Young Children's Selective Sharing in Friendships: Expectations and Underlying Motives

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Abstract

As material resources are limited, partiality is sometimes unavoidable. Thus, even young children have to decide how to distribute their resources. At the same time, they experience that others' prosocial behavior is also selective – affecting their expectations about others' behavior.

In this thesis I focus on children's selective sharing behavior and selective sharing expectations in friendships. We know from previous research that children start to share selectively with their friends between 3 and 5 years (Birch & Billman, 1986; Buhrmester, Goldfarb, & Cantrell, 1992; Garon, Johnson, & Steeves, 2011; Moore, 2009; Paulus, 2016; Paulus & Moore, 2014; Yu, Zhu, & Leslie, 2016). Around the same time children also start to expect others to share more with their friends than with disliked peers or strangers (Afshordi, 2019; Liberman & Shaw, 2017; Olson & Spelke, 2008; Paulus, 2014a). However, why and how young children first start to show partial sharing behavior is still not fully resolved. The current thesis explores the underlying mechanisms and motives for young children's preferential sharing with friends compared to their sharing with disliked peers or strangers. In addition, the thesis investigates whether preschoolers also expect their own friends to (preferentially) share with them and whether these expectations relate to children's social behavior and their decision to rely on others.

The current thesis compares and partially tests three – not necessarily exclusive – models, which could explain children's selective sharing with friends. That is, affective processes, strategic motives, or a norm to share with friends could explain children's partiality. Social- interactionist and constructivist theories (Carpendale, 2010; Carpendale, Hammond, & Atwood, 2013; Paulus, in press-a) suggest that affection and shared experiences could be responsible for children's selective sharing behavior (Model 1). However, from an evolutionary or cognitive standpoint (Axelrod, 1984/2006; Kuhlmeier, Dunfield, & O'Neill, 2014; Trivers, 1971) it would be rational to share more with friends because the chance to get something in return is higher than with other peers (Model 2, strategic motives). This strategic explanation would also be in line with classical theories on

friendship (Damon, 1977; Laursen & Hartup, 2002; Selman, 1980; Youniss & Volpe, 1978), which imply that preschoolers' friendships are still mostly self-serving. And lastly, Model 3 proposes that preschoolers might share more with their friends out of a sense of interpersonal obligation (Furman & Bierman, 1983; Keller, Edelstein, Schmid, Fang, & Fang, 1998; Paulus, Christner, & Wörle, 2020).

Study 1 and 2 examined the mechanisms underlying children's selective sharing with friends. Study 1 shows that children's selective sharing with friends is not subserved by strategic motives. Additionally, the results of Study 1 stress the role of the past relationship with a friend, making an affective explanation more likely. More importantly, the children in Study 2 justified their preferential sharing with friends mostly with positive affect, lending additional support to Model 1 (affective processes). Study 2 also provides some support for the idea that a feeling of obligation might add to the effect of affective processes on young children's selective sharing.

Thus, the results of the current thesis support the importance of affective processes and shared experiences for children's selective sharing with friends (Model 1) and speak against strategic considerations as motivating factors.

Study 3 investigated children's sharing expectations in a first person scenario. The results show that children's selective reliance on their friends' sharing develops in the preschool period. Four- to 5-year-old but not 3-year-old children rely more on their friends than on their non-friends to share with them. Young children's increasing reliance on their friends' sharing demonstrates children's developing understanding how relationships influence the intentions and behavior of others. This is an important ability because it allows children to choose cooperative interaction partners, maximize their gain and avoid exploitation (Afshordi & Liberman, 2021). In Study 3 older preschoolers were also willing to risk getting no resources by relying on their friend, thus indicating that children's expectations manifest in their behavior.

In sum, during the preschool years, children's friendships seem to become affectionate, trusting, and reciprocal relationships in which both friends expect and provide prosocial support. Thus, young children's friendships might be less superficial and self-serving than previously implied by classical studies.

Abstract (deutsch)

Da materielle Ressourcen limitiert sind, ist es manchmal unvermeidbar parteiisch zu sein. Deshalb müssen selbst kleine Kinder entscheiden, wie sie ihre Ressourcen verteilen. Gleichzeitig machen sie auch selbst die Erfahrung, dass das prosoziale Verhalten anderer selektiv ist, und formen eine dementsprechende Erwartungshaltung.

Diese Arbeit konzentriert sich auf das selektive Teilverhalten und selektive Teilerwartungen von jungen Kindern. Aus früherer Forschung wissen wir, dass Kinder zwischen 3 und 5 Jahren anfangen selektiv mit ihren Freund*innen zu Teilen (Birch & Billman, 1986; Buhrmester et al., 1992; Garon et al., 2011; Moore, 2009; Paulus, 2016; Paulus & Moore, 2014; Yu et al., 2016). Um dieselbe Zeit herum fangen Kinder auch an zu erwarten, dass andere mehr mit ihren Freund*innen als mit fremden oder nicht gemochten Personen teilen (Afshordi, 2019; Liberman & Shaw, 2017; Olson & Spelke, 2008; Paulus, 2014a). Wie und warum kleine Kinder anfangen parteiisches Teilverhalten zu zeigen ist noch nicht vollständig erforscht. Diese Arbeit untersucht mögliche zugrundeliegende Mechanismen und Motive, die dazu führen könnten, dass Kinder mehr mit Ihren Freunden als mit fremden Kindern oder Kindern, die sie nicht so gerne mögen, teilen. Außerdem wird untersucht, ob Vorschulkinder auch erwarten, dass ihre Freund*innen (präferiert) mit ihnen teilen und ob diese Erwartungshaltung Einfluss auf ihr soziales Verhalten und ihre Entscheidung, sich auf andere zu verlassen, hat.

Diese Arbeit vergleicht drei Modelle, die das selektive Teilverhalten von Kindern mit ihren Freund*innen erklären könnten. Affektive Prozesse, strategische Motive oder eine Norm mit Freund*innen zu teilen, könnten für das parteiische Teilverhalten von Kindern verantwortlich sein. Sozial-interaktionistische und konstruktivistische Theorien (Carpendale, 2010; Carpendale et al., 2013; Paulus, in press-a) legen nahe, dass Zuneigung und gemeinsame Erlebnisse für das selektive Teilverhalten von Kindern verantwortlich sind (Modell 1). Von einem evolutionären oder kognitiven Standpunkt aus (Axelrod, 1984/2006; Kuhlmeier et al., 2014; Trivers, 1971) wäre es andererseits rational mehr mit Freund*innen zu teilen, da die Wahrscheinlichkeit, etwas im Gegenzug zu bekommen, bei Freunden höher

ist, als bei anderen Personen (Modell 2). Dieser strategische Erklärungsansatz wäre auch im Einklang mit klassischen Freundschaftstheorien (Damon, 1977; Laursen & Hartup, 2002; Selman, 1980; Youniss & Volpe, 1978), die implizieren, dass die Freundschaften von Vorschulkindern noch hauptsächlich dem eigenen Vorteil dienen. Abschließend legt Modell 3 nahe, dass Vorschulkinder mehr mit ihren Freund*innen teilen, weil sie sich aufgrund der Beziehung zum Freund dazu verpflichtet fühlen (Furman & Bierman, 1983; Keller et al., 1998; Paulus et al., 2020). Die drei Erklärungsansätze schließen sich nicht unbedingt gegenseitig aus.

Studie 1 und 2 haben sich mit den Mechanismen beschäftigt, die dem selektiven Teilverhalten mit Freund*innen zugrunde liegen. Studie 1 zeigt, dass das selektive Teilen mit Freund*innen nicht strategisch motiviert ist. Außerdem heben die Ergebnisse von Studie 1 die Wichtigkeit der vorangegangenen Beziehung mit dem Freund bzw. der Freundin hervor, was eine affektive Erklärung wahrscheinlicher macht. Wichtiger noch, die Kinder in Studie 2 erklärten ihr präferiertes Teilen mit Freunden meist mit positivem Affekt, was Modell 1 zusätzlich unterstützt. Die Ergebnisse von Studie 2 weisen außerdem darauf hin, dass ein Gefühl von Verpflichtung, ergänzend zu den affektiven Prozessen, einen Einfluss auf das selektive Teilverhalten von Vorschulkindern haben könnte.

Insgesamt unterstreichen die Ergebnisse dieser Arbeit die Wichtigkeit von affektiven Prozessen und geteilten Erfahrungen für das selektive Teilen mit Freund*innen (Modell 1) und sprechen gegen strategische Erwägungen als motivierende Faktoren.

Studie 3 untersuchte zusätzlich die Teilerwartungen von Kindern aus der Ich-Perspektive. Die Ergebnisse zeigen, dass sich das selektive Verlassen auf andere in der Vorschulzeit entwickelt. 4- bis 5-jährige, aber noch nicht 3-jährige, verlassen sich mehr darauf, dass ihre Freunde mit ihnen teilen, als dass ihre Nicht-Freunde mit ihnen teilen. Das steigende Vertrauen in das Teilen ihrer Freund*innen zeigt, dass die Kinder zunehmend verstehen, wie Beziehungen die Intentionen und das Verhalten anderer Menschen beeinflussen. Dies ist eine wichtige Fähigkeit, weil sie es den Kindern erlaubt, kooperative Interaktionspartner*innen zu wählen, womit sie ihren Gewinn maximieren und verhindern können, ausgenutzt zu werden (Afshordi & Liberman, 2021). In Studie 3 vertrauten ältere Vorschulkinder so stark darauf, dass ihre Freunde mit ihnen teilen, dass sie bereit waren das Risiko einzugehen keine Ressourcen zu bekommen, wenn sie falsch lagen. In diesem Fall haben sich die Teilerwartungen der Kinder also auf ihr Verhalten ausgewirkt.

Insgesamt zeigt diese Arbeit also, dass ältere Vorschulkinder prosoziale Unterstützung von ihren Freunden erwarten, aber auch bereit sind ihre Freunde selbst zu unterstützen. Das heißt, schon in der Vorschulzeit scheinen die Freundschaften von Kindern zunehmend von Zuneigung, Vertrauen und Reziprozität gekennzeichnet zu sein. Das deutet darauf hin, dass die Freundschaften von Vorschulkindern möglicherweise weniger oberflächlich und eigennützig motiviert sind als von klassischen Studien angenommen.

1. Introduction

Impartiality is an important fairness principle for both adults and children (Shaw, DeScioli, & Olson, 2012; Shaw & Olson, 2014). Children value equality and later also equity and fair procedures (Blake & McAuliffe, 2011; Grocke, Rossano, & Tomasello, 2015; Shaw & Olson, 2014; Sigelman & Waitzman, 1991; Wörle & Paulus, 2018). Given that biases and preferential treatment of the ingroup can lead to discrimination (Brewer, 1979; Fiske, 2002), partiality is something adults and children are justifiably weary of (Mills, Al-Jabari, & Archacki, 2012; Mills & Grant, 2009).

However, humans also value loyalty towards friends and family members (Gummerum & Keller, 2008; Hartup, 1993) and there are relationships, like parent child relationships, in which preferential treatment and care are seen as morally right and even obligatory (Jollimore, 2000; Keller et al., 1998; Kolodny, 2010). If a mother, for example, sees that her own child and another child are about to drown, no one would fault the mother for saving her own child first. Some philosophers suggest that partiality is also a necessary part of friendships (Jollimore, 2000).

Additionally, partiality is sometimes unavoidable. Material resources and time are limited, and it is not always possible to treat everybody equally. Thus, even young children have to decide how to distribute their time and resources. Indeed, both adults and children are sometimes partial in their everyday life. Partiality often favors others who were or could be good collaborators (Shaw et al., 2012; Trivers, 1971), the ingroup (Dunham, Baron, & Carey, 2011; Tajfel, Billig, Bundy, & Flament, 1971) and family and friends (Olson & Spelke, 2008; Paulus & Moore, 2014). However, why and how young children start to show partial behavior is still not fully explored. Additionally, understanding how relationships influence other people's behavior is an important ability for children to acquire, because it can help them to pick good cooperation partners and avoid exploitation (Afshordi & Liberman, 2021).

In the current thesis, I focus on children's selective sharing in friendships. Children start to share more with their friends than with other peers in the preschool years (Moore,

2009; Paulus & Moore, 2014). However, the underlying motives and mechanisms for young children's preferential sharing with friends are still not fully investigated and will therefore be further explored in the current thesis. In addition, the thesis also investigates children's expectations regarding their own friends' sharing behavior and whether those (selective) expectation guide children's behavior in social situations. More specifically, I investigate whether young children rely on their friends' sharing.

I will first give an overview of the development of children's early sharing and young children's friendships. Then I will discuss children's selective sharing and sharing expectations in the preschool period before describing possible underlying motives and mechanisms.

1.1 The development of children's early sharing.

Children's sharing behavior originates in their early experiences and interactions with their caregivers (Carpendale et al., 2013). In the context of fun give-and-take games with their caregivers, infants receive objects, get encouraged by their parents to hand them back over, and eventually also learn to interpret the social cues associated with these interactions (i.e., an outstretched hand as a give-me gesture; Paulus, in press-a). Thus, handing over objects in infancy is at first not motivated by moral considerations or even a concern for the other's welfare but might mainly be driven by children's interest in the activity of others, their wish for social interaction and the accompanying positive emotions (Carpendale et al., 2013; Carpendale, Kettner, & Audet, 2015; Hammond & Drummond, 2019; Paulus, 2018). Paulus (in press-a) suggests that once children become proficient in these social sharing routines, they can also apply them to the interaction with others (i.e. strangers in an experimental setting). The view that children's sharing is at first grounded in positive emotions and social routines is supported by findings that toddlers' first "sharing" instances in experimental settings with strangers are often non-costly (Brownell, Svetlova, & Nichols, 2009) and in response to give-me gestures or scaffolded in some other way (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Hodapp, Goldfield, & Boyatzis, 1984; Schmidt & Sommerville, 2011; Vandell & Wilson, 1987; Wu & Su, 2014). Thus, these sharing instances are often remarkably similar to the emotionally rewarding give-and-take games young children play with their caregivers.

The observations described above are in line with social-interactionists and constructivists approaches like the developmental systems approach or Piaget's work (Carpendale, 2010; Carpendale et al., 2013). These approaches suppose that cooperation,

prosocial behavior, and morality develop or are constructed in the social interactions and experiences with others.

As children get more independent and mobile, children's peer relationships also get more important and influential in children's (pro-)social development. The interactions in caregiver-child relationships are hierarchical and mostly structured by the caregivers (Laursen & Hartup, 2002). In contrast, the relationship with friends and siblings are more balanced and thus enable even more cooperation (Piaget, 2013; Youniss, 1980). Piaget (2013) stresses the importance of these equal peer relationships – and especially of friendships – for children's prosocial and moral development. Because children want to maintain the positive, emotionally rewarding, relationship with the friend, they are motivated to resolve conflicts and figure out what is fair in the interaction with their friends (Carpendale, 2010; Carpendale et al., 2013). Laursen and Hartup (2002) also stress the importance of children's need for affiliation for the emergence of social interaction and reciprocity with peers. According to them, reciprocal interactions in peer relationships are especially important because they allow children to learn how to "implement principles of social exchange, manage reciprocal obligations, and negotiate equivalent benefits" (Laursen & Hartup, 2002, p. 28).

1.2 Friendship and selective sharing

1.2.1 Friendship in the preschool period

In the second year of life children start to have reciprocal interactions with peers and even show relatively stable preferences for specific peers (Howes, 1983; Howes & Phillipsen, 1992; Ross & Lollis, 1989). For toddlers and preschool children, friendship mainly means playing together and enjoying the company of the other child (Howes, 1983; Marcone, Caputo, & Della Monica, 2015). However, these interactions are early on characterizes by cooperation and reciprocity (Gifford-Smith & Brownell, 2003; Hartup, 1989). Thus, like previously in the relationship with their caregivers, enjoyable reciprocal interactions are also at the center of young children's friendships.

By the late preschool period shared positive affect, reciprocity, proximity (including mutual play), similarity and prosocial support are essential themes of friendships (Afshordi, 2019; Furman & Bierman, 1983; Gifford-Smith & Brownell, 2003; Howes, 1983). On a behavioral level, friends of all ages cooperate better, have more positive interactions and at

least by the end of preschool are more likely to share with each other than peers who are not friends (Birch & Billman, 1986; Newcomb & Bagwell, 1995; Paulus & Moore, 2014).

Classical cognitive theories (Damon, 1977; Selman, 1980; Youniss, 1980) suggest that in the preschool period children's understanding of what friendships entail (friendship concept) is still superficial and the motivation behind the relationships is egocentric (Afshordi & Liberman, 2021; Laursen & Hartup, 2002). According to these theories, children's friendship conceptions "progress from that of an ephemeral relationship designed to maximize personal benefits, to a short-term relationship dedicated to equality, and finally to a committed relationship designed to satisfy psychological needs" (Laursen & Hartup, 2002, p. 33), like intimacy and affection. The driving forces behind this development are social interactions and increasing cognitive and perspective taking abilities. Selman (1980) for example supposes 5 stages. First children see their friends as momentary playmates (3-7 years), then as individuals who can help them achieve their goals (4-9 years). Subsequently reciprocity and cooperation get more important, but the relationship is still not built on long term commitments (6-12 years). From preadolescence on, friendships start to be characterized by intimacy, mutual support, and commitment (9-15 years) and finally friendships also become balanced with regard to interdependence and autonomy (12-adulthood).

Laursen and Hartup (2002) build on these classical cognitive theories of friendship and propose with regard to reciprocity that children's earliest friendships resemble exchange relationships which with age gradually transform into communal relationships. That is, young children's friendships are focused on strict symmetrical reciprocation and motivated by past and anticipated future benefits (exchange relationship). By preadolescence, the welfare of the partner and of the relationship gets more important and strict reciprocity gives way to need based support (communal relationship). A shift in the direction of a communal relationship can for example be seen in that fourth graders' sharing with friends is less affected by prior sharing than their sharing with non-friends (Staub & Sherk, 1970).

These classical cognitive theories and Laursen and Hartup's view (2002) are supported by interview studies showing that friendship expectations regarding support, intimacy, loyalty and trust increase with age while more superficial or self-serving characteristics, like physical characteristics or friendship as a source of pleasure, are mentioned less frequently (Berndt, Hawkins, & Hoyle, 1986; Bigelow & La Gaipa, 1975; Furman & Bierman, 1983; Gifford-Smith & Brownell, 2003; Reisman & Shorr, 1978).

However, recent studies using cognitively less demanding methods, like picture recognition tasks, forced choice ratings, or asking children to infer who is friends with whom in a forced-choice scenario, indicate that preschoolers' friendship concepts are more comprehensive and nuanced than suggested by classical theories (Afshordi, 2019; Afshordi & Liberman, 2021; Furman & Bierman, 1983; Liberman & Shaw, 2019). For example, 4-year-olds infer friendship from the amount of time individuals spend together but not from coincidental physical proximity (Afshordi, 2019; Liberman & Shaw, 2019) and from shared interests but not random similarities (Afshordi, 2019). Additionally, they also weigh the different friendship characteristics. Four-year-olds, for example, consider prosocial interactions to be better indicators of friendship than similarity (Afshordi, 2019).

These recent studies suggest, that by the end of preschool, children expect friends to show affection and prosocial support – importantly including sharing behavior (Afshordi, 2019; Bigelow, 1977; Bigelow & La Gaipa, 1975; Furman & Bierman, 1983; MacEvoy, Papadakis, Fedigan, & Ash, 2016). This is relevant for the current thesis and is also in contrast to the above-described classical studies.

1.2.2 Partiality, selective sharing and sharing expectations in friendships

Young children do not only expect support in friendships they also treat their friends more prosocially than other peers (Costin & Jones, 1992; Engelmann, Haux, & Herrmann, 2019; Fujisawa, Kutsukake, & Hasegawa, 2008). For example, 3-year-olds are more likely to provide help to a friend than to a neutral peer (Engelmann et al., 2019) and reciprocate object offerings more often (Fujisawa et al., 2008). Importantly for the current thesis, children also start to share more with their friends than with less liked or less familiar peers between 3-5 years (Birch & Billman, 1986; Buhrmester et al., 1992; Garon et al., 2011; Moore, 2009; Paulus & Moore, 2014; Yu et al., 2016). Children's partiality towards friends even overrides their adherence to equity norms (Paulus, 2016) which children follow by 5-years (Malti et al., 2016; Paulus, 2014a; Paulus, Nöth, & Wörle, 2018; Rizzo & Killen, 2016). Paulus (2016) showed that 3- to 6-year-old children share more with rich friends than needy disliked peers and in the case of 5- to 6-year-olds they even share more with their friends than with needy strangers. In sum, preschool children show strong partiality regarding their friends. However, the underlying motives and mechanisms are still unclear.

Around the time children start to share more generously they also start to expect others to share more with their friends than with disliked peers or strangers. It is likely that their own selective sharing behavior and the observation of their peers' sharing inform these

expectations. Olson and Spelke (2008) showed that 3.5-year-olds guide others to share more with friends than strangers and in a study by Paulus and Moore (2014), 4- to 5-year-old but not yet 3-year-old children predicted that others would be more prosocial to their friends than to disliked peers. Similarly, by 4 years children also infer that two children are friends from their helping behavior and selective sharing behavior (Afshordi, 2019; Liberman & Shaw, 2017). Thus, on a theoretical level, preschool children know that relationships, and specifically friendships, influence others' sharing behavior. However, it is unclear if children also apply this knowledge to themselves. That is, we do not know whether preschooler also expect their own friends to (preferentially) share with them and whether these expectations relate to children's social behavior and their decision to rely on others.

1.3 Aims of the current thesis

The current thesis investigates two aspects of children's partiality. The first aim was to find out more about the mechanisms and motives underlying children's preferential sharing with friends. The second aim was to study young children's expectations regarding their friends' sharing behavior toward them and to what extent such expectations guide young children's decision to rely on their friends. First, I discuss possible explanations for children's preferential sharing with friends. Then I will also discuss the influence of relevant cognitive abilities on children's selective sharing and sharing expectations.

1.4 Motives underlying children's preferential sharing

In the following I focus on three not necessarily exclusive models to explain young children's preferential sharing with friends. The first model focuses on children's history of shared experiences and affect as an explanation for preschooler's selective sharing with friends. Reciprocal interactions play a role in this model as a context to gain shared experiences, to establish social routines that could facilitate sharing and to deepen the positive bond between the friends. The second model focuses on more cognitive explanations, specifically on how selective sharing with friends could be advantageous for children. Children's developing understanding of reciprocity and specifically strategic sharing are central to this model. In this context we also discuss the role of children's developing sharing expectations as a tool to share strategically but also to protect oneself from exploitation. Lastly, the third model discusses if normative considerations might additionally add to children's partiality.

1.4.1 A history of reciprocal exchange and a bond of affection

It is likely that positive mutual experiences and affiliative feelings play a role in young children's preferential sharing with friends.

Especially for young children, friendships are mainly characterized by reciprocal play and (mutual) affection. Reciprocal interactions are important for the formation as well as maintenance of friendships (Laursen & Hartup, 2002; Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005; Selman, Jaquette, & Lavin, 1977).

There is evidence that young children's positive interactions with peers increase children's sharing with those peers. Three-year-old children share more with a peer if they have cooperated with them previously (Warneken, Lohse, Melis, & Tomasello, 2011). One might conclude that children share more in these instances because it is advantageous to support possible future cooperation partners (Tomasello, Melis, Tennie, Wyman, & Herrmann, 2012) or because of fairness considerations related to the previous cooperation (Corbit, 2020). I will discuss these possibilities in the next chapters. However, children are also more prosocial if there was no cooperation and they just acted with or acted synchronously alongside the other person (Cirelli, Einarson, & Trainor, 2014; Tunçgenç & Cohen, 2018). Additionally, mere group membership based on minimal group markers also increases children's prosocial behavior (Dunham et al., 2011). These findings indicate that more low-level processes like preferences based on affiliative feelings or affection are also important for children's (selective) sharing. Interaction experiences and affiliative feelings indeed seem to be connected. By 5 years, children like agents more who they had previously collaborated with (Plötner, Over, Carpenter, & Tomasello, 2015). Thus, some of the effects of collaboration and mutual or even just synchronic interactions on children's sharing might be mediated by an increase in affiliative feelings. With regard to friendship, the positive reciprocal interactions which characterize friendships most likely intensify children's affiliative feelings regarding their friends and could thus add to children's selective prosocial behavior towards friends.

Low-level mechanisms like approach-withdrawal systems (Cowell & Decety, 2015) based on affective preferences, the execution of social routines or empathic concern seem especially likely for the earliest instances of children's selective sharing with friends because they are not (as) cognitively demanding.

Affective preferences and behavioral routines likely influence especially young children's sharing behavior, and the effect gets complemented by more cognitively demanding mechanisms later on (Paulus & Essler, 2020). There are several theoretical and experimental papers stressing the role of emotions for children's sharing behavior (Carpendale et al., 2013; Eisenberg, 2020; Hammond & Drummond, 2019). Li, Spitzer, and Olson (2014) showed the importance of affective mechanisms for young children's selective sharing. In their study 4- to 5-year-old children shared more with poor over rich recipients but preferred the resource rich recipient affectively. However, if there was a delay between being presented with the inequality and the sharing task and children had forgotten who the rich and poor recipient was, they shared more with the rich recipient. This shows the persistence and pervasiveness of affective mechanisms because by 5-years children normally have a strong preference for equality and even enforce the norm to give more to poor recipients (Wörle & Paulus, 2018). Interestingly, children's preferences for friends also override their equality concerns (Paulus, 2016), which is a weak indication that both incidence of inequality perpetuation might be carried by the same underlying mechanism – that is, positive affect.

Additionally, the philosopher Jollimore (2000) suggests that partiality has a communicative function and expresses the affection inherent in friendships. Indeed, 4- to 6-year-olds use preferential resource distribution as a cue to friendship and 7- to 9-year-old children specifically infer friendship from intentional partiality (Liberman & Shaw, 2017). Thus, at least in older children, partiality might additionally be a tool to communicate their affection and relationship status to their friend.

Behavioral routines might also make sharing with friends easier. Reciprocity is important for the initiation and maintenance of friendships (Hartup, 1989; Laursen & Hartup, 2002). That sharing is more prevalent in friendships than in other peer relationships is thus consistent with an interactionist perspective because the enjoyable and reciprocal play which is central to children's friendships gives them the opportunity to "practice" prosocial behavior and especially sharing behavior (Paulus, in press-a). That is, sharing with friends might be easier than sharing with other peers because in friendships children already have experience with similar interactions.

Empathic concern is cognitively more demanding than simple approach-avoidance mechanisms but not as cognitively demanding as most strategic motives and normative considerations. The earliest reported instances of children's preferential sharing with friends

are around 3 years. By that time, children already have acquired the necessary self-other differentiation not to get distressed by the other person's emotions (Paulus & Moore, 2012; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992) and are able to show empathic concern and to intervene (Paulus, Jung, O'Driscoll, & Moore, 2017; Zahn-Waxler et al., 1992). Because of the affective relationship with the friend, children might be emotionally more responsive towards their friends than towards other peers which in turn can motivate sharing. Strong evidence supporting this argument comes from a study by Costin and Jones (1992), in which preschool children showed more empathetic responses and suggested more prosocial interventions towards a friend than towards an acquaintance in distress. In line with this, there is general evidence that empathic concern motivates young children's prosocial behavior (Hepach, Vaish, & Tomasello, 2013; Vaish, Carpenter, & Tomasello, 2009).

In sum, affective processes most likely influence children's preferential sharing with friends. Children's shared experiences with their friends both add to the affective bond with their friend and might in the case of reciprocal interactions also independently influence children's selective sharing. As affective processes are cognitively less demanding, they are useful in explaining early instances of preferential sharing. Thus, at first, children's preferential sharing with friends is probably motivated by less cognitive demanding mechanisms like affection and social routines, which are especially practiced and ingrained in close social relationships, like friendships. Later on, around 4- to 5-years (Kumaki, Moriguchi, & Myowa-Yamakoshi, 2018; Paulus et al., 2020), more cognitively demanding mechanisms like normative and strategic considerations might start to add to children's partiality.

1.4.2 Reciprocity and strategic sharing

Even though affective processes most likely play a role in children's partiality, cognitive and evolutionary theories suggest (Axelrod, 1984/2006; Kuhlmeier et al., 2014; Trivers, 1971) that more strategic motivations could be responsible for children's preferential sharing with friends.

Cognitive and evolutionary theories often propose that prosocial behavior towards non-kin would not be as common for humans if it was not advantageous for the individual (Axelrod, 1984/2006; Tomasello et al., 2012; Trivers, 1971). Sharing with unrelated others is said to be especially surprising because of the accompanying cost. The most common explanation of evolutionary and cognitive theories for human prosociality towards non-related others is reciprocity (Axelrod, 1984/2006; Kuhlmeier et al., 2014; Leimgruber,

2018). Direct reciprocity (Agent B shares with agent A because agent A had previously shared with agent B) and indirect reciprocity (Agent C shares with agent A because agent A had previously shared with agent B) make prosocial actions mutually beneficial. Through reciprocity, prosociality can lead to future gains and a bigger choice of cooperation partners (Tomasello et al., 2012). Indirect reciprocity is important for establishing prosocial behavior in bigger groups. It can also explain prosocial acts towards individuals who cannot reciprocate because a good reputation can help to find future collaborative partners. However, as at the center of the current thesis are friend-dyads and not social groups, the focus in the following paragraphs is on direct reciprocity. Direct reciprocity is the reaction to another person's behavior (Paulus, in press-a) and especially relevant in dyadic relationships with continuing, repeated interactions (Axelrod, 1984/2006; Nowak, 2006), like friendships.

Reciprocity can be further differentiated in "partner choice" and "partner control" models. It is possible to reciprocate past (prosocial or antisocial) behavior by selecting or not selecting another person to be the recipient of a prosocial act ("partner choice") or by matching one's behavior to the behavior of the other person ("partner control"). That is, partner choice means that children choose who to interact with and partner control means that they choose how to interact with a (fixed) partner.

Children show signs of reciprocity first through partner choice. With 21 months, children selectively help others who have previously tried to share with them (direct reciprocity; Dunfield et al., 2011) and by 27 months they preferentially help others who have behaved prosocially, as opposed to antisocially, towards a third party (indirect reciprocity; Dahl, Schuck, & Campos, 2013). Partner control emerges later – probably because it is cognitively more demanding to contingently match the own behavior with the behavior of a partner than to select the most prosocial individual in a forced choice scenario (Paulus, in press-a). Depending on task difficulty and cost, experimental studies found first evidence for contingent reciprocity in 3.5- to 7-year-old children (House, Henrich, Sarnecka, & Silk, 2013; Warneken & Tomasello, 2013). Warneken and Tomasello (2013) showed in their study that 3.5-year-old but not 2.5-year-old children shared more if their interaction partner had previously shared with them. Similarly, 3.5-year-olds also guide others to share more with individuals who had previously shared with them (Olson & Spelke, 2008). Thus, from around 3.5 years, the concept of reciprocity begins to guide both children's recommendations and their own (selective) sharing behavior.

For the current thesis, one of the most interesting aspects of reciprocity is strategic reciprocity. That is, children might share more with their friends because they expect a higher chance to be reciprocated by friends than by non-friends. Strategic reciprocity is cognitively demanding as it involves future oriented thinking, planning abilities and perspective taking abilities which still gradually develop in the preschool period (Atance, 2015; McCormack & Atance, 2011; Suddendorf, Nielsen, & Gehlen, 2011; Wellman & Liu, 2004). Thus, it is not surprising that strategic sharing emerges only at the end of the preschool period. However, by 5 years there is clear evidence that children can and under some circumstances do share strategically. In experimental settings, 4- to 5-year-old children share more if the other person has the possibility or the intention to reciprocate (Kenward, Hellmer, Winter, & Eriksson, 2015; Sebastián-Enesco & Warneken, 2015; Xiong, Shi, Wu, & Zhang, 2016). Around the same time children also start to share more if it can improve their reputation – especially with ingroup members (Engelmann, Over, Herrmann, & Tomasello, 2013). In order to share strategically, children have to have formed the expectation that others will reciprocate prosocial behavior. Thus, children's strategic sharing most likely builds on their own prior experiences with reciprocity. Indeed, 3- to 5-year-old children expect previous recipients to reciprocate the benefits they have received from them (Paulus, 2016) and by 5 years, children's expectation of reciprocity even shows normative qualities (Wörle & Paulus, 2019), as children spontaneously affirm third parties in reciprocating generous sharing.

Strategic sharing in practice means selectively sharing with individuals because they are likely to have the opportunity and the intention to reciprocate. Thus, in theory, friends should be ideal targets for strategic sharing. First, as friendships are generally ongoing relationships with frequent interactions, there are a lot of future opportunities to get rewarded for prosocial behavior. Second, friendships are characterized by reciprocal interactions. That is, children had a lot of positive interactions with their friends, which might have helped them to form the expectation that their friends usually reciprocate or even have a generally prosocial disposition towards them. It is not even necessary for children to have made specific sharing experiences with their friends. Even unspecific positive experiences can lead young children to belief that their friend would be prosocial towards them, as preschool children make quite global evaluations about others. 5-year-olds for example judge more competent children also to be more prosocial (Brosseau-Liard & Birch, 2010). This is in line with findings showing that 3-year-olds children make attributions such as labelling someone as "helpful" based on prior experiences (Dunfield, Kuhlmeier, & Murphy, 2013). This indicates that young children can make attributions based on prior experiences. Moreover,

by 4 years, children expect others to share more with friends than with disliked peers or strangers (Olson & Spelke, 2008; Paulus & Moore, 2014) providing evidence for recipient-dependent sharing expectations. By the end of preschool, sharing is even part of children's friendship concept (Furman & Bierman, 1983), making it even more likely that children also expect their own friends to have a prosocial disposition towards them.

Interestingly, classical theories claim that preschoolers' understanding of friendships is still self-serving (Selman, 1980). In line with this, Bigelow and La Gaipa's interview study (1975) suggests that children expect their friends to help them earlier (2nd grade) than they mention helping their friends themselves (6th grade). Thus, classical theories would predict that strategic sharing would be more predominant in younger children and then become less common in middle childhood once they start to care more about their friends' welfare. That is, 5- and 6-year-old children's selective sharing with friends could very well be strategically motivated because they already have the necessary cognitive abilities but are not yet concerned with their friend's welfare.

In sum, by 5 years, children are able to share strategically (Sebastián-Enesco & Warneken, 2015; Xiong et al., 2016) and their friendships fulfill the condition that makes strategic sharing profitable – a high probability of reciprocation. Thus, strategic considerations are a viable explanation for young children's selective sharing with friends – at least by 5 years. Kuhlmeier et al. (2014) even suggest that already "by 3-years-of-age, selective partner choice may also, in some situations, be based on the attribution of a prosocial disposition coupled with an expectation of reciprocity" (page 5).

1.4.3 Norms

Norms may also add to children's (selective) sharing with friends. Philosophers have suggested that friendships could not exist without partiality (Jollimore, 2000) and that friendship involves special duties which go beyond the duties regarding strangers (Annis, 1987). This view is for example supported by a finding that not taking the side of a close friend in an argument with a third party can endanger the friendship of adults (Shaw, DeScioli, Barakzai, & Kurzban, 2017). As discussed in the paragraphs above, children indeed consider sharing to be part of friendships by the end of preschool (Afshordi, 2019; Bigelow, 1977; Bigelow & La Gaipa, 1975; Furman & Bierman, 1983; MacEvoy et al., 2016) and they expect others to share (more) with their friends (Liberman & Shaw, 2017; Olson & Spelke, 2008; Paulus & Moore, 2014). As expectations are the conceptual foundation of normativity (Mead, 1934), the first prerequisite for a sharing norm in

friendships is thus met. At the end of the preschool period, children also have the cognitive abilities to act according to their normative convictions. By the end of preschool, children enforce and (usually) follow equality, equity, and reciprocity norms (Fehr, Bernhard, & Rockenbach, 2008; Fujisawa et al., 2008; Paulus, 2014a; Paulus et al., 2018; Wörle & Paulus, 2018, 2019). That is, older preschoolers can reflect on their and others' behavior, are able to judge whether something is right or wrong and are able to align their behavior with their normative convictions (Dahl & Paulus, 2019).

There is also more concrete evidence that preschool children consider sharing in friendships to have some normative qualities (Paulus et al., 2020). In a study by Paulus et al. (2020), 4- to 6-year-old children protested against a third party who shared less resources with a friend than with a disliked peer and affirmed a third party who shared more with the friend. However, if there was an option to give the same number of resources to both recipients, the children enforced equality. Thus, for preschoolers, friendship entails at least an obligation not to put friends at a disadvantage. That is, even though partiality in friendship seems to have some normative qualities, in third person scenarios, children consider moral norms to be more important than favoring friends. However, on a behavioral level, preschoolers show strong partiality for their friends (Paulus, 2016). This is in line with findings that children's behavior not always aligns with their moral beliefs (Smith, Blake, & Harris, 2013).

An interesting finding comes from Smetana and Ball (2018) who show that relationships do not fundamentally change moral judgements but only skew them slightly. In their study 4- to 9-year-old children were interviewed about moral transgressions against friends, acquaintances, disliked peers, and bullies. The transgressions also included sharing less resources with one peer than with other peers. The children did not think that it was permissible to transgress against anyone – not even against disliked peers and bullies. However, they viewed it as slightly more acceptable to transgress against bullies than against friends and disliked peers. One interpretation for this is that people who harm others are less deserving of benefits (Vaish, Carpenter, & Tomasello, 2010) and more deserving of punishment (Kenward & Östh, 2015; Smith & Warneken, 2016). Additionally, the children also predicted the transgressor to have more negative feelings when transgressing against a friend than when transgressing against anyone else. Thus, children seem to see transgressions against friends as slightly more severe – at least regarding the emotional valence.

In sum, while interpersonal obligations are not as important for children's sharing as moral norms, they might still add to the influence of affective or strategic motivations.

1.5 Relevant social-cognitive abilities

In the following I will discuss the influence of cognitive perspective taking, affective perspective taking and emotion understanding on children's selective sharing behavior and their sharing expectations. Perspective taking abilities are connected to young children's sharing behavior (Vonk, Jett, Tomeny, Mercer, & Cwikla, 2020; Wu & Su, 2014; Yu et al., 2016) and might therefore influence children's selective sharing with friends and their sharing expectations. I discuss these abilities separately from the discussions of children's motives because perspective taking abilities can support both affective and strategic motives. These abilities improve considerably in the preschool years (Wellman & Liu, 2004). The description of the abilities is mostly based on (Paulus, in press-b). I applied the considerations to children's selective sharing with friends.

1.5.1 Cognitive perspective taking and Theory of Mind

First, understanding that others may have different desires, intentions, and beliefs from oneself can help to identify what others need and want and through this can increase the concern for others' welfare and the ability to help them. Indeed, some previous studies show a connection between preschoolers' theory-of-mind (ToM) abilities and their sharing behavior (Wu & Su, 2014; Yu et al., 2016). Children spend a lot of time with their friends and their shared experiences with the friends might make it easier to take the friend's perspective (Thomas & Fletcher, 2003). This could be one of the mechanisms underlying children's selective sharing with friend.

Second, being aware that people may conceive differently of the world, makes predictions about others' actions more differentiated and more accurate (Paulus, in press-b). Thus, preschooler's increasing ToM-abilities can help them to navigate the social world. Regarding sharing, ToM-abilities can help children to realize that not only their own but also other's sharing behavior can be selective (Paulus, in press-b). By 5 years children for example, expect others to share more with friends than with non-friends or strangers (Liberman & Shaw, 2017; Olson & Spelke, 2008; Paulus & Moore, 2014). That is, they understand that the relationship with the recipient influences others' sharing behavior. Thus, around this time preschool children might also increasingly attribute intentions to share with them to their friends and less or no intentions to share with them to their nonfriends.

Third, as children make increasingly more accurate predictions about others' actions and reactions, they can use their ToM abilities also for strategic behavior. On the one hand, this strategic behavior can be egoistic and manipulative (Cowell, Samek, List, & Decety, 2015). Children, for example, share more with others when there is a chance to get something in return or to improve their reputation (Engelmann et al., 2013; Kenward et al., 2015; Sebastián-Enesco & Warneken, 2015; Xiong et al., 2016). With regard to children's selective sharing this means, that children might share more with their friends because they expect a higher probability to be rewarded for their generosity. However, in a partner-choice context, strategic considerations can also be used to protect against exploitation. Thus, children might more often choose friends as cooperative partners because they trust them and rely on them more. In line with this, 5- and 6-year-old children report higher trust in their friends' than in their non-friends' promise- and secret-keeping behaviors (Chin, 2014).

In sum, there are multiple paths through which ToM might promote children's selective sharing with friends and influence their sharing expectations. On the one hand ToM abilities could support affective processes by increasing children's awareness of the friend's needs. On the other hand, through primarily cognitive pathways, children's increasing ToM abilities can help them to identify their friends as dependable interaction partners (future oriented partner choice) or to use their sharing strategically to attain future gains from their friends (future oriented partner control). Previous research on this topic is however mixed. In Vonk et al.'s study (2020) higher ToM abilities predicted an increase in children's sharing with friends. However, in another study (Yu et al., 2016), ToM predicted sharing with strangers but not friends. Thus, more research is needed on the connection between young children's ToM abilities and their preferential sharing with friends.

1.5.2 Affective perspective taking and emotion understanding

The ability to recognize others' emotions and to predict emotional reactions in different situations can also increase children's prosocial behavior.

Empathic concern is shown to be connected to young children's prosocial behavior (Malti, Gummerum, Keller, & Buchmann, 2009; Vaish et al., 2009). Even though, affective perspective taking is a cognitive ability and lacks the emotional quality of empathy, cognitively understanding how others (might) feel can trigger children's empathic concern and thus motivate children to act prosocially.

Apart from enhancing motivation, affective perspective taking can also increase children's ability to act prosocially in an effective way. For example, knowing how others feel and what will comfort someone or will make them happy can help to select the appropriate time and means to support them.

With regard to sharing, predicting that the other person will be happy when someone shares with them and sad when no one shares with them, could increase children's sharing behavior. Indeed, in a previous study (Paulus & Moore, 2015), the sadder 3- to 6-year-olds predicted that others would be when not being shared with, the more they shared in a subsequent sharing task. There is some evidence that 4- to 6-year-old children show more sympathy and suggest more interventions if their friend is sad or angry than if an acquaintance is sad or angry (Costin & Jones, 1992).

Thus, there are three ways in which affective perspective taking might contribute to preschool children's selective sharing with friends. First, they might be more concerned with their friend's than with other peers' welfare in general and therefore be more likely to think about how their friends will feel if they do not share with them. Second, because of their previous experience with their friends, children might have an easier time predicting that their friend will feel sad if they do not share with them. And third, because of the affective relationship with the friend the predicted feelings of the friend but not so much of other peers might lead to more empathic concern and thus be a stronger motivator to share with the friend.

2. Current Thesis

2.1 Aims and research questions of the current thesis

The first aim of the current thesis was to find out more about the mechanisms and motives underlying children's preferential sharing with friends. In this context one main goal was to tease apart different motives for children's enhanced generosity toward friends. Above we proposed three possible motivating factors for children's selective sharing with friends: affective processes, strategic motives, and norms.

In the current thesis, I investigate the role of strategic motives in the most detail of the three possible motivating factors. In the introduction, I have established that at least by 5 years children act strategically in some contexts. For example, older preschool children share more generously if sharing can improve their reputation or if the recipient has the means, the intention and the opportunity to reciprocate (Engelmann et al., 2013; Kenward et al., 2015; Sebastián-Enesco & Warneken, 2015; Xiong et al., 2016). Thus, by the end of the preschool period children have the necessary cognitive abilities to share strategically. Additionally, friendships are characterized by positive reciprocal interactions (Gifford-Smith & Brownell, 2003; Hartup, 1989; Laursen & Hartup, 2002) and children are more prosocial to friends than to other peers by late preschool (Paulus & Moore, 2014; Yu et al., 2016). Thus, it would be rational for older preschoolers to attribute more intentions to share with them to their friends than to less familiar peers. That is, they might consider it more likely that friends reciprocate generous sharing. In sum, it is possible that children share in part more with their friends because they expect a higher probability to be reciprocated. Thus, the first research question of the current thesis is whether strategic motives underly children's selective sharing with friends (Research question 1).

I also wanted to investigate the mechanisms and motives underlying children's preferential sharing with friends more generally. Thus, the second research question is, what motives underly children's preferential sharing with friends (Research question 2). This, very open question can of course also inform the discussion on the impact on affective processes, strategic motivations, and norms. However, the main purpose of answering this

research question was to get a broader overview of the different motives underlying children's selective sharing.

The second aim of the current thesis was to study young children's expectations regarding their friends' sharing behavior towards them and to what extent such expectations guide young children's (social) behavior. Above, we have described how young children not only start to share preferentially with friends in the preschool years (Birch & Billman, 1986; Moore, 2009) but also form the belief that sharing is part of friendships in general (Afshordi, 2019; Furman & Bierman, 1983). Four- to five-year-old but not yet 3-year-old children also have formed the more specific expectation that others share more with their friends than with strangers or disliked peers (Paulus & Moore, 2014). However, little research has focused on young children's sharing expectations regarding their own friends. We have established that relying on friends is a rational choice because friendships are characterized by affection and reciprocity (Laursen & Hartup, 2002; Rubin et al., 2005) and friends are from preschool on more prosocial towards each other than towards other peers (Engelmann et al., 2019). Yet, whether preschoolers selectively expect their own friends to share with them and whether they also rely on their own friends' sharing in a situation in which children's own interests are at stake, has not been directly tested so far. This is an important question because making accurate predictions on how relationships influence others' behavior can help young children to choose good cooperation partners and avoid exploitation. That is, learning who they can rely on, can help children to navigate the social world. Whether young children selectively rely on their friends can also give us information about children's developing friendship concepts. As children's recipient dependent sharing and sharing expectations in third party contexts only gradually emerge in the preschool period (Paulus & Moore, 2014), we a are also interested in developmental changes of children's reliance on their friends' sharing. Thus, research question 3 is, whether and to what extend preschool children (selectively) rely on their friends to share with them and how this recipient dependent reliance develops over the preschool period (Research question 3).

2.2 Outline of the current thesis, hypotheses, and contributions of the author

The current thesis includes three studies. Table 1 gives an overview of the studies and outlines the respective contributions of the author.

Table 1. Overview of studies and contributions of the author.

	Study 1 (Influence of strategic motives and different relationships)	**Study 2** (Motives underlying selective sharing with friends)	**Study 3** (First-person reliance on friends' sharing)
Study design	✓	✓	(✓)
Supervision of data collection	✓	✓	(✓)
Data analysis	✓	✓	(✓)
Writing of the manuscript	✓	✓	✓

Note. major contribution ✓, joint contribution (✓)

In Study 1 (see Appendix A), research questions 1 and 2 (influence of strategic motives on selective sharing & motives underlying selective sharing with friends) were addressed. To this end, we tested 270 3- and 5-year-old children in two experiments. Both experiments investigated whether children share especially much with their friends if their sharing can be reciprocated or whether friendship and strategic reciprocity independently influence children's sharing. If children's selective sharing with their friends is motivated by strategic reasons, we would expect that children prefer their friend relatively more in a context in which reciprocity is possible than in a context in which the recipients (including the friend) do not have the possibility to reciprocate. In both experiments the children could successively share stickers with three recipients, a friend, a potential friend who would join the kindergarten group the next day, and an unfamiliar peer the children would never meet (stranger). Half the children participated in the "Reciprocity" condition in which the recipients supposedly had the possibility to reciprocate and the other half in the "No Reciprocity" condition in which the recipients could not reciprocate. Experiment 1 and 2 differed in how strongly the possibility for reciprocation was pointed out. In Experiment 1, the possibility for reciprocation was manipulated by anonymous and non-anonymous sharing. Thus, the children had to deduct themselves that the friend and the potential friend could potentially reciprocate if they knew who afforded them the stickers. In contrast, in Experiment 2, the children in the Reciprocity condition were explicitly told that the recipients could share tumbled stones with them the next day.

In Study 2 (see Appendix B), research question 2 (motives underlying selective sharing with friends) was addressed. Here we investigated children's motives for their preferential sharing with friends more broadly. To this end we asked 38 4- to 6-year-old

children about their justifications for sharing more with their friend than with a disliked peer. First, the children could successively share stickers with a friend and with a disliked peer. Subsequently, we conducted a semi-structured interview with all children who afforded more stickers to their friend (38 children; 84 %). That is, we inquired why they had shared more stickers with their friend and less stickers with the disliked peer and asked appropriate follow up questions. Lastly, we also assessed children's reactions to the reversed allocation – that is, to an allocation in which the disliked peer would get more and the friend less stickers from the children. We hoped children's reactions would indirectly give us further clues about children's motives for their preferential sharing with friends.

In Study 3 (see Appendix C), research question 3 (first-person reliance on friends' sharing) was addressed. We investigated how much preschool children rely on their friends and non-friends to share with them. To this end, 82 3- to 5-year-old children were told that a friend and a non-friend have had the opportunity to share some of the children's most favorite resources with them by putting it in a closed box but also had the option of keeping all resources for themselves. Subsequently, the participant children were confronted with two choices. On the one hand, they could choose the box by their peer in hopes of getting one of their most favorite items but run the risk of getting nothing. On the other hand, they could choose a safe option - an opt-out box that contained a slightly less attractive but certain item. Thus, children were expected only to choose the risky option (peer box) if they thought that their peer had shared with them. Otherwise, they should choose the safe opt-out option to maximize their outcome. We hypothesized that children would rely on their friends' sharing more than on their non-friend's sharing and thus choose the risky option more often if it was the friend who had had the possibility to share with them. Additionally, we hypothesized that children's sharing expectations would get more differentiated over the course of the preschool period. That is, we predicted that the number of risky choices children were willing to make would increasingly differ with age between the friend and the non-friend.

2.3 Results of the current thesis

In the first study (Study 1), 3- and 5-year-old children shared more resources with their friend than with the potential friend or the stranger but did not differentiate between the potential friend and the stranger. Additionally, 5-year-old children but not 3-year-old children shared more generously if the recipients had the opportunity to reciprocate – but only if the children were explicitly told how the recipients could reciprocate (Experiment 2).

Most importantly, children's preferential sharing with their friend was independent of the possibility to be reciprocated. That is children's preference for the friend was equally strong whether reciprocity was possible or not.

In Study 2, the 4- to 6-year-old children justified their preferential sharing with friends most of the time with positive affect for the friend. That is, they expressed that they shared more with the friend because they liked them, loved them, or loved playing with their friend. Other often used justifications included friendship, positive traits and actions of the friend and proximity – in that descending order of frequency. Some children also referred to the welfare of the friend – but far less than referred to the other categories. When the experimenter reversed the allocation, almost half the children intervened and some worried about the welfare of their friend.

The results of the third study (Study 3) reveal that older preschool children rely on their friends to share with them, and they rely on their friends more than they rely on their non-friends. There was a developmental effect showing that the difference in children's reliance on their friends' sharing compared to on their non-friends' sharing increased with age. Four- and 5-year-old, but not 3-year-old children chose the risky peer box more often than the safe opt-out box in the friend condition indicating that they strongly believed that their friend had shared with them and were willing to take the risk to get nothing if they were wrong. In sum, children's differential reliance on their friends' sharing compared with their nonfriends' sharing emerges in the preschool period.

3. General Discussion and Directions for Future Research

In the following, I will first discuss the three proposed models in light of the three studies of the current thesis. I will draw a conclusion what model – affective processes, strategic motives, or a sharing norm - is the most likely to explain children's preferential sharing with friends (Research question 1). Then I will discuss additional motivating factors for children's selective sharing that can be deducted from the results of the exploratory Study 2 (Research question 2).

Next, I will discuss the implications of the three studies of the current thesis for preschooler's selective sharing and sharing expectations. In this context, I will also discuss research question 3, that is, children's emerging reliance on their friends. The implications for children's friendships will be discussed next.

Lastly, I will discuss implications for future research and summarize the insights of the current thesis for young children's recipient dependent sharing, sharing expectations and friendships.

3.1 Motives underlying children's preferential sharing – first research question

3.1.1 A history of reciprocal exchange and a bond of affection

The results of Study 1 and Study 2 support the idea that affective processes based on shared experiences motivate young children's selective sharing with friends.

Study 1 revealed that young children's selective sharing with friends is not motivated by strategic motives. In Study 1 friendship and the possibility for reciprocity independently affected children's sharing. This makes the alternative explanations, that is, affective processes and feelings of obligation (norms), more probable. Another indication that shared experiences and affective processes are involved is that the children in Study 1 shared more with their friend than with the other two recipients but did not share more with the potential friend than with the stranger. This is interesting because the friend is the only recipient that had a past relationship with the child. Thus, it seems to be especially the past relationship with the friend that motivates children's more generous sharing with friends. Thus, the positive experiences children made in this past relationship and the resulting positive affect

likely play a role in children's selective sharing with friends. Another interesting detail of Study 1 is that even 3-year-old children shared more with their friends than with the less familiar recipients. An explanatory approach involving affective processes is very appealing for explaining behavior of children who are that young. Affective processes can influence behavior through less cognitively demanding pathways like simple approach-avoidance systems (Cowell & Decety, 2015) which might be necessary because cognitively more demanding mechanisms only gradually start to influence children's sharing in the preschool period (Paulus & Essler, 2020; Warneken & Tomasello, 2013).

More direct evidence that children's increased generosity towards friends is motivated by affective processes comes from Study 2. That is, the 4- to 6-year-old children in Study 2 justified their preferential sharing with friends over disliked peers most with positive affect towards the friend but also most of children's other explanations have a connection to affective processes. Positive actions and traits can of course lead to more liking especially if the actions are directed at the child. Proximity includes shared experiences like playing together and similarities which are both connected to more positive affect (Fawcett & Markson, 2010; Plötner et al., 2015). And concern for the welfare and fair treatment of the friend might be a consequences of positive affect (Costin & Jones, 1992). Thus, Study 2 provides support for positive affect and shared positive experiences as motivating factors for children's selective sharing with friends.

To conclude, Study 1 and Study 2 provide some evidence that children's selective sharing with friends is mainly motivated by shared experienced and affective processes. This is in line with several studies and theories, like the developmental systems approach (Carpendale et al., 2013; Paulus, 2014b) or the social interaction model (Paulus, 2014b) which emphasize the role of shared experiences, affiliation and positive affect for children's developing sharing behavior (Cirelli et al., 2014; Hammond & Drummond, 2019; Over & Carpenter, 2009) The current thesis expands previous research by showing that these mechanisms are especially relevant in close relationships. Shared experiences, shared emotions and positive affect might also be responsible for other instances of children's recipient dependent sharing. However, we have to leave it to future studies to further investigate this possibility.

The results of the current thesis indicate that past experiences and positive affect motivate young children's selective sharing with friends. However, there are multiple pathways through which positive affect and experiences can influence children's sharing. For example, simple approach-avoidance systems could bridge the gap between children's

positive affect and their sharing behavior (Cowell & Decety, 2015). Or the positive affect could lead through increased empathy to genuine concern for the welfare of the friend (Costin & Jones, 1992; Hepach et al., 2013; Vaish et al., 2009). It is possible that more than one mechanism is responsible for the connection between children's positive affect and their selective sharing and that these mechanisms might change as children's cognitive abilities increase. Increasing perspective taking abilities might for example enhance children's empathy and in turn also increase their concern for others. We have to leave it to future research to explore these possibilities further.

3.1.2 Reciprocity and strategic sharing

As mentioned above, Study 1 speaks against strategic considerations as motivating factors for children's strategic sharing with friends. First, Study 1 shows that friendship can influence children's sharing independently of the anticipation to be reciprocated. That is, children shared always more with their friends – even when reciprocation was not possible and even 3-year-old children, who did not consider the possibility to get reciprocated at all, favored their friends. Second, Study 1 also shows that even if children share strategically, the preference for the friend does not seem to be influenced by strategic considerations. That is, the 5-year-olds in Study 1 shared more with the three recipients if the possibility to get reciprocated was explicit. However, their relative preference for the friend was not higher than in the No Reciprocity condition. In sum, Study 1 shows that friendship and reciprocity influence preschool children's sharing independently. That is, children's preferential sharing with friends is not caused by strategic considerations.

In Study 2, children's statements overall also did not indicate strategic motives. One child mentioned that sharing more with the friend could improve the relationship and another worried that sharing less with the friend might hurt the relationship. However, these were the only two children who clearly anticipated that how much they shared with the friend could have direct consequences for them. In sum, the studies of the current thesis indicate that children's more generous sharing with friends compared to with other peers is not motivated by the anticipation of reciprocity.

Two possible explanations for this are, first, that children do not expect their own friends to be especially prosocial towards them, or second, that they generally do not consider their friends' prosociality when making strategic decisions. However, the results of Study 3 suggest otherwise. Preschool children do expect their friends to share with them and by 4- to 5-years they are even so confident in their friends' prosociality towards them that

they are willing to risk getting no resource if they are wrong. Importantly, with age children's reliance on others' sharing gets more selective and the effect remains when controlling for the preference to interact with the friend. That is, 4- to 5-year-old but not yet 3-year-old children rely on their friends' sharing more than they rely on the sharing of disliked peers. Older preschoolers 's selective reliance on their friends is likely driven by the attribution of more prosocial intentions to their friends than to their non-friends. This means that when deciding who to rely on, older preschool children actually use their assessment of their friends' prosociality towards them to make strategic decisions. This is in contrast to the findings of Study 1, in which 5-year-old children either did not consider their friends' prosociality or did not apply these considerations to their strategic sharing decisions.

The results of study 3 make the fact that young children's selective sharing with friends is not subserved by strategic motives, even more remarkable. First, we know from Study 1, that older preschool children are able to share strategically and under some circumstances do so. Second, older preschoolers have strong expectations that their friends will share with them and are more likely to share with them than disliked peers (Study 3). Third, they are able to use their knowledge about their friends' prosociality to make strategic decisions (Study 3). In conclusion, older preschool children should know that their friends are ideal targets for strategic sharing, but they still do not use this knowledge in their strategic decisions.

I want to point out that even though children's selective sharing with friends is not motivated by strategic motives, the current thesis is still in line with previous studies which show preschoolers' increasing ability for future oriented and strategic behavior (Kenward et al., 2015; Sebastián-Enesco & Warneken, 2015; Thompson, Barresi, & Moore, 1997; Warneken, Sebastián-Enesco, Benjamin, & Pieloch, 2019; Xiong et al., 2016). Study 1 shows that older preschool children share strategically when they are made aware of the possibility to get reciprocated. Interestingly, the children did not share strategically if they were only told that the recipients would know who afforded them the stickers. That is, without prompts they did not consider the possibility to be reciprocated. This puts into question how relevant strategic sharing is in the everyday life of young children. There have been observational studies confirming children's reciprocal sharing (with friends) in naturalistic contexts (Fujisawa et al., 2008; Kato-Shimizu, Onishi, Kanazawa, & Hinobayashi, 2013). It would be a fruitful endeavor to build on these studies and investigate the prevalence of strategic sharing in children's daily life.

To conclude, the studies of the current thesis show that while older preschool children are able to share strategically and do so under certain circumstances, children's increased generosity towards their friends is not subserved by strategic considerations. That even the five-year-old children in Study 1 only shared strategically when they were explicitly pointed to the possibility to be reciprocated, additionally opens an interesting discussion on the importance of strategic reciprocity for young children's sharing in general.

3.1.3 Norms

The third model explores the possibility that sharing in friendships might have normative qualities (Paulus et al., 2020), that friendships come with obligations (Keller et al., 1998) and that some degree of partiality in friendships might be necessary or even obligatory (Jollimore, 2000).

The results of the current studies support the normative model at least to some extent. In Study 3, children's reliance on their friends' sharing went beyond simple predictions. Older preschoolers were so confident that their friends would share with them that they took the risk not to get any resources if they were wrong. If sharing in friendships was a norm this would explain and justify children's confidence in their friends' sharing.

Study 2 also provides some support for the normative model. First, many children explained their preferential sharing with their friend with friendship. "Because he/she is my friend", is technically a circular argument but in this context, it might be an indication that children consider (selective) sharing with friends to be normative. Preschool children for example also justify punishment of theft with "It's stealing" without providing further information (Mammen, Köymen, & Tomasello, 2018; Nunner-Winkler, 2007). Not providing additional explanations has in this previous study been seen as an indication that children assume the underlying (moral) norm and the wrongness of the offence to be common knowledge. Similarly, the 4- to 6-year-old-old children in Study 2, seem to view the connection between friendship and sharing to be common ground with the experimenter. This confirms that sharing is part of children's friendship concept by the end of preschool (Afshordi, 2019; Furman & Bierman, 1983) and indicates further that children might consider sharing in friendships to be normative. Second, almost half of the children intervened when the experimenter reversed the children's original allocation. Giving less to a friend than to a disliked peer was clearly not ok for the children. This is in line with a previous study in which preschool children also protested against a third party who gave

more resources to a disliked peer than to a friend (Paulus et al., 2020). Thus, there is clear evidence that sharing less with a friend is a severe (moral) transgression.

In a study by Smetana and Ball (2018), 4- to 9-year-old children predicted a transgressor to have more negative feelings when transgressing against a friend than when transgressing against less close affiliations. Smetana and Ball (2018) additionally found that while children find it unacceptable to transgress against anyone, including disliked peers and bullies, they find it slightly more acceptable to transgress against a bully. Thus, while relationships do not fundamentally change children's moral convictions, they might skew them slightly or enhance their emotional valence. Importantly for the current thesis, if it is (emotionally) slightly more important not to put a friend at a disadvantage, this can indirectly lead to partiality. That is, if children are conscious of not putting their friends at a disadvantage but do not mind putting other recipients at a disadvantage as much (i.e., bullies), they might end up "accidentally" sharing more with their friends.

In conclusion, the current thesis supports the notion that children understand that friendship entails some sort of obligation to share with friends (Paulus et al., 2020; Paulus, in press-a). However, the current thesis cannot conclusively determine whether selective sharing with friends is obligatory. The finding of a previous study, which shows that children enforce the equality norm over partiality towards friends, speaks against this notion (Paulus et al., 2020). There are interpersonal norms to care about the welfare of friends (Grunebaum, 1993; Keller et al., 1998). However, these interpersonal obligations are less important than universal moral norms like equality (Paulus et al., 2020). I propose that even though it might be necessary to be partial to friends sometimes to maintain the friendship (Jollimore, 2000), it is not necessary or obligatory to be partial all the time - especially if a universal moral norm would have to be broken (Grunebaum, 1993). We have to leave it to future studies to pursue this line of research further.

With regard to selective sharing, interpersonal obligations to care for friends and a norm not to put friends at a disadvantage might indirectly add to children's more generous sharing with friends. However, given that preschool children judge partial sharing to be less important than equality norms (Paulus et al., 2020), interpersonal norms are probably not mainly responsible for children's selective sharing.

3.1.4 Comparison and integration of the three models

I introduced three models to explain children's selective sharing with friends: The first model proposed that shared experiences and affective processes underly children's more generous sharing with friends. The second model suggested that children might share more with friends for strategic reasons, because children expect a higher probability to be reciprocated by friends. And lastly, in the third model I proposed that interpersonal obligations to share (selectively) with friends might motivate children's partiality.

The three studies of the current thesis support the first, affective model, largely rule out the second, strategic model and indicate that norms might additionally add to the affective processes that motivate young children's sharing. Thus, to answer my first research question, children's selective sharing with friends seems to be mainly motivated by affective processes.

First, the findings of the current thesis are in line with constructivist and social-interactionist theories and studies that stress the importance of shared experiences and (shared) positive affect for the development and as motivational factors for children's sharing (Carpendale et al., 2013; Cirelli et al., 2014; Hammond & Drummond, 2019; Paulus, 2014b). The current thesis expands these theories by showing that shared experiences and affect are especially important for the prosocial behavior in close relationships. It would be important for future research to examine whether affective processes are responsible for children's selective sharing in other contexts (i.e., after collaboration). Second, children's selective sharing with friends is not motivated by strategic processes. Thus, even though on an evolutionary level, altruism towards non-kin might not have evolved if it was not advantageous for the individual (Axelrod, 1984/2006; Leimgruber, 2018; Nowak, 2006; Trivers, 1971), the current thesis provides evidence that on an ontogenetic level the underlying mechanisms are far less utilitarian. That is, children's "use" for their friends might lie more in their need for affiliation (Laursen & Hartup, 2002; Paulus, 2018) than in their need for material ressources. Third, norms might additionally add to the affective processes that underly children's preferential sharing with friends, but previous research suggests that they are not the main motivator (Paulus et al., 2020; Smetana & Ball, 2018).

3.1.5. Additional motives underlying children's selective sharing with friends – second research question

Above I discussed three likely mechanisms which could be responsible for children's selective sharing with friends. However, there could be other mechanisms and motives that I originally did not consider. Thus, to explore children's motives for sharing more with their friends than with less close affiliations more broadly, we conducted a semi-standardized interview study (Study 2). In this study we asked 4-6-year-old children directly why they shared more with their friend. Except for friendship, which I already discussed in relation to a potential sharing norm in close relationships, all of children's justifications relate well to the affective process model.

The only aspect I want to discuss separately is the justification category "positive actions and traits of the friend", because it might also relate to another possible underlying mechanism which I have not discussed so far. In the eyes of the children, the positive actions and traits of the friend might make the friend more deserving of resources. Malti et al. (2016) for example showed that 4- and 8-year-old children share more with someone who is morally deserving and another study with younger children showed similar results (Kenward & Dahl, 2011). Malti et al. (2016) operationalized the morally deserving recipient in terms of someone who does not push others and shares resources. Interestingly, this is similar to how many of the children in Study 2 described their friends. Thus, children might share more with their friends because they think that their friends are morally more deserving than other peers. This effect might even get heightened by the fact that children show an implicit bias in their evaluation of in-group members (Dunham et al., 2011). Thus, I recommend investigating moral deservingness as a reason for children's selective sharing with friends in future studies.

3.2 Selective sharing and sharing expectations – third research question

One of the things that the current thesis highlights is how important interpersonal relationships and specifically friendships are in prosocial contexts (Birch & Billman, 1986; Engelmann et al., 2019; Fehr et al., 2008; Paulus & Moore, 2014).

Study 1 and 2 confirm the findings of many previous studies that children begin to share selectively with their friends in the preschool period (Birch & Billman, 1986; Garon et al., 2011; Moore, 2009; Paulus, 2016; Paulus & Moore, 2014; Yu et al., 2016). Study 3

expands these findings by showing that young children are not only more prosocial in close relationships themselves but also rely on their close affiliations to be more prosocial towards them. Importantly, in Study 3, we did not measure simple predictions. By adapting a paradigm from metacognition research, we could show that the relationship with the other person begins to influence children's sharing expectations on a behavioral level.

This also answers my third research question: Older preschool children (selectively) rely on their friends to share with them and this selective reliance develops in the preschool period.

That older preschoolers selectively rely on their friends, points to children's developing understanding how relationships influence intentions and behavior. This understanding can help children to choose generous and cooperative interaction partners and to avoid exploitation (cf., Afshordi & Liberman, 2021).

3.3 Friendship

The results of the current thesis also have some implications for young children's friendships in general. That children's selective sharing with friends is subserved by affective processes and shared experiences, stresses the role of affection for young children's friendships in general (Furman & Bierman, 1983). It might for example imply that other cooperative behaviors in friendships, like helping could also be motivated by positive feelings for the friend.

Most importantly, the current thesis seems to be in contrast with classical theories (Damon, 1977; Selman, 1980; Youniss & Volpe, 1978) which propose that preschoolers' understanding of friendships is still superficial. In addition, children's motivation and behavior in friendships is said to be self-serving until at least 6-years (cf., Afshordi & Liberman, 2021; Selman, 1980).

The current thesis shows that sharing, prosocial support, and reliance are much earlier key factors of friendships than previously suspected. The strong expectation of the older preschool children in Study 3, that their friend will share with them, is in line with other studies that show that preschool children have a comprehensive understanding of what friendships entail. Already young children, for example, know that loyalty, shared interests and selective sharing are characteristics of friendships (Afshordi, 2019; Liberman & Shaw, 2017, 2019; Paulus & Moore, 2014). The current thesis expands these findings by showing that children's understanding of friendships is not only conceptually more advanced than

previously thought, but that this knowledge also corresponds to children's own behavior. The older children in Study 3 made consequential decisions based on their expectations when they chose to rely on their friends' sharing. They risked getting no resources by relying on their friends' sharing. Additionally, children's more generous sharing with friends is not motivated by strategic considerations and thus not self-serving. That the 4- to 6-year-old children in Study 2 were aware that they shared more with their friends because they like them, further implies that they shared with their friends for the sake of their friends' welfare and not because of automatic affective processes. Thus, young children's friendships are already affectionate, trusting, and reciprocal relationships in which both friends expect and provide prosocial support.

3.4 Directions for future research – different underlying pathways

Based on the results of the three thesis studies, I propose that different mechanisms underly children's reliance on their friends' (selective) sharing and children's own selective sharing with friends (see Figure 1). I propose that older preschool children share selectively with their friends for affective reasons but rely more on their friends for strategic reasons.

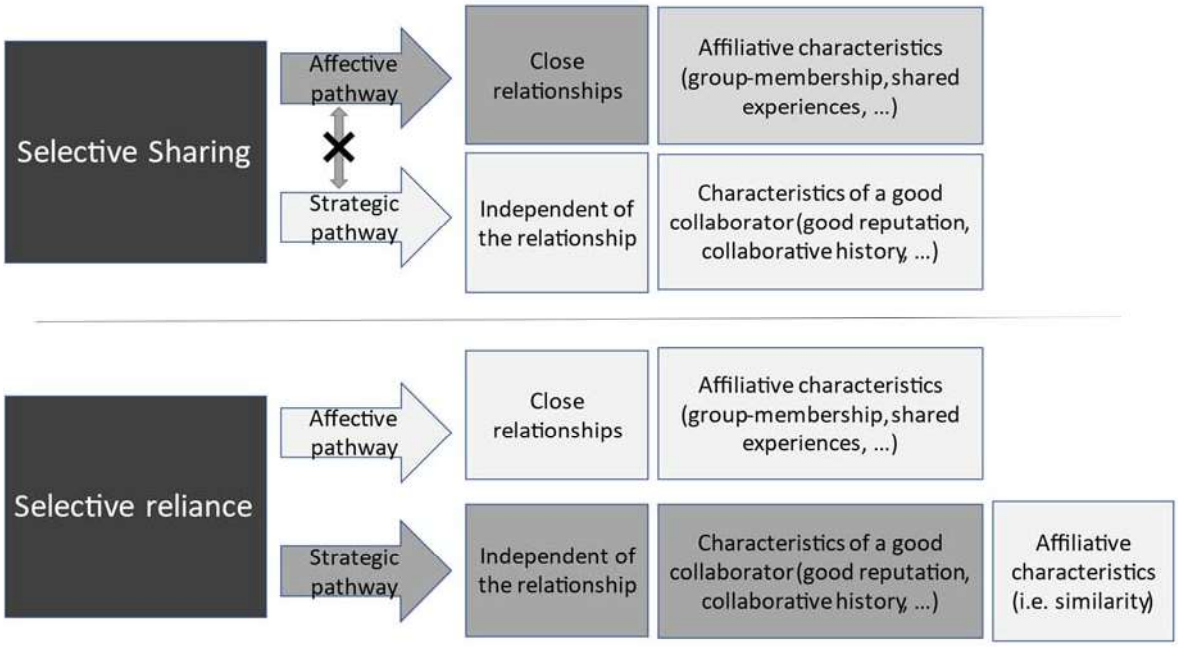

Figure 1. Model regarding the underlying mechanisms of selective sharing and selective reliance in older preschool children. Darker shades indicate main underlying pathways and

important characteristic of the other person. Lighter shades mark less important alternative pathways or characteristics.

I have established that affective and affiliative processes are likely the main mechanism underlying young children's selective sharing with friends. As young children only seem to share strategically when they are made explicitly aware of the possibility to be reciprocated, affective processes might even be the underlying mechanism for most of preschoolers' selective sharing in general. Indeed many of the recipient characteristics that lead children to share selectively, like similarity (Dunham et al., 2011; Renno & Shutts, 2015; Sparks, Schinkel, & Moore, 2017), and collaboration (Plötner et al., 2015; Warneken et al., 2011) are also related to increased feelings of affiliations and affection (Fawcett & Markson, 2010; Plötner et al., 2015; Sparks et al., 2017).

However, this does not mean that more cognitively demanding processes do not play an important role in preschoolers' selectivity. I propose that older preschoolers' decisions, who to rely on in prosocial situations, are much more driven by strategic considerations. First, the decision to rely on someone is naturally more focused on the outcome of the reliance. We usually decide to rely on others if we need or want something. Thus, the ability and intention of the other person to fulfill that need or want is much more directly relevant. There is evidence from metacognitive research that 5-year-old children trust information by an accurate informant more than by a familiar informant (Corriveau & Harris, 2009). Thus, older preschoolers choose the strategically relevant information over the more affectively relevant information.

I want to point out that strategic considerations probably rely on perspective taking abilities, planning abilities and future directed thinking (i.e., Kumaki et al., 2018; Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010). These abilities increase with age – especially in the preschool period (Atance, 2015; McCormack & Atance, 2011; Wellman & Liu, 2004). For this reason, I propose this model specifically for older preschool children who already have the relevant cognitive abilities. Younger preschool children either do not differentiate between agents (Study 3; Paulus & Moore, 2014) or rely on affectively relevant information, like familiarity (Corriveau & Harris, 2009).

To test the model, one could for example contrast two different recipients and two different trustees (agents the child can choose to rely on or not). One of the recipients and one of the trustees has more strategically relevant characteristics (i.e., more wealth, a good reputation) and the other more affectively relevant characteristics (i.e., similarity, having

performed a synchronous activity). I predict that children would share selectively with the recipient with the affectively relevant characteristics and rely selectively on the trustee with the strategically relevant characteristics.

3.5 Limitations and additional resulting suggestions for future research

The current study has some limitations which might also provide ideas for future research.

3.5.1. Limited age range

The current thesis only discusses children‘s selective sharing and sharing expectations regarding friends in the preschool period. Thus, we can only capture development in that age range. However, not only young children are more prosocial towards their friends. As close friendships get more important in adolescence (Keller et al., 1998), prosocial behavior and support further increase (Padilla-Walker, Carlo, & Nielson, 2015). For older children and adolescents, other motives to prefer their friends might come into focus, like interpersonal obligations and the wish to maintain personal relationships (Killen & Turiel, 1998; Padilla-Walker et al., 2015). As loyalty and trust are central motives in adolescence (Keller et al., 1998), children’s reliance on their friends might also increase and expand to other areas like self-disclosure. In the following I want to focus on the increasing role self-related cognitions might play for slightly older children’s and adolescents’ selective sharing with friends.

3.5.1.1 Self related cognitions

I will first discuss the possible role of the self-concept and then the influence that own anticipated emotions might have on children’s sharing with friends.

3.5.1.2 Self-concept – being a good friend

Prosocial support and sharing become part of children’s understanding of what friendships entail around the end of preschool (Furman & Bierman, 1983). However, as friendship gets increasingly important for children in the course of childhood and adolescence, the values of friendship, like loyalty and prosocial support towards friends, become more central to adolescents’ identities (Keller et al., 1998). Thus, first, it would be interesting to investigate how important it is for children and adolescence to be “a good friend” and how much they identify themselves with being a good friend. In the next step

one could assess whether this "friendship self-concept" is related to their partiality and selective sharing towards friends. The idea behind this is that once a concept is integrated into a person's identity, the corresponding behavior becomes natural to that person (Frimer & Walker; Paulus, in press-b). If a friendship self-concept exists, it would probably be part of the social (Harter, 1982) or the moral self-concept (Keller et al., 1998). Indeed, there is evidence that the moral self-concept is related to prosocial behavior (Sticker, Christner, Pletti, & Paulus, 2021). The importance children place on being a friend could predict prosocial behavior towards the friend as part of a bigger concept, like the social or moral self-concept, but it might also still independently predict prosocial behavior. Specific sub-dimension of the moral self-concepts often relate to the corresponding behavior. The moral sharing self-concept, for example, predicts 4-9-year-old children's actual sharing behavior (Christner, Pletti, & Paulus, 2020; Sticker et al., 2021). Thus, the friendship self-concept could also be related to behavior that children and adolescence associate with friendships, specifically prosocial support and sharing.

3.5.1.3 Own (anticipated) emotions

Interestingly, in older children the connection between the moral self-concept and sharing seems to be mediated by the anticipation of own negative emotions when not sharing (Christner et al., 2020). Indeed, sharing is in other studies positively correlated to the anticipation of own negative emotions when failing to perform a prosocial action like sharing (Ongley & Malti, 2014; Paulus & Moore, 2017). This mechanism could be especially relevant in the friendship contexts because children might feel more negative emotions when not sharing with the friend. Evidence for this comes from a study by Smetana and Ball (2018) in which 4- to 9-year-old children predicted transgressors to have more negative emotions when transgressing against a friend than when transgressing against an acquaintance, a disliked peer, or a bully. Investigating children's anticipation of positive emotions when sharing with friends might also be fruitful as self-determination theory predicts that prosocial acts are especially rewarding if they allow the helpee to create and strengthen social bonds (Aknin & Whillans, 2021; Deci & Ryan, 2000). Indeed, there is evidence that recalling being generous to close others compared to acquaintances leads to greater happiness (Aknin, Sandstrom, Dunn, & Norton, 2011). Thus, it would be worthwhile to investigate older children's anticipation of negative emotions when not sharing and of positive emotions when sharing in the context of different relationships and how these anticipated emotions relate to children's recipient dependent sharing.

3.5.2 Limited variety and differentiation in relationship comparisons

In the current thesis, I compared children's behavior towards friends with their behavior towards disliked peers, strangers, and potential friends. These are very common comparisons in experimental studies (Engelmann et al., 2019; Moore, 2009; Paulus et al., 2020; Yu et al., 2016) and as children differ in their behavior towards the different agents, these comparisons have proven to be useful. However, these are also very broad categories and further differentiation in the compared relationships might give us additional insight how and why relationship quality influences children's attitudes and behavior. Smetana and Ball (2018) for example showed that children find it slightly more acceptable to transgress against bullies than against friends, acquaintances and disliked peers. In my studies and many others (Moore, 2009; Paulus et al., 2020) such differences would have been lost because disliked peers and bullies would have been both categorized as disliked peers. Children in Study 2 sometimes pointed out that they share more because their friend is their "best friend", which indicates that by 6 years, children also differentiate within friendships and this might have consequences for their selective sharing behavior. There is also evidence from older children that friendship quality within friendships is important. Besides having a friend at all, friendship quality is for example an important protective factor against mental difficulties and a predictor for school adjustment (Aikins, Bierman, & Parker, 2005; Asher & Paquette, 2003; Hodges, Boivin, Vitaro, & Bukowski, 1999)

Thus, depending on the proposed underlying mechanisms and research question, further differentiation within the used relationship categories would be important for future research.

3.6 Impact and conclusion

The results of the current thesis support the importance of affective processes and shared experiences for children's selective sharing with friends and are thus in line with constructivist and social-interactionist theories (Carpendale et al., 2013; Paulus, 2014b). In contrast, the results speak against the suggestion of evolutionary and cognitive theories (Axelrod, 1984/2006; Kuhlmeier et al., 2014; Trivers, 1971) that sharing with non-related others is motivated by future benefits and cooperation. That is, even though, older preschoolers are able to share strategically and even selectively rely on their friends to share with them, their preferential sharing with friends is not motivated by strategic considerations. A sense of obligation to share with friends might additionally add to the affective processes that underlie children's partiality. By disentangling different motivations and demonstrating

the importance of affective processes for preschoolers' selective sharing, the current thesis adds to our understanding of children' prosociality.

The current thesis also shows that older preschool children (selectively) rely on their friends to share with them, and that this selective reliance develops in the preschool period. This result highlights children's developing understanding how relationships influence behavior and points to children's related ability to choose good cooperation partners (cf., Afshordi & Liberman, 2021). When the older preschool children in Study 3 relied on their friend, they took the risk not to get any resources. That is, children's expectation that their friends would share with them, manifested in their behavior. Thus, this finding also adds to the discussion on the behavioral significance of expectation.

Lastly, the current thesis also has implications for young children's friendship. The present work dissents from classical theories (Damon, 1977; Selman, 1980; Youniss & Volpe, 1978) which propose that preschoolers' understanding of friendships is still superficial and children's behavior in friendships mostly self-serving (cf., Afshordi & Liberman, 2021; Laursen & Hartup, 2002; Selman, 1980)

Prosocial support and reliance are much earlier important factors of friendships than previously suspected. By the end of preschool, children not only know that loyalty, shared interests and selective sharing are characteristics of friendships (Afshordi & Liberman, 2021; Liberman & Shaw, 2017, 2019; Paulus & Moore, 2014), this knowledge also corresponds to children's own behavior. Older preschool children selectively share with their friends and rely on them. Thus, young children's friendships are already affectionate, trusting, and reciprocal relationships in which both friends expect and provide prosocial support.

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5. Appendices

A. Study 1: Paper by Lenz and Paulus (2021), published in Journal of Experimental Child Psychology, based on data presented in this thesis

Lenz, S., & Paulus, M. (2021). Friendship is more than strategic reciprocity: Preschoolers' selective sharing with friends cannot be reduced to strategic concerns. *Journal of Experimental Child Psychology, 206*, Article 105101. https://doi.org/10.1016/j.jecp.2021.105101

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Friendship is more than strategic reciprocity: Preschoolers' selective sharing with friends cannot be reduced to strategic concerns

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ABSTRACT

The current study investigated whether children share especially much with their friends when sharing can be reciprocated (strategic sharing) or whether friendship and strategic reciprocity are independent factors in predicting children's sharing. If the former is the case, children should prefer their friend relatively more in a situation where the friend can reciprocate than in a situation without the possibility for reciprocity. In two experiments, 3- and 5-year-old participants (N = 270) could distribute stickers between themselves and three recipients: a friend, a child who would join the kindergarten group the next day, and a stranger. Half of the children were led to believe that their generosity could be reciprocated, and the other half were not. In Experiment 1, this was implemented by anonymous and nonanonymous sharing. In Experiment 2, the possibility of reciprocity or lack thereof was explicitly mentioned. The results show that participants across both age groups shared more resources with their friend than with less familiar recipients. Potential reciprocity affected 5-year-olds' sharing but not 3-year-olds' sharing—but only if reciprocity was explicitly mentioned (Experiment 2). Importantly, the preference for the friend was independent of the possibility to be reciprocated for all children. The current study shows that friendship and strategic reciprocity are relevant but probably largely independent factors for children's sharing. That is, the preference to share with friends cannot be reduced to strategic considerations.

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Introduction

In our daily lives, we sometimes invest resources with the expectation and purpose to be reciprocated for it in the future. A woman who knows that she will need to borrow her friend's car the next week might be more willing to share her lawnmower with him if he asked her for it. On the other hand, familial relationships and friendships are also informed by other factors such as affection and responsibility (Howes, 1996; Neff, Turiel, & Anshel, 2002). Potentially, the possibility for reciprocity might guide our behavior even more in interactions with friends than in interactions with strangers because we build on a history of reciprocal exchange (Laursen & Hartup, 2002; Selman, Jaquette, & Lavin, 1977). Thus, it would be interesting to explore whether or not social relationships and strategic considerations are intertwined. That is, it would be fruitful to investigate whether people show more or less strategic prosocial behavior toward a person depending on the relationship with that person. We discuss this consideration in detail in the following sections.

By the preschool period, the relationship with the recipient (Engelmann, Haux, & Herrmann, 2019; Moore, 2009; Olson & Spelke, 2008; Paulus & Moore, 2014; Vonk, Jett, Tomeny, Mercer, & Cwikla, 2020; Yu, Zhu, & Leslie, 2016) and the expectation to be reciprocated (Engelmann, Over, Herrmann, & Tomasello, 2013; Kenward, Hellmer, Winter, & Eriksson, 2015; Paulus, 2016b; Xiong, Shi, Wu, & Zhang, 2016) start to influence children's sharing and prosocial behavior. That is, the emergence of reciprocity concerns and the impact of friendship on children's sharing show similar age-related developmental trends. In the current study, we investigated whether these two factors are connected early in human development. More specifically, we investigated whether children partly share more with their friends because they expect a higher chance to be reciprocated for their generosity. Investigating the connection between recipient-dependent sharing behavior and strategic sharing can give us further insight into the underlying mechanisms and motives of prosocial behavior during the preschool period.

In the following section, we first outline previous findings concerning the influence of recipient characteristics and reciprocity expectations on preschoolers' sharing. Then, we discuss the aim of the study in greater detail.

Relationship with the recipients

By about 4 years of age, children start to be more generous to their friends than to other individuals (Buhrmester, Goldfarb, & Cantrell, 1992; Moore, 2009; Yu et al., 2016) and also expect others to be more generous to their friends (Olson & Spelke, 2008). Moreover, children's selective sharing and sharing expectations are related to each other by 5 years of age (Paulus & Moore, 2014), indicating an integration of the two concepts (e.g., Kumaki, Moriguchi, & Myowa-Yamakoshi, 2018). Likewise, starting from the third year of life, children have a higher frequency of reciprocal exchanges and more generous reciprocal interactions with their friends than with other peers (Fujisawa, Kutsukake, & Hasegawa, 2008). Yet, although influential developmental theories highlight the role of reciprocal interactions and mutual affectivity for the formation and maintenance of friendships (Laursen & Hartup, 2002; Rubin, Coplan, Chen, Bowker, & McDonald, 2011), the psychological mechanisms underlying children's increased generosity toward friends are open to debate.

One possible mechanism that has been discussed is that children build a sharing routine with their friends based on emotionally rewarding interactions (Paulus, 2016a). This might be closely related to a more positive affect (Furman & Bierman, 1983; Hammond & Drummond, 2019; Howes, 1996; Volling, Youngblade, & Belsky, 1997) and enhanced empathy toward friends (Costin & Jones, 1992). Thus, from this theoretical perspective, a history of shared affect and a bond of affection explain children's generosity toward their friends.

Another possibility, from a cognitive perspective, is that more strategic motives might underlie children's selective generosity toward friends. Indeed, ample research has shown that preschool children's sharing is affected by reciprocal concerns (e.g., Engelmann et al., 2019; Kenward et al., 2015). Thus, children might share more with their friends because they expect them to more likely be

generous in return. Indeed, current social-cognitive and evolutionary theories assume that the need for cooperation is at the basis of human prosocial behavior (e.g., Boyd & Richerson, 2005).

Although it is important to note that strategic and affective motives for selective sharing with friends might not be mutually exclusive, our main aim was to investigate to what extent children's preferred sharing with friends can be explained by genuinely strategic motives. Thus, the current study investigated the unique contribution of strategic motives for children's preferential sharing with friends. Indeed, current developmental research tries to obtain a deeper understanding of to what extent different psychological mechanisms affect young children's sharing (e.g., Brownell, 2013; Malti et al., 2016; Martin & Olson, 2015). Thus, to contribute to this theoretical endeavor, the current study aimed at disentangling the impact of strategic considerations on young children's generosity toward their friends. In the following section, we outline the development of reciprocity, reciprocity expectations, and strategic sharing in preschoolers.

Reciprocity and strategic sharing

Children increasingly reciprocate prosocial behavior between 3 and 5 years of age (Fujisawa et al., 2008; Kato-Shimizu, Onishi, Kanazawa, & Hinobayashi, 2013; Vaish, Hepach, & Tomasello, 2018; Warneken & Tomasello, 2013). In addition, by 3 years of age preschool children also expect others to act reciprocally (Olson & Spelke, 2008; Wörle, Essler, & Paulus, 2020), particularly if they themselves were generous to these others in the past (Paulus, 2016b). Thus, even young children seem to know that their past generosity makes it more likely that the recipient of their generosity will be generous to them. By about 4 or 5 years of age, sharing becomes more strategic. For example children share more if there is the possibility to be reciprocated by the other person (Sebastián-Enesco & Warneken, 2015; Xiong et al., 2016). For example, Sebastián-Enesco and Warneken (2015) demonstrated that 5-year-olds, but not 3-year-olds, shared more resources if the recipient (a puppet) could share valuable resources in a subsequent game than if the recipient did not have the chance to share anything in return. Thus, it has been shown that by 4 or 5 years of age children start to act strategically in order to secure an advantage for themselves in the future. The development of strategic sharing could be related to a number of developing cognitive and social-cognitive abilities. For example, children's understanding of time and appreciation of future states, and the related planning abilities (e.g., Martin-Ordas, 2018; Prabhakar & Hudson, 2014; Suddendorf, Nielsen, & von Gehlen, 2011), might support the emergence of strategic prosociality. Moreover, children's abilities for perspective taking increase during the preschool years (for a review, see Wellman, Cross, & Watson, 2001), and several studies have highlighted the impact of perspective taking on prosocial behavior (e.g., Belacchi & Farina, 2012; Eisenberg, Zhou, & Koller, 2001; Rizzo & Killen, 2018; for a review, see Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016) and on strategic prosocial behavior (Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010). Thus, during the course of the preschool years, reciprocal behavior becomes increasingly strategic.

The current study

The aim of the current study was to investigate whether children's selective sharing with friends is partly subserved by strategic motives. In other words, by investigating children's costly sharing with friends and their strategic sharing in the same experiment, our study extends previous work by teasing apart different motives for children's enhanced sharing with friends. In particular, we examined to what extent preschool children's enhanced generosity toward friends can be explained by strategic social motives, that is, strategic reciprocity.

If this was the case, the preference for the friend should be stronger in a situation where children could be reciprocated for their sharing than in a situation without the possibility for reciprocity. Such a result would indicate that 5-year-olds use their expectation of their friends' generosity in their strategic sharing. Thus, the current study could clarify whether or not children's tendency to share selectively with friends and their emerging ability to share strategically is connected.

We implemented the possibility for reciprocity by means of an experimental manipulation. In Experiment 1, half of the children shared anonymously and the other half shared nonanonymously.

Here, we intentionally did not specify the currency in which children could be reciprocated. That is, by sharing, children could gain anything from more attention to the exchange of resources (social exchange; Laursen & Hartup, 2002). In Experiment 2, we also told children how and when the recipients would have the possibility to reciprocate resources, returning to the more traditional view of material reciprocity. Comparing the results of both experiments gave us the unique opportunity to explore whether children share strategically out of their own accord or only if the possibility for reciprocity is made explicit.

In both experiments, children had the opportunity to distribute resources between themselves and a friend, a potential friend who would soon join the kindergarten group, and a stranger who children would never meet. We decided to rely on these three recipients because they differed in their past and future relationships with the children. This could help us to tease apart which aspects of children's friendships motivate their more generous sharing behavior. The friend has a past and future relationship with the child, the potential friend has no past but a potential future relationship with the child. and the stranger has neither a past nor a future relationship with the child. For ethical reasons, we decided against including a fourth recipient with a past relationship but no potential for a future relationship with the child. We did not want to jeopardize children's existing friendships by claiming that a friend would move away forever the next day.

The past relationship with the friend could allow children to form the expectation that their friend is more likely to reciprocate than other recipients because they had positive experiences with the friend in similar situations. However, the positive past relationship with the friend could also be a reason for more positive emotions toward the friend and therefore more sharing. The anticipated future relationship with the friend and the potential friend could lead children to expect future reciprocity from them if children are openly generous to the friend and the potential friend in the present. The stranger has neither a past nor a future relationship with the child. Thus, the stranger can only reciprocate if this is facilitated by the experimenter (Experiment 2). In sum, including a potential friend and a stranger allowed us to isolate the effect of a past relationship (friend vs. potential friend) and an anticipated future relationship (potential friend vs. stranger) on preschool children's sharing. It is important to note that the role of the stranger condition differs between Experiment 1 and Experiment 2. Because the stranger has no future relationship with the child, in Experiment 1 the stranger cannot reciprocate in either the anonymous condition or the nonanonymous condition. In contrast, in Experiment 2 we could manipulate the possibility for reciprocity also for the stranger and, thus, had the opportunity to investigate the effect of the future relationship more thoroughly.

We decided to examine 3- and 5-year-old children. We included 3-year-olds for the following reasons. First, there is some evidence that 3-year-olds might be more generous to their friends (Olson & Spelke, 2008). Thus, including 3-year-olds gave us the opportunity to investigate selective sharing and its motives from the very beginning. Second, even though children usually only begin to share strategically from 4 years of age, the onset of strategic sharing might happen earlier in the friendship context because taking the perspective of the friend and imagining the friend's future actions might be easier with familiar recipients than with strangers (Thomas & Fletcher, 2003). Third, there is empirical work demonstrating that even 3- and 4-year-olds have expectations of reciprocity and engage in reciprocal behavior (e.g., Olson & Spelke, 2008; Wörle et al., 2020)—even though this does not necessarily mean that they are able to organize their sharing behavior as a function of future possibilities or, in other words, that they can share strategically. Thus, it was an open question whether the 3-year-old children in the current study would engage in selective sharing and, if so, whether their preference for their friend would be partly due to strategic considerations. We included 5-year-old children because by this age they should clearly show selective sharing with friends (Paulus & Moore, 2014; Yu et al., 2016) and strategic reciprocal behavior (Sebastián-Enesco & Warneken, 2015; Xiong et al., 2016). Thus, we could examine to what extent preferential sharing with the friend was due to strategical concerns.

Importantly, if 5-year-old children's generosity with friends is in part based on strategic motives, we expected the preference for the friend to be especially strong in the condition where sharing is not anonymous. Yet, when there is no possibility for reciprocity, selectivity in sharing should be drastically reduced. Thus, this hypothesis would predict an interaction between recipient and condition. Moreover, in the nonanonymous condition, we expected 5-year-olds to share the most with the friend,

to share the second most with the potential friend, and to share the least with the stranger because there is at least a possibility for reciprocation with the potential friend. On the contrary, if children's selective sharing with friends is based on the past relationship and not on concrete expectations of reciprocity, we expected a main effect of recipients but no interaction with condition. That is, if sharing with the friend is primarily based on the affective relationship, children's sharing with the friend should not differ much between the anonymous and nonanonymous conditions. Children would share more with the friend even in the anonymous condition. For 3-year-old children, our predictions were not as definitive. If 3-year-olds share more with their friends but do not show an appreciation of reciprocity, it would suggest that selective sharing with friends does not capitalize on young children's emerging concerns for reciprocity. The data of both experiments are available on the Open Science Framework at https://osf.io/drjt4/?view_only=12f916f6a0dc4df98cbd89351ac75450.

Experiment 1

Method

Participants

The sample consisted of 162 children aged 3 years (n = 60; age range = 3 years 1 month to 3 years 11 months, M = 43.0 months, SD = 2.9; 23 boys) and 5 years (n = 102; range = 5 years 0 months to 5 years 11 months, M = 65.3 months, SD = 3.3; 45 boys). An additional 32 children (17 3-year-olds and 15 5-year-olds) were excluded due to experimenter error (n = 10; $n_{5\text{-year-olds}}$ = 9 and $n_{3\text{-year-olds}}$ = 1), loss of motivation or distraction (n = 8; $n_{5\text{-year-olds}}$ = 4 and $n_{3\text{-year-olds}}$ = 4), language problems (n = 2; $n_{3\text{-year-olds}}$ = 2), difficulties in selecting a friend (n = 3; $n_{5\text{-year-olds}}$ = 1 and $n_{3\text{-year-olds}}$ = 2), and difficulties in answering the familiarization questions correctly regarding the recipients and the reciprocity condition (n = 9; $n_{5\text{-year-olds}}$ = 1 and $n_{3\text{-year-olds}}$ = 8). For both experiments, children were recruited through their kindergartens. Each child had written parental consent. Participants received the stickers that they had retained in the sharing task.

Sample size and power

Studies on children's strategic sharing and studies comparing preschoolers' sharing with friends and other peers reported medium to very large main effects for 5-year-old children and nonsignificant or small to medium effect sizes for 3-year-old children (Engelmann et al., 2013; Moore, 2009; Olson & Spelke, 2008; Paulus & Moore, 2014; Sebastián-Enesco & Warneken, 2015). Thus, we assumed a small to medium effect size for the interaction between reciprocity and the relationship with the recipient. Assuming alpha = .05 and a power of .80, the projected sample size required to detect such an interaction effect (f = 0.18) was approximately N = 52 per age group based on G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007). Thus, we aimed for a final sample of N = 104 to 120 in both experiments.

Research design

To investigate whether children's generosity toward their friends is partly due to strategic motives, we manipulated children's relationships with the recipients (past and future relationships) and whether sharing was anonymous or not anonymous. Each participant could successively share stickers with three recipients (within participants): a friend from the participant's kindergarten (*friend*), a child who the participant had never met but who would soon join the kindergarten group (*potential friend*), and a stranger who the participant would never meet (*stranger*). The order of the three recipients was counterbalanced across participants.

For half of the participants, sharing was anonymous. That is, in the No Reciprocity condition, the recipients would never know who gave them the stickers and therefore could not reciprocate participants' sharing. In contrast, in the Reciprocity condition the participants' sharing was not anonymous. Therefore, except for the stranger, the recipients could return the favor if they wanted to do so. Thus, by manipulating whether sharing was anonymous or not anonymous, we also manipulated the possibility for strategic reciprocity with regard to the friend and the potential friend. Participants of

both age groups were randomly assigned to the No Reciprocity or Reciprocity condition (between participants).

Materials

Children could share colored stickers with each of the three recipients. All children expressed a clear liking of the stickers during the familiarization phase. During the familiarization phase, participants drew colored pictures of the three recipients, which served as representations of the recipients during the sharing task. The participants drew the potential friend and stranger with the help of photos of age- and gender-matched children; the friend was drawn from memory. The children depicted in the photographs looked happy but not overly emotional (smile with closed mouth). Because our sample was predominantly White (~95%) and the individual participants were not known before participating in the experiment, we used the same standardized pictures for all participants. In addition, 12 paper boxes (~1 × 3 × 3 inches) with insertion slots were used to ensure anonymous sharing with regard to the experimenter.

Procedure

Each participant was tested individually in a quiet room of the respective kindergarten. The experimenter introduced the three recipients one after the other.

The experimenter showed the participant photos of two age- and gender-matched children in order to introduce the two unfamiliar recipients (the potential friend and the stranger) and gave the participant the following information. The potential friend would join the kindergarten group the next day, and the participant would have the possibility to get to know this recipient. The stranger, however, lived in another city far away. Therefore, the participant would never have the opportunity to get to know this recipient. To establish the identity of the participant's friend, the experimenter asked whether there was a peer in the kindergarten group who the participant enjoyed playing with and liked a lot. After the introduction of each recipient, the participant was asked to draw a picture of the respective recipient.

To familiarize the participant further with the recipients, and to make sure that the participant could match the recipients to the drawings, the experimenter asked the participant questions about each drawing: "Who is this?", "Do you already know [name of recipient]?", and "Will you meet [name of recipient] again?" For the drawing of the friend, the experimenter also asked whether the participant often played with the recipient. The experimenter also inquired whether the participant liked stickers to ensure that stickers were viewed as valuable resources.

The experimenter then explained the sharing game to the participant child. In two trials per recipient, the participant could choose stickers that would then belong to him or her. The participant subsequently could share some of his or her stickers with the recipients (costly sharing). The respective recipients would get the shared stickers the next day.

In the No Reciprocity condition, the anonymity of the participant's sharing was emphasized. To this end, the experimenter told the participant that neither the experimenter nor the participant would tell the recipients who gave them the stickers. In contrast, in the Reciprocity condition, the experimenter told the participant that she would tell the recipients that the participant gave them the stickers and there would also be a note stating that the stickers came from the participant. To check whether the manipulation was successful, the experimenter asked the participant whether the recipients would know who gave them the stickers. As expected, the 3-year-old children needed a little bit more explanations (M = 1.45, SD = 0.77) than the 5-year-old children (M = 1.21, SD = 0.47).

Shortly before the sharing task, the experimenter repeated the central information regarding each of the recipients again and asked the participant child to identify the corresponding picture (e.g., "Who is the child you already know and who you like to play with a lot"). If the participant made a mistake, the experimenter gave the correct answer and repeated the question. Nine participants were excluded from data analysis because they could not answer the corresponding familiarization questions correctly or because they needed to be corrected more than five times before giving the correct answer.

In the subsequent sharing task (see Fig. 1), the participant could share with all three recipients one after the other.

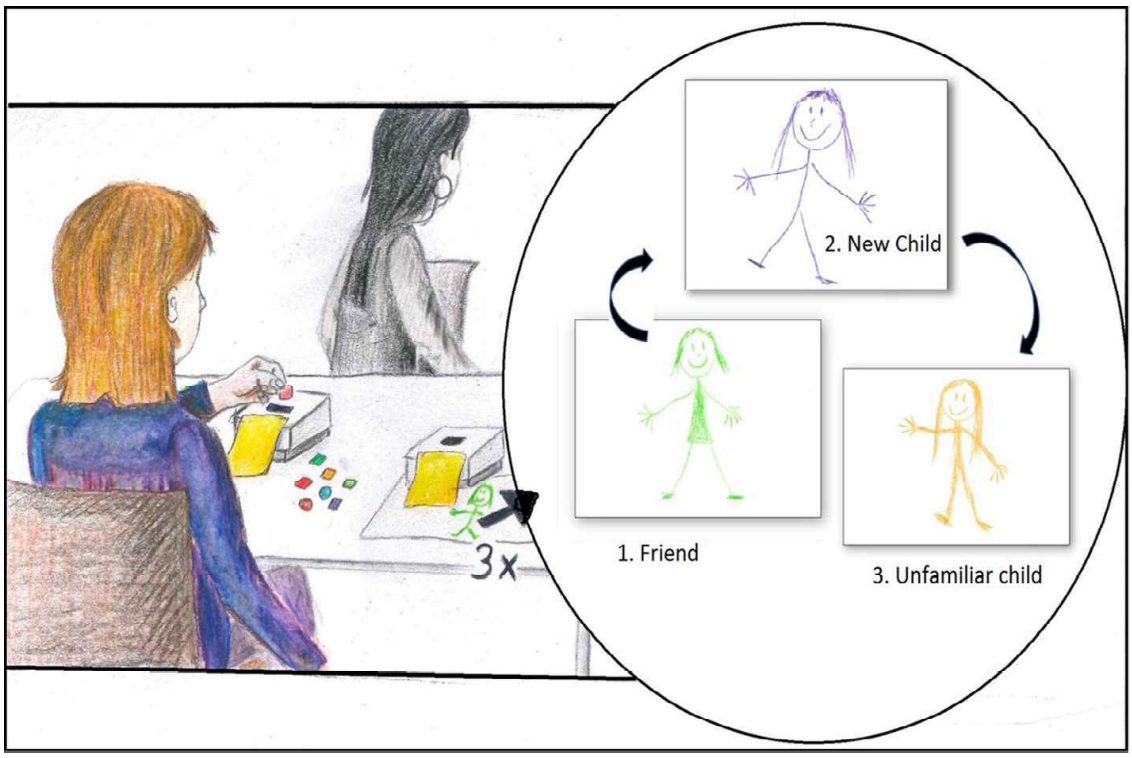

Fig. 1. Setup of the sharing task.

The procedure was equivalent for all three recipients. There were two successive sharing trials for each recipient. In both trials, the participant child could choose his or her 8 favorite stickers (out of ~20 stickers). Because young children sometimes have difficulties with large numbers of resources (Desforges & Desforges, 1980) or resort to equal sharing (Kenward & Dahl, 2011), we chose to divide the total of 16 stickers into 8 stickers over two trials in order to reduce the number of stickers presented to the children at one time. For a comparison of the experimental setup of Experiment 1 and Experiment 2, see Fig. 2.

In the sharing task, the experimenter emphasized that the 8 stickers belonged to the participant child. The participant child was told that he or she could share some of the stickers but did not need to share any. The participant put the stickers that he or she wanted to take home in a box labeled with the participant's name and put the stickers for the recipient in another box. The drawing of the respective recipient was placed next to the recipient's box in order to ensure that the participant knew who the current recipient was during the sharing trial.

In both conditions (No Reciprocity and Reciprocity), the experimenter put a Post-it Note labeled with the name of the participant child on the participant's box. In the No Reciprocity condition, a second Post-it on the recipient's box was labeled with the recipient's name. In the Reciprocity condition, however, the second Post-it was labeled with a dedication: "For [name of recipient], from [name of child]." Participants wrote their own names whenever possible. If they could not write their names, they drew a little picture of themselves on the Post-it. The aim of the note and the participant's involvement in creating it was to further establish that in the Reciprocity condition the recipients would know who gave them the stickers.

Before the participant was allowed to share, the experimenter repeated whether the recipients would know that the participant child gave them the stickers and reminded the participant whether he or she would meet the recipient; for example, "[Name of recipient] knows/doesn't know that the stickers are from you because I will/will not tell him and you can/won't tell him too/either" (friend); "You will see [name of recipient] in the kindergarten tomorrow" (potential friend); "You will not meet [name of recipient] because she goes to another kindergarten. But you will play the game with [name of recipient] now anyway" (stranger).

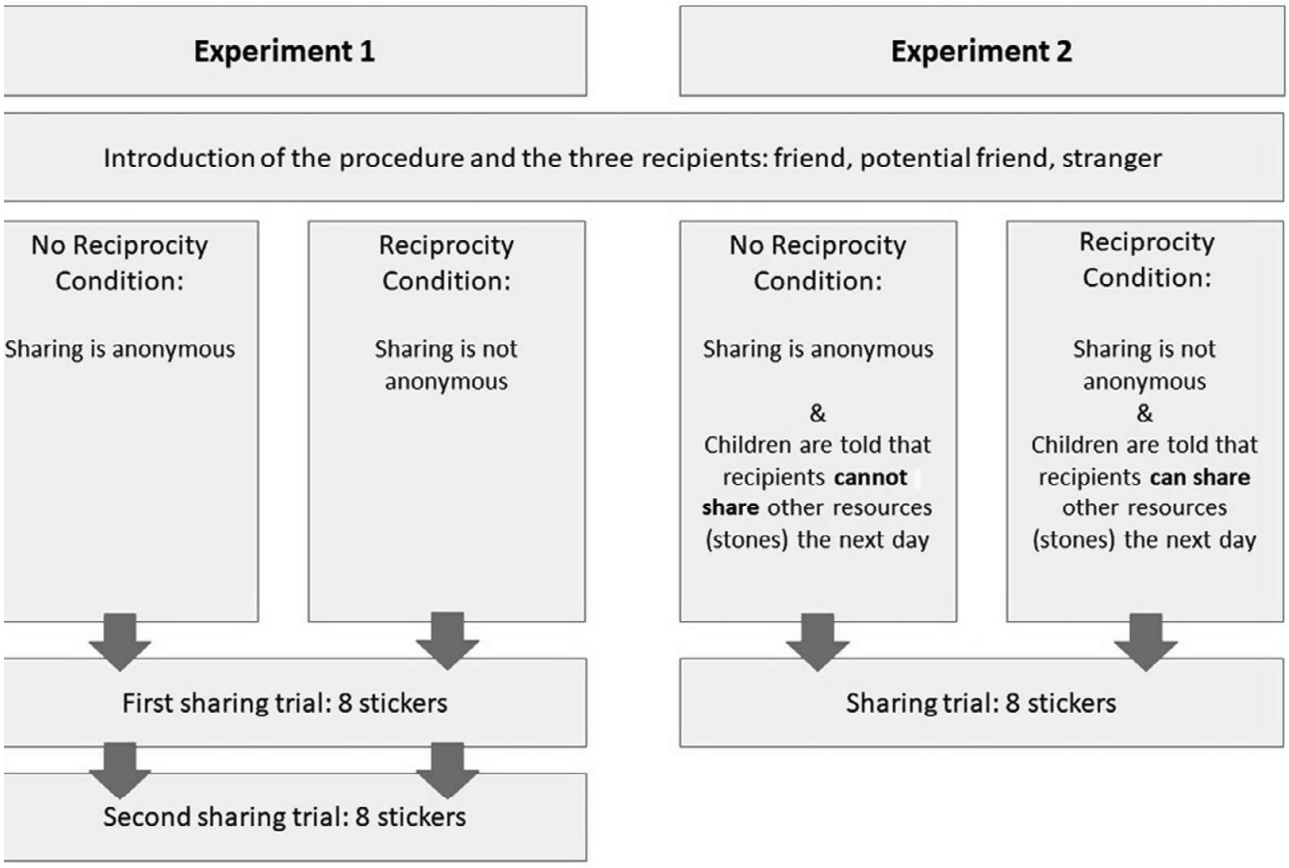

Fig. 2. Comparison of the experimental setups of Experiment 1 and Experiment 2.

The experimenter closed her eyes and turned away while the participant was sharing with the recipient. The participant was also told to cover the slot for the stickers with the Post-it Note after sharing. For each recipient (friend, potential friend, and stranger), the sharing procedure was conducted two successive times, resulting in a total of six sharing trials.

The experimenter counted the number of stickers that the participant child had shared with each of the three recipients after she had escorted the participant back to the kindergarten group.

Results

For descriptive statistics, see Fig. 3 and Table A1 in Appendix A. For percentages of children who did not share any stickers, see Table B1 in Appendix B.

Data were analyzed using a 3 × 2 × 2 mixed-model repeated-measures analysis of variance (ANOVA) with the within-participants factor recipient (friend, potential friend, or stranger) and the between-participants factors condition (Reciprocity or No Reciprocity) and age group (3 or 5 years). A preliminary analysis including the factor gender showed no significant effect of this factor, so it was dropped from the main analysis. A preliminary analysis including the factor recipient order showed no main effect or two-way interactions,[1] so we dropped the factor recipient order from the main analysis. A preliminary analysis including the factor trial showed significant effects for the factor recipient (see also main analysis below), $F(2, 316) = 10.30$, $p < .001$, $\eta_p^2 = .061$, trial, $F(1, 158) = 4.51$, $p = .035$, $\eta_p^2 = .028$, and the interaction between trial and recipient, $F(1.76, 277.60) = 4.13$, $p = .040$, $\eta_p^2 = .021$. Children shared a little bit more stickers in the first trial ($M = 2.91$, $SD = 0.11$) than in the second trial ($M = 2.76$, $SD = 0.11$). To follow up on the interaction between trial and recipient, we analyzed

[1] There was a significant three-way interaction of Recipient × Condition × Recipient Order, $F(4, 300) = 3.90$, $p = .004$, $\eta_p^2 = .049$. For statistical reasons (i.e., low cell count and no prior hypotheses), we refrain from interpreting or following up on this interaction.

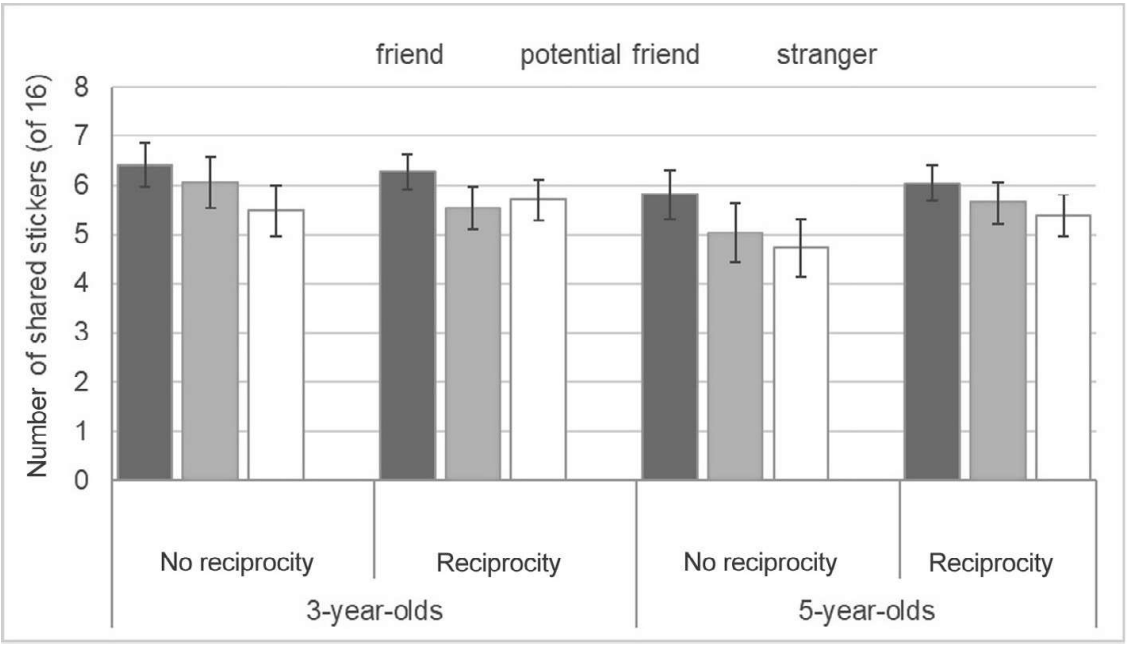

Fig. 3. Mean numbers of stickers shared with the recipients in Experiment 1 as a function of recipient (friend, potential friend, or stranger), children's age (3- or 5-year-olds), and condition (Reciprocity or No Reciprocity). A maximum of 16 stickers could be shared. Error bars indicate standard errors of the means.

the data separately for both trials. Analyzing the first trial separately, children descriptively gave more stickers to the friend (M = 3.01, SD = 1.48) than to the potential friend (M = 2.80, SD = 1.64) and the stranger (M = 2.80, SD = 1.63), yet this effect was not significant. The pattern of results for the second trial matched the pattern of results of the main analysis (see below), with recipient being the only significant effect, $F(1.83, 316) = 11.87$, $p < .001$, $\eta_p^2 = .070$. Children shared more with the friend (M = 3.07, SD = 1.61) than with the potential friend (M = 2.72, SD = 1.71), $t(161) = 2.72$, $p = .007$, 95% confidence interval (CI) = [0.10, 0.62], and the stranger (M = 2.44, SD = 1.57), $t(161) = 4.64$, $p < .001$, 95% CI = [0.37, 0.91], and they shared more with the potential friend than with the stranger, $t(161) = 2.77$, $p = .006$, 95% CI = [0.08, 0.48]. Because we did not have any prior hypothesis about trials, we dropped this factor from the main analysis.

The main analysis yielded a main effect of recipient, $F(2, 316) = 10.30$, $p < .001$, $\eta_p^2 = .061$ (see also Fig. 4). Post hoc t tests revealed that children shared more stickers with the friend than with the potential friend, $t(161) = 3.32$, $p = .001$, 95% CI = [0.23, 0.90], and the stranger, $t(161) = 4.51$, $p < .001$, 95% CI = [0.47, 1.21], but they did not give significantly more stickers to the potential friend than the stranger, $t(161) = 1.63$, $p = .105$, 95% CI = [−0.06, 0.61].

There was no significant interaction between recipient and age group, $F(2, 316) = 0.45$, $p = .956$, $\eta_p^2 < .001$. This demonstrates that preschool children favor their friends over less familiar recipients in sharing situations.

Importantly, there was no significant interaction between the factors recipient and condition, $F(2, 316) = 0.76$, $p = .467$, $\eta_p^2 = .005$, indicating that the children did not especially prefer the friend in the Reciprocity condition. The three-way interaction among recipient, condition, and age group, $F(2, 316) = 0.64$, $p = .526$, $\eta_p^2 = .004$, was also not significant. Participants did not share significantly more stickers in the Reciprocity condition than in the No Reciprocity condition, $F(1, 158) = 0.17$, $p = .679$, $\eta_p^2 = .001$. The interaction between condition and age group was also not significant, $F(1, 158) = 0.58$, $p = .446$, $\eta_p^2 = .004$.

Because the main question of our study was whether children share more with friends partly due to strategic reasons or whether the expectation to be reciprocated (condition) and the relationship with the recipient (recipient) are independent factors, we tested the nonsignificant interaction between condition and recipient by means of Bayesian analysis using JASP (Version 0.13; JASP Team, 2020). This allowed us to quantify the evidence in favor of the null hypothesis. For reproducibility, we

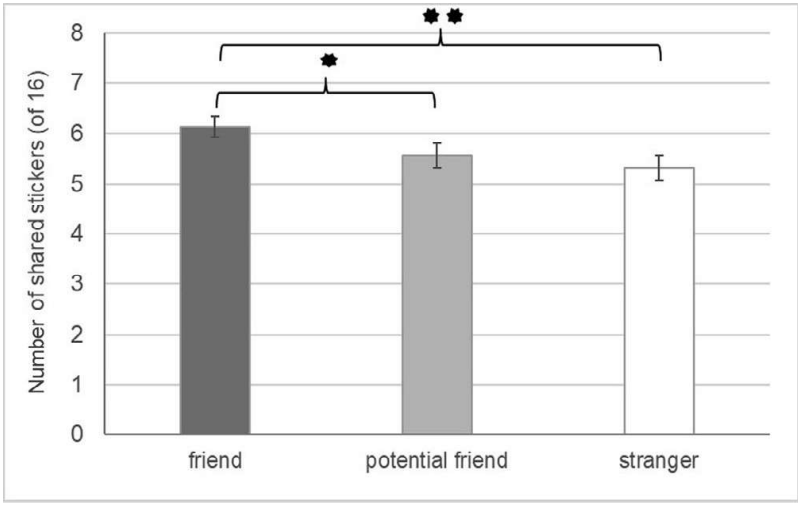

Fig. 4. Mean numbers of stickers shared with the recipients in Experiment 1 as a function of recipient (friend, potential friend, or stranger). A maximum of 16 stickers could be shared. Error bars indicate standard errors of the means. Asterisks represent statistical significance (* $p < .05$; ** $p < .001$).

set a seed (433002), but other random seeds produced comparable results. The exclusion Bayes factor across matched models for the interaction between recipient and the possibility for reciprocity (condition) was *BFexcl* = 12.71. That is, the observed data have changed the odds in favor of models that do not include the interaction by a factor of 12.71. Thus, there is strong evidence against the interaction between recipient and condition (Wagenmakers et al., 2018), that is, strong evidence in favor of the null hypothesis.

Discussion

Experiment 1 aimed at investigating whether children's greater generosity toward friends can be partly explained by strategic considerations with respect to future generosity or whether reciprocity and friendship are two independent factors in preschool children's sharing. The central finding of Experiment 1 was that children of both age groups preferred their friend in sharing situations over less close affiliations; children overall shared more stickers with their friend and less often gave no stickers to the friend than to the less familiar recipients. The preschoolers shared about 1 sticker more with the friend than with the stranger. This difference might seem small, but it is still notable given preschoolers' strong tendency to distribute resources equally (see Elenbaas, 2019; Smith, Blake, & Harris, 2013). In the long run, such a repeated preference for the friend could be important in establishing and stabilizing relationships (see Moore, 2009). Importantly, the greater generosity toward the friend did not depend on strategic considerations because it was not particularly strong in the Reciprocity condition.

Children shared a little bit more stickers in the first trial than in the second trial of the experiment. Whereas in the first trial children did not significantly differentiate among the recipients, the patterns of results of the second trial largely followed the main analysis. A post hoc explanation of why the preschoolers differentiated between participants in the second trial but not in the first trial is that the second trial could have been more salient because it was the last time that children shared with each recipient. Thus, in the second trial they might have thought more carefully about their decision—regarding their self-interest as well as regarding the different characteristics of the three recipients. Interestingly, in the second trial, children not only differentiated between the friend and the less familiar recipients but also gave more stickers to the potential friend than to the stranger. This indicates that not only the past relationship with the friend but also to some extent the anticipated future relationship with the potential friend had some influence on children's sharing. How to interpret this effect? On the one hand, given that children do not have any shared affective experiences with the potential friend but could expect reciprocation, this might hint to emerging considerations of reciprocity. Yet, given the lack of an effect of condition, these considerations might not be fully fledged yet. On

the other hand, this could be evidence for an in-group bias (cf. Dunham, 2018). Thus, our results could indicate that even merely knowing about a future in-group membership of another person might induce preferential treatment of this person. However, these possible interpretations need to be treated with caution because the preschoolers differentiated between the potential friend and the stranger only in the second trial of Experiment 1 but not either overall in Experiment 1 or in Experiment 2 (see also the Results section of Experiment 2). We also note that we did not have any hypotheses regarding the trials beforehand. Thus, we need to leave it to future studies to verify and investigate the effect of trial order further.

The 5-year-olds only on the descriptive level shared more resources in the Reciprocity condition. However, contrary to previous studies (Sebastián-Enesco & Warneken, 2015; Warneken, Sebastián-Enesco, Benjamin, & Pieloch, 2019; Xiong et al., 2016), this trend was not significant and therefore cannot be generalized. Notably, we intentionally did not mention each recipient's possibility to reciprocate the child's generosity because we wanted to see whether children considered the possibility for reciprocity without any external reminder that they could be reciprocated. By not mentioning how the other person might reciprocate, we allowed children to imagine any kind of reward for their sharing. In addition, because adults are not always around to point children to the possible consequences of their actions, our manipulation was probably closer to children's everyday experiences. This indicates that in the current experiment preschool children apparently did not consider reciprocity in sharing situations without any further hints or prompts. Previous studies showing an effect of reciprocity on preschoolers' sharing either involved verbal cues by the experimenter or situational cues (Sebastián-Enesco & Warneken, 2015; Warneken et al., 2019). Thus, although the results of our first experiment indicated that children's preferential sharing with friends is independent of strategic considerations, we wanted to gain stronger empirical evidence.

Thus, we conducted a second experiment in which the experimenter made the children aware of the possibility for reciprocity. The second experiment closely followed the design of the first experiment with the important difference that the experimenter explicitly stressed the possibility for reciprocity.

Experiment 2

Method

Participants

In Experiment 2, we tested 54 3-year-old children (range = 3 years 0 months to 3 years 11 months, M = 42.7 months, SD = 2.8; 28 boys) and 54 5-year-old children (range = 5 years 0 months to 5 years 11 months, M = 65.8 months, SD = 3.3; 27 boys). An additional 6 3-year-olds were excluded due to experimenter error (n = 1), distractions (n = 1), language problems (n = 1), or difficulties in answering the familiarization questions correctly regarding the recipients and the reciprocity condition (n = 3). The participants in Experiment 2 had not previously participated in Experiment 1.

Research design

As in Experiment 1, each participant could share stickers with a friend, a potential friend, and a stranger (within participants). Again, for half of the participants sharing was anonymous and for the other half sharing was not anonymous. In contrast to Experiment 1, however, the experimenter explicitly pointed to the possibility for reciprocity in the Reciprocity condition and showed the participants what items (tumbled stones) the recipients could share back. Thus, in Experiment 2, the stranger also had the possibility to reciprocate children's sharing in the Reciprocity condition. Participants of both age groups were again randomly assigned to the No Reciprocity or Reciprocity condition (between participants).

Materials

The materials were equivalent to the materials used in Experiment 1. However, 6 boxes (1 box per recipient and 3 boxes for each participant), instead of 12 boxes, served as containers for the resources.

The participants could share stickers with the recipients—just like in Experiment 1—but we used tumbled stones instead of stickers as the items that the recipients could share back in order to avoid transfer effects due to the shared materials. That is, we were worried that if recipients could reciprocate by sharing the same or similar stickers back, this could reduce or change children's motivation to share with the recipients. First, the stickers that children could get from the recipients might not be as attractive to them because children got many of the same stickers in the game. Second, the recipients could obtain stickers themselves the next day. Thus, recipients' need for stickers was reduced and children might feel less obligated to share with the recipients. Even if participants still shared, the motivation to share might be different if the recipients could share the same kind of resources back. We suspect that the motivation then would be less materialistic and more social; that is, without the need for resources on both sides, children's main motivation might be the interaction with the other persons. However, in the current study, we wanted to keep materialistic considerations as a potential motivating factor and therefore decided to use tumbled stones instead of stickers as reciprocation items.

Procedure

The procedure was largely equivalent to the procedure of Experiment 1. The changes are described below. The central change in Experiment 2 was that the possibility for reciprocity was explicitly mentioned in the Reciprocity condition.

The experimenter also told the participant in the Reciprocity condition that the next day the recipients would play a similar game: The recipients would choose some tumble stones and could then decide whether they wanted to give some of them to the participant. Thus, the participant was told when and how exactly the recipients could reciprocate. To keep the Reciprocity and No Reciprocity conditions as similar as possible, the experimenter also told the participant about the tumble stone game in the No Reciprocity condition. However, the rule of the game in the No Reciprocity condition was that the recipients could only choose stones for themselves but were not allowed to share any stones. To check whether the participant could follow the additional manipulation, the experimenter subsequently not only asked the participant whether the recipients would know who gifted them the stickers but also whether they could share any stones with the participant in the tumble stone game the next day. The 3-year-old children needed a little bit more explanations (sticker question: $M = 1.51$, $SD = 0.97$; tumble stone question: $M = 1.32$, $SD = 0.64$) than the 5-year-old children (sticker question: $M = 1.15$, $SD = 0.36$; tumble stone question: $M = 1.19$, $SD = 0.39$).

The test trials (sharing task) closely followed those in Experiment 1. The difference was that before sharing, the experimenter also reminded the participant that the recipients would play the tumble stone game the next day. In the Reciprocity condition, the respective recipient would play the tumble stone game after he or she received the stickers and could share stones with the participant. In the No Reciprocity condition, the recipient would play the tumble stone game before receiving the stickers and would not be allowed to share any stones with the participant. A further change was that in the second experiment the participant shared only once with each recipient. The pattern of results in Experiment 1 did not differ between analyzing only the second trial for each recipient and analyzing both trials together. Thus, in the second experiment, we decided to use only one trial with 8 stickers for each recipient. One-shot mini-dictator games have been successfully used in a number of sharing studies with young children (e.g., Benenson, Pascoe, & Radmore, 2007; Smith et al., 2013; Yu et al., 2016).

Results

For descriptive statistics, see Fig. 5 and Table A2 in Appendix A. For the percentages of children who did not share any stickers, see Table B2 in Appendix B.

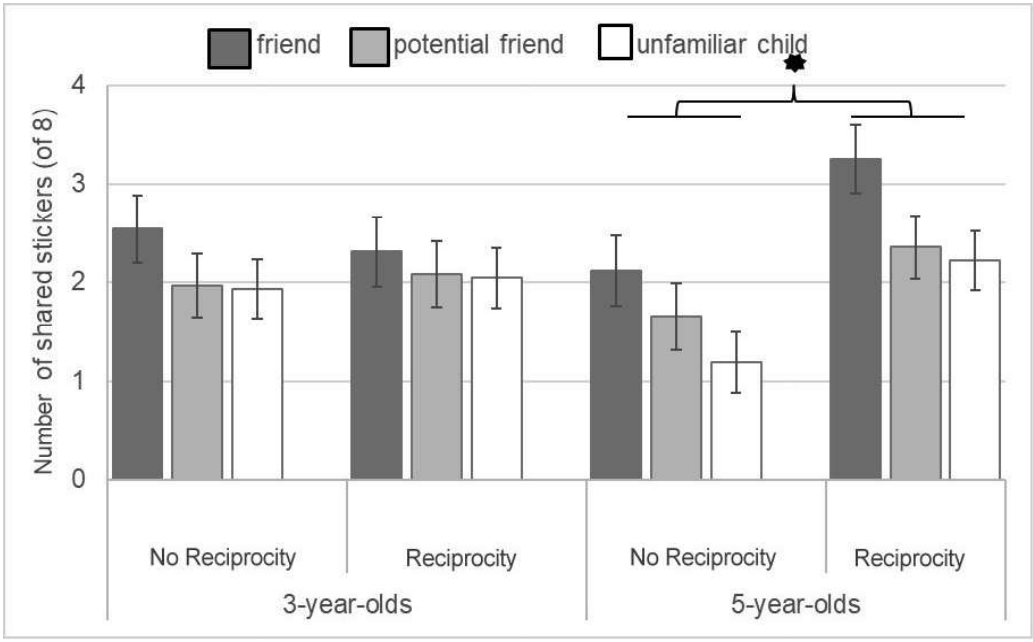

Fig. 5. Mean numbers of stickers shared with the recipients in Experiment 2 as a function of recipient (friend, potential friend, or stranger), children's age (3- or 5-year-olds), and condition (Reciprocity or No Reciprocity). A maximum of 8 stickers could be shared. Error bars indicate standard errors of the means. Asterisks represent statistical significance (* $p < .05$).

Data were analyzed using a 3 × 2 × 2 mixed-model repeated-measures ANOVA with the within-participants factor recipient (friend, potential friend, or stranger) and the between-participants factors condition (Reciprocity or No Reciprocity) and age group (3 or 5 years). A preliminary analysis including the factor gender showed no significant effect of this factor, so it was dropped from the main analysis. A preliminary analysis including the factor recipient order showed no main effect or two-way interactions,[2] so participant order was dropped from the analysis as well.

The main analysis yielded a main effect of recipient, $F(2, 208) = 8.62$, $p < .001$, $\eta_p^2 = .077$ (see also Fig. 6). Post hoc t tests revealed that children shared more stickers with the friend than with the potential friend, $t(107) = 2.92$, $p = .004$, 95% CI = [0.18, 0.92], and the stranger, $t(107) = 4.16$, $p < .001$, 95% CI = [0.18, 0.92], but did not give significantly more stickers to the potential friend than to the stranger, $t(107) = 0.97$, $p = .336$, 95% CI = [−0.18, 0.51].

There was no significant interaction between recipient and age group, $F(2, 208) = 1.15$, $p = .318$, $\eta_p^2 = .011$. This demonstrates that preschool children favor their friends over less familiar recipients in sharing situations.

Most important for our research question, there was no significant interaction between the factors recipient and condition, $F(2, 208) = 0.10$, $p = .901$, $\eta_p^2 = .001$, indicating that the children did not especially prefer the friend in the Reciprocity condition. The three-way interaction among recipient, condition, and age group, $F(2, 208) = 0.59$, $p = .554$, $\eta_p^2 = .006$, was not significant either. Thus, preschoolers' selective sharing with friends did not differ between conditions. To further qualify the nonsignificant two-way interaction between recipient and condition, we calculated the exclusion Bayes factor across matched models for the interaction between recipient and the possibility for reciprocity (condition) with JASP Version 0.13 (seed = 433002), $BFexcl = 15.25$. That is, the observed data have changed the odds in favor of models that do not include the interaction by a factor of 15.25. Thus, there is strong evidence against the interaction between recipient and condition

[2] There were significant three- and four-way interactions including the factor participant order: Recipient × Condition × Recipient Order, $F(10, 168) = 1.95$, $p = .042$, $\eta_p^2 = .104$, and Recipient × Condition × Recipient Order × Age, $F(10, 168) = 1.97$, $p = .040$, $\eta_p^2 = .105$. However, for statistical reasons (i.e., low cell counts and no prior hypotheses), we refrain from interpreting or following up on these interactions.

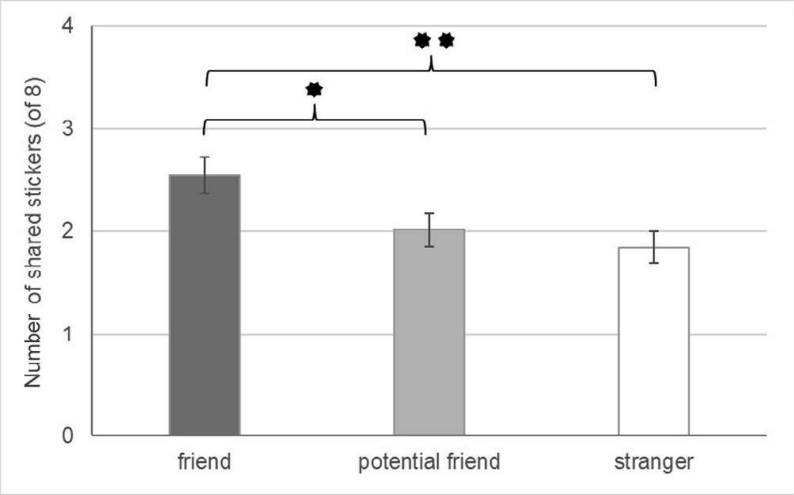

Fig. 6. Mean numbers of stickers shared with the recipients in Experiment 2 as a function of recipient (friend, potential friend, or stranger). A maximum of 8 stickers could be shared. Error bars indicate standard errors of the means. Asterisks represent statistical significance (* $p < .05$; ** $p < .001$).

(Wagenmakers et al., 2018). In other words, we obtained strong evidence in favor of the null hypothesis.

However, there was a marginally significant effect of condition, $F(1, 104) = 3.50$, $p = .064$, $\eta_p^2 = .033$, indicating that children gave more stickers if reciprocity was possible. The interaction between condition and age group was at $F(1, 104) = 3.52$, $p = .063$, $\eta_p^2 = .033$, indicating a trend. In line with this, some studies on reciprocity suggest a directional shift between 3 and 5 years of age (Sebastián-Enesco & Warneken, 2015; Wörle & Paulus, 2019), with 5-year-olds sharing strategically and affirming reciprocal sharing. Thus, because we had a clear hypothesis that 5-year-olds, but not 3-year-olds, would share more if the other person had the possibility to reciprocate, we decided to analyze the data of the age groups also separately regarding the effect of condition (possibility to be reciprocated). The 3-year-olds did not share more stickers if there was a possibility to be reciprocated (condition), $F(1, 52) < 0.001$, $p = .996$, $\eta_p^2 < .001$. However, the 5-year-olds shared more stickers if the recipients had the possibility for reciprocation, $F(1, 52) = 9.77$, $p = .003$, $\eta_p^2 = .158$.

Discussion

The results confirm that 3- and 5-year-old children shared more resources with their friends than with less familiar recipients. Importantly, analyzing the age groups separately, 5-year-olds, but not 3-year-olds, also shared more resources overall if they were told that the recipients had the possibility to return the favor. We note that there was a trend for the interaction between age and condition, but it was not significant. Thus, this finding needs to be interpreted with caution. However, this strategic sharing by 5-year-olds is in line with previous studies in which the possibility to be reciprocated was also made explicit (e.g., Engelmann et al., 2013; Sebastián-Enesco & Warneken, 2015). To conclude, in the second experiment, where children were explicitly told that the recipients could share resources at a later point in time, 5-year-olds considered the possibility to be reciprocated in their sharing behavior.

Most important for our central question, this gave us the opportunity to investigate whether 5-year-old children share more strategically when sharing with a friend than when sharing with other recipients. The reasoning behind this hypothesis was that strategic sharing might be more relevant in friendships because children might consider the probability that their friend would reciprocate to be higher. However, 5-year-olds' preference for their friend was not especially strong in the condition where the recipients could reciprocate. We interpret our findings as indicating that reciprocity and the quality of the relationship with the recipients are largely independent factors in young children's sharing. We discuss the implications of these findings in the General Discussion.

General discussion

Developmental research has shown that preschool children are more inclined to share with friends and close others (Birch & Billman, 1986; Moore, 2009; Paulus & Moore, 2014). Yet, the psychological basis of this selectivity in early sharing has remained open. The aim of the current study was to investigate whether children share more with friends partly due to strategic considerations (i.e., because they expect a higher chance to be reciprocated for their generosity by their friends) or whether friendship and strategic reciprocity are independent factors in predicting children's sharing.

To this end, we explored 3- and 5-year-old children's sharing with three recipients—a friend, a potential friend who would soon join the kindergarten group, and a stranger who the participant would never meet. Importantly, we manipulated whether recipients had the possibility to reciprocate or not. Whereas in Experiment 1 the possibility for reciprocation was only implied (sharing was either anonymous or not anonymous), in Experiment 2 it was explicitly mentioned in the Reciprocity condition. Overall, the results of our study suggest that anticipated reciprocity and friendship are largely independent factors in preschoolers' sharing. We interpret our findings as evidence that preferential sharing with friends is not mainly caused by strategic considerations.

Notably, the results of our experiments consistently showed that preschoolers are more generous toward their friends than toward other peers. Our findings are in line with studies indicating that preschoolers selectively share with others based on their relationships (Kumaki et al., 2018; Olson & Spelke, 2008) and, more specifically, based on friendship (e.g., Engelmann et al., 2019; Moore, 2009; Vonk et al., 2020). This effect was consistently strong across the two experiments and was more prevalent than concerns about the possibility of a future relationship with the recipients. We note that the reasons why 3-year-old and 5-year-old children do not differentiate between the potential friend and the stranger might differ. Whereas 5-year-olds should be able to weigh both the past relationship with the friend and the future relationship with the potential friend, 3-year-olds might have difficulties in envisioning the future relationship with the potential friend (Atance & Meltzoff, 2005; Russell, Alexis, & Clayton, 2010). Thus, for 3-year-olds, the perceived future relationship with the potential friend and the stranger might not differ as much. The relationship with the friend, however, influences both 3- and 5-year-olds' sharing.

In the current study, 5-year-old children were not more generous than 3-year-old children. This seems to contradict many studies using costly sharing (Benenson et al., 2007; Blake & Rand, 2010; Fehr, Bernhard, & Rockenbach, 2008; Gummerum, Hanoch, Keller, Parsons, & Hummel, 2010; Nilsen & Valcke, 2018; Smith et al., 2013; Yu et al., 2016) and some using noncostly sharing (Fehr et al., 2008; Vonk et al., 2020) that show an age-related increase in children's generosity. Moreover, because sharing in the current study was costly, our results seem to speak against the notion that younger children's (not) sharing is heavily influenced by self-interest. That is, it has been suggested that young children are less generous because they have more difficulties in inhibiting their desire to keep the stickers for themselves (Aguilar-Pardo, Martínez-Arias, & Colmenares, 2013; Nilsen & Valcke, 2018) than older children. However, results on the development of children's generosity are mixed. There are other studies using costly sharing (Aguilar-Pardo et al., 2013; House, Henrich, Brosnan, & Silk, 2012; Takagishi et al., 2010) as well as noncostly sharing (House et al., 2012) that do not find an age-related increase in generosity or show mixed results (Gummerum et al., 2010). Many factors, such as the anonymity of the recipients (Fehr et al, 2008; House et al. 2012) and the experimental setup, seem to influence how generously young children share. One could speculate that in the current study inhibitory control might not have been as important as in other studies because children in our experiments could share a relatively large number of stickers. Overall, this points to the existence of moderating factors for the presence or absence of age effects in sharing that need to be explored in future studies.

Interestingly, we also found no age-related differences in children's sharing with the different recipients. Notably, the evidence on young children's selective sharing is mixed. There are some studies showing that 3-year-old children do not distinguish between friends and less familiar or less liked recipients yet (Paulus & Moore, 2014; Yu et al., 2016). However, especially in more naturalistic contexts, 3-year-olds seem to distinguish between friends and other peers (Birch & Billman, 1986;

Fujisawa et al., 2008), and there are some experimental studies indicating the same (Olson & Spelke, 2008; Paulus, 2016a). However, most studies including younger and older preschool children at least show an increase in children's selective sharing toward their friends (Paulus, 2016a; Vonk, Jett, Tomeny, Mercer, & Cwikla, 2020). Thus, our study supports the notion that even young preschool children are more inclined to share with their friends.

Interestingly, in the second experiment, 5-year-old children, but not 3-year-old children, shared more if the recipients had the possibility to reciprocate. This developmental effect corresponds to previous work demonstrating a developmental change in preschool children's appreciation of reciprocity (Engelmann et al., 2013; Sebastián-Enesco & Warneken, 2015; Warneken et al., 2019; Wörle & Paulus, 2019). For example, in their reciprocity is secondary model, Warneken and Tomasello (2013) hypothesized that young children's sharing is initially not affected by strategic considerations. During the course of the preschool years, children start to consider reciprocity and possibilities for tit for tat and are consequently more inclined to share if reciprocity is possible or likely. Similarly, Wörle and Paulus (2019) demonstrated that 5- and 6-year-olds, but not younger children, endorsed compliance with a reciprocity norm. The development of a reciprocity norm could also explain why the 5-year-old children in our study considered the possibility to be reciprocated just as much when sharing with a friend as when sharing with unfamiliar recipients. They might see reciprocity as a general norm (Wörle & Paulus, 2019) and therefore as something that is not dependent on the relationship with the recipient. Overall, our results corroborate the view that concerns for reciprocity develop during the course of the preschool years. The results also suggest that friendship starts to influence children's sharing earlier than strategic considerations. This finding provides further evidence that these two aspects are in fact independent to some extent.

Our study extends previous studies that manipulated reciprocity expectations (e.g., Engelmann et al., 2013; Sebastián-Enesco & Warneken, 2015; Warneken et al., 2019). In particular, Experiment 1 examined whether children consider reciprocity if this aspect is not explicitly highlighted by the experimenter. Here, potential reciprocity was solely manipulated by anonymous and nonanonymous sharing. Interestingly, in Experiment 1, 5-year-old children did not share more if the recipients merely knew who gave them the stickers than if sharing was anonymous. Only in Experiment 2, where potential reciprocity was explicitly mentioned and highlighted by the experimenter, did 5-year-olds consider this issue. Given that these results were obtained in an experimental setting, it would be interesting to explore whether similar patterns of behavior could be observed in sharing situations that children experience on a daily basis. One possibility as to why children in the current study considered the possibility for reciprocity only if it was explicitly mentioned could be that mentioning the possibility for reciprocity creates demand characteristics. However, we think that this explanation is unlikely because sharing in the current study was always anonymous with regard to the experimenter. Another possibility as to why children in the current study considered the possibility for reciprocity only if it was explicitly mentioned could be that mentioning or demonstrating the possibility for reciprocity (Engelmann et al., 2013; Warneken et al., 2019) makes it easier for children to take the perspective of the recipients or think about the future consequences of their actions (Beck, Robinson, Carroll, & Apperly, 2006). This interpretation is supported by studies suggesting that the propensity for future thinking and children's sharing is connected (Kumaki et al., 2018). Thus, mentioning or showing children exactly how others can reciprocate, first, makes it clear to the children that they are in a situation where strategic thinking is relevant and, second, could reduce the cognitive load on the children imagining the consequences of their sharing decisions (Leimgruber, 2018).

By manipulating the possibility to be reciprocated experimentally, we were able to investigate whether children share more with friends in part because they expect a higher chance to be reciprocated for their generosity (strategic sharing) or whether friendship and strategic reciprocity are independent factors in predicting children's sharing. That is, if the preference for the friend had been especially strong in the condition where reciprocity was possible, this would have indicated that children share in part more with their friends because of this possibility. However, because children's preference for the friend was equally strong in both conditions, our results indicate that strategic considerations and relationship considerations independently influence children's sharing. Because the concept of reciprocity is used for a number of quite different phenomena, it is important to note that we focused on strategic reciprocity in sharing and did not examine affective reciprocity in relation-

ships (in the long run). The ability to consider long-term reciprocity in friendships also probably develops only later during childhood (Laursen & Hartup, 2002). To our knowledge, this is the first study to reveal that social relationships and future directed strategic reciprocity are largely independent factors for preschoolers' sharing. Three aspects of the results reinforce the independence of relationships and anticipated reciprocity as influences on preschoolers' sharing. First, even preschoolers, who did not consider the possibility for reciprocity, showed a preference for their friends (3- and 5-year-olds in Experiment 1 and 3-year-olds in Experiment 2). Second, preschoolers in the current study also favored their friends if the recipients could not return the favor (No Reciprocity condition). Third, 5-year-olds in Experiment 2 as a group shared more if the recipients could return the favor. Thus, they considered the possibility for reciprocity and shared strategically. However, in both conditions, 5-year-olds favored their friends. Thus, they were always more generous to their friends, but not relatively more so if their friends could share something back. The first two points (just) indicate that friendship can influence preschoolers' sharing independent of the anticipation of reciprocity. The third point surpasses the previous points by indicating that even if children share strategically, they do not seem to factor in their relationship with the recipients in their strategic considerations. Taken together, our results indicate that social relationships and strategic considerations independently influence preschoolers' sharing.

Given that our results render it unlikely that children share more with their friends for strategic reasons, why do we then find such a strong tendency for recipient-dependent sharing? In our study, children shared with a friend, a child who would soon join the kindergarten group, and a stranger they would never meet. With the friend, children had a past, present, and future relationship; with the potential friend, children could have a possible future relationship; and with the stranger, children had no past, present, or possible future relationship. Children in both experiments shared more with their friend than with the potential friend and the stranger, but they did not differentiate between the latter two. Thus, it seems to be especially the past and present relationship with the friend that causes children to be more generous. Thus, one possibility is that past shared experiences and the affective bond between friends cause them to be more generous to each other. Indeed, several other studies stress the role of shared experiences and shared emotions for people's sharing behavior (e.g., Carpendale, Hammond, & Atwood, 2013; Cirelli, Einarson, & Trainor, 2014; Eisenberg, 2020; Hammond & Drummond, 2019). Our interpretation extends that line of research to the area of interpersonal relationships because it suggests that the recipient effects observed in preschoolers' sharing could be based on past shared experiences and shared emotions. We need to leave it to future research to directly examine this possibility.

Open questions and conclusion

The current study leaves a number of open questions and limitations. First, in our study we did not directly measure children's reciprocity expectations regarding the three recipients. Previous studies assessed only children's selective sharing expectations, and it is unclear whether sharing expectations and reciprocity expectations are subject to the same rules. Thus, it would be fruitful to assess in greater detail whether children's reciprocity expectations are in a similar way dependent on the relationship with the other person as their sharing expectations. Second, it should be noted that the interaction effect between reciprocity and age was only marginally significant. Although analyzing the data of 3- and 5-year-old children separately seems to be justified based on the clearly directional hypothesis, 5-year-olds' consideration of reciprocity needs to be interpreted with caution. Thus, it would be important to further substantiate the current claims in future studies that might use different ways to manipulate reciprocity expectations. Third, it remains an open question how experimental scenarios relate to children's behavior in their everyday lives. The results of the current study show that 5-year-olds share strategically—but only if the possibility for reciprocation is obvious. This raises the question of whether strategic sharing is a common behavior in 5-year-olds or is something that occurs primarily in (more or less scaffolded) experimental settings. Thus, assessing children's strategic behavior in a natural setting (e.g., a kindergarten group) could shed light on its actual prevalence and under which condition strategic sharing occurs naturally. Another limitation of the current study is that we could not fully manipulate the past and future relationships because we did not want to claim that the chil-

dren's friends would move away forever. Including a recipient with an existing past relationship but no future relationship with the child would have allowed us to investigate children's past and future relationships with the recipients more thoroughly. We propose that in future studies play relationships could be established in a laboratory setting over a couple of sessions. In this context, it could be more ethical to control whether the play acquaintances meet each other in a subsequent session or not. Lastly, children in our study came from one region. It would be important to further explore the interplay between strategic sharing and close social relationships across different cultures and more diverse samples.

In sum, the current study informs the discussion on the development of preschoolers' selective sharing and strategic future-directed behavior. It extends previous studies by showing that children share strategically only if the possibility for reciprocation is pointed out to them, indicating that although children can act strategically under certain circumstances, they might not do so as often in everyday life. The main aim of the study was to investigate whether preschoolers' recipient-dependent sharing is connected to their emerging tendency to share strategically. Our results suggest that these two factors are independent from each other. That is, children share strategically with friends, but not more so than with other recipients, and their preferential sharing with friends is not based on strategic considerations.

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Appendix A

See Tables A1 and A2.

Table A1
Means (and standard deviations) of children's sharing with a friend, a potential friend, and a stranger as a function of age group and experimental condition: Experiment 1.

	Friend	Potential friend	Stranger
3-year-olds			
No Reciprocity condition	6.41 (2.40)	6.06 (3.05)	5.47 (3.04)
Reciprocity condition	6.27 (2.78)	5.54 (2.85)	5.69 (2.91)
5-year-olds			
No Reciprocity condition	5.81 (2.74)	5.04 (3.17)	4.73 (3.23)
Reciprocity condition	6.04 (2.46)	5.64 (2.95)	5.38 (2.66)

Table A2
Means (and standard deviations) of children's sharing with a friend, a potential friend, and a stranger as a function of age group and experimental condition: Experiment 2.

	Friend	Potential friend	Stranger
3-year-olds			
No Reciprocity condition	2.54 (2.05)	1.96 (1.84)	1.93 (2.04)
Reciprocity condition	2.31 (1.95)	2.08 (2.61)	2.04 (1.54)
5-year-olds			
No Reciprocity condition	2.12 (1.58)	1.65 (1.32)	1.19 (1.23)
Reciprocity condition	3.25 (1.65)	2.36 (1.19)	2.21 (1.32)

Appendix B

See Tables B1 and B2.

Table B1
Percentages (and numbers) of children who did not share at all (0 stickers for the recipient) in Experiment 1.

	Friend	Potential friend	Stranger
3-year-olds			
No Reciprocity condition	5.9% (2)	8.8% (3)	11.8% (4)
Reciprocity condition	7.7% (2)	11.5% (3)	11.5% (3)
5-year-olds			
No Reciprocity condition	7.7% (4)	13.5% (7)	21.2% (11)
Reciprocity condition	2% (1)	6% (3)	6% (3)

Table B2
Percentages (and numbers) of children who did not share at all (0 stickers for the recipient) in Experiment 2.

	Friend	Potential friend	Stranger
3-year-olds			
No Reciprocity condition	21.4 % (6)	39.3 % (11)	35.7 % (10)
Reciprocity condition	26.9 % (7)	38.5 % (10)	30.8% (8)
5-year-olds			
No Reciprocity condition	26.9 % (7)	23.1 % (6)	42.3% (11)
Reciprocity condition	7.1 % (2)	7.1 % (2)	17.9 % (5)

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B. Study 2: Manuscript by Lenz, Misch, and Paulus (2021), based on data presented in this thesis

Lenz, S., Misch, A., & Paulus M. (in preparation). “Why did you give more stickers to your friend?”: Children’s reasoning about their preferential sharing with friends.

Running head: Children's reasons for more sharing with friends.

"Why did you give more stickers to your friend?": Children's reasoning about their preferential sharing with friends.

Abstract

Children start to share selectively in the preschool years and sharing becomes an integrated part of their friendship-concept by the beginning of primary school. However, children's motivation underlying preferential sharing with their friends is still unclear.

In the current study, we explore these underlying motivations by investigating why children share more with their friends than with non-friends. To this end, 45 children between 4 and 6 years first engaged in a sharing task with a friend and a disliked peer. Subsequently, we assessed the reasons behind their sharing choices in a semi-structured interview. To further prompt children to reflect upon their choices, we also assessed their reactions to a reversal of their allocation. We analyzed the interviews of the 38 children (84%) who afforded more stickers to their friend than to the disliked peer.

Children justified their preferential sharing with their friend most with their positive feelings towards the friend, including affection statements of liking and loving but also affective mutual interactions like hugging. Besides affection, children also referred to friendship, the friend's positive character traits and actions, proximity (including mutual play), and to a lesser extend to the welfare of the friend. Thus, most of children's justifications referred in some way to the relationship with the friend. Additionally, the use of friendship as a justification and children's protest against giving more resources to the non-friend than to the friend indicates that friendship obligations might contribute to children's preferential sharing with friends.

Thus, this study confirms that relationship quality influences children's prosocial behavior. Additionally, the current study highlights the importance of positive affect for young children's partiality in friendships and thus raises the question whether children's recipient dependent sharing might be generally influenced by affective processes.

CHILDREN'S REASONS FOR MORE SHARING WITH FRIENDS.

Keywords: **prosocial development; sharing; friendship; reasoning; interview study**

Children's reasoning about their preferential sharing with friends.

Friendships are among the most important types of relationships in a person's life and can be greatly beneficial. Studies suggest that mental and physical health profits from a strong social network (Dunbar, 2018; Holt-Lunstad, Smith, & Layton, 2010; Kim, Benjamin, Fowler, & Christakis, 2016). Children benefit from good friendships regarding their academic achievements (Fraysse, 1994; Ladd, 1990; Sills, Rowse, & Emerson, 2016; for a review see Wentzel, Jablansky, & Scalise, 2018), mental health (Antonopoulou, Chaidemenou, & Kouvava, 2019; Asher & Paquette, 2003; Bukowski, Laursen, & Hoza, 2010; Goldstein, Field, & Healy, 1989; Hodges, Boivin, Vitaro, & Bukowski, 1999; Maunder & Monks, 2019) and psychosocial development in general (Bagwell, Newcomb, & Bukowski, 1998; for a review see Gifford-Smith & Brownell, 2003; Hartup, 1989; Howes, 1983; Newcomb & Bagwell, 1995). Regarding the latter, friendship is for example connected to more prosocial skills (Gest, Graham-Bermann, & Hartup, 2001; McGuire & Weisz, 1982). In conclusion, friendships are very important in a child's life.

The importance of friends in children's lives is also reflected in their preferential prosocial treatment of their friends (Fujisawa, Kutsukake, & Hasegawa, 2008; Newcomb & Bagwell, 1995). Already by 4 years of age, children show more sympathy and suggest more interventions towards a sad or angry friend than towards a sad or angry acquaintance (Costin & Jones, 1992). In a similar way, Engelmann, Haux, and Herrmann (2019) show that three-year-olds preferentially help their friends compared to neutral peers.

Most relevant for the current study, children also start to share more with their friends than with less familiar or less liked peers around 4-5 years (Garon, Johnson, & Steeves, 2011; Moore, 2009; Paulus & Moore, 2014; Yu, Zhu, & Leslie, 2016) or maybe even slightly earlier (Olson & Spelke, 2008). Around that age, children also start to share fairly with friends even if it induces a

cost – which they are not willing (or able) to do with strangers until the end of middle childhood (Moore, 2009; Yu et al., 2016). Additionally, children's partiality towards friends even overrides their concern for other's welfare. For example, Paulus (2016) showed that 3- to 6-year-old children share more with friends, even if they have a lot of resources and are less needy than other recipients. Around the onset of primary school (Afshordi, 2019; Bigelow, 1977; Bigelow & La Gaipa, 1975; Furman & Bierman, 1983; MacEvoy, Papadakis, Fedigan, & Ash, 2016), prosocial behavior and sharing is part of children's conceptual understanding of friendships (friendship-concept). This integration of sharing into the friendship concept is further reflected by findings that by 5 years, children's expectation that others share more with friends than with disliked others is connected to their own sharing behavior (Paulus & Moore, 2014) and that by 4 years children infer friendship from partial sharing with a recipient (Liberman & Shaw, 2017).

Yet, even though social relationships seem to influence children's sharing greatly (Paulus, 2016), the underlying motives are not fully investigated yet. There are some studies investigating underlying cognitive mechanisms (Garon et al., 2011; Kumaki, Moriguchi, & Myowa-Yamakoshi, 2018; Paulus et al., 2015; Vonk, Jett, Tomeny, Mercer, & Cwikla, 2020) and a few that take a closer look at single motivational factors for children's preferential sharing with friends (Buhrmester, Goldfarb, & Cantrell, 1992; Lenz & Paulus, 2021; Paulus, Christner, & Wörle, 2020). However, the current state of research is very unlikely to cover all of children's motivations. The current interview study sets out to explore children's motivations for their selective sharing with friends more broadly. Our aim was to give an overview of children's probable motivations, to generate new hypotheses and, in doing so, to provide starting points for future studies to confirm or refute our hypotheses and create a full picture of children's motivations underlying their partiality towards friends.

Learning about children's motivations underlying their partiality would further inform our knowledge about children's friendship concepts as well as their motivations behind prosocial behavior.

Possible motivating factors – aspects of friendship

There are many friendship characteristics and the meaning of friendship also seems to vary throughout a person's life (Gifford-Smith & Brownell, 2003). Thus, it is not clear which characteristics of friendships are responsible for young children's preferential sharing with friends. However, there are some stable core characteristics of friendship which already emerge in early childhood. Besides the prosocial support which we investigate in the current study, reciprocity, common activities, proximity, similarity, and shared positive affect, seem to be important aspects of friendships and friendship concepts by 4 years (Afshordi, 2019; Furman & Bierman, 1983; Gifford-Smith & Brownell, 2003; Howes, 1983). As children already start to share more with their friends at the end of the preschool period, some of these core characteristics of friendship are probably important motivators concerning children's selective sharing with friends.

In the following I will describe how the core friendship characteristics could influence young children's selective sharing before discussing other factors that could also influence children's preferential sharing with friends.

Reciprocity and strategic sharing. Friendship in early childhood develops and is maintained in the context of reciprocal play and interactions (Hartup, 1989; Laursen & Hartup, 2002). Thus, children might share more with their friends to return past favors (House, Henrich, Sarnecka, & Silk, 2013; Warneken & Tomasello, 2013) or because they expect a higher possibility to be rewarded for their generosity in the future (Engelmann, Herrmann, & Tomasello, 2018; Sebastián-Enesco & Warneken, 2015). Regarding the latter, previous research suggests that

children's sharing with friends is not strategically motivated (Buhrmester et al., 1992; Lenz & Paulus, 2021). However, children might still share selectively because they want to repay their friends for past favors.

Proximity and common activities. Spending time together and being in physical proximity to someone makes it more likely to initially become friends with a person (Chin, Xu, Wang, & Wang, 2012) and once two people are friends, they also tend to spend more time together (Liberman & Shaw, 2019; Newcomb & Bagwell, 1995). Children are mostly playing together. That is, they are engaging in mutual activities (Berndt & Perry, 1986; Bigelow & La Gaipa, 1975; Furman & Bierman, 1983). Preschool children are often explaining (their) friendships in terms of playing together, which could point to more superficial, fleeting and self-serving friendships in the younger years (Gifford-Smith & Brownell, 2003; Hayes, 1978; Marcone, Caputo, & Della Monica, 2015; Selman, 1980) but could in part also reflect young children's verbal inability to explain their close relationships in more depth (for a review see Afshordi & Liberman, 2021).

Similarity. Children develop affection for others and become friends with others who are similar to them (Fawcett & Markson, 2010; Heiphetz, Spelke, & Banaji, 2014; Kenneth H. Rubin, Bukowski, & Parker, 2007). These similarities can, for example, be shared interests or similar behavior (Afshordi, 2019; Kupersmidt, DeRosier, & Patterson, 1995; K. H. Rubin, Lynch, Coplan, Rose-Krasnor, & Booth, 1994; Urberg, Degirmencioglu, & Tolson, 1998). Importantly, preschool children share more with peers who share their interests (Sparks, Schinkel, & Moore, 2017). There has also been evidence that even superficial and arbitrary similarities can establish group-membership (Dunham, Baron, & Carey, 2011) which in turn can lead to more generous sharing (Sparks et al., 2017).

Mutual positive affect. Friendships of young children are characterized by (mutual) positive feelings (Furman & Bierman, 1983; Howes, 1983; Sharabany, Gershoni, & Hofman, 1981). Positive affect is usually part of the friendship definition and often one of the criteria to determine friendships (i.e. Howes, 1983). The positive feelings towards the friends might increase children's empathy and with that their concern for the friend's welfare (Costin & Jones, 1992). Positive affect might even be a mediator for the effect of other friendship characteristics on sharing. That is, for example similarity and proximity could lead to more familiarity or an affective relationship which in turn could foster sharing.

Other possible motivating factors

Beyond the core friendship characteristics of early childhood, there are other factors which could also motivate children's partiality. In the following, I will describe friendship norms, concern for the welfare of others, own positive emotions connected to sharing and the perceived characteristics of the friend. Some factors, like friendship obligations, have a direct connection to friendships. Other factors, like the concern for the welfare of others, influence sharing in general, but could be especially relevant in friendships and thus contribute to children's partiality.

Friendship norms and obligations. An additional motivating factor concerning preschool children's partiality towards friends could be that they feel a sense of obligation to share (more) with the friend (Keller, Edelstein, Schmid, Fang, & Fang, 1998; Paulus et al., 2020). Even though children's prosocial behavior is probably not innately altruistic, by the end of preschool, children are able to reflect their and others' behavior and make the necessary judgements to act prosocially out of normative obligation and not just driven by the wish to interact or empathy (Dahl & Paulus, 2019). Norms concerning equality, equity, and reciprocity influence children's sharing by the end of the preschool years (Paulus, Nöth, & Wörle, 2018; Wörle & Paulus, 2018, 2019). And there are

also some indications that sharing with friends and even partiality in friendships could be normative (i.e., Paulus et al., 2020).

First, prosocial behavior and sharing are part of children's friendship concepts and expectations (Furman & Bierman, 1983) and there are theoretical considerations that partiality is necessary for friendships to exist (Jollimore, 2000). Second, in a study by Paulus et al. (2020), the 4- to 6-year-old children affirmed the actions of a puppet if it shared more with their friend than a disliked peer and protested if the puppet shared more with the disliked peer than their friend – at least if there was only the choice between favoring the friend or the disliked peer. These results imply that children internalized a norm not to put friends at a disadvantage. In sum, it is also possible that children think one should share more with friends and act accordingly.

Concern for the friend. Preschool children's sharing could also be motivated by an empathic concern for the well-being of the other person (Costin & Jones, 1992; Dahl & Paulus, 2019; Eisenberg & Miller, 1987). As friends are more familiar with each other, children might be more aware of their friends' needs and it might also be easier to take a friend's perspective. In line with this, there have been studies showing that children are more empathetic towards friends (Costin & Jones, 1992; Howes & Farver, 1987). Thus, the well-being of the friend in general or the friend's anticipated emotions when being shared or not being shared with could be a stronger motivating factor in friendships than when dealing with less familiar or less liked recipients. Anticipating negative emotions of the recipient when not being shared with is indeed connected to more generous sharing in preschool children (Paulus & Moore, 2015).

Own affective benefits. Children feel good after sharing with others (Aknin, Hamlin, & Dunn, 2012) and by preschool they are aware of the connection between happiness and sharing. Preschoolers who anticipate they will feel good when sharing and bad when not sharing, share

more generously (Paulus & Moore, 2017). Through more empathy and perspective taking children might benefit emotionally more from sharing with friends than from sharing with less close individuals (for a similar idea see Martin & Olson, 2015).Thus, children might share more with their friends because they might feel even better when sharing with a friend than when sharing with other peers.

Perceived characteristics of the friend. As children might pick their friends based on their perceived positive (moral) qualities, they might share more with them because they think they are (morally) more deserving than others. Children are, for example, more prosocial towards generous and non-destructive others (Hamlin, Wynn, & Bloom, 2007; Olson & Spelke, 2008).

Current study

There is one other study in which children were also interviewed about their sharing with a friend and another recipient. Yu et al. (2016) asked 3- to 10-year-old children for their reasons for sharing equally or selfishly with a friend and a stranger. As this was not the main part of the study, the results were reported in the supplementary material. The results are still relevant for the current study because they give us some indication what kind of justification categories might emerge in the current study. Yu et al. (2016) determined four categories: In-group bias, Self-interest, Other-regarding preference/Fairness considerations and a rest category. All categories were defined quite broadly. In-group bias, for example, also included information about the relationship quality, including friendship status and familiarity, (mutual) positive or negative treatment (e.g., arguments) and positive or negative affect in the relationship. Other-regarding preference/fairness considerations also included the anticipated emotions of the recipient.

In the current study we investigated why children share more with their friends. To this end, we let children share resources with a friend and a disliked peer. We then interviewed the

children who had shared more resources with the friend. We decided to use a semi-standardized interview because we wanted to get an overview of children's motivations for sharing more with their friends. Additionally, we wanted also to be able to assess some of children's potential motivators which are relatively hard to capture by behavioral observations or reports by caregivers – like emotions or past experiences with the recipients (Gifford-Smith & Brownell, 2003).

As this is a qualitative study, we were generally open to any justifications children might have for sharing more with the friend. We first generated categories from similar answers, compared the new categories to the above-mentioned potential reasons for partiality, adapted some of the categories, added new ones and then analyzed and categorized all of the children's justifications again. We also analyzed children's reactions to the reversed allocation, that is, an allocation in which the children would have given less stickers to the friend and more to the disliked peer. This might indirectly give us additional clues why children share more with their friends.

To further investigate the normative aspects of partiality, we also analyzed the participants' justifications for their sharing decisions with regard to normative language and assessed protest in reaction to the reversed allocation.

The first-person perspective of the current study is important and unique. Opposed to other studies in which children reason about hypothetical scenarios (i.e., Keller et al., 1998), in the current study, children reason about their own decisions. Thus, reasoning should be easier, especially regarding own affective motivations.

We decided to use a disliked peer instead of a stranger or an acquaintance as the second recipient because we wanted to base the interviews on children's own sharing decisions and the

friend vs. disliked peer comparison had the biggest likelihood that the children would share more resources with the friend (Moore, 2009).

We tested 4- to 6-year old children because by 4-years children share more with their friends and other close affiliations (Paulus & Moore, 2014; Yu et al., 2016) whereas for 3-year-olds the results are still mixed (Olson & Spelke, 2008; Paulus & Moore, 2014). Additionally, in this age range children start to form reciprocated and relatively stable friendships (Berndt & Hoyle, 1985; Howes, 1983; Ladd, Kochenderfer, & Coleman, 1996; Walden, Lemerise, & Smith, 1999).

Method

Participants

The final sample regarding the sharing task consisted of 45 four- to six-year-old children (M = 5 years and 5 months[1], SD = 8 months, range = 4 years and 0 months to 6 years and 8 months 20 girls, 25 boys). The mode for age in years was 5 years (24 children). Two additional children were excluded due to language problems (n = 1) and refusal to continue the study (n = 1). The main aim of the current study was to investigate children's reasons for sharing more resources with their friends. Thus, for the qualitative analyses we also excluded seven additional participants who – even after some prompting – did not share more stickers with the friend compared to the non-friend. This resulted in 38 four- to six-year-old children (M = 5 years and 5 months, SD = 8 months, range = 4 years and 1 month to 6 years and 8 months, 16 girls, 22 boys) who remained in the main analyses of the interviews. Participants were recruited from kindergartens and from the children's area of a science museum. Informed written consent was obtained from children's caregivers.

[1] The exact age of one 5-year-old child was unknown and was thus replaced by the mean age of the 23 five-year-olds whose exact age was known.

Participants agreed verbally to take part in the study and could terminate their participation at any time.

Power Analysis

Studies comparing preschoolers' sharing with friends versus less familiar or disliked peers reported medium to large sized effects for older preschool children (Moore, 2009; Paulus & Moore, 2014). Assuming an alpha of .05 and a power of .95, the projected sample size required to detect a medium effect (dz = 0.50) was approximately $N = 45$. Thus, to test our assumption that children share more with their friend than with a disliked peer, a minimum sample of 45 participants was necessary.

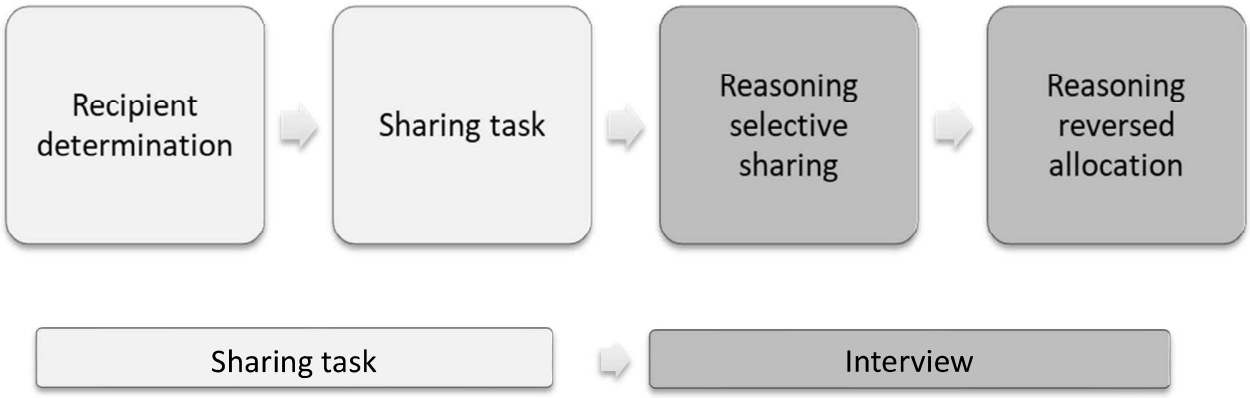
Materials

In line with previous studies (Engelmann, Over, Herrmann, & Tomasello, 2013; Paulus & Moore, 2014; Schlam, Wilson, Shoda, Mischel, & Ayduk, 2013), colored stickers were used as resources – two identical sets of stickers were used in the sharing trials with the recipients – the friend and the non-friend. Three envelopes were used to hold the stickers for the participant and the two recipients. Additionally, we used two coloring pictures which were colored by the child in order to represent their friend as well as a non-friend.

Procedure

Each participant was tested individually in a quiet room of the respective kindergarten or in a visually separated section of a museum's children's area. First, children took part in a sharing task. Subsequently, we interviewed children based on their sharing decisions with a semi-standardized interview. For an overview of the study procedure see Figure 1.

Figure 1. Overview of the procedure



Recipient determination. To establish the identity of the participant's friend, the experimenter asked whether the children had a friend in their kindergarten group or their class at school – someone who the participant enjoyed playing with and liked a lot. To establish the identity of the non-friend, the experimenter asked whether there was a peer in the kindergarten group/class who the participant did not enjoy playing with and did not like that much. If the determination of the friend or the non-friend was ambivalent, the experimenter asked for another child who the participant played with the most (friend) or hardly at all (non-friend). Except for the initial question regarding the friend, the experimenter did not refer to the recipients as the "friend" and the "non-friend" but called them by their names. The participant was then asked to color a picture of a child

for each recipient, according to what the respective recipient looked like. These drawings then represented the two recipients throughout the study.

Sharing Task. The experimenter put approximately 40 pairs of colored stickers on the table in front of the participant child, with two identical stickers held together by a paper clip. The experimenter then asked the participant to choose 10 of those sticker pairs (20 stickers in total) which they liked the most. By using identical pairs of stickers, we could ensure that the participants shared the same kind of stickers with the two recipients in the same order and, thus, that the value of the stickers used for the two recipients did not differ.

The experimenter then explained that the participant would now play the sharing game consecutively with the two recipients. The sharing procedure was the same for both recipients. The experimenter first asked the participant two write their name on one envelope and wrote the name of the first recipient (the friend or the non-friend) on the other envelope. Both envelopes were placed in front of the participant child and the picture of the respective recipient was placed on the recipient's envelope. The experimenter then explained that she would give the participant some stickers and the participant could then decide how many stickers they wanted to keep and how many stickers they wanted to give to the recipient. The participant was reminded to put the stickers they wanted to keep on their envelope and to put all stickers they wanted to give to the recipient on the recipient's envelope. The participant could take the envelope with their stickers home and the recipient would also get the envelope with their stickers. Every child participated in three different trials –two costly open sharing trials (3 and 5 stickers) and one costly forced choice sharing trial (2 stickers: 2, 0 vs. 1, 1). In the open sharing trials, participants could freely decide how many out of 3 and 5 stickers they wanted to keep for themselves and how many they wanted to share. In the forced choice sharing trial, participants could keep two stickers for themselves and

share nothing with the recipient or keep one sticker for themselves and share one sticker with the recipient (2, 0 vs. 1, 1). In total, 10 stickers per recipient were used in the sharing trials. The participants could share up to 9 out of 10 stickers with each recipient – the options in the forced sharing trial resulted in participants keeping at least one sticker.

After sharing with the first recipient, the experimenter put the stickers in the respective envelopes so that they were not visible anymore and set aside the envelope and the drawing of the first recipient. Then, the participant's envelope and the envelope of the second recipient with the drawing of the recipient on top were placed in front of the participant child and the sharing game was repeated with the second recipient.

The order of sharing with the two recipients and the order of the three different sharing trials was counterbalanced across participants. Additionally, the order in which the choices in the forced sharing trail were presented was counterbalance across participants.

Resource comparison. After the participant had shared with the second recipient, the experimenter showed the participant how they had shared with the friend in comparison to how they had shared with the non-friend. The experimenter placed the two envelopes of the recipients in front of the participant and put the recipients' stickers and the drawings representing them on the respective envelopes. The experimenter then showed and told the participant how many stickers they had shared with the first and the second recipient: "That is intriguing. You gave X stickers to <friend> and Y stickers to <non-friend>." For all children who gave more stickers to one of the two recipients the study continued with the interview part of the session (see Reasoning selective sharing).

Additional forced choice resource distribution in case of equal sharing. For the children who gave the same number of stickers to the friend and the non-friend, there was an

additional forced choice distribution trial. The participants who shared equally were presented with an additional sticker and asked to give the sticker either to the friend or the non-friend. "Look, I have another sticker. You can decide who you want to give this sticker to – <friend> or <non-friend>." After the participant put the sticker on one of the two envelopes, the experimenter showed the participant again how many stickers the recipients now had. "You just gave the sticker to <friend/non-friend>. That means in total you gave X stickers to <friend> and Y stickers to <non-friend>." With this extra trial we gave the participants another opportunity to prefer their friend.

Semi-standardized interview. In the following section we describe the procedure of the semi-standardized interview for the children who (eventually) shared more stickers with their friend. The interview was semi-standardized. That is, the topic, sequence and wording of the three main questions was standardized (Raab-Steiner & Benesch, 2015). However, the follow-up questions which resulted from the children's answers were not standardized. For an overview of the standardized questions see Table 1.

Table 1.

Standardized interview questions.

<u>Reasoning selective sharing</u>	
Reasoning friend	Do you remember why you gave more stickers to <friend> than to <non-friend>?
Reasoning non-friend	Do you remember why you gave less stickers to <non-friend> than to <friend>?
<u>Reasoning reversed allocation</u>	
	This way you would have given more stickers to <non-friend> than to <friend>. What do you think of that?

Reasoning selective sharing. After the participants were reminded how many stickers they afforded to the two recipients, the experimenter first asked them about their reasons for sharing more stickers with the friend and then about their reasons for sharing less stickers with the non-friend (see Table 1). The follow-up questions were based on the participants' answers. The experimenter picked up on the participants' answers and probed for more in-depth reasons underlying the children's answers. For example: "And why do you give <friend> more stickers if he is your best friend?". By repeating the children's answers in an upbeat and enquiring tone of voice, we wanted to encourage the children to keep talking. Once an answer of the participant seemed to be fully explored, the experimenter asked for further reasons. The experimenter asked about 1-3 follow up questions with respect to each standardized question. Clarification questions were asked if necessary.

The main set of questions ended once the participant indicated that there were no further reasons why they had shared more stickers with the friend and less stickers with the non-friend.

Reasoning about the reversed allocation. Following the main interview, the experimenter reversed the participant's allocation and asked the participant about their opinion. We intentionally presented the reversed allocation with the participant as the actor, because we specifically wanted to know how young children react to the possibility of giving less resources to their friend themselves and not just to the possibility of their friend getting less resources.

The experimenter first assured the participant about their sharing decision and then presented the reversed allocation as an alternative option the participant could have chosen: "Look! You gave more stickers to <name of the friend> than to <name of the non-friend>. That is a valid option. But it would also be possible to do this.", The experimenter ostentatiously moved the stickers of the friend to the envelope of the non-friend and vice versa and then asked: "Then you

would have given more stickers to <non-friend> than to <friend> ". What do you think of that?". Depending on the participants reactions the experimenter again asked some follow-up questions. The experimenter, for example, asked the children why they reacted a certain way or why they evaluated the reversed allocation the way they did.

Once the participant indicated that they were done expressing their opinion, the experimenter finished the session and together with the participant changed the distribution back to the sticker distribution the participant wanted and put all the stickers into the respective envelopes. We ensured that all recipients (including friends and non-friends) received their stickers, so no deception was involved in the study.

Coding and method of the content analysis

The participants' answers during the semi-standardized interview were transcribed from video or audio recordings and then coded by the first author.

For the coding and analyses of the interviews we only included children who had shared more with their friends than with their non-friends (38 children; 84%).

Justifications.

The process of forming the justification categories was as follows. First, similar justifications were sorted into the same category. The items in each category were continuously checked for differences within the category and similarities with items in other categories. Thus, justification categories were continuously adjusted during the coding process. We described each category and selected prototypical answers from the interviews as reference examples. After coding all interviews, the coding categories were compared to existing coding categories from previous studies on sharing and friendship. After we adjusted the description and example for some

categories which were similar to already existing categories, the main author coded all interviews again according to the new description of the categories.

Apart from the justification categories, we also coded whether the valences of the justifications were negative ("Because he hits me"), negative in comparison ("<Non-friend> plays me with but <friend> plays with me more often"), positive ("Because I like him"), or neutral/ambivalent ("Because I did not know <non-friend> got less stickers than <friend>"). Rules or general norms regarding a justification were coded separately. We consider a statement a rule if the children use normative language or indicate that all or most people do something. For the selective sharing questions, justifications regarding the friend and the non-friend were first coded separately with regard to the respective question asked ("Do you remember why you gave more stickers to <friend> than to <non-friend>?", "Do you remember why you gave less stickers to <non-friend> than to <friend>?"). During content analysis we realized that participants referenced both the friend and the non-friend regarding both types of questions, and therefore we decided to sort children's answers to the "friend more" and "non-friend less" question according to whether the friend or the non-friend was referenced by the child and not according to what question was asked.

We also coded children's justifications regarding their reaction to the reversed allocation. As children referenced their friend, their non-friend, both recipients, or neither recipient, we also coded which recipient was references for each justification.

The first responses children gave might me the most spontaneous and heartfelt. Thus, we also analyzed the first responses for all three question separately.

Reversed allocation. The standardized question concerning the reversed allocation was open-ended ("What do you think of that?") and thus elicited a lot of different responses besides

justifications (see above). Children's remaining reactions were coded as protest, evaluations, and suggestions on how to change or maintain the reversed allocation. Coding concerning these responses is described below. Many children responded in multiple ways but due to the open-ended nature of the question not all children responded in all dimensions (i.e., evaluation, justification, and suggestion how to change the allocation but no protest).

Reversed allocation – protest. When confronted with the reversed allocation many children intervened. Taking stickers from one or both envelopes, the attempt to change the envelopes back or to switch the pictures of the recipients were coded as physical forms of protest. We coded spontaneous protest from the time the experimenter reversed the participant's allocation to the time when the experimenter asked the participant what they thought about the reversed allocation. Every intervention after that was coded as prompted protest.

Additionally, we assessed the intended results of the intervention. Intended results were coded as, reestablishing the original allocation (friend more), creating an equal distribution (equal) or unclear. Unclear was for example coded if the child took one sticker from an envelope and kept it in their hand without indicating what they wanted to do with it.

Reversed allocation – evaluation. Most children gave their opinion on the reversed allocation. Evaluations were coded as negative, worse in comparison, neutral, or positive.

1. Negative: Clear indication that the child does not approve of the reversed allocation. This can include verbal protest, a negative evaluation of the reversed allocation or the expression of own negative emotions triggered by the reversed allocation.
2. Worse in comparison: Clear indication that the child would prefer another allocation, but no clear negative evaluation of the reversed allocation.
3. Neutral: Child indicates that the reversed allocation is neither good nor bad.

4. Positive: Positive evaluation or verbal affirmation of the reversed allocation.

Reversed allocation – decision on changing or maintaining the allocation. Some children also indicated whether they wanted to change the reversed allocation. This score includes children's physical interventions if an intention is clearly identifiable and participants' verbal expressions of their intentions. With regard to this, we coded 5 different aspects:

1. More friend: Participant suggests or demands the original allocation (friend more) or intervenes and/or establishes the original allocation physically.
2. Equal: Participant suggests or demands an equal allocation or intervenes and/or establishes an equal allocation physically.
3. More non-friend: Child positively evaluates the reversed allocation and/or affirms it.
4. No decision – discontent: Clear indication that the participant is unhappy with the allocation; either negative verbal evaluation or a physical intervention; however no clear indication what the participant wants to happen instead.
5. No decision: No clear indication that the participant likes, dislikes or wants to change the reversed allocation; neutral statements about the allocation or no answer/don't know.

Results

Sharing task

After children had shared between themselves and each of the two recipients, 23 of the 45 children had shared more stickers with the friend than with the non-friend (51%), 8 had shared more with the non-friend (18%) and 14 had shared equally (31%). Please note that at this point children might not have known which recipient they had treated more generously. Two children who had initially shared more stickers with the non-friend changed their mind once the

experimenter showed them how much they had shared with the friend and the non-friend. One child decided to share more with the friend and the other decided to share equally. Thus, at this point 24 children had shared more with the friend (53%). All 14 children who initially shared equally gave the additional sticker to the friend. Thus, we were able to analyze the interviews of a total of 38 children (84%) who decided to give more resources to the friend than to the non-friend before the interview started. For the procedure of including or excluding participants from the content analysis of the interviews, see Figure A1 in the appendix.

We analyzed how much children had shared with the two recipients spontaneously – that is, we analyzed children's sharing decisions before the experimenter showed the children how much they had shared with each recipient. We could confirm our assumption that children selectively share more resources with their friends (M = 3.60, SD = 2.14) than with their non-friends (M = 2.71, SD = 2.03), $t(44) = 2.41$, $p = .020$. After children saw how much they had shared with the recipients and after the children who shared equally could share an additional sticker, the difference in children's sharing with friends (M = 3.96. SD = 2.08) and non-friends (M = 2.64, SD = 1.98) became even more distinct, $t(44) = 3.90$, $p < .001$.

Selective sharing questions and reversed allocation – justifications

In the following we describe children's justifications for sharing more with the friend and less with the non-friend. We also describe children's justifications regarding their reaction to the reversed allocation.

For the justification questions the following categories emerged (see Table 2). A sizable number of children referred to their *friendship* as a justification for their decision. Technically, this is a circular argument. In this context, however, it might be an indication that children consider selective sharing with friends as normative. Thus, as the friendship category differs from the other

categories, we opted to include it as a separate category. For a more detailed description of the categories and more examples see Table B1 and Table B2 in the appendix.

Table 2.

Main justification categories – selective sharing and reversed allocation.

Reasoning selective sharing	**Examples**
Friendship: explicit mention of friendship; (positive and negative)	Because she is (not) my friend.
Affect child: emotions of the child towards the recipient or mutual emotions. Actions of the child with strong emotional connotations and emotional descriptions of mutual actions; (positive and negative)	Because I (do not) like/love her.; Because I cuddle with her; Because I enjoy playing with her
Recipient's actions and character traits: character traits, behavior (in the relationship and otherwise); (positive and negative)	Because she hits me; Because she is nice.
Proximity: common activities (including playing together with a focus on quantity), association (i.e., group membership) or lack of interaction, involvement with different friends; (lack of) demographic/surface similarities, shared interests, and propinquity; (not) belonging to the same group.	I often play with her.; She has never been at my house; He likes blue. Blue is also my favorite color.; I am a girl. I prefer girls.
Welfare: other-regarding preference/fairness considerations; reference to preferences, feelings and/or welfare of the other.	I want her to be happy; She likes to play with stickers; It would be unfair to her.
Additional reasoning reversed allocation	
Change relationship: change in the relationship or consequences for the relationship; sharing/not sharing does not align with the existing relationship; Consequences for the child with regard to the (change in the) relationship.	She might think I do not like her anymore; Why should I show her that I like her even though she is mean to me.

Some other justifications were informative but were maximally used once per question (2-3%). We did not include those justifications as main justification categories but instead coded them as "other". The categories included in "other" are: own interest, physical appearance/age (recipient), participant's traits, the welfare of a third party and having been unaware of the distribution between the friend and the non-friend. Possible changes in the relationship were frequently mentioned when justifying why the reversed allocation was good or bad but only mentioned one time each as a justification for sharing more with the friend and less with the non-friend. Thus, the category was coded as *other* for the selective sharing question and as a main category regarding the reversed allocation. There were also some justifications which were not informative. These include circular justification (i.e., because I want it like this; just because), statements with no apparent connection to the question (i.e., I took a picture with <non-friend>. But I did not want to.) and statements which could not be interpreted because key parts were not audible on the recording. For an overview of the additional categories see Table 3.

Table 3.

Additional justification categories – selective sharing and reversed allocation.

Additional informative categories – "other"
own interest, physical appearance/age, participant's traits, the welfare of a third party, unaware of the allocation, change in the relationship (full category for the reversed allocation)
Additional non-informative categories – "not informative"
circular answers: child's will, description of the allocation, against the child's original decision (reversed allocation question)

no connection to the question/hard to interpret, not audible

Children gave an average of 1.95 (*SD* = 1.04) informative justifications for why they gave more stickers to the friend and 1.34 (*SD* = 0.71) informative justifications for why they gave less stickers to the non-friend. Regarding the question why participants reacted the way they did to the reversed allocation, participants gave an average of 1.05 (*SD* = 1.04) informative justifications.

If participants did not answer a question or said that they did not know or could not remember why they did something, these answers were excluded from the corresponding analyses. All children justified sharing more with the friend. Two children (5%) said they could not remember why they shared less stickers with the non-friend and 9 children (24%) did not justify their reaction to the reversed allocation. Those children were thus excluded from the justification analysis of the respective question.

Justification categories – frequency.

For an overview of how many children justified sharing more with the friend and less with the non-friend with each justification category, see Figure 2.

CHILDREN'S REASONS FOR MORE SHARING WITH FRIENDS.

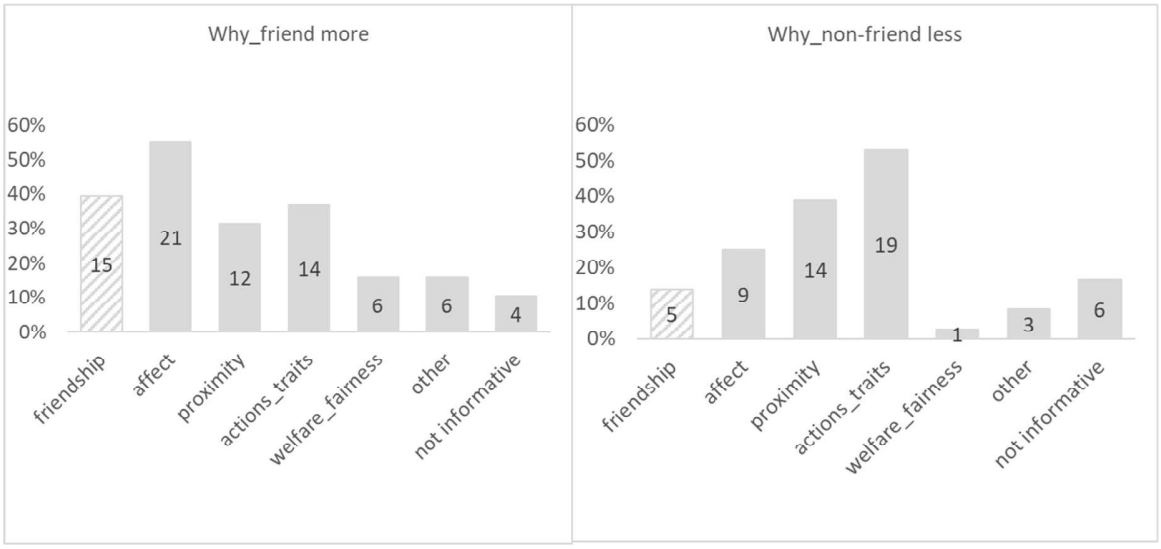


Figure 2. Selective Sharing questions: Percentage and number of children who used each of the following justification categories: friendship, affect of the participant towards the recipient (affect), proximity, recipient's actions and character traits (actions_traits), welfare and fairness considerations regarding the recipient (welfare_fairness), other and not informative. Multiple responses were possible; Why friend more: n = 38, Why non-friend less: n = 36.

The participants justified sharing more with the friend most with positive affect and affectionate interactions with the friend. Friendship was the second most frequently used justification category for sharing more with the friend. Third most often, children referenced positive traits of the friend or positive behavior of the friend. The fourth most used category was the category proximity. That is, many children, for example, mentioned playing often with the friend, spending time with them or other signs of physical of temporal proximity. Some children also took the emotional and material welfare of the friend into consideration with the aim to improve it (welfare_fairness).

CHILDREN'S REASONS FOR MORE SHARING WITH FRIENDS.

The first responses for sharing more with the friend mostly follows children's overall justification pattern. The main difference is that proximity is together with friendship the second and not, as in the overall analysis, the third most frequently used category. This is due to the fact that for proximity, 75% of the responses were first responses in comparison to 48% – 60% of the affect, actions/traits and friendship responses and 17% of the welfare responses.

Participants justified sharing less with the non-friend most with the recipients' negative actions and traits. Hitting, teasing, and destroying toys were for example frequently mentioned behaviors. The next biggest category was proximity which is made up mostly by children stating that they do not play with the non-friend or spend less or no time with them. Thirdly, children referenced own (mostly negative) feelings towards the non-friend as a reason. The category friendship was the fourth most frequently used informative category. One child referenced the non-friend's welfare by stating that the recipient was only three and might choke on the stickers. For an overview of the frequencies and percentages of each category see Figure 2.

The first responses for sharing less with the non-friend closely follow children's overall justification pattern.

Justifications – valence. Participants' reasons for sharing more with the friend had almost exclusively positive connotations (97%; 72 of the 74 informative responses). Only in the "other" category, two statements were coded as neutral (3%).

The participants' justifications for sharing less with the non-friend had mostly negative connotations (83%; 44 of 53 informative responses). However, in comparison to the justifications why the friend got more stickers more participants gave neutral or ambivalent justifications (8%; i.e., "I like to play with him – but not always."), or the assessment was worse in comparison to the positive assessment of the friend but not necessarily negative (6%; "<Non-friend> plays with me

but <friend> plays with me more often"). Two justifications were positive and referred to the welfare of the non-friend and a third party (4%).[2]

Reversed allocation – justifications. 29 participants (76%) justified their reaction to the reversed allocation. See below (Figure 3) for the percentage and number of children who used each justification category.

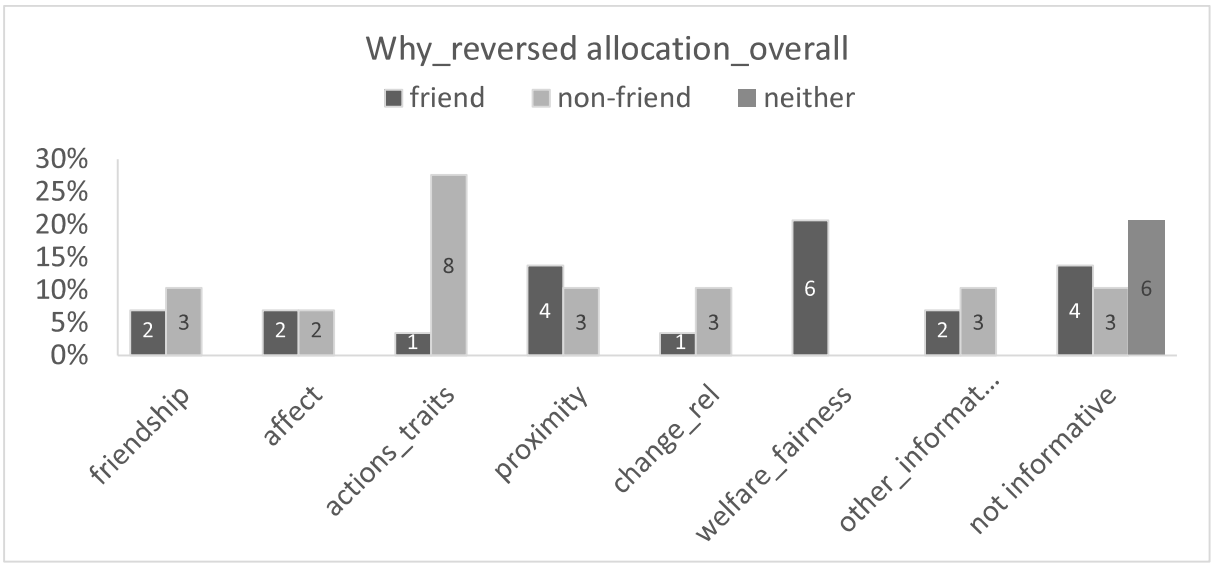


Figure 3. Reversed allocation: Percentage and number of children who used each of the following justification categories: friendship, affect of the participant towards the recipient (affect), proximity, recipient's actions and character traits (actions_traits), welfare and fairness considerations regarding the recipient (welfare_fairness), change in the relationship (change_rel), other and not informative. Differentiation by referenced recipient – friend, non-friend, neither.; Multiple responses were possible; n = 29.

A lot of children mentioned the negative behaviors and traits of the non-friend as a justification for their (mostly negative) reactions to the reversed allocation. Interestingly, welfare

[2] Due to rounding the percentages of the valences add up to 101%

or fairness concerns regarding the friend were also mentioned relatively often. Proximity was mentioned moderately often. Friendship and especially affect were mentioned less than when the participants justified their own resource allocation. A possible change in the relationship is now one of the main categories. Some mentioned how sharing more with the non-friend and less with the friend might (mostly negatively) affect the respective relationships. Surprisingly more children referred to the non-friend than the friend. Children were concerned that sharing more with the non-friend might lead to negative reactions or misunderstandings because preferential sharing was not in line with the existing relationship.

The pattern of first justifications is similar to the pattern of overall justifications.

Justifications pertaining to the friend had again mostly positive (91%) and justifications pertaining to the non-friend mostly negative connotations (88%).

Justifications - Indications of normativity. We also assessed whether children insisted on certain justifications. That is, we measured whether children repeated previous arguments without any additional information, when being asked to elaborate on the same argument or repeated an argument more than two times. For the "friend more"-question, two children in the category friendship and one child each in the categories affect and actions/traits insisted on a justification. For the "non-friend-less" question one child insisted on a justification in the category proximity.

Some children also formulated rules associated with their justifications (see Table 4). We consider a statement a rule if the child uses normative language or indicates that all or most people generally do something. We did not include the rules as a justification category because all the mentioned rules refer to one of the other justification categories like friendship or affect or are not rules concerning sharing.

Table 4.

Rules.

Connection between positive affect and sharing (6-year-old boy and 5-year-old boy)
Because if you love someone, you give more to them.;
Because I like him more. Because of that he (friend) also deserves more stickers than him (non-friend).
Connection between friendship status and sharing (4-year-old boy)
Because she is my friend and if <non-friend> is not my friend, I just cannot give him more than <friend> ".
Description of friendships; Connection between friendship status and playing together (4-year-old boy)
Because friendship is a community and not being friends is not a community.; Because if <non-friend> is not my friend, he cannot play with me. And if <friend> " is my friend, he can play with me.

Reversed allocation – reactions.

The participants reacted to the question what they thought about the reversed allocation in various ways. Apart from the justifications reported above, some children intervened with the reversed allocation that afforded more stickers to the non-friend (17; 45%), and most gave their opinion on the new allocation (evaluation; 31; 82%) or suggested how to change the allocation physically (intervention) or verbally (19; 50%). Thirty-six (95%) of the 38 participants reacted at least in one of the described ways to the reversed allocation.

Reversed allocation – intervention.

When the experimenter reversed the allocation, 17 participants (45%) intervened (see also Figure 4). The interventions of some participants made it clear what they wanted to happen instead. Most children who intervened wanted to restore an allocation in which the friend gets more stickers than the non-friend. Two children took stickers from one or two of the envelopes, but their

intention regarding their intervention was not clear. The interventions of these two children were sorted into the category "unclear intention", together with the interventions of two additional children for whom the video recording did not capture how the children rearranged the allocation. One child reallocated the stickers to establish an equal allocation between the recipients.

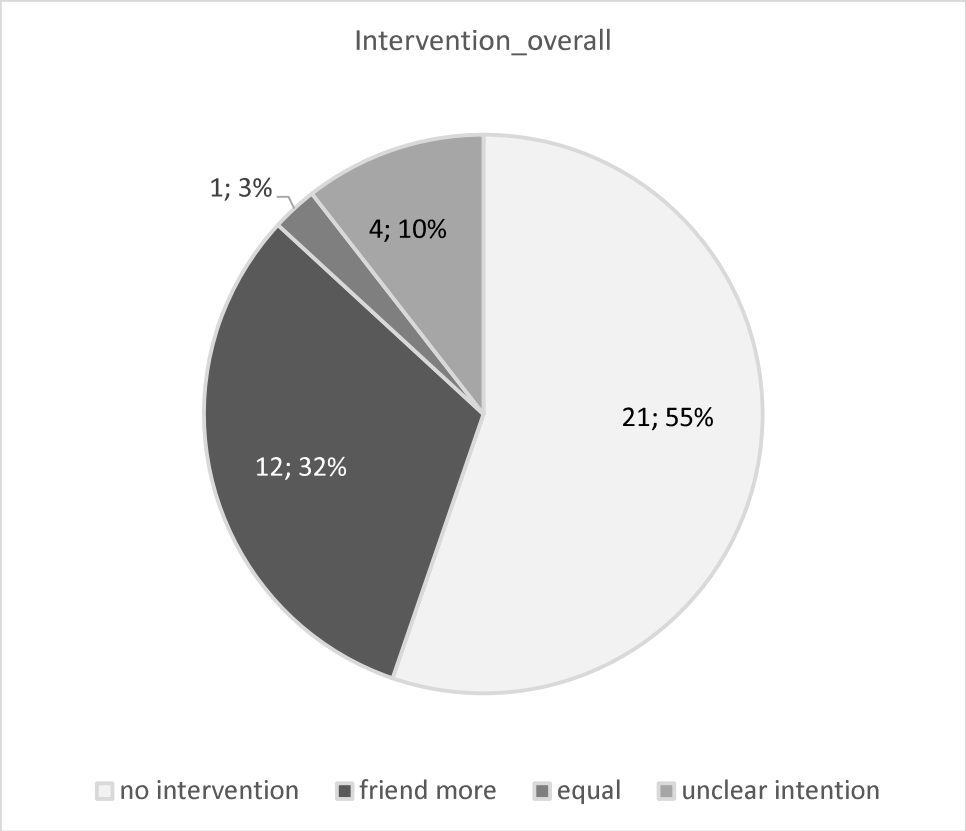


Figure 4. Reversed allocation – intervention overall: Number and percentage of participants who intervened against the reversed allocation (dark shades) and intention of the interventions.; n = 38.

Only a few participants intervened before the experimenter asked a question (5; 13%; spontaneous protest) but more (14; 37%; prompted protest) during the rest of the interview.

CHILDREN'S REASONS FOR MORE SHARING WITH FRIENDS.

Reversed allocation – evaluation. Seven children (18%) did not evaluate the reversed allocation. Most children expressed in some way that they did not like the reversed allocation (26; 68%) or would have preferred an alternative allocation (2; 5%). One child's evaluation was neutral (1; 3%) and two children approved of the reverse allocation (2; 5%).

Reversed allocation – decision. In addition to the participants whose interventions made it clear what they wanted to happen instead of the reversed allocation (13; 34%; i.e., by restoring their original allocation), there were some participants who only expressed what they wanted to happen verbally (5; 13%). See Figure 5 for an overview of participants' verbal and physical decisions combined. Most children who expressed how to change the reversed allocation in some way wanted their friend to have more stickers than their non-friend. A lot of children did not decide on how to change the reversed allocation but many of them expressed their discontentment with the reversed (non-friend more) allocation without making suggestions on how to change the allocation.

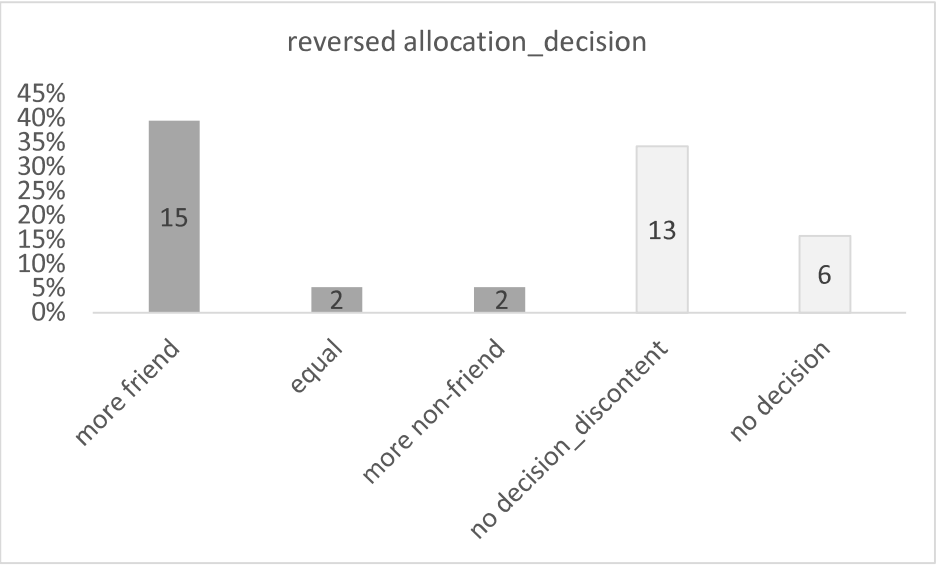


Figure 5. Reversed allocation – decision: Number and percentage of participants' (physical and verbal) decisions how to change the reversed allocation (non-friend more); n = 38.

Discussion

The purpose of the current study was to generate hypotheses why young children share more resources with their friends than non-friends. The 4- to 6-year-old children mentioned positive affect, friendship, the recipients' character traits and actions, proximity and to a lesser extent welfare and fairness considerations as justifications for their preferential sharing with friends (order according to the frequency of the justification).

That children share more with their friends could in part be motivated by their wish to share less with the disliked peer. Thus, the reasons for sharing less with the non-friend are also relevant for the question why children share more with their friends. The same categories of justifications emerged for sharing less with the non-friend as for sharing more with the friend. However, the valence was inverted. That is, whereas most statements regarding the friend were positive, most statements regarding the non-friend were negative. Additionally, the frequencies and thus importance of the categories differed. The negative actions and traits of the non-friend was the most utilized argument for sharing less with them, followed by the lack of proximity, affect and friendship. One single child used the welfare of the non-friend as an argument to share less with the non-friend. Thus, children's preferential sharing with friends seems to be mainly motivated by affective processes, whereas sharing less with the non-friends seems to be mainly motivated by their negative actions and traits (i.e., hitting other children).

As children might (accidentally) share more with the friend because they try to avoid sharing less with them, we confronted children additionally with an allocation in which the non-friend got more and the friend less stickers. To this end, the experimenter inverted the children's original resource allocation. Most children were unhappy with the reversed allocation and almost half even intervened. Half of the participants indicated what they wanted to happen regarding the

reversed allocation and most of them clearly indicated that they wanted the friend to have more stickers again. Children's justifications for their reactions were often thematically similar to the justifications regarding their own resource allocation. However, one striking difference was that more children were now concerned with the needs, feelings and fair treatment of their friend (welfare & fairness category). The children again also referred a lot to the negative actions and traits of the non-friend.

In the following we will discuss the relevance and implications of the emerged justification categories.

Positive affect directed towards the recipient

The category children used the most to justify their preferential sharing with their friend was children's (positive) affect towards the friend. Friendship is by definition an affective relationship (Howes, 1983). Thus, it is plausible that positive affect is a motivator for children's partiality in friendships. There are a couple of possible underlying mechanisms.

First, sharing with the friend could be an expression of affection. This would be in line with a finding that giving gifts to friends is mainly accompanied by feelings of affection whereas giving gifts to extended kin is mainly accompanied by feelings of obligation (Komter & Vollebergh, 1997). Additionally, adult participants in a study by Floyd and Morman (1998) assessed social support including prosocial behavior like helping as one way to communicate affection. The continuous exchange of favors and resources might also provide both friends with information about the state of the relationship (Massen, Sterck, & Vos, 2010).

Second, as two children in the current study formulated (Table 4: Rules), preferential sharing might be a part of affective relationships for children. Thus, (preferential) sharing might

be part of children's friendship concept because it is part of children's concept of affective relationships in general.

The recipients' character traits and actions

Some children justified sharing more with the friend with the friend's positive character traits ("He is good"), positive actions ("She hugs me all the time") or lack of negative actions ("He does not hit children").

This could imply that children share more with the friend because they think that their friend – independently from their relationship with them – is (morally) more deserving than other recipients (Malti et al., 2016). This might be especially true when the friend is contrasted with a disliked peer like in the current study. There is indeed basis to believe that children might deem their friends as morally better. Being (morally) "good" and positive character traits are at least from middle childhood on part of children's friendship expectations (Clark & Ayers, 1993; Clark & Bittle, 1992). Thus, even though this would be earlier than previously expected children in the current study might have selected their friends in part based on their goodness (Clark & Ayers, 1993). Additionally, there is evidence that children show an explicit and implicit bias regarding their attitudes and evaluations of in- and out-group members (Dunham et al., 2011). That is, even if our participants' friends are not morally "better" than their non-friends, the children might still see them that way. In line with this, sharing less with the disliked peer was often justified by their morally ("Because he does bad things") or conventionally ("Because he screams a lot") wrong behavior. Children might have even tried to reward the recipients' good and punish the recipients' bad behavior (Kato-Shimizu, Onishi, Kanazawa, & Hinobayashi, 2013; Kenward & Dahl, 2011; Kenward & Östh, 2015; McAuliffe, Jordan, & Warneken, 2015; Wörle & Paulus, 2018).

On a more personal level, children might also share more with the friend and less with the non-friend because they want to reciprocate the good or bad behavior directed at them. This would be in line with studies showing that children increasingly reciprocate behavior directed at them in the preschool years (Fujisawa et al., 2008; Hepach, Vaish, & Tomasello, 2013; Warneken & Tomasello, 2013). However, because it was not always clear who the actions of the recipients were directed at ("Because he hits") and behavior directed at others close to the child ("He hits my friends") might also be personally relevant for the child, we did not create a separate category for behavior directed at the children.

Additionally, listing positive or negative behavior of the recipients might entail an expression of emotions on the child's part. That is, when one of our participants for example said that her friend was "someone special", this indicated the friend's positive traits, but the child might have also wanted to express how much she liked her friend. Additionally, negative behavior, like aggression and rule violations which were mentioned regarding the non-friend in the current study are the main reasons for dislike among preschool children (Hayes, Gershman, & Bolin, 1980). Thus, justifications regarding the traits or behavior of the recipients might additionally be connected to affective motivations.

Proximity

This category contains justification referring to three often found aspects of children's friendship concepts, namely common activities, propinquity and similarities (Bigelow & La Gaipa, 1975; Kenneth H. Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005). We grouped these justifications together because the three friendship characteristics overlap and have similar behavioral consequences. Mutual activities create similarities because of the shared experience, spending time together often goes hand in hand with physical proximity and statements like "we

are neighbors" could on the one hand refer to physical proximity and on the other hand to belonging to the same group or being similar.

Some similarities the children mentioned simultaneously also identify them as belonging to the same group as the recipient ("She is also a girl"). Thus, the findings of the current study also support previous findings that children are more prosocial and share more generously if they share traits or interests with the recipient or if the recipient is an in-group member (Dunham et al., 2011; Fehr, Bernhard, & Rockenbach, 2008; Sparks et al., 2017). As both similarities and group membership are markers of affiliation, Sparks et al. (2017) argue that it could be this feeling which leads to more generous sharing. Thus, partiality in friendships could also be motivated by affiliative feelings.

Welfare and fairness concerns regarding others

Some children shared more with their friends because they were concerned with the welfare or fair treatment of their friend. They cared about their friend's interests or feelings when being shared and not being shared with. Especially regarding the reversed allocation some children were worried how their friend might feel if they got no stickers from them or only a few while the non-friend got more.

One possible underlying mechanism might be empathy or sympathy. Young children sympathize more with friends (Costin & Jones, 1992) than acquaintances and thus the concern for the other's well-being might be a stronger motivator for sharing regarding friends than regarding less close recipients. This is in line with studies showing that sympathy and other moral emotions are connected to children's increased sharing behavior (Ongley & Malti, 2014).

On a similar note, Aron, Aron, and Smollan (1992) show that adults can experience friends even as part of their own self and Laursen and Hartup (2002) propose that communal relationships

like strong friendships involve a shared identity. Thus, children might be more concerned about the welfare of their friend because they are concerned about their own welfare which entails the welfare of their friend.

Friendship

Friendship as a justification category is different from the other justification categories. As mentioned before, using friendship as a justification to share more with the friend and the lack of friendship as a justification to share less with the non-friend are technically circular arguments. However, given how many children used friendship as a justification, they seem to consider friendship to be a valid and informative argument.

Thus, for the children the word friendship apparently entails (additional) information which justifies partiality, and they assume this information to be common ground with the experimenter. The word friendship potentially entails a lot of the other justifications. That is, when children justify their sharing decision with friendship, they could mean any or all the aspects which make up their friendship concept. More importantly, the children also seem to assume the connection between friendship and sharing to be common ground with the experimenter. The concept and therefore also the word friendship might entail certain properties and obligations similar to how morally relevant words inherently entail evaluations (Mammen, Köymen, & Tomasello, 2018; Nunner-Winkler, 2007). The word "stealing", for example also entails the moral wrongness of the offense (Nunner-Winkler, 2007). When children only state the word describing the offence ("It's stealing") without any further justifications to explain their punishment of the offense, this is seen as a sign that they understand the underlying moral norm and assume the norm to be common knowledge (Mammen et al., 2018). Thus, children using friendship as a justification for their partiality without further explanations, on the one hand indicates young children's understanding

of the habits and maybe even obligations inherent in friendships. On the other hand, it also shows children's developing understanding of the underlying meaning of words. That is, it shows their developing proficiency in the language game and the importance of the language game regarding interpersonal relationships. It might also be an indication that friendship and sharing could be connected on a normative level.

In addition, even when being asked for further clarifications or justifications, two children in the current study kept repeating the friendship justification. This might be another indication that they assumed common ground regarding the obligation to share with the friend and thus did not understand why the experimenter would need any further explanation.

Change in the relationship

Some children were considering how sharing more or less with the recipients might affect the respective relationships. Thus, this might be a further motivational factor. Two children mentioned that (preferential) sharing more could improve the relationship with the friend and the non-friend. Thinking that sharing less with the friend might lead to the dissolution of the friendship could be an indication that sharing in friendships is normative. However, only one child worried about that. More children worried how the non-friend would react to the stickers - both in terms of a negative reaction of the non-friend and in terms of a false perception of the relationship. Overall, it is interesting that at least some children are already aware that sharing can influence social relationships.

After describing the emerged justification categories separately, I will now compare them and discuss the impact and implications of the categories more broadly.

Children's justifications – comparison of the justifications

The current study shows the importance of personal relationships for young children's partiality. Three of the four most used categories referring to the friend – friendship, affect, and proximity – directly refer to the relationship with the recipient. The focus on relationship related justifications regarding the friend are especially interesting when contrasted with the justifications regarding the non- friend. The negative actions and traits of the non-friend were the most used argument when justifying why children gave less to the non-friend. That is, sharing with the friend might be related to the relationship whereas sharing less with the non-friend could be more connected to fairness considerations – that is, the (moral) undeservingness of the non-friend (Vaish, Carpenter, & Tomasello, 2010). The results of the current study could indicate differences in children's argumentation and decision-making process depending on the relationship with the other person. Children might mention their emotions more in connection to their friend than in connection their non-friend because friendship is characterized by positive affect, whereas the negative feelings for disliked peers might not be as strong, yet (Abecassis, 2003). Preschool children for example already have reciprocal friends but only very seldomly reciprocal enemies (Hayes et al., 1980). Thus, relationship related justifications might not be as relevant.

The use of the welfare and fairness justifications are also interesting. They were almost exclusively limited to concerns about the friend. As the interviewed children all shared more with their friend, this is not surprising because it is harder to justify sharing less with welfare considerations. Interestingly, only few children justified their preferential sharing with friends with welfare or fairness concerns, but more were concerned about the welfare of the friend regarding the reversed allocation. Welfare and fairness concerns seem to be most relevant if the friend is at risk of being at a disadvantage.

It is also informative which justifications were not given. Even though young children are aware of the positive emotional effects sharing has on the sharer (Paulus & Moore, 2017), it was not a justification in the current study. That is, even though the "warm glow" might motivate sharing in general (Aknin et al., 2012), it does not seem to be a conscious motivator for children's selective sharing in friendships. More intriguing is that no child mentioned reciprocity or the possibility to get something in return for sharing (strategic reciprocity). This is surprising because reciprocal interactions are one of the key characteristics of friendships (Laursen & Hartup, 2002). The mention of the recipients' good (friend) or bad behavior (non-friend) could be an indication that the children were reciprocating this behavior. However, no justifications seem to fit strategic future oriented reciprocity which is in line with previous research indicating the independence of strategic reciprocity and partiality in friendships (Lenz & Paulus, 2021). Children not mentioning reciprocity but focusing on the relationship and especially positive feelings regarding the friend is in line with a communal relationship in which the relationship eventually evens out because it is based on the mutual concern for the welfare of the other, but the friends do not keep close track of the favors given and received (Laursen & Hartup, 2002). This emotionally mediated reciprocity is at least in the short term considered to be unconditional and is based on the strength of the relationship (Massen et al., 2010). Thus, the results of the current study could indicate that selective sharing in friendships is more based on habit, social routines and affective ties (Carpendale, Hammond, & Atwood, 2013) than on direct or strategic reciprocity (Kuhlmeier, Dunfield, & O'Neill, 2014; Trivers, 1971).

It was also interesting that when confronted with the reversed allocation, children mentioned less justifications referring to the feelings of the participant than when justifying the original allocation. Thus, sharing more with the friend might be motivated by feelings whereas

trying to avoid sharing less with the friend might be motivated by normative and welfare considerations.

Norms, obligations and morality

The results of the current study indicate that sharing with friends and to some extend partiality might have some normative qualities.

Based on the current study and in line with Paulus et al. (2020), preferential sharing with non-friends over friends is clearly not permissible for young children. Children evaluated it negatively and protested when the friend got less resources than the non-friend – both in a first (current study)- and third-party context (Paulus et al., 2020). In the current study, one child even formulated a rule about not giving more resources to non-friends than to friends. Smetana and Ball (2018) showed that while from an outsider perspective children do not think it is less permissible to transgress against friends than non-friends, they predict more negative feeling when transgressing against a friend. This indicates a stronger emotional valence of transgressions against friends.

However, how normatively motivated partiality in friendships is, is still unclear. Many children in the current study justified sharing more with friends with their friendship status and after the reversal of their allocation often reestablished the unequal allocation favoring the friend. This is in line with children affirming partiality in Christner, Pletti, and Paulus's study (2020). However, this is not clear evidence of a strict partiality norm and in Christner et al.'s study (2020) children also enforced equal sharing over partiality indicating that partiality is not as important as moral norms. Similarly, the children in Smetana and Ball's study (2018) viewed moral transgressions, against anyone, including disliked peers and bullies, as wrong. Thus, children's selective sharing is probably not motivated by a strict partiality norm that intentionally puts others

at a disadvantage. Consequently, that children in the current study shared more with their friends, instead of sharing the same number of resources with friends and non-friends is in line with previous research showing that children not always follow (their own) moral considerations (Smith, Blake, & Harris, 2013) and partiality regarding friends sometimes overrides (other) moral considerations (Paulus, 2016).

As sharing is part of children's friendship concept (Furman & Bierman, 1983), it is likely that there is a norm to at least sometimes share with your friends. Further research is needed to find out to what extent partiality is normative for young children.

Regardless of partiality being a norm or not, the norm not to share less with friends might still lead to partiality. That is, if children consciously try not to put their friends at a disadvantage but do not mind putting other recipients at a disadvantage, they might end up accidentally sharing more with their friends.

Comparison with classical stage theories of friendship

Even though it was not our intention to verify classical stage theories of friendship (Bigelow & La Gaipa, 1975; Damon, 1977; Selman, 1980; Youniss, 1980; Youniss & Volpe, 1978), most statement in the category proximity seem to be in line with the "momentary physical interaction"-stage (level 1) of Selman's 5-stage- model of friendship (Marcone et al., 2015; Selman, 1980) or "common activities and propinquity" – the first stage of a 3-stage- model by Bigelow and La Gaipa (1975; Clark & Ayers, 1993) The described positive character traits and actions would partly fall into stage 2 – "character admiration" and justifications regarding welfare and fairness might even indicate some children to be at level 3 focusing on "loyalty, commitment, empathy and intimacy potential".

It is interesting that some 4-6-year-old children in the current study already cared about the welfare of their friends. Caring about the interests and needs of the friend is in line with the second stage of Selman's 5-stage-theory of friendship in which friendship is no longer mainly based on the fulfillment of the child's own interest but on mutual reciprocity and the friend's interests and needs start to become important too (Gummerum & Keller, 2008). However, children are not supposed to reach this stage until about 7 years (Selman, Jaquette, & Lavin, 1977). Thus, the current study supports the notion that classical stage theories of moral or social development (Bigelow & La Gaipa, 1975; Damon, 1977; Selman, 1980; Youniss, 1980; Youniss & Volpe, 1978) might slightly underestimate children's actual social and moral development (Afshordi & Liberman, 2021). The concern for the friend's welfare is also in line with a beginning change from an exchange to a communal relationship (Laursen & Hartup, 2002).

Limitations

The current study has some limitations. First, because this is an interview study, we could only assess children's explicit, conscious motivations they were willing to share with us. Future studies could try to combine interview and experimental measures to assess the connection between children's explicit motivations and the underlying cognitive mechanisms for children's partiality.

Second, the children in the current study might not have known that they had shared more stickers with their friend until they were told by the experimenter because they had shared with both recipients individually. Thus, justifications may have been post-hoc in some cases. However, once children saw that they had shared more with the friend, they did not indicate that they wanted to change the allocation. Additionally, when confronted with the reversed allocation, most children wanted to re-reverse the allocation – that is, give more stickers to the friend again. Thus, even

though initially sharing more with the friend might have been accidental, the children were clearly in favor of the partial resource allocation. That is, children most likely justified their preferred resource allocation in the current study.

Third, we contrasted children's sharing with a friend and a disliked peer. Even though, the higher probability of partiality regarding the friend and a similar level of familiarity are advantages, the comparison also has a disadvantage. That is, children's preferential sharing with friends might have partially been caused by children not wanting to share (much) with the non-friend. We tried to counteract this confounding effect, by asking about sharing more with the friend and less with the non-friend separately. However, it would be interesting to see if a future study comparing sharing with friends and strangers would yield similar results.

Conclusion and suggestions for future research

Positive affect, positive traits and behavior of the friend, proximity and concern for the welfare of the friend seem to be important for young children's partiality in friendships – all of these are connected to children's relationship with the friend. Thus, the results of the current study especially stress the importance of relational aspects for children's preferential sharing with friends. Friendship obligations might additionally add to children's preferential sharing with friends.

The verification of any of the above-mentioned possible factors for children's partiality would be worthwhile future research projects. However, when justifying their preferential sharing with the friend, positive affection toward the friend was the most used argument and proximity was also an often-used argument. Thus, this indicates that it might be especially interesting for future studies to explore and verify the influence of affection and affiliative feelings on children's partiality.

Further investigating the normative aspects of children's partiality in friendships would also be fruitful and would additionally enrich the discussion of what constitutes a norm . It would be important to find out if and under what circumstances partiality in friendships is obligatory, what consequences arise if friends do not treat each other preferentially in the short and in the long term and what emotions are related to such violations.

The current study stresses the importance of the relationship and especially affection for children's preferential sharing with friends and raises questions about the normative quality of children's partiality. The proposed justification categories can serve as reference points for future research and thus contribute to a more comprehensive understanding of young children's preferential sharing with friends.

Appendix A

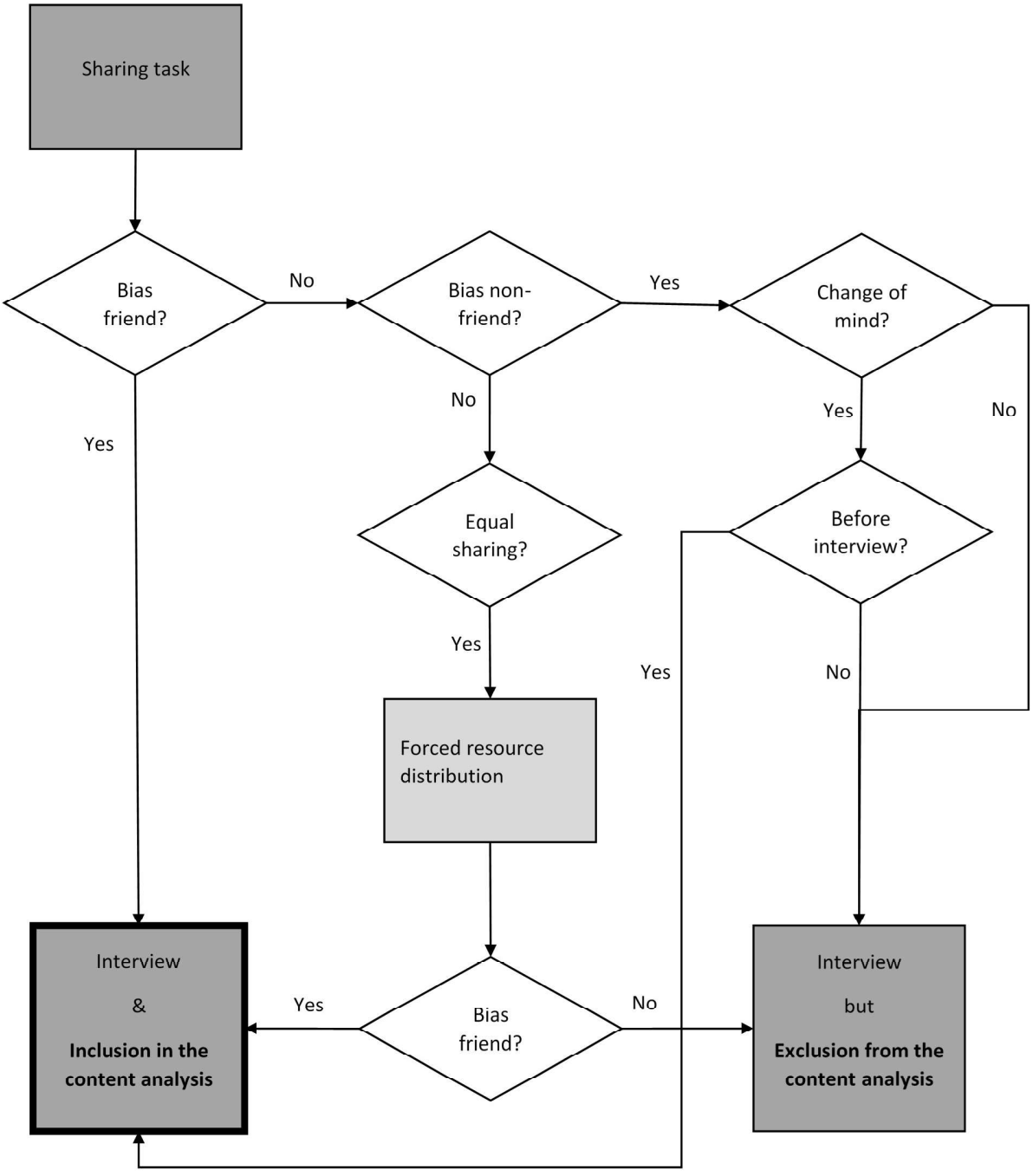


Figure A1. Procedure of in- and exclusion in the content analysis of the interviews.

Appendix B

Table B1.

Justification categories – detailed description.

Reasoning selective sharing
Friendship: explicit mention of friendship (positive and negative)
Affect child: emotions and actions of the child towards the recipient or mutual emotions or actions
Positive: positive affection statements of liking, loving, caring for, other references to emotional attachment, report of clear physical signs of positive affect and positive affective language regarding mutual activities.
Negative: negative affective statements of disliking, disgust or hating and negative affective language regarding mutual activities.
Recipient's actions and character traits: Character traits, behavior in the relationship and otherwise, trust
Positive: Positive character traits (being nice and kind); positive behavior (i.e., cooperative behavior, prosocial behavior; including reciprocity), trust.
Negative: Negative character traits, conflict, unfriendly/disruptive behavior, lack of trust
Proximity:
Positive: common activities (including playing together with a focus on quantity), association (i.e., group membership), demographic/surface similarities, shared interests, and propinquity (being near one another, hanging around together, living nearby, going to the same school, or otherwise being physically close)

Negative: lack of interaction ("We aren't around each other much"), involvement with different friends ("I have other friends to talk to"), differences, and different interests, not belonging to the same group

Distinction: affective statements about playing with the other child belong to the affective category.

Welfare: Other-regarding preference/Fairness considerations; reference to preferences, feelings and/or welfare of the other.

Additional reasoning reversed allocation

Change relationship: Changes the relationship/does not align with the existing relationship; Consequences for the child or the relationship

Distinction from welfare as welfare only covers consequences for the recipient. (positive and negative)

Table B2.

Justification categories – examples.

Reasoning selective sharing
Friendship:
Positive: Because <friend> is my (best) friend.; I give my best friend some of my things.; Because being friends is a community and not being friends is not a community.
Negative: Because <non-friend> is not (so much) my (best) friend (right now).; Because <non-friend> gets more even though he is not my friend. (justification for a negative evaluation of the reversed allocation)
Affect child:
Positive: I love/like her.; I like nice people.; We are in love; If you love someone you give more to them; We kiss/hug.; Because I want to marry her; Because he plays with me more beautifully; Because I like to play with him a lot; Because I like it when he plays with me
Negative: I do not want to give so much to someone who I do not like.; Because I do not like her.; Because I do not like people who are annoying.
Recipient's actions and character traits:
Positive: Because she/he never hits/teases/annoys me.; Because she/he does not scream so much; Because she/he does not hit other children; Because she/he is nice(r) (to me); Because she/he is good; Because she/he is better.; Because she is someone special; Because she is happy all the time; She hugs me all the time.; Because she gives me more stuff.; She likes to play with me.;

Negative: Because she/he hurts/hits/teases/annoys (me/other children).; Because he laughs at me.; Because we fight.; Because he sometimes destroys (my) things.; Because he interrupts conversations.; Because he screams a lot.; He cannot play well with us.; Because he is not nice to me. Because she/he does bad things.; Because he teases/hurts my friends.; She does not listen to me and does not play what I want.; Because Rafael does not give me his police car.; We stole sweets together and got scolded.; Because I do not think he is that great.

Proximity:

Positive:

Because I play (more) often/always with her/him. <friend> has always played with me.; Because I go to her house, and she comes to my house.; Because we are neighbors.; We play together every recess.; Because she is in my team.; It is easier to understand him.; Because he loves blue. Blue is also my favorite color.

Negative: Because I do not play (that) often with <non-friend>; <Name of non-friend> does not play in our team.; <Name of non-friend> never visited me.; I do not like boys better than girls. <Name of non-friend> is a boy. He plays with the boys first and then with me.; It is hard to understand his language. ; Blue is my favorite color. He likes purple more.

Welfare/Fairness:

Because <friend> likes stickers; Because he likes to do arts and crafts.; Because otherwise <friend> does not have stickers.; I like to always give her something nice for her birthday.; Because I want to make her happy.; Because I want her to be happy.; He sometimes cries if one does not give him something. That would not be great for <friend> (reversed allocation).; He might be sad otherwise.; I did that to say thank you.; Because it is polite.

Because <name of non-friend> will just put the stickers in her mouth. And then she might choke.; (I like him better.) So, he deserves more stickers.; He (friend) has so many stickers - and he is allowed to have them.; Because I do not know if non-friend likes stickers.

Additional reasoning reversed allocation
Change relationship:
He might think, I like him. I do not think that is good. I do not want to give him a sign that I like him. He is mean to me. And if he is mean to me, why would I show him that I like him if I really think he is mean.; He will be happy that he gets a reward and then he will continue teasing me; He will hit me if I ask him something.; She will play with me more (non-friend).
Because he will think that I do not like him as much anymore.; Because he will not want to play with me anymore.; Because he will not like me anymore; Because he will not be my best friend anymore – but I want him to be.;

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"Who will share with me?": Preschoolers rely on their friends more than on their nonfriends to share with them

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ABSTRACT

During the preschool years, children start to share selectively with close affiliates such as friends. However, it is unclear whether preschool children also selectively rely on their own friends more than on their nonfriends to share with them. Moreover, the developmental course of this relationship-dependent reliance is unknown. In the current study, therefore, we investigated to what extent preschoolers rely on their friends and nonfriends to share with them. To this end, we analyzed the choices of 82 3- to 5-year old children by means of a metacognitive opt-out paradigm. Children were led to believe that a friend and a disliked peer have had the opportunity—but have not been obligated—to share a highly valued resource with them by putting it in a box. Children could then choose between the above-mentioned box by their peer and an opt-out box that contained a slightly less attractive but certain item. Thus, children were expected to choose the peer's box only if they thought that their peer had shared with them. Otherwise, they should choose the opt-out option to maximize their outcome. Our results reveal developmental changes with older but not younger preschool children relying on their friends to share with them and relying more on their friends than on their nonfriends. This highlights the developmental changes in selective reliance over the preschool years and gives further insight into how young children learn to navigate the social world.

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Introduction

Humans live in a social world in which cooperation and relying on others is key (Harris, 2012; Tomasello, 2016). This is particularly evident in humans' propensity for other-oriented behaviors (e.g., Penner, Dovidio, Piliavin, & Schroeder, 2005). The cooperativeness of the human species is evident early in life. Young children engage in a variety of prosocial behaviors (e.g., Dunfield & Kuhlmeier, 2013; Hammond & Drummond, 2019), are concerned about fairness (e.g., Engelmann & Tomasello, 2019; Grocke, Rossano, & Tomasello, 2015; McAuliffe, Blake, Steinbeis, & Warneken, 2017), and feel sorrow for violating others' rights or well-being (e.g., Drummond, Hammond, Satlof-Bedrick, Waugh, & Brownell, 2017). Understanding early prosocial development, thus, has become a major topic in developmental science (for reviews, see Carpendale, Hammond, & Atwood, 2013; Kuhlmeier, Dunfield, & O'Neill, 2014; Martin & Olson, 2015).

Importantly, children not only engage in prosocial behavior themselves but also acquire expectations on how others will engage in prosocial behavior (e.g., Olson & Spelke, 2008). Social functioning is supported by knowledge about others' likelihood to engage in sharing (e.g., Essler, Wörle, Moore, & Paulus, 2020). Indeed, theoretical work highlights that the ability of people to correctly evaluate whether someone will act prosocially toward them is important for fruitful cooperative relationships and for preventing exploitation (Molnár & Heintz, 2016). Most relevant in this context, there are particular groups of people, such as family members and friends, who are strategically more reasonable interaction partners than others. Because friendship, for example, emerges in the context of mutual affection and reciprocity (Hartup, 1989; Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005), people should expect their friend to act prosocially toward them. Yet, despite a large body of research on how young children reason about and expect others' sharing, little research has focused on how children expect their own friends to share. That is, the developmental emergence and change of children's recipient dependent sharing expectations has not been investigated in first-party contexts. It is unclear to what extent young children indeed rely on their own friends more than on others in sharing situations. Investigating this question is important because the results would show whether children apply the sharing expectations that they have in third-party contexts also to their own lives and relationships. In addition, investigating this question could also further clarify how children's concept of relationships, and especially of friendships, develops during the preschool years.

Selective sharing and sharing expectations

Children start to display behavior that can be interpreted as sharing during the second year of life (e.g., Brownell, Svetlova, & Nichols, 2009; Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011). Over the course of early childhood, children's sharing becomes less selfish (Smith, Blake, & Harris, 2013) and more selective, especially regarding recipient characteristics (Fehr, Bernhard, & Rockenbach, 2008; Kuhlmeier et al., 2014; Malti et al., 2016; Moore, 2009). Children's sharing, for example, starts to depend on previous cooperation and previous prosocial behavior (Kenward & Dahl, 2011; Warneken, Lohse, Melis, & Tomasello, 2011). Notably, the relationship with the recipient also becomes more important during the preschool years (Paulus, 2016; Vonk, Jett, Tomeny, Mercer, & Cwikla, 2020; Yu, Zhu, & Leslie, 2016). By 3 years of age, children selectively help close others (Engelmann, Haux, & Herrmann, 2019). By 4 or 5 years, children share more with familiar recipients, such as friends, than with disliked peers or strangers (Paulus & Moore, 2014; Yu et al., 2016).

As children start to share more with their friends, they also observe that their peers share more with friends than with other acquaintances. In line with this idea, preschool children use partial resource allocations and loyalty as cues to friendship (Afshordi, 2019; Liberman & Shaw, 2017, 2019). Likewise, preschool children also start to expect others to be more generous toward their friends than toward strangers and disliked peers. In these studies, children either led third parties to share more with their friends (Olson & Spelke, 2008) or predicted that other agents would be more generous to their friends (Paulus & Moore, 2014). The latter study reported that sharing expectations become more selective during the preschool years, with 4- and 5-year-olds, but not 3-year-olds,

expecting that others will share more with friends than with disliked peers. Overall, these studies demonstrate children's knowledge about preferential sharing with friends in third-party contexts. From a theoretical level, children's expectation that friends share with each other also nicely relates to evolutionary accounts that stress the importance of reciprocity and collaboration—important features of friendships—for the existence and development of prosocial behavior and morality (Vaish & Tomasello, 2014). Relatedly, many theories on friendships and other close relationships stress the importance of children's own prosocial behavior in relationships but also of related expectations regarding the behavior of other people (La Guardia & Patrick, 2008; MacEvoy, Papadakis, Fedigan, & Ash, 2016; Wieselquist, Rusbult, Foster, & Agnew, 1999). Friendships, unlike parent–child relationships, are symmetrical relationships with equal rights and obligations (Laursen & Hartup, 2002). Thus, the expectation of equal treatment is constitutive of friendships. That is, as preschool children start to preferentially share with and help their friends (e.g., Engelmann et al., 2019; Paulus & Moore, 2014), as part of the friendship, they should also expect their friends to treat them in an equivalent prosocial manner. However, previous studies mainly investigated preschoolers' prosocial behavior in friendships but rarely investigated preschoolers' expectations regarding their friends' prosocial behavior toward them. The current study addressed this topic and, thus, could help to gain a better understanding of preschoolers' relationship-dependent expectations specifically and their concept of friendships in general. There are some interview studies suggesting that elementary school children expect their friends to share with them (Bigelow, 1977; Bigelow & La Gaipa, 1975; MacEvoy et al., 2016), and Furman and Bierman (1983) reported that already preschool children start to expect prosocial behavior in friendships. However, Furman and Bierman asked children about general properties of friendships and not about children's own friends.

Selective reliance on others

In sum, most studies with preschool children have focused on their prediction of others' behavior in third-party tasks or on general assessments of friendships. Thus, little is known about the expectations that preschool children have toward their own friends, that is, in first-party contexts. In other words, it is unclear to what extent children take friendship into account in their own social behavior and when relying on others' sharing. Notably, in interview studies and third-party contexts there is nothing at stake for children, whereas in first-party situations children's own interests are at stake. This distinction is supported by research in other areas that has indicated disparities between third-party judgments and reasoning and actual behavior during childhood (e.g., Smith et al., 2013). Indeed, relying on others in first-party situations also includes the willingness to be vulnerable to others' actions (Fehr, 2009; Hong & Bohnet, 2007). Taken together, given young children's knowledge about friendship in third-party contexts (e.g., Liberman & Shaw, 2017, 2019), it would be interesting to explore how children apply this in first-party situations. First evidence comes from a study in which 5- and 6-year-olds reported higher levels of trust in their friends' secret and promise keeping than in their nonfriends' secret and promise keeping (Chin, 2014). In the current study, therefore, we investigated whether young children selectively rely on close others to share with them in a situation where children's own interests are at stake. By relying on their peers' sharing, children risk getting fewer resources than they would by taking a safe option.

Interestingly, evidence that young children selectively rely on others comes from metacognition research in epistemic contexts, that is, where the acquisition of novel knowledge is concerned (for a review, see Harris et al., 2012). Next to knowledge about others' reliability (e.g., Koenig & Harris, 2005; Pasquini, Corriveau, Koenig, & Harris, 2007), it has been shown that preschool children trust others based on the quality of the relationship and prior experiences (Landrum, Mills, & Johnston, 2013). For example, they preferentially choose to endorse information provided by their caregivers (Corriveau et al., 2009). Children's selective trust in others' testimony gets more differentiated during the preschool years. For example, whereas 3-year-old children only selectively trusted informants who were always correct, 4-year-olds based their decision of who to trust on the relative accuracy of the informants (Pasquini et al., 2007). This developmental increase in differentiation might also be relevant for children's selective reliance on their friends' sharing. Friends do not act prosocial toward each other 100% of the time. Thus, this makes it necessary for children to evaluate the relative

prosociality of their friends compared with nonfriends when deciding who to rely on in sharing situations. In the current study, we hypothesized that selective reliance on friends' sharing emerges and gets more differentiated during the preschool years. Our hypothesis is based on two rationales. First, previous studies using third-party scenarios have shown that preschool children expect others to share more with and show loyalty toward their friends (Liberman, Gerdin, Kinzler, & Shaw, 2020; Olson & Spelke, 2008). These expectations seem to become more differentiated and more agent dependent during the course of the preschool period (Paulus & Moore, 2014). Second, studies on social and epistemic trust show that children selectively rely on people based on characteristics that also apply to friends such as a positive relationship and prior positive experiences in similar situations (Chin, 2014; Corriveau & Harris, 2009; Corriveau et al., 2009). These studies also show that children become better at judging who is a reliable agent during the course of the preschool period (e.g., Pasquini et al., 2007).

In contrast to metacognitive studies, we decided to use the term *reliance* instead of *trust* to avoid the normative connotation of the concept trust. We investigated whether preschoolers are willing to take a risk and act based on their expectations that their friends will share with them. Thus, the current study investigated not only children's verbally expressed expectations but also how much preschoolers rely on their friends.

The current study

In the current study, we adapted a paradigm that has frequently been used in metacognitive research, namely the opt-out paradigm. The opt-out paradigm is mostly used to investigate uncertainty monitoring in comparative research with animals and young children (e.g., Balcomb & Gerken, 2008; Smith, Shields, Schull, & Washburn, 1997; Smith & Washburn, 2005). In these studies, participants get rewarded for responding correctly in (memory) tasks and get nothing for responding incorrectly. Importantly, participants also have a task-independent response option that results in a standard outcome (independent of participants' ability to pass the task) of medium value (Smith et al., 1997). Choosing this option, when a task is particularly difficult, is often interpreted as evidence for implicit metacognitive abilities. For example, in a memory-monitoring task using the opt-out paradigm, 3-year-old children strategically opted out when they were not able to correctly remember an item (Balcomb & Gerken, 2008; for similar findings, see Coughlin, Hembacher, Lyons, & Ghetti, 2015; Hembacher & Ghetti, 2014). Thus, the opt-out paradigm represents a suitable methodological approach also for 3-year-old children. It allows exploring children's certainty regarding different options and, thus, represents a novel methodological approach to explore children's reliance on their friends' sharing. We assessed children's expectations indirectly through their choices to accept or opt out of an offer by their peers. Thus, children's decisions in the current study had immediate consequences for children and reveal the extent to which they rely on their friends to share with them. Using a behavioral measure also allowed us to investigate how and when young children's sharing expectations regarding their friends become strong enough to manifest in their behavior.

More specifically, we gave children the choice between a box from a peer (a friend or a nonfriend) that could contain a very attractive item and an opt-out box containing a less attractive item for sure. Children were instructed that a friend and a nonfriend had gotten two attractive items and either could have kept both items for themselves and shared nothing with the children or could have shared with the children by placing one item into the peer box. If children were confident that the peer had shared with them, therefore, they should choose the peer box. If they did not think that their peer had shared with them, they should choose the opt-out box. In the second part of the experiment, we directly compared how much children rely on their friends with how much they rely on their nonfriends. We compared children's sharing expectations regarding a friend versus a disliked other from the same kindergarten because this allowed us to control for group membership and familiarity. In addition, due to the differences in affection and the presumed antithetical previous experiences in the relationships with the friend and the nonfriend, this comparison provided the clearest rationale for a difference in reliance.

Method

Participants

The final sample consisted of 82 3- to 5-year-old children (M = 54.4 months, SD = 9.4, range = 38–71; 42 boys). An additional 14 children were excluded due to experimenter error or refusal to continue the study (n = 4), lack of clear resource preferences (n = 3), or failure to correctly answer the control questions (n = 7). Participants were evenly distributed across three age bands: 25 3-year-olds, 28 4-year-olds, and 29 5-year-olds. Participants were recruited from kindergartens located in metropolitan areas of the same European country and came from mixed socioeconomic backgrounds. Informed written consent was obtained from children's caregivers. Participants agreed verbally to take part in the study and could terminate their participation at any time.

Power analysis

To estimate the required sample size, we conducted a statistical power analysis. Previous research (Moore, 2009; Paulus & Moore, 2014) indicated mostly medium effect sizes for age-related changes in sharing behavior and sharing expectations involving friends and nonfriends. Assuming alpha = .05, the projected sample size required to detect a medium effect size was approximately N = 55 for a power of .80 and N = 89 for a power of .95. Thus, we aimed for a final sample of N = 55 to 90.

Materials

Following previous studies (Engelmann, Over, Herrmann, & Tomasello, 2013; Paulus & Moore, 2014; Schlam, Wilson, Shoda, Mischel, & Ayduk, 2013), we used cookies, stickers, and balloons as attractive items and pebble stones as unattractive items. For the warm-up trials, we used a hand puppet named "Max" (~12 inches). Max and the child each received an envelope in which to collect their obtained resources. In the test trials, two identical white paper boxes (~1 × 3 × 3 inches) contained the resources in each trial. In addition, we used two pictures drawn by the child, representing a friend and a nonfriend of the child.

Procedure

Children were tested individually in a quiet room of their kindergarten, and sessions were videotaped. Children were seated at a table opposite of the experimenter. The procedure of the experiment consisted of three parts: the determination of resource preferences, the familiarization phase, and the test phase (see Fig. 1).

First, we asked children about their resource preference in order to determine which resources would be used in the subsequent familiarization and test phases. In the four practice trials of the familiarization phase, children were introduced to the opt-out paradigm. The test phase consisted of three different types of test trials, henceforth labeled blocks: the opt-out block, the favorite block, and the least favorite block. In all three blocks, children needed to choose between two boxes.

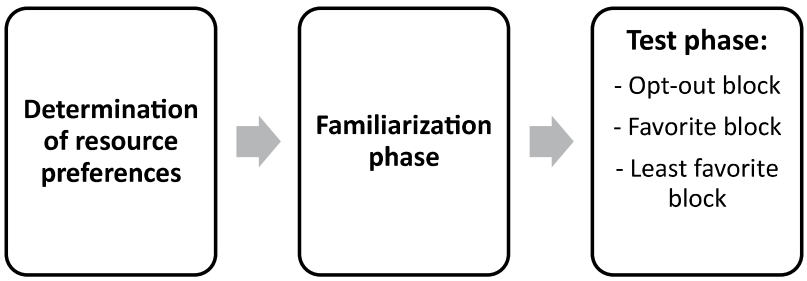

Fig. 1. Overview of the procedure.

The *opt-out block* was the most important block. Here children could choose between an opt-out box and a box by either their friend or their nonfriend. The opt-out block consisted of three friend trials and three nonfriend trials. Because the opt-out block included a safe option (opt-out box), this block could measure children's absolute level of reliance. Thus, the opt-out block had the potential to be the most informative block. If there was enough variance, it could give us information about children's absolute level of reliance on their friends and disliked peers, and by comparing the friend and disliked peer trials it could also inform us on children's relative levels of reliance.

In both the *favorite block* and the *least favorite block*, children's reliance on their friend's sharing and their nonfriend's sharing was compared directly (whose box do children prefer?). Here children could choose between a box from their friend and a box from their nonfriend. The difference between the last two blocks was that in the favorite block both the friend and nonfriend could share equally valuable items, whereas in the least favorite block the items the friend could share were less valuable (pebble stone) than the items the nonfriend could share (favorite item). Both blocks consisted of three identical trials each.

The favorite block measures children's relative reliance and compares how much children rely on their friends and disliked peers directly. We included this block in case there was a ceiling or floor effect in the opt-out block. Under these circumstances, the favorite block would be more informative because it could still provide information that agent children rely on more in a forced-choice scenario (relative level of reliance). In contrast to the opt-out block, it is not possible to infer absolute levels of reliance from the favorite block because children could rely on their friends a lot or only a little bit even if they rely on them more than they rely on their nonfriends.

The least favorite block is most informative in combination with the opt-out block. It measures children's tendency to choose the friend's box based on a general preference to interact with the friend. This block gave us the opportunity to statistically control for children's general preference to interact with the friend in the analysis of the opt-out block. Thus, the combination of the opt-out block and the least favorite block gave us the opportunity to separate children's level of reliance on their friends from their general wish to interact with them.

All children participated in all three test blocks. The opt-out block was always administered first. The order of the favorite block and least favorite block was counterbalanced across participants. In each block, we counterbalanced the order of the presentation of the two boxes and the order of demonstrating the sharing options. In the opt-out block, also the order of the friend and nonfriend trials was counterbalanced. For an overview of the three test blocks, see Fig. 2.

Determination of resource preferences

First, children's preferences regarding the three attractive resources were solicited. Participants were presented with cookies, stickers, and balloons and were asked to rank-order the three types of items according to how much they liked them. The resource type each child liked the least was subsequently used as the opt-out option, and the two resource types the child liked the most were used as the high-value options (most favorite and second most favorite items) throughout the experiment. To keep the child from losing interest in the most favorite item, the second most favorite item was used in the second half of the opt-out block. It is important to note that the opt-out resource still constituted a valuable resource type for children even though it was less valuable than the other resources. As mentioned above, balloons, stickers, and cookies all are generally attractive resources for preschoolers. This is crucial for the current experiment because the opt-out option still needed to be a reasonable choice for children in that it was clearly more preferable than getting nothing. To verify children's resource preferences, each child was asked to choose between an open box containing a most favorite item and an open box containing an opt-out item. If the child chose the most favorite item, the verbal rank-order was confirmed and the experiment continued. If the child chose the opt-out item, the preference determination was repeated to arrive at an unambiguous hierarchy of resources.

Familiarization

During the following familiarization phase, children were introduced to the opt-out paradigm. In four trials, participants learned that they could always choose between two boxes. One box certainly

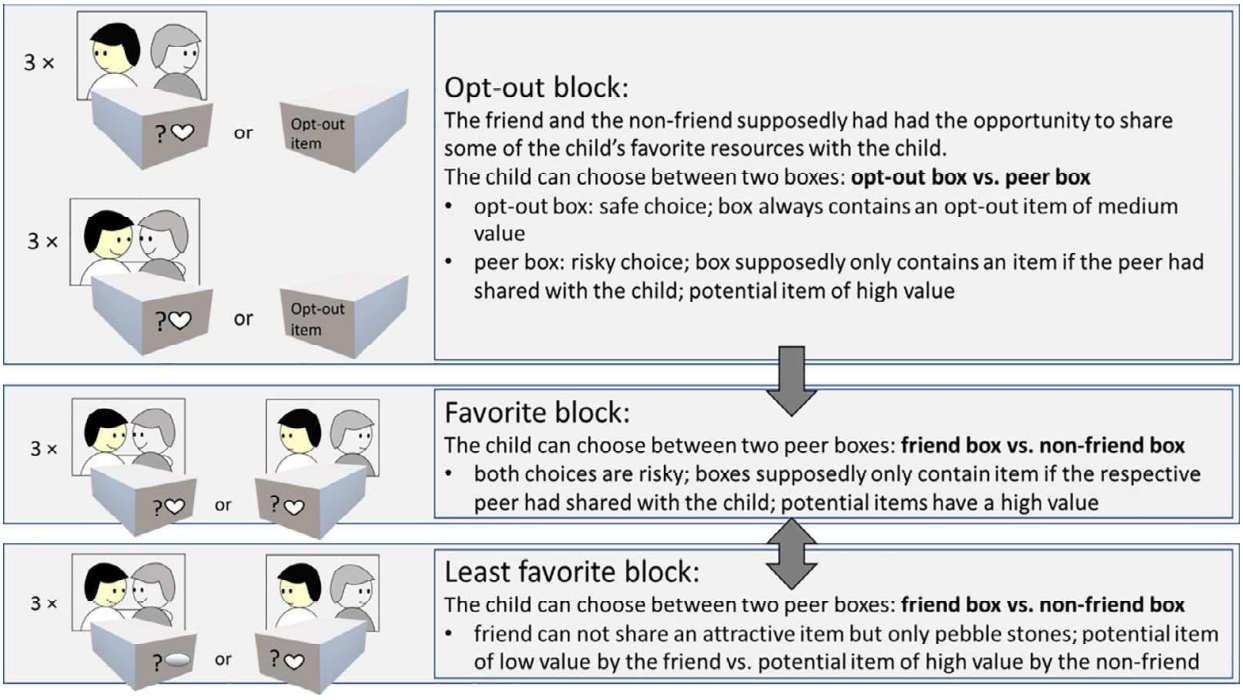

Fig. 2. Overview of the experimental procedure. The child with the neutral expression facing away from the other child depicts the nonfriend. The smiling child who faces the other child depicts the friend. Symbols: ?, risky choice/unclear whether the box contains an item; ♥, attractive/high-value item; opt-out item, medium-value item; , pebble stone/low-value item; , the opt-out block was always administered first; , the order of the favorite and least favorite blocks was counterbalanced.

contained an opt-out resource (*opt-out box*), whereas the content of the other box was determined by the decision of the distributing agent (*peer box*). Max, the hand puppet, was the distributing agent during the familiarization trials. In each of the trials, Max got two of the child's most favorite items from the experimenter and could then make a decision; he could share one item (e.g., a cookie) with the child by putting it into the peer box and keep one for himself, or he could keep both items for himself and leave the peer box empty. In contrast to the test trials, the child saw whether Max put a most favorite item into the peer box during the familiarization phase. The opt-out box was also filled while the child watched. Thus, the child knew that the opt-out box contained an item and whether or not the peer box contained an item. After each trial, the child had the binary choice to select either the opt-out box or the peer box, the latter of which contained a most favorite item or nothing, depending on Max's decision. To familiarize the child with all possible outcomes, Max put a most favorite item into the peer box in two trials (*sharing trials*) and kept all items for himself in the other two trials (*nonsharing trials*). In the first two trials the experimenter left both boxes open, but in the last two trials she closed them before the child decided between the two boxes. This way, the child got used to deciding between two closed boxes. After each trial, the child was asked what Max did and whether he put an item into the peer box to make sure that the child understood whether Max had shared or had not shared. Because we expected children to take the peer box if Max had shared but to take the opt-out box if he had not shared, the familiarization trials also allowed us to check whether children understood the concept of the opt-out paradigm.

Test phase

During the test phase, a friend and a disliked peer of each child assumed the role of the distributing agents (peers). To this end, the experimenter first asked children to name a peer who they liked to play with (in our terminology, a *friend*) and a peer who they did not like to play with (thus, a *nonfriend*). The questions were "Is there a child you particularly enjoy playing with?" and "Is there a child you don't

like to play with?" We asked children to name someone "they like to play with" because early friendships are based on mutual play (Damon, 1977, p. 137). The peers were not labeled as the "friend" and "nonfriend" throughout the experiment but rather were always called by their names. Then each child drew separate pictures of each of the two peers that served as representations of them in the subsequent test trials (e.g., Moore, 2009). After the child identified the picture of the friend and the nonfriend, the first test block (opt-out block) started. If the identification initially failed, it was repeated.

Opt-out block. The child was told that both the friend and nonfriend had participated in the same game as Max. More specifically, the experimenter told the child that the friend and nonfriend also had the opportunity to share some of the child's favorite resources with the child. The experimental setup of the opt-out block was very similar to that of the familiarization trials except that the child's peers now supposedly had distributed the resources. There were six trials: three trials with the friend and three trials with the nonfriend as the distributing peer. The order of the friend trials and nonfriend trials was counterbalanced within the opt-out block. The peer boxes were closed. Thus, the child did not know whether they contained an item. Whereas the experimenter prepared the peer boxes before the experiment started, the opt-out box was filled with the opt-out item during the trial while the child was watching. The opt-out box was then also closed. In each trial, the experimenter put the two closed boxes in front of the child—the peer box next to the respective peer's picture. The child could then choose one of the two boxes, and the chosen box was set aside. So as not to reinforce the child's decision, the experimenter asked the child not to open the boxes after each trial but instead to collect the closed boxes and open all of them at the end of the experiment. For ethical reasons, all boxes contained a resource.

Favorite block. The second test block (favorite block) aimed at directly comparing children's expectations of their friend's and nonfriend's sharing behavior toward them. In three trials, the child could always decide between the box from the friend and the box from the nonfriend. In the favorite block, there was no opt-out option. The child was told that both the friend and nonfriend could have shared one of the most favorite items. Thus, the child had a forced choice between two uncertain outcomes. Equivalent to the opt-out block, the child was told that both the friend and nonfriend had the choice to either keep two most favorite items for themselves or to keep only one item and to share one item with the child by putting it into the peer box. In each trial, the experimenter put the two closed boxes in front of the child—next to the respective pictures of the peers—and the child could then choose one of the two boxes.

Least favorite block. The least favorite block was identical to the favorite block, with the only difference being that the resource the friend could potentially share was less desirable. Whereas the nonfriend could share one of the attractive items, the friend could share only a pebble stone. Thus, there was now a stronger incentive to take the nonfriend's box. If the child chose the friend's box in the least favorite block, this could be interpreted as a general preference to interact with the friend.

After all three test blocks, the child was again asked to identify the friend and nonfriend in the drawings. Children who could not answer correctly were excluded from the analyses (see "Participants" section above).

Coding

In the opt-out block, in deciding between the box coming from their peer (friend or nonfriend) and the opt-out option, children got 1 point for choosing the peer box and 0 points for choosing the opt-out box. Thus, participants could get 0 to 3 points for the three friend trials and 0 to 3 points for the three nonfriend trials. In addition, we formed a difference score (ranging from −3 to +3) by subtracting the points for the nonfriend trials from the points for the friend trials. Positive scores indicate that children chose the friend's box more often than the nonfriend's box. In the favorite and least favorite blocks, children got 1 point for choosing the friend's box and 0 points for choosing the nonfriend's box. Therefore, they could get 0 to 3 points in sum in each block given that both blocks consisted of three trials. Data are available at https://osf.io/yhdbx/?view_only=0f28ec4e6a5f4261b435e9fcc7b79c97

Results

Table 1 shows descriptive statistics for children's choices for the peer boxes in the three blocks separated for the three age groups. The mean scores indicate that older participants chose the peer box from their friend more often than the peer box from their nonfriend in all three blocks.

To address our main hypothesis, we assessed for the opt-out block whether the difference of children's reliance on their friends and nonfriends (i.e., the difference score) increased with age. Reliance was measured as the number of times children picked the peer box instead of the opt-out box. To this end, we conducted a simple linear regression with age in months as the predictor. The model was significant, $F(1, 80) = 3.974$, $p = .0496$, and explained 5% of the variance in difference scores ($R^2 = .05$). Age emerged as a significant predictor with a standardized linear regression coefficient of $\beta_{std} = .218$. That is, preschoolers increasingly chose the peer box in the friend trials compared with the peer box in the nonfriend trials with increasing age, $t(80) = 1.994$, $p = .0496$ (see also Fig. 3).

Notably, the effect of age remained significant after partialling out children's general preferences to interact with their friends (i.e., the score they received in the least favorite block) in a partial correlation analysis, $r(79) = .23$, $p = .039$. To test for differences in children's reliance on friends and nonfriends within each age group, we followed up on the regression analysis with t tests. To correct for multiple testing we applied $\alpha = .017$ (Bonferroni-corrected: $\alpha/3$) for all following t tests that were conducted separately for the three age groups. Whereas 3-year-olds did not differ in their choices between the peer box in the friend trials and the peer box in the nonfriend trials, $t(24) = 0.44$, $p = .66$, $d = 0.09$, 4-year-olds chose the peer box more often in the friend trials than in the nonfriend trials, $t(27) = 2.92$, $p = .007$, $d = 0.55$. Lastly, 5-year-olds also chose the peer box more often in the friend trials than in the nonfriend trials, $t(28) = 3.46$, $p = .002$, $d = 0.64$ (see Fig. 3). Thus, preschoolers' reliance on their friends and nonfriends gets more selective with age, with 4- and 5-year-olds, but not 3-year-olds, relying on their friends more than on their nonfriends.

To analyze whether children generally rely on their friends and nonfriends to share with them, we conducted one-sample t tests against chance level ($M = 1.50$, meaning that participants chose the peer box as often as the opt-out box). Children overall preferred the peer box ($M = 1.98$, $SD = 1.05$), over the opt-out box in the friend trials, $t(81) = 4.09$, $p < .001$, $d = 0.45$, but did not differentiate between the peer box ($M = 1.51$, $SD = 1.05$) and the opt-out box in the nonfriend trials, $t(81) = 0.11$, $p = .916$, $d = 0.01$. The 3-year-olds did not differentiate between the peer box and the opt-out box in either the friend trials, $t(24) = -0.63$, $p = .536$, $d = 0.13$, or the nonfriend trials, $t(24) = -1.04$, $p = .310$, $d = 0.21$ (see Table 1 for means and standard deviations). The 4- and 5-year-olds chose the peer box over the opt-out box in the friend trials [4-year-olds: $t(27) = 6.41$, $p < .001$, $d = 1.21$; 5-year-olds: $t(28) = 3.10$, $p = .004$, $d = 0.58$], but they did not differentiate between the peer box and the opt-out box in the nonfriend trials [4-year-olds: $t(27) = 1.67$, $p = .107$, $d = 0.32$; 5-year-olds: $t(28) = -0.46$, $p = .652$, $d = 0.08$]. This shows that children relied on their friends but not necessarily on their nonfriends, with older preschoolers more clearly showing that they relied on their friends.

In an exploratory analysis of the opt-out block, we also investigated the relationship between age in months and children's reliance on friends and nonfriends separately (see Table 2). Children who

Table 1
Means (and standard deviations) for choices of the friend's and nonfriend's boxes by age group.

	3-year-olds	4-year-olds	5-year-olds
Opt-out block			
Friend's box vs. opt-out box	1.36 (1.11)	2.39 (0.74)	2.10 (1.05)
Nonfriend's box vs. opt-out box	1.28 (1.06)	1.82 (1.02)	1.41 (1.02)
Favorite block			
Friend's box vs. nonfriend's box	1.64 (0.86)	2.07 (0.90)	2.03 (0.91)
Least favorite block			
Friend's box vs. nonfriend's box	1.70 (0.82)	1.78 (1.12)	1.97 (0.68)

Note. Values apply to the choice of the box printed in bold type. Each box could be picked a maximum of three times (range = 0–3).

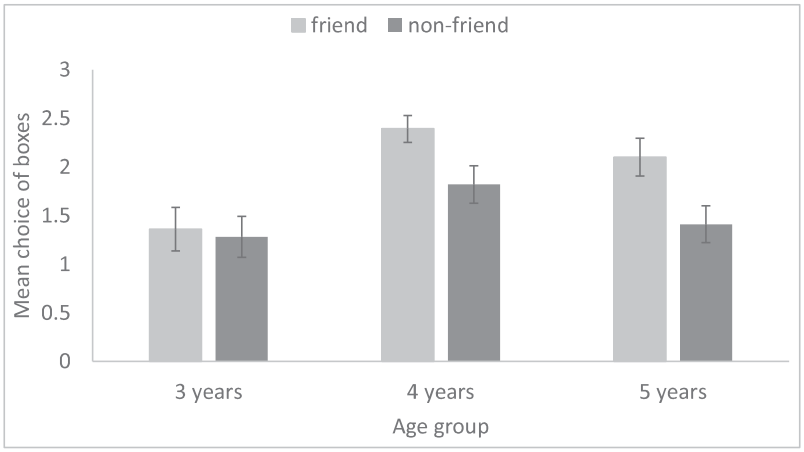

Fig. 3. Mean choices of boxes in the opt-out block by age group and distributing peer (friend or nonfriend). The *p* values are reported in the text. Error bars represent standard error of the mean.

showed a lot of reliance on their friends also showed a lot of reliance on their nonfriends. That is, there were children with a generally stronger or weaker tendency to rely on others irrespective of the relationship with those others. Only children's reliance on their friends, but not their reliance on their nonfriends, correlated with age.

Note that in the favorite and least favorite blocks, children could directly choose between the friend's box and the nonfriend's box (three times in each trial). That is, the choices for the friend's box and nonfriend's box are dependent. Therefore, we report only the means for the choices of the friend's box.

Turning to the favorite block, a one-sample *t* test against chance level (M = 1.50, meaning that participants choose the peer box from the friend as often as the peer box from the nonfriend) revealed that children overall preferred the peer box from the friend (M = 1.92, SD = 0.90) over the peer box from the nonfriend, $t(81) = 4.30$, $p < .001$, $d = 0.47$. To check whether this preference for the peer box from the friend showed an age-related increase, we specified a linear regression model with age in months as the predictor of the number of peer boxes from the friend that children chose. However, age, $\beta_{std} = .138$, $t(80) = 1.247$, $p = .216$, and therefore the model itself, $F(1, 80) = 1.556$, $p = .216$, turned out to be nonsignificant. To further test whether all age groups preferred the peer box from the friend, we conducted Bonferroni-corrected *t* tests ($\alpha = .017$) against chance level (M = 1.50). The 3-year-olds did not significantly differ from chance (M = 1.64, SD = 0.86), $t(24) = 0.81$, $p = .42$, $d = 0.16$, but the 4-year-olds (M = 2.07, SD = 0.90), $t(27) = 3.36$, $p = .002$, $d = 0.64$, and 5-year-olds (M = 2.03, SD = 0.91), $t(28) = 3.18$, $p = .004$, $d = 0.59$, preferred the peer box from the friend over the peer box from the nonfriend. Thus, the effect of age was not evident as a general trend in the regression analysis, but only at the age group level. That is, when forced to choose who to rely on, preschool children rely on their friends more than on their nonfriends, and this seems to be especially true for older preschool children.

In the least favorite block, children also preferred the peer box from the friend over the peer box from the nonfriend (M = 1.82, SD = 0.89), $t(78) = 3.23$, $p = .002$, $d = 0.36$. As in the favorite block,

Table 2
Pearson correlations among age in months, children's reliance on friends, and children's reliance on nonfriends.

	M	*SD*	1	2
1. Age in months	54.40	9.38		
2. Reliance_F	1.98	1.05	.283*	
3. Reliance_NF	1.51	1.05	.071	.516*

Note. Reliance_F, number of times (out of 3) the friend's box was chosen over the opt-out box; Reliance_NF, number of times (out of 3) the nonfriend's box was chosen over the opt-out box.
*$p < .01$ (two-tailed).

age was not a significant predictor of the number of peer boxes from the friend that children chose, β_{std} = .062, $t(77)$ = 0.554, p = .581, when included in a linear regression model, $F(1, 77)$ = 0.307, p = .581. On the age group level, Bonferroni-corrected t tests (α = .017) showed that 3-year-olds (M = 1.70, SD = 0.82), $t(22)$ = 1.14, p = .27, d = 0.24, and 4-year-olds (M = 1.78, SD = 1.12), $t(26)$ = 1.29, p = .21, d = 0.25, did not differentiate between the peer box from the friend and the peer box from the nonfriend, but 5-year-olds did (M = 1.97, SD = 0.68), $t(28)$ = 3.68, p < .001, d = 0.68.

Discussion

In the current study, we investigated whether and to what extent preschoolers rely on their friends to share with them. We were also interested in whether this relationship-dependent reliance undergoes developmental changes during the preschool period. To this end, we adapted the metacognitive opt-out paradigm to measure children's levels of (un)certainty regarding their peers' prosociality toward them. Children could choose between a box coming from a peer (a friend or nonfriend) and an opt-out box. The box coming from the peer supposedly contained either a very attractive item if the peer had shared or nothing if the peer had not shared. The opt-out box was provided by the experimenter and certainly contained a slightly less attractive item. By also letting children directly choose between a box from their friend and a box from their nonfriend in the second part of the experiment, we could also assess which peer children preferred more in a direct comparison. Our results reveal a developmental effect, with older preschool children relying on their friends to share with them and relying more on their friends than on their nonfriends. Thus, our study demonstrates that preschoolers' differential reliance on their friends' sharing compared with their nonfriends' sharing emerges during the preschool years. An exploratory analysis also revealed that children's reliance on their friends, but not on their nonfriends, correlated with age, indicating that the increasing differentiation in children's reliance is mainly driven by children's increasing reliance on their friends and not by their increasing uncertainty about their nonfriends' sharing.

Overall, the current study adds to a recently growing field of research that demonstrates young children's understanding of friendship. These studies have shown that preschool children recognize central characteristics of friendship such as loyalty and selective sharing of resources and secrets (e.g., Afshordi, 2019; Liberman & Shaw, 2017, 2019; Paulus & Moore, 2014). Our study adds to this line of research the finding that young children's appreciation of friendship is also evident in first-party situations where children's own interest is at stake.

Importantly, the reliance displayed in our study is person specific. That is, older preschoolers (4- and 5-year-olds) in our study relied on their friends more than on their nonfriends. In the opt-out block, they chose the peer box more often if the peer was their friend than if the peer was their nonfriend. Moreover, only the reliance on the friend, but not on the nonfriend, exceeded chance level. This pattern pertained not only to the opt-out block but also to the favorite block, where children needed to directly decide between the friend's box and the nonfriend's box. The reliance on the friend, therefore, is not merely a display of a general tendency to rely on people but also an expression of person-specific reliance. This supports the importance of interpersonal relationships in prosocial contexts (e.g., Fehr et al., 2008; Miller, Bersoff, & Harwood, 1990; Moore, 2009) and extends previous studies by showing that children not only act more prosocially toward people they are close to (e.g., Engelmann et al., 2019; Paulus, 2016; Vonk et al., 2020) but also rely on them to act more prosocially toward them. The current study shows that especially older preschool children are willing to take a risk based on their expectation that their friend is more likely to share with them. Thus, their expectation regarding their friend's sharing seems to go beyond simple predictions. The current study complements recent work from a third-party task indicating that preschool children appreciate that friendship comes with normative obligations toward each other (Paulus, Christner, & Wörle, 2020). It extends previous work by demonstrating how this knowledge guides children's own behavior. We leave it to future studies to further explore the normative nature of children's sharing expectations in first-party scenarios.

Our study shows that preschoolers' selective reliance on their friends undergoes developmental changes. More specifically, 4- and 5-year-olds, but not 3-year-olds, relied on their friends more than

on their nonfriends to share with them. The developmental change was particularly apparent in the opt-out block, whereas only a weaker age trend was observable in the favorite and least favorite blocks. Regarding the developmental changes, our results extend previous work on preschoolers' sharing expectations. By 4 years of age, preschoolers have been shown to expect other agents to share more with friends than with nonfriends (Liberman & Shaw, 2017; Olson & Spelke, 2008; Paulus & Moore, 2014). By adapting the opt-out paradigm, we were able to demonstrate that the quality of relationships begins to influence children's sharing expectations on a behavioral level. Our findings add to theoretical conceptions on the developmental emergence of selectivity in prosocial behavior (e.g., Kuhlmeier et al., 2014) the fact that also young children's reliance on other's prosociality becomes selective during early childhood.

Notably, our results also extend research on selective reliance in other domains to the interpersonal domain of prosocial interactions. Metacognition research shows that children selectively rely on more familiar informants, such as their kindergarten teachers and mothers (Corriveau & Harris, 2009; Corriveau et al., 2009), and rely on accurate informants more than on inaccurate informants (Clément, Koenig, & Harris, 2004; Lane & Harris, 2014). There is some research indicating that children's reliance on the interpersonal domain also gets more selective during the preschool years. Older preschool children invest in reliable reciprocators more than in agents who do not reciprocate (Rosati, Benjamin, Pieloch, & Warneken, 2019) and report higher levels of trust in their friends' secret and promise keeping than in their nonfriends' secret and promise keeping. Being the first study to investigate recipient-dependent reliance in others' sharing, our study adds to the notion that young children rely on others in a variety of domains beyond epistemic contexts. Children's differential reliance on other social agents seems to emerge during the preschool years across distinct domains such as acquiring knowledge and interpersonal relationships. Interestingly, the factors that influence children's reliance are similar across different domains. Preschoolers seem to selectively rely on others based on the quality of the relationship and on how reliable an agent was in the past in a specific context. That is, older preschoolers selectively rely on accurate informants when acquiring knowledge and on prosocial agents in sharing contexts. Thus, based on similar developmental timelines in the prosocial domain and learning domain, it would be interesting to investigate whether similar psychological mechanisms underlie reliance in multiple contexts. A possible connection between the prosocial domain and the learning domain, for example, is supported by theoretical accounts proposing that sharing information and experiences with others is deeply rooted in human nature (e.g., Moore, 2006). That is, collaboration and interaction with others could foster both prosocial behavior and information sharing (Vaish & Tomasello, 2014).

Findings from this study indicate that 4- and 5-year-olds, but not 3-year-olds, differentiate in their reliance on friends and on nonfriends to share with them. There are several factors that could account for the developing differentiation in preschoolers' reliance. First, from a social-interactionist perspective (e.g., Carpendale et al., 2013), one could assume that preschoolers' sharing experiences become more frequent and more differentiated with age. As preschoolers grow older, they might cumulatively witness more sharing incidents and also increasingly experience that sharing is recipient dependent (e.g., Moore, 2009). Thus, they might gradually experience their friends as more reliable interaction partners than other peers in sharing situations. Second, the emergence of differential reliance toward friends and nonfriends might be connected to preschoolers' developing theory-of-mind understanding. Children's theory-of-mind abilities (e.g., attributing desires, intentions, and beliefs to others) change significantly over the preschool years (Wellman & Liu, 2004). Past work has pointed to the importance of theory-of-mind competencies, especially the understanding that people might hold different beliefs regarding the same thing, for preschoolers' sharing behavior (Wu & Su, 2014; Yu et al., 2016). That is, preschoolers might increasingly attribute intentions to share with them to their friends and no intentions to share with them to their nonfriends. Third, past work has revealed that preschoolers prefer interactions with their friends over interactions with their nonfriends (e.g., Charlesworth & La Freniere, 1983; Doyle, 1982; Howes, Droege, & Matheson, 1994). Although preschoolers did not directly interact with their peers in the current study, one might argue that our findings could be related to a preference for friends over nonfriends (Jaswal & Kondrad, 2016; Rowles & Mills, 2018). However, the preference for the friend's box increased with age and only emerged at around 4 years. In contrast, mere preferences to interact with specific people arise early

in development and should not be strongly affected by age. Moreover, the results from the partial correlation analysis render it unlikely that mere social interaction preference can account for the observed effects in the opt-out block. It is not unlikely, however, that all three factors could play a role in young children's emerging reliance on their friends. We leave it to future research to explore these possibilities in greater detail.

On a broader scale, recipient-dependent sharing expectations might support children in navigating the social world by helping them to make strategic and efficient decisions (for reviews, see Banaji & Gelman, 2013). The more accurate preschoolers' sharing expectations are, the more strategically and adequately preschoolers might be able to choose who does and who does not constitute a reliable interaction partner (Willer, Feinberg, Irwin, Schultz, & Simpson, 2010). In a sharing context, as in the current study, this can help children to gain valuable resources. In other prosocial contexts it could help children to get the instrumental and social-emotional support they need. Moreover, relying on a friend could lead to more cooperation and further strengthen the reciprocal relationship. In this way, relying on others could also further benefit children's social relationships with their peers (Gifford-Smith & Brownell, 2003).

Limitations and conclusion

The current study demonstrates that preschoolers rely on their friends more than on their nonfriends to share with them. However, our study also has some limitations and leads to open questions. First, whereas we assessed children's responses in an experimental setting, it would be interesting to see how children rely on their peers in naturalistic contexts. The effects of this study might, for example, become more pronounced when children interact with their peers face to face. Second, this study focused on children's sharing, but would children also rely on their friends to help or comfort them (for a recent finding, see Engelmann et al., 2019) and how would that change with age? Third, the correlational analyses also revealed individual differences in children's tendency to rely on others irrespective of the relationship with those others. That is, children who strongly relied on their friends also showed more reliance on their nonfriends. It would be an important task to explore in greater detail the nature of individual differences in children's inclination to rely on others. Fourth, it would be worthwhile for future studies to explore children's preference to interact with familiar others more thoroughly. Including a nonsocial condition in a similar experiment, for example, could contribute to differentiating children's sharing expectations and their wish to interact with others further. Lastly, contrasting children's reliance on friends with their reliance on other agents besides disliked peers could also shed light on what aspects of children's friendships warrant the stronger reliance on friends. Comparing the reliance on friends with the reliance on unknown neutral peers and known neutral peers, for example, could explore the aspect of familiarity.

In sum, the current study is the first to reveal that preschool children begin to rely on their friends more than on their nonfriends in sharing situations and, therefore, supports the importance of interpersonal relationships in prosocial contexts. Close social relationships, even those with nonrelatives, seem to foster a cycle of prosociality, reliance, and reciprocity (Laursen & Hartup, 2002). The development of selective reliance in prosocial contexts is an important step in the development of children. By guiding children in their choice of (cooperative) interaction partners, selective reliance could help children to navigate their social world and benefit their social relationships.

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