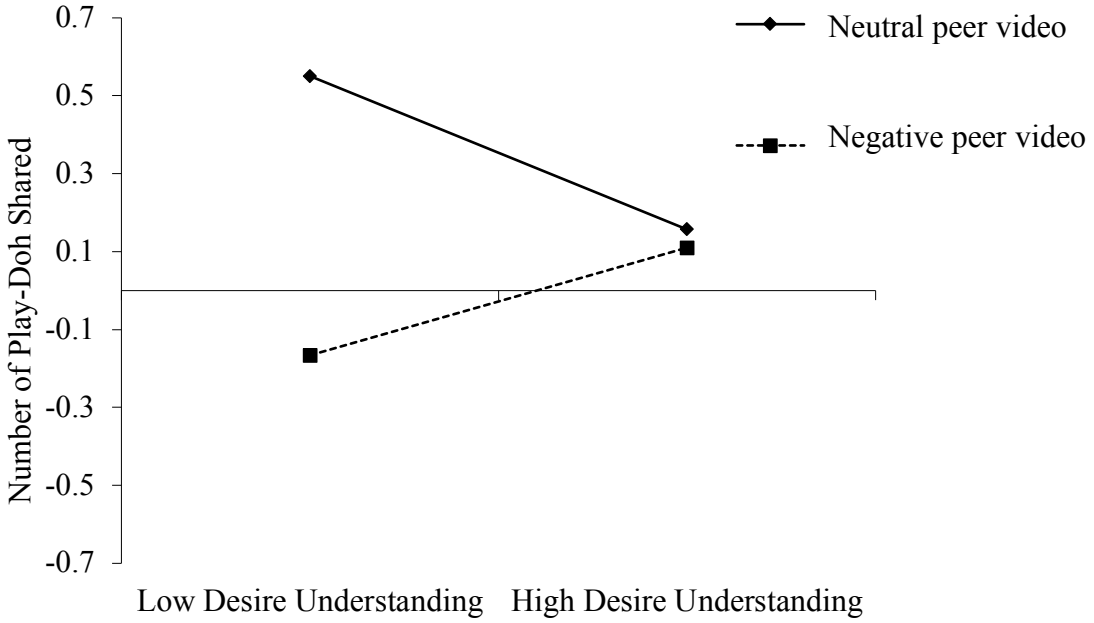

Figure 11. The two-way interaction between desire social cognition and peer emotion condition predicted the number of Play-Doh shared.

Summary. I hypothesized that children with better desire understanding would be more prosocial than children with lower desire understanding in the *Child Negative Only*, *Peer Child Negative Only*, and *Both Negative* conditions. In contrast to this hypothesis, lower desire understanding supported initial prosocial behavior, whereas higher desire understanding hindered it, for children who were in the children's own emotion neutral conditions. Play-Doh sharing varied between children who saw the neutral and negative emotion peer video by children's desire understanding, but this may have been driven by children with extremely high or low desire understanding and finally, desire understanding was not moderated by own or other emotion for any of the remaining conditions or outcomes.

Intention understanding

Latency to share bunny stickers. When the effects of own and others' emotion were tested as moderators of the link between intention understanding and latency to share, the overall model predicting latency to share was not significant, $F(7, 114) = .93$, $p = .49$, $R^2 = .05$, adjusted $R^2 = -.004$, nor were any of the predictors, ts < 1.46, ps > .15.

Initial bunny sticker sharing. The overall model predicting initial bunny sticker sharing was not significant, likelihood ratio $\chi^2(7) = 9.52$, $p = .22$. There was a main effect of children's own emotion condition, $b = -.16$, $SE = .08$, Wald $\chi^2 = 3.83$, $p = .05$, 95% CI [-.326, 0]. Children in the child negative emotion condition shared fewer bunny stickers initially. There were no other predictors, Wald χ^2s (1) < 1.67, ps > .10.

Overall bunny sticker sharing. The overall model predicting the number of bunny stickers shared overall was significant, likelihood ratio $\chi^2(7) = 25.82$, $p = .001$.

There was a main effect of children's own emotion condition, b = -.20, SE = .06, Wald χ^2 = 10.18, p = .001, 95% CI [-.32, -.07]. Children who played the negative emotion version of shared a lower number of stickers overall. There was also a main effect of intention understanding, b = .34, SE = .16, Wald χ^2 = 4.36, p = .037, 95% CI [-.021, .66]. Children with higher intention understanding shared a greater number of bunny stickers overall. There were no other significant predictors, Wald χ^2s (1) < 1.8, ps > .18.

Play-Doh sharing. The overall model predicting the number of Play-Doh shared was not significant, likelihood ratio $\chi^2(7) = 9.37$, p = .23, nor were any of the predictors, Wald χ^2s (1) < 2.21, ps > .14.

Summary. In line with the hypothesis that better intention understanding would be associated with more prosocial behavior, and mirroring findings with perception understanding, children with higher intention understanding shared a greater number of bunny stickers overall regardless of their emotion condition. I also hypothesized that children with better intention understanding would be more prosocial than children with lower perception in the three conditions that had child, peer, or both negative emotion (i.e., *Child Negative Only*, *Peer Negative Only*, and *Both Negative*); however, intention understanding did not play a role in predicting any of the remaining outcomes and was not moderated by the effects of own and others' emotion.

Emotion understanding

Latency to share bunny stickers. When the effects of own and others' emotion were tested as moderators of the link between emotion understanding and latency to share, the overall model predicting the latency to share bunny stickers was not

significant, $F(7, 114) = .90$, $p = .51$, $R^2 = .05$, adjusted $R^2 = -.01$, nor were any of the predictors, ts < 1.43, ps > .16.

Initial bunny sticker sharing. The overall model predicting the number of bunny stickers shared initially was significant, likelihood ratio $\chi^2(7) = 15.65$, $p = .028$. There was a marginal main effect of children's own emotion condition, $b = -.15$, $SE = .08$, Wald $\chi^2 = 3.10$, $p = .079$, 95% CI [-.311, .02]. This marginal main effect was qualified by a two-way interaction between emotion understanding and children's own emotion condition, $b = .53$, $SE = .19$, Wald $\chi^2 = 7.46$, $p = .006$, 95% CI [.149, .904] (*Figure 12*).

For children who played the neutral version of *Cyberball*, there was a negative association between emotion understanding and the number of bunny stickers shared initially, $b = -.79$, $t = -2.68$, $p = .008$. When they did not play the negative emotion version of *Cyberball*, children with lower emotion understanding shared more initially, whereas children with higher emotion understanding shared less. For children who played the negative emotion version of *Cyberball*, there was no association between emotion understanding and the number of bunny stickers shared initially, $b = .27$, $t = 1.06$, $p = .29$. There were no other significant predictors, Wald χ^2s (1) < 1.81, ps > .18.

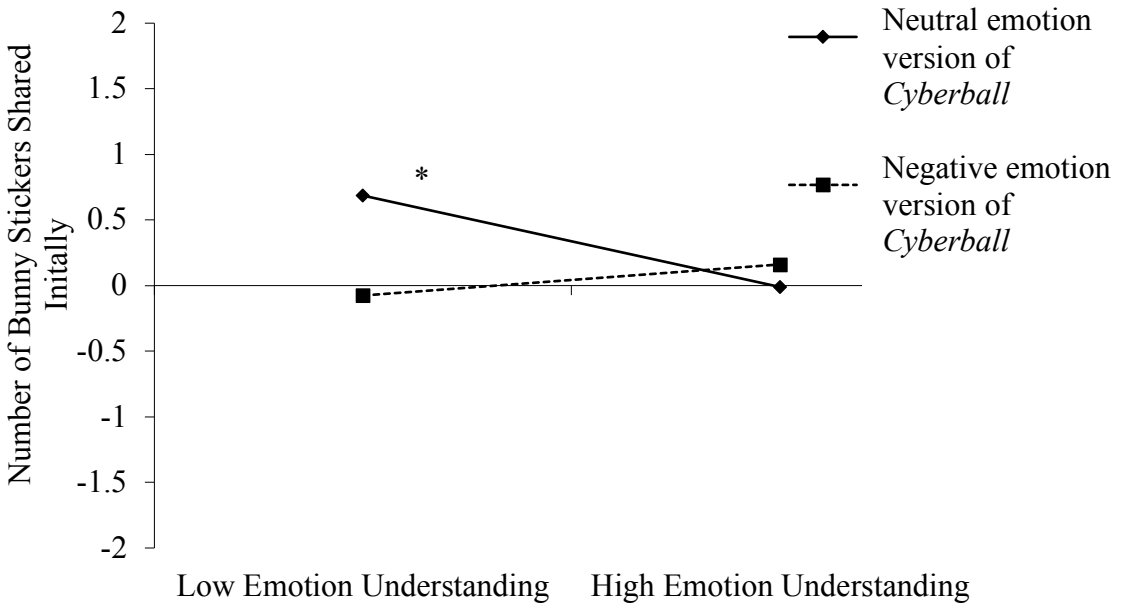

Figure 12. The interaction between emotion understanding and child emotion condition predicted the number of bunny stickers shared initially.

Overall bunny sticker sharing. The overall model for the number of bunny stickers shared overall was significant, likelihood ratio $\chi^2(7) = 32.43$, $p < .001$. There was a main effect of children's own emotion condition, $b = -.18$, $SE = .06$, Wald $\chi^2 = 7.99$, $p = .005$, 95% CI [-.30, -.06], qualified by the three-way interaction between children's emotion condition, others' emotion condition, and emotion understanding, $b = -.38$, $SE = .15$, Wald $\chi^2 = 6.80$, $p = .009$, 95% CI [-.664, -.094] (*Figure 13*).

For the *Both Negative* condition, there was not a significant association between emotion understanding and the overall number of bunny stickers shared, $b = .28$, $t = 1.23$, $p = .22$. For the *Child Negative Only* condition, there was a positive association between

emotion understanding and the overall number of bunny stickers shared, $b = .51$, $t = 2.32$, $p = .022$. For the *Peer Negative Only* condition, there was a positive association between emotion understanding and the number of bunny stickers shared overall, $b = .62$, $t = 2.63$, $p = .01$. For the *Neutral* condition, there was a negative association between emotion understanding and the overall number of bunny stickers shared, $b = -.66$, $t = -4.09$, $p < .001$.

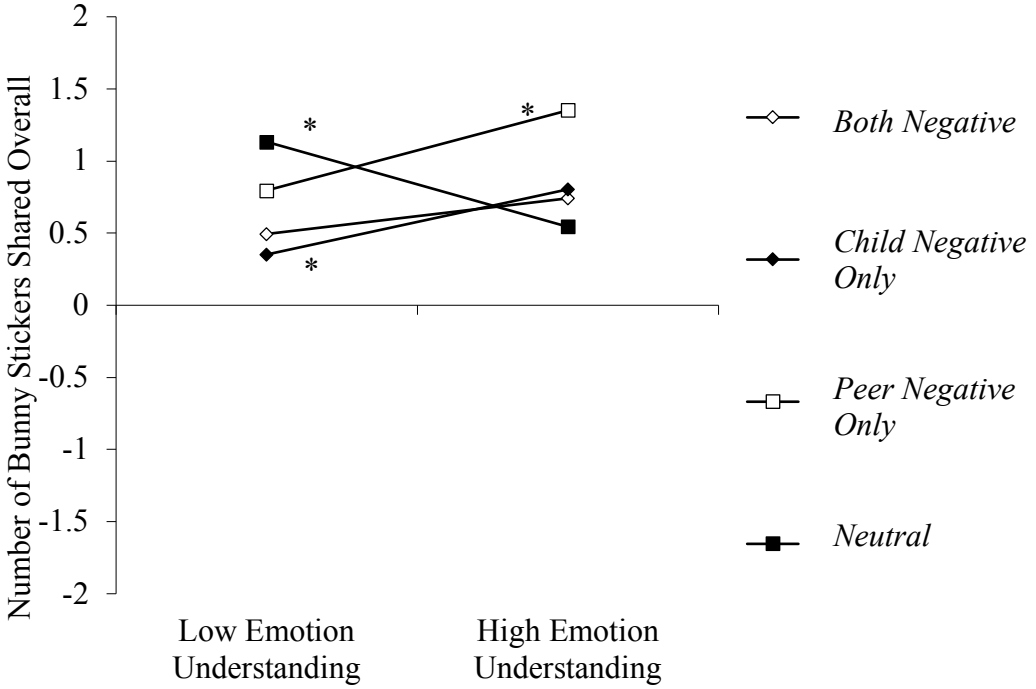

Figure 13. The three-way interaction among child emotion condition, peer emotion condition, and emotion understanding predicted the number of bunny stickers shared.

Play-Doh sharing. The overall model predicting Play-Doh sharing was not significant, likelihood ratio $\chi^2(7) = 7.86$, $p = .35$, nor were any of the predictors, Wald χ^2s $(1) < 2.33$, ps $> .13$.

Summary. It was hypothesized that when children were in a negative emotion context, saw a peer in distress, or were in a negative emotion context and saw a peer in distress, children with better emotion understanding would be more prosocial than children with lower emotion understanding. In line with this hypothesis, when children experienced either their own negative emotion or saw a peer who experienced negative emotion, higher emotion understanding was associated with greater overall sharing, whereas lower emotion understanding was associated with lower overall sharing. In contrast to this hypothesis, children who originally played the neutral version of *Cyberball* shared more initially and overall when they had lower emotion understanding and shared less when they had better emotion understanding. This pattern is similar to the pattern for desire understanding for children in these conditions.

Chapter 4

Discussion

The primary goals of this dissertation were a) to investigate the effects of children's own and other people's negative emotion on prosocial behavior and b) to investigate the moderating role of individual differences in children's emotion regulation and social cognition on their prosocial behavior towards other children in an ecologically valid context. The secondary goal of this dissertation was to investigate how skills that have been identified as possible contributors to prosocial behavior, including emotion regulation and social cognition, would be influenced by children's experiences of own and others' negative emotion during early childhood.

Discussion Overview

I hypothesized that children's own negative emotion would result in lower prosocial behavior, which was supported. In contrast, my hypothesis that observing other children's negative emotion would result in greater prosocial behavior was not supported, nor was the hypothesis that the effects of children's own emotion on prosocial behavior would be moderated by the effects of being exposed to others' negative emotion. With the notable exception that children's own negative emotion experiences were associated with less prosocial behavior, results did not support the direct experimental hypotheses because, in contrast to what was expected, children were similar in how quickly they shared, how many stickers they shared initially, and how many Play-Doh they shared across the four emotion conditions.

The story of children's sharing in different emotion contexts is more complex when taking individual differences into account. It was hypothesized that the experience of own and others' emotion would moderate the association between emotion regulation and prosocial behavior. Specifically, children with better emotion regulation skills were expected to be more prosocial than children with poorer emotion regulation skills when children experienced their own or another's distress. These hypotheses were partially supported. Better emotion regulation supported more prosocial behavior for children who experienced either their own distress, saw a peer in distress or both, whereas poorer emotion regulation in these emotion contexts was associated with less sharing for these children. For children in the *Neutral* condition, however, better emotion regulation was associated with less prosocial behavior and poorer emotion regulation was associated with more prosocial behavior. Additionally, I hypothesized that child and others' emotion would moderate the association between social cognition and prosocial behavior for children in the conditions where they were exposed to the child negative emotion manipulation, saw a peer in distress, or both. Specifically, children with better social cognitive skills were expected to be more prosocial than children with lower social cognition in these three negative emotion conditions. Intention understanding and perception understanding each directly supported prosocial behavior for children across the four emotion contexts investigated in the current study. Other aspects of social cognition supported prosocial behavior in some contexts, but not in others.

Gender differences in observed prosocial behavior were not expected and this was fully supported, as there were no differences between boys' and girls' observed prosocial

behavior. Gender differences in parent perceptions of children's prosocial behavior were expected. Specifically, it was expected that parents would rate girls as more prosocial than boys. This hypothesis was fully supported. Finally, no specific hypotheses were made about age because the prosocial tasks were novel and were created to be age-appropriate for all children in the current study. Age was not associated with any of the measures of observed prosocial behavior.

Overall, several of my hypotheses were supported, and this study demonstrated that children's own emotion experiences and the emotions their peers display are important to consider when understanding the links between emotion regulation and social cognition with prosocial behavior. In general, children's experiences of negative emotion appear to interfere with their prosocial behavior, but when these effects are contextualized in relation to their individual differences in socioemotional competencies, there is a more complex picture. Children who experience emotion situations with better existing social cognition and emotion regulation abilities often make different prosocial decisions later on than children with lower social cognition and emotion regulation. Each of these findings will be discussed in turn in the next sections.

Was Cyberball an Effective Negative Emotion Elicitation for Children This Age?

One of the novel contributions of this study was the examination of the effectiveness of a widely-used negative emotion elicitation for use with children ages 4-6, a younger sample than has typically been studied with this social exclusion paradigm. As expected, children who played the negative emotion version of the game felt more negative emotion and less positive emotion as a result of the game. This suggests that

using Cyberball to mimic real-world peer interactions that children have is an effective negative emotion elicitation for children this young. This extends evidence that Cyberball is an effective negative emotion elicitation for children across a wide range of ages. Though this paradigm had not previously been tested in 4- to 6-year-old children, the effectiveness of the task was somewhat unsurprising because being left out of games is a typical childhood experience that evokes negative emotions and it is even used as a measure of bullying beginning in the preschool years (Camodeca, Caravita, & Coppola, 2015).

The finding that *Cyberball* evoked negative emotion helps advance understanding of the process of prosocial behavior across multiple prosocial opportunities in a brief time-span during early childhood in the real world. This finding suggests *Cyberball* is a novel and efficient way to evoke negative emotions that may relate to children's prosocial behavior in more ecologically valid emotion contexts within a controlled laboratory setting. These findings may be particularly relevant for children's interactions with peers online and give insight into how their online activities can influence their emotions and that these experiences and emotions can influence their offline behavior with peers.

This was the first study to investigate prosocial behavior in different negative emotion contexts that more closely mapped on to children's typical emotional experiences in the real world, including when children themselves are upset, when their peer is upset, and when they are both upset. As a result of the child emotion manipulation, children displayed more negative emotion. Additionally, even though the

others' emotion (peer video) manipulation did not result in a change in children' sadness or anger, the investigation of the interplay of child and peer emotion on children's prosocial behavior contributes to the current study's ecologically validity. Own and others' emotion should continue to be incorporated into studies of prosocial behavior in early childhood, because results from the current study suggest that both moderate the influence of children's social cognitive and emotion regulation on their prosocial behavior that contributes to a better understanding the effects of their interplay on prosocial behavior in applied settings.

Though the task used here was a step forward in studying prosocial behavior in an ecologically valid context, this task could be used in other ways in future studies in more ecologically valid ways, such as with peers they have more experience with. Children in the current study had no prior interactions or relationship with the peer in the study, and they might behave differently toward a peer they know. Specifically, *Cyberball* could be used to investigate children's prosocial behavior with peers with whom they have an established relationship by telling children that the other players in the game are peers they know, such as friends or disliked peers. These methods have been used in other work with children this age (Paulus et al., 2015; Fehr, Bernhard, & Rockenbach, 2008). This is an important avenue for future research on prosocial behavior in early childhood because even though toddlers help a friendly but unfamiliar adult by 25-months-old (Brownell, Svetlova, & Nicholas, 2009), they show more distress in response to someone they know than in response to a stranger (Spinrad & Stifter, 2006). Additionally, 5-year-olds, but not 3-year-olds, take into account whether or not their partner reciprocates

(Sebastian-Enesco, & Warneken, 2015), children have developed recipient-dependent sharing and sharing expectations by age 4 (Paulus & Moore, 2014), and by age 5, children share more with a liked peer than a disliked peer (Paulus et al., 2015). Thus, the effects of emotion on prosocial behavior should also be examined in these varied peer contexts to better understand these effects on prosocial behavior in early childhood.

Did Observation of Others' Emotion Influence Children's Emotional Experience?

To assess how the experience of others' emotion influences children's prosocial behavior, I examined the effects of a novel peer video. The video was created for this study to present a prosocial opportunity (i.e., sticker sharing) and so that children in the study could see a peer who felt upset or neutral, similar to what they might see in real life. That is, the peer video introduced an unfamiliar child, Jamie, and enabled children to take advantage of multiple prosocial opportunities during the study. The fact that Jamie was a same-age and same-gender peer advances our understanding of prosocial behavior beyond how children behave toward an adult (e.g., Williamson, Donohue, & Tully, 2013) or puppet (e.g., Paulus et al., 2015). The novel peer video was particularly useful because it allowed experimental control of the child's exposure to the peer and the peer's emotions for a more direct study of how others' emotion influences prosocial behavior. It was particularly important for children to see a peer in this study because if children view the emotion regulatory capacities of the sharing partner differently for a puppet than for a peer, the moderating effects of peer emotion on prosocial behavior may not have been representative of how children respond to people in distress who have some ability to manage their own negative emotion. Prior work that has investigated children's sharing

with puppets has primarily focused on investigating children's instrumental helping and sharing and has not ascribed emotion to the puppet, so it was unknown if children would have considered the puppet's emotion or emotion regulation when making decisions in prosocial opportunities if that methodology had been used.

Neither version of the peer video led to children reporting increases in negative emotion. This could be because the peer was a stranger and, as a result, children were similar to toddlers (Spinrad & Stifter, 2006) and did not feel as much empathy toward the peer as they would have towards someone who is familiar. Also, the peer video was not designed to negatively impact children's own emotions. If the others' distress, which was seen in the peer video, had resulted in children feeling more upset, it would have suggested that children became upset as a result of the others' emotion and that there was emotion contagion. However, use of basic emotion regulation strategies (i.e., behavioral strategies) is early emerging (Heckhausen, Wrosch, & Schulz, 2010) and, by age 5, children have awareness of sophisticated emotion regulatory strategies (Davis, Levine, Lench, & Quas, 2010). Thus, it could be that the negative emotion peer video did not cause increases in children's negative emotion because they were able to effectively regulate the emotion they saw the peer express.

Though the peer video did not have effects on children's emotions, the difference in others' emotions it showed did lead to differences in their prosocial behavior when social cognition was taken into account. This suggests that even though the others' emotions did not influence how children themselves felt, children did pay attention to these emotion cues and used this information to inform their thought process and inform

their decision about whether or not to engage in prosocial behavior. Thus, the findings that others' emotion can influence children's prosocial behavior when their social cognition is also investigated suggest that videos of peers who ostensibly need something the participating child can choose to share can be employed as a feasible and efficient in-lab method for examining children's prosocial behavior towards other children.

Did Children's Own Emotions and the Emotions of Their Peer Influence Their Prosocial Behavior?

The effects of children's own and the others' negative emotion on prosocial behavior were examined. This was the first study to show that, as hypothesized, when children experienced their own negative emotion, their prosocial behavior decreased. This finding can be interpreted through the lens of contemporary social information processing. This perspective highlights the effects of emotion on subsequent social information processing because it can influence social information processing at multiple points during this process (Arsenio & Lemerise, 2000). Contemporary social information processing details how emotion can influence the information children attend to, how they define their goals, the solutions they create for their goals, whether they think they will be able to successfully complete their goal and enact their proposed solution, and, ultimately, whether or not children decide to enact their solution. Social information processing also highlights that emotion can disrupt social information processing at any of these steps, and if, for example, children decide that sharing is not one of their goals, then processing of that information stops. Results from this study help advance our understanding of how children's own negative emotion experiences impact social

information processing by extending social information processing theory to prosocial behavior. Specifically, I found that when children experience their own negative emotion, their subsequent sharing during prosocial behavior opportunities is decreased, suggesting that that children's negative emotion hinders their prosocial behavior. This could be a result of children not attending to sharing-relevant information, or if they did, it could be that they decided this information was not relevant to their goal of alleviating their negative emotion.

The finding that children share less when they experience negative emotion aligns with prior work that has suggested that negative emotions limit attention to only information that is relevant to one's current emotional state (Levine & Pizarro, 2004), but the effect of negative emotion hindering prosocial behavior was only found for children's sharing overall and was not found for their initial sharing or their Play-Doh sharing. Although children who played the negative emotion version of *Cyberball* initially shared similar amounts of stickers as children who played the neutral emotion version, the differences in their sharing did not emerge until children had repeated opportunities throughout the course of the study to process the social information. This finding is particularly interesting given the timing of when children decided to share during my study. The differences in overall sharing across the experimental groups could be a result of differences in how emotional processes influenced social information processing.

Though there were no differences in children's initial sharing across conditions, children who experienced negative emotion shared less overall. That is, even though both groups had the same amount of time, including when they were directly asked about their

sharing in the peer room interview (Appendix C), and the same number of opportunities to share, only the children who did not experience the negative emotion manipulation shared more when given more opportunities. This could be because they continued to process the information about the peer and his/her needs, started processing it as goal-relevant information, and realized that they could share stickers to help the peer complete his/her drawing. In contrast, children who did experience the negative emotion manipulation continued to not engage in prosocial behavior which could be because they stopped processing the information about the peer. Specifically, it could be that children continued to not attend to sharing information because they did not think it was relevant to their emotion, and as a result, shared less; whereas the other children began to attend to sharing information more, and as a result, shared more. An alternative explanation is that children who experienced their own distress continued to process information about the peer but did not think it was relevant to their goal of alleviating their own negative emotion or, even if they thought it was relevant, they did not think they would be efficacious in carrying out their goal of helping the peer.

The finding that children's sharing varied across the opportunities to behave prosocially has implications for understanding what information children process as relevant to their negative emotion. Specifically, this suggests that though it may not appear that there are differences in how social information is processed at any given point, there are differences that can be seen after children complete repeated cycles of social information processing. The pattern of findings that there are differences in children's overall sharing demonstrates that it is important for future research to study the

effects of emotion on prosocial behavior by examining a more overall picture of children's sharing across multiple sharing opportunities because the effects of emotion on prosocial behavior are not always immediately apparent and having more interactions with the peer (e.g., through the second round of *Cyberball*) could also promote more social information processing about the peer. Specifically, this finding suggests that though children's own negative emotion changes over time and is regulated, it still impacts subsequent social information processing of sharing relevant information and children's prosocial decisions.

This finding that children who were excluded shared less could also reflect that children took into account their previous sharing partners' (the computer players in *Cyberball*) behavior when deciding whether to share with the peer from the video. As highlighted by social information processing, children take their prior experiences into account when processing social information processing, and these results suggest that this also applies to children's prosocial behavior. Prior work has found that children as young as 3 years notice when others share or do not share with them, similar to being passed the ball or excluded while playing *Cyberball* (Warneken & Tomasello, 2013). Their results demonstrated that young children used information about whether their partner shared to inform their own prosocial behavior towards those same sharing partners, and something similar may have happened in the current study. The negative emotion manipulation used in this study was social in nature and involved other children passing, or not passing a ball to them, and this could have contributed to the finding that children who experienced their own negative emotion were less prosocial because these children may have expected

that the peer would not share back with them, even though the peer was not one of the children who they were excluded by (i.e., the computer players in *Cyberball*).

Contrary to what was hypothesized, observing the negative emotions of others, specifically a distressed peer, had no effect on children's prosocial behavior towards that person. This is contrary to what has been found in other work that found that toddlers help more when someone is in distress (e.g., Brownell, Svetlova, & Nichols, 2009; Williamson, Donohue & Tully, 2013). This pattern could have a few different explanations. First, the current study investigated slightly older (ages 4 to 6 years) children's prosocial behavior towards someone in distress, and, second, the person in distress was a peer instead of an adult (e.g., experimenter or parent) or a puppet (e.g., Warneken & Tomasello, 2013). By age 4, children are developing social cognition skills that support their understanding of what others think. As a result of their social cognitive skills, they may have thought that even though the peer did not know where bunny stickers were, adults know more than children, so the (off-screen) adult experimenter would know where to get more bunny stickers for the peer because.

Children also may have thought that the peer would not need help from them because the peer was with an (off-screen) experimenter who knew about the peer's situation. Children may have further reasoned that because the experimenter was actually with the peer, the experimenter would help the peer think of other ways to feel better. However, this explanation is unlikely because no children mentioned this during the study or in either of the interviews about prosocial behavior (Appendix C; Appendix D). This extends prior work that demonstrates that children's social cognition plays a role in

prosocial behavior (Eisenberg, 2006) by demonstrating that children may be using their social cognition to decide who is best equipped to help someone in need. Alternatively, it could be that the peer children saw in the video did not express enough distress to cue children to behave prosocially. The peer in the video verbally expressed that they were upset and frowned, but children may have thought the peer was upset, but that s/he would be able to regulate it on their own. If the peer in the video had expressed extreme negative emotion by crying or continually expressing how upset they were about the bunny stickers, or if the peer had spent more time looking around the room for bunny stickers, children may have thought that the peer really needed the child to share bunny stickers with them. The former explanation that children's thoughts about what other people thought and know is more plausible because further investigation into children's prosocial behavior toward a peer in distress revealed that children's social cognition moderated this effect, and that without accounting for this variation in social cognition, the effect was masked. It appears that the intensity of the others' negative emotion was not the main cause of the peer video not having an effect on prosocial behavior towards them because children with greater social cognition seemed to have understood that the peer was in distress and as a result, shared more with that peer.

Did the experience of own and/or others' emotion moderate the association between individual differences and prosocial behavior?

This study demonstrated that children's own negative emotion experiences decreased prosocial behavior; however, the story is more complex when the effects of emotion are contextualized by children's emotion regulation and social cognition skills

that they enter these situations with. When either the child experienced their own negative emotion or saw another person's negative emotion, children who had lower skills demonstrated less prosocial behavior, and children with better skills demonstrated more prosocial behavior. This is in line with other work suggesting that children's developing skills can support prosocial behavior (e.g., Newton, Goodman, & Thompson, 2014) and advances it by showing how important each skill is for understanding prosocial behavior depending on own and other emotion. However, when the child did not experience their own or others' negative emotion, or when they experienced both, children with higher social cognition skills demonstrated less prosocial behavior, whereas children with lower social cognition skills demonstrated more prosocial behavior. This contributes to clarifying mixed findings about how social cognition impacts prosocial behavior found by others (Lonigro, Laghi, Baiocco, & Baumgartner, 2014; Renouf, et al., 2010).

Specifically, this study demonstrated that the role of social cognition in prosocial behavior is different in different emotion contexts because children with better social cognition responded differently to prosocial opportunities depending on their emotional experiences. Children with better social cognition may have identified the sharing information from the peer video as relevant to their own or their peer's negative emotion and subsequently figured out that they could use their prosocial behavior as a tool to help manage these emotions; however, when there was no negative emotion, children with better social cognition did not need to think about ways to manage their or their peer's emotion, and, as a result, may not have seen a reason to behave prosocially for the peer.

Additionally, when the child experienced their own negative emotion and saw others' negative emotion, children with better social cognition may have been too focused on these negative emotions. Perhaps they were overloaded with thinking about how they felt and how the peer felt to think about this solution, regardless of whether they considered sharing information as relevant to their own and others' emotion. Taken together, these findings highlight that children's own emotion, others' emotion, and their interaction, are important contextual factors that help clarify mixed findings in prior work about the role of social cognition in prosocial behavior.

The important new finding is that children's own negative emotion experiences play a role in the process of behaving prosocially and cannot be ignored. Results of the current study suggest that for 4- to 6-year-olds, children share less when they experience their own negative emotion, and their emotion regulation and social cognition skills can support or hinder their prosocial behavior in different emotion contexts. Emotion regulation was specifically investigated because of its effect on emotion type, intensity, and duration. Children with better emotion regulation can experience negative emotion and subsequently regulate it so that they do not feel as upset as they did originally and so that they do not feel upset for as long. So, one interpretation of the findings from this study could be that children with better emotion regulation were better equipped to handle their own and the other peer's negative emotions.

As I hypothesized, children's emotion regulation played a key role in unpacking the effects of negative emotion on their prosocial behavior. Children who experienced either their own or others' negative emotion and had poorer emotion regulation were less

equipped to manage these negative emotions. As a result, these children with poorer emotion regulation may have been less prosocial because they continued to focus on the negative emotions, did not consider sharing as relevant to alleviating the negative emotion, or considered how to help the peer but did not think their solution would be successful.

In contrast, and also in line with what I hypothesized, children who experienced own or others' negative emotion but who had better emotion regulation skill were equipped to effectively manage these emotions. These children had the skills necessary to reduce the negative emotion they encountered and this may have allowed them to turn their attention away from their own emotions and towards processing information about the peer.

Because children in the *Neutral* condition did not experience or see others' negative emotion, they did not need to use their emotion regulation skill. Children in this condition with poorer emotion regulation skill may have shared more than those who were better regulated, in an attempt to avoid making the peer feel upset that the child did not share with them, or perhaps in an attempt to get the peer to like them. These findings that children draw upon their emotion regulatory skills as they process social information, which are consistent with social information processing theory (Arsenio & Lemerise, 2004), help advance our understanding of the role of emotion regulation in prosocial behavior by suggesting that children in negative emotion contexts can draw upon their emotion regulation skill to alleviate the effects of negative emotion and focus on

problem-solving, but when children have poorer skills, they are unable to effectively use them and the process leading to prosocial behavior is disrupted.

Similarly, children who did not experience their own or others' negative emotion may have demonstrated more sharing overall when they had lower emotion understanding because, in contrast to children who had better emotion understanding, they had difficulty interpreting how the peer felt. As a result, these children may have incorrectly thought that the peer was in distress and shared to help the peer feel better. Additionally, children who did not experience their own or a peer's negative emotion who had low desire understanding may have demonstrated more prosocial behavior because they lacked an understanding that just because someone wants something doesn't mean they need it, and further, that not all wishes come true. As a result, these children may have thought that they needed to share so that the peer's desire for stickers would come true. This could be indicative of less social competency because sharing in this context may have been less needed, but these children were less able to correctly interpret and respond the situation than children who had better desire understanding.

Taken together, the findings that poorer emotion regulation and social cognition were associated with greater prosocial behavior in neutral emotion contexts extends our understanding of the importance of these skills in early childhood. Prosocial behavior is typically an indicator of greater social competence (Denham et al., 2003). However, these results reiterate that social cognition has consequences for prosocial behavior because children draw upon these skills when processing social information (Denham, 1983) and prosocial behavior may not always be socially competent. Children may incorrectly

process others' emotion and have an inflated idea about how much the other person needs assistance, and this miscalibration could have consequences as children transition into formal schooling.

The two individual difference factors that were most relevant to emotion (i.e., emotion regulation and emotion understanding) investigated in the current study influenced children's decisions to engage in prosocial behavior. Taken together, the findings that children with better emotion regulation and emotion understanding are more prosocial in negative emotion contexts suggest that individual differences that directly address emotion are central to understanding prosocial behavior in emotion contexts because children go into these situations prepared to draw upon these skills when processing social information in emotionally laden prosocial opportunities. Further, these are important to investigate because the results of the current study found that the ways these skills impact prosocial behavior varies by the specific emotion context.

These individual difference findings provide support for contemporary social information processing theory by highlighting that children's social cognition and emotion regulation skills are consequential in prosocial situations. Specifically, these individual differences related to social information processing of prosocial-relevant information both initially and over multiple prosocial opportunities within a single lab visit differentially based on the emotion context within which it occurs. As highlighted by social information processing theorists (e.g., Crick & Dodge, 1994), social information processing is continuous and children can draw upon these skills as they process information and make decisions about whether or not to engage in prosocial behavior.

Findings from the current study suggest that the different emotion contexts within which this processing occurs impact its outcome by influencing how children handle the emotion information. Social cognition did not promote prosocial behavior across all of the emotion contexts as children with better skills in some of the contexts were less prosocial, which suggests that aspects of social cognition contribute differentially to children's prosocial behavior based upon the emotion context.

In addition, when children had greater knowledge understanding and played the negative emotion version of *Cyberball*, they shared more initially and overall, but children with lower knowledge understanding in this condition shared less. This result is in line with the hypothesis that greater social cognition would support prosocial behavior when children themselves experienced negative emotion. In contrast to what was hypothesized, children with lower knowledge understanding were prosocial behavior initially and overall when they experienced their own negative emotion and saw a peer in distress, but children higher knowledge understanding were less prosocial in that situation. This could be because these children wanted to keep their own stickers and did not want to share them, which is convergent with prior work that though children ages 3- to 4-years old can help and share, they also behave selfishly (Fehr, Bernhard, & Rockenbach, 2008). As a result, when children evaluated their goals during social information processing, and had access to better knowledge understanding, they may have thought that the peer would not know the child had stickers to share with them and that the experimenter would not know whether or not they had shared, so they did not make their peer's needs a part of their goals. It could have been that these children knew

that the situations they and their peer were experiencing in the lab were not fair, and as such, they felt they needed to take care of their own needs first, which would also be in line with findings that children though children often behave prosocially in early childhood, they do not always do so and sometimes behave selfishly.

Children who had lower belief understanding shared less when they played the negative emotion version of the game, whereas children who had better belief understanding shared more in this same situation. Children who experienced their own negative emotion shared less initially and overall when they had lower belief understanding, but shared similarly to children in other conditions when they had higher belief understanding because it supported them in behaving prosocially, which is similar to the pattern found for the roles of emotion regulation and knowledge understanding previously found for children in this condition. This pattern could reflect that because children with greater belief understanding understood that people have different beliefs and that even though the peer believes there are no more bunny stickers left, there actually are, similarly to how their knowledge understanding supported their understanding of the situation, and how their emotion regulation supported their engagement with prosocial-relevant information. The common denominator between belief and knowledge understanding could reflect that when children with better understanding in these aspects saw the peer, they understood that the peer wanted stickers and that the child could provide it.

Contrary to what was hypothesized, I found that intention and emotion understanding were each negatively associated with Play-Doh sharing. These results may

have been driven primarily by the effect of negative emotion present in the three negative emotion contexts and as such, may not be as representative of the association between emotion understanding and prosocial behavior more broadly. The lack of the hypothesized associations between each of the other aspects of social cognition with the other three prosocial behavior outcomes may have been masked by the effects of the negative emotion manipulations.

Though intention understanding did not play a role in children's initial sharing, their intention understanding was linked to more sharing overall across each of the emotion contexts in this study. The result that intention understanding plays a key role in prosocial behavior in neutral contexts is supported by prior work that found that children take others' intentions into account when deciding whether to share with them (Vaish, Carpenter, & Tomasello, 2010). The results that intention understanding plays a role in sharing in emotionally laden prosocial contexts extend our understanding of the role of intention understanding for more realistic (albeit contrived) prosocial contexts because the current study looked at a combination of different emotion situations. These findings also highlight the importance of looking at prosocial behavior across time in emotion contexts. The effects of children's emotions were initially strong on prosocial behavior, but because sharing was also measured over an extended period of time, the main effect of intention understanding on prosocial behavior was able to be discovered. In a similar vein, children's understanding that people have different perceptions of situations was linked to more sharing initially across each of the different emotion contexts investigated in the current study, but not overall. These findings suggest that perception understanding

is important early on when children are deciding whether to engage in prosocial behavior, but is less important in subsequent prosocial opportunities. It could be that intention understanding takes longer to determine than perception understanding because the peer's goal may have become more clear when the child was interviewed about their sharing behavior in the interviews (Appendix C; Appendix D). It could be that the salience of perception understanding is stronger immediately after children learn new information, and less salient as they take other information, such as differences in people's intentions, into account. That is, these findings could suggest that perception understanding is more heavily drawn upon in early iterations of social information processing and that intention understanding is more heavily drawn upon in later iterations of this process. This converges with the social information processing perspective because these results highlight that children draw upon their skills but do not do draw upon every skill they have at the same time. An alternative interpretation of this finding is that perception understanding is important for prosocial opportunities that occur in close proximity to a negative emotion situation and less important for prosocial behavior in opportunities that are more distal from own and other negative emotion.

In addition, these findings contribute to a better understanding of how different aspects of children's social cognitive skills contribute to their prosocial behavior in different emotion contexts. This approach allowed for insight into how children with varying degrees of social understanding of different aspects of social cognition handle emotion information in prosocial opportunities.

Intention understanding and perception understanding were associated with greater prosocial behavior above and beyond the effects of children's own and others' emotion, and were not moderated by these effects, suggesting that these skills support prosocial behavior in each of the different contexts. This could be because intention and perception understanding are some of the earliest emerging aspects of social cognition (Astington & Gopnik, 1995; Malle, Moses, & Baldwin, 2001). By the second year of life, children begin to connect the emotion expressions of others to the internal states of those people (Phillips, Wellman, & Spelke, 2002). Young children also use their intention understanding to inform their understanding about the thoughts and emotions of other people (Carpenter, Nagell, Tomasello, & Butterworth, 1998).

Though desire understanding is also early-emerging and children understand that desires inform intentions, children only begin to distinguish desires from intentions around age 5 (Feinfeld, Lee, Flavell, Green, & Flavell, 1999). These developments in children's skill in distinguishing between intentions, which must be satisfied through a goal being met, and desires, which do not necessarily require action, may help explain the different patterns for intention understanding and desire understanding. One possible interpretation of this is that there may have been more variation in children's desire understanding than in their intention understanding than was captured by the parent-report measure of children's social understanding.

Further, better desire understanding may have been particularly relevant to sharing in this study because the prosocial opportunities were centered around the peer wanting, or desiring, something. As such better desire understanding may have been

associated with lower prosocial behavior in neutral own emotion conditions because children with better desire understanding thought about the peer's desire for bunny stickers as something that would be more fleeting rather than a goal, or intention, that the peer would persist in trying to achieve.

Future work should investigate this in more depth to determine how constellations of individual differences play a role in social information processing over the course of multiple prosocial opportunities, as well as how these patterns influence social information processing throughout childhood to contribute to a better understanding about how each skill, or set of skills, contributes to different patterns of sharing in different emotion contexts.

Finally, the plethora of findings that social cognition was related to differences in prosocial behavior as quantified by initial and overall sticker sharing but not Play-Doh sharing could be due in part to task demands. Specifically, children in each condition could have shared Play-Doh similarly because the peer did not express a direct need for it, and such, they might have thought it was not as necessary to share with the peer. This aligns with findings that toddlers help more when someone explicitly needs something than when there is not an explicit need (Newton, Thompson, & Goodman, 2014). Additionally, this finding suggests that 4- to 6-year-old children help more when a need is directly expressed to them by the person in need and they help less when the need is expressed to them by someone else (i.e., an experimenter). It also suggests investigation of children's prosocial behavior in response to prosocial opportunities that vary by how

explicit the recipient's need for assistance is to potential helpers could further elucidate the process underlying how children make prosocial decisions in early childhood.

Each prosocial task allowed children to engage in both empathic (i.e., emotionally-driven) and instrumental (i.e., cognitively based) prosocial behavior, however, the Play-Doh task occurred after more time had passed than the other measures, and as such, the emotion information about the peer, and the peer's needs and desires may have become less salient to the child as children did other activites in the study. Specifically, the initial bunny sticker sharing may reflect the effects of the emotion manipulations because it was measured in closest succession to the child and others' emotion manipulations. The overall bunny sticker sharing score also included children's sharing after they played the second round of *Cyberball* with the peer, when they were being interview about their thoughts about the peer, and when they were directly given the opportunity to share Play-Doh with the peer. As such, the overall sharing score reflects sharing during times when a) others' emotion cues were salient because children thought they were interacting with the peer and answering questions about the peer. Those activities could have kept the peer's desires more salient or increased children's awareness of the peer's needs. This could have prompted children to share for the first time or to share more with the peer than they had previously. The overall sharing score also captures sharing after children had already made a series of decisions about how to handle information about the others' emotion during the peer video, the peer room, and round two of *Cyberball*. As a result of so many different sharing opportunities, children

may have felt that they had already done enough to benefit the peer and as a result, experienced a sort of prosocial fatigue.

Playing the second round of *Cyberball* with the peer who was the target of prosocial behavior, Jamie, could have influenced what children thought about that peer because Jamie always shared fairly with the child and with the other player in the game. This could have made children realize that when Jamie was given the opportunity, s/he included the child and never excluded the child like the players in the first round may have done. This potentially prompted the child to think about Jamie and share with him/her because Jamie had shared with the child during the game. Children played *Cyberball*, and they had to share (pass) the ball to one of the two on-screen players. Some children may have thought that additional sharing beyond sharing the ball with Jamie during the second round of *Cyberball* was unnecessary because they had already shared the ball with the peer during that round. Thus, playing this second round of *Cyberball* with the target peer may have also constrained children's prosocial behavior for overall bunny sticker sharing and Play-Doh sharing because the game presented a forced-choice ball sharing opportunity.

In contrast, the Play-Doh sharing opportunity was the furthest in time from any interactions they had with the peer which could have resulted in children not thinking about the peer's needs and wants as much by this point in the study. The Play-Doh itself may have held higher value because they were more appealing to children than the bunny stickers, which could have made children feel like this was costlier to share with the peer than bunny stickers. Children also may have also been reluctant to share the Play-Doh

because it was a novel toy in the study that children earned a prize for participating in the study and they knew they would take this prize home with them. Ultimately, children may have seen Play-Doh sharing as requiring more self-sacrifice than sharing bunny stickers because the Play-Doh was more appealing and the bunny stickers were smaller and potentially less fun to play with. Because children may have valued the Play-Doh more than the bunny stickers, it may have resulted in children deciding to behave more selfishly and less prosocially toward the peer. Finally, children were presented with the Play-Doh sharing opportunity after many of them had already shared bunny stickers, they may have thought that sharing stickers was sufficient for benefiting the peer and that additional sharing with the peer was not as necessary or felt some fatigue in behaving prosocially after so many opportunities to share with the peer. It is likely that each of these reasons contributed to children's sharing decisions in the Play-Doh sharing opportunity because other studies have demonstrated that even toddlers behave prosocially depending on how costly the sharing is and prior sharing behavior (Warneken & Tomasello, 2013).

Gender

In line with previous findings and theory that suggest gender differences in prosocial behavior are largely an artifact of bias on informant-report (Grusec, Goodnow, & Cohen, 1996; Hastings, Rubin, & DeRose, 2005), parents reported higher prosocial behavior for girls than for boys, though there were no gender differences in observed prosocial behavior.

The lack of gender differences in the observational measures of prosocial behavior utilized in the current study is consistent with other findings from studies using observational measures of prosocial behavior at these ages (Paulus & Moore, 2009; Paulus et al., 2015; Sebastian-Enesco, & Warneken, 2015), though a few studies have found gender differences (e.g., Kirschner & Tomasello, 2010). The finding that boys and girls share with a peer similarly across different emotion contexts advance our understanding that they process prosocial-relevant information similarly and additionally, that both genders come to similar decisions about whether or not to engage in prosocial behavior. These findings provide support for the hypothesis that gender differences in prosocial behavior are largely due to differences in perceptions of each gender's prosocial behavior rather than their actual prosocial behavior (Hastings, Utendale, & Sullivan, 2007) because they demonstrate, within the same sample, that differences emerge on parent report of prosocial behavior but not on any of the four different measures of prosocial behavior. The two different patterns of gender differences (or lack thereof) between parent and observed measures of prosocial behavior also indicates the importance of utilizing observed measures of prosocial behavior in early childhood, and these methodological considerations are likely relevant to prosocial behavior throughout childhood. This pattern also suggests that gender differences that emerge from parent reports of prosocial behavior should be interpreted with caution because they may be misleading by suggesting that there are gender differences, when these differences are in fact an artifact of the methodology used.

Age

Age was not associated with the prosocial behavior outcomes in this study. This suggests that age itself did not have a direct influence on prosocial behavior, though age still played a role in prosocial behavior through age-related increases in the development of the individual differences that moderated prosocial behavior. Prior work with children in this age range (i.e., 4- to 6-years-old) has found a positive effect of age on prosocial orientation, though the authors considered this to be trivial because they considered the effects of false-belief understanding, language, and emotion comprehension on prosocial behavior as more interesting and important for understanding prosocial development (Ornaghi, Pepe, & Grazzani, 2016). In contrast, work with younger children demonstrates that age plays an important role is early prosocial behavior, which may reflect that these skills develop more universally early on and there is more variation in the rate of development as children age. Younger children (18-months-old) are less prosocial than older children (30-months-old), but both readily engaged in prosocial behavior (Svetlova, Brownell, & Nichols, 2010).

The positive associations between age and each of the six aspects of social cognition investigated are not unexpected because social cognition is developing during this age range and older children have better developed social cognition (Moses, 2001), and children are very competent in terms of social cognition around this age because early childhood is a time of great social, emotional, and cognitive skill development (Denham et al., 2003). Children develop these skills over the course of childhood and all children do not acquire them at a consistent rate (Liu, Wellman, Tardif, & Sabbagh, 2008) and in

line with this, social cognition was more informative than age for understanding prosocial behavior at this point in development in the current study. Social cognition has long been acknowledged as consequential for prosocial behavior (Denham, 1986) and our understanding of this was advanced by examining how age-related development in each aspect of social cognition influenced prosocial behavior.

Future directions and limitations

There are some limitations to this study that should be mentioned. First, it could be argued that children with better social cognition did not believe that the peer was real and shared less because of this; however, there are several reasons to think that each aspect of social cognition plays a differential role in prosocial behavior. Mean levels for sharing for all of the sharing outcomes were greater than zero in each of the conditions, and thus, was not at floor levels (i.e., zero sharing). Second, no children in the study gave any indication that they did not believe this cover story. Rather, many children asked to play with the peer during or after the study.

A strength of this study was that it included many opportunities for children to engage in prosocial behavior to benefit the peer. However, each opportunity, and thus each measure of observed prosocial behavior, varied in how proximal it was to the two emotion-based manipulations. Initial sharing and latency to share were each assessed close in time to when children played *Cyberball* and saw the peer video. Because these opportunities were in closer proximity to the manipulations, they may have been more strongly influenced by emotion. Overall sharing included initial sharing as well as sharing at any subsequent point in the study and as such, the effects of the manipulations

on sharing later may have been lessened because children may have effectively regulated their own emotion by that point. Finally, the Play-Doh sharing opportunity was completed at the very end of the study and was most distal from the manipulations than the other prosocial outcomes. Because of this, children's prosocial decisions in the Play-Doh opportunity may have been least affect by the manipulations. Thus, the differences in children's prosocial behavior do not directly address questions of sharing items of different value because answers to these questions were confounded by the order in which they were measured in relation to the two emotion manipulations.

Though the current study did not measure whether children anticipated that the peer would reciprocate, future work could investigate such questions by establishing a short-term relationship of varying degrees of reciprocity in the lab (similar to Sebastian-Enesco & Warneken's methodology), by measuring existing child-peer prosocial reciprocity through self- or other-report, or perhaps new methods aided by technology. Social relationships are critical in socioemotional development during early childhood and may provide important insight into the relationship between negative emotion and prosocial behavior development. These findings did not investigate the impact of many additional factors, such as parenting and broader developmental contexts including cultural norms and expectations (e.g., Trommsdorff, Friedlmeier, & Mayer, 2007), that play an important role in prosocial behavior, because they were not the focus of the current study. However, the current findings do not indicate that these factors should be disregarded. Rather, future studies of the effects of children's own negative emotion on

prosocial behavior should investigate these effects in light role of the additional factors that influence prosocial behavior.

In order to better understand the mechanisms of certain discrete emotions, future work should investigate how prosocial behavior is affected by discrete emotions separately to parse out the effects of sadness, anger, frustration, and other negative emotions, as these were blended in the current study. However, the different emotion contexts created in this study was a strength in mirroring children's every-day situations because it is typical for children to be upset, to see a peer who is upset, and for both the child and the peer to be upset. There are many remaining questions to consider with social exclusion as well, including the effects of online versus in person social exclusion, exclusion by an adult (e.g., a teacher tells a child they are not allowed to play during recess or go on a field trip) vs a peer, exclusion by a sibling versus by a peer, varying the intensity and type of bullying contexts, and other related situations. It would also be very interesting to investigate the effects of self and other negative emotions on prosocial behavior when the negative emotions have a social origin, as they did in the current study, in comparison to when they have a non-social origin (e.g., a child is upset because they forgot their lunch at home, their toy broke, the playground is closed).

Conclusions

The effects of negative emotion on prosocial behavior have not been clearly established. The current study attempted to move beyond a focus on the influence of negative emotion cues from someone in need of help by examining the influence of children's own negative emotion on their subsequent prosocial behavior. The major

findings of this study are that children's own emotion experiences have a direct effect on their prosocial behavior and, further, that the ways their social cognition and emotion regulation contribute to prosocial behavior depends on the emotion context in which it occurs. These findings illustrate that children's own and others' emotion both influence how children utilize their social cognitive and emotion regulatory skills during neutral and negative emotion prosocial opportunities. These results have real-world implications for children's peer relations in their daily lives because they suggest that children's peer interactions influence their social information processing and decision making during subsequent prosocial opportunities with new peers, which advances our understanding about how children develop social competency. Though negative experiences hindered children's prosocial behavior, children with better emotion regulation, knowledge understanding, and perception understanding tended to share more even in negative emotion contexts, which suggests that development of these skills in particular are key for children developing social competency in everyday situations that often include negative emotions. These results advance our understanding of how social cognition does not help peer relations across all emotion contexts by suggesting that children draw upon different aspects of social cognition based on the emotion context they are in. The effects of children's own negative emotion on their prosocial behavior towards peers were ameliorated by their emotion and social cognitive skills. These findings suggest that children's understanding of their own and others' thoughts has varied implications for their prosocial behavior particularly in negative emotion contexts. School programs that focused on developing prosocial behavior have been found to be effective (Battistich, et

al., 1989) and may further benefit from bolstering children's developing social cognitive skills specifically when children are experiencing their own distress. However, these results may not account for how negative emotion influences children's prosocial behavior in all prosocial opportunities they may encounter, and more work is needed to contribute to a more complete understanding of these processes.

Prior research has emphasized the emotions only of people children could help; there has been less investigation of how children's own emotion experiences in these contexts contributes to the process of prosocial behavior. This study suggests children's emotion experiences are important to consider in addition to the emotions of others when working to understand the process and development of prosocial behavior, and help contextualize how children's emotion regulation and social cognition skills contribute to prosocial behavior in negative emotion situations children typically experience.

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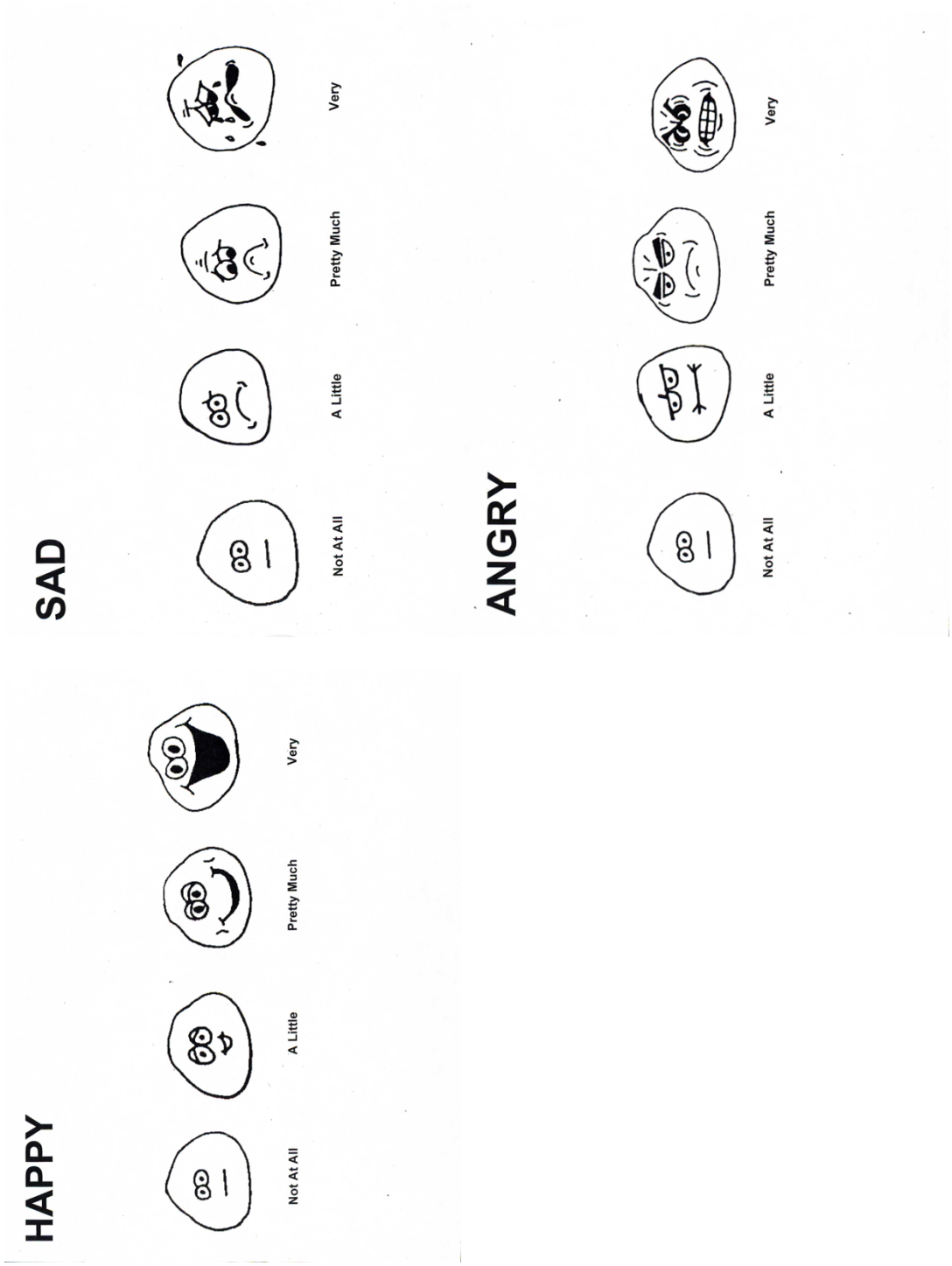
Appendix A

Emotion Report Scales



Appendix B

Peer Drawing

Appendix C

Peer Room Interview

1. I think Jamie left a drawing in the room. Did you see Jamie's drawing? (yes/no answer)
    a. If yes:
        1. Tell me about what you thought about when you saw Jamie's drawing.
        2. What else did you think about?
        3. Is there anything else you thought about?
        ii. Did you see the spots where stickers were missing? (yes/no)
    b. If no:
        i. Did you see <u>any</u> drawings over there?
        ii. Tell me about what you saw on the table (where the drawing is) in Jamie's room.
2. Tell me about anything you did when you saw Jamie's drawing.
        1. What else did you do?
        2. What else?
        3. If the child did something:
            a. Do you think Jamie would like that you did ____(fill in whatever the child said they did for Jamie)____?
            b. Why do you think Jamie would/would not like it?

4. If nothing:
    a. You said you didn't do anything when you saw Jamie's drawing. Why didn't you do anything?
    b. Do you think Jamie would have liked if you had put stickers on the drawing?

3. It sounds like you did a lot in Jamie's room! Did you do anything to <u>help</u> Jamie?
    i. If yes: Tell me about what you did to help Jamie. What else did you do?
        1. (if child references previous response to #4?) Oh, I remember that you said you did ___(fill in what the child said earlier in the interview when he/she was asked what they did in the room)___.
        2. Do you think that will help Jamie?
        3. Why do you think that will help Jamie?
    ii. If no: Tell me about anything anyone could do in the room that could help Jamie.
        a. What else?
        b. Could you have shared some of your stickers?
        2. Do you think sharing some of your bunny stickers would have helped Jamie?

4. How much would you want to play with Jamie? (show a circle rating scale of small to big circles and point to the smallest circle for none, the medium for a little, and the big one for a lot)
    a. Why?
5. How much do you like Jamie? (show a circle rating scale of small to big circles and point to the smallest circle for none, the medium for a little, and the big one for a lot)
    a. Why?
6. Ok, now I want to know how you think Jamie felt about different things.
        i. How sad/angry/happy was Jamie feeling after he/she played the game? (have child rate Jamie's emotions sad/angry/happy, one at a time using the emotion rating scales).
        ii. Ok, now I want to know how you think Jamie would feel about different things.
            1. How sad/angry/happy when he/she goes back into his/her room? (have child rate Jamie's emotions sad/angry/happy, one at a time using the emotion rating scales).

Appendix D

Play-Doh Interview

Play-Doh interview conducted after the Prosocial Play-Doh Task.

1. How many Play-Dohs did you share with Jamie?
2. Tell me why you shared __(number shared)_ Play-Doh?
    a. Why else?
    b. Why else?
3. How do you think it will make Jamie feel to get them/not get Play-Doh from you?
4. How do you feel about sharing/not sharing Play-Doh with Jamie?

5. Remember during _____ (emotion report #___) you said you felt _____ (fill in emotion). Did you do or think about anything to make yourself feel better? ____yes ____no ___n/a
6. If yes: What did you do?