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„Friendship and Prosocial Interactions in Preschool Children"

verfasst von / submitted by

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Abstract

Humans are social animals that start forming close relationships with peers early in life. Similarity, spatial proximity, and prosocial interactions are key aspects of friendship at preschool age, which is believed to be key to the development of social understanding as well as the acquisition of important social skills.

With this master's thesis and the underlying study, I investigated spatial proximity as well as similarity in gender and age between friends. I studied the effect of friendship on two types of prosocial interactions (sharing and helping) in a naturalistic setting with familiar peers. I tested 109 participants, aged three to seven, in naturalistic peer groups of six to 13 children. In line with previous research and my hypotheses, I detected higher levels of spatial proximity between befriended peers. I confirmed that friends are more similar in age and that same-gender friendships were more frequent than mixed-gender friendships. Friendship proved to be a significant positive predictor for prosocial behaviors sharing and helping. Children were more likely to exhibit these behaviors towards a peer they had nominated as a friend, than towards other members of their peer group. This finding goes in line with previous research and confirms my hypotheses regarding the link between friendship and prosociality.

Findings of this study make a valuable contribution to the body of existing research on social cognition at preschool age. They further stress the importance of friendship even in early life stages and give incentives to investigate children's concepts, expectations, and behaviors regarding friendship and prosociality in more detail.

Contents

1 Theoretical background

1.1 The importance of friendship

Humans are social animals. Social relationships and interactions with conspecifics play a major role throughout a person's lifespan. Humans start forming close relationships with peers early in life. Peer preferences can be found in toddlers already; by the age of four, around 75% of children maintain mutual friendships (Rubin et al., 2009). Research focusing on social cognition in young humans, specifically on friendship, has its origins in the 1940s, with real interest in the topic starting around 1970 (Afshordi & Liberman, 2021). Friendships are believed to be key to the development of social understanding as well as the acquisition of important social skills, which are needed to navigate one's way through society (Hartup & Abecassis, 2002; Walden et al., 1999). Studies show that the number and quality of peer relationships is closely linked to different types of social behavior in children: Preschoolers with at least one mutual friendship were rated as better liked by peers and more socially competent by their teachers (Lindsey, 2002). In addition, children that had friends were found to be more prosocial (Howes et al., 1988; Sebanc, 1999, 2003).

The intense and frequent social interaction that goes along with mutual friendship (Newcomb & Bagwell, 1995) provides regular opportunities for learning adequate social behaviors, and experiencing their beneficial effects. For example, the negotiation (Green & Rechis, 2006) and cooperative (Hartup et al., 1988) skills acquired during conflict resolution enable children to gain better access to limited resources.

Considering the importance of friendship, especially in early life stages, research on this topic may provide valuable knowledge for understanding children's social cognition. Insights on how friendship can affect infant's maturation and behaviors can help institutions such as preschools to create environments that benefit a healthy social development.

1.2 Key features of preschool friendship

Classic literature on social cognition in young humans assumes that preschoolers see friends as individuals that play together (e.g. Bigelow, 1977; Furman & Bierman, 1983; Howes, 1983). Some studies ask children simple yes-or-no questions or use short scale sociometric measures to assess friendship; some aim to assess children's concepts of friendship by asking them to infer relationships between two persons in a story or a picture (Afshordi & Liberman, 2021). Research has thereby identified three key aspects of early life friendships: Similarity, spatial proximity, and prosocial interactions.

1.2.1 Similarity and spatial proximity

Preschool friendships are characterized by similarity in several domains. Some studies have identified similar preferences, character traits or interests as relevant factors within friendships (for a review, see Afshordi & Liberman, 2021). Eivers and colleagues (2012) observed similar levels of prosociality in both parts of a friend dyad over a one-year period. Children of same gender or similar age interact more often (Fabes et al., 2003) and are more likely to be friends (Maccoby & Nagy Jacklin, 1987; Martin et al., 2013). Between gender and age, similarity in gender seems to be a better predictor for friendship (Wang et al., 2019).

Spatial proximity facilitates formation and sustaining of friendship. Wang and colleagues (2019) found that children that were regularly seated next to each other by their preschool teachers across one year were more likely to become and stay friends. Several behavioral observation studies showed that friends spend more time in joint activities and spatial proximity than non-friends (Altman et al., 2020; Howes, 1983; Newcomb & Bagwell, 1995; Werebe & Baudonniere, 1988). When asked to rate friend and non-friend pairs from their group, kindergarten teachers gave friends higher scores in items measuring spatial proximity (e.g., "Always sit together at snack"; Sebanc, 2003).

As both, similarity in age and gender as well as spatial proximity are more frequent and pronounced between preschool friends than between non-friend peers, they provide reliable cues in identifying early life friendship.

1.2.2 Prosocial interactions: sharing and helping

Grusec and colleagues (2002) define prosocial behavior "as any voluntary, intentional action that produces a positive or beneficial outcome for the recipient regardless of whether

that action is costly to the donor, neutral in its impact, or beneficial" (p. 458). Sharing and helping are generally accepted as prosocial actions that start occurring early and frequently in life, and have thus been the object of many developmental research papers (see Eisenberg et al., 2006; or Grusec et al., 2002). In this context, sharing can be defined as willingly giving some of or even the whole resource to a conspecific. To help can be defined as a voluntary act that allows another individual to reach a goal or to avoid harm.

How and why children decide to share or help may be influenced by various factors, such as social hierarchies (Pellegrini, 2008), potential for reciprocity (Cortes Barragan & Dweck, 2014; Persson, 2005), gender (Berndt, 1981; Longobardi et al., 2019), age (Eisenberg et al., 2006a; Fabes & Eisenberg, 1998; Jambon et al., 2019), or expressed need of the potential recipient (Tavassoli et al., 2023). Whether a child is willing to suffer some cost in an altruistic action towards a peer is often decided by the relationship between agent and recipient. When asked, many children from four to seven years of age deem support to be essential within a friendship (Furman & Bierman, 1983), implying that prosocial behaviors are consciously directed towards befriended peers. Reciprocity in helping and sharing has been found to play an important role within friendship (Rubin et al., 2006). Some approaches have stressed the emotional involvement that comes with friendship, suggesting that friends help each other because they care about each other (Dunn et al., 2000; Lindsey, 2002). Many studies have confirmed that friends are more likely to support, cooperate and comfort each other (for a review, see Newcomb & Bagwell, 1995). Children are more likely to share resources with or provide help to a peer that they see as friend than towards a non-friend. In a setting, where three and five year-olds were asked to share stickers with a friend, a child who would join the kindergarten group the next day or a stranger, participants of both age groups gave more stickers to befriended peers than to any other category (Lenz & Paulus, 2021). For both, sharing and helping, Sebanc (2003) showed that friendship nominations made by children were positively correlated with behavioral ratings made by teachers (i.e., teachers rated sharing and helping as more pronounced between peers that had nominated each other as friends). In a setting where two friends and a third, neutral child were observed while having access to sets of two matching objects, children offered objects to their friend more often than to the third participant (Werebe & Baudonniere, 1988). Engelmann and colleagues (2019) found that children showed partiality towards their friends when helping in a forced choice task as well as a novel paradigm, where motivation to help was measured by the amount of help that was given to a friend or neutral peer. In a study by Berndt (1981), kindergarteners and

fourth-graders stated that they would share with and help a friend more than a non-friend. This finding highlights the importance of prosociality within friendships, perceived by children themselves.

Situations, in which humans rely on sharing and helping from conspecifics occur frequently throughout a person's lifespan. Investigating the effect of friendship on these behaviors in early life stages may help in understanding their origins and further highlight the importance of the link between friendship and prosociality.

1.3 Friendship and prosocial interactions in preschool classrooms

Preschool is a particularly interesting environment for studying friendship and prosocial interactions for two main reasons: First, for many children, preschool is the first opportunity to socialize with a broad range of different same-age peers (Howes, 1983; Martin et al., 2005). While for the first few months to years after birth, humans mostly interact with adults or older siblings, interactions within peer groups, defined as a group of individuals of roughly the same age, social status, and social environment (Little, 2020), gain importance throughout childhood (Rubin et al., 2006). Second, in the preschool period, children start to move from playing alone or alongside another person towards interactive play with others (Howes et al., 1988; Rubin et al., 2006). This general transition to peer-oriented behavior in preschoolers allows individuals to develop social strategies and form affiliative relations, such as friendships. Fabes and colleagues (2009) even consider preschool to be "a sensitive period, that may set the stage for developing the fundamental behaviors, attitudes, and preferences underlying peer interactions and relationships" (p. 47). Preschool classrooms are naturally existing examples of early life peer groups, in which life's first friendships are formed. They therefore provide an excellent setting for the study of friendship and its effect on prosocial peer interactions.

1.4 Research gap

Research on prosocial interactions within friendships has largely been conducted by employing interview methods to assess children's friendship concepts (Liberman & Shaw, 2017), by running experiments in laboratory-like settings with dyads or triads (Berndt, 1981; Charlesworth & La Frenière, 1983; Engelmann et al., 2019; Werebe & Baudonniere, 1988), or as observational studies that do not allow assumptions about causality (Hartup et al., 1988). Still, up to this day, few studies have investigated how friendship affects

prosocial behavior in preschool group interactions, which provide a naturalistic experimental setting. Most of these publications focus on one type of prosocial behavior as their behavioral variable. The study of effects of friendship on different forms of prosocial behavior may provide relevant insight into how and why children decide with whom to share and whom to help. The use of two behavioral measures, in addition to increasing construct validity, may help in understanding, how different aspects of prosociality are interrelated. With my master's thesis, I am aiming to fill this gap in existing literature by examining the effect of friendship on the prosocial behaviors sharing and helping in a naturalistic group setting with familiar peers.

1.5 Research questions, hypotheses, and predictions

Based on the literature cited, I formulated two research questions for my master thesis regarding the characteristics of preschoolers' friendships and the effect of friendship on preschoolers' prosocial behavior (see below). To answer my questions, I determined friendship status by asking children whether they liked to play with peers from their group. I collected additional information on friendship from teacher's questionnaires. Sharing behavior was observed during a task, where children got a limited amount of time to play with a single toy (i.e., a limited resource paradigm); helping behavior was observed during a "freeze-unfreeze" game where children needed to help their peers so these could continue playing.

1.5.1 Research question one: characteristics of preschool friendship

My first research question is: *Is friendship among preschoolers characterized by higher levels of similarity (i.e., same gender and similar age) and spatial proximity (i.e., voluntarily sitting next to each other during experimental sessions)?* My hypothesis (H.1) is that friends will show higher levels of similarity as well as spatial proximity. My predictions are that (1) children are more likely to nominate same-gender peers as their friends; (2) the age difference between a child and peers that they consider as friends is significantly smaller than the age difference between a child and peers that are not considered as friends; and (3) children are more likely to sit next to a peer that they consider to be a friend than next to a peer they do not consider to be a friend.

1.5.2 Research question two: effects of friendship on prosocial behaviors

My second research question reads: *Do preschoolers behave more prosocial towards their friends than towards familiar peers that they do not consider as friends?* My hypothesis (H.2) is that friends show higher degrees of prosociality. I predict that (1) children are more likely to share a limited resource with a peer that they consider to be a friend than with a peer they do not consider to be a friend and that (2) children are more likely to help a peer that they consider to be a friend than with a peer they do not consider to be a friend.

2 Method

The present study is part of a larger project designed to test the connection between prosociality and competitiveness in preschoolers. Part of the data analyzed for this master thesis has been collected within the frame of a previous master thesis, which focused on the link between social status, dominance, and prosociality (Wimmer, 2023). Data collection was carried out by me and a team of graduate students. Since the study is part of a larger project, it contains some elements that are not relevant for my thesis. To provide a comprehensive overview, I will briefly include these elements in the description of the methods but exclude them from statistical analysis.

2.1 Study design

The study consisted of a friendship assessment conducted as age-appropriate child interviews. Friendship assessments were followed by 3 sessions of naturalistic, game-like experiments designed to elicit social dominance and prosocial behaviors (cf., Wimmer, 2023). For each group, we conducted child interviews before the first set of experimental games, using sociometric measures to acquire information on relationships within tested preschool peer groups. In addition to data acquired from children directly, we asked teachers to fill out questionnaires. These included a sociometric item (i.e., naming a maximum of 5 best friends per child) as well as 4 items on prosociality and social dominance, each. Between each of the 3 experimental sessions, there was a break of at least 4 days (*max* = 14 days; *Mdn* = 7 days). Data collection took place between June 2022 and May 2023.

2.2 Participants

We recruited participants from 5 different preschools in Vienna and tested them at their respective sites, together with peers from their respective group. To assure understanding of all experimental procedures, children had to speak German and be at least 3 years old to participate. Written informed consent was collected of parents as well as kindergarten teachers (see appendix for the information letter and consent form). We obtained verbal consent from participants before each task.

In total, 109 children (54 females, 55 males; see table 1) and their parents as well as 22 teachers agreed to participate in the study. A t-test showed that females were significantly older than males (t (2158.9) = 6.19, $p < 0.001$, $d = 0.29$), although the difference was only 3 months (females: $M \pm SD$ = 62 ± 11.17, *min* = 39, *max* = 79; males: $M \pm SD$ = 58.96 ± 11.66, *min* = 38, *max* = 80; numbers indicate age in months).

We tested all groups individually; groups consisted of 6 to 13 children (*Mdn* = 11) that attended the same preschool classroom with 3 exceptions: due to the low number of written consent forms for classrooms C.1, C.2, I.1, I.2, J.1 and J.2, suitable groups (i.e., groups where children were likely to know one another) were combined. They were tested as C (i.e., C.1 and C.2), I (i.e., I.1 and I.2) and J (i.e., J.1 and J.2). An overview of the different groups regarding size, gender and age distribution is provided in table 1.

Table 1. *Group size, gender, and mean age per group. Brackets contain standard deviation, minimum and maximum.*

Group	Size	Gender		Age	
		Female	Male	Months	Years
A	11	5	6	60.09 (± 18.52; 39, 76)	5.01 (± 1.54; 3.25, 6.33)
B	12	7	5	60.17 (± 19.25; 43, 76)	5.01 (± 1.6; 3.58, 6.33)
D	11	8	3	63.18 (± 19.33; 51, 79)	5.27 (± 1.61; 4.25, 6.58)
E	12	8	4	56.75 (± 18.24; 39, 74)	4.73 (± 1.52; 3.25, 6.17)
F	13	3	10	56.08 (± 18.76; 38, 76)	4.67 (± 1.56; 3.17, 6.33)
G	8	3	5	66.88 (± 17.67; 56, 78)	5.57 (± 1.47; 4.67, 6.5)
H	6	4	2	57.00 (± 13.31; 46, 74)	4.75 (± 1.11; 3.83, 6.17)
I	8	5	3	61.75 (± 16.51; 42, 77)	5.15 (± 1.38; 3.5, 6.42)
J	11	3	8	60.18 (± 18.63; 39, 80)	5.02 (± 1.55; 3.25, 6.67)
K	11	7	4	68.55 (± 20.82; 60, 79)	5.71 (± 1.73; 5, 6.58)
L	6	1	5	55.83 (± 13.07; 38, 75)	4.65 (± 1.09; 3.17, 6.25)
Total		**54**	**55**	**62.00 (± 11.17; 39, 79)**	**58.96 (± 11.66, 38, 80)**

2.3 Experimental procedure

Full scripts of friendship assessment and games as well as recording sheets (cf., Wimmer, 2023) are provided in the appendix.

2.3.1 Friendship assessment

To assess friendship in this study, children took part in a simple sociometric test. Three colored faces, that were placed in separate spaces on a white cardboard (figure 1) symbolized the 3 possible answers (green smiling face = "I like to play with this child", red frowning face = "I do not like to play with this child", yellow neutral face = "I do not know/care, whether I like to play with this child").

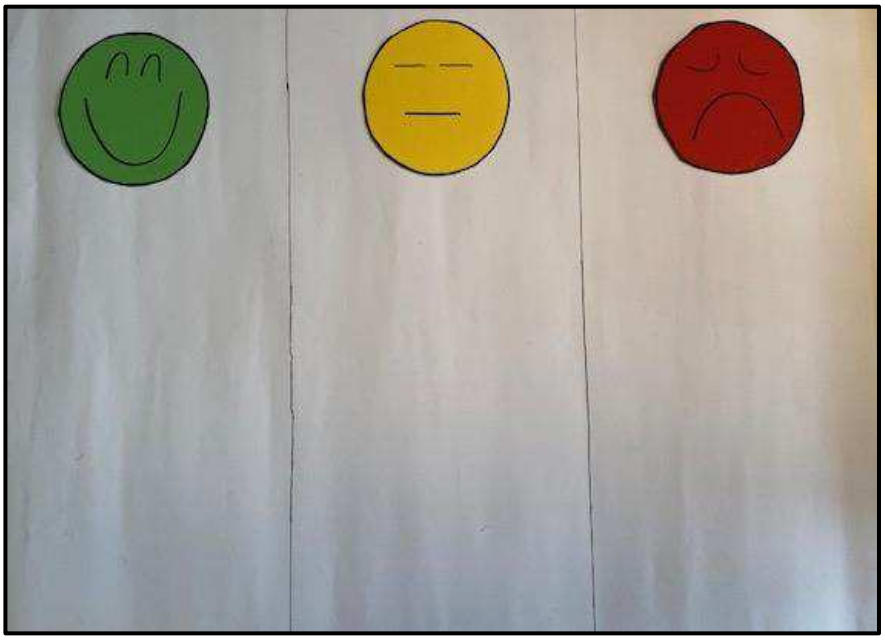


Figure 1. Setup for the friendship assessment, that was used in both rounds.

The assessment was done in two rounds. For the first round, we showed the participant pictures of other members of their group, one picture at a time. For each picture, we asked participants to first name the person on the picture to ensure that they knew them. Then, we asked the participant to indicate whether s/he likes to play with this child. The word "friend" was omitted on purpose, to avoid socially desired answers. Each photo was briefly allocated to one colored face, then put away. We repeated this procedure for every peer in the group. For the second part, photos were shuffled and handed to the participant. We then instructed the child to allocate all pictures to the colored faces, until every photo had been matched

with a face. Friendship assessments were conducted for each child individually in a quiet room at their preschool.

2.3.2 Teacher ratings

As an additional measure for friendship in this study, we asked teachers to name a maximum of 5 best friends from within the sample for each participant. As part of the larger project, the questionnaire also contained eight items to assess social group behavior (4 items for social dominance, taken from Pellegrini et al., 2011; 4 items for prosocial behavior, taken from Ladd & Profilet, 1996). I did not analyze these questions for my thesis project.

Per kindergarten classroom, a questionnaire was filled out by at least 2 teachers that knew participants well, with 2 exceptions: For groups C.1 and E, we could only acquire a single consent form from teachers, so that only a single questionnaire was filled out for these groups. Except for groups C.1 and E, I determined inter-rater reliability for the friend nomination item between raters per group. Cohen's κ ranged from .12 to 1 ($M \pm SD = .55 \pm .30$), indicating poor to perfect agreement. Agreement between teachers and children, also determined using Cohen's κ, was overall poor, with scores ranging from - .63 to 1 ($M \pm SD = .34 \pm .34$). Overviews of all Cohen's κ can be found in the appendix. Due to this lack of substantial agreement between pairs of teachers as well as between teachers and children, teacher ratings were excluded from further analysis.

2.3.3 Experimental games

Each experimental session consisted of 3 games, lasting roughly 30 minutes in total, and was videotaped for later analysis. Three sessions were conducted on 3 different days, so that each game was played 3 times. The games were always played in the same order, with only small changes within certain games.

Before the start of each experimental session, we prepared a circle with seating cushions, which matched the number of participants plus a cushion for the experimenter. Apart from the experimenter's seat, children were allowed to pick any cushion to sit on, meaning they could choose seating neighbors freely.

The first game was designed as a contest competition, meaning that there was a single resource that can only be held by 1 person at a time. For game 1, an interesting toy was placed in the middle of the seating circle. Children then got a limited amount of time

(3 minutes for < 10 participants, 5 minutes for 10 or more participants) to play with this toy. They were told that the experimenter would not interfere, so that they themselves could decide who plays when. A different toy was used in each experimental session (figure 2).

Figure 2. Three different toys used for game 1. From left to right: kaleidoscope, hoop game, mini-TV. When looking into the kaleidoscope, children saw reflections of their surroundings. For the ring game, children could press the blue button on the bottom to collect little hoops on poles inside the toy. For the mini-TV, children could look through a window on the toy to see a picture; the picture changed when a button was pressed. Each week, we used a novel toy in random order.

The second game consisted of a scramble competition, similar to Pellegrini and colleagues' (2007) ticket paradigm. We instructed children to form a line to choose from an assortment of stickers of varying desirability, which they collected in a sticker pass. I did not analyze this game's data for my thesis.

For game 3, we instructed participants to move freely within a designated area while balancing a plush squid on their head. Squids were available in two different sizes, with the bigger size being easier to balance; each size was available in different colors (figure 3). If their squid fell to the ground, children were "frozen" (i.e., they were not allowed to move) until another child placed the fallen plush toy back on their head. This procedure was demonstrated by two experimenters without using the word help, to avoid socially desired behavior. Children played game 3 for the duration of two songs, amounting to a total playing time of 5 minutes. The order of the songs played varied between sessions.

After the last experimental session, we thanked children for participating. They were allowed to pick 2 additional stickers for their sticker pass, which was then handed out to them to take home.

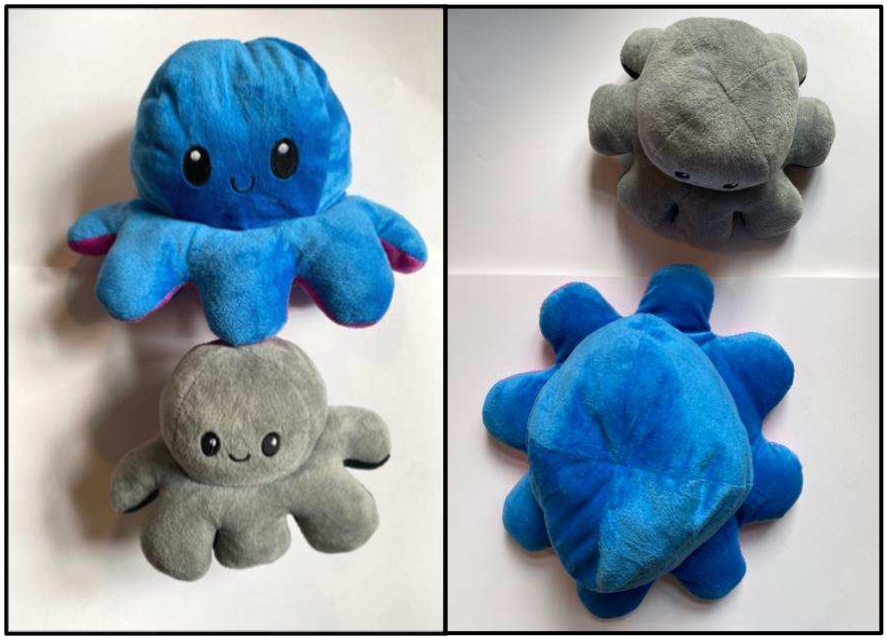


Figure 3. Squid plush toys used for game 3.

2.4 Data coding and data treatment

2.4.1 Sample characteristics

Due to absences, not all 109 children took part in all sessions and/or the friendship assessment. One child did not participate in any part of the study, 6 children did the friendship assessment but none of the games, and 2 children did not do the sociometric tests but participated in at least 1 games session. The numbers of participants are reflected in the different *n* values for friendship assessment and individual experimental sessions (n_{FA} = 106, n_{games} = 102, n_{Sess1} = 90, n_{Sess2} = 83, n_{Sess3} = 82). Participation per group for different parts of the study is summarized in table 2 below, a more detailed version with participation per group and gender can be found in the appendix. Due to similarity in gender (χ^2 (10, N = 109) = 15.216, p = 0.124) and age (ANOVA: F (10,98) = 1.39, p = 0.196) distribution between groups, I used the full sample for statistical analyses and did not include group as a predictor.

Table 2. *Participation per group for friendship assessment (FA) and experimental sessions. Groups with missing FA are marked by asterisks.*

Group	Group size	FA	Session 1	Session 2	Session 3
A	11	11	10	8	7
B	12	12	9	9	8
C*	11	9	9	8	10
D	12	12	10	9	12
E	13	13	9	8	9
F	8	8	8	6	6
G	6	6	4	6	5
H	8	8	6	6	5
I*	11	10	10	9	6
J	11	11	10	8	8
K	6	6	6	6	6
Total	**109**	**106**	**91**	**83**	**82**

2.4.2 Coding of friendship and spatial proximity

To define friendship, I used results of both rounds of children's friendship assessments. Sociometric tests were taken by 106 participants, 51 of which were female. Over both rounds, 2004 nominations should have been made in total. However, in 134 instances where children did not know a peer, they did not place the photo with any given category. I counted these instances, which occurred exclusively within the mixed-classroom groups (see chapter 2.2), as missing values. A single missing value occurred in group J, 74 in group C (i.e., 33.64% of possible nominations) and 59 in group I (i.e., 26.34%). The remaining 1870 nominations are distributed as shown in table 3.

For all kids combined, a moderate agreement for friendship ratings between both rounds of the friendship assessment was found (Cohen's $\kappa = .68$). Individual Cohen's κ ranged from poor to perfect agreement between individuals, with most individuals showing at least substantial agreement ($M \pm SD = .63 \pm .32$, $min = -.36$, $max = 1$; see appendix for a table with individual Cohen's κ).

Table 3. *Friendship nominations by gender.*

Rater	Target	Green	Yellow	Red	Total
Female	*female*	252	145	69	466
	male	161	138	134	433
	total	413	283	203	899
Male	*female*	208	132	121	461
	male	245	140	125	510
	total	453	272	246	971
Both	*female*	460	277	190	927
	male	406	278	259	943
	total	**866**	**555**	**449**	**1870**

Note: Numbers are for all groups together.

To get a more differentiated perspective on children's reliability during friendship assessments, I calculated a standardized error score per child, which considers the "severity" of divergence between the two rounds' ratings. I did this by first assigning numbers 0, 1 or 2 to each possible combination of nominations. Zero was assigned when nominations in both rounds were equal, meaning that no error was made (e.g., nominating a peer as a friend in both rounds). Two was assigned when one nomination was friend while the other was non-friend, as this instance was the most substantial divergence between ratings. One was given for all other cases (e.g., nominating a peer as a friend in the first and as neutral in the second round). All numbers were added up to a raw *err* score per individual. To achieve comparability between participants, I divided this number by the maximum possible total score per group (e.g., if a group consists of $n = 10$ individuals, a total score of 18 could have been obtained: $(n - 1) * 2$). The formula for the standardized error is as follows:

$$err_{standardized} = \frac{err}{(n-1) * 2}$$

Individual $err_{standardized}$ ranged from 0 to .75 ($M \pm SD = .13 \pm .15$) and showed a moderate negative relationship with age ($r\,(104) = -.46$, $p < 0.001$; figure 4).

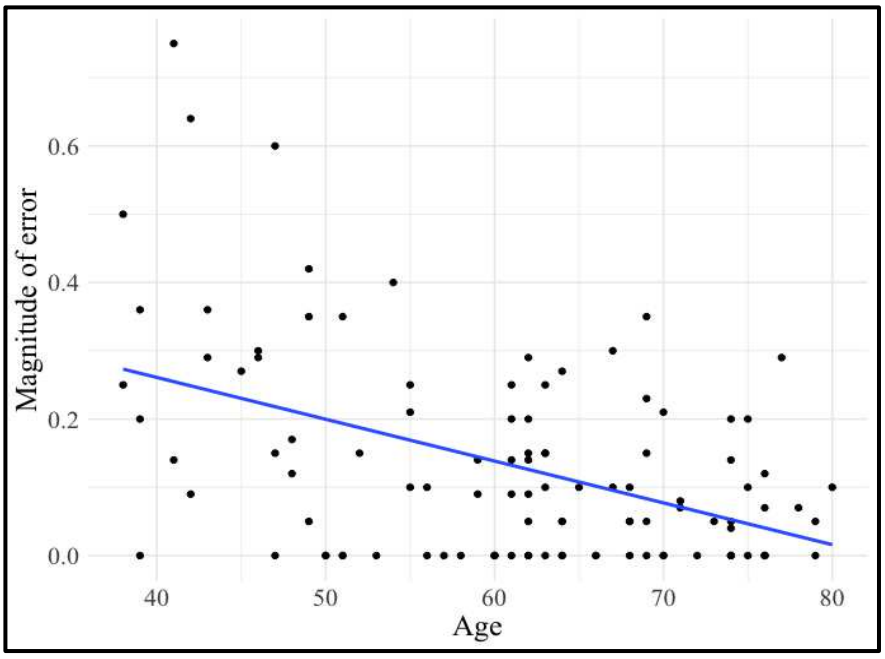


Figure 4. Scatter plot of age and standardized magnitude of error. Each dot represents one individual.

Considering both, Cohen's κ and $err_{standardized}$ scores, I argue that children's friendship ratings can overall be seen as reliable. I thus used nominations of both rounds to define two predictor categories for statistical testing. I counted only those instances as friendship, where the assessor had nominated a peer as a friend in both rounds. All other nomination combinations were summarized in a single non-friend category. I used these unilateral nominations for the statistical analyses in this study because the focus of the hypotheses lies on interactions, where one individual shows prosociality towards another. I argue that, in such instances, it is more important how the actor regards their target, than how both interaction partners view each other.

While 103 children nominated at least one of their peers as friend, 3 participants made no friend nominations from within the sample. In total, 379 friendship nominations were made (i.e., 41.06% of assessments are friendship nominations). Participants who made friend nominations, named between 1 and 12 peers as friends ($M \pm SD$ = 3.6 ± 2.2; table 4). A Kruskal-Wallis test, with the number of friends standardized in relation to group size, revealed no significant difference in the number of friendships between groups (χ^2 (11, N = 11) = 11, p = 0.443). A more detailed table showing the distribution of friendship counts for each participant can be found in the appendix.

I coded spatial proximity from the children's seating position at the start of the first game in each session. For each child, left and right neighbors in the sitting circle were noted.

Table 4. *Mean friend counts per group and gender. Brackets contain standard deviation, minimum and maximum.*

Group	Gender	Friends
A	*female*	4.6 (± 2.3; 3, 3)
	male	5 (± 2.7; 0, 0)
	total	4.8 (± 2.4; 0, 0)
B	*female*	3.3 (± 2.8; 0, 0)
	male	3.6 (± 0.9; 3, 3)
	total	3.4 (± 2.1; 0, 0)
C	*female*	2.5 (± 1.5; 1, 1)
	male	3 (± 1; 2, 2)
	total	2.7 (± 1.3; 1, 1)
D	*female*	3 (± 0.8; 2, 2)
	male	6.3 (± 1.7; 4, 4)
	total	4.1 (± 1.9; 2, 2)
E	*female*	8.7 (± 1.2; 8, 8)
	male	4.5 (± 3.1; 1, 1)
	total	5.5 (± 3.3; 1, 1)
F	*female*	3 (± 1; 2, 2)
	male	2 (± 0.7; 1, 1)
	total	2.4 (± 0.9; 1, 1)
G	*female*	2.5 (± 1.3; 1, 1)
	male	1 (± 0; 1, 1)
	total	2 (± 1.3; 1, 1)
H	*female*	3.6 (± 2.4; 1, 1)
	male	2 (± 1.7; 1, 1)
	total	3 (± 2.2; 1, 1)
I	*female*	1 (± 0; 1, 1)
	male	2.8 (± 1.7; 1, 1)
	total	2.4 (± 1.6; 1, 1)
J	*female*	4.4 (± 1.4; 3, 3)
	male	3.3 (± 2.1; 1, 1)
	total	4 (± 1.7; 1, 1)
K	*female*	4 (± 0 ; 4, 4)
	male	2.8 (± 1.6; 0, 0)
	total	3 (± 1.5; 0, 0)
ALL	*female*	3.6 (± 2.3; 0, 10)
	male	3.7 (± 2.4; 0, 12)
	total	**3.6 (± 2.2; 0, 12)**

2.4.3 Coding of sharing and helping

Behaviors were coded according to an ethogram (see appendix) using Solomon Coder Software (Péter, 2019). I used the instances of giving the toy to another child during game 1 to measure sharing; failed attempts of sharing were excluded from further analysis due their rarity. Helping was operationalized as instances where a child picked up a peer's plush squid during the third game.

Game 1 was coded only by me. I found a strong positive correlation between sharing and its inverse behavior (i.e., receiving the toy), which confirmed that almost all behaviors were detected during video coding (r_{Sess1} = .67, $p < 0.001$; r_{Sess2} = .83, $p < 0.001$; r_{Sess3} = .78, $p < 0.001$). Game 3 was coded by me and 4 other raters, so that each video was coded twice in varying rater combinations (i.e., each rater coded ca. 40% of videos). Inter-rater reliability for behavioral frequencies was calculated using a Spearman correlation, with results indicating high agreement between each rater pair (table 5). Correlations were calculated for behaviors *Drop* (i.e., child dropping their plush squid), *Pick-up* (i.e., the measure for helping), and *Self Pick-up* (i.e., a child picking up their own plush squid).

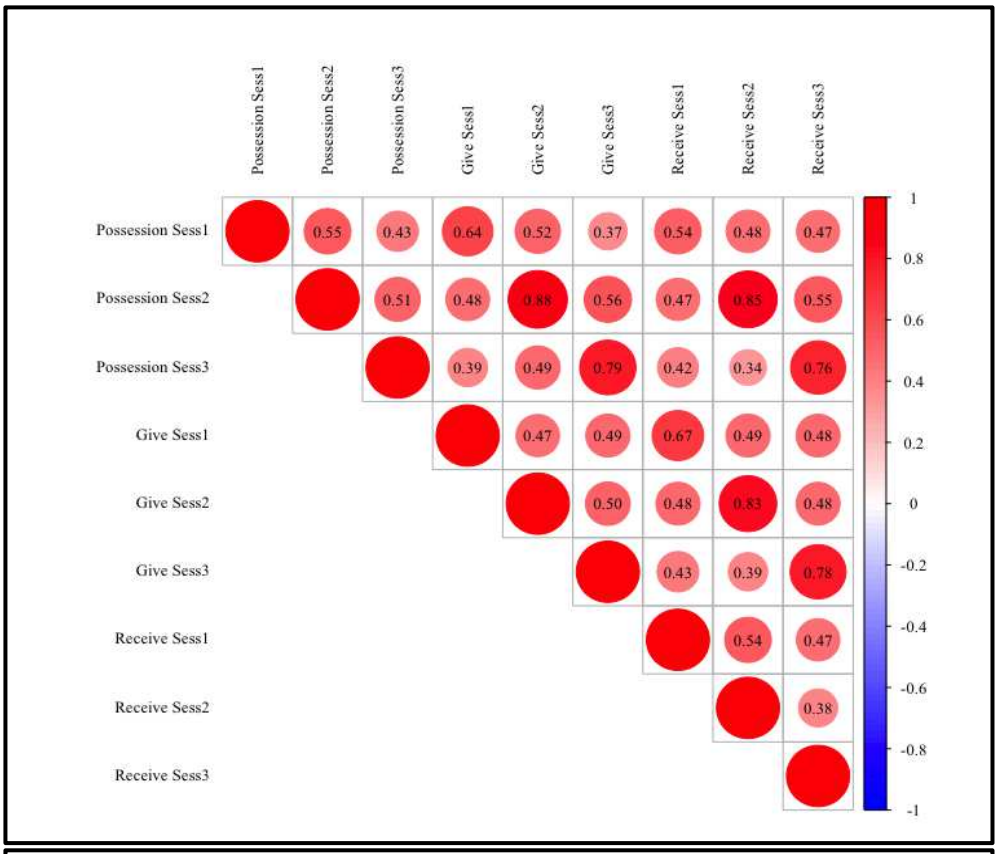
Table 5. *Inter-rater spearman correlation coefficients. All p-values are < 0.001.*

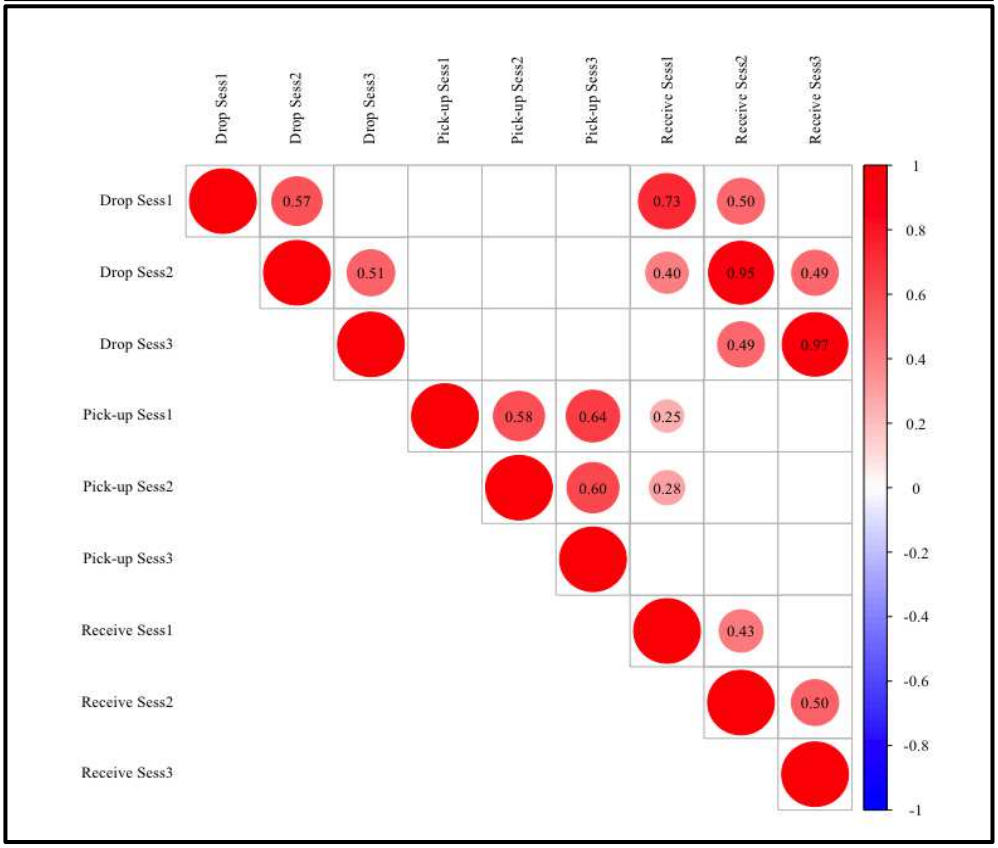
	Raters 1&2	Raters 1&3	Raters 1&4	Raters 1&5	Raters 2&3
Drop	.98**	.99**	.97**	.99**	.99**
Pick-up	.95**	.99**	.94**	.98*	.99**
Self Pick-up	.86**	.99**	.82**	.56**	.83**

	Raters 2&4	Raters 2&5	Raters 3&4	Raters 3&5	Raters 4&5
Drop	.96**	.99**	.98**	.95**	.94**
Pick-up	.79**	.97**	.99**	.77**	.88**
Self Pick-up	.57**	.91**	.93**	.85**	.84**

I calculated Cohen's κ for all raters combined, using identifiers of two peers that were involved in an interaction as variables. The calculation showed moderate overall agreement (κ = .63), indicating that in some instances, raters had misidentified children. In two instances, this led to exclusion of one rater's coding from further analysis. For statistical analyses, I chose to always use the second coder's data, as this ensured that data for each group was taken from multiple raters (i.e., a maximum of 2 sessions of the same group were coded by the same rater).

As Spearman rank order correlations for behaviors of interest between sessions yielded significant moderate to strong relationships (see figures 5 and 6), I calculated behavioral occurrence means over all sessions. Prosocial behaviors sharing and helping were moderately positively correlated (r = .34, $p < 0.001$).





Figures 5 & 6. Heatmaps of correlations for behavioral frequencies between experimental sessions for games 1 (upper figure) and 3. Color represents the magnitude of the correlation; *r* values are written inside their respective squares in the heatmap. Only significant correlations are shown.

2.5 Statistical Analysis

I first collected and organized all data in Excel. I performed statistical analyses using R in RStudio (Posit Team, 2023), with the aid of packages DHARMa (Hartig, 2022), psych (Revelle, 2022), dplyr (Wickham et al., 2023), ggplot2 (Wickham, 2016), corrplot (Wei & Simko, 2021), readxl (Wickham & Bryan, 2023), and lme4 (Bates et al., 2015).

2.5.1 Hypothesis 1: similarity and spatial proximity between friends

To test my first hypothesis, I used age and gender as measures for similarity. I conducted a chi-square test for friendship (yes vs. no) and gender combination (same vs. mixed) of assessor and peer. To find out whether peers nominated as friends were closer in age to the assessor than peers not nominated as friends, I first calculated a mean age difference between each assessor and their friends as well as the mean age difference between assessor and other peers. I performed a Wilcoxon test using this mean age difference between assessor and nominated children, comparing the variable between friends and non-friends. Testing my hypothesis on spatial proximity within friendship, I calculated a chi-square test with friendship (yes vs. no) and the measure for proximity (neighbor vs. not-neighbor).

2.5.2 Hypothesis 2: higher levels of prosociality between friends

For testing my second hypothesis, I used relationship status (friends vs. non-friends) as a predictor for sharing (game 1) and helping (game 3) behaviors between children. Due to participants being tested multiple times over the 3 experimental sessions, the dataset generated can be classified as having repeated measures. The outcome variables for sharing and helping follow a Poisson distribution but include many zero-values due to missing events. In addition, my calculations of dispersion parameters for *Give to, FAIL Give to* and *Pick-up* suggested that the data may be over-dispersed (for *Give to:* $M \pm SD = 0.13 \pm 0.48$, dispersion parameter = 1.77; for *FAIL Give to:* $M \pm SD = 0.07 \pm 0.035$, dispersion parameter = 1.75; for *Pick-up*: $M = 0.34 \pm 0.91$, dispersion parameter = 2.43). Poisson models and negative binomial mixed models both are well suited for data with repeated measures. However, negative binomial models are better suited to handle over-dispersion and missing data or excess zeros due to missing events than a (zero-inflated) Poisson model (Yirga et al., 2020). I, thus, chose to fit negative binomial mixed models for both, sharing and helping.

Models were fitted with the count data of *Give to* and the count data for *Pick up*, respectively. Binary variable *Friends* and categorical variable *Session*, which are predictor variables in both models, were added as fixed effects. For *Friends*, value 1 meant that the focal individual had nominated their interaction partner as a friend during the friendship assessment; value 0 meant that the focal individual had not made a friend nomination. For *Session*, numbers 1, 2 and 3 were assigned, according to the experimental session. *Session* was included in the model, because often sessions differed slightly in participants (e.g., absence of certain participants), which also resulted in different numbers of friendships in the respective session. Individual IDs, by themselves and nested within the experimental group, were included as random effects to control for repeated testing of participants. I assessed goodness of model fits by calculating *distributed architecture for generalized models residuals* (short: DHARMa residuals). DHARMa residuals are designed, specifically, to handle the complex structure of hierarchical or zero-inflated data (Hartig, 2019) and are, thus, well suited to assess goodness of the negative binomial mixed model fit. I plotted residuals as quantile-quantile plot (short: QQ plot).

3 Results

3.1 Hypothesis 1: similarity and spatial proximity between friends

Same-gender nominations occurred more often than mixed-gender nominations (χ^2 (1, N = 92) = 10.327, p = 0.001; figure 7). Statistical tests confirmed that peers nominated as friends had a smaller age difference with the assessing children than peers not nominated as friends (Wilcoxon test: V = 928.5, p < 0.001; age difference between friends: $M \pm SD$ = 10.43 ± 8.47, *min* = 0, *max* = 37; age difference for other nominations: $M \pm SD$ = 14.58 ± 9.41, *min* = 0, *max* = 41; age in months; figure 8). Results showed that children were more likely to sit next to a peer that they nominated as a friend, compared to peers that had not been nominated (χ^2 (1, N = 2049) = 103.77, p < 0.001; figure 9).

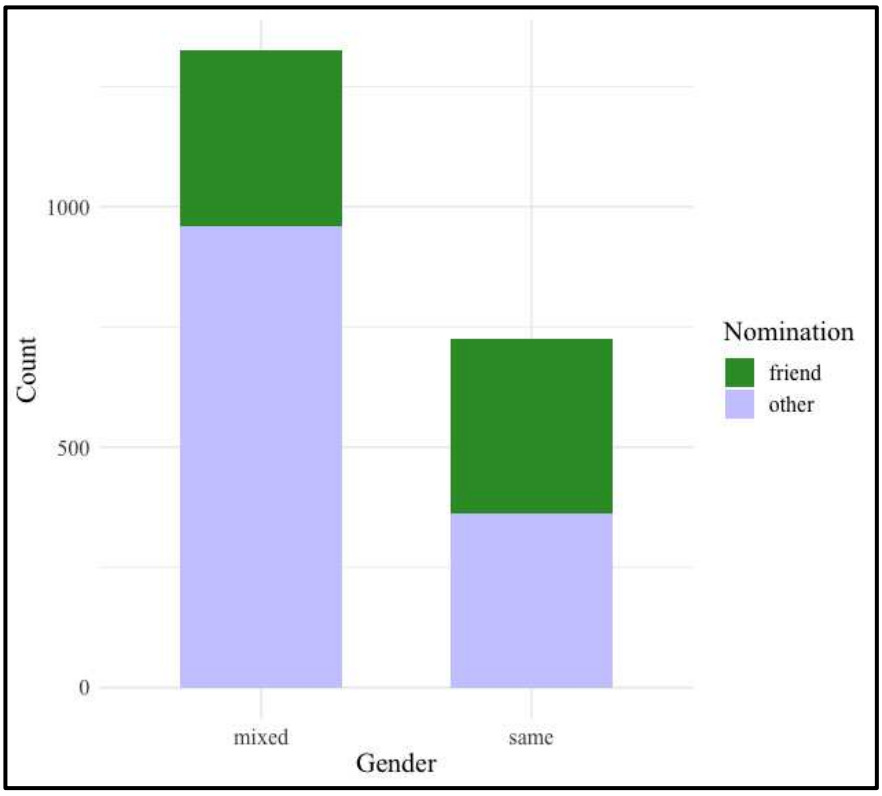


Figure 7. Stacked bar plot for mixed vs. same gender friends and non-friends.

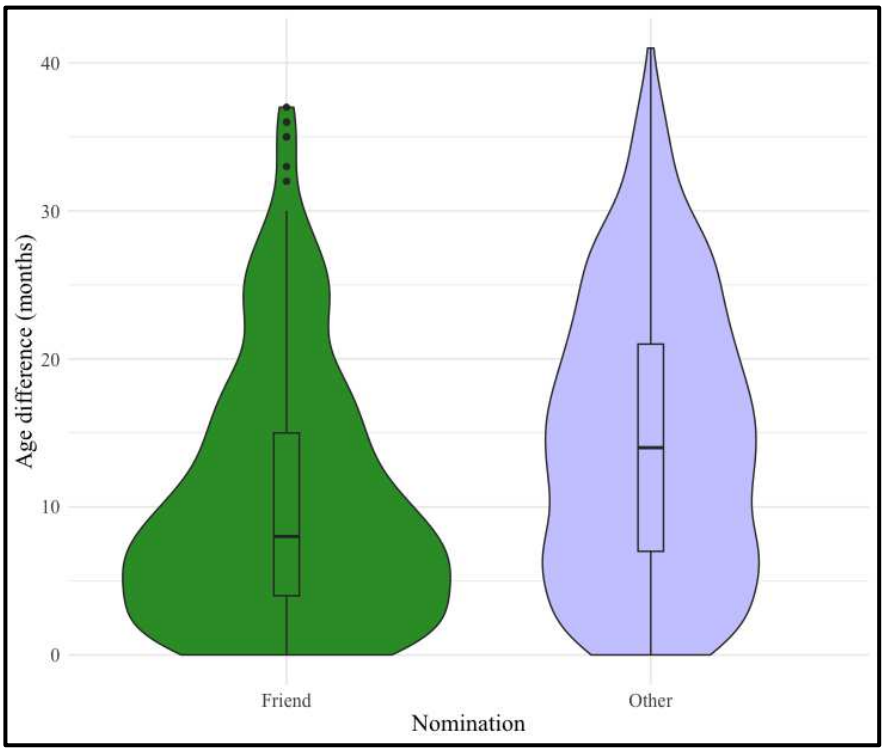


Figure 8. Violin and box plots of age difference between assessor and friend versus other nominations. Black bar represents median, dots represent outliers.

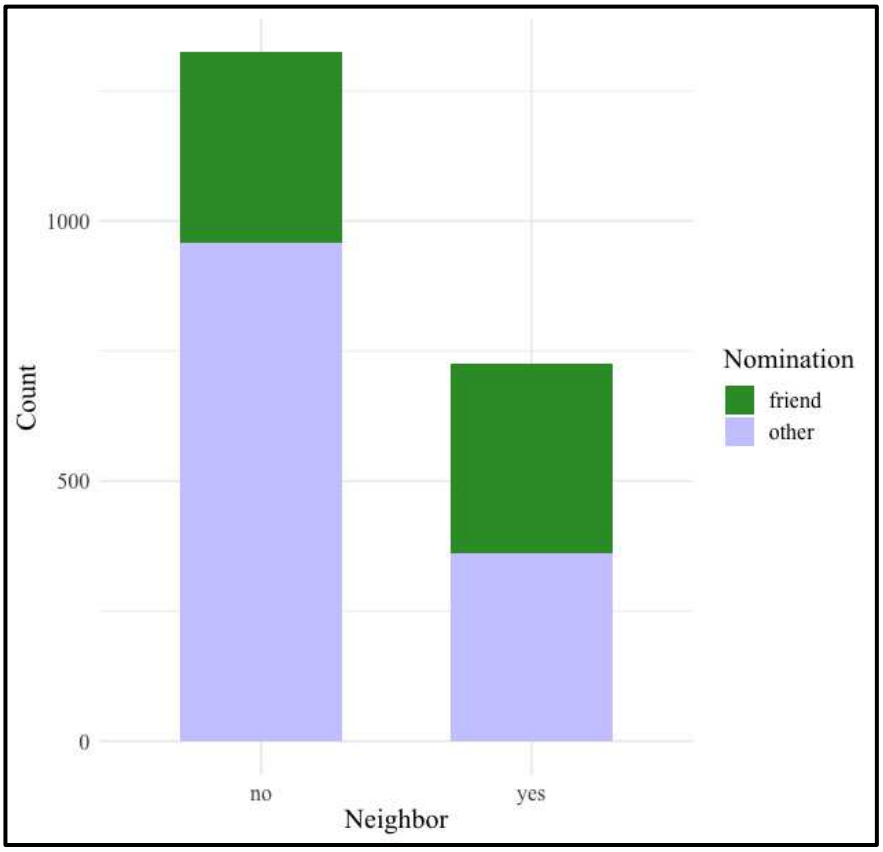


Figure 9. Stacked bar plot for friend vs. other neighbors and non-neighbors.

3.2 Hypothesis 2: higher levels of prosociality between friends

The model for sharing showed a significant negative effect of the intercept (table 6), suggesting that baseline levels of *Give to* differ between individuals within groups. I did not find a significant effect of *Session* on the occurrence of *Give to* (table 6). The model for sharing yielded a significant positive effect of the predictor variable *Friends* on the outcome variable. This relationship between predictor and outcome indicates that, if a peer has been nominated as a friend, the likelihood of the focal individual giving the toy to said peer increases (figure 10). Calculations and plotting of DHARMa residuals indicated a good model fit. Random and fixed effects of the model for helping are shown in table 7. For the intercept, I found a significant negative effect, suggesting that the baseline occurrence of *Pick-up* differs between individuals nested within their group. There was a significant positive effect of *Friends* on *Pick-up*, but no significance of *Session*. The model fit for helping indicates that, if a peer has been nominated as a friend, the likelihood of the focal individual picking up the plush squid of said peer increases (figure 11). DHARMa residuals and QQ plot indicated good model fit.

Table 6. *Random and fixed effect results of the negative binomial mixed model for sharing*

Random effects			
	Name	Variance	*SD*
Group:Individual	Intercept	0.078	0.230
Individual	Intercept	0.001	0.034

Fixed effects				
	Estimate	*SE*	*z*	*p*
(Intercept)	- 2.540	0.221	- 11.502	< .001***
Friends	1.202	0.157	7.651	< .001***
Session	- 0.051	0.092	- 0.584	.584

Note: Number of observations = 2406; number of individuals within groups = 102; *** indicates high statistical significance.

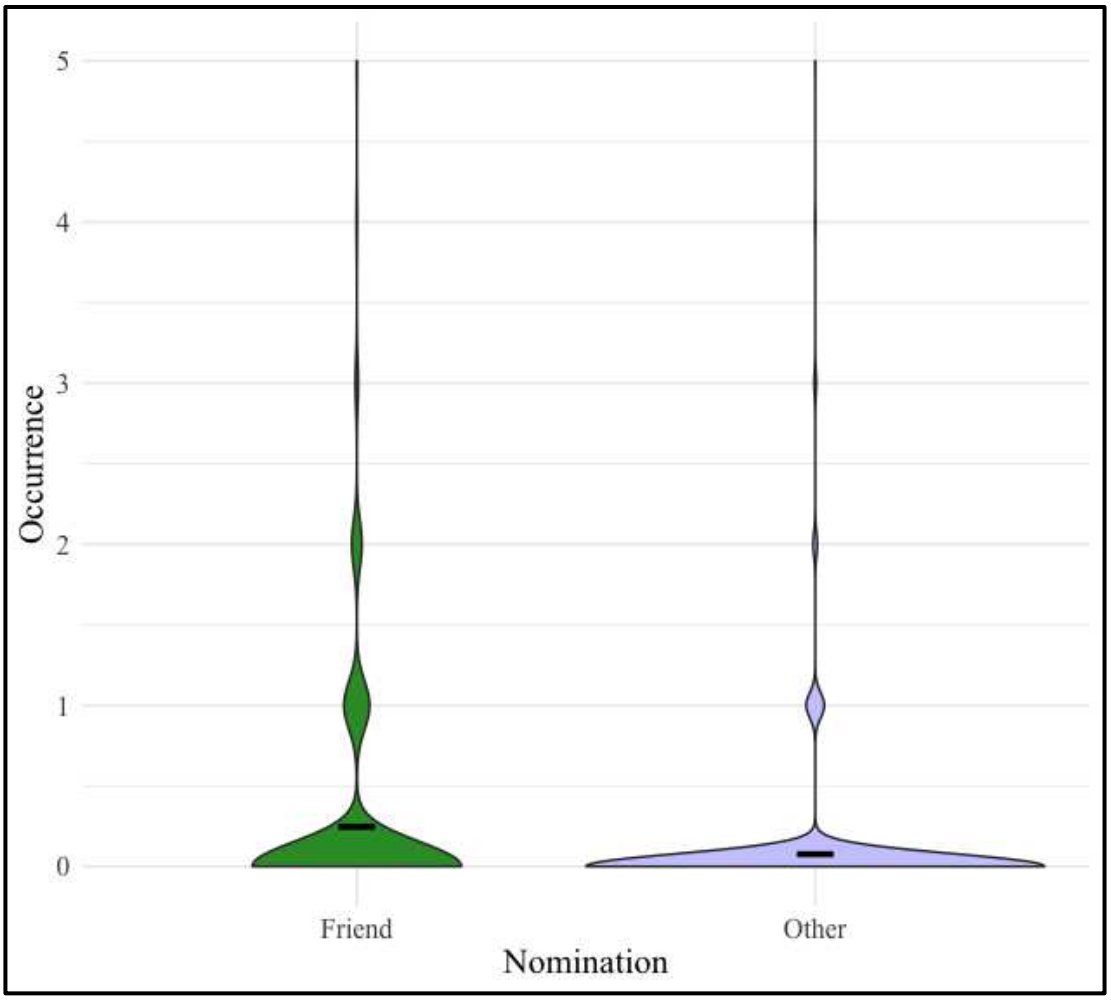


Figure 10. Violin plot of occurrences of sharing with friends and other peers. Black bar represents mean.

Table 7. *Random and fixed effect results of the negative binomial mixed model for helping*

Random effects			
	Name	Variance	*SD*
Group:Individual	Intercept	0.840	0.916
Individual	Intercept	0.831	0.912

Fixed effects				
	Estimate	*SE*	*z*	*p*
(Intercept)	- 2.52	0.210	- 12.036	< .001***
Friends	0.640	0.116	5.527	< .001***
Session	0.091	0.064	1.425	.154

Note: Number of observations = 2904; number of individuals within groups = 108; *** indicates high statistical significance.

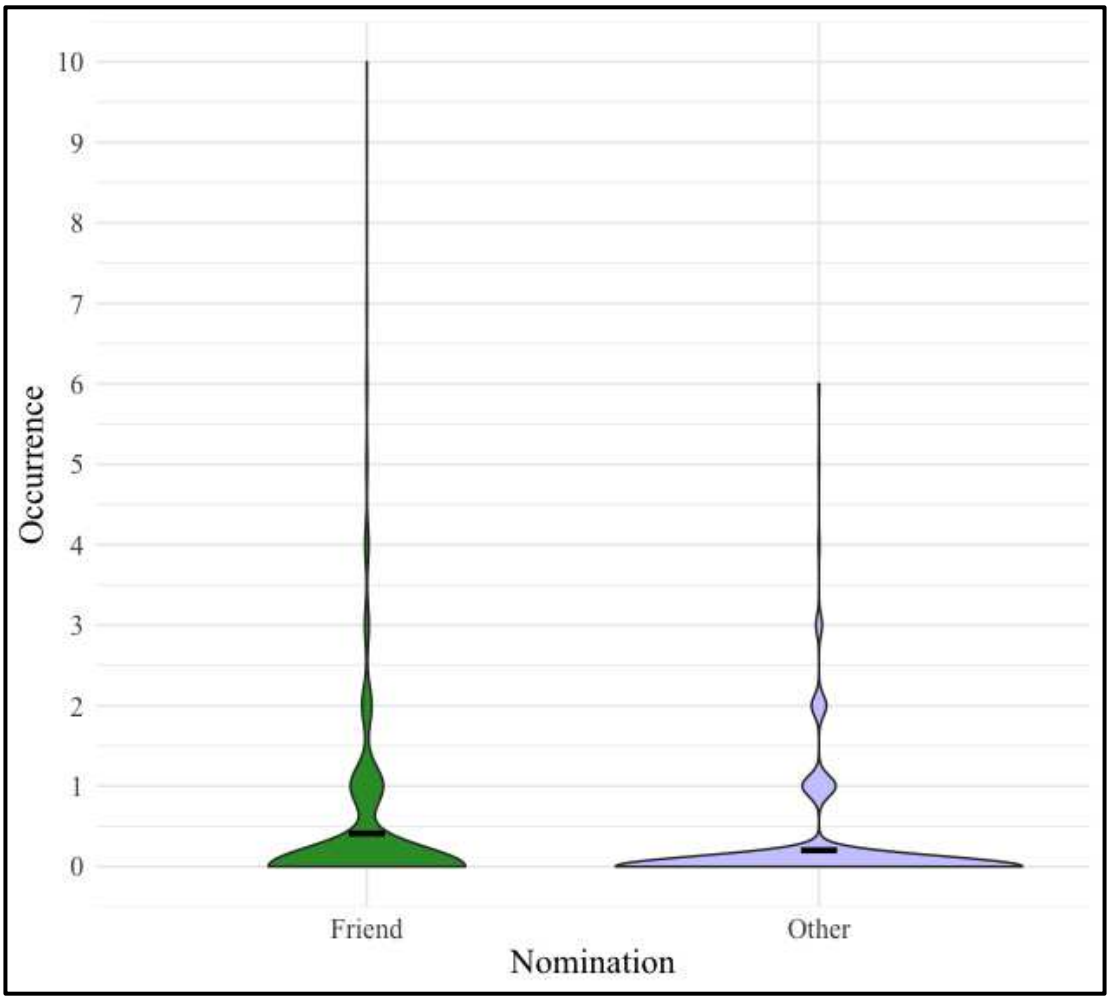


Figure 11. Violin plot of occurrences of helping with friends and other peers. Black bar represents mean.

4 Discussion

For this master's thesis, I first investigated similarity in age and gender in preschool friendships. Second, I tested the effect that friendship status has on two types of prosocial behavior, namely sharing and helping. Using collected data from children's friendship assessments, I was able to confirm that preschoolers are more likely to nominate similar aged and same-gender peers as their friends. Analyzing friendship nominations and behavioral observations during games, I showed that friendship significantly increases occurrences of sharing and helping. In addition to confirming my hypotheses and answering my research questions, I can make valuable assumptions about suitability of the method employed for researching preschool friendship and prosociality in the future.

4.1 Research question one: characteristics of preschool friendship

4.1.1 Reliability of assessments

The friendship assessment's main source of information were children's ratings, with teachers' ratings intended to serve as a measure of external validity. Children's friendship ratings showed overall substantial agreement between two rounds. This indicates that children can well differentiate with whom they are friends from with whom they are not; an assumption that is reflected in the magnitude of error, which was low in most cases. A moderate negative correlation of standardized error with age was found, suggesting that younger children are less precise in their peer nominations than older ones. This does not mean that the friendship assessment is unsuited for the tested age group. Even among younger participants, perfect agreement between both rounds of the assessment and low errors were found. Familiarity may play a role in this context: some of the younger children may have joined preschool only a short while ago and, thus, not have developed clear relationships with their peers yet. Such lack of familiarity may have resulted in less accurate nominations. Publications on friendship in early life found that younger kids generally have less friends and are less likely to participate in reciprocal friendships (Vaughn et al., 2001), perhaps due to being less peer oriented than their older classmates (Rubin et al., 2007). This lack of peer orientation and resulting lower motivation to make friends may result in ambivalent peer nominations in sociometric tests. No definitive conclusion can be drawn about the reasons for the negative correlation of age and magnitude of error, as neither

familiarity nor the relationship between age and nature of friendship were investigated more closely.

Teachers' ratings of peer friendship proved to be unreliable in two ways: On the one hand, agreement between teachers that rated the same peers was low. On the other hand, ratings made by teachers differed from those made by children themselves. While contradicting most findings on teacher reliability, these results are not entirely surprising: a study by Shin and colleagues (2014) states that, even if there is positive correlation between teachers' and children's friendship ratings, the latter are a much better predictor of behavior than the former; the same study found that only 57% of children's friendship nominations were made by teachers as well. A second study explicitly concludes that children's ratings are not replaceable by teacher reports, with association between the two being weak at best (Peceguina et al., 2020). There are a variety of possible reasons for low teacher reliability. Even though preschools were asked to let those teachers fill out questionnaires, that knew children well, no measure to assess familiarity of teachers and children was included. Such a measure could have been, for example, how long the teacher had worked with their respective group or how many hours per week they spent with children. Perhaps, ratings of teachers that work more hours or have been with the group for a longer period would be more reliable than those of newer staff members. In addition, teacher ratings may have been influenced by teachers' motivation to participate in the study. While some staff showed great interest and high motivation to participate and know more about the study, other teachers seemed less willing to fill out the questionnaires and sometimes had to be asked several times. This could be a reason why, in some questionnaires, multiple friend nominations were given per child, while in other questionnaires each peer was assigned only a single friend. Therefore, lack of agreement between teachers must be interpreted with caution: results do not necessarily state that teachers per se are an unreliable source for peer relationship but may rather point to relationships between quality of teacher ratings and teacher-children familiarity or teacher motivation. Regarding the low agreement between teachers' and children's friendship nominations, the same caution should be administered. While children were allowed to nominate as many peers as they liked as their friends, teachers were asked to name only five best friends from within the group. Accordingly, especially in larger groups, there is a chance that friends were not nominated by teachers simply due to the limit of five.

While challenging findings on the reliability of teacher ratings, results from this study confirm that the sociometric method for assessing friendship from children provides robust

information about peer relationship. Friendship, as determined from such assessments, may safely be used as a variable in future studies.

4.1.2 Similarity and spatial proximity

My findings on similarity and spatial proximity within preschool friendships are in line with literature, which states that both are higher between friends than non-friends (Afshordi & Liberman, 2021; Altman et al., 2020; Howes, 1983; Newcomb & Bagwell, 1995; Wang et al., 2019). Based on the results, I can confirm my first hypothesis, that friends exhibit higher degrees of similarity and spatial proximity.

4.2 Research question two: the effects of friendship on prosocial behavior

4.2.1 Correlations of prosocial behaviors

Behaviors of interest (*Give to* for sharing and *Pick-up* for helping) were significantly positively correlated with themselves over all sessions. For sharing, correlations were stronger than for helping, although only slightly. These correlations of prosocial behaviors suggest that instances of sharing and helping were elicited as desired and occurred reliably as well as with similar frequency in each experimental session. Both behaviors were positively correlated with each other. This suggests that children differ in prosocial tendencies in general, with some being more prosocial than others. The correlation being moderate may hint to differences between certain aspects of prosociality: even though an overall prosocial individual may show more instances for both behaviors, than a less prosocial peer, some children may favor helping over sharing or vice versa.

4.2.2 Sharing

The model I fit for sharing suggests that children are more likely to share a limited resource with a peer that they nominated as friend than with a non-friend. A significant negative effect could be found for the random effect of individual nested within group on sharing, meaning that, if all predictors were equal to 0, the outcome variables would occur less. This finding suggests that the occurrence of *Give to* differed between individuals and groups. A possible underlying factor could be how well a child asserts him- or herself to get possession or how long a child possesses the toy each time it has it: To be able to give the toy to another child, one must first possess the toy oneself. A participant who keeps the toy

for a long time might accumulate less instances of giving it to a peer than a child that only keeps the toy briefly before passing it on.

When regarding the positive effect of friendship on the occurrence of sharing, one should consider results from the analysis of spatial proximity. Friends were found to be more likely to sit next to each other before the first game (and therefore during, as seating order did not change over the course of the game). While in most experiments (20 out of 33 sessions, i.e., roughly 60%), the toy was handed over disregarding seating order, some groups decided to pass the toy around in a circle during some sessions (13 out of 33 sessions, i.e., roughly 40%). Friends being more likely to sit next to each other may thus have led to more instances of transactions between befriended peers than would otherwise have been recorded. At the same time, one could argue that the opposite may be true: in a circle, not all children can have friend neighbors only. Thus, sitting next to a non-friend may have led to more transactions between non-friends. As in more than half of sessions the toy was not passed in a circle, I conclude that results can safely be interpreted to confirm my hypothesis about sharing.

4.2.3 Helping

For game three of the study, which was designed to elicit helping as a measure of prosocial behavior, the model fitted showed a highly significant positive effect of *Friends* on the occurrence of *Pick-up*. This positive relationship suggests that children are more likely to help a friend. The random effect of the individual nested within its preschool group had a significant negative effect on *Pick-up*, meaning that the occurrence of *Pick-up* varied significantly between individuals and groups. In other words: Some individuals picked up more plush squids than others, regardless of recipient. While this finding could mean, that levels of prosociality differ between individuals, no final assumptions can be made just from this study's design. Other reasons for individual differences in *Pick-up* could have been, that some children were more comfortable with balancing the plush squid on their head, thus finding it easier to pick up other children's squids. Or that some children simply did not mind if their own squid fell during *Pick-up*, while others did not want to risk losing theirs. *Session* did not have a significant effect on outcome in the model, indicating that occurrences of *Pick-up* stayed roughly the same over all sessions. Considering results of game three and their interpretations, my hypothesis about the effect of friendship on helping can be accepted.

4.3 Study strengths and limitations

4.3.1 Study strengths

One of the study's strengths lies in the balanced sample: Gender-distribution was nearly equal, with genders being only two months apart in their mean age. Due to testing in five different preschools in different parts of Vienna, a variety of socioeconomic and cultural backgrounds was covered (Landesstatistik Wien, 2022). The naturalistic group setting enabled children to act normally within a known environment and among familiar peers. Repeated measures of two different types of prosocial behavior provided information on behavioral consistency and allowed for additional reliability and validity regarding the construct of prosociality. Especially these last factors set this study apart from existing research on friendship and prosociality (e.g., Charlesworth & La Frenière, 1983; Eivers et al., 2012; Engelmann et al., 2019; Fabes & Eisenberg, 1998; Flook et al., 2019). The study underlying this master's thesis is one of few that combines sociometric friendship assessments with a set of naturalistic group experiments, designed to elicit two different types of prosocial behavior.

4.3.2 Limitations of the study design

The focus of this master's thesis is the relationship between friendship and prosocial interactions in preschool children, observed in a naturalistic group setting. However, one must keep in mind that the underlying study was originally designed to investigate social dominance, peer acceptance and prosociality (cf. Wimmer, 2023). Regarding teacher's questionnaires, the format of friendship ratings was not perfectly suited for my research questions. If conducting future studies on the relationship of peer relationship and prosocial interactions, teacher's questionnaires should be designed specifically for this purpose to collect useable data. As suggested in the discussion of results for friendship assessments, items on how well teachers know children (e.g., how long they have worked with their group or how many hours per week they work with children of interest) could make a useful addition.

Regarding the sharing game, the fact that in roughly 40% of sessions the toy was passed around in a circle shows a potential flaw in the study design. The experimenter explained the game while saying that s/he would not interfere and that children could decide

themselves, who plays when. An alternative approach may be to phrase instructions to include the interaction of giving the toy to another child, rather than focusing on the possession. For example, the instruction could be: "You can decide yourself, who you want to give the toy to, once you are ready to pass it on."

With exceptions for the teacher's questionnaires and instructions for the sharing game, the study design was well suited for investigating the relationship between friendship in prosocial interactions in preschool children.

4.3.3 Limitations of the data collection

Due to novelty of the study design, some issues occurred during data collection. In the first preschool, friendship assessments were partly done in the same room with two children simultaneously (cf. Wimmer, 2023). Even though participants were sat at a distance, experimenters reported that children would occasionally look towards their interviewed peer. A feeling of being observed may have led to more socially desired answers. Future assessments were done separately, to ensure privacy. A second limitation during friendship assessments were those groups that were combined from two classrooms. For two out of these three groups, children made few or no nominations for peers they claimed to not know well, resulting in many missing values. As recruiting enough participants from one preschool classroom can be challenging, the likelihood of combining groups to ensure a naturalistic setting is high in studies such as the underlying. A possible solution for the future could be, to ask children to make a nomination based on "gut feeling". This nomination would still represent the participant's opinion of their peer and thus provide useful information for further analysis.

In the first two preschools, teachers supervised experimental sessions. This was problematic in one case in the second preschool, where a teacher told a child to pass on the toy, upon which a transaction took place. In addition, the presence of teachers potentially leads to children trying to get assistance from a teacher or simply feeling observed and thus behaving more socially desired. In all following preschools, teachers were either present only very briefly or not at all during experiments.

Even though limitations are present due to irregularities during data collection, data treatment has shown measures to be reliable for friendship assessments as well as behavioral variables.

4.4 Outlook

4.4.1 Definition of friendship

Many studies mention differences between unilateral and reciprocal friendships, with reciprocal friendship generally considered to be the more intense relationship (Hartup et al., 1988; Newcomb & Bagwell, 1995; Shin et al., 2014). For this study, unilateral friendship nominations were used as a predictor for prosocial behaviors sharing and helping. There is a chance that effects may have been even stronger if only reciprocal friendship had been counted. However, data would also have been less suited for model fitting, due to the rarity of mutual friend dyads. Future research should attempt to compare unilateral and reciprocal friendships with regards to prosocial behavior, to shed more light onto the matter.

4.4.2 Additional factors influencing friendship nominations

Research has found that younger children are not as strict in nominating their friends when it comes to similarity (Howes & Lee, 2007) and that the number of friends increases with age (Hartup & Abecassis, 2002; Howes, 1983). With regards to gender, girls were found to have more dyadic reciprocal friendships (Lee et al., 2007), whereas boys' playgroups are larger (Ladd, 1983). Future research on this subject could help understand the effects that age and gender may have on preschool friendships.

4.4.3 Additional effects on sharing and helping

Correlation of sharing and helping behavior suggested that behaviors are not shown in equal intensity. Future research should investigate whether children show preferences for certain types of prosocial behaviors, which could explain why occurrences of sharing differed from those of helping.

A longitudinal study by Jambon and colleagues (2019) showed that prosocial behavior generally increased with age and was correlated with ratings of parents' prosociality. A second study found that older children were more selective in whom they shared with, based on the potential recipients' perceived character (Flook et al., 2019). This result suggests, that even between peers that are nominated as friends, differences may be made. Contradicting these findings, a study by Lenz and Paulus (2021) showed that strategic concerns, such as whether there was a chance of reciprocity after sharing or not, did not

reduce prosociality towards friends in three and five year-olds. A classic study by Berndt (1981) found that girls shared a crayon with their friends just as often as with other peers, while boys were more willing to give the crayon to a stranger than a friend. Disregarding age and gender, studies have shown that the number of friends is positively correlated with prosociality (Howes et al., 1988; Sebanc, 1999, 2003). Future research should look more closely into the relationship of age, gender and prosociality as well as how the number and quality of friendships is linked to prosocial behaviors.

During friendship assessments, many children specifically stated that they did not like to play with certain peers. While this thesis only focuses on the effects of friendship, future studies should pay closer attention to the "dark side" of relationships. Recently, some researchers have started to investigate the co-evolution of friendships and antipathies (Daniel et al., 2016), for example. More findings on how antipathy might affect prosocial behavior during early childhood are needed.

4.4.4 External measures of children's friendships

Regarding friendship assessments, studies have found that correlations between children's and teacher's friend nominations are moderate at best, often identifying a lower percentage of friendships than children themselves (Altman et al., 2020; Shin et al., 2014). Even though ratings of children's behavior may be more accurate, studies using teacher ratings only (e.g., Jambon et al., 2019) should be interpreted with caution. Since children's own peer ratings have been found to be a good predictor of behavior in the underlying and other studies (e.g., Berndt, 1981; Engelmann et al., 2019; Lenz & Paulus, 2021), the use of smart technology presents a promising perspective for future research: Using movement and vocalization tracking systems, Altman and colleagues (2020) were able to validate children's friendship ratings with proximity and speech production recordings. When employed carefully and cautiously (i.e., in addition to children's ratings, comparing system data to sociometric and behavioral measures), such technologies could be a much more objective indicator of children's relationship than observations by teachers.

4.4.5 Children's reasoning behind prosocial actions

Classic literature often highlights children's selfish objectives behind interactions, claiming that they are prosocial towards friends because they can be relatively sure to that behaviors will be reciprocated (for a review, see Afshordi & Liberman, 2021). Recent studies show that (lack of) prospective reciprocity did not change the amount of sharing with friends

(Lenz & Paulus, 2021). Findings suggest that preschoolers' understanding of social constructs is more refined than has been assumed. An objective of future research should be to investigate children's reasoning behind behaving prosocially towards their friends.

4.5 Conclusion

With this master's thesis and the underlying study, I investigated the link between friendship and prosocial interactions in a preschool classroom. In line with previous research and my hypotheses, I found that similarity in age and gender was higher between friends than between non-friends. I could confirm findings on higher proximity between befriended peers. Regarding prosociality, I found friendship to be a significant positive predictor for prosocial behaviors sharing and helping. Children were more likely to exhibit these behaviors towards a peer they had nominated as a friend, than towards other members of their group. This finding goes in line with research cited and confirmed my hypotheses on friendship and prosocial behavior.

As the main aim of this study was to find out whether children's friendship nominations affected their behavior during experimental games, no assumptions can be made about reasoning behind those decisions. Factors such as motivation to or competence at playing games were not assessed. Still, findings of this study make a valuable contribution to the body of existing research on social cognition at preschool age. They further stress the importance of friendship in early life stages and give incentives to investigate children's concepts, expectations, and behaviors regarding friendship and prosociality in more detail.

5 References

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6 Appendix

6.1 Deutsche Zusammenfassung

Der Mensch ist ein soziales Tier, das schon früh im Leben enge Beziehungen zu Gleichaltrigen aufbaut. Ähnlichkeit (*Similarity)*, räumliche Nähe *(Spatial Proximity)* und prosoziale Interaktionen sind Schlüsselaspekte von Freundschaften im Vorschulalter. Man nimmt an, dass diese entscheidend für die Entwicklung von sozialem Verständnis und den Erwerb wichtiger sozialer Fähigkeiten sind.

In dieser Masterarbeit und der zugrundeliegenden Studie wurden *Spatial Proximity* und *Similarity* zwischen Freund*innen sowie der Einfluss von Freundschaft auf zwei Arten von prosozialen Interaktionen (Teilen und Helfen) in verschiedenen Kindergärten Wiens untersucht. Es wurden 109 Teilnehmer*innen im Alter von drei bis sieben Jahren in einem naturalistischen Gruppensetting (sechs bis 13 Kinder) mit bekannten Peers getestet. Ich konnte bisherige Erkenntnisse über größere *Spatial Proximity* zwischen befreundeten Peers bestätigen. Im Einklang mit früheren Forschungsergebnissen und meinen Hypothesen konnte ich feststellen, dass die *Similarity* in Bezug auf Alter und Geschlecht zwischen Freund*innen größer war als zwischen Nicht-Freund*innen. Freundschaft war ein signifikanter positiver Prädiktor für die prosozialen Verhaltensweisen Teilen und Helfen. Kinder zeigten diese Verhaltensweisen mit höherer Wahrscheinlichkeit gegenüber Gleichaltrigen, die sie als Freund*in nominiert hatten, als gegenüber anderen Mitgliedern ihrer Gruppe. Dieses Ergebnis stimmt mit der zitierten Forschung überein und bestätigt meine Hypothesen für beide prosozialen Verhaltensweisen.

Die Ergebnisse dieser Studie sind ein wertvoller Beitrag zu bestehenden Forschungsergebnissen im Bereich der sozialen Kognition im Vorschulalter. Sie unterstreichen die Bedeutung von Freundschaft bereits in frühen Lebensphasen und geben Anreize, die Konzepte, Erwartungen und Verhaltensweisen von Kindern in Bezug auf Freundschaft und Prosozialität genauer zu untersuchen.

6.2 Letter of information

Elternbrief

Betreff: Studie „Helfen und Sich-Durchsetzen im Kindergartenalter“

Liebe Familien!

In diesem Forschungsprojekt untersuchen wir, wie oft Kindergartenkinder anderen Kindern helfen und wie gut sie sich in der Gruppe durchsetzen können. Wir würden uns sehr freuen, wenn Ihr Kind an unserer Studie teilnehmen würde!

In dieser Studie darf Ihr Kind mit den anderen teilnehmenden Kindern ein einfaches Spiel, das sogenannte „Versteinern“ spielen. Dabei balancieren die Kinder ein Bohnensäckchen auf dem Kopf und werden „versteinert“, wenn es hinunterfällt. Sie können aber von anderen Kindern befreit werden. In einem zweiten Spiel dürfen sich die Kinder zuerst ein interessantes Spielzeug ansehen (z.B. ein Kaleidoskop). Dann wird eine Geschichte über eine Gruppe von Tieren vorgelesen, die sich anstellen müssen, um sich Sticker aussuchen zu dürfen. Danach werden wir Ihrem Kind einige Verständnisfragen stellen. Dann wird Ihr Kind zusammen mit den anderen Kindern die Möglichkeit haben, sich selbst um Sticker anzustellen. Die Interaktionen der Kinder bei diesen Spielen werden wir auf Video aufzeichnen, um das Verhalten der Kinder zu einem späteren Zeitpunkt genau analysieren zu können. Beide Spiele werden insgesamt 3x (an verschiedenen Tagen) gespielt. Zusätzlich werden wir Ihr Kind zu ihren/seinen Freundschaften mit den anderen Kindern befragen. Außerdem werden wir die Pädagog*innen bitten, einen kurzen Fragbogen über die Freundschaften zwischen den teilnehmenden Kindern und die Durchsetzungsfähigkeit Ihres Kindes in der Gruppe auszufüllen. Die Studie wird an 4-5 Tagen direkt im Kindergarten, in Absprache mit und unter Aufsicht von den Pädagog*innen durchgeführt.

Alle Informationen, die Sie und Ihr Kind, sowie die Pädagog*innen uns in dieser Studie geben, werden streng vertraulich behandelt. Die Informationen werden ohne Nennung von Namen unter einer Teilnehmer*innen-Nummer auf einem sicheren, universitätsinternen Laufwerk gespeichert, zu welchem nur die Mitarbeiter*innen, die an diesem Projekt beteiligt sind, Zugang haben.

Während der Studie werden zur ungestörten Beobachtung Videoaufzeichnungen von Ihrem Kind gemacht, die von den Versuchsleiter*innen sicher aufbewahrt und für wissenschaftliche Analysen verwendet werden. Diese Videoaufzeichnungen werden nicht veröffentlicht.

Die Studie wird mit Ihrem Kind nur dann durchgeführt, wenn Sie zustimmen und Ihr Kind vollkommen freiwillig daran teilnimmt. Zusätzlich können Sie die Teilnahme Ihres Kindes an der Studie ohne Begründung zurückziehen, und somit eine sofortige Löschung aller von Ihrem Kind gesammelten Daten erwirken.

Die im Rahmen dieser Studie gesammelten Daten werden 3 Monate nach der Datenerhebung vollkommen anonymisiert und in dieser anonymisierter Form archiviert. Durch diese Form der Speicherung ist kein Rückschluss auf die Identität der Teilnehmer*innen möglich. Video- und Fragebogen-Daten werden für 5 Jahre gespeichert und danach gelöscht.

Wenn Sie sich dazu entscheiden, unsere Forschung zu unterstützen, unterschreiben Sie bitte die beiliegende Einverständniserklärung und geben Sie diese Ihrem Kind wieder in den Kindergarten mit. Bei Fragen zu unserer Studie können Sie uns gerne per Email oder Telefon kontaktieren.

Herzlichen Dank für Ihre Unterstützung und wir verbleiben mit freundlichen Grüßen,

[redacted]

Wien, Dezember 2022

6.3 Parental consent form

Teilnehmer*inneninformation und Einwilligungserklärung

zur Teilnahme an der Studie:

„Helfen und Sich-Durchsetzen im Kindergartenalter“

Sehr geehrte*r Erziehungsberechtigte*r,

wir laden Sie ein, an der oben genannten Studie teilzunehmen.

Ihre Teilnahme und die Teilnahme Ihres Kindes an dieser Studie erfolgen freiwillig. Sie können jederzeit, ohne Angabe von Gründen, Ihre Bereitschaft zur Teilnahme ablehnen oder auch im Verlauf der Studie zurückziehen. Die Ablehnung der Teilnahme oder ein vorzeitiges Ausscheiden aus dieser Studie hat keine nachteiligen Folgen für Sie.

Diese Art von Studien ist notwendig, um verlässliche neue wissenschaftliche Forschungsergebnisse zu gewinnen. Unverzichtbare Voraussetzung für die Durchführung von Studien ist jedoch, dass Sie Ihr Einverständnis zur Teilnahme Ihres Kindes an dieser Studie schriftlich erklären. Bitte lesen Sie den folgenden Text sorgfältig durch und zögern Sie nicht, Fragen zu stellen.

Bitte unterschreiben Sie die Einwilligungserklärung nur

- wenn Sie Art und Ablauf der Studie vollständig verstanden haben,
- wenn Sie bereit sind, der Teilnahme Ihres Kindes zuzustimmen und
- wenn Sie sich über Ihre Rechte und die Rechten Ihres Kindes als Teilnehmer*innen im Klaren sind.

1. Was ist der Zweck der Studie?

In dieser Studie untersuchen wir, wie oft Kindergartenkinder anderen Kindern helfen und wie gut sie sich in der Gruppe durchsetzen können.

2. Wie läuft die Studie ab?

In dieser Studie darf Ihr Kind mit den anderen teilnehmenden Kindern 10 Minuten ein einfaches Spiel, das sogenannte „Versteinern“ spielen. Dabei balancieren die Kinder ein Bohnensäckchen auf dem Kopf und werden „versteinert“, wenn es hinunterfällt. Sie können aber von anderen Kindern befreit werden.
In einem zweiten Spiel dürfen sich die Kinder zuerst für ein paar Minuten ein interessantes Spielzeug ansehen (z.B. ein Kaleidoskop). Dann wird eine Geschichte über eine Gruppe von Tieren vorgelesen, die sich anstellen müssen, um sich Sticker aussuchen zu dürfen. Danach werden wir Ihrem Kind einige Verständnisfragen stellen. Dann wird Ihr Kind zusammen mit den anderen Kindern ungefähr 5 Minuten die Möglichkeit haben, sich selbst um Sticker anzustellen. Die Interaktionen der Kinder bei diesen Spielen werden wir auf Video aufzeichnen, um das Verhalten der Kinder zu einem späteren Zeitpunkt genau analysieren zu können.
Beide Spiele werden insgesamt 3x (an verschiedenen Tagen) gespielt. Pro Tag dauern diese Spiele (inklusive Erklärungen und kurzen Pausen) ungefähr 60 Minuten.
Zusätzlich werden wir Ihr Kind zu ihren/seinen Freundschaften mit den anderen Kindern befragen. Dieser Teil dauert ungefähr 15 bis 20 Minuten und wird an einem anderen Tag durchgeführt.

Außerdem werden wir die Pädagog*innen bitten, einen kurzen Fragbogen über die Freundschaften zwischen den teilnehmenden Kindern und die Durchsetzungsfähigkeit Ihres Kindes in der Gruppe auszufüllen. Die Studie wird an 4-5 Tagen direkt im Kindergarten, in Absprache mit und unter Aufsicht von den Pädagog*innen durchgeführt.

3. Worin liegt der Nutzen einer Teilnahme an der Studie?

Eine Teilnahme an dieser Studie gewährt Ihnen direkte Einblicke in die wissenschaftliche Arbeit im Bereich Verhaltensforschung und Entwicklungspsychologie. Die Ergebnisse dieser Studie sollen wichtige Daten darüber liefern, wie sich Helfen und Durchsetzungsvermögen unter Gleichaltrigen entwickeln, und welche Faktoren diese Entwicklung beeinflussen. Eine Zusammenfassung der Ergebnisse wird Ihnen am Ende der Studie zur Verfügung gestellt.

4. Gibt es Risiken bei der Durchführung der Studie und ist mit Beschwerden oder anderen Begleiterscheinungen zu rechnen?

Die Teilnahme an dieser Studie birgt für Sie und Ihr Kind keinerlei Risiken.

Covid-19-Sicherheitskonzept
Um die Gesundheit und Sicherheit der teilnehmenden Kinder und des Kindergartenpersonals während der Covid-19-Pandemie sicherzustellen, werden während der Datenerhebung folgende Sicherheitsmaßnahmen befolgt:

- Die*der Studierende ist geimpft und wird am Tag vor der Datenerhebung mittels PCR-Test auf SARS-CoV-2 getestet. Wir garantieren, dass sie*er nur dann die Datenerhebung im Kindergarten durchführen wird, wenn die*der Studierende: a) negativ auf SARS-CoV-2 getestet wurde, b) keine Symptome hat, die mit Covid-19 assoziiert sind, und c) keine Kontaktperson von Personen ist, die positiv auf SARS-CoV-2 getestet wurden.
- Im direkten Kontakt mit den Kindern und dem Kindergartenpersonal trägt die*der Studierende immer eine FFP2-Maske.

5. Hat die Teilnahme an der Studie sonstige Auswirkungen auf die Lebensführung und welche Verpflichtungen ergeben sich daraus?

Diese Studie wird direkt im Kindergarten zu den regulären Aufsichtszeiten durchgeführt. Daher hat die Studie keine Auswirkungen auf Ihre Lebensführung und es ergeben sich keine sonstigen Verpflichtungen daraus.

6. Was ist zu tun beim Auftreten von Beschwerdesymptomen, unerwünschten Begleiterscheinungen und/oder Verletzungen?

Wir erwarten im Rahmen dieser Studie keine Risiken für die teilnehmenden Kinder. Für weitere Fragen können Sie sich jederzeit an eine der Kontaktpersonen wenden (siehe Punkt 10).

7. Wann wird die Studie vorzeitig beendet?

Sie und/oder Ihr Kind können jederzeit, auch ohne Angabe von Gründen, die Teilnahme an der Studie widerrufen und die Studie aus persönlichen Gründen abbrechen, ohne, dass daraus Nachteile entstehen. Sollte die Versuchsleitung den Eindruck haben, dass eine weitere Teilnahme an der Studie nicht im Interesse Ihres Kindes ist, kann sie des Weiteren entscheiden, die Teilnahme Ihres Kindes an dieser Studie zu beenden.

8. In welcher Weise werden die im Rahmen dieser Studie gesammelten Daten verwendet?

Persönliche Daten (Geburtsdatum, Name etc.) werden streng vertraulich behandelt. Auch in etwaigen Veröffentlichungen der Daten dieser Studie werden die Namen der Teilnehmer*innen nicht genannt und es können keine Rückschlüsse auf die Teilnehmer*innen gezogen werden.

Alle Daten werden pseudonymisiert (d.h. unter Zuweisung einer anonymen, alphanumerischen ID-Nummer) erhoben und statistisch ausgewertet, sodass kein Rückschluss auf die Identität Ihres Kindes möglich ist. Für die Auswertung werden die Daten aller Kinder herangezogen, die an dieser Studie teilgenommen haben. Da es uns um die allgemeine Entwicklung von Kindern und nicht um die spezielle Entwicklung einzelner Kinder geht, werden keine Einzelauswertungen vorgenommen. Drei Monate nach der Datenerhebung werden die Daten vollkommen anonymisiert: d.h. ab diesem Zeitpunkt besteht auch für die Versuchsleitung keine Möglichkeit mehr, Ihren Namen und den Namen Ihres Kindes mit den erhobenen Daten in Verbindung zu bringen.

Aufzeichnungen von Ihrem Kind (Videos, Fragebögen, Erhebungsbögen) werden ohne Namenskennung auf einem sicheren, universitätsinternen Laufwerk gespeichert, zu welchem nur die Mitarbeiter*innen, die an diesem Projekt beteiligt sind, Zugang haben. Die Videoaufzeichnungen werden allein zur Datenanalyse verwendet und nicht veröffentlicht. Ausschließlich das an der Studie mitwirkende Personal hat Zugang zu den Daten und ist zur Verschwiegenheit verpflichtet.

Anonymisierte Daten, die keinerlei Rückschluss auf die Identität der Teilnehmer*innen erlauben, werden permanent auf einem sicheren, universitätsinternen Laufwerk archiviert. Videos, Fragebögen und Erhebungsbögen werden ohne Namenserkennung für 5 Jahre sicher gespeichert und danach gelöscht.

Sie können bis zu 3 Monate nach der Datenerhebung und ohne Angabe von Gründen die Löschung Ihrer Daten (inkl. Videos) bei der Projektleiterin Lisa Horn-Péter beantragen (siehe Kontaktdaten in Punkt 10).

9. Entstehen für die Teilnehmer*innen Kosten? Gibt es einen Kostenersatz oder eine Vergütung?

Durch Ihre Teilnahme an dieser Studie entstehen für Sie keinerlei Kosten. Ihr Kind erhält für die Teilnahme eine Urkunde.

10. Möglichkeit zur Diskussion weiterer Fragen

Für weitere Fragen im Zusammenhang mit der Studie steht die Projektleitung gerne zur Verfügung. Fragen, die Ihre Rechte als Teilnehmer*in an der Studie betreffen, werden selbstverständlich beantwortet.

Namen der Projektleitung bzw. der Kontaktpersonen:

Projektleiterin	[redacted]
Durchführende Studierende	[redacted]

11. Einwilligungserklärung

Name der teilnehmenden Person in Druckbuchstaben: .....
(Erziehungsberechtigte*r)

Name der teilnehmenden Person in Druckbuchstaben: .....
(Kind)

Geb. Datum: .....
(Kind)

Kindergartengruppe: .....
(Kind)

Ich bin einverstanden, dass mein Kind an der Studie *„Helfen und Sich-Durchsetzen im Kindergartenalter“* teilnehmen darf.

Ich bin ausführlich und verständlich über Zielsetzung, Bedeutung und Tragweite der Studie und die sich für mich daraus ergebenden Anforderungen aufgeklärt worden. Ich habe darüber hinaus den Text dieser Teilnehmer*inneninformation und Einwilligungserklärung gelesen, insbesondere den 4. Abschnitt (Gibt es Risiken, Beschwerden und Begleiterscheinungen?). Aufgetretene Fragen wurden mir von der Studienleitung verständlich und ausreichend beantwortet. Ich hatte genügend Zeit, mich zu entscheiden, ob ich an der Studie teilnehmen möchte. Ich habe zurzeit keine weiteren Fragen mehr.

Ich werde die Hinweise, die für die Durchführung der Studie erforderlich sind, befolgen, behalte mir jedoch das Recht vor, meine freiwillige Mitwirkung jederzeit zu beenden, ohne dass mir daraus Nachteile entstehen. Sollte ich aus der Studie ausscheiden wollen, so kann ich dies jederzeit schriftlich oder mündlich bei Lisa Horn-Péter veranlassen.

Ich bin zugleich damit einverstanden, dass die im Rahmen dieser Studie erhobenen Daten meines Kindes aufgezeichnet und ausgewertet werden.

Ich stimme zu, dass die Daten meines Kindes (Videos, Fragebögen, Erhebungsbögen) für 5 Jahre ohne Nennung von Namen unter einer anonymen alphanumerischen ID-Nummer elektronisch gespeichert und dann gelöscht werden. Die Daten werden in einer nur der Projektleitung zugänglichen Form gespeichert, die gemäß aktueller Standards gesichert ist.

Sollte ich zu einem späteren Zeitpunkt, die Löschung meiner Daten (inkl. Videos) wünschen, so kann ich dies bis zu 3 Monate nach der Datenerhebung schriftlich oder telefonisch und ohne Angabe von Gründen bei Lisa Horn-Péter veranlassen.

Den Aufklärungsteil habe ich gelesen und verstanden. Ich konnte alle mich interessierenden Fragen stellen und sie wurden vollständig und verständlich beantwortet.

Eine Kopie dieser Teilnehmer*inneninformation und Einwilligungserklärung habe ich erhalten. Das Original verbleibt bei der Studienleitung.

.....
(Datum und Unterschrift des*der Erziehungsberechtigen)

.....
(Datum, Name und Unterschrift der Studienleitung)

6.4 Friendship assessment script

Taken from Wimmer (2023)

Die Bilder der Peers liegen auf einem Stapel (noch verdeckt) auf dem Tisch
Die drei Emojis liegen auf einem Tisch.

Die Reihenfolge der Fotos ist bei jedem Kind zufällig (d.h. bevor das Kind zur ersten Runde kommt, die Fotos bitte gut mischen). Um das Protokollieren zu erleichtern und zügig zu gestalten, würde ich empfehlen, die Reihenfolge der IDs dann gleich ins Protokollblatt zu übertragen, bevor das Kind zur ersten Runde kommt.

_____

1.Runde
Hallo [Name des Kindes]. Wir möchten dir gerne ein paar Fragen dazu stellen, mit welchen Kindern aus deiner Kindergartengruppe du gerne spielst und mit welchen Kindern du nicht so gerne spielst. Dafür habe ich von allen Kindern ein Bild und drei verschiedene Gesichter mitgebracht

Das grüne, lachende Gesicht bedeutet, dass du sehr gerne mit diesem Kind spielst. [dabei auf das grüne Gesicht zeigen]

Das rote, traurige Gesicht bedeutet, dass du gar nicht gerne mit diesem Kind spielst. [dabei auf das rote Gesicht zeigen]

Das gelbe Gesicht bedeutet, dass es dir egal ist, ob du mit diesem Kind spielst oder nicht. Das heißt, du spielst weder sehr gerne mit dem Kind, noch gar nicht gerne mit dem Kind, oder du weißt es einfach nicht, wie gerne du mit diesem Kind spielst. [dabei auf das gelbe Gesicht zeigen]

Ich zeige dir jetzt gleich die Fotos von den anderen Kindern. Du darfst jedes Foto zu einem dieser Gesichter legen, je nachdem, ob du mit diesem Kinder sehr gerne spielst [dabei auf das grüne Gesicht zeigen], oder mit dem Kind gar nicht gerne spielst [dabei auf das rote Gesicht zeigen], oder ob es dir egal ist, ob du mit diesem Kind spielst [dabei auf das gelbe Gesicht zeigen].

Das erste Bild vom Stapel nehmen.

Wer ist das [überprüfen, ob das Kind den richtigen Namen sagt; wenn nicht, richtigen Namen nennen] - Wie gerne spielst du mit Kind-XY?

[bei den 2-3 ersten Fotos nochmal wiederholen]
Ich spiele sehr gerne mit Kind-XY - grüner lachender Smiley [dabei auf das grüne Gesicht zeigen]
Ich spiele gar nicht gerne mit Kind-XY - roter trauriger Smiley [dabei auf das rote Gesicht zeigen]
Es ist mir egal, ob ich mit Kind-XY spiele - gelber Smiley [dabei auf das gelbe Gesicht zeigen]

Das Kind soll das Bild zu dem Smiley legen.

Wenn die Kinder die Frage nicht verstehen, nochmal wiederholen oder Frage umformulieren.
Für jedes Kind aus der Gruppe durchführen.

_____

2. Runde
So, jetzt mische ich kurz alle Bilder und zeige sie dir dann alle noch einmal. Jetzt kannst du noch einmal alle Kinder, mit denen du sehr gerne spielst zum grünen Gesicht legen [dabei auf das grüne Gesicht zeigen], alle Kinder mit denen du gar nicht gerne spielst zum roten Gesicht legen [dabei auf das rote Gesicht zeigen], und alle Kinder, bei denen es dir egal ist, ob du mit ihnen spielst oder nicht zum gelben Gesicht legen [dabei auf das gelbe Gesicht zeigen].

Dem Kind den ganzen Stapel mit allen Fotos in die Hand geben. Das Kind soll jedes Bild unter den entsprechenden Smiley legen. Dadurch entsteht unter jedem Gesicht eine Gruppe an Fotos.

Wenn das Kind mit dem Anordnen fertig ist, noch einmal fragen:

Passt das jetzt so?

Wenn das Kind „ja“ sagt, sich beim Kind bedanken, die Fotos umdrehen und die jeweiligen IDs protokollieren. Ich würde für das Protokoll für die zweite Runde größere Boxen zu den jeweiligen Gesichtern vorschlagen, in die leicht viele IDs eingetragen werden können.

Wenn die Kinder die Frage nicht verstehen, nochmal wiederholen oder Frage umformulieren. Für jedes Kind aus der Gruppe durchführen.

6.5 Friendship assessment recording sheet

Taken from Wimmer (2023)

ID:

Runde 1	
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■
ID:	■ ■ ■

Runde 2					
	ID___	**ID___**	**ID___**	**ID___**	**ID___**
	ID___	**ID___**	**ID___**	**ID___**	**ID___**
	ID___	**ID___**	**ID___**	**ID___**	**ID___**
	ID___	**ID___**	**ID___**	**ID___**	**ID___**
	ID___	**ID___**	**ID___**	**ID___**	**ID___**
	ID___	**ID___**	**ID___**	**ID___**	**ID___**
	ID___	**ID___**	**ID___**	**ID___**	**ID___**
	ID___	**ID___**	**ID___**	**ID___**	**ID___**
	ID___	**ID___**	**ID___**	**ID___**	**ID___**

6.6 Games script

Taken from Wimmer (2023)

1. Contest Competition Game

[Kinder und ein:e Versuchsleiter:in setzen sich in den Sitzkreis]
Liebe Kinder, heute haben wir euch mehrere lustige Spiele mitgebracht. Wir werden jedes Spiel zuerst hier im Sitzkreis erklären und es dann spielen. Das heißt, es ist wichtig, dass ihr zuerst zuhört, wenn wir das Spiel erklären, damit jeder von euch versteht, wie das Spiel funktioniert. Wenn ihr Fragen habt, könnt ihr natürlich gerne fragen. Am besten, ihr hebt die Hand, falls ihr eine Frage habt:

---

1) Kaleidoskop
Schaut mal, als erstes Spiel habe ich euch ein neues Spielzeug mitgebracht *[Kaleidoskop zeigen]*
Das ist ein Kaleidoskop, wenn ihr dort durschaut sehr ihr tolle und lustige Muster.

Ich werde es gleich hier in die Mitte des Kreises legen und ihr könnt es dann 3/5 Minuten anschauen und damit spielen. Damit ihr wisst, wie lange ihr Zeit habt, mit dem Spielzeug zu spielen, habe ich auch eine Sanduhr mitgebracht. Wenn es lost geht, werde ich die Sanduhr umdrehen. Wenn die Hälfte des Sands durch die Uhr gefallen ist, werde ich euch sagen, dass schon die Hälfte der Zeit um ist. Wenn der letzte Sand durch die Sanduhr gefallen ist, ist das Spiel zu Ende und ich werde das Spielzeug wieder einsammeln. Ihr könnt euch selbst ausmachen, wer anfängt und wie lange jeder spielt.

Habt ihr noch Fragen zu dem Spiel? Seid ihr bereit? Los geht's! *[Das Spiel in die Mitte des Kreises legen; die Sanduhr umdrehen]*

[Zeit läuft]

[bei Hälfte der Zeit]: Die Hälfte der Zeit ist um!

[bei Ende der Zeit]: Die Zeit ist um! Könnt ihr mir das Spielzeug bitte zurückbringen? Danke! Wir werden jetzt das nächste Spiel spielen.

---

2) Wassertropfen-Spiel
Schaut mal, ich habe euch heute ein neues Spielzeug mitgebracht *[Wassertropfen-Spiel]*
Dieses Spielzeug erzeugt lustige Muster, wenn ihr es bewegt.

Ich lege es hier in die Mitte des Kreises und ihr könnt damit spielen. *[Das Spiel in die Mitte des Kreises legen]*

Ich werde die Sanduhr umdrehen. Wenn die Zeit um ist, werde ich das Spiel wieder einsammeln.

[Zeit läuft]

[bei Hälfte der Zeit]: Die Hälfte der Zeit ist um!

[bei Ende der Zeit]: Die Zeit ist um! Könnt ihr mir das Spielzeug bitte zurückbringen? Wir werden jetzt das nächste Spiel spielen.

3) Gucki
Schaut mal, ich habe euch noch ein neues Spiel mitgebracht *[Gucki]*.
Dieses Spielzeug hat hinten ein kleines Guckloch, in das man hinein schauen kann. Wenn man auf den Knopf an der Seite drückt, kann man dadurch verschiedene Bilder sehen.

Ich lege es hier in die Mitte des Kreises und ihr könnt damit spielen. *[Das Spiel in die Mitte des Kreises legen]*

Ich werde die Sanduhr umdrehen. Wenn die Zeit um ist, werde ich das Spiel wieder einsammeln.

[Zeit läuft]

[bei Hälfte der Zeit]: Die Hälfte der Zeit ist um!

[bei Ende der Zeit]: Die Zeit ist um! Könnt ihr mir das Spiel bitte zurückbringen? Wir werden jetzt das nächste Spiel spielen.

2. Sticker Game Script

Die Kinder sitzen immer noch im Sitzkreis mit Sitzkissen (nach dem Contest Competition Game). Orange Kegel sind schon in einer anderen Ecke des Raumes aufgestellt.
Sticker-Pass mit Namen sind schon vorbereitet.

Schaut, was ich euch noch mitgebracht habe (in den Beutel greifen und das Bilderbuch herausholen) – ein Bilderbuch.

In diesem Bilderbuch gibt es eine ganz tolle Geschichte – wollt ihr sie hören? [*wenn die Kinder zustimmen, etwas Bestärkendes antworten, wenn die Kinder zögerlich sind, etwas Aufmunterndes sagen z.B*. „also ich habe schon in dieses Buch reingeschaut und es ist wirklich spannend"]

In dem Buch geht es um Flippy Flamingo und ganz viele andere Tiere, die alle bei einem tollen Sticker-Spiel mitmachen. Soll ich es euch vorlesen? Schaut, ob ihr euch die Geschichte gut merken könnt.

[Das Buch vorlesen]

Wir werden euch jetzt einzeln im Kreis ein paar Fragen zu der Geschichte von Flippy Flamingo stellen. Bleibt auf euren Sitzkissen sitzen, wir kommen zu euch.

Eine Versuchsleiterin geht von Kind zu Kind und zeigt Fotos von den 4 Tieren und fragt jedes Kind einzeln diese zwei Fragen:

1. Zeig mir doch bitte auf dem Bild, welches Tier darf sich als erstes einen Sticker aussuchen?
2. Zeig mir doch bitte auf dem Bild, welches Tier darf sich als letztes einen Sticker aussuchen?

Jedem zweiten Kind werden die zwei Fragen in der umgekehrten Reihenfolge gestellt. Die Kinder sollen auf das Tier zeigen, aber es ist auch kein Problem, wenn sie den Namen des Tieres nennen.

Wenn das Kind auf das richtige Tier zeigt, sagt die Versuchsleiterin laut und deutlich „Ja, das stimmt". Wenn das Kind auf das falsche Tier zeigt, sagt die Versuchsleiterin laut und deutlich „Hm, ich glaube, es ist dieses Tier". So kann entweder eine zweite Versuchsleiterin die Antworten der Kinder protokollieren oder ihr könnt es später von den Videos protokollieren.

[Jetzt kommt das Austeilen der Stickeralben]

Wisst ihr was, wir haben auch für jeden von euch einen Stickerpass mitgebracht. Das heißt wir können das gleiche lustige Stickerspiel spielen, wie Flippy Flamingo und seine Freunde. Jeder von euch darf sich jetzt einen Stickerpass nehmen. Wer schon selbst seinen Namen schreiben kann, darf ihn draufschreiben. Wer Hilfe mit dem Schreiben braucht, dem können wir den Namen draufschreiben

[Kinder unterstützen, bis alle Kinder ihren Namen auf dem Stickeralbum haben]

So, jetzt setzen wir uns alle wieder in den Sitzkreis und ich erkläre, wie das Spiel funktioniert.

Dort drüben stehen orange Kegel, genau wie in der Geschichte von Flippy Flamingo und seinen Freunden [*zu den Kegeln zeigen*]. Dort gibt es dann auch eine Sticker-Box mit ganz vielen tollen Stickern, schaut mal her [*den Kindern die Sticker-Box zeigen*] Schaut, da sind ganz viele verschiedene Sticker drin. *[die Kinder gerne ein paar der Sticker benennen lassen]*

Wenn ich später „Los" sage, müsst ihr euch wie Flippy Flamingo und seine Freunde hinter den orangenen Kegeln in einer Reihe anstellen. Das Kind das ganz vorne in der Reihe steht, darf sich dann als erstes einen Sticker aus der Sticker-Box aussuchen, das Kind als Zweites in der Reihe darf sich als zweites einen Sticker aussuchen, usw. und das Kind, das als letztes in der Reihe steht, muss den Sticker nehmen, der übrig geblieben ist.

Wenn ich später „Los!" sage, habt ihr 2 Minuten Zeit, um euch in einer Reihe anzustellen, um eure Sticker auszusuchen. Die Reihe beginnt dort drüben bei den orangenen Kegeln *[zu den Kegeln zeigen]*, so wie in der Geschichte im Buch „Flippy Flamingo" *[die Seite zeigen, auf der sich die Tiere um ein Sticker anstellen]* Ihr macht euch untereinander aus, wer in der Reihe ganz vorne steht, wer in der Mitte steht, und wer am Schluss steht. Wir werden euch nicht sagen, in welcher Reihenfolge ihr euch anstellen sollt.

Habt ihr noch Fragen zu dem Spiel? Seid ihr bereit?

Los geht's! Ihr dürft euch anstellen. [Stoppuhr auf 2 Minuten stellen]

Falls Kinder um Hilfe bitten:
Wir werden euch nicht sagen, in welcher Reihenfolge ihr euch anstellen sollt. Das müsst ihr euch selbst ausmachen.

Okay, die Zeit ist um! Alle bleiben in ihrer Position stehen.

Jetzt darf das erste Kind zwischen den Kegeln durchgehen, um sich einen Sticker auszusuchen.

[Die Kinder laufen einzeln durch die zwei Kegel durch. Falls mehrere Kinder gleichzeitig durch die Kegel durchlaufen, aufhalten und sagen]
Nur immer ein Kind auf einmal!
Position des Kindes und Namen des Kindes beim Durchlaufen laut sagen.

3. Helping Game Script

Ein:e Versuchsleiter:in und die Kinder setzen sich wieder in den Sitzkreis; der:die zweite Versuchsleiter:in steht außerhalb des Sitzkreises.
Plüschtiere sind in Beuteln bei Versuchsleiter:innen.

So, jetzt kommen wir alle zurück in den Sitzkreis und ich erkläre euch das dritte Spiel. Es ist ein Bewegungsspiel. Ihr bekommt gleich alle einen Oktopus aus Plüsch *[die sitzende Person zeigt einen Oktopus beispielhaft]* und der Oktopus möchte einen Ausflug machen. Und zwar nicht irgendwie, der Oktopus möchte sich bei diesem Ausflug auf euren Kopf rauf setzen.

Mit dem Oktopus auf dem Kopf macht ihr euren kleinen Ausflug hier im Raum, ihr wandert durch den Raum, den Oktopus balanciert ihr auf eurem Kopf. [*die stehende Person platziert den Oktopus auf dem eigenen Kopf und geht ein paar Schritte hin und her*]

Und was passiert, wenn der Oktopus von eurem Kopf runterfällt? [*die stehende Person lässt den Oktopus vom Kopf fallen und bleibt in einer auffallenden Position stehen*]

Wenn der Oktopus runterfällt, dann müsst ihr stehen bleiben und seid eingefroren. Wisst ihr was das bedeutet? *[Antwort der Kinder abwarten, in jedem Fall nochmal wiederholen]* Ihr dürft euch nicht mehr bewegen. Das heißt sobald der Oktopus auf den Boden gefallen ist, dürft ihr euch nicht mehr bewegen und dürft auch den Oktopus nicht aufheben.

Aber das macht gar nichts. **Ein anderes Kind kann euch euren Oktopus aufheben und zurück auf den Kopf setzen. Dann seid ihr nicht mehr eingefroren, sondern wieder aufgetaut [*die sitzende Person steht auf und geht zur eingefrorenen Person, setzt den Oktopus wieder auf den Kopf; die Person beginnt sich wieder zu bewegen. Ganz wichtig: NICHT „DANKE“ SAGEN und das Vorzeigen mit so neutralem Gesichtsausdruck wie möglich machen; danach wieder in den Sitzkreis zu den Kindern setzen*]**

Habt ihr noch Fragen zu diesem Spiel? Habt ihr Lust dieses Spiel auch zu spielen?

Die Plüschtiere werden an die Kinder verteilt, die Kinder dürfen sich ihren Oktopus aussuchen.

Jetzt habt ihr alle euren Oktopus bekommen und wir probieren das mal aus. Setzt euch den Oktopus auf den Kopf und versucht mit ihm rumzulaufen. Wie klappt das? *[weniger als 1 min. üben lassen]*

Okay, wir werden das Spiel jetzt starten. Ich werde Musik anschalten und sobald das Lied startet, geht das Spiel los. Wenn das Lied vorbei ist, endet das Spiel.

Seid ihr bereit? Los geht’s! *[wenn Kinder bereit sind, die Musik starten und das Spiel beginnt]*

6.7 Games recording sheet

Taken from Wimmer (2023)

1. Tag – Datum: _____

Contest/ Toy Type:_____

ID:	Rang	Kommentar

Scramble

ID:	Rang	Verständnisfrage	Kommentar

Prosocial

ID:	Squid fällt	Geholfen HK	Helfen HK	Kommentar

6.8 Ethogram

FI = focal individual

COLOR CODE:

- State: Describes current state of FI. Output as duration.
- Event: Single occurrence of one behavior. Output as single time points.
- Bout: Series of events that occur within a specified period. Output as duration.

INFO TO PUT INTO EXCEL SHEET:

- *NA:* For individuals, that are not participating in focal session.

CODING BEHAVIORS:

All games:

- *Out of sight:* FI is not visible on screen. Start state as soon as FI leaves screen. End state as soon as FI is back on screen.

Game 1 (contest competition):

By hand into Excel:

- *Toy:* Type of toy used in focal session
- *Neighbor (right):* Child sitting next to FI on the RIGHT side.
- *Neighbor (left):* Child sitting next to FI on the LEFT side.
- *Rank:* Indicate rank for toy possession. 1st child in possession has rank 1, 2nd has rank 2 and so on. If a child, that has been in possession before, gets the toy again, it is not assigned a second rank, but this specific rank is skipped until another child gets the toy for the first time. It will then get the next rank in line.

Informative:

- *G1 start:* Code this as a marker to indicate the START of G1. The variable is coded as soon as the sand clock has been turned by the experimenter.
- *G1 end:* Code this as a marker to indicate the END of G1. The variable is coded as soon as the toy has been handed back to the experimenter. Must be set exactly 3 or 5 minutes after *G1 start*.

Request G1:

- *Request (ID):* FI requests the toy from (ID) at least once. Start bout as soon as the first request starts. End bout if child has stopped asking for ≥ 3 seconds.

Get possession:

- *Pick up*: FI picks up toy from ground and touches it for ≥ 3 seconds. Code as soon as at least one finger of at least one hand touches toy.
- *Receive from (ID)*: FI receives toy from (ID) and touches it for ≥ 3 seconds. Code as soon as at least one finger of at least one hand touches toy.
- *Take by force from (ID)*: FI takes toy by force from (ID) and touches it for ≥ 3 seconds. Code as soon as at least one finger of at least one hand touches toy.
- Failed attempt to take by force from (ID): FI attempts to take toy by force from (ID) but does NOT touch it for ≥ 3 seconds. Code as soon as at least one finger of at least one hand touches toy.
- *Undecided take/receive from (ID)*: FI gets toy from (ID) in a way that cannot clearly be defined as *take by force* or *receive* and touches it for ≥ 3 seconds. Code as soon as at least one finger of at least one hand touches toy.

Possession:

- *Possession*: FI touches toy with at least one part of at least one hand. Start coding as soon as at least one finger of at least one hand touches toy. End coding as soon as FI is not touching toy anymore.

Leave possession:

- *Place on ground*: FI places toy on ground. Code as soon as the child does not touch the toy anymore.
- *Give to (ID)*: FI gives toy to (ID). Code as soon as the child does not touch the toy anymore.
- Failed attempt to give to (ID): FI attempts to give toy to (ID) for ≥ 3 seconds, but (ID) does not get into possession (i.e. touch for ≥ 3 seconds). Code as soon as the child offers the toy by holding it towards (ID), while looking at them or calling out (ID)s name and verbally offering the toy.
- *Taken by force from (ID)*: FI is forcefully taken away toy by (ID). Code as soon as the child does not touch the toy anymore.
- *Undecided give to/taken from (ID)*: FI loses possession to (ID) in a way that cannot clearly be defined as *taken by force* or *give*. Code as soon as the child does not touch the toy anymore.

OPTIONAL: Co-possession:

To be coded "over" possession

- *Friendly*: FI as well as one or more other children (IDs) touch toy with at least one part of at least one hand. FI does not try to gain sole possession (= takes no action to stop other IDs from touching toy).
- *Unfriendly:* FI as well as one or more other children (IDs) touch toy with at least one part of at least one hand. FI attempts to gain sole possession by verbally demanding it, physically manipulating another child (e.g., push, move fingers) or the toy (e.g., pull on it)
- *Undecided:* FI as well as one or more other children (IDs) touch toy with at least one part of at least one hand for. The co-possession cannot clearly be defined as *friendly* or *unfriendly*.

Game 2 (scramble competition):

By hand into Excel:

- *Comprehension:* Number of comprehension questions answered right (0 – 1 – 2).
- *Rank:* FIs position in the queue (1 to *n*, with *n* = no of participants for the experimental session).

Game 3 (helping game):

Informative:

- *G3 start*: Code this as a marker to indicate the START of G3. The variable is coded as soon as the first song starts playing.
- *G3 end:* Code this as a marker to indicate the END of G3. The variable is coded as soon as the 2nd song ends. Must be coded exactly 5 minutes after *G3 start.*

Proximity:

- *Proximity (ID):* FI is located within a radius of ca. 0.5 meter around (ID). Ca. 0.5m = one arm-length, FI could touch (ID) if arm was put out. Multidirectional variable (FI can be in proximity of multiple other children at once).

Request G3:

- *Request (ID):* FI asks another child (indicate ID) for help/ to pick up their squid at least once. Start bout as soon as FI starts first question. End bout if child has stopped asking for ≥ 3 seconds.

Squid action:

- *Drop:* Squid leaves FIs head and FI freezes for ≥ 3 seconds. Code as soon as FI freezes.
- *Pick up (self):* FI picks up their squid themselves. Code as soon as FI has continued moving with squid on their head.
- *Pick up (ID):* FI picks up another child's squid and either hands it to them or places it back on their head. Code as soon as FI does not touch squid anymore and (ID) has continued moving with squid on their head.
- *Undecided:* FI has continued moving with squid on their head after a *drop*. It is not clear, whether this is due to self- or other-pick-up.

6.9 Attendance per group and session

Group	Gender	FA	Session 1	Session 2	Session 3
A	females	5	4	4	3
	males	6	6	4	4
	total	**11**	**10**	**8**	**7**
B	females	7	5	6	6
	males	5	4	3	2
	total	**12**	**9**	**9**	**8**
C	females	6	7	5	8
	males	3	2	3	2
	total	**9**	**9**	**8**	**10**
D	females	8	6	6	6
	males	4	3	2	3
	total	**12**	**9**	**8**	**9**
E	females	3	2	2	3
	males	10	7	7	9
	total	**13**	**9**	**9**	**12**
F	females	3	3	2	2
	males	5	5	4	4
	total	**8**	**8**	**6**	**6**
G	females	4	3	4	3
	males	2	1	2	2
	total	**6**	**4**	**6**	**5**
H	females	5	3	4	4
	males	3	3	2	1
	total	**8**	**6**	**6**	**5**
I	females	2	2	2	1
	males	8	8	7	5
	total	**10**	**10**	**9**	**6**
J	females	7	6	5	6
	males	4	4	3	2
	total	**11**	**10**	**8**	**8**
K	females	1	1	1	1
	males	5	5	5	5
	total	**6**	**6**	**6**	**6**
ALL	females	51	42	41	43
	males	55	48	42	39
	total	**106**	**90**	**83**	**82**

6.11 Teacher reliability

6.11.1 Agreement between teachers

Group	Kappa
A	.73
B	.22
C.1	.12
C.2	/
D	.66
E	/
F	.34
G	.62
H	1
I.1	.22*
I.2	1
J	.51*
K	.66

Note. * indicates 4 raters

6.11.2 Agreement between teachers and children

Child	T1	T2	T3	T4
A_F01	.74	.74	/	/
A_F02	.74	.74	/	/
A_F03	.15	.25	/	/
A_F04	.65	.29	/	/
A_F05	1	.74	/	/
A_M01	0	0	/	/
A_M02	-0.18	-.03	/	/
A_M03	0.15	.48	/	/
A_M04	.62	.42	/	/
A_M05	.15	.25	/	/
A_M06	-.10	-.31	/	/
B_F01	.00	.00	/	/
B_F02	.47	.23	/	/
B_F03	.63	1	/	/
B_F04	.35	-.17	/	/
B_F05	.31	1	/	/
B_F06	-.25	.43	/	/
B_F07	.17	.17	/	/
B_M01	.56	.43	/	/
B_M02	1	.43	/	/
B_M03	0	.31	/	/

Child	T1	T2	T3	T4
B_M04	.47	.23	/	/
B_M05	.11	.43	/	/
C_F01	.33	/	/	/
C_F02	.67	/	/	/
C_F03	.25	/	/	/
C_F04	.57	/	/	/
C_F05	.33	/	/	/
C_M01	-.36	/	/	/
C_F06	/	/	/	/
C_F07	/	/	/	/
C_F08	/	/	/	/
C_M02	/	.55	/	/
C_M03	/	.00	/	/
D_F01	.63	.80	/	/
D_F02	.40	.63	/	/
D_F03	.56	.80	/	/
D_F04	.75	.44	/	/
D_F05	.40	.27	/	/
D_F06	1	1	/	/
D_F07	.25	.25	/	/
D_F08	.80	.64	/	/

Child	T1	T2	T3	T4
D_M01	0	.17	/	/
D_M02	-.11	.21	/	/
D_M03	.63	.47	/	/
D_M04	.68	.35	/	/
E_F01	.56	/	/	/
E_F02	-.02	/	/	/
E_F03	.32	/	/	/
E_M01	.24	/	/	/
E_M02	.28	/	/	/
E_M03	.11	/	/	/
E_M04	-.11	/	/	/
E_M05	.10	/	/	/
E_M06	.03	/	/	/
E_M07	.28	/	/	/
E_M08	.81	/	/	/
E_M09	-.05	/	/	/
E_M10	.28	/	/	/
F_F01	.47	.71	/	/
F_F02	.50	.75	/	/
F_F03	.33	1	/	/
F_M01	.14	.14	/	/
F_M02	.33	1	/	/
F_M03	.71	.33	/	/
F_M04	.38	.60	/	/
F_M05	.71	1	/	/
G_F01	.33	.67	/	/
G_F02	.25	.25	/	/
G_F03	.40	.18	/	/
G_F04	.57	.57	/	/
G_M01	-.20	-.20	/	/
G_M02	-.29	-.20	/	/
H_F01	1	1	/	/
H_F02	.25	.25	/	/
H_F03	.53	.53	/	/
H_F04	-.26	-.26	/	/
H_F05	.33	.33	/	/
H_M01	.38	.38	/	/
H_M02	-.25	-.25	/	/
H_M03	.60	.60	/	/
I_F01	0	/	/	/
I_F02	0	-.16	-.10	-.10

Child	T1	T2	T3	T4
I_M01	-.10	-.10	0	0
I_M02	.62	.62	0	0
I_M03	-.10	-.14	-.10	-.10
I_M04	.24	.04	-.18	0
I_F03	0	0	0	0
I_M05	0	0	.42	.42
I_M06	0	0	.42	.42
I_M07	0	0	.74	.74
I_M08	0	0	.74	.74
J_F01	.74	.74	.42	.42
J_F02	.79	.79	.54	.23
J_M01	.62	.62	.62	.62
J_F03	.42	.42	.63	.62
J_F04	.21	.21	.44	.44
J_F05	.23	.23	.29	.49
J_F06	-.04	-.04	.44	-.18
J_F07	.61	.21	.07	.38
J_M02	.81	.81	.63	.24
J_M03	.44	.07	.63	.81
J_M04	0	1	.21	.62
K_F01	.18	.18	/	/
K_M01	.40	.67	/	/
K_M02	1	.33	/	/
K_M03	.67	.67	/	/
K_M04	.33	.67	/	/
K_M05	0	/	/	/

6.12 Children's reliability for friendship assessments

ID	age	gender	kappa
A_F01	52	F	.53
A_F02	61	F	.38
A_F03	63	F	.44
A_F04	69	F	.80
A_F05	76	F	1
A_M01	41	M	-.36
A_M02	39	M	0
A_M03	62	M	.81
A_M04	62	M	.51
A_M05	68	M	.63
A_M06	68	M	.66
B_F01	47	F	1
B_F02	68	F	.86
B_F03	73	F	.41
B_F04	61	F	.66
B_F05	43	F	.06
B_F06	74	F	.57
B_F07	62	F	.53
B_M01	49	M	.84
B_M02	50	M	1
B_M03	59	M	.83
B_M04	60	M	1
B_M05	76	M	1
C_F08	70	F	1
C_M02	69	M	.23
C_M03	51	M	.15
C_F01	79	F	1
C_F02	63	F	.34
C_F03	63	F	.61
C_F04	63	F	.55
C_F05	75	F	.69
C_M01	56	M	.82
D_F01	42	F	.63
D_F02	58	F	1
D_F03	64	F	.86
D_F04	64	F	.46
D_F05	45	F	.32
D_F06	41	F	.61

ID	age	gender	kappa
D_F07	39	F	0
D_F08	74	F	1
D_M01	62	M	.66
D_M02	69	M	0
D_M03	59	M	.55
D_M04	64	M	.81
E_F01	66	F	1
E_F02	74	F	.82
E_F03	64	F	1
E_M01	76	M	.54
E_M02	46	M	.20
E_M03	48	M	.67
E_M04	49	M	.13
E_M05	39	M	1
E_M06	38	M	.29
E_M07	55	M	.38
E_M08	48	M	.52
E_M09	71	M	.75
E_M10	55	M	.47
F_F01	69	F	1
F_F02	61	F	1
F_F03	78	F	.72
F_M01	57	M	1
F_M02	56	M	1
F_M03	76	M	.74
F_M04	76	M	1
F_M05	62	M	1
G_F01	74	F	1
G_F02	46	F	- .01
G_F03	70	F	1
G_F04	51	F	1
G_M01	54	M	.38
G_M02	47	M	0
H_F01	71	F	.68
H_F02	68	F	1
H_F03	61	F	.56
H_F04	42	F	-.40
H_F05	70	F	.16

ID	age	gender	kappa
H_M01	43	M	.07
H_M02	62	M	.36
H_M03	77	M	0
I_F02	61	F	.30
I_M01	49	M	.05
I_M02	80	M	.72
I_M03	47	M	.45
I_M04	65	M	.68
I_F03	62	F	1
I_M05	50	M	1
I_M06	74	M	.83
I_M07	60	M	1
I_M08	75	M	.72
J_F01	62	F	.47
J_F02	66	F	1
J_M01	67	M	.40
J_F03	60	F	1
J_F04	79	F	.80
J_F05	72	F	1
J_F06	74	F	0.38
J_F07	67	F	0.80
J_M02	64	M	1
J_M03	74	M	1
J_M04	69	M	0.47
K_F01	63	F	1
K_M01	51	M	1
K_M02	55	M	0.64
K_M03	53	M	1
K_M04	75	M	1
K_M05	38	M	-0.67

6.13 Children's friend counts

Group	ID	Gender	Age (months)	Friend Count
A	A_F01	F	52	3
	A_F02	F	61	3
	A_F03	F	63	8
	A_F04	F	69	6
	A_F05	F	76	3
	A_M01	M	41	0
	A_M02	M	39	6
	A_M03	M	62	6
	A_M04	M	62	5
	A_M05	M	68	8
	A_M06	M	68	5
B	B_F01	F	47	0
	B_F02	F	68	5
	B_F03	F	73	1
	B_F04	F	61	7
	B_F05	F	43	1
	B_F06	F	74	3
	B_F07	F	62	6
	B_M01	M	49	3
	B_M02	M	50	3
	B_M03	M	59	4
	B_M04	M	60	5
	B_M05	M	76	3
C	C_F01	F	79	1
	C_F02	F	63	3
	C_F03	F	63	2
	C_F04	F	63	5
	C_F05	F	75	3
	C_F06	F	53	/
	C_F07	F	53	/
	C_F08	F	70	1
	C_M01	M	56	4
	C_M02	M	69	2
	C_M03	M	51	3

Group	ID	Gender	Age (months)	Friend Count
D	D_F01	F	42	4
	D_F02	F	58	4
	D_F03	F	64	3
	D_F04	F	64	2
	D_F05	F	45	3
	D_F06	F	41	3
	D_F07	F	39	2
	D_F08	F	74	3
	D_M01	M	62	6
	D_M02	M	69	8
	D_M03	M	59	4
	D_M04	M	64	7
E	E_F01	F	66	8
	E_F02	F	74	8
	E_F03	F	64	10
	E_M01	M	76	1
	E_M02	M	46	4
	E_M03	M	48	7
	E_M04	M	49	2
	E_M05	M	39	12
	E_M06	M	38	5
	E_M07	M	55	4
	E_M08	M	48	3
	E_M09	M	71	3
	E_M10	M	55	4
F	F_F01	F	69	3
	F_F02	F	61	4
	F_F03	F	78	2
	F_M01	M	57	3
	F_M02	M	56	2
	F_M03	M	76	2
	F_M04	M	76	1
	F_M05	M	62	2
G	G_F01	F	74	3
	G_F02	F	46	2
	G_F03	F	70	4
	G_F04	F	51	1
	G_M01	M	54	1
	G_M02	M	47	1

Group	ID	Gender	Age (months)	Friend Count
H	H_F01	F	71	5
	H_F02	F	68	7
	H_F03	F	61	3
	H_F04	F	42	1
	H_F05	F	70	2
	H_M01	M	43	1
	H_M02	M	62	4
	H_M03	M	77	1
I	I_F01	F	39	/
	I_F02	F	61	1
	I_F03	F	62	1
	I_M02	M	80	1
	I_M03	M	47	1
	I_M04	M	65	5
	I_M01	M	49	1
	I_M05	M	50	3
	I_M06	M	74	5
	I_M07	M	60	3
	I_M08	M	75	3
J	J_F01	F	62	3
	J_F02	F	66	3
	J_F03	F	60	5
	J_F04	F	79	5
	J_F05	F	72	7
	J_F06	F	74	4
	J_F07	F	67	4
	J_M01	M	67	2
	J_M02	M	64	5
	J_M03	M	74	5
	J_M04	M	69	1
K	K_F01	F	63	4
	K_M01	M	51	4
	K_M02	M	55	3
	K_M03	M	53	4
	K_M04	M	75	3
	K_M05	M	38	0

Note. / indicates that individual did not participate in the friendship assessment.