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TITLE	Together with my playmates: Preschoolers' peer relationships and interactions in small group settings
YEAR	2021
DOI	https://doi.org/10.1016/j.lcsi.2021.100531
VERSION	Author's accepted manuscript
COPYRIGHT	License: CC BY NC ND
CITATION	Wang, Y.-L & Kajamies, Anu & Hurme, Tarja-Riitta & Palonen, Tuire. (2021). Together with my playmates: Preschoolers' peer relationships and interactions in small group settings. Learning Culture and Social Interaction. 30. 100531. 10.1016/j.lcsi.2021.100531.

Abstract

Researchers and professionals in the early childhood education context have expressed concern over children's social and emotional behaviours and peer relationships. The current study aimed to investigate how children's interactions in small groups are associated with their peer relationships. Another aim was to learn how children's peer interactions vary at the individual level. The study's participants were 16 five-to-six-year-old full-time kindergarteners. Social network analysis was conducted, based on sociometric nominations, to test the degree centrality of all 16 children's peer acceptance, preference and likability. Video-recorded interactions among all participants were analysed to calculate the children's frequency of prosocial and problem behaviours. Four children's interactions were analysed in more detail. Our results showed a positive correlation between children's peer preferences and their problem behaviours. Furthermore, we observed a positive correlation between children's mutual ties and their prosocial and problem behaviours. We found no linear developmental trend from individual-level interactions. Our results indicate that situational environments relate to children's peer relationships and interaction dynamics. Kindergarten teachers can use this study's results to consider various activities that would encourage children's active interactions with various peers from children's standpoints, rather than adults' perspective.

Keywords: preschooler, peer relationship, peer interaction, small group, social network analysis

Together with My Playmates: Preschoolers' Peer Relationships and Interactions in Small-Group Settings

Children's social and emotional skills are expected to develop in practice while they interact with their peers (Denham & Brown, 2010; Hu et al., 2017). During peer interactions, children learn to understand and manage their emotions and to establish and maintain peer relationships. Learning social and emotional skills relates to peer relationships' formation in many ways (Şendil & Erden, 2014), and early childhood is a crucial phase in the development of peer relationships and interactions because children start expanding their networks beyond family members during this time (Ortega et al., 2009). Even one-year-old children tend to select specific peers to play with (Engdahl, 2012).

Educational and psychological research has provided rich evidence concerning early childhood social relationships and their significance for children's later lives (Hepler, 1997). Humans' psychological adjustments have been regarded as deeply related to these experiences, and peer relationships have been deemed necessary because they affect children's social, cognitive and emotional development (Johnson et al., 2000). On the other hand, children's social and emotional behaviours have been supposed to affect their opportunities to establish peer relationships (Lyubomirsky et al., 2005). Furthermore, emotions' frequency and intensity have been suggested to predict the quality of kindergarteners' social relationships (Hernandez et al., 2017).

Peer status terminology uses multiple definitions (see, e.g., Gifford-Smith & Brownell, 2003). Typically, peer status is regarded as a one-way concept that determines children's acceptance of or preferences for a particular peer (Doll, 1996; Rubin et al., 2006). In this study, we use the term *peer preference* to indicate children's own selection of which peers to play with. Similarly, we define *mutual likability* as a reciprocal relationship that requires both acceptance and mutual preference between two children. In our study, we aimed to compare

how peer relationships – that is, children's peer preferences, peer acceptance and mutual liking – relate to their social and emotional interactions in small groups. Because peer relationships and interactions during early childhood are expected to be dynamic, we were interested in variation throughout an academic year in order to see how peer ties influenced social and emotional interactions, as well as vice versa. For this purpose, we sought methods and tools that would help us to understand the direction of a tie and, thus, discern whether a tie were asymmetric or symmetric and whether a child were starting an interaction or responding to a previous interaction. Often, teachers evaluate young children's peer relationships and interactions. In this study, we instead listened to children's own opinions and observed their interactions in small-group contexts.

Peer Acceptance and Rejection in Social and Emotional Behaviour

Just as peer acceptance is associated with positive social and emotional interactions, peer rejection relates to negative social and emotional interactions (Johnson et al., 2000). Gülay and Onder's (2013) study with five-to-six-year-old children found social and emotional skills to predict prosocial behaviour and, thus, help form peer relationships. Hernandez et al. (2017) proposed that children with better emotional control enjoy greater teacher–student closeness, as well as more peer acceptance. Additionally, according to Gartstein et al. (2012), children who are able to express more positive emotions are also more likely to be prosocial and fun, to be around their peers more often and to be better liked by their peers. Preschoolers' peer acceptance has been positively related to their prosocial behaviours (Shin et al., 2011), as well as their social interaction skills (Gottman et al., 1975). Further, children who are widely accepted by other children are more capable of showing prosocial skills, such as blindfolded listening or providing help. According to Lindsey (2002), teachers regard children with at least one mutual friendship as more socially competent than children without any mutual friendship ties.

Numerous researchers have shown that children with low peer acceptance levels present more negative social and emotional behaviours than children with higher peer acceptance levels (Smith, 2001). For example, rejected children have been found to more likely exhibit problem behaviours, such as disruption, aggression (Hymel et al., 1990), and a hot temper (Erwin, 1993), and they have also been found to have less emotional control, such as more intense or frequent anger (Hernandez et al., 2017). Further, rejected children's verbal communication competence has been shown to develop poorly (van der Wilt et al., 2018). Similarly, according to Coplan and Bullock (2012), children with negative emotions are less likely to engage in prosocial behaviours and, thus, are less liked by their peers. For example, children who express more anger tend to have a lower peer status (Strand et al., 2015).

Children's social and emotional interactions share a complex connection with their peer relationships. Children's behaviours are connected with their peer relationships (Lyubomirsky et al., 2005) and the quality of their peer relationships (Hernandez et al., 2017). Whether children can participate in prosocial interactions or whether problem behaviours manipulate their daily interactions could predict their abilities to build and maintain peer ties. Accordingly, one of this study's main goals was to better understand how children's peer ties – such as friendship ties – influence their interactions with other children and vice versa, as well as how children's behaviour relates to the number and quality of their peer ties.

Observing Prosocial and Problem Behaviours during Peer Interactions

A wide range of studies have focused on children's peer interactions, emphasising various perspectives, such as emotional competence (Denham, 2007; Köngäs, 2018), emotional regulation and self-management (Denham et al., 2012), and children's collaboration and socio-emotional learning in a digital context (Koivula et al., 2017). Prosocial behaviour can be examined through feelings of empathy and compassion towards other children, positive attitudes about sharing and cooperation, expressions of positive feelings and such behaviours

as inclusion and compliment-giving (Honig, 2004). Conversely, problem behaviours include internal or external acts, such as aggressive or impulsive interactions (Sterba et al., 2007).

Prosocial competence is believed to help reduce behavioural problems (Langeveld et al., 2012), and for this reason, many interventions and programmes have been planned and implemented to enhance social and emotional skills among preschoolers. Some curricula have indicated positive results, including the Dinosaur School Curriculum (Webster-Stratton et al., 2008) and the Preschool Promoting Alternative Thinking Strategies curriculum (Hamre et al, 2012). However, negative impacts on self-regulation and social skills – such as increased aggressive behaviour – have also been reported after interventions (Coley et al., 2013; Vermeer & van Ijzendoorn, 2006).

A screening process, if implemented at the start of kindergarten, is believed to enable early identification of and intervention with children experiencing social and emotional difficulties (Houri & Miller, 2019). To screen for children's social and emotional behaviours, various classifications of positive and negative behaviour are available. For example, CASEL (Collaborative for Academic, Social and Emotional Learning, 2012) has defined five domains that encompass these behaviours: self-awareness, self-management, social awareness, relationship skills and responsible decision-making. For this project, a new tool was developed to observe prosocial and problem behaviours (PIOT; Author et al., 2018). PIOT is a modification of the preschool version of the Social Skills Improvement System–Rating Scales (SSIS–RS; Gresham & Elliott, 1990), which other researchers have also verified (Gamst-Klaussen et al., 2016). PIOT further divides prosocial and problem behaviours into *initiating* and *responding* behaviours.

We have noted in this section that a large body of research has provided evidence supporting a positive correlation between children's peer relationships and social and emotional skills, as well as emotional development, social competence and self-regulation skills (Stifter et al., 2008;

Valiente et al., 2012). Less is known about how these two elements – emotional and social behaviour and peer relationships – interrelate. Still more information is needed on the complex and interrelated connection between children's social and emotional behaviour when they interact in peer groups and how this connection relates to their peer relationships. Furthermore, most of the previous literature has been written from professionals' perspective, targeting mainly how adult norms are followed. More questions could be asked of children themselves or observed during children's activities in authentic environments. In our study, we were particularly interested in how children's liking-ties (peer acceptance, peer preference and mutual ties) relate to their social and emotional behaviours in small-group interactions from children's own perspectives. Furthermore, we studied interactions from attributors' and receivers' perspectives – that is, by examining whether children initiated or responded to interactions.

Research Questions

The present study aimed to investigate how preschool-aged children's peer relationships relate to their social and emotional interactions, which were classified as either *prosocial behaviours* or *problem behaviours*. Children's social relationships were examined through a peer rating of peer acceptance, peer preference and ties' mutuality. Essentially, we aimed to study children in the small-group, early childhood education context usually organised at Finnish preschools for one academic year. Our research questions were:

1. How do children's peer relationships relate to their social and emotional interactions, classified as either *prosocial* or *problem* behaviours and further divided into *initiating* and *responding* interactions?
2. How do children's social and emotional interactions vary at the individual level?

Method

Participants

The participants in this longitudinal study were children attending full-time daycare at a private kindergarten in southern Finland. Altogether, 16 native Finnish-speaking five-to-six-year-olds – seven girls and nine boys –participated in the study. A more detailed analysis was conducted with four children. All children participated voluntarily. Parental consent was obtained in advance of the study, and the study's participation rate was 100% of the targeted kindergarten group.

Data Collection and Analysis

This study used two types of information: sociometric ratings and video-recorded peer interactions. Therefore, two kinds of methodological approaches were utilised. Sociometric ratings were analysed using social network methods to indicate how much children were liked by their peers. Meanwhile, observational analysis was used to examine children's social and emotional interactions in small-group situations centred around tablet computers. The study's duration was one academic year, which began in the autumn semester and continued until the end of the spring semester.

Sociometric Rating and Social Network Analysis (SNA). A traditional sociometric procedure which had been deemed reliable and valid for young children was individually administered to each child. Peer rating data were collected from interviews using a three-point Likert scale originally developed by Asher et al. (1979), and each interview lasted about 15 minutes. Photographs of 15 peers were shown to each child using a tablet device during each interview, one at a time and in a random order, thus ensuring that the children's memories would not influence their responses (Howes, 1987). In their interviews, each child was asked to indicate how much they liked playing with their peers using the following rating categories: *I always like to play with this child*, *I sometimes like to play with this child*, or *I never like to play with this child*. The interviews were repeated for each child every other month to

determine which changes had occurred in their peer relationships. Since the interview procedure was repeated five times, in total, 78 interviews were conducted. Two children were absent from their interviews one time each, and the missing data were replaced using values reported by the other children – in other words, via symmetrisation with a maximum principle.

For the study's social network analysis (SNA; Wasserman & Faust, 1994), degree centrality was used to indicate how much the children were liked by their peers (peer acceptance was measured with Freeman's indegree values) and how much they liked their peers (peer preference was measured with Freeman's outdegree values; Wasserman & Faust, 1994). Additionally, a mutually positive liking-relationship between children was recorded if both children had reported that they liked playing with each other 'sometimes' or 'always'.

One square matrix was created for data analysis at each time point. In these matrices, *0* was coded each time a child replied with the statement, *I never like to play with this child*, *1* was coded for each time a child replied with, *I sometimes like to play with this child*, and *2* was coded for each time a child replied with, *I always like to play with this child*. Thus, each cell's value in each square matrix could vary from 0 to 2 (see Table 1). Within each matrix, the sum of a column indicated peers' reported indegree value, while the sum of a row indicated the outdegree values reported by each child. Finally, all indegree values and outdegree values were summed at all five measurement points. These variables are, hereinafter, called *peer acceptance* for the sum of all indegree values and *peer preference* for the sum of all outdegree values. Additionally, we used a variable that was the sum of mutual liking-ties between children, calculated by adding all mutual ties from the five square matrices together, collected every second month during the study's academic term. Possible indegree and outdegree values ranged, thus, from 0 to 150 for each child, while possible mutual tie values varied from 0 to 75. At the end of the study, these three variables (*peer acceptance*, *peer preference* and *mutual ties*) were added to an SPSS (IBM Corp., Armonk, NY, USA) spreadsheet for further analysis.

Table 1

Example Matrix of Sociometric Ratings at One Time Point

Pseudonymised name	Sinikka	Veera	Sanna	Emilia	Olavi	Lauri	Eemeli	Arto	Marita	Outi	Seija	Aatu	Asko	Kalle	Antti	Oskari	**Outdegree**
Sinikka		2	1	1	0	1	1	1	2	2	1	2	2	2	2	1	**21**
Veera	1		1	1	0	1	0	0	1	1	1	1	1	1	1	0	**11**
Sanna	2	2		2	0	0	0	0	2	2	2	0	0	0	0	0	**12**
Emilia	1	1	2		0	0	0	0	1	1	1	1	0	0	0	0	**8**
Olavi	1	1	2	1		1	2	2	1	0	1	1	2	1	1	2	**19**
Lauri	0	0	0	0	2		2	1	0	0	0	0	1	0	0	2	**8**
Eemeli	1	0	1	1	2	2		2	0	0	1	2	2	0	1	2	**17**
Arto	1	0	1	1	2	1	2		1	0	1	1	2	0	1	1	**15**
Marita	1	1	1	1	0	0	0	1		2	1	1	1	1	1	1	**13**
Outi	1	1	1	1	0	0	0	1	2		1	1	1	1	1	0	**12**
Seija	1	1	1	1	1	1	0	1	1	1		0	1	0	0	0	**10**
Aatu	1	0	0	1	0	1	1	0	1	1	0		1	1	1	1	**10**
Asko	2	1	1	2	1	1	2	2	2	1	1	2		2	2	2	**24**
Kalle	0	0	1	2	0	1	2	0	2	2	0	2	2		2	2	**18**
Antti	1	0	0	1	0	0	1	1	1	1	0	1	1	2		1	**11**
Oskari	0	0	0	0	1	2	2	1	0	0	0	0	1	1	0		**8**
Indegree	**14**	**10**	**13**	**16**	**9**	**12**	**15**	**13**	**17**	**14**	**11**	**15**	**18**	**12**	**13**	**15**	

Note. 0 = *never want to play*, 1 = *sometimes like to play* and 2 = *always like to play*.

Detailed analysis of the participants selected for further study was based on the sum of the sociometric nominations. The criteria for individual-level analysis were selecting the least-liked and most-liked girls and the least-liked and most-liked boys, based on the sums of indegree values in the five peer rating matrices collected (see, e.g., Table 1). Consequently, we chose Veera (with a value of 49), Marita (with a value of 74), Olavi (with a value of 43) and Asko (with a value of 64). We assumed the sums of the indegree values reflected the levels of peer acceptance among participating children.

Participants were selected for the study's video analysis in two steps. First, we analysed all 16 participants in two different types of sessions: (a) a session in which group members were selected by the children themselves, and (b) a session in which group members were selected by the teacher. Second, four children were selected for in-depth, individual-level analyses. Altogether, 11 video clips (30 minutes each) were utilised to scrutinise interaction trends among these children during the study's six-month duration, from November to May. Sessions

were chosen from the beginning, middle and end of the research period. For all sessions analysed at the individual level, the children had been allowed to select their group members by themselves. We selected participants from child-preferred groups to emphasise child-initiated preferences, instead of groups arranged by teachers. This use of child-preferred groups resulted in all of the groups comprising same-gender peers. We had expected this same-gender composition, given that children at this age tend to play most often with peers of the same gender (Maccoby & Jacklin, 1987). Some changes in small-group composition occasionally took place due to a child's absence, such as when a child was out ill or on holidays. Additionally, for one girl (Marita, see Table 2), only three videos were analysed because we lacked sufficient recordings from the child-preferred groups. Some videos were used several times for various children (Veera and Marita were both in Group 1, while Olavi and Asko were both in groups 9–11). Table 2 presents detailed information about the study's participants and group compositions.

Table 2

Participants Analysed at the Individual Level and Group Compositions

Gender	Group	Group Members			
Girls	1	Veera 1	Marita 1	Outi	
	2	Veera 2	Emilia	Seija	
	3	Veera 3	Emilia	Seija	Sinikka
	4	Veera 4	Emilia	Sanna	
	5	Marita 2	Sinikka	Seija	Outi
	6	Marita 3	Sinikka	Seija	Outi
Boys	7	Olavi 1	Lauri	Eemeli	
	8	Asko 1	Kalle	Aatu	
	9	Olavi 2	Asko 2	Eemeli	Arto
	10	Olavi 3	Asko 3	Oskari	Lauri
	11	Olavi 4	Asko 4	Oskari	Arto

Note. The numbers after the names of analysed participants indicate sessions' order.

Observations of Video-Recorded Peer Interactions in Small-Group Situations. Video analyses were conducted using ELAN annotation software (Wittenburg, Brugman, Russel, Klassmann, & Sloetjes, 2006). Peer interaction was observed based on our PIOT tool (Author

et al., 2018), which was modified from a preschool version of the SSIS–RS (Gresham & Elliott, 1990). The PIOT tool was developed especially for use with interactive behaviours that can be observed in videos. Following the PIOT categories, the participating children's social and emotional interactions were classified as either *prosocial* or *problem* interactions and also as either *initiating* or *responding* interactions. Detailed PIOT categories and related results have been published elsewhere, along with another perspective to these data (see Author et al., 2018). Prosocial initiating comprises eight subcategories – for example, *providing help*, *initiating conversation*, *taking responsibility* and *inviting a peer*. Prosocial responding comprises seven subcategories – for example, *accepting help*, *replying to a peer*, and *ignoring distraction*. Problem initiating behaviours comprise four subcategories, such as *acting impulsively* and *excluding a peer*. Finally, problem responding behaviours are classified into four subcategories, such as *being inattentive* and *being aggressive*. In this article, such subcategories were not differentiated due to the data's size. We expected that understanding whether a behaviour were an initiation or a reaction would provide information with which to distinguish each child's positioning vis-à-vis their peers during an interaction (Iiskala et al., 2015) in a particular social context (Turner & Nolen, 2015). At the end of the study period, the four variables (*prosocial initiating*, *prosocial responding*, *problem initiating* and *problem responding*) and the totalled values for prosocial and problem interactions were added to an SPSS spreadsheet for further analysis.

iPads as a Learning Environment. iPads were used at the kindergarten for the study's research sessions. Outside the research periods, tablets were also integrated into other pedagogical activities. The application of technical support is also considered to offer the advantage of co-evolving technology and social infrastructure (Lipponen, 2002). Thus, digital play offered a context of collaboration for this study. In each research session, three or four children shared one tablet computer for about 30 minutes. The children were allowed to discuss

among themselves which games they wanted to play and how they wanted to organise shifts for iPad use. This environment was designed to initiate situations in which collaborative interactions could occur (Lipponen et al., 2004). The children were encouraged to collaborate with their peers while gaming, but solo play was also possible. To create a natural context in which to observe the children's peer interactions, we instructed teachers to only involve themselves in the activity if the children encountered technical problems or unresolvable conflicts; thus, the teachers played a passive role during these sessions. This decision also aimed to maximise the children's own contributions. During the study, the participating children's game session occurred approximately every other week, with three or four children playing tablet computer games together, and one video camera was used to capture all group interactions.

Statistical Analyses. After the data were prepared, descriptive statistical analyses and Spearman's rank-order correlation measures of the children's peer relationships and interactions were calculated.

Results

To begin our analyses, we presented descriptive statistics for all variables (see Table 3). Peer relationships' standard deviations indicated that peer acceptance (i.e. peer reports) differed less between children than peer preferences (i.e. self-reports). Therefore, some children were more eager to report peer ties than others, and this difference was greater than the difference in observed likeability (i.e. variance in peer acceptance). There were no rejected children in our data, and all participants had mutual ties with other children; standard deviation values were moderate, indicating little variation.

The mean values for peer interactions showed that prosocial interactions were nearly three times more frequent than problem interactions. Further, problem interactions were unevenly distributed among the children, as the standard deviation values revealed. This result stemmed

from particular children in a group more frequently participating in problem interactions than others (see Table 3).

Table 3

Descriptive Statistics for Summed Values in Peer Relationships and Interaction

	Peer Relationships			**Prosocial Interactions**			**Problem Interactions**		
	Acceptance	Preference	Mutual	Initiating	Responding	**Sum**	Initiating	Responding	**Sum**
Mean	60	61	37	54	51	**105**	27	9	**36**
SD	8	17	8	24	20	**36**	21	8	**26**
Min.	43	34	27	17	27	**44**	1	0	**6**
Max.	74	93	49	85	101	**149**	76	29	**100**

Bridging Peer Relationships with Social and Emotional Interactions

According to our research questions, we first studied whether peer relationships and interactions were linked using correlation analysis. Spearman's correlation coefficient was selected because some variables were not normally distributed. A statistically significant correlation was found for peer preferences with problem initiating interactions (r = 0.594). Consequently, a correlation was also found between the totalled values of all problem interactions (r = 0.584). However, the results of this analysis indicated that peer acceptance did not correlate with either prosocial or problem interactions, a somewhat unexpected result (see Table 4). The other partly unexpected result, indicating that peer preference correlated with problem behaviours, could be explained by both variables' indicating some sort of activity: activity in reporting liking-ties with one's peers and activity in starting problem interactions in small-group situations.

Table 4

Spearman's Correlation Between Peer Relationships and Interactions

Peer	**Prosocial Interactions**			**Problem Interactions**		
Relationships	Initiating	Responding	**Sum**	Initiating	Responding	**Sum**
Acceptance	0.434	0.199	0.346	0.275	0.303	0.332
Preference	0.206	0.093	0.116	0.594*	0.208	0.584*
Mutual	0.510*	0.041	0.285	0.531*	0.268	0.534*

Note. *Correlation significant at 0.05 (two-tailed).

Regarding mutual liking-ties, correlation analyses indicated the co-occurrence of prosocial initiating (r = 0.510), problem initiating (r = -.531) and the sum of problem interactions (r = -.534). The active children seemed to have more mutual liking-ties than the other children, and obviously, children did not care whether peers had initiated prosocial or problem interactions.

Individual-Level Variance in Prosocial and Problem Interactions

For the two most-liked and the two least-liked children, a closer examination of individual variances and trends in small-group interactions revealed that these children's interactions – both prosocial and problem – had fluctuated during follow-ups, with a more pronounced variation among the boys than among the girls (Figure 1). Our results for these girls (Veera and Marita) emphasised prosocial interactions, but our results for the boys (Olavi and Asko) revealed no similar tendency. Olavi's prosocial and problem interactions were, rather, at similar levels in sessions 2 and 4, and his prosocial interactions were higher in sessions 1 and 3. Asko's high levels of prosocial, problem or both interactions varied. While prosocial interactions decreased throughout the study's follow-up period for the girls and Olavi, Asko's prosocial and problem interactions increased throughout the follow-up period. Peer likeability does not seem to play a role in peer interactions. For this study's participants, being more or less liked by peers did not correlate with how children interacted in small-group situations.

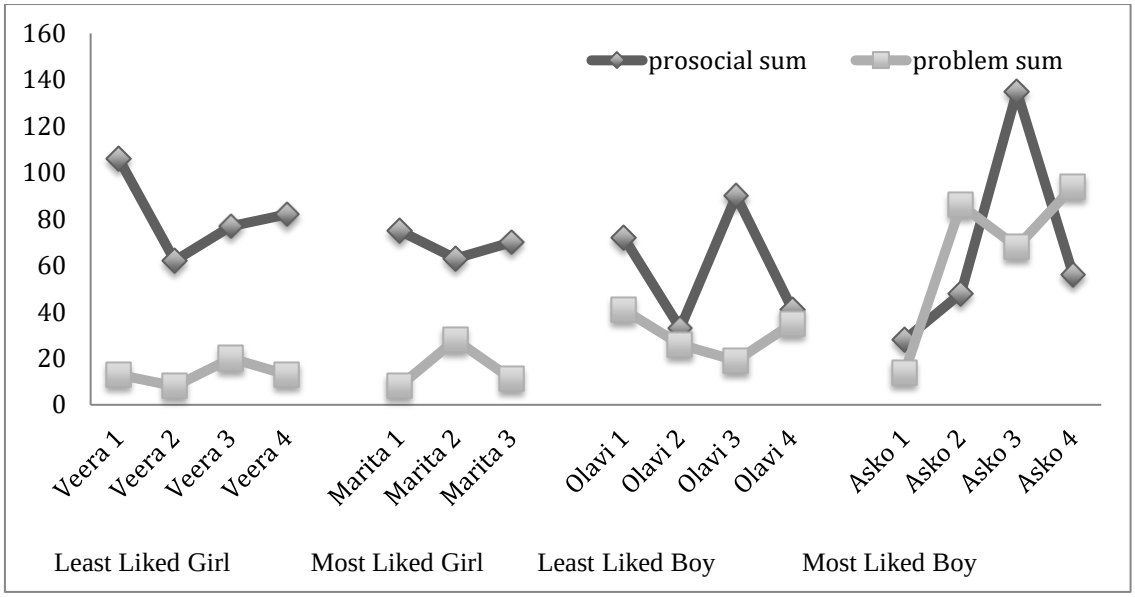

Figure 1

Individual Variance in Prosocial and Problem Interactions among the Most-Liked and Least-Liked Children

A closer analysis of initiating and responding interactions revealed that the observed trends were based on initiating interactions (see Figure 2). In particular, problem responding interactions were rare. This result is partly understandable because an initiating interaction is a prerequisite for a responding interaction and, thus, these interaction types are nested.

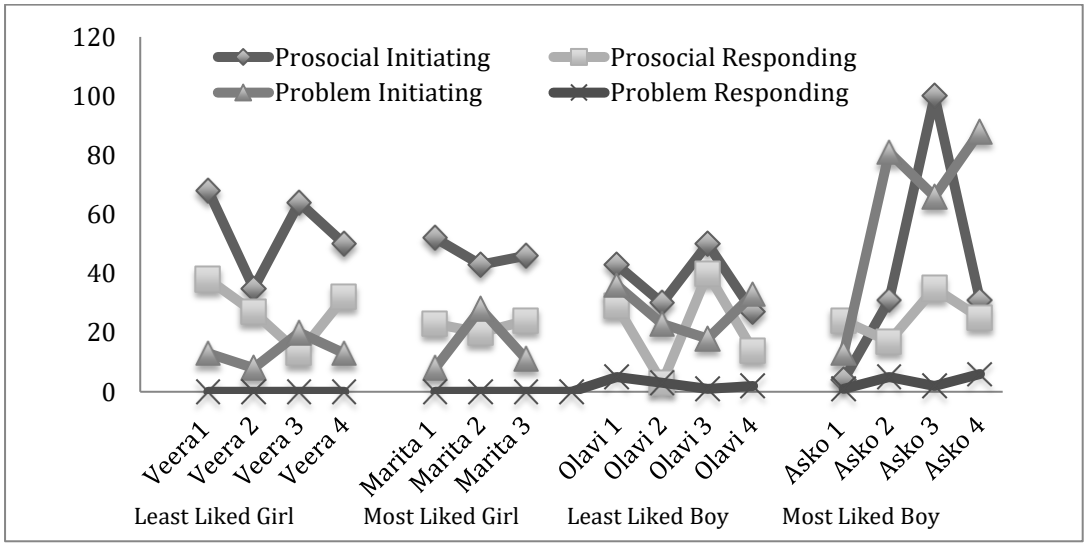

Figure 2 *Individual variance in Initiating and Responding Interactions among Most-Liked and Least-Liked Children*

Thus, any clear positive trend regarding interactions among the most-liked and least-liked children in small-group situations was difficult to find. The only visible pattern seems to have been that these children's interactions differed by gender.

Discussion

In this one-year longitudinal study, we explored whether children's peer acceptance, peer preference and mutual liking related to their prosocial and problem interactions in small-group situations, further differentiating their interactions as *initiating* or *responding* interactions. The first part of the study's unit of analysis focused on the group level. The second part focused on how the most-liked and least-liked children's interactions varied during a six-month period, emphasising individual-level analyses.

Our findings showed no linear relationship between peer likeability and how skillfully children interacted with their peers. Liked children do not necessarily behave better than other children, nor are they more socially skilled – although a partially conflicting earlier study somewhat suggested that they were more socially skilled (Hernandez et al., 2017). Our results suggest that children themselves apparently assess liking – as an expression of social behaviour – differently, whereas adults (teachers and researchers) tend to dominate and set norms for what kinds of interactions are socially desirable. We must note that this finding may be partly due to our use of SNA methods and data collected from children themselves as informants. Our results indicate, somewhat unexpectedly, that the children who reported the most liking-ties with their peers (i.e. who are at higher levels of peer preference) showed more problem initiating interactions during play sessions than other children. Thus, children who spark problem interactions during play showed the most interest in different peers, and controversially, children with fewer initiating interactions reported less interest in playmates. This result is interesting in that it indicates two sides of what we understand to be social interaction. In our earlier work (Author et al., 2018), we found that children seemed to have

more conflicts and more intense interactions when playing with peers whom they liked and whose company they had selected themselves.

In earlier studies, researchers have achieved somewhat conflicting results regarding correlations between children's peer acceptance and emotional intensity (Hendrickx et al., 2017). Some studies have shown a negative association between negative emotions and peer acceptance (Fabes et al., 2012). However, our results imply that when children endeavour to establish peer relationships, they engage in both positive and negative social and emotional interactions. An active role of any kind may constitute an effective start to social and emotional interactions with peers. No children in our study had extremely low levels of peer acceptance (i.e. none had been rejected), and the variation in peer status among our participants was moderate; however, note that Lindsey's (2002) study indicated that children with no mutual ties differed from children with even one mutual friendship tie.

Similarly, presentations of initiating both prosocial and problem behaviours in small-group interactions correlated, in our study, with numbers of mutual liking-ties. This finding aligns with earlier studies which have associated children's peer relationships with social competencies (e.g. Şendil & Erden, 2014). However, finding explanations for problem behaviour is difficult, aside from our earlier study (Author et al., 2018), in which children behaved worse when playing with their best friends than they did with casual peers from the same daycare group. A negative relationship between peer preference and a tendency to display negative social and emotional behaviours had already been reported some decades ago (Bukowski & Hoza, 1989). However, even aggressive behaviours have been found to sometimes correlate with high levels of peer acceptance (Bukowski et al., 1993). Therefore, importantly, anger and conflict do not necessarily accompany peer rejection. Social contexts matter. For example, anger when defending a peer or controlling group activities does not correspond to peer rejection (Hernandez et al., 2017).

One of the current study's main findings is that, at an individual level, children's social interactions varied considerably throughout the whole study period – without any sort of positive development in small-group interactions. This finding contrasts with earlier studies emphasising the development of children's social and emotional skills during peer interactions (Denham & Brown, 2010; Hu et al., 2017). This difference highlights the need for more intensive and systematic support from adults than the current study provided.

Prosocial interaction was always more typical than problem interaction among the girls in this study, as well as among the boys in some sessions. This kind of finding has been reported for girls before (Padilla-Walker & Carlo, 2015; Rose & Rudolph, 2006), and in our earlier study in a similar context, girls spent more time than boys on conversational interactions, a finding which has often been connected with prosocial behaviour (Author et al., 2018). For boys, differences between prosocial and problem behaviours varied. Earlier studies have reported less self-control among boys, indicating a close relationship with problem behaviours (Chapple et al., 2010). Boys particularly tend to exhibit hyperactivity and aggression, while girls' problems are internalised (Hill et al., 2006). Girls and boys may display different kinds of aggression. For example, the exclusion of friends from certain groups has been reported to be more typical among girls than boys (Crick, 1996), and girls present more relationally aggressive behaviours while boys present more physically aggressive behaviours (Swit, 2019). In all, our study aligns with many earlier studies in finding a clear difference between girls and boys' social and emotional interactions.

Implications and Limitations

Combined with qualitative interaction video analysis, SNA can provide a rich picture of peer relationships among children. This kind of mixed-method SNA (MMSNA) can also help link personal and structural dimensions (Bolíbar, 2016). For boys and girls in middle childhood, peer relationships begin to gradually stabilise (Author et al., 2019) before becoming

stable friendships. This transition means that complex notions of temporality must be included in the research process. To the best of our knowledge, we have progressed beyond the snapshot with this study's use of a long timeframe for data collection and its ability to avoid the problems caused by randomly selected sessions.

Our main contribution to the field is our revelation that so-called sociality involves many facets among children. Perhaps contrary to adult expectations, peer likeability does not necessarily equate with prosocial interaction. Teachers and parents should bear this finding in mind when, for example, trying to help children make friends and interact with other children. Based on these results, problem initiating behaviours could also enable children to establish relationships with peers while prosocial responding behaviours do not always promise more peer liking. An important practical implication of this result is that, during daily educational activities, teachers should not be too alarmed – or immediately intervene – with children's mild problem behaviours. During possible conflict situations, teachers should either allow children to find solutions by themselves or intervene sensitively, according to each situation. In practice, teachers' decisions on when and how to facilitate children's social interactions are challenging (Littleton & Whitelock, 2005). Thus, importantly, teachers should understand children's social and emotional skills in the context of small-group interactions. Based on this understanding, they might more easily decide whether further support is necessary for a child. Eliminating problem behaviours not the only goal of early childhood education; more essentially, teachers should create pedagogical guidelines to assist children's development of social and emotional skills and peer relationships. A close look at children's peer interactions reveals how situational these processes are, starting with determining which child decides who plays with whom and why. These problem-solving situations occur every day in early childhood institutes, but little is known about how children's play groups come to agree, how they should reach an agreement or how these decisions influence interaction dynamics within a group. Our study highlights the

importance of children's initiating behaviours, which seem to play a crucial role in social and emotional interaction. Clearly distinguishing which behaviours are preferable (i.e. prosocial) and which are problematic may not always be easy. For instance, using PIOT, we found in our previous study that the most commonly observed problem behaviour was acting impulsively. From adults' standpoint, this finding points to the need to support self-control (Whitebread, 2014), whereas, from children's perspective, acting impulsively is a way to show initiating behaviour, which relates to extending peer relationships; identifying acting impulsively as prosocial or problem behaviour depends on the receiver's reaction. In other words, what bothers adults might not be a problem for children. Thus, determining whose perspective is adopted when observing a behaviour – and whether the focus is on the child in question, the other children, all children under observation (Malti & Noam, 2016) or the adult in a given context – is important.

This study's limitations include its small sample size, which might reduce our results' generalisability. Collecting rich longitudinal data with two data gathering procedures is hard and laborious, but additional similar research is needed to confirm our study's results. Therefore, to improve our results' reliability and generalisability, more children should be recruited from different kindergartens. Studying more children from more heterogeneous backgrounds and age groups would increase our understanding of children's interactions and peer relationships in early childhood contexts. Our study's small dataset might also have led to our finding no linear developmental trend from individual-level interaction. To deepen our understanding of developmental trends, more children and more sessions should be analysed.

Another limitation of the current study's design is its lack of data regarding one child rejected by several children, which prevented us from making some conclusions regarding isolated or rejected children. This limitation may also be one reason for the absence of a correlation between peer acceptance and prosocial or problem interactions in our study. This

topic could present a perspective for a future study by including children who received several *never want to play with* responses as one attributor. These responses could guide teachers to help children who are really isolated or rejected to find playmates; thus, all children could be included in a group to form peer relationships.

We used iPads to initiate children's interactions and ensure video recordings, and iPad game sessions were designed as a proxy for other activities in the current study. However, children might employ different social and emotional skills in various play contexts. For example, children's behaviour may vary based on group composition or the number of children in a group – and especially based on the circumstances that influence children's play activity, such as numbers of toys, whether children need to share these toys and the nature of play activity. When children play within a digitally mediated context, presumably, significant differences to traditional imaginative play occur since apps' features largely shape activities and, therefore, children's digital play varies in response to the apps they interact with. The question is whether playing with apps at all supports children's traditional play. Earlier studies (Verenikina et al., 2016) have shown that children are more empowered when they play with others and can capitalise their actions on the affordances of apps. Social interactions are also essential regarding digital play. In the Verenikina et al. (2016) study, even when children were familiar with each other, playing separate apps did not stimulate talk, which is highly important to children in traditional play.

These considerations require further and broader perspectives in different playing contexts, and not only on indoor activities. In further studies, more observations are needed in different contexts – such as outdoor environments or under kindergarten teachers' leadership. Maybe not restricting children's activities to a certain space would offer a preferable approach. For teachers, understanding children's social and emotional skills – as well as their peer nominations and preferences in different contexts – is always important. For this purpose,

although video recordings (as were applied in the current study) cannot be organised as part of daily practices, observations of children's social and emotional skills or the atmosphere of a particular context remain helpful. Based on these observations, teachers might more easily decide whether further support is necessary for a child. This understanding can also help teachers develop practices that encourage children to initiate interactions in groups. We hope the steps we have taken in this study will inspire future studies to answer open questions about peer interactions and relationships.

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