ABSTRACT

Title of Dissertation:	DO PRESCHOOLERS TRACK AND EVALUATE SOCIAL INCLUDERS AND EXCLUDERS?
	Amanda Mae Woodward, Doctor of Philosophy, and 2020
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Social exclusion is a hurtful experience that can lead to detrimental effects in the social, cognitive, and physiological domains. These consequences can lead to poor, potentially long-lasting, negative outcomes for children. Therefore, it is critical for excluded children to reduce the impact of its negative effects. One helpful strategy to accomplish this is to select social partners who are likely to be inclusive. The current dissertation investigates cognitive processes that may underly children's partner choice, including the abilities to detect, track, and evaluate social excluders. In Experiment 1, 4-year-old children (n = 32) experienced direct inclusion and exclusion before evaluating target characters. Surprisingly, children in the overall sample did not evaluate excluders more negatively than includers. Experiment 2 further investigated children's abilities to track and evaluate social excluders using several methodological improvements and a wider age range, including 4- to 6-year-olds (n = 96). With age, children in the overall sample detected social exclusion more

often but did not evaluate excluders more negatively. Children who accurately identified includers (n = 68) also evaluated them more positively than excluders. Experiment 3 investigated whether 3- to 6-year-old children who observed third-party games could detect and evaluate social excluders. While children detected and evaluated social excluders, only older children preferred to play with includers. Overall, this work suggests that young children who detect exclusion also evaluate social excluders negatively, although these evaluations may not influence play partner choices until later in development.

DO PRESCHOOLERS TRACK AND EVALUATE SOCIAL INCLUDERS AND EXCLUDERS?

by

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Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2020

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Acknowledgements

I would like to thank my graduate school advisor, Jonathan Beier, and my committee members for their support throughout graduate school and feedback on these projects. I would also like to thank my lab mate, Brandon Terrizzi. This work could not have been completed without all of hard work of the undergraduate research assistants who helped with data collection and coding as well as those who spent hours recruiting families to participate in this research. In particular, I appreciate the work of Jorelle Casumbal, Cole Dougherty, Sarah Knoll, Lindsay Horen, Cayla Cwerner, and Jennifer Han. I am thankful for the weekends they sacrificed and their creative problem solving, which allowed us to finish data collection faster than I anticipated.

Finally, I want to thank my family, friends, and partner for being the best support system and for listening to more about child development than they probably anticipated when I started my graduate school career. In particular, I want to thank my mom, Heather Woodward, who was always there to help me plan and who made me laugh, even when I did not want to. In addition, I want to thank my friends for everything from pizza runs to long phone calls. Thank you all for reminding me of my life outside of graduate school and for being just as excited for my dissertation as I was. Last but not least, I want to thank my partner, Peter Sisson, for keeping me sane and listening to monologues about my work. Writing a dissertation can be isolating, and I am so thankful to everyone who made sure I never felt alone and supported me along the way.

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Chapter 1: Introduction

Humans are social creatures who invest considerable time and energy into their relationships with others. Positive social interactions lead to overall positive wellbeing and create a sense of belonging (Leary & Cottrell, 2013). Humans have a fundamental need to belong that leads us to seek social connections with others and avoid breaking social bonds (Baumeister & Leary, 1995; Pickett et al., 2004). Experiencing negative social interactions can lead to feelings of isolation and lowered affect (Maner et al., 2007).

Social exclusion is one particular type of negative interaction that uniquely threatens the need to belong (Jamieson et al., 2010). Social exclusion has been defined and studied extensively by different research traditions. This dissertation will focus specifically on interpersonal instances of social exclusion, during which one person "feels physically or emotionally separated from others" (Wesselman & Williams, 2016). Being excluded leads to detriments across many domains, including impairments in social, cognitive, and physiological functioning (Baumeister et al., 2002; Blackhart et al., 2007; Dewall et al., 2011).

Social exclusion is of particular interest because the consequences of being left out can be severe and people experience social exclusion frequently (Nezlek et al., 2012). Experiencing social exclusion leads to painful feelings akin to those felt during physical pain (Eisenberger et al., 2006; MacDonald & Leary, 2005). Acute effects of exclusion include lowered self-esteem, impaired reasoning abilities, reduced self-regulation, and feelings of guilt (Baumeister et al., 2002; Baumeister et al., 2005; Leary & Cottrell, 2013). If exclusion becomes chronic, or long-lasting and

repeated, the subsequent consequences for the victim worsen and can become permanent (Wesselman & Williams, 2013). Those who are chronically excluded may begin to isolate themselves or engage in antisocial behaviors (Williams, 2007). Specifically, chronically excluded people attempt suicide more often and long-term exclusion is correlated with becoming a perpetrator in mass-shootings (Leary et al., 2003; Sommer et al., 2001). For these reasons, it is important to understand how people think about social exclusion and when in development people begin to feel its effects.

Social exclusion occurs much earlier in development than adulthood. Preschool-age children frequently exclude each other (Fanger et al., 2012; Stenseng et al., 2014). Children suffer consequences similar to adults when excluded. For instance, excluded preschoolers are more likely to develop poor self-regulation, become more aggressive, and be less cooperative (Stenseng et al., 2014; Stenseng et al., 2015). Preschoolers who experience social exclusion are more likely to become maladjusted, suffer from depression as they age, and develop more internalizing problems, including anxious behaviors (Crick et al., 1997; Stenseng et al., 2014). The development of internalizing problems can lead to social withdrawal, which can increase the occurrence of social exclusion for the child (Rubin & Coplan, 1995). More social exclusion can worsen the impact of existing negative effects on the child and result in even poorer outcomes.

People suffer from social exclusion across development and would benefit from strategies that mitigate its effects. The best strategy to reduce the consequences of social exclusion is to avoid being excluded at all. People can reduce the likelihood

of being excluded by acting in cooperative ways, following social and cultural norms, cultivating qualities of a socially beneficial partner, and having a positive reputation (Barclay, 2013; Martin et al., 2019). While these strategies may reduce the chances of experiencing exclusion, they cannot guarantee that a person will never be excluded. We are excluded by other people, and we cannot control how others will interact with us. Therefore, it is important to understand the strategies people employ to mitigate, rather than avoid, the consequences of social exclusion.

This dissertation addresses issues concerning children's strategy use after exclusion in two ways. First, it asks whether children show signs of having a social-cognitive system that guides their adaptive responses to social exclusion, similar to the one seen in adults. Second, it asks whether young children who are excluded keep track of who excluded them and whether they then use this information to make good choices about their social partnerships.

The Ostracism Detection System

There is now substantial evidence that a dedicated social cognitive system underlies adults' responses to being excluded. The *"ostracism detection system"* has evolved to detect instances of social exclusion when they are present and help people avoid further exclusion (Spoor & Williams, 2007; Wesselman & Williams, 2012; Williams, 2007). This system activates quickly to reduce the consequences of exclusion (Spoor & Williams, 2007). Activation of the ostracism detection system is sensitive, and it is triggered when adults witness the exclusion of third parties (Giesen & Echterhoff, 2017; Wesselman et al., 2009). Further, activation of the system is mandatory and even occurs in situations where we would benefit from exclusion. For

instance, the system responds when a participant is excluded by people that they have no desire to affiliate with (e.g. members of the KKK), when being excluded leads to financial gain, and even when exclusion is carried out by pre-programmed computer players (Gonalkorale & Williams, 2006; van Beest & Williams, 2006; Zadro et al., 2004).

Once it detects that exclusion has occurred, the ostracism detection system motivates adults to act in ways that mitigate the negative effects of being excluded. According to the *Temporal Need-Threat Model of Ostracism*, social exclusion causes negative effects that threaten four basic human needs: the need to belong, the need to maintain high self-esteem, the need to feel some control over our social environment, and the need to feel that our existence is meaningful (Williams, 2009). The strategies people use to reduce the negative consequences of social exclusion depend on which needs are most threatened. When needs concerning one's meaningful existence and sense of control are threatened, people may respond using antisocial strategies, including aggression, retaliation, and violence (Dewall et al., 2009; Twenge et al., 2001; Warburton et al., 2006; Williams, 2007; Williams & Nida, 2011). When belonging and self-esteem are most threatened, people engage in strategies to increase social connection, like compliance and prosocial behavior (Carter-Sowell et al., 2008; Maner et al., 2007; Williams & Nida, 2011).

It is less clear whether an ostracism detection system, like the one observed in adults, is already present in early childhood. It is clear that young children suffer consequences from being excluded. However, there has been insufficient work to

determine whether their responses to exclusion share characteristics with those that result from the ostracism detection system present in adults.

Several lines of recent research have contributed evidence that children between 3 and 6 years do detect exclusion events. However, these studies use a wide range of methods to expose children to social exclusion, including having children observe exclusion or experience it through a virtual ball-toss game. It is possible that children's ability to detect social exclusion differs based on whether they are being excluded directly or watching the exclusion of another person.

Young children who have observed social exclusion in a third-party scenario think more about social connection. Five-year-olds who have watched exclusion remember more social events than nonsocial events, suggesting that they are more attuned to social information (Marinovic & Trauble, 2018). Five-year-olds who have watched exclusion draw more affiliative pictures, which may suggest that they are thinking more about social connections than children who did not watch exclusion (Song et al., 2015).

Young children who have observed exclusion not only think more about social connection, but also behave in ways that signal they are good social partners. For instance, 3- to 6-year-old children who have watched exclusion imitate others with more fidelity (Over & Carpenter, 2009; Watson-Jones et al., 2014). Four-year-olds sit closer to others after watching social exclusion (Marinovic et al., 2017).

Children's responses to directly experiencing social exclusion are consistent with their responses after observing it. Excluded 5-year-olds attend more to the

intentions of others (White et al., 2016). Excluded 5-year-olds also imitate others more faithfully (Watson-Jones et al., 2016).

Partner Choice Models

As detailed in the previous section, children engage in behavioral strategies after exclusion to promote social connection. They imitate others, sit closer to potential social partners, attend to social information, and think about other's intentions. Surprisingly, little work has investigated whether or not children use their experiences of exclusion and inclusion to either avoid or approach their prior social partners in future encounters. This would be a valuable social strategy because people's past behavior may be indicative of their future actions. Incorporating prior experiences of exclusion or inclusion into their partner choice decisions would allow children to reduce the likelihood of future exclusion.

Partner choice models offer one way to describe how people choose who to form affiliative relationships with and who to avoid (Baumard et al., 2013; Martin et al., 2019). These models focus specifically on relationships formed with non-kin. Partner choice models focus on a person's ability to choose which social partners to form relationships with and their ability to dissolve a relationship when it is no longer beneficial (Barclay, 2013; Noë & Voelkl, 2013). These qualities make them distinct from reciprocity models, which involve using "tit-for-tat" strategies where one partner repays cooperation with more cooperation and not cooperating with subsequent uncooperativeness (Noë & Voelkl, 2013). In partner choice models, people consider more information than a partner's previous action when choosing to stay and cooperative or to select a new partner (Baumard et al., 2013). Further,

partner choice models differ from partner control models because they predict different behaviors when a partner becomes uncooperative. In partner control models, a partner reciprocates uncooperativeness, which leads the uncooperative partner to become more cooperative or leads to interactions that are not beneficial for either partner (e.g. they are always uncooperative with each other). In contrast, when a partner stops cooperating in partner choice models, the other partner has an option to continue their relationship or select a new social partner (Baumard et al., 2013; Barclay, 2013; Noë & Voelkl, 2013).

Selecting good social partners has direct implications for survival (Barclay, 2013). People should choose partners who will maximize benefits and evolutionary fitness while minimizing costs (Barclay, 2013; Baumard et al., 2013). Additionally, people should avoid social partners who do not provide benefits, decrease evolutionary fitness, or will be otherwise costly to interact with. Ideal social partners are cooperative and good relationships include benefits for both partners, such as acquiring more resources (Baumard et al., 2013). Based on these partner choice models, social relationships should continue until one person no longer benefits, possibly because the other person stops cooperating. When a relationship is no longer beneficial to a person, they end the relationship and seek a new social partner (Baumard et al., 2013; Martin et al., 2019). Selecting a new social partner is costly and requires people to both spend resources on searching for new partners and signaling that they are beneficial partners (Barclay, 2013).

When choosing social partners, humans rely on several sources of information to select beneficial partners. For instance, knowing about a potential partner's prior

behavior is valuable information when selecting a social partner. People can gain this knowledge by learning about the potential partner's reputation or through direct experience with them (Barclay, 2013; Baumard et al., 2013). These sources of information allow people to seek partners who will benefit them. In particular, people look for partners who will be generous and fair, who are competent, and approachable (Barclay & Willer, 2007; Martin et al., 2019). Additionally, people may choose partners based on their reputation and prestige (Fu et al., 2008; Martin et al., 2019).

Partner Choice and Social Exclusion

Partner choice models are related to social exclusion because those who are excluded have experienced the dissolution of a social relationship and need to find new social partners. When selecting new social partners, the excluded person should approach people who will benefit them and avoid those who will be costly to interact with. Specifically, the excluded person should seek social partners who are likely to include them and will increase feelings of social connection, thus reducing negative effects of exclusion. Additionally, they should avoid partners who are likely to exclude them, possibly leading to further negative consequences. To do this successfully, the excluded person could use information from their own interactions with a potential partner or attend to the partner's history of inclusive and exclusive behaviors toward others.

Do Young Children Socially Evaluate Social Excluders?

What social cognitive abilities would be necessary for excluded children to use their recent experiences to make smart partner choice decisions? One important step between being excluded and avoiding the excluder is forming stable

representations of the excluder's identity and behavioral tendencies. It may be possible for the excluded person to remember the fact that someone previously excluded them, without attributing additional information to the excluder. However, person perception often involves making inferences about a range of characteristics based on limited information about another person (Olivola & Todorov, 2010).

This dissertation will examine how children socially evaluate those who have included or excluded them. It will also address whether children use these evaluations to incorporate prior information about potential partners in their partner choice decisions.

Only two experimental studies have investigated preschool-age children's evaluations and partner preferences of social includers and excluders. The first assessed children's evaluations of someone they observed being excluded from a ball-toss game relative to those who excluded them (Hwang et al., 2017). The second investigated children's evaluations of those who directly excluded and included them (Hwang & Markson, 2020). Because this work is highly related to the current dissertation, I will discuss it in more detail.

The first study examined how children evaluate social excluders in a third-party observational context. Hwang and colleagues (2017) examined 2- to 3-year-old children's evaluations of social excluders relative to includers. Children were introduced to three puppets and watched a short ball-toss game. One character was excluded for six throws and showed distress when they did not receive the ball. An experimenter then asked children who they would like to play with. Three-year-olds, but not two-year-olds, indicated that they would prefer to play with the excluded over

the excluding character. This preference was replicated using videos of adults playing catch and videos of adults talking. Hwang and colleagues (2017) also assessed whether children's preference for the excluded character stemmed from the character's distress. They included three additional follow up conditions to determine if children's preference for the excluded over the excluding character resulted from a negative evaluation of the excluder or as a response to the excluded puppet's distress. The three conditions included one where a third character was included in a ball-toss game, but showed distress; another where the third character was "unintentionally excluded" because they turned around when the ball was thrown to them, and a third where the character was excluded, but showed no signs of distress. Children showed no preference for the distressed included puppet over an including puppet and they also did not prefer an unintentionally excluded puppet over an unintentional excluder. In the third condition, children showed no preference for an excluded puppet who showed no distress over an excluding puppet. While children's responses in this condition did not differ from chance, they also did not significantly differ from the original exclusion condition. Because children did not prefer a distressed included character over an including character, the authors suggested that children's preference for a distressed excluded puppet over its excluder is not driven solely by its distress. They imply that children have negatively evaluated the excluder on the basis of its prior behavior.

Hwang and colleague's (2017) findings do indicate that 3-year-old children prefer the excluded person over the excluding person. This is compatible with the claim that they may evaluate social excluders in some capacity. However, it is

possible that this preference was driven primarily by sympathy for the excluded person, rather than an avoidance of the excluder. Children may not have formed a negative evaluation of the excluder at all.

The second study investigating children's evaluations of social excluders was conducted by Hwang and Markson (2020). In this paper, the authors examined 3- to 6-year-old children's evaluations of social excluders across two experiments (Hwang & Markson, 2020). It differs from their earlier work in two critical respects. First, it more directly assesses children's evaluations of prior excluders and includers. Second, children actually experienced being excluded, rather than just observing the exclusion of others. It is possible that children's detection of exclusion and evaluations of excluders differ between observed and experienced exclusion.

In the first experiment of Hwang & Markson (2020), 3-year-olds, 4-year-olds, and a combined group of 5- and 6-year-olds experienced in-person, direct social inclusion and exclusion. They played two short ball-toss games with puppets and were included in one and excluded in the other. After both games, children were asked to identify who did not play with them and who they liked more. Five- through six-year-olds accurately identified excluders and stated that they liked includers more, while 3- and 4-year-olds did not accurately identify excluders or state that they liked includers. However, when 3-year-olds played a game where the excluders explicitly stated, "We don't want to play with you anymore," 3-year-olds accurately identified social excluders, but still did not state a preference for the includer.

In the second experiment, 3- to 6-year-olds played a sequence of games; analyses were divided between "younger" 3- and 4-year-olds and "older" 5- and 6-

year-olds. Children played four games of Cyberball, a virtual ball-toss game commonly used in the adult literature to study responses to ostracism (Williams et al., 2000). Each game lasted nine throws. Across games, children were included twice and excluded twice. After each game, children evaluated their prior social excluders relative to novel characters and their prior social includers relative to novel characters. They were asked to indicate whether the players shared or not and whether they were mean or nice. They were also asked whether they wanted to play with the current players or a new pair of players and to allocate stickers between these two pairs (i.e., between the current and novel player pairs).

Children's responses in this experiment are informative in two ways. First, we can assess the influence of children's prior play experiences on their responses to the different dependent measures. Both younger and older children were more likely to say that a prior excluder did not share than that a prior includer did not share, suggesting that all children distinguished between their own experiences of inclusion and exclusion. Both age groups also were more likely to call a prior excluder "mean" than a prior includer, suggesting that they had socially evaluated these characters as nice or mean. And both age groups gave relatively fewer resources to a prior excluder (in favor of the novel players) than they gave to a prior includer, suggesting that these evaluations do support their recommendations for reward or punishment. However, only older children showed signs of using their prior inclusion and exclusion experiences to choose future play partners. Although most children preferred to play with novel characters overall, only 5- to 6-year-olds' preferences for novel characters were enhanced when choosing between them and their prior excluders; 3- and 4-year-

olds' partner preferences were not influenced at all by their prior experiences of inclusion and exclusion.

Second, it is also helpful to look at the results in terms of children's performance in each game type separately. That is, rather than analyzing whether children's responses differed for games in which they had been excluded or included, we can ask whether their responses specifically within exclusion games differ from chance. Although these analyses are subject to distortion by baseline preferences (e.g., if children always prefer novel characters independent of their prior game experience, a preference for novel characters over prior excluders is not informative), they can at least provide a sense of when children answer in expected ways. It is thus notable that younger children did not significantly indicate that their prior excluders had not shared the ball, nor did they say that excluders were more "mean" than "nice".

This dissertation was developed with the goal of addressing open questions that arose from Hwang et al. (2017). However, the Hwang and Markson (2020) paper was published in January 2020, as data collection for this dissertation was nearing completion. In their more recent paper, Hwang and Markson (2020) address some of the same open questions investigated here—even using similar methods and measures. Consequently, I will refer to it throughout the remaining chapters and will discuss where our findings converge and where they differ.

This dissertation will examine children's evaluations of social excluders in two contexts: one where children directly experience social exclusion in a first-person context and another where children observe the exclusion of another in a third-person

context. While the two contexts will not be directly compared in this dissertation, it is important to understand the ways in which children's evaluations may differ in a first-person context versus a third-person context. For instance, adults experience threatened needs after first-person and third-person experiences of exclusion. While adults who observed exclusion in a third-person context experience threatened needs, they are less threatened than when the adult experiences exclusion in a first-person context (Giesen et al., 2018). It is possible that children's evaluations reflect a similar pattern, where they are stronger after first-person experiences of exclusion than after third-person observations. This may occur because children who directly experience exclusion in a first-person context may incorporate their emotional responses or coping strategies into their evaluations. In observed, or third-person, contexts, children may not incorporate emotional responses into their evaluations. Alternatively, children's evaluations may follow a different pattern than adults. For instance, children who observe exclusion in a third-person context may form clearer representations of exclusion, and evaluate excluders more negatively than they would in first-person accounts. Chapter 4 will discuss qualitative differences between different contexts.

The Current Research Studies

The current dissertation focuses on whether young children detect social exclusion, track and evaluate social excluders, and how exclusion influences children's partner choice. Chapter 2 presents research investigating whether 4- to 6-year-olds track and evaluate those who have directly included and excluded them in a ball toss game. In Experiment 1, 4-year-olds evaluated social excluders relative to

includers. Children's general views of excluders relative to includers were assessed with comparative questions, a resource allocation task, and a play partner recommendation. We hypothesized that 4-year-olds would view the social excluder more negatively than the social includer.

To better understand the findings of Experiment 1, Experiment 2 used a similar paradigm with 4- to 6-year-olds. As before, the goal was to examine how children view their prior social excluders relative to social includers. Experiment 2 featured several methodological improvements, as well as a memory check to assess whether or not children accurately identified those who included them in the past. Our main hypotheses focused specifically on the children who accurately tracked and recalled who included them. We hypothesized that children who accurately identified the social includer would view the social excluder more negatively than the includer. We further hypothesized that there would be developmental changes in whether children tracked the excluder. We thought that older children would accurately identify social exclusion more often than younger children. We also hypothesized that there would be developmental changes in children's evaluations of the social excluder, as well as their recommendations of these characters as future play partners. If children were remembering the inclusion and exclusion games better with age, we thought they would be more likely to incorporate their prior experiences into their evaluations and views of each character.

Chapter 3 presents research examining similar questions of children who have observed third-party instances of social exclusion, rather than experiencing it themselves. Three- to six-year-old children watched videos depicting social inclusion

and exclusion. Immediately after each video, they were asked an exclusion detection question and an evaluation question. After watching both videos, comparative questions assessed whether children could recall which character had excluded another and whether children's own play partner preferences were influenced by characters' histories acting inclusively or exclusively. We hypothesized that children would detect social exclusion better with age and that older children would evaluate social excluders more negatively than younger children.

Chapter 2: Children's Evaluations After Experienced Exclusion

Social exclusion hurts. It threatens our fundamental need to belong and results in harmful outcomes, including low self-esteem, negative affect, and feelings of isolation, which have negative effects on the excluded person's overall wellbeing (Leary & Cottrell, 2013; Over, 2016; Williams, 2007). To reduce this impact, children and adults employ strategies to alleviate the negative effects of social exclusion (Maner et al., 2007). An effective strategy is to seek social partners who will likely generate positive social experiences for the excluded person (Molden & Maner, 2013).

How do children determine who is likely to include them in future interactions? Children can use group membership and stereotypes to select novel social partners (Killen et al., 2001; Theimer et al., 2001). While it is important to consider group level factors, knowing a potential social partner's individual history of excluding others is also directly relevant to determining whom to interact with. Children may gain this knowledge through direct observation of third-party interactions or through social gossip concerning a potential partner's reputation. However, children should also consider their own personal history with a potential social partner. Prior social interactions provide a strong basis for judging the likelihood of re-inclusion after experiencing social exclusion. Knowing and appropriately recalling who had previously excluded or included them would provide the child with valuable information when searching for or selecting a social partner to connect with. By tracking information about previous social partners and evaluating

them, children can reduce the likelihood of further exclusion and, moreover, can share this information with others.

To adopt this strategy, children must first detect instances of social exclusion and then evaluate the excluders. Some social psychologists suggest that humans have evolved an "*ostracism detection system*," which serves as an early warning system to motivate responses that limit the consequences of social exclusion (Spoor & Williams, 2007). This system is highly sensitive and activates when adults witness instances of social exclusion (Giesen & Echterhoff, 2017; Wesselmann et al., 2009). The activation is automatic and even occurs in situations where being excluded is beneficial. For instance, social exclusion triggers the system when people are excluded by undesirable social partners (e.g. members of the KKK), when exclusion is financially beneficial, and when exclusion is carried out by pre-programmed computer players (Gonsalkorale & Williams, 2006; van Beest & Williams, 2006; Zadro et al., 2004).

Research with children provides evidence that this "*ostracism detection system*" may be operating early in life. Children engage in cognitive processes that increase the likelihood of social connection and reduce consequences of exclusion. After witnessing animated shapes depict social exclusion, 4- and 5-year-olds draw more affiliative pictures, suggesting that they think more about social belonging (Song et al., 2015). Experiencing social exclusion reorients children's social motivations to the intentions and thoughts of others (White et al., 2016). Children who have watched social exclusion or have been excluded engage in behaviors that are beneficial for strengthening social bonds, such as imitation and sitting in closer

proximity to others (Over & Carpenter, 2009; Marinovic et al., 2017; Watson-Jones et al., 2015). Together, these studies indicate that children detect instances of exclusion when it happens to other people and when it happens to themselves. However, the measures adopted in these studies have focused primarily on how detection motivates behaviors that might facilitate social connection, rather than how detection influences children's thoughts about the exclusion event itself or those who perpetrated it.

A separate body of work clearly demonstrates that children make moral judgments about acts of social exclusion. Three-year-old children describe social exclusion as an isolating experience and state that it is bad to exclude others (Theimer et al., 2001). They also display more nuanced reasoning about exclusion events, distinguishing between different reasons for excluding and allowing context to moderate the wrongness of the act (Killen et al., 2013; Killen et al., 2001). Despite the clear evidence that children reason about the act of social exclusion, these studies similarly do not ask children to socially evaluate the excluders themselves.

Two studies have specifically looked at children's evaluations of social excluders. First, Hwang and colleagues (2017) investigated 2- and 3-year-olds preferences after observing third-party social exclusion. Children watched a puppet exhibit distress after being excluded from play by two other puppets. When later asked to indicate which puppet they wanted to play with, only 3-year-olds preferred the distressed, excluded puppet. This suggests that 3-year-olds may have tracked the identities of the excluders and evaluated them in some capacity. However, it is not clear if children's play preferences were actually driven by a negative evaluation of the excluder, whom they subsequently sought to avoid. It is possible that children's

preferences were driven by sympathy for the excluded puppet. Moreover, in another condition in which the excluded puppet showed no signs of distress, children did not significantly prefer it. This raises the possibility that children were primarily influenced by one puppet's distress, independent of the preceding exclusion event.[1]

In a second study, Hwang & Markson (2020) investigated 3- to 6-year-old children's reactions to being personally excluded from play. Like the work reported here, this study examined whether children detect social exclusion as well as children's evaluations of social excluders compared to includers. In the first experiment, 3-, 4-, and 5- through 6-year-old children experienced exclusion and inclusion via a live ball-toss paradigm. Three- and four-year-olds did not identify which characters played with them more, or state that they liked includers more than excluders. In contrast, 5- through 6-year olds' answers were clearly based on their prior experiences of exclusion and inclusion. These children identified that excluders did not play with them and stated that they liked includers more. In a second experiment using a computer-based ball-toss game, 3- to 6-year-olds evaluated social excluders relative to novel characters and social includers relative to novel characters. Younger children, comprised of 3- and 4-year-olds, stated that excluders did not share more than they stated includers did not share, suggesting they may have identified social exclusion. Younger children also stated that excluders were mean, but exclusion did not seem to influence children's play preferences. Older children,

[1] The authors included an inclusion with distress condition, which they used to argue against the account I have provided here. In that condition, the third puppet was included but showed signs of distress. In this condition, children did not prefer to play with either the including or distressed included puppet. They argue that distress was not enough to motivate children's play choices in distressed exclusion condition. However, it is also possible that children's play choices are driven by warranted, rather than unwarranted, distress (Hepach et al., 2013). Therefore, it is unclear if children's sympathy for a puppet in warranted distress influenced their play choices.

comprised of 5- and 6- year-olds, evaluated excluders as mean, identified that they didn't share, and chose to play with novel characters more often.

In sum, research by Hwang and colleagues (2017, 2020) suggests that children are capable of detecting social exclusion and that they evaluate social excluders in some situations. However, it is surprising that in a procedure that realistically depicts the sort of social exclusion that 3- and 4-year-olds often experience—i.e., being denied game participation by others—young children failed to even identify social excluders. This result would not be predicted by theories of ostracism response systems that posit innate sensitivity to being excluded (e.g., Hawes et al., 2012; Williams & Zadro, 2004). Moreover, it is even more surprising that 3-year-olds who do detect their own exclusion, and who subsequently view excluding characters as less nice, do not also base their social preferences on these evaluations.

The present study examined children's evaluations of characters who directly exclude them versus characters who include them. Although it was initiated prior to Hwang and Markson (2020)'s research, both our research questions and the overall approach of our projects are quite similar. The present research thus offers an opportunity to better understand whether young children accurately identify social excluders and the developmental trajectory of children's evaluations of social excluders in two ways. First, the present work can be viewed as a conceptual replication of Hwang and Markson's (2020) main findings. Additionally, as discussed below, our investigation is strengthened by several methodological departures from those used by Hwang and Markson (2020).

Experiments 1 and 2 investigated whether children detect and evaluate social excluders relative to social includers. Experiment 1 served as our initial attempt to understand whether 4-year-old's viewed social excluders negatively, relative to social includers. Children completed a resource allocation task, responded to an evaluative question, answered two questions comparing characters, and recommended a friend for a novel third-party. The unexpected findings in Experiment 1 raised new questions about the conditions under which young children recognize that they are being excluded and how they encode these experiences. To address some of these questions, Experiment 2 continued to examine children's evaluations of social excluders by expanding the age range to include 4- through 6-year-olds and included further methodological improvements.

Experiment One

Experiment 1 investigated whether 4-year-old children viewed social excluders more negatively than social includers. To ensure that children had enough time to detect social exclusion, participants played two in-person ball toss games, similar to Cyberball, that each lasted 35 throws. These games are longer than the games in Hwang & Markson (2020), which consisted of nine throws. We chose to use 35 throws based on evidence from a meta-analysis of Cyberball research conducted with adults, which indicated that a manipulation of this duration was sufficient to induce effects of exclusion; moreover a 35-throw session is consistent in duration with other research conducted with similarly aged children (Hartgerink et al., 2015; Watson-Jones et al., 2016; White et al., 2016).

Following the exclusion and inclusion games, we measured children's views of excluding players relative to including players in multiple ways. First, children completed a resource distribution task similar to Hwang and Markson's (2020). Children's distribution choices were thought to reflect their preference for a particular character. Second, children answered questions comparing the characters on both positively and negatively valenced traits. We chose comparative questions because answering would lead children need to compare their experiences with both characters to answer, rather than just focusing on their feelings about one character. The first question was an evaluation question similar to the evaluation question asked by Hwang and Markson (2020), i.e. "Which mouse is meaner?". We also asked two comparison questions to investigate whether children's views of social excluders influenced their expectations of prosocial behavior or expectations for other facets of the characters' social lives. Finally, because children engage in prosocial gossip, children completed a friendship referral measure (Engelmann et al., 2016). By asking children to recommend a playmate for another individual, we can see if children apply their prior experiences of others to their social reasoning in a way that can be shared with, or is applicable to, others. For instance, children may recommend that others avoid the exclusive character. By helping a novel character avoid exclusion, children could further signal that they are good social partners and increase their likelihood of positive future interactions.

We focused on the responses of 4-year-olds because prior research indicates that the children at this age respond to social exclusion with behaviors aimed at increasing social connection, and may therefore detect social exclusion (Marinovic et

al., 2017; Watson-Jones et al., 2014). Moreover, children's reasoning about social exclusion suggest that children in this age range would detect exclusion (Theimer et al., 2001).

Methods

Participants

Thirty-two 4-year-old children (19 female, *mean age* = 4.52 years, *range* = 4.00 years - 4.99 years). Participants were recruited from a database of families in the suburbs of a mid-Atlantic city. All participants were typically developing and had normal, or corrected to normal, vision and hearing and all participants heard English at least 70% of the time. Based on parent report, our sample was 68.75% White, 15.61% Black, 9.37% Asian, and 9.06% Hispanic. Parents provided informed consent prior to the start of the experiment. All participating children received a small gift at the end of the study.

An additional 7 children participated but were not included in the final analyses for the following reasons: two children did not answer all of the test questions, two were excluded due to technology issues, and one was excluded because of parental interference.

Materials

Set Up. Two experimenters ran this experiment. Experimenter 1 interacted with the child directly, and Experimenter 2 controlled all of the puppets from behind the stage while obscured from the child's view. Children sat in a chair centered in front of the puppet stage. The stage consisted of two pieces: a black foam board covering a table and a black curtain draped over additional foam board to block the

child's view of Experimenter 2. A yellow puppet "house" and an orange puppet "house" sat on either end of the stage.

Puppets. Children interacted with several animal puppets during the experiment. All puppets, except one, wore monochrome outfits to help children track their identities. To determine outfit colors, we conducted preference tests for two color combinations, green/blue and yellow/orange, with an additional 15 children. Children in this sample showed no color preferences in. For this reason, blue and green outfits were used for the puppets in the practice task and the yellow and orange outfits were used for the including and excluding puppets.

Two identical bear puppets, one wearing blue and one wearing green, were used in the practice allocation task. Four identical mouse puppets played inclusive and exclusive ball toss games with the participating children. One pair wore yellow outfits and the other pair wore orange outfits. A final puppet, a horse, served as the novel third-party character in the friend referral task.

Design

The color of the outfits worn by the excluding mice, the side of the stage the excluders appeared on, and the order of the ball-toss games were counterbalanced across children. After playing both games, children always completed the test measures in a fixed order. First, they allocated resources between one mouse from each game, then they answered the comparative questions in a fixed order (e.g., "Who is meaner?" "Who is a better sharer?" "Who has more friends?"), and they completed the friend referral task last.

Procedure

See *Figure 1*.

Introductions. The child and Experimenter 1 sat in front of the puppet stage while Experimenter 2 controlled the puppets. One pair of mouse puppets appeared on stage, and Experimenter 1 introduced them by emphasizing the color of their outfits and indicating where they lived (e.g. “These are the yellow mice. They have yellow shirts and live in this yellow house."). Then, Experimenter 1 initiated a practice throw sequence with the participant. Experimenter 1 threw a ball to one of the mice, that mouse threw the ball to the participant, and Experimenter 1 asked the participant to throw the ball to one of the mice. After a successful throw, the first pair of mice left the stage and the second pair appeared. They were introduced in the same manner (e.g., “These are the orange mice. They have orange shirts and live in this orange house”) and the same practice throw sequence occurred.

After meeting both pairs of mice, children were introduced to the bear puppets and practiced allocating resources between them. The experimenter placed a small box with a cover in front of each bear. The cover had a small opening to allow children to allocate items, but to hide previously allocated items from view. After placing the boxes, Experimenter 1 explained that the child could give an object to a specific bear by placing it in the puppet’s box. Experimenter 1 placed four tokens between the bears. The child received one token at a time and Experimenter 1 asked them to indicate who they wanted to give it to. Once the child allocated all four tokens, the bears left the stage.

Inclusion and Exclusion Games. One group of mice, based on the counterbalanced order (e.g. orange pair first, yellow pair second), returned to the stage. Experimenter 1 stood up, announced that she needed to work, and sat with her back to the stage approximately 65 inches away. The mice reintroduced themselves to the child and initiated one of two games. During the inclusion game, children received the ball twice in the first five throws, and then each player received the ball an equal number of times during the final 30 throws. During the exclusion game, the initial five throws followed the same pattern as in the inclusion game, but the mice only threw the ball to each other during remaining 30 throws. This set up is similar to Cyberball, an online ostracism game that has been used successfully with young children (Watson-Jones et al., 2016; Williams et al. 2000). After the first game ended, the mice left the stage and the second pair of mice joined the child. Then, the mice reintroduced themselves and played the remaining ball toss game with the child.

Dependent Measures. After children played both games, Experimenter 1 returned and one mouse from each pair appeared on the stage. Experimenter 1 then initiated the resource allocation task by placing a box in front of each mouse and producing three bells. As in the practice trial, children received one bell at a time and chose which mouse to give it to.

After all of the bells were allocated, Experimenter 1 asked children three questions comparing the social includer and excluder. The first question, "Which mouse is meaner?", probed children's evaluations of the characters. The second, "Which mouse is a better sharer?", indicated children's expectations of prosocial behavior by the characters. The third question, "Which mouse has more friends?",

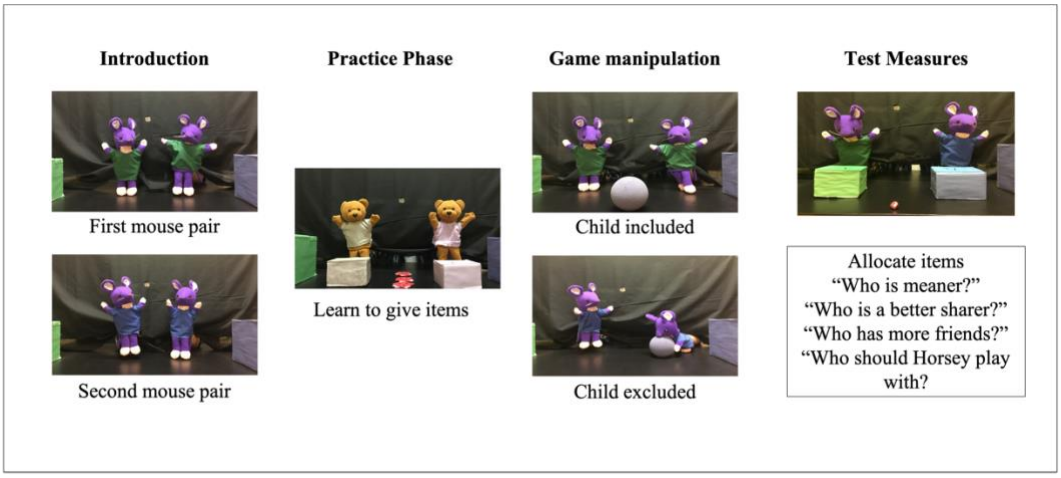
investigated whether children formed expectations for the character's social lives outside of the game environment. Once children answered each comparison question, Experimenter 1 repeated their answer and asked them to explain their choice.

Finally, Experimenter 1 introduced the child to a new puppet named Horsey, who wanted to play catch. Children indicated which mouse puppet they recommended that Horsey should play with.

Cool Down. When children completed all dependent measures, they played catch with one mouse puppet from each game. This game lasted for two minutes, or until the children chose to stop playing. This allowed children to have positive experiences with both puppets and to ensure they left the experiment in a good mood.

Figure 1

Schematic Depiction of Experiment 1 Procedure



Note. Children were introduced to the mice individually, practiced allocating items with bears, and then played inclusion and exclusion games which lasting approximately 90s. The test measures were asked in a fixed order.

Coding

Two coders, who were blind to which mouse pair excluded the participant, recorded children's responses to the dependent measures using Datavyu (Datavyu Team, 2014). Reliability between coders was perfect (Cronbach's alpha = 1).

Statistical Approach

We analyzed children's responses for the resource allocation, each comparative question, and the friend referral separately. Each measure was analyzed using two steps. First, preliminary analyses focused on whether counterbalancing factors or gender predicted children's responses in a generalized linear model. Follow-up analyses investigated whether children's responses significantly differed from chance. Scores for the three resource allocations (0 = excluder; 1 = includer) were added together and the sum was compared to chance in a two-tailed, one-sample t-test (*mu* = 1.5). Two-tailed binomial tests examined whether children's first allocation choice, responses to each comparative question, or friend referrals differed from chance (p = 0.50).

Results

Overall Sample

Counterbalancing factors, child's age, and gender did not significantly predict children's responses to any test measure. All results are summarized in *Figure 2*.

Resource Allocation. Children's allocation scores (M = 1.50, SD = 0.57) did not differ significantly from chance (mu=1.50), $t(31) = 0.00$, $p = 1.00$. Children's first

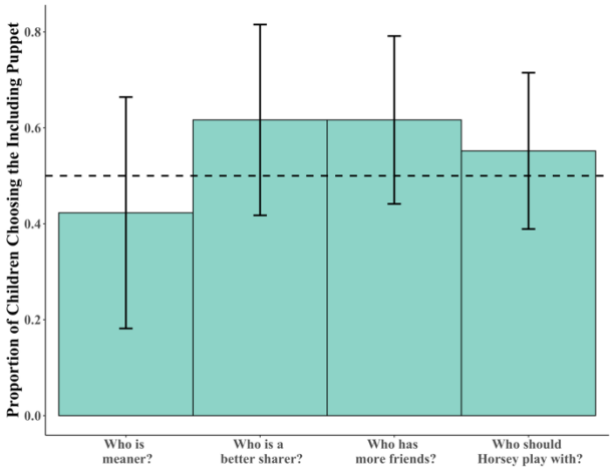
allocation choices also did not differ significantly from chance (12 of 32 to the includer, $p = 0.21$).

Comparative Questions. One child chose both mice for all three comparative questions, so their responses were not included in the analyses. In the remaining sample, children did not evaluate the excluding puppet as meaner more often than chance (18 of 31, $p = 0.47$). They also did not state that the includer was a better sharer or that the includer had more friends (both 19 of 31, $p = 0.28$).

Friend Referral. Children did not refer the inclusive puppet as a play partner more often than chance (18 of 32, $p = 0.59$).

Figure 2

Children's Responses in the Overall Sample



Note. Bars indicate the proportion of children choosing the includer over the excluder for each question, and error bars represent the 95% confidence interval around the measure's mean. Children's responses did not differ from chance.

Exploratory Analyses

We were surprised that children did not view their own excluders as meaner than includers. To investigate children's responses more thoroughly, we explored the responses of children who identified the includer as a better sharer (n = 19). While we did not originally view this question as a memory check, using it as such is consistent with the identification question used in Experiment 2 by Hwang and Markson (2020; "Did these players share or not share the ball with you?"). Results are summarized in *Figure 3*. As before, counterbalancing factors and gender did not predict children's responses.

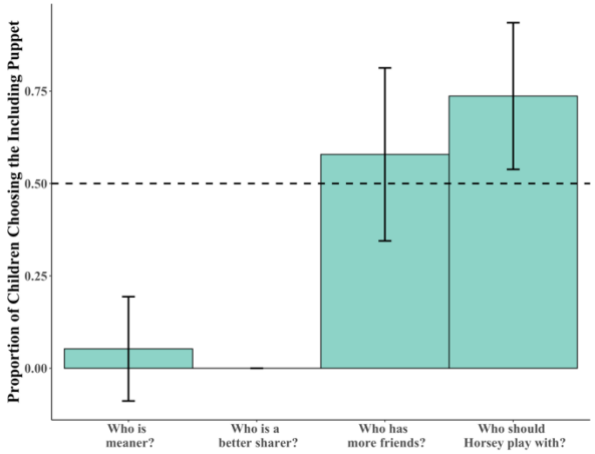
Resource Allocation. Children who indicated that the includer was a better sharer ($M = 1.63$, $SD = 0.60$) did not allocate more resources to the including puppets over the excluding puppets, $t(18) = 0.96$, $p = 0.34$. They also did not give the first item to includers more often than to excluders (8 of 19, $p = 0.65$).

Comparative Questions. Children identified the excluder as meaner than the includer (18 of 19, $p < 0.001$), but did not think includers had more friends (11 of 19, $p = 0.65$).

Friend Referral. Children's friend referrals did not differ significantly from chance (14 of 19, $p = 0.06$).

Figure 3

Exploratory Analyses in Experiment 1



Note. The responses of 4-year-olds who identified the includer as a better sharer for the comparative questions and friend referral in Experiment 1. Bars indicate the proportion of children choosing the includer over the excluder for each question, and error bars represent the 95% confidence interval around the measure's mean. Children evaluated the excluder as meaner more often than chance.

Discussion

Experiment 1 investigated four-year-olds' evaluations of those who exclude them relative to those who include them. Surprisingly, children in the overall sample did not allocate more resources to social includers, did not view excluders as meaner than includers, and did not preferentially recommend includers as play partners for a new character. However, our exploratory analyses suggest that at least some children may have viewed excluders and includers differently. Approximately 60% of children identified the includer as a better sharer. If we use this question as a memory check,

we see preliminary evidence that at least some 4-year-olds view excluders more negatively than includers. Specifically, these children thought the excluder was meaner, suggesting that they may have evaluated the excluders negatively, relative to those who included them. We thus conducted Experiment 2 to clarify the findings from Experiment 1 and to further investigate the developmental trajectory of children's evaluations of social excluders.

Experiment Two

Experiment 2 extended our investigation of children's evaluations of social excluders and includers in three ways. First, building from the exploratory analyses conducted in Experiment 1, we now built an explicit memory check question into the study (e.g. "Who played with you more?"). Our planned analyses now included only the children who answered the memory check question correctly. Second, we expanded the age range upward, to include 4-, 5-, and 6-year-old participants, to assess possible developmental changes in children's responses. Third, we adopted several methodological improvements to the procedure.

The methodological improvements involved changes to both the game-play manipulation and to the test measures. One reason that children in Experiment 1 may not have viewed excluders negatively is that children did not realize that the two pairs of mice were different characters. To reduce the likelihood of this occurring, we introduced both pairs of mice to children at the same time. It was also possible that practicing playing catch with the mice prior to the games influenced how children viewed the excluding mice. We removed this possible influence by having children practice playing catch with the bears rather than the mice. Finally, to avoid children

becoming distracted by Experimenter 1 during the ball toss games, Experimenter 1 removed themselves from the child's sight by going behind a curtain in Experiment 2.

We also made several improvements to how we conducted our test measures. First, we counterbalanced the order of evaluative questions to remove any possible order effects. Second, children responded to test measures using pictures of the puppets rather than having the puppets physically present on stage. We made this change to reduce the possible threat children may feel when negatively evaluating the excluders (e.g., calling excluders mean may be easier if they are not physically present).

Finally, we refined our dependent measures themselves, to better focus on how children evaluate social excluders relative to includers. To better assess children's evaluations, we added an additional question, "Who is nicer?", to complement the question about relative meanness. We also removed the "Who has more friends?" question because it was unclear whether there was a specific response that children could be expected to give. For instance, the excluder could have more friends so they can afford to be more selective about who they choose to interact with, but includers could also have more friends because they play more with others, as compared to excluders. Finally, as noted above, we added an explicit memory check to the end of the study session (e.g. "Who played with you more?").

Methods

Participants

Ninety-six 4- to 6-year-old children, divided equally across three age ranges[2] (4-year-olds: 17 female, *mean age*= 4.32 years, *range* = 4.04-4.99 years; 5-year-olds: 17 female, *mean age* = 5.52 years, *range* =5.0-5.98 years; 6-year-olds: 16 female, *mean age* = 6.29 years, *range* = 6.00 – 6.89 years), participated in this study. Children were recruited from the same database used in Experiment 1. All participants in the final sample were typically developing, had normal, or corrected to normal, vision and hearing and all participants heard English at least 70% of the time. Based on parent report, our sample was 69.79% White, 13.54% Black, 3.12% Asian, and 6.25% Hispanic. All participating children received a small gift at the end of the study.

An additional 19 children (seven 4-year-olds; seven 5-year-olds; 5 6-year-olds) participated but were not included in the final analyses for the following reasons: five children did not complete the full experiment, two children previously participated in Experiment 1, four due to technology issues, one because of parental interference, seven because of experimenter error.

[2] Data with 4- and 5-year-olds were collected prior to the dissertation proposal. We decided to collect data with 6-year-olds on the basis of results from 4- and 5-year-olds. All three age ranges are presented together, and a combined analysis examines effects across age groups.

Materials

Set Up. As in Experiment 1, two experimenters conducted the experiment and performed the same roles. Children sat in the same location and the same puppet stage was used. Blue and green puppet "houses" sat on either end of the stage.

Puppets. Children interacted with the same puppets as in Experiment 1. However, the puppets wore different colored outfits. The bears wore purple and grey outfits. The mice wore blue and green outfits.

Design

As in Experiment 1, the color of the outfits worn by the excluding mice, the side of the stage the excluder appeared on, and the order of the ball-toss games were counterbalanced across children. Children completed the test measures in a counterbalanced order. Comparative questions, including the "nicer" and "meaner" evaluation questions, were interspersed among three 1-item resource allocation tasks. Specifically, children allocated a unique resource between the mice and subsequently answered one unrelated comparative question. This pattern repeated until all three resources and all three comparative questions were asked. The specific items allocated occurred in a fixed order (box, cheese, then bell). Comparative evaluation questions were asked in one of six counterbalanced orders. The final two questions—the friend referral and the new memory check—were asked in a fixed order after the other test measures were completed.

Procedure

See *Figure 4.*

Introductions. As in Experiment 1, the child and Experimenter 1 sat in front of the puppet stage. Then, the two pairs of mice appeared, and Experimenter 1 introduced them to the child. After the introductions, the mice left the stage and the two bears appeared. Children practiced throwing the ball using the throw sequence from Experiment 1 and practiced allocating resources with the bears. The procedure for the practice resource allocation was the same as in Experiment 1.

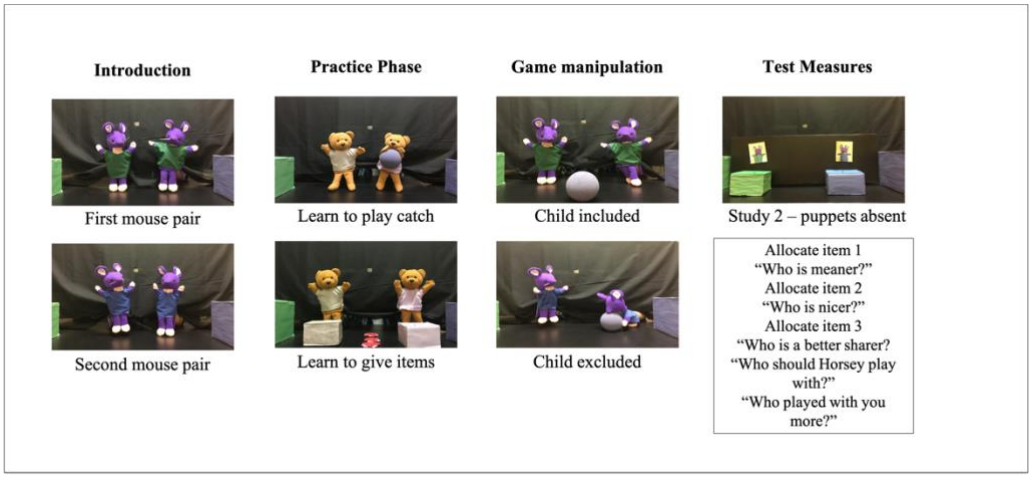
Exclusion and Inclusion Games. After the introductions, Experimenter 1 stood up and announced that she needed to finish some work. She sat behind a curtain while the child participated in both the exclusion and inclusion games. Both game procedures were identical to those used in Experiment 1.

Dependent Measures. After children played both games, Experimenter 1 returned and one mouse from each pair appeared on stage. Experimenter 1 placed a cardboard wall between the child and the mice. The wall displayed a picture of each mouse on their respective side of the stage. Experimenter 1 explained that the mice would not be present while she asked the child the test questions. Experimenter 1 also placed a box in front of each mouse picture for the allocation tasks. Experimenter 1 reminded children how to give objects to the chosen mouse and initiated the first allocation task by handing the child a block. After allocating the block, Experimenter 1 asked the first comparative question (e.g. “Who is a better sharer?”). When the child responded, Experimenter 1 prompted the child to explain their response. Once children explained their choice, they allocated a piece of cheese to one of the mice, answered another comparative question (e.g. “Who is meaner?”), allocated a bell, and answered the last comparative question (e.g. “Who is nicer?”). Next, children

completed the friend referral question from Experiment 1 and then answered the memory check.

Figure 4

Schematic Depiction of Experiment 2 Procedure



Note. Children were introduced to the mice at the same time, practiced with bears, and then played inclusion and exclusion games, lasting approximately 90s. The inclusion and exclusion games lasted approximately 90s. This schematic includes an example order of the counterbalanced comparative questions.

Coding

Coding procedures were the same as in Experiment 1. Coders recording children's responses to dependent measures had near perfect reliability (Cronbach's alpha= 0.99). Any discrepancies were resolved through discussion with the first author.

Statistical Approach

We first investigated whether 4- to 6-year-olds viewed social excluders more negatively than social includers. We analyzed children's responses to each measure separately. We conducted preliminary analyses to determine if counterbalancing factors, children's age (in months), or children's gender predicted children's responses in a generalized linear model. Then, follow-up analyses investigated whether children's responses significantly differed from chance. Scores for the three resource allocations (0 = excluder; 1 = includer) were added together and the sum was compared to chance in a two-tailed, one-sample t-test (*mu* = 1.5). Children's meaner and nicer responses were coded (meaner: 0 = includer, 1= excluder; nicer: 1= includer, 0 = excluder) to create a combined evaluation score for each child. This score was compared to chance using a two-tailed, one-sample t-test (*mu* = 1.00). Two-tailed binomial tests examined whether children's first allocation choice, responses to each comparative question, friend referrals, or memory check differed from chance (p = 0.50).

Based on the findings from Experiment 1, we thought children who accurately answered the memory check may evaluate excluders and includers differently than those who did not. For this reason, our primary analyses included only the group of 4- to 6-year-old children who accurately identified the includers. These analyses matched those conducted on the full sample of children.

To compare our results to the exploratory findings from Experiment 1, we examined the responses of 4-, 5-, and 6-year-olds separately. As with the combined sample, we first examined the responses of all children and then proceeded to our

planed analyses that were conditional on correct responses to the memory check. The analysis steps taken within each age group were the same as those run on the combined sample.

Results

Combined Sample

All Participants. The following section examines the responses of all children, regardless of their performance on the memory check. The counterbalancing factors, children's age, and children's gender did not predict their responses to the test measures. *Figure 5* summarizes the results by age.

Resource Allocation. Children's allocation scores (M = 1.50, SD = 0.58) did not favor the including mouse, $t(95) = 0.00$, $p = 1$. Children did not favor the includer in their first allocation choice (39 of 96, $p = 0.08$).

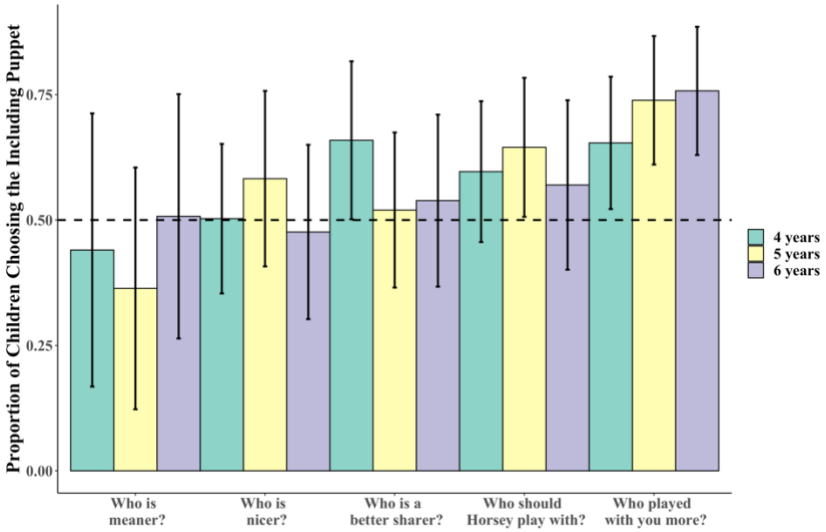
Comparative Questions. Children (M = 1.08, SD = 0.93) did not evaluate excluders more negatively than includers based on their combined evaluation scores, $t(95) = 0.88$, $p = 0.38$. When we examined the evaluation questions separately, children did not identify the excluder as the meaner (54 of 96, $p = 0.26$) or the includer as nicer more often than chance (50 of 96, $p = 0.76$). Children also did not select the includer as a better sharer more often than chance (55 of 96, $p = 0.18$).

Friend Referral. Children did not recommend the includer as a playmate more often than chance (58 of 96, $p = 0.052$).

Memory Check. Children accurately answered the memory check more often than chance (68 of 95, $p < 0.01$).

Figure 5

Children's Responses in the Combined Sample



Note. Children's responses to the evaluation, comparative, friend referral, and memory check questions in Experiment 2. Bars indicate the proportion of children choosing the includer over the excluder for each question, and error bars represent the 95% confidence interval around the measure's mean.

Accurate Memory Check. Subsequent analyses involved only the children who answered the memory check question correctly (n = 68). Unless otherwise indicated, counterbalancing factors, children's age, and children's gender did not predict responses. *Figure 6* summarizes children's responses to the comparative questions, friend referral, and memory check by age.

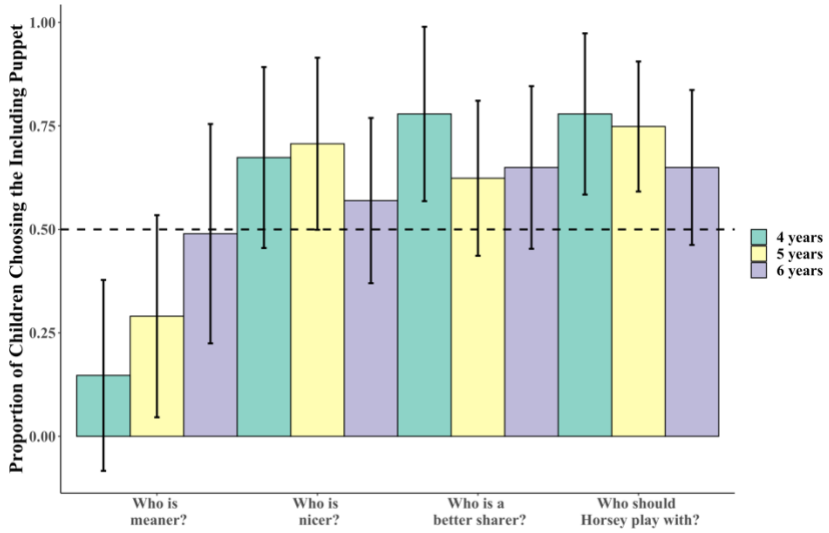
Resource Allocation. Children's allocation scores (M = 1.54, SD = 0.56) did not indicate a preference for the including mouse, $t(67) = 0.65$, $p = 0.52$. Children did not favor the includer in their first allocation choice (31 of 68, $p = 0.54$).

Comparative Questions. Children who accurately responded to the memory check (M = 1.32, SD = 0.87) evaluated excluders more negatively than includers based on their combined evaluation scores, $t(67) = 3.06$, $p = 0.003$. When we examined the evaluation questions separately, children identified the excluder as meaner (46 of 68, $p = 0.004$) and the includer as nicer more often than chance (44 of 68, $p = 0.02$). Children also indicated that the includer was a better sharer more often than chance (46 of 68, $p = 0.004$).

Friend Referral. Children who answered the memory check accurately also recommended the includer as a playmate (49 of 68, $p = 0.003$).

Figure 6

Responses of Children who Answered the Memory Check Accurately



Note. The responses of children who accurately answered the memory check to the evaluation, comparative, and friend referral questions in Experiment 2. Bars indicate the proportion of children choosing the includer over the excluder for each question, and error bars represent the 95% confidence interval around the measure's mean.

Four-Year-Olds

All Four-Year-Old Participants. Unless indicated, counterbalancing factors and children's gender did not predict children's responses.

Resource Allocation. Children's allocation scores (M = 1.59, SD = 0.61) did not differ significantly from chance (mu = 1.5), $t(31) = 0.86$, $p = 0.39$. Children also did not favor the includer in their first allocation choice (13 of 32, $p = 0.38$).

Comparative Questions. Four-year-olds (M = 1.06, SD = 0.91) did not evaluate the excluder more negatively than the includer, $t(31) = 0.38$, $p = 0.70$.

Order of the games significantly predicted children's individual meaner and nicer evaluations (b = -1.89, z = -1.93, $p = 0.05$; $b = 1.61$, $z = 1.99$, $p = 0.04$). Children who experienced exclusion in the second game stated that the excluding puppet was meaner more often than chance (13 of 17, $p = 0.049$). Children who experienced exclusion second were also more likely to identify the includer as nicer, but this did not occur more often than chance (11 of 17, $p = 0.33$).

Overall, 4-year-olds did not indicate that the excluder was meaner more often than chance (19 of 32, $p = 0.38$) or that the includer as nicer (15 of 32, $p = 0.86$). Children also did not identify the includer as a better sharer (20 of 32, $p = 0.21$).

Friend Referral. Gender significantly predicted 4-year-old's friend recommendations. Male children were more likely than females to refer the excluder as a play partner ($b = -3.57$, $z = -2.36$, $p = 0.02$). Overall, 4-year-olds' referrals did not differ significantly from chance (18 of 32, $p = 0.59$).

Memory Check. Gender significantly predicted children's memory check responses. Female children were more likely than male children to identify that the

includer played with them more (b = 2.31, z = 2.60, p = 0.02). Four-year-old females answered the memory check accurately more often than chance (13 of 16, p = 0.02). Overall, 4-year-olds did not answer the memory check correctly more often than chance (19 of 31, p = 0.28).

Accurate Four-Year-Old Participants. Subsequent analyses involved only the 4-year-olds who accurately answered the memory check (n = 19). Unless otherwise indicated, counterbalancing factors and children's gender did not predict children's responses.

Resource Allocation. Children who answered the memory check correctly (M = 1.74, SD = 0.45) allocated more resources to the includer than the excluder, $t(18)$ = 2.28, p = 0.03. Children did not favor the includer in their first allocation choice (9 of 19, p = 1).

Comparative Questions. Children (M = 1.53, SD = 0.69) evaluated the excluder more negatively than the includer, $t(18)$ = 3.29, p = 0.004.

Order of the games significantly predicted who children evaluated as meaner (b = -1.89, z = -1.93, p = 0.05; b = 1.61, z = 1.99, p = 0.04). Children who experienced exclusion in the second game stated that the excluding puppet was meaner more often than chance (13 of 17, p = 0.049).

Four-year-olds identified the excluder as meaner (16 of 19, p = 0.004), but did not identify the includer as nicer more often than chance (13 of 19, p = 0.17). Children also stated the includer was a better sharer (15 of 19, p = 0.02).

Friend Referral. Children recommended the including puppet as a playmate more often than chance (15 of 19, p = 0.02).

Five-Year-Olds

All Five-Year-Old Participants. Counterbalancing factors and gender did not significantly predict children's responses to any test measure.

Resource Allocation. Children's allocation scores (M = 1.44, SD = 0.56) did not differ significantly from chance (mu=1.5), $t(31) = -0.63$, $p = 0.53$. Five-year-old children also did not favor the includer in their first allocation choice (13 of 32, $p = 0.38$).

Comparative Questions. Five-year-old children (M = 1.22, SD = 0.91) did not evaluate the excluder more negatively than the includer, $t(31) = 1.36$, $p = 0.18$. When we examined the evaluation questions separately, five-year-old children did not identify the excluder as meaner (20 of 32, $p = 0.21$) or the includer as nicer (19 of 32, $p = 0.38$) more often than chance. Children also did not identify the includer as a better sharer (17 of 32, $p = 0.86$).

Friend Referral. Children did not recommend the includer as a play partner more often than chance (21 of 32, $p = 0.11$).

Memory Check. Overall, 5-year-olds answered the memory check correctly more often than chance (24 of 32, $p = 0.007$).

Accurate Five-Year-Old Participants. Subsequent analyses involved only the 5-year-olds who accurately answered the memory check (n = 24). Unless

otherwise indicated, counterbalancing factors and children's gender did not predict children's responses.

Resource Allocation. Five-year-olds (M = 1.46, SD = 0.59) did not allocate more resources to the includer than the excluder, $t(23) = -0.35$, $p = 0.73$. Children did not favor the includer in their first allocation choice (11 of 24, $p = 0.84$).

Comparative Questions. Five-year-old children (M = 1.42, SD = 0.88) evaluated the excluder more negatively than the includer, $t(31) = 2.31$, $p = 0.03$. When we examined the evaluation questions separately, 5-year-olds did not identify the excluder as meaner (17 of 24, $p = 0.06$) or the includer as nicer (17 of 24, $p = 0.06$) more often than chance. Children also did not identify the includer as a better sharer (15 of 24, $p = 0.31$).

Friend Referral. Children recommended the includer as a play partner more often than chance (18 of 24, $p = 0.02$).

Six-Year-Olds

All Six-Year-Old Participants. Unless indicated, counterbalancing factors and children's gender did not significantly predict children's responses.

Resource Allocation. Children's allocation scores (M = 1.46, SD = 0.57) did not differ significantly from chance, $t(31) = -0.31$, $p = 0.76$. They also did not favor the includer in their first allocation choice (13 of 32, $p = 0.38$).

Comparative Questions. Six-year-olds (M = 0.97, SD = 0.97) did not evaluate the excluder more negatively than the includer, $t(31) = -0.18$, $p = 0.86$. When analyzed separately, children did not identify the excluder as meaner (15 of 32, $p =$

0.86) or the includer as nicer (16 of 32, $p = 1$). Children also did not identify the includer as a better sharer (18 of 32, $p = 0.59$).

Friend Referral. Children did not recommend the includer as a play partner more often than chance (19 of 32, $p = 0.38$).

Memory Check. Six-year-olds answered the memory check accurately more often than chance (25 of 32, $p < 0.01$).

Accurate Six-Year-Old Participants. Subsequent analyses involved only the 6-year-olds who accurately answered the memory check (n = 25). Unless otherwise indicated, counterbalancing factors and children's gender did not predict children's responses.

Resource Allocation. Six-year-old children's allocation scores ($M = 1.48$, $SD = 0.59$) did not differ significantly from chance, $t(24) = -0.17$, $p = 0.87$. They also did not favor the includer in their first allocation choice (13 of 32, $p = 0.38$).

Comparative Questions. Six-year-olds ($M = 1.08$, $SD = 0.95$) did not evaluate the excluder more negatively than the includer, $t(24) = 0.42$, $p = 0.68$. When analyzed separately, children did not identify the excluder as meaner (13 of 25, $p = 1$) or the includer as nicer (14 of 25, $p = 0.69$). Children also did not identify the includer as a better sharer (16 of 25, $p = 0.23$).

Friend Referral. Children did not recommend the includer as a playmate more often than chance (16 of 25, $p = 0.23$).

Discussion

Experiment 2 investigated 4-, 5-, and 6-year-old's evaluations of those who exclude them relative to those who include them. Surprisingly, children in the overall

sample did not allocate more resources to includers, evaluate excluders negatively, or recommend the includer as a play mate. Children did not accurately identify who included them until 5-years-old.

Approximately 70% (68 of 96) of children accurately responded to the memory check. These children evaluated the excluder more negatively than the includer and indicated the includer was a better sharer. These children also recommended the novel character play with the inclusive puppet over the exclusive puppet. Taken together, these findings suggest that children who can accurately report who included them also evaluate social excluders negatively and may take their prior experiences into account when recommending a play partner for another.

We also examined children's views of includers and excluders across age groups. Four-year-olds who answered the memory check correctly evaluated excluders negatively and referred includers as play partners for others. This is consistent with our findings from Experiment 1, suggesting that children who accurately identify includers are evaluating includers and excluders in some capacity. While we expected older children to view social excluders more negatively than younger children, the opposite pattern emerged. Five-year-olds who answered the memory check correctly evaluated excluders more negatively than includers and recommended includers as play partners. Six-year-olds, however, did not evaluate excluders and includers differently. This pattern may have occurred because older children were less invested in the ball toss games. It is possible that when 6-year-olds stopped receiving the ball, they disengaged more than younger children from the

scene unfolding on the puppet stage. Six-year-olds also typically have more real-life social interactions, and the experiment may not have held their attention.

These findings must be interpreted cautiously. Although we planned to condition analyses on the accuracy of children's responses to the memory check, children's responses to this question were not independent of other dependent measures. We placed it at the end of the study so that it would not influence the primary measures of interest, but it is possible that children's responses to other dependent measures influenced their response to the memory check question. For instance, children may have desired to be consistent across questions, so if they indicated the green mouse was meaner, they may have answered that the blue mouse played with them more, even if the blue mouse did not actually include them.

Our findings from Experiment 2 are somewhat consistent with those from Hwang and Markson (2020). In the present work, 4-year-old children do not accurately identify includers overall. In Experiment 1 of Hwang and Markson (2020), children experience inclusion and exclusion during game play with puppets very similar to the procedure we employed here. In their study as well, 4-year-olds failed to identify that the excluder did not play with them.

However, our results with older children seem to diverge. In the current study, children did not evaluate excluders as meaner than includers or includers as nicer than excluders. In their Experiment 1, Hwang and Markson (2020) found that 5- and 6-year-olds evaluated social excluders negatively when compared to includers. Specifically, children in their study stated that they liked the includer more than the excluder after playing with both characters. This difference may occur because our

games were significantly longer than those used in Hwang and Markson (2020). It is possible that extending the game length influenced children's responses in two ways. First, children may have forgotten they were being excluded. It is possible that they thought they were still playing, and their role was to watch. Second, because the game was longer and because they were answering comparative questions, children had to track information about two characters and retain it.

In Experiment 2 of Hwang and Markson (2020) also found that 5- and 6-year-olds evaluate social excluders as mean and social includers as nice. While these questions are similar to the ones asked in the current study, answering these questions requires a different amount of information. In the current study, children answered comparative questions, which encouraged them to think about both characters prior to answering. While the answers to comparative questions may be based on direct comparisons of both characters, they also increase memory demands for children. Therefore, it is possible that, at least for some children, their responses indicated that the memory demand of the task was too high, rather indicating that they lacked the capacity to detect and track social exclusion. Children in Hwang and Markson's (2020) experiment evaluated characters after each game, which requires them to only track one character at a time. This may have made it easier for children to draw on prior experiences and evaluate exclusive characters negatively.

It is still surprising that 30% of the overall sample did not accurately identify those who included them. Children may have had inaccurate responses to the memory check for several reasons. First, these children may not have remembered who included them. Some children may have thought that they were playing with only one

pair of mice, when in reality each game occurred with a different pair of mice (e.g. “They changed shirts”). Other children may have had difficulty tracking the identities of the excluding and including mice because they were identical puppets wearing similar, but different colored, outfits. While using the identical puppets for each pair with similar outfits increases the likelihood that children’s responses to test questions are based on the intended manipulation (i.e. who included and who excluded them), these similarities may also create memory demands that are too high for young children.

Additionally, children’s responses may have been influenced by their emotional responses to social exclusion. If being excluded resulted in negative emotions, such as anger or frustration, children may have paid less attention to which mice included them and which mice excluded them.

Chapter 3: Children's Evaluations After Observing Social Exclusion

The experiments in Chapter 2 investigated whether 4- to 6-year-old children track and evaluate social excluders and social includers. In the overall sample, children accurately identified which characters played with them, suggesting that children tracked the social excluders. However, children did not evaluate social excluders more negatively than social includers.

Because we were interested in whether children evaluated social excluders at all, we specifically looked at the responses of children who accurately identified those who included them. Consistent with hypotheses, these children also viewed social excluders negatively. Four- to six-year-olds evaluated the social excluder as mean and the includer as nice, stated the includer was a better sharer and recommended that a new puppet play with the includer.

The Chapter 2 discussion identified two reasons why 4- to 6-year-olds failed to evaluate social excluders more negatively than includers. First, it was possible that children's emotional experiences during the game influenced their choices during the test measures. Second, children's lack of evaluation could stem from an inability to track multiple, highly similar characters at the same time. While emotions may have influenced children's responses, the primary aim of the current study was to investigate whether children detect, track, and evaluate social excluders in an experimental context with reduced memory demands.

The current study examines whether 3- to 6-year-old children detect social exclusion and evaluate social excluders in a third-party context. This study was

designed to reduce tracking demands. Children watched videos of two characters; one who was included and one who was excluded from a ball-toss game. To reduce memory demands, children answered exclusion detection questions and evaluated players immediately after observing each game. Once children watched both games, they answered a comparative memory check question and a play preference question. An additional question probed children's play partner choice further.

We focused on whether 3- to 6-year-old children detected social exclusion and evaluated social excluders because previous research suggested that children in these ages could detect social exclusion as third-party observers (Hwang et al., 2017).

Methods

Participants

We planned for the final sample to consist of 64 children (16 3-year-olds, 16 4-year-olds, 16 5-year-olds, and 16 6-year-olds). However, our preregistration (https://osf.io/2qdjf) indicated that our final sample would include any children scheduled prior to completing data collection for the intended 64 children. Our final sample contained 69 children (35 younger children: 16 3-year-olds and 19 4-year-olds; 34 older children: 17 5-year-olds and 17 6-year-olds). Participants were recruited from a database of local families in a large suburb of a mid-Atlantic city, at a local children's museum, and at an on-campus preschool. All children in the final sample were typically developing, had normal, or corrected to normal, vision and hearing, and heard English at least 50% of the time. Due to rapid on-site testing, we did not collect additional demographic information. Prior to participation,

experimenters obtained informed consent from parents. After participating, families were debriefed and thanked for their participation.

An additional 29 children (9 3-year-olds; 6 4-year-olds; 10 5-year-olds; 4 6-year-olds) participated but were not included in the final analyses for the following reasons: three children did not complete the study, three children because of a technology error, two children did not meet study eligibility, and twenty children because of experimenter error. This high dropout rate for experimenter error is due to misunderstanding of the script. Prior to asking the memory check question, the experimenter said "This is the green dog. You saw them play with the green mice" instead of "This is the green dog. You saw them with the green mice", which could influence the way children answer the question "Which dog got to play more".

Puppet Characters. Children watched videos about two dog puppets. The dogs had similar features but had different colored fur (e.g. brown and white with black spots) to help children distinguish them. Additionally, the dogs wore different shirts in the videos. Specifically, the brown dog wore a green shirt and the white dog with black spots wore a blue shirt to further aid children's ability to track them. Each dog appeared in videos with two mouse puppets. The mice were identical to each other, except that the two who appeared with the dog in the green shirt wore matching green shirts and the other two, who appeared with the dog in the blue shirt, also wore blue shirts.

Videos. The dog puppets served as the focal characters in the videos. Children met the dogs in separate introduction videos that lasted approximately 17 seconds.

The dog first walked to the center of a puppet stage, introduced themselves to the child, mentioned that they liked to dance, and then danced for 5 seconds.

Children also watched videos of two different ball toss games that each lasted approximately 70 seconds. In the inclusion video, children watched the dog play catch with the two mice. The two mice introduced themselves (e.g. “Hi. We’re the blue mice. We wear blue hats and blue shirts.”) and stated that they liked to play catch. The dog responded by saying “Me too” and the three characters proceeded to play. Each game lasted for 36 throws and all characters received the ball twelve times, so that the number of throws to each character was equal. The number of throws in each video was consistent with the number of throws in the games used in the previous study and was based on previous research with children (Watson-Jones et al., 2016). After every 5 throws, the mice exclaimed (e.g. “Woo!”) to keep children interested in the videos.

The video of the exclusion game began the same way. The two mice introduced themselves and stated that they liked to play catch. The dog replied, “Me too,” and the game began. In the exclusion game, the two mice threw the ball back and forth 18 times, so that each mouse received the ball an equal number of times in the 36 throws. The dog never received the ball in the exclusion game, and the dog did not show signs of distress.

Procedure

See *Figure 7.* After obtaining informed consent, the Experimenter placed both tablets equidistant from the child and introduced the two dogs. Then, children watched the first dog’s introduction video followed by the first ball-toss game.

Exclusion Detection Questions. When the game ended, a picture of the dog appeared. The Experimenter asked children the exclusion detection question (e.g. "Did the dog get to play or did they have to watch?"). The Experimenter provided feedback on the child's response (e.g. "That's not quite right.") and prompted children to pay attention to the dog while watching the video a second time.

Only the first exclusion detection question for each game was used in our analyses because it revealed whether children detected exclusion on their own. All children watched both videos twice to ensure they remembered what happened in each game. Children who answered the first detection question incorrectly were prompted to pay attention to the dog because we thought this would lead children to attend more to whether the dog received the ball. Children who answered the first detection question correctly still watched the videos a second time, in order to match the experiences of children who answered the first detection question inaccurately. Then, the Experimenter repeated the exclusion detection question and provided feedback.

Evaluation Question. The tablet advanced to a picture of the mice from the prior ball-toss game and the experimenter asked children to indicate whether the mice were nice or not nice. Once children responded, the Experimenter produced a 3- point smiley or frowny face scale and asked children to quantify how nice or not nice the mice were (e.g. "a little nice", "nice", or "really nice").

After children responded, the Experimenter shifted their attention to the second tablet, and reintroduced the second dog. The second dog introduced itself in

an identical introduction video and the same procedure was used to ask the exclusion detection and evaluation questions.

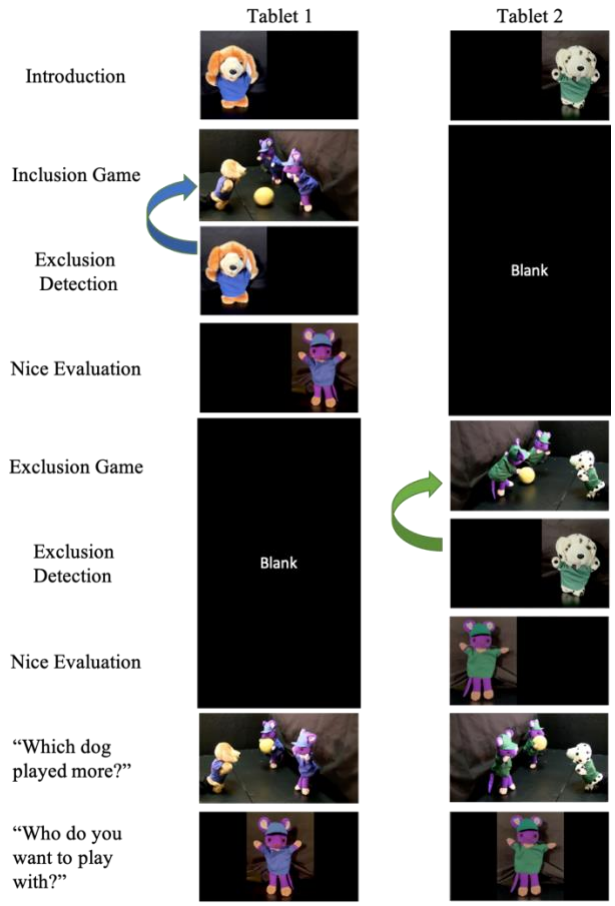
Memory Check. After completing the procedure above, the Experimenter presented the child with an image of the blue mice and dog and an image of the green mice and dog. The Experimenter asked the child to indicate which dog played more to determine if children remembered events from both games.

Play Partner Choice. The Experimenter then displayed a picture of one mouse in a green shirt on one tablet and a picture of a mouse in a blue shirt on the other tablet. Children selected the mouse they wanted to play with, and the experimenter asked children to explain why they chose a specific mouse.

Once children responded, the Experimenter removed the tablets and produced a board presenting a picture of each mouse. To further probe children's play choices, the Experimenter asked children to indicate if they selected the chosen mouse because they thought that mouse would play with them or because the other mouse would not play with them. The Experimenter asked children to explain why they thought a given mouse would or would not play with them. After answering all questions, children watched a video of one mouse from each video play with the excluded dog to reduce any potential negative feelings after watching exclusion.

Figure 7

Schematic Depiction of Experiment 3 Procedure



Note. Children in this study were introduced to each dog separately, watched them play with a pair of mice, indicated whether the dog got to play, then evaluated the mice. After watching both videos, children answered the memory check and indicated which mouse they wanted to play with more.

Coding

Two coders, who were blind to which dog was excluded, recorded children's responses to the dependent measures. Reliability between the two coders was near perfect (Cronbach's alpha = 0.99). All discrepancies were resolved through discussion with the first author.

Statistical Approach

Exclusion detection, evaluations, memory check responses, and play choices were analyzed separately. While our pre-registration indicated we would examine children's responses in the overall sample and in the subset of children who answered the memory check correctly, very few children answered the memory check inaccurately (n = 2). Only the results from the overall sample are reported below.

Exclusion Detection. We first analyzed whether children detected social exclusion more often after watching exclusion than after watching inclusion using a one-tailed McNemar test. Follow up McNemar tests investigated younger and older children's ability to detect social exclusion separately. Then, a Generalized Linear Mixed Model (GLMM) that included a random intercept for each participant analyzed children's responses. A preliminary model examined if children's age or gender, game type, or any counterbalancing factors influenced whether children detected social exclusion. Follow-up analyses were conducted if gender or any counterbalancing factor predicted children's responses. The main GLMM had a

random intercept for each participant and examined whether age, game type, or their interaction predicted children's exclusion detection.

Evaluation Questions. A paired, one-tailed Wilcoxon signed-rank test investigated whether children rated the includer more positively than they rated the excluder. Follow up Wilcoxon signed-rank tests investigated younger and older children's evaluations separately. A preliminary GLMM with a random intercept for each participant examined whether gender, age, or counterbalancing factors influenced children's evaluations. Follow up analyses probed any factors that significantly predicted children's responses. The main GLMM had a random intercept for each participant and examined whether age, game type, or their interaction predicted children's evaluations.

Comparative Questions. Children's memory check responses, play choices, and the play partner reasoning question were analyzed the same way. First, one-tailed binomial tests examined whether children's choices differed from chance (*mu* = 0.50). Follow up binomial tests examined younger and older children's responses separately. Next, a preliminary logistic regression examined whether children's age or gender, game type, or any counterbalancing factors influenced their responses. Follow up analyses probed any factors that predicted children's responses. Finally, the main logistic regressions determined if age predicted children's responses.

Results

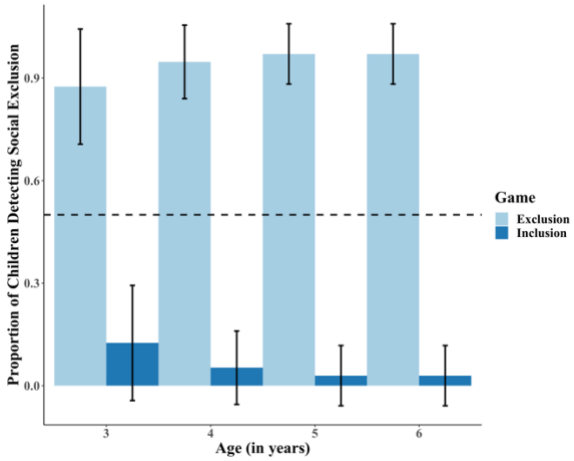
Exclusion Detection

Children's exclusion detection responses are summarized in *Figure 8*. Overall, children detected social exclusion more often after observing it than after observing

social inclusion, $\chi^2(1) = 59.02$, $p < 0.01$. Counterbalancing factors, children's gender, and children's age did not predict whether children detected exclusion. In the Generalized Linear Mixed Model, only game type predicted children's exclusion detection, $b = -27.41$, $z = -4.57$, $p < 0.01$. Children were more likely to detect exclusion after observing it than after observing inclusion. This pattern occurred both for younger children, $\chi^2(1) = 27.03$, $p < 0.01$ and for older children, $\chi^2(1) = 30.03$, $p < 0.01$.

Figure 8

Children's Exclusion Detection Responses in Experiment 3



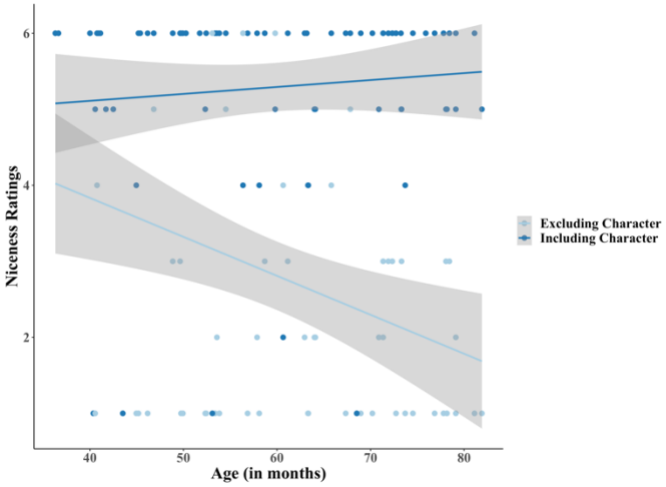
Note. Bars indicate the proportion of children who answered that the dog "had to watch" and error bars represent the 95% confidence interval around the measure's mean. Children across ages detected exclusion more often than chance and more often after watching exclusion than after watching inclusion.

Evaluation Questions.

Children's niceness evaluations are summarized in *Figure 9*. Children's niceness evaluations reflected that they thought of includers (M = 5.29, SD = 1.32) more positively than they thought of excluders (M = 2.83, SD = 1.98), V = 65.5, p < 0.01. Counterbalancing factors, children's gender, and children's age did not predict children's evaluations. In the main Generalized Linear Mixed Model, without counterbalancing factors or gender, age significantly predicted children's evaluations, b = -0.05, t(130.92) = -3.45, p < 0.01. Children were more likely to rate characters as less nice as age increased. The interaction between age and game type was also significant, b = -0.06, t(67) = 3.11, p = 0.003. Follow up Wilcoxon signed rank tests used a Bonferroni correction and indicated that 4-, 5-, and 6-year-old children rated social excluders as less nice than they rated social includers (p's < 0.03). Younger children's evaluations reflected that they thought more positively of includers (M = 5.26, SD = 1.46) than they thought of excluders (M = 3.34, SD = 2.23), V = 25.5, p < 0.01. Older children also evaluated includers (M = 5.32, SD = 1.17) as nicer than they evaluated excluders (M = 2.29, SD = 1.53), V = 4.5, p < 0.01.

Figure 9

Children's Niceness Evaluations in Experiment 3



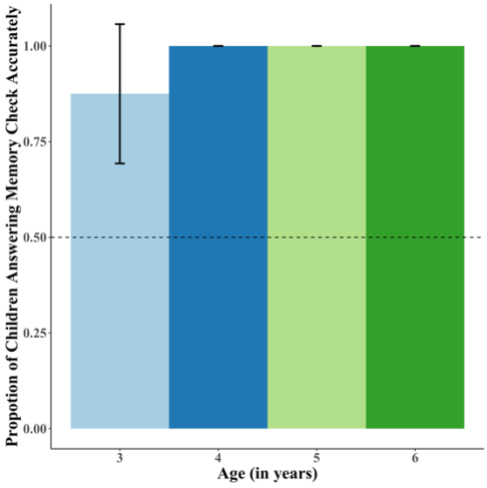
Note. Shaded regions represent the 95% confidence interval. Children evaluated the excluder more negatively across ages.

Memory Check

Children accurately answered the memory check more often than chance (67 of 69, $p < 0.01$), see *Figure 10*. Counterbalancing factors, children's age, and children's gender did not significantly predict their memory check responses. In the main logistic regression, age did not predict children's memory check responses. Younger children (33 of 35, $p < 0.01$) and older children (34 of 34, $p < 0.01$) accurately answered the memory check more often than chance.

Figure 10

Children's Memory Check Responses in Experiment 3



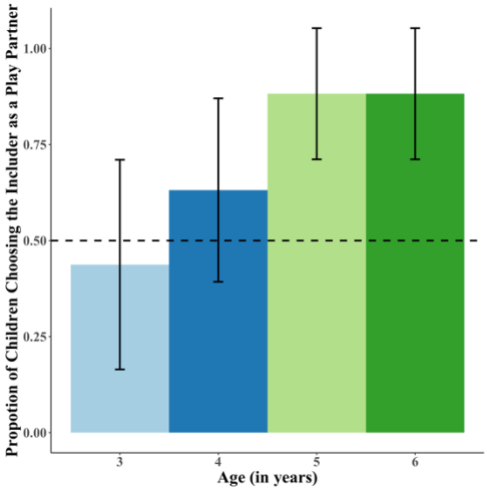
Note. Bars indicate the proportion of children who answered the comparative memory check correctly and error bars represent the 95% confidence interval around the measure's mean. All children answered the memory check accurately more often than chance.

Play Choice

Overall, children preferred the includer as a play partner rather than the excluder (49 of 69, $p < 0.01$), see *Figure 11*. Outfit color significantly predicted children's play choices, $b = 1.26$, $z = 1.97$, $p = 0.04$. Children were more likely to choose the blue puppet over the green puppet as a play partner. In the main logistic regression, age predicted children's play choices, $b = 0.08$, $z = 3.13$, $p = 0.002$. Younger children did not prefer to play with the includer more often than chance (19 of 35, $p = 0.37$), but older children preferred the includer as a play partner (30 of 34, $p < 0.01$).

Figure 11

Children's Play Preferences in Experiment 3



Note. Bars indicate the proportion of children who chose to play with the includer over the excluder and error bars represent the 95% confidence interval around the measure's mean. Older children, but not younger children, preferred to play with the includer.

Exploratory Analyses

Exploratory analyses investigated children's reasons for choosing a specific play partner. One child chose both reasons for selecting a play partner and was excluded from the current analyses. Overall, children indicated that they chose their play partner because they thought the chosen mouse would play with them (56 of 68, $p < 0.01$). Counterbalancing factors, children's age, and children's gender did not predict the selected reason for choosing a play partner. In the main logistic model, children's age did not predict the reason given for choosing a play partner. Both

younger (28 of 34, $p < 0.01$) and older children (28 of 34, $p < 0.01$) thought their choice would play with them.

Discussion

The current study investigated whether 3- to 6-year-old children track, evaluate, or disprefer social excluders. Across all ages, children detected social exclusion after it occurred. Importantly, children did not detect social exclusion when a third-party character was included. Across ages, children evaluated social excluders more negatively than they evaluated social includers. This effect was primarily driven by the responses of 4- to 6-year-olds. These results provide evidence that children both detect and evaluate social excluders.

Our play preference measure was designed to further clarify how children viewed social excluders. Children preferred to play with includers over excluders, suggesting that children showed a preference for the includer. However, this result was driven by older children. Younger children's play partner preferences did not differ from chance. We also asked if children's play preferences stemmed from thinking the chosen play partner was likely to play with them or that the other player was likely to not play with them. Children overwhelmingly stated that they chose their play partner because they were likely to play with them. This suggests that children may be motivated to approach a potential social partner, rather than avoid other possible partners. However, it is also possible that the wording of this question was confusing for young children or that a positivity bias influenced younger children's responses. Future work should further examine if children's history with a character influence the reasoning behind play partner choices.

Our findings are somewhat consistent with those from Hwang and colleagues' (2017) study investigating children's evaluations after observing exclusion. Though 3-year-olds in Hwang et al. (2017) preferred to play with the distressed, excluded puppet over the excluding puppet, 3-year-olds did not prefer an excluded puppet displaying no distress over the excluder. This latter finding is consistent with the result found in this experiment: our younger children did not prefer to play with an includer over an excluder. Our results also suggest that, while younger children do not prefer includers, they do detect exclusion and evaluate excluders negatively. Future work should investigate this pattern.

Our findings from this study are more similar to those from Hwang and Markson (2020), where children directly experienced exclusion and inclusion. In this study, 3- and 4-year-olds identified social exclusion more after it occurred than after inclusion. 3- and 4-year-olds in our sample displayed a similar pattern. However, 3- and 4-year-olds in the current study detected social exclusion more than chance, while this younger age group in Hwang and Markson (2020) did not differ from chance. One reason this difference may have occurred is because our exclusion games differed. In Hwang and Markson (2020), the exclusion game consisted of nine throws and, prior to this game, excluders threw the ball to the child twice in a short practice game. The games in the current study were 36 throws, and the excluded character never received the ball. These differences may have made it easier for children to identify exclusion.

Our evaluation findings are similar to those found in Hwang and Markson (2020). With age, children in their study were more likely to evaluate the excluder

negatively, but their evaluations of includers remained positive. In the current study, we saw a similar pattern with a different measure. Our evaluation question used a scale and allowed for more variability than question involving a dichotomous choice. Consistent with Hwang and Markson (2020), our results suggest that children's evaluations of includers are relatively positive and stable across ages. Younger children's evaluations of excluders are also positive, but children rate the excluders more negatively as they age. Our findings further clarify children's evaluations of social includers and excluders.

Additionally, our play preference findings are consistent with those found in Hwang and Markson (2020). They found that younger children's play preferences did not differ between the inclusion and exclusion games. They noted that this finding may be due to a novelty preference. Our results are consistent with their novelty effect interpretation because younger children in the current study also showed no preference for the excluder or includer when they had the same amount of information about both characters. Further work should examine children's play preferences after exclusion. For instance, it is possible that the strength of children's preference could differ between characters. Asking how much a child wanted to play with an excluder could provide more insight into their preferences.

The present findings suggest that 3- to 6-year-old children detect and evaluate social excluders, but that only older children preferred to play with includers. Surprisingly, younger children did not prefer to play with includers over excluders. This finding is consistent with Hwang and Markson's (2020) equally surprising

result. Taken together, these two studies suggest that young children's play preferences may not be influenced by their evaluations.

Chapter 4: General Discussion

Social exclusion leads to negative effects across the lifespan. To mitigate the effects of social exclusion, young children engage in strategies that foster social connections with others. However, little work has examined the cognitive processes underlying children's responses to social exclusion. This dissertation addressed two issues concerning the cognitive processes underlying children's strategy use after exclusion. First, we asked whether children detected social exclusion. Second, we asked whether children evaluate social excluders and if these evaluations influenced their play partner preferences. Each issue is addressed below.

When do children detect social exclusion?

This question can be answered by looking at two types of evidence. First, we can examine the age at which children detect social exclusion provides insight into when this ability emerges in development. Second, understanding the circumstances in which children detect social exclusion can reveal a more nuanced picture of when children detect social exclusion.

While the current studies suggest that children detect social exclusion, the age at which they do so is unclear. In Chapter 2, 4-year-old children failed to identify those who included them in an in-person ball toss game. Children in this study did not reliably identify who included them until 5-years-old. In Chapter 3, a group of 3- and 4-year-olds readily detected exclusion after they observed third-party ball toss games.

The findings from the current study are similar to those found in other work investigating whether children detect social exclusion. Hwang et al. (2017) also found evidence that 3-year-olds detect social exclusion after observing third-party games.

These children preferred a distressed excluded character over their excluder, suggesting the children detected exclusion in the ball toss game. However, 3-year-olds in this study did not prefer the excluded character when there was no distress, which may weaken the claim that 3-year-olds in this study detected exclusion. Taking evidence from Hwang et al. (2017) and from Chapter 3, it is likely that 3-year-olds detect exclusion when observing games.

These findings also relate to Hwang and Markson's (2020) findings. When experiencing social exclusion via an in-person ball toss game, 3- and 4-year-olds did not detect social exclusion. Only the 5- through 6-year-old age group accurately identified those who excluded them. This is consistent with the results from Chapter 2, where 5- and 6-year-olds detected exclusion accurately. This suggests that children only begin to detect social their own social exclusion around 5 years of age.

Yet there were two contexts examined by Hwang and colleagues (2020) in which younger children were in fact sensitive to whether or not social exclusion had occurred (Markson & Hwang, 2020). First, although 3-year-old children who experienced exclusion in a live ball toss game did not spontaneously recognize that it occurred, they did accurately identify their excluders in an additional condition in which the excluders verbally stated they did not want to play with them. Second, after experiencing social exclusion via Cyberball, a virtual ball-toss game, 3- and 4-year-old children also accurately identified social exclusion. These findings indicate that children may detect exclusion at these younger ages. However, this conclusion requires a more detailed explanation of why similarly aged children experiencing

exclusion in in-person ball toss games (Chapter 2 and Hwang and Markson's (2020) Experiment 1) did not detect social exclusion.

There are several reasons that children seem to detect exclusion at different ages in different studies. It is possible that conclusions about when children detect social exclusion were based on Type I errors or Type II errors. Type I errors may have led to the conclusion that younger children detected exclusion, when in reality, they do not. Alternatively, Type II errors may have led to the conclusion that younger children cannot detect social exclusion even though they do detect it. More research with pre-registered comparisons and larger sample sizes would help clarify whether any of these results were due to Type I or Type II errors.

Another reason that the age at which children detect social exclusion differ are that tracking demands may be too high for younger children. Both studies using in-person ball-toss games to expose children to social exclusion (Ch 2, Hwang & Markson Experiment 1) asked children to report detection by choosing the player who included or excluded them. To answer these questions correctly, children needed to keep track of two highly similar experiences with highly similar characters. Results from these studies suggest that children did not detect social exclusion until they were 5-years-old. However, it is possible that younger children could detect social exclusion, if the game were modified to reduce tracking demands. Three-year-olds could detect social exclusion when the excluding characters explicitly stated, "We don't want to play with you anymore" (Hwang & Markson Experiment 1b). The different statements made by the excluders and includers may have helped 3-year-olds differentiate between the two games and made it easier to track and report

exclusion. Future work should assess if younger children detect social exclusion in in-person contexts when children have more cues to differentiate characters and track their identities. Additionally, future work could assess whether children detect social exclusion in in-person, experimental scenarios with procedures that facilitate tracking, such as those used in the current third-party observation study (Chapter 3). Younger children may report detecting social exclusion in cases where they only need to track and use information about one character at a time.

It is also possible that children's detection differs between experiments because of the context in which they experience social exclusion. Children who observe exclusion of another in a third-person context detect social exclusion around 3 years of age (Chapter 3; Hwang et al., 2017). However, children who directly experience social exclusion in a first-person context detect it around 5 years of age (Chapter 2; Hwang & Markson, 2020). Children who experience exclusion in Cyberball, which can be seen as a hybrid of first and third-person contexts, detected exclusion at 4 years of age (Hwang & Markson, 2020). Exclusion detection during Cyberball falls in between detection in third-person and first-person contexts. These three contexts differ in several ways and the differences between these contexts may influence children's ability to detect exclusion at different ages.

The three contexts differ in the amount of visual information available to a person concerning the overall events of the game. It may be easier for children to detect social exclusion in third person contexts because observation provides the most visual information. When observing a game, they can see all three characters equally and track who has received the ball, which may make it easier for young children to

remember or recognize exclusion. In first-person direct experiences of exclusion, children have the least visual information available. Children can watch the other players but cannot see themselves, which may make it more difficult to detect exclusion or remember what is happening. The amount of visual information provided in Cyberball falls between the amount given in the third-person and first-person contexts. When playing Cyberball, children can see both excluding characters and some representation of themselves (e.g. a glove or character). This amount of visual information may make it easier for children to detect exclusion than in the first-person scenario but may be harder than the third-party context.

Second, the three exclusion contexts differ in the degree of social involvement that a person experiences, from being a player themselves to being entirely removed from the situation. When children are observing the exclusion of another in a third-person context, children are entirely removed from the game. There may be less ambiguity concerning which characters are playing and which are not because the child is further removed from the situation and may expect all players to receive the ball. In contrast, children excluded in first-person contexts are directly involved in the game. In all first-person games, children received the ball twice before being excluded. This may lead to ambiguity concerning the child's role as a player in the game. If children's definition of play includes their proximity to the game and others as playing, children may feel that they were not excluded in these contexts. Further, children excluded in these first-person contexts may feel more engaged in the game, even while being excluded. Though they are not receiving the ball, watching others play and commenting on the game may make them feel as though they are still part of

the activity. Children's social involvement when being excluded via Cyberball may fall somewhere in between first and third person contexts. These children are directly playing in the game, but they may be less engaged because they are not co-present with their excluders. When they don't receive the ball, children cannot communicate with the other players. This lack of co-presence may make it easier for children to detect social exclusion than if they were experiencing it in a first-person context.

Future work could examine when children detect exclusion by directly comparing children's detection of social exclusion across the three contexts with the same detection measure. Additionally, future work could test if social involvement or visual information influenced children's ability to detect social exclusion. For instance, children could play Cyberball with a webcam activated, so that children felt more present with other players.

Ostracism Detection System in Early Childhood?

It appears that, at least in some contexts, 3-year-old children detect social exclusion. Although they do not report detecting exclusion when responding to comparative questions in first-person contexts, 3-year-old children accurately detect it in observed third-person contexts. It is possible that even younger children detect social exclusion. To my knowledge, only one experiment has investigated evaluations of social excluders with children younger than 3 years. Hwang and colleagues' (2017) study investigating children's preferences for excluded and excluding characters in third-party contexts included a sample of 2-year-olds. While 3-year-olds preferred excluded characters, 2-year-olds in this study did not prefer excluded characters over excluding characters. However, it is possible that 2-year-olds would detect social

exclusion if asked a direct exclusion detection question. Future work could use a procedure similar to the one used in the current third-party observation study (Chapter 3) to investigate this possibility.

How do our findings relate to claims made about the ostracism detection system? The ostracism detection system in adults is fast, sensitive, and mandatory (Spoor & Williams, 2007). However, it is unclear if children's exclusion detection shares similar characteristics. Below, we will examine each characteristic of the adult ostracism detection system in relation to the findings concerning children's exclusion detection abilities.

Children's responses to exclusion may or may not be fast. In the current dissertation, children experienced 35-36 throws in each exclusion game. Three-year-olds who observed exclusion games of this length detected it more often than chance (Chapter 3). Three- and four-year-old children who experienced exclusion via Cyberball (Hwang & Markson (2020) Experiment 2) may have detected exclusion after just nine throws. These children indicated that excluders did not share more often than they stated includers did not share, suggesting they detected exclusion. However, they did not state that excluder did not share more often than chance. More work is needed to determine if children detect social exclusion quickly. An event related potential (ERP) study with older children, between 8 and 12 years, examined neural responses related to children's experiences of exclusion (Crowley et al., 2010). They compared ERPs for rejection events, where the child experienced exclusion, and "not my turn" events, where the child experience inclusion, but was not currently throwing or receiving the ball. Neural responses differed between rejection and "not

my turn" events. Specifically, a component resembling the P300 (thought to reflect salience of the event) showed greater amplitude following rejection events than after "not my turn" events. Children's attention to the game may have increased quickly after exclusion events, suggesting that children detected exclusion rapidly (Crowley et al., 2010). Using ERP methods and a similar study design could clarify whether younger children detect social exclusion rapidly.

Research with adults also suggested that the ostracism detection system was sensitive. The system is thought to be sensitive because it activated when adults merely observed exclusion in third-person contexts in addition to when they directly experienced it in first-person contexts (Wesselman et al., 2009). Surprisingly, young children may only detect exclusion when they observe it. Three- and four-year-olds fail to detect social exclusion in first-person paradigms. This lack of detection by younger children in first-person contexts has now been found across two labs, even though first-person exclusion was theorized to be the easiest form to detect. This suggests that children's ostracism detection is not sensitive in the ways previously defined.

The final characteristic of the ostracism detection system is that activation of the system is mandatory and occurs if any type of exclusion is present. Current experimental studies have not addressed this characteristic directly. None of the studies used methods to test for a mandatory response, including exclusion by a disfavored group or asking children to try to ignore their experience of exclusion. Future work could use one of these methods to assess if children's detection of exclusion is mandatory.

Do Children's Evaluations or Preferences Reflect Prior Experience with Excluders and Includers?

The current dissertation provides some evidence that children evaluate social excluders negatively. While children who experienced exclusion in first-person contexts did not evaluate social excluders negatively, those who accurately identified who included them evaluated excluders more negatively. Interestingly, 4- and 5-year-olds, but not 6-year-olds, who answered the memory check correctly were more likely to evaluate excluders negatively. Taken together, these results suggest children may have evaluated characters based on their prior experiences.

Chapter 3 investigated children's evaluations of observed excluders and whether these evaluations influenced children's play preferences. While both younger and older age groups evaluated excluders negatively, only 5- and 6-year-olds preferred to play with includers. It was surprising that younger children, 3- and 4-year-olds, did not show a play partner preference consistent with their evaluations.

While surprising, the finding that younger children evaluated observed excluders negatively but did not prefer to play with observed includers is consistent with other work. Hwang and Markson (2020) found that 3- and 4-year-olds who played Cyberball also evaluated excluders negatively but did not prefer includers as play partners.

We assumed that children's social evaluations would generate personal preferences that aligned with those evaluations. However, both the current work and Hwang and Markson's (2020) findings show that this is not always the case. This

suggests we need to rethink this assumption and consider why evaluations of social excluders may not inform children's play partner choices.

One reason that younger children's evaluations may not inform their play partner choices is that they are using different strategies than older children to mitigate effects of social exclusion. We assumed that children would choose partners who were likely to include them. However, while partner choice models theorize that people will choose partners who maximally benefit them, there are different ways partners can be beneficial (Baumard et al., 2013). Additionally, individual differences influence the type of information people prioritize when they are selecting a social partner.

When choosing social partners, some people consider the social status of the partner they are selecting (Martin et al., 2019). It is possible that younger children do not prefer includers as play partners, even though they negatively evaluate excluders, because they are basing their partner choices on social status information. Younger children may view the excluding character as having high-status because they controlled the child's access to resources. If young children made this association, they may have preferred the exclusive character as a play partner because their status would bring more benefits to the child than choosing the inclusive character. Future work should examine children's choices for selecting a specific partner and probe specific strategy use. Additionally, future work could investigate whether children view excluders as higher status than includers.

Finally, it is possible that younger children do not weigh prior experience with a character heavily in their partner choice decisions. Younger children may not expect

prior experiences with a character to predict their future interactions. It may not be until children are older that they recognize that prior experiences with exclusive people can provide useful information for selecting beneficial partners.

Conclusions

The current projects provide evidence that, at least in some contexts, children detect, track, and evaluate social excluders. However, the contexts in which children detect social exclusion and the contexts in which they fail to do so reveal that children may not have an ostracism detection system with similar characteristics to the one present in adulthood. Future work should further investigate children's abilities to detect social exclusion across multiple contexts and directly test whether children's detection of social exclusion is quick, sensitive, and mandatory.

This work also suggests that children's evaluations may not influence their play partner decisions. Only older children selected the inclusive player as a play partner while younger children showed no preference for either character. It is unclear if children who do not evaluate the excluder negatively are using some other strategy to select their play partner. Future work should further investigate young children's play partner preferences after exclusion.

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