



Universiteit
Leiden
The Netherlands

Being deaf at the playground: the effects of hearing loss on children's social participation

de Sousa Da Silva, B.M.

Citation

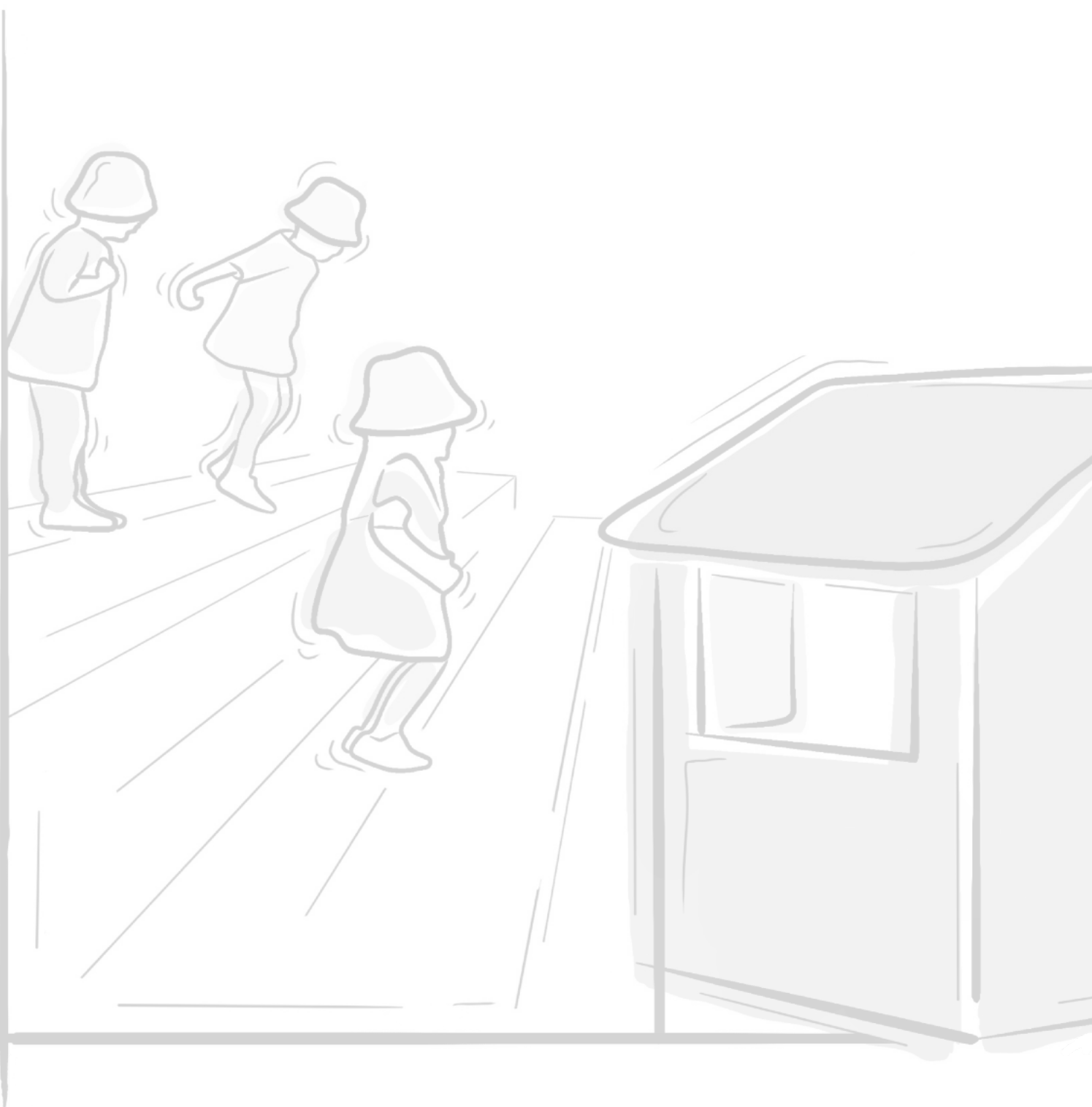
De Sousa Da Silva, B. M. (2025, February 12). *Being deaf at the playground: the effects of hearing loss on children's social participation*. Retrieved from <https://hdl.handle.net/1887/4180254>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/4180254>

Note: To cite this publication please use the final published version (if applicable).

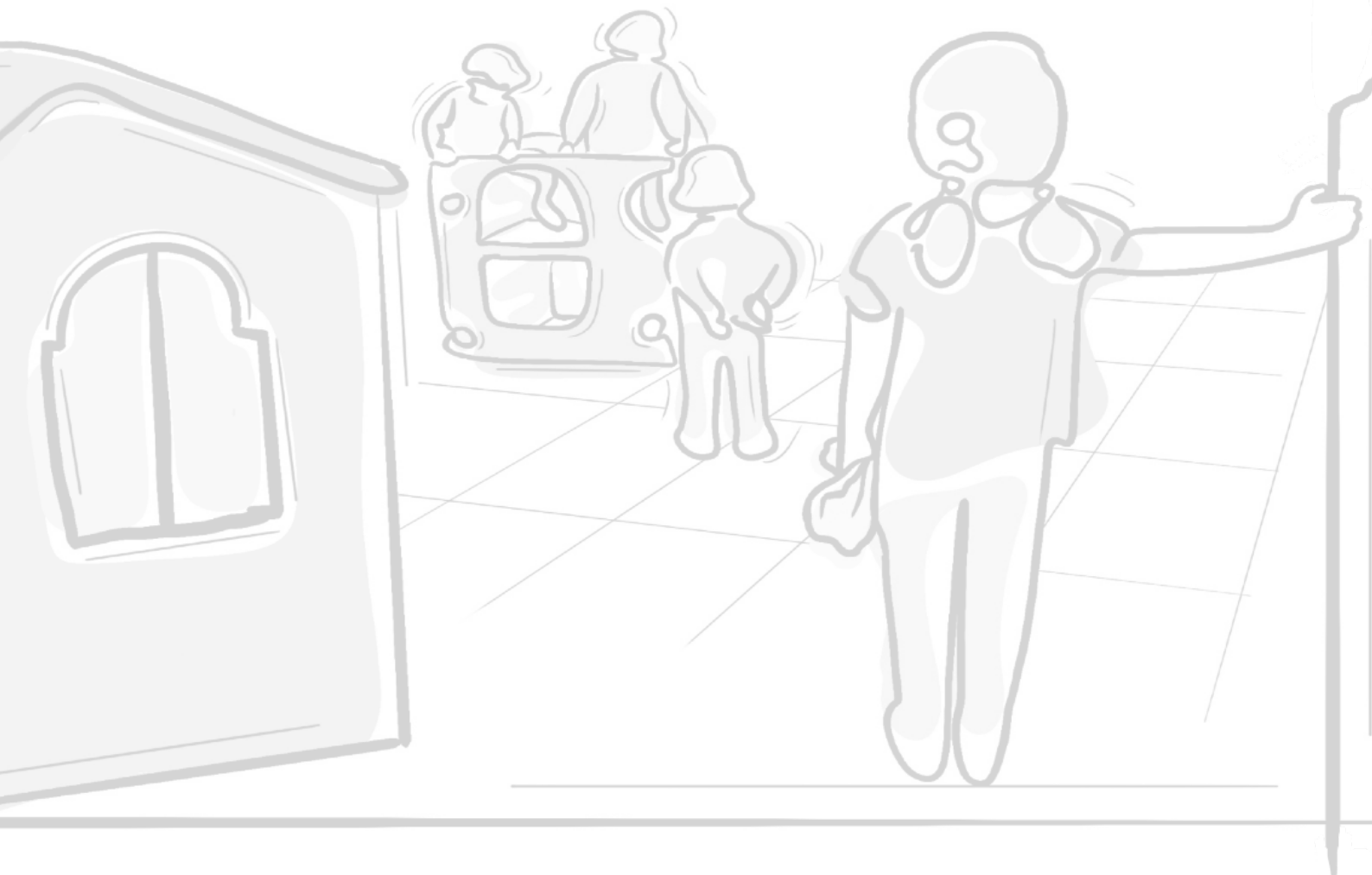


Chapter 6

Do my reactions outweigh my actions?

The relation between reactive and proactive aggression with peer acceptance in preschoolers.

Da Silva, B.M.S., Veiga, G., Rieffe, C., Endedijk, H.M., & Güroğlu, B. (2023). Do my reactions outweigh my actions? The relation between reactive and proactive aggression with peer acceptance in preschoolers. *Children*, 10(9), 1532. <https://doi.org/10.3390/children10091532>



ABSTRACT

Aggressive behaviours negatively impact peer relations starting from an early age. However, not all aggressive acts have the same underlying motivations. Reactive aggression arises as a response to an antecedent behaviour of someone else, whereas, proactive aggression is initiated by the aggressor and is instrumental. In this study, we aim to understand the relation between reactive and proactive aggression and peer acceptance in preschoolers. Parents of 110 children aged between 3 and 6 years old, rated their children's manifestation of reactive and proactive aggressive behaviours. To assess the children's peer acceptance score within their class they completed a paired comparisons task. The outcomes confirmed that reactive aggression in particular is negatively related to peer acceptance at the preschool age. Our results provide insights for the needs and directions of future research and interventions.

INTRODUCTION

All children develop emotionally and socially through social interactions with their peers. Positive peer interactions at school create a sense of belonging and are related to better mental health (Ng-Knight et al., 2019; O'Connor et al., 2022). Yet, opportunities to play are affected by how much a child is accepted by other children in the peer group, i.e., peer acceptance (Engdahl, 2012; Howes, 1983). In the context of preschool, peer acceptance reflects the degree to which a child is liked by peers within their peer group (Guimond et al., 2022). Thus, accepted children are those who obtain more liking nominations from peers, which is associated with more shared affect and companionship (Guimond et al., 2022). Aggressive behaviours negatively affect peer acceptance. Studies focused on preschoolers' aggression show that higher levels of aggression are related to lower peer acceptance, and more victimization, rejection, and conflicts within the peer group (Diesendruck & Ben-Eliyahu, 2006; Endedijk et al., 2020; Kucaba & Monks, 2022; Stenseng et al., 2014). Furthermore, studies with elementary school aged children and adolescents that distinguish between the motives of aggression – reactive versus proactive – show that these two forms of aggression are differentially related to peer acceptance and peer relationships (Manring et al., 2018; McClain et al., 2022; Stoltz et al., 2016). However, even though reactive and proactive aggression can already be distinguished in preschoolers (Evans et al., 2018; Perry & Ostrov, 2018), the relation between these two forms of aggression and peer acceptance is yet to be studied in this age group, which will be the focus of the current study.

Aggressive behaviours can be observed in toddlers after their first year of life, and tends to be mostly physical, manifested through behaviours such as biting, kicking and hitting (Tremblay et al., 2004, 2018). Albeit undesirable, these behaviours are not yet viewed as defiant, as they reflect the immaturity in regulating and communicating the toddler's own negative feelings (Côté et al., 2006; Tremblay et al., 2004; Vaughn & Santos, 2009). These behaviours tend to increase until children are 3-to-4 years of age, yet decrease rapidly after entering a peer group (Girard et al., 2019; Gonzalez-Peña et al., 2013), which can be explained by the social information processing (SIP) model developed by Crick and Dodge (Crick & Dodge, 1994). The SIP model suggests that children's responses to new social situations are influenced by their daily social experiences, and that behavioural responses arise from the way that children process social cues based on six cognitive steps: i) encoding of cues, ii) interpretation of cues, iii)

clarification of goals, iv) response construction, v) response decision and vi) behavioural enactment (Crick & Dodge, 1994; Verhoef et al., 2022). Previous research has shown that children who act aggressively have atypical processing of the aforementioned steps, encoding more hostile cues (step i), interpreting situations as more hostile (step ii), more often opt for revenge or personal gain as a goal (step iii), constructing and deciding on aggressive responses more often (steps iv & v), and evaluating the impact of their aggressive behaviours towards others less negatively (see de Castro & van Dijk, 2017, for a review). Although not part of the original SIP model, emotion processing is understood as an important and interrelated additional element. For example, biased encoding and interpretation (steps i & ii) are related to impaired emotional understanding (Cook et al., 1994; De Castro et al., 2005), and aggressive response construction. Decision and enactment are related to impaired emotion regulation (Cole et al., 1992; De Castro et al., 2005). As children grow older their emotion processing skills are expected to improve and they become more skilful in navigating through the aforementioned steps. However, when these emotion processing skills (e.g., emotional regulation; emotional understanding) are impaired, children are more prone to maintain these aggressive behaviours (Baker, 2022; Diesendruck & Ben-Eliyahu, 2006; Perhamus & Ostrov, 2021; Phillips Keane & Calkins, 2004). Note that biases in different steps result in different types of aggression. For example, biases in interpretation (step ii) are associated with reactive aggression, whereas bias in response decision (step v) is related with proactive aggression (Crick & Dodge, 1996; De Castro et al., 2005).

Reactive aggression is a defensive and impulsive aggressive response to an antecedent behaviour or provocation. In light of the SIP model, reactive aggressive children have an underlying tendency to encode more hostile cues (step i), and interpret the situations (step ii) as more hostile than their peers (Crick & Dodge, 1996; De Castro et al., 2005). These biases are related to impaired emotional understanding and emotional regulation (Crick & Dodge, 1996; De Castro et al., 2005). Thus, reactive aggressive children show an impaired ability to understand their own and other's emotions, causing them to encode and interpret the situations as hostile. The difficulties in regulating their emotions can lead to quick escalation to an aggressive response (physical or verbal) (Cook et al., 1994; Crick & Dodge, 1996; De Castro et al., 2005). More recently, Verhoef and colleagues (Verhoef et al., 2022) have suggested that overtime, children who react aggressively, seem to automatise these reactive aggressive behaviours, as an immediate

response to perceived negative and hostile behaviours by their peers, which can lead to social problems (Camodeca & Goossens, 2005; Dodge, 2006). Indeed, studies with school aged children and adolescents consistently show that more reactive aggressive behaviours are related to lower peer acceptance within the peer group (Manring et al., 2018; McClain et al., 2022). A longitudinal study has also shown that reactive aggressive behaviours during adolescence contributed to the prediction of lower peer acceptance 18 months later (Prinstein & Cillessen, 2003). Although – to the best of our knowledge – no study has addressed the relation between reactive aggression and peer acceptance for preschoolers, other constructs related to social functioning and aggression have been studied. For example, preschoolers who tend to be reactively aggressive are more often rejected within the peer group (Evans et al., 2018).

Proactive aggression is intentional and unprovoked aggressive behaviour is used to achieve a personal goal, hence it is an instrumental form of aggression (Dodge & Coie, 1987). In light of the SIP model, proactive aggressive children have a tendency to decide on the response (step v) that allows them to obtain personal gain, causing conscious harm to others (Crick & Dodge, 1996; De Castro et al., 2005). Impaired empathy and emotional awareness can cause these children to devalue the impact of their actions on others' well-being (De Castro et al., 2005; Tampke et al., 2020). The few studies that have explored peer acceptance and proactive aggression in older children, highlighted that proactive aggression is related to lower acceptance by the peer group (Useche et al., 2014; Walcott et al., 2008). However, proactive aggressive behaviours in adolescents did not predict later peer acceptance (Prinstein & Cillessen, 2003). A longitudinal study that included reactive and proactive aggressive elementary school-aged boys also showed that reactive aggressive boys have increased difficulties with peer interactions and lower peer acceptance, in comparison to proactive aggressive boys (Dodge et al., 1997). The relation between proactive aggression and peer acceptance is yet to be studied in preschoolers, although some studies have examined the relation between proactive aggression and other constructs related to social interactions in preschoolers. A study conducted by Evans and colleagues (Evans et al., 2018) indicated that displays of proactive aggression were related to teachers' perceptions of the child being rejected/isolated from the peer group.

To the best of our knowledge, no study has focused on sex differences in the association between peer acceptance and preschoolers' aggression. Furthermore, research on sex differences regarding the prevalence of reactive versus proactive aggression during

preschool years has shown inconsistent findings, with some studies showing that boys were rated as more aggressive (McClain et al., 2022), and others studies showing that these behaviours are equally manifested by boys and girls (Baker et al., 2019; Perhamus & Ostrov, 2021).

PRESENT STUDY

Peer acceptance is an important indicator of preschoolers' social interactions and a predictor for later maladjustment. Understanding 'if' and 'how' each type of aggression relates to peer acceptance at this young age may provide better guidance for the development of early intervention, to prevent social maladjustment, and allow us to develop more specific and targeted interventions for young children. The first aim of this study was to examine the extent to which reactive and proactive aggression is related to peer acceptance in preschoolers. Considering that peer rejection is related to both types of aggression in this age group (Evans et al., 2018), we expected a negative relation of both reactive and proactive aggression with peer acceptances in preschoolers. The second aim of the study was to examine which type of aggression (i.e., reactive versus proactive) is more strongly related to peer acceptance. Our assumptions for this specific research question are supported by longitudinal studies that indicate that reactive aggression alone has been shown to predict lower peer acceptance (Prinstein & Cillessen, 2003), and that reactive aggressive boys are less preferred within the peer group in comparison to proactive aggressive boys (Dodge et al., 1997). Considering these findings, we expected the relation between reactive aggression and peer acceptance to be stronger compared to the relation between proactive aggression and peer acceptance. Previous research that focused on sex differences regarding preschoolers reactive and proactive aggression are inconsistent (Baker et al., 2019; McClain et al., 2022; Perhamus & Ostrov, 2021). Therefore, we did not formulate specific hypotheses regarding sex differences, but explored possible sex differences.

METHOD

Participants and procedure

A total of 110 children aged between 3 and 6 years old (53% boys; $M_{age} = 61.26$ months, $SD = 10.05$) participated in the study. The participants were recruited directly at preschools in the area of Lisbon, centre and south of Portugal. In total nine classes, each one from a different preschool, participated in the study, with average class size of eleven children ($SD = 4.03$). This study forms part of a larger study on deaf and/or hard of hearing (DHH) and hearing children. Children from the DHH group were recruited from hospitals in the area of Lisbon, and their parents were asked which preschool their children attended. These preschools were contacted, informed about the purpose and planning of this larger study and their participation was requested. For preschools that agreed to participate, all parents from participating classes were given information about the study and asked to provide written consent for their children to participate. Parents and teachers also filled out paper questionnaires for every participating child. In order to reliably calculate the peer acceptance scores for the current study, only classrooms with a participation rate of at least 80% were included.

In order to allow the children to become familiarised with each other, all assessments took place at least two months into the start of the school year. The researchers went to the preschools on two different days. On the first day the examiner met the children, explained the study and asked them for their verbal consent to participate. On the second day children performed the peer acceptance task in a quiet room with the examiner.

Variables and Materials

Peer acceptance

Peer acceptance was obtained using a computerised assessment of paired comparison (Endedijk & Cillessen, 2015). On the first day of the assessment, an individual picture of each child from the class was taken and uploaded to one tablet. All pictures were numbered so each child was assigned to a specific and random number on the classroom list. In a separate room each child was shown the screen of the tablet. First, to introduce the task, each child was presented with pictures of a pair of toys (either a

bike/ball, bike/train, or ball/train) on the screen and asked to touch the toy that he/she liked to play with the most. Once it was clear that the child had understood how this worked, the experimental task started.

During the experiment, pairs of photos of classmates were presented on the screen, and the experimenter asked “which one of these children do you like to play with the most?”. The child was again asked to indicate his/her acceptance regarding a pair of photos by touching the screen, and the procedure was repeated. Initially, the maximum number of pairs (with random matching of photos of all children in the classroom; no pairs were repeated, thus all pairs presented were unique combinations) that were to be shown to each child was set up to 80, however, after the first four data collection sessions, it was clear that the younger children were distracted and uneasy after 40/50 pairs of the experiment. Therefore, the maximum number of pairs presented was adjusted to 45 to ensure that all children could stay focused throughout the task. Comparisons between the average results when children performed the task after viewing 45 pairs and 80 pairs revealed no significant differences in the average peer acceptance score between groups ($t(133) = -.906$, $p = .183$), therefore, we maintained all results in our analysis. For every participant a peer acceptance score was calculated by dividing the number of times the participant was chosen by each specific classmate by the number of times that the participant was presented on the screen. To achieve a general peer acceptance score for each participant, received peer acceptance scores from all classmates were averaged and standardized within each class.

Reactive and Proactive Aggression

Reactive aggression and proactive aggression scores were obtained using the Aggressive Behavior Rating developed by Dodge & Coie (Dodge & Coie, 1987). The questionnaire was administered to parents; who were asked to report on their child’s manifestation of reactive aggressive behaviours (3 items; i.e., “When teased, strikes back”, “Overreacts angrily to accidents”, and “Blames other children for the fights”); and proactive aggressive behaviours (3 items; i.e., “Threatens or hits other children”, “Makes other children turn against one child”, “Uses physical strength to dominate other children.”). Parents rated on a 5-point scale (0 = (almost) never, 1 = rarely, 2 = sometimes, 3 = often, 4 = (almost) always). To obtain the reactive and proactive aggression scores, the average of the items belonging to each scale was calculated per child. The scores

obtained for each child were then standardised within each class (i.e., z-score calculation within classes). Due to the small number of items in the reactive and proactive aggression scales, inter-item correlations were considered as the measure for internal consistency (Clark & Watson, 1995). In both scales the mean inter-item correlations were within the ideal range (.39 for reactive aggression; .32 for proactive aggression), confirming coherence of the items in each scale and that each scale is attending to the specificity of each type of aggression. The Cronbach's alphas of both scales were within the acceptable range (.67 for proactive aggression; .60 for reactive aggression).

STATISTICAL ANALYSES

Considering that our data involves sociometric assessment, prior to data analysis we standardised the scores of all variables, as suggested by Coie and colleagues (1982). As there were classrooms with a hierarchical structure (a couple of children who are aggressive and most of the class shows no aggression) or with a more egalitarian distribution (everyone is equally aggressive), this preliminary step allowed us to attend to the specificity of each class, by comparing children with their peers, and not the overall sample.

To answer our first research question, bivariate correlations between the variables of our study, i.e., peer acceptance, reactive aggression, and proactive aggression, were conducted. To answer the second research question comparing the strength of correlations between each type of aggression and peer acceptance, the Meng's Z test (Meng et al., 1992), was used. Considering our hypotheses that the relation between peer acceptance and reactive aggression is stronger than that between peer acceptance and proactive aggression, we used one tailed testing to access significance. The Meng's Z-test in this study was conducted using R's (version 4.2.1) cocor package (version 1.1-4) (Diedenhofen & Musch, 2015). All the other statistical analyses were performed with the IBM SPSS (version 28). We analyzed mean differences between sexes of all variables using an independent sample t-test. Additionally, we explored the differences in the strength of the relation between both types of aggression and peer acceptance by conducting the Meng's Z-test for boys and girls separately. Possible sex differences in the

relation between each type of aggression and peer acceptance were analysed using the Fisher r-to-z transformations.

RESULTS

The range, mean and standard deviations of the raw and standardised scores of peer acceptance, reactive, and proactive aggression are reported in Table 1. Our correlation analyses (see Table 2 & Figure 1) to examine the relations between our variables yielded a positive relation between reactive and proactive aggression. As expected, peer acceptance was negatively related to reactive aggression, yet unrelated to proactive aggression. Comparison between the strength of correlations for each type of aggression and peer acceptance showed that the correlations of reactive and proactive aggression with peer acceptance did not differ ($z = -.95$; $p = .82$).

Table 1. Range, means and standard deviations of Peer Preference, Reactive and Proactive Aggression for the overall group, and separately by sex (raw score / standardized score - Z).

	Range Total (raw scores)		Mean Total (SD)		Mean Boys (SD)		Mean Girls (SD)	
	Min (% of children)	Max (% of children)	Raw	Z	Raw	Z	Raw	Z
Peer Preference	.31 (1%)	.71 (1%)	.52 (.09)	.07 (.92)	.51 (.09)	.04 (.93)	.53 (.09)	.11 (.93)
Reactive Aggression	.00 (13%)	3 (1%)	1.28 (.73)	.00 (.72)	1.47 (.67)	.20 (.63)	1.07 (.75)	-.23 (.75)
Proactive Aggression	.00 (54%)	2.33 (2%)	.34 (.50)	.00 (.75)	.49 (.59)	.19 (.84)	.17 (.30)	-.22 (.55)

Note. The scale scores have been standardized within classrooms.

Exploratory analyses regarding sex differences showed that boys and girls did not differ in their peer acceptance ($t(108) = -3.26$, $p = .87$), but differed in regards to reactive ($t(108) = .12$, $p = .001$) and proactive aggression ($t(99) = -.3.04$, $p = .003$). The positive relation between both types of aggression that was observed for the overall group was also found in both sexes. Furthermore, the relation between reactive aggression and peer

acceptance that we observed for the overall group, was not significant when calculated for boys and girls separately. Since no relation was found between both types of aggression and peer acceptance for girls and boys separately, the strength of these correlations was not compared. In addition to this, the Fisher r to z , revealed no sex differences regarding the strength of correlation between reactive aggression and peer acceptance ($z = -.78$; $p = .22$), and proactive aggression and peer acceptance ($z = .04$; $p = .52$).

Table 2. Correlations between Peer Preference, Reactive and Proactive Aggression for overall group (boys / girls).

	Peer Preference	Reactive Aggression
Reactive Aggression	-.18* (-.18 / -.18)	-
Proactive Aggression	-.08 (-.13 / .02)	.40*** (.38** / .33**)

* $p < .05$, ** $p < .01$, *** $p < .001$.

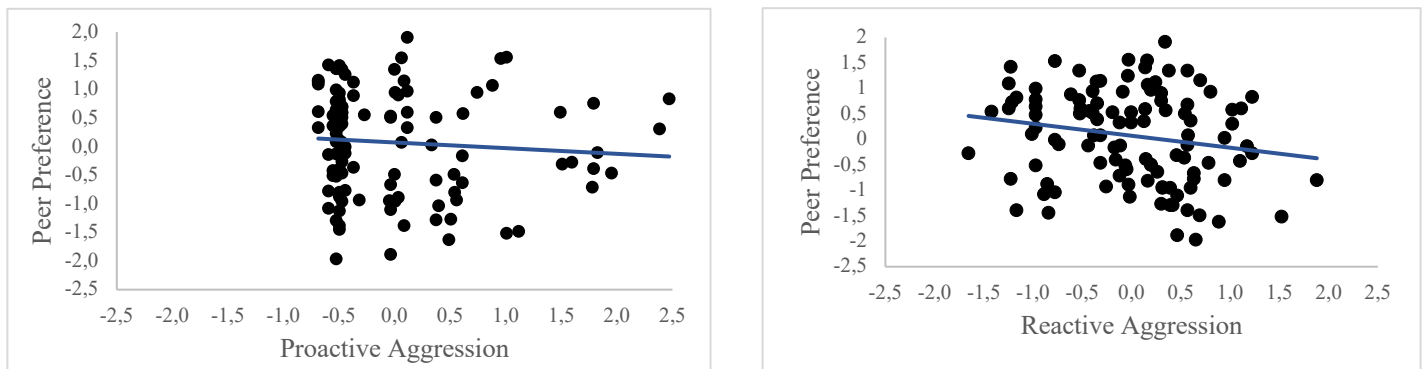


Figure 1. Scatter plots of the correlations between the standardized scores for Reactive and Proactive Aggression, and Peer Preference, for the overall group

DISCUSSION

Aggressive behaviours can negatively affect peer relations during preschool years (Endedijk et al., 2020; Sebanc, 2003; Stenseng et al., 2014), however, different

underlying mechanisms of aggressive behaviours might also affect peer relations differently. Consistent with previous studies in preschool children, the current study confirmed that, even at this age, aggressive behaviours can be distinguished regarding their reactive or proactive nature (Evans et al., 2018; Perry & Ostrov, 2018). Although several aspects of peer relations (e.g., victimization, rejection) have previously been studied regarding both types of aggression (Evans et al., 2018; Ostrov et al., 2014), this is the first study to focus on peer acceptance. Based on parent reports and peer nominations, our findings show that reactive aggression is related to preschoolers' peer acceptance, whilst proactive aggressive behaviours were rarely reported and unrelated to peer acceptance. Yet, the strength of the correlations between each type of aggression and peer acceptance did not differ in our sample. Exploratory analyses highlighted the negative relation between reactive aggression and peer acceptance was absent when considering boys and girls separately, and no sex differences appeared. These results were partially in line with our expectations and will be further discussed below.

Unlike outcomes based on studies in older children (Useche et al., 2014; Walcott et al., 2008), the expected relation for proactive aggression with peer acceptance was absent in our study. Note that proactive behaviours showed a low incidence. In fact, only 46% of parents noted at least one incidence of proactive aggression in their children, compared to 87% for reactive aggression. Although all studies on proactive and reactive aggression during preschool years show a much lower incidence of proactive aggression compared to reactive aggression, it might also be that preschoolers are not yet aware of the manipulative aspect that proactive aggression holds (e.g., helping them in gaining or maintaining status) (Jia, 2014; Murray-Close & Ostrov, 2009). In addition, parents may also be unlikely to see their own child as proactive aggressive, i.e., having manipulative or instrumental goals, which might thus result in the relatively low rates of reported proactive aggressive behaviours.

Our exploratory results regarding sex differences showed that boys had higher rates in both types of aggression compared to girls, which is in line with some previous research (McClain et al., 2022). However, these sex differences were not found to have an impact on the relation of peer acceptance with each type of aggression. As girls' aggressive behaviours tend to be more difficult to report (Ostrov & Keating, 2004), possibly girls' aggressive behaviour is underestimated. Typically, girls exhibit relational aggression which involves causing deliberate harm to others' social relationships, and the

way that they are perceived by others (Ostrov & Keating, 2004). Therefore, future studies focused on the relation between aggression and peer acceptance should use more comprehensive instruments to measure aggression, combining the type (physical versus relational), and the form (reactive versus proactive) when looking into sex differences of preschoolers.

The findings of this study shed light into the importance of early prevention of reactive aggressive behaviours, as they are already impacting social relationships starting as early as the preschool years. The current study has several strengths that should be highlighted.

Firstly, considering that peer acceptance is built upon the interactions between preschoolers, the use of computerised paired comparisons allowed us to rely on peers' perspective regarding their preferences, rather than those reported by teachers or caregivers, who may not fully grasp how preferences are underlying actual play behaviours. Moreover, this computerised assessment is appropriate for young children, since the task only involves comparisons between two pictures of peers, without demands on complex cognitive or language skills.

Furthermore, our results provide guidance for intervention in the preschool setting that might aid children's SIP. As previously mentioned, reactive aggression stems from issues in encoding and interpreting of social situations (steps i & ii), that are interrelated with difficulties emotional processing, namely emotional understanding and emotional regulation (Crick & Dodge, 1996; De Castro et al., 2005). Therefore, it could be essential at this young age to opt for interventions that are focused on body awareness (i.e., understanding the body cues that signal an increased anger arousal) and self-regulation, in order to attend to the specific difficulties of emotional processing that reactive aggressive children are negatively impacting their ability to process social information properly. For example, body-oriented interventions have been shown to positively contribute to preschoolers' emotional processing (Dias Rodrigues et al., 2022). Within the scope of body-oriented interventions, interventions that combine play and relaxation aid children to promote their self-regulation skills (Dias Rodrigues et al., 2023; Veiga et al., 2023). Furthermore, recreating scenarios that are encountered in their daily lives, and reinforcing problem-solving skills, may allow teachers/practitioners to improve children's ability to perceive situations (steps i & ii) in a less hostile way and contribute

to remainder of the SIP steps (Verhoef et al., 2022). Therefore, promoting these interventions in the preschool setting might contribute to reducing the prevalence of reactive aggressive behaviour in this age group, which future studies could further explore.

Finally, our findings create a baseline for future studies focusing on more complex theoretical models and approaches. For example, recent studies have confirmed that teacher-child relationship mediates certain aspects of peer relationships (Longobardi et al., 2021; Prino et al., 2023; Sette et al., 2013), especially children who have behavioural problems (see Endedijk et al., 2022, for a review). Children spend most of their time under the care of their teachers, and their peer responses are modelled by mimicking how teachers respond to their peers (Schaefer Whitby et al., 2012). When teachers expose these children to regulated models, children acquire these positive models as their own (Schaefer Whitby et al., 2012). When conflicts arise, teachers can help children to navigate through the situation by promoting changes in children's encoding and interpretation (steps i & ii), by helping children to evaluate the initial situation, how they felt about it, what their perception was, and why they reacted in a certain way (Crick & Dodge, 1996; De Castro et al., 2005; Verhoef et al., 2022). As behavioural responses are largely influenced by the social repertoire that children have, while guiding them on reevaluating their responses to peers, encouraging perspective taking and problem-solving skills that children can internalise alternative ways to respond to future social conflicts, rather than automatising reactive aggressive patterns (Verhoef et al., 2022). Therefore, future studies should consider the role of the teachers on the peer acceptance of reactive/proactive aggressive children. The potential of these studies is not only to make teachers more aware of their importance, but it is also crucial to provide them with tools to facilitate relationships with children when challenges arise (e.g., Dias Rodrigues et al., 2023; Veiga et al., 2023), so that dysfunctional patterns are not repeated in daily interactions between peers.

Although this study gave new insights into children's aggressive behaviours and peer relations in the preschool years, the use of only parent reports is a limitation. The present results should be taken with caution, as the strength of the correlations could have been influenced by a low power due to our sample size. Future studies should aim to include teachers' perspectives to assess reactive and proactive aggression. A second limitation is related to the cross-sectional nature of this study that prevent us from drawing

conclusions about the possible impact of each type of aggression on peer acceptance across the preschool years. Finally, future studies would largely benefit from also including observational measures (e.g., free play interactions) that provide additional valuable information regarding the manifestation of proactive/reactive aggressive behaviours towards peers in the preschoolers' natural environment (e.g., on the playground).

In conclusion, although both types of aggression, reactive and proactive, showed a rather low prevalence at the preschool age, our outcomes also highlighted that reactive aggression is negatively associated with children's peer relations already in preschool age. As a final note, we suggest multi-method and multi-informant measurements for a complete assessment of proactive and reactive aggression during preschool years, as well as conducting longitudinal and experimental studies to further improve our understanding of the links between various forms of aggressive behaviours and development of peer relationship.

REFERENCES

- Baker, E. R. (2022). Head start parents' vocational preparedness indirectly predicts preschoolers' physical and relational aggression. *Aggressive Behavior*, 48(4), 418–430. <https://doi.org/10.1002/ab.22025>
- Baker, E. R., Jensen, C. J., & Tisak, M. S. (2019). A closer examination of aggressive subtypes in early childhood: contributions of executive function and single-parent status. *Early Child Development and Care*, 189(5), 733–746. <https://doi.org/10.1080/03004430.2017.1342079>
- Camodeca, M., & Goossens, F. A. (2005). Aggression, social cognitions, anger and sadness in bullies and victims. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 46(2), 186–197. <https://doi.org/10.1111/j.1469-7610.2004.00347.x>
- Clark, L. A., & Watson, D. (1995). Constructing Validity: Basic Issues in Objective Scale Development. In *Psychological Assessment* (Vol. 7, Issue 3).
- Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and Types of Social Status: A Cross-Age Perspective. In *Developmental Psychology* (Vol. 18, Issue 4).
- Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion Regulation as a Scientific Construct: Methodological Challenges and Directions for Child Development Research. *Child development*, 75(2), 317–333. <https://doi.org/10.1111/j.1467-8624.2004.00673.x>
- Cook, E. T., Greenberg, M. T., & Kusche, C. A. (1994). The Relations Between Emotional Understanding, Intellectual Functioning, and Disruptive Behavior Problems in Elementary-School-Aged Children. In *Journal of Abnormal Child Psychology* (Vol. 22, Issue 2).
- Côté, S., Vaillancourt, T., LeBlanc, J. C., Nagin, D. S., & Tremblay, R. E. (2006). The development of physical aggression from toddlerhood to pre-adolescence: A nationwide longitudinal study of Canadian children. *Journal of Abnormal Child Psychology*, 34(1), 71–85. <https://doi.org/10.1007/s10802-005-9001-z>

- Crick, N. R., & Dodge, K. A. (1994). A Review and Reformulation of Social Information-Processing Mechanisms in Children's Social Adjustment. In *Psychological Bulletin* (Vol. 115, Issue 1).
- Crick, N. R., & Dodge, K. A. (1996). Social Information-Processing Mechanisms in Reactive and Proactive Aggression. In Source: *Child Development* (Vol. 67, Issue 3).
- De Castro, B. O., Merk, W., Koops, W., Veerman, J. W., & Bosch, J. D. (2005). Emotions in social information processing and their relations with reactive and proactive aggression in referred aggressive boys. *Journal of Clinical Child and Adolescent Psychology*, 34(1), 105–116. https://doi.org/10.1207/s15374424jccp3401_10
- de Castro, B. O., & van Dijk, A. (2017). It's Gonna End Up with a Fight Anyway. In J. E. Lochman & W. Matthys (Eds.), *The Wiley Handbook of Disruptive and Impulse-Control Disorders* (pp. 237–253).
- Dias Rodrigues, A., Cruz-Ferreira, A., Marmeleira, J., & Veiga, G. (2022). Effects of Body-Oriented Interventions on Preschoolers' Social-Emotional Competence: A Systematic Review. In *Frontiers in Psychology* (Vol. 12). Frontiers Media S.A. <https://doi.org/10.3389/fpsyg.2021.752930>
- Dias Rodrigues, A., Marmeleira, J., Pomar, C., Lamy, E., Guerreiro, D., Veiga, G., Rosário, P., Gil-Madrone, P., Saraiva, L., Rodrigues, D. A., & Rodrigues, D. (2023). *Body-oriented interventions to promote preschoolers' social-emotional competence: a quasi-experimental study*. <https://doi.org/10.3389/fpsyg.2023.1198199>
- Diedenhofen, B., & Musch, J. (2015). Cocor: A comprehensive solution for the statistical comparison of correlations. *PLoS ONE*, 10(4). <https://doi.org/10.1371/journal.pone.0121945>
- Diesendruck, G., & Ben-Eliyahu, A. (2006). The relationships among social cognition, peer acceptance, and social behaviour in Israeli kindergarteners. *International Journal of Behavioral Development*, 30(2), 137–147. <https://doi.org/10.1177/0165025406063628>
- Dodge, K. A. (2006). Translational science in action: Hostile attributional style and the development of aggressive behaviour problems. *Development and Psychopathology*, 18, 791–814. <https://doi.org/10.1017/S0954579406060391>

- Dodge, K. A., & Coie, J. D. (1987). Social-Information-Processing Factors in Reactive and Proactive Aggression in Children's Peer Groups. *Journal of Personality and Social Psychology*, 53(6), 1146–1158.
- Dodge, K. A., Lochman, J. E., Harnish, J. D., Bates, J. E., & Pettit, G. S. (1997). Reactive and Proactive Aggression in School Children and Psychiatrically Impaired Chronically Assaultive Youth. In *Journal of Abnormal Psychology* (Vol. 106, Issue 1).
- Endedijk, H. M., Breeman, L. D., van Lissa, C. J., Hendrickx, M. M. H. G., den Boer, L., & Mainhard, T. (2022). The Teacher's Invisible Hand: A Meta-Analysis of the Relevance of Teacher–Student Relationship Quality for Peer Relationships and the Contribution of Student Behavior. *Review of Educational Research*, 92(3), 370–412. <https://doi.org/10.3102/00346543211051428>
- Endedijk, H. M., & Cillessen, A. H. N. (2015). Computerized sociometric assessment for preschool children. *International Journal of Behavioral Development*, 39(4), 383–388. <https://doi.org/10.1177/0165025414561706>
- Endedijk, H. M., Cillessen, A. H. N., Bekkering, H., & Hunnius, S. (2020). Cooperation and preference by peers in early childhood: A longitudinal study. *Social Development*, 29(3), 854–870. <https://doi.org/10.1111/sode.12437>
- Engdahl, I. (2012). Doing friendship during the second year of life in a Swedish preschool. *European Early Childhood Education Research Journal*, 20(1), 83–98. <https://doi.org/10.1080/1350293X.2012.650013>
- Evans, S. C., Frazer, A. L., Blossom, J. B., & Fite, P. J. (2018). Forms and Functions of Aggression in Early Childhood. *Journal of Clinical Child and Adolescent Psychology*, 48(5), 790–798. <https://doi.org/10.1080/15374416.2018.1485104>
- Girard, L. C., Tremblay, R. E., Nagin, D., & Côté, S. M. (2019). Development of Aggression Subtypes from Childhood to Adolescence: a Group-Based Multi-Trajectory Modelling Perspective. *Journal of Abnormal Child Psychology*, 47(5), 825–838. <https://doi.org/10.1007/s10802-018-0488-5>
- Gonzalez-Peña, P., Carrasco, M., Del Barrio, V., & Gordillo Rodríguez, R. (2013). Analisis of Reactive and Proactive Aggression in Children from 2 to 6 Years Old. *Revista*

Iberoamericana de Diagnóstico y Evaluación Psicológica, 1(35), 139–159.
<https://www.researchgate.net/publication/286519232>

Guimond, F. A., Altman, R., Vitaro, F., Brendgen, M., & Laursen, B. (2022). The interchangeability of liking and friend nominations to measure peer acceptance and friendship. *International Journal of Behavioral Development*, 46(4), 358–367.
<https://doi.org/10.1177/01650254221084097>

Howes, C. (1983). Patterns of Friendship. *Child Development*, 54(4), 1041–1053.
<https://doi.org/http://www.jstor.org/stable/1129908>

Jia, R. M. (2014). The Role of Peer Preference and Friendship in the Development of Bullying and Peer Victimization in Children. University of British Columbia. Retrieved from
<https://open.library.ubc.ca/collections/ubctheses/24/items/1.0165977>

Kucaba, K., & Monks, C. P. (2022). Peer relations and friendships in early childhood: The association with peer victimization. *Aggressive Behavior*, 48(4), 431–442.
<https://doi.org/10.1002/ab.22029>

Longobardi, C., Settanni, M., Lin, S., & Fabris, M. A. (2021). Student–teacher relationship quality and prosocial behaviour: The mediating role of academic achievement and a positive attitude towards school. *British Journal of Educational Psychology*, 91(2), 547–562. <https://doi.org/10.1111/bjep.12378>

Manring, S., Christian Elledge, L., Swails, L. W., & Vernberg, E. M. (2018). Functions of Aggression and Peer Victimization in Elementary School Children: the Mediating Role of Social Preference. *Journal of Abnormal Child Psychology*, 46(4), 795–809.
<https://doi.org/10.1007/s10802-017-0328-z>

McClain, C. M., Elledge, L. C., Manring, S., Whitley, M. L., & Vernberg, E. M. (2022). Functions of Aggression and Peer Likeability in Elementary School Children across Time. *Journal of Applied School Psychology*, 38(2), 95–122.
<https://doi.org/10.1080/15377903.2021.1911897>

Meng, X.-L., Rosenthal, R., & Rubin, D. B. (1992). Comparing correlated correlation coefficients. *Psychological Bulletin*, 111(1), 172–175. <https://doi.org/10.1037/0033-2909.111.1.172>

- Murray-Close, D., & Ostrov, J. M. (2009). A Longitudinal Study of Forms and Functions of Aggressive Behavior in Early Childhood. *Child Development*, 80(3), 828–842.
- Ng-Knight, T., Shelton, K. H., Riglin, L., Frederickson, N., McManus, I. C., & Rice, F. (2019). ‘Best friends forever’? Friendship stability across school transition and associations with mental health and educational attainment. *British Journal of Educational Psychology*, 89(4), 585–599. <https://doi.org/10.1111/bjep.12246>
- O’Connor, R. A. G., van den Bedem, N., Blijd-Hoogewys, E. M. A., Stockmann, L., & Rieffe, C. (2022). Friendship quality among autistic and non-autistic (pre-) adolescents: Protective or risk factor for mental health? *Autism*. <https://doi.org/10.1177/13623613211073448>
- Ostrov, J. M., Kamper, K. E., Hart, E. J., Godleski, S. A., & Blakely-Mcclure, S. J. (2014). A gender-balanced approach to the study of peer victimization and aggression subtypes in early childhood. *Development and Psychopathology*, 26(3), 575–587. <https://doi.org/10.1017/S0954579414000248>
- Ostrov, J. M., & Keating, C. F. (2004). Gender Differences in Preschool Aggression During Free Play and Structured Interactions: An Observational Study. *Social Development*, 13(2), 255–277.
- Perhamus, G. R., & Ostrov, J. M. (2021). Inhibitory Control in Early Childhood Aggression Subtypes: Mediation by Irritability. *Child Psychiatry and Human Development*. <https://doi.org/10.1007/s10578-021-01254-y>
- Perry, K. J., & Ostrov, J. M. (2018). Testing a Higher Order Model of Internalizing and Externalizing Behavior: The Role of Aggression Subtypes. *Child Psychiatry and Human Development*, 49(1), 20–32. <https://doi.org/10.1007/s10578-017-0725-0>
- Phillips Keane, S., & Calkins, S. D. (2004). Predicting Kindergarten Peer Social Status From Toddler and Preschool Problem Behavior. In *Journal of Abnormal Child Psychology* (Vol. 32, Issue 4).
- Prino, L. E., Longobardi, C., Fabris, M. A., & Settanni, M. (2023). Attachment behaviours toward teachers and social preference in preschool children. *Early Education and Development*, 34(4), 806–822. <https://doi.org/10.1080/10409289.2022.2085980>

- Prinstein, M. J., & Cillessen, A. H. N. (2003). Forms and functions of adolescent peer aggression associated with high levels of peer status. In *Merrill-Palmer Quarterly* (Vol. 49, Issue 3, pp. 310–342). Wayne State University Press. <https://doi.org/10.1353/mpq.2003.0015>
- Schaefer Whitby, P. J., Ogilvie, C., & Mancil, G. R. (2012). A Framework for teaching Social Skills to Students with Asperger Syndrome in the General education classroom (Vol. 18, Issue 1).
- Sebanc, A. M. (2003). The Friendship Features of Preschool Children: Links with Prosocial Behavior and Aggression. *Social Development*, 12(2), 249–268. <https://doi.org/10.1111/1467-9507.00232>
- Sette, S., Spinrad, T. L., & Baumgartner, E. (2013). Links Among Italian Preschoolers' Socioemotional Competence, Teacher-Child Relationship Quality, and Peer Acceptance. *Early Education and Development*, 24(6), 851–864. <https://doi.org/10.1080/10409289.2013.744684>
- Stenseng, F., Belsky, J., Skalicka, V., & Wichstrøm, L. (2014). Preschool Social Exclusion, Aggression, and Cooperation: A Longitudinal Evaluation of the Need-to-Belong and the Social-Reconnection Hypotheses. *Personality and Social Psychology Bulletin*, 40(12), 1637–1647. <https://doi.org/10.1177/0146167214554591>
- Stoltz, S., Cillessen, A. H. N., van den Berg, Y. H. M., & Gommans, R. (2016). Popularity differentially predicts reactive and proactive aggression in early adolescence. *Aggressive Behavior*, 42(1), 29–40. <https://doi.org/10.1002/ab.21603>
- Tampke, E. C., Fite, P. J., & Cooley, J. L. (2020). Bidirectional associations between affective empathy and proactive and reactive aggression. *Aggressive Behavior*, 46(4), 317–326. <https://doi.org/10.1002/ab.21891>
- Tremblay, R. E., Nagin, D. S., Séguin, J. R., Zoccolillo, M., Zelazo, P. D., Boivin, M., Pérusse, D., & Japel, C. (2004). Physical Aggression During Early Childhood: Trajectories and Predictors. In *Pediatrics* (Vol. 114). <http://www.pediatrics.org/cgi/content/full/114/1/e43>
- Tremblay, R. E., Vitaro, F., & Côté, S. M. (2018). Developmental Origins of Chronic Physical Aggression: A Bio-Psycho-Social Model for the Next Generation of Preventive

Interventions. In *Annual Review of Psychology* (Vol. 69, pp. 383–407). Annual Reviews Inc. <https://doi.org/10.1146/annurev-psych-010416-044030>

Useche, A. C., Sullivan, A. L., Merk, W., & Orobio de Castro, B. (2014). Relationships of Aggression Subtypes and Peer Status Among Aggressive Boys in General Education and Emotional/Behavioral Disorder (EBD) Classrooms. *Exceptionality*, 22(2), 111–128. <https://doi.org/10.1080/09362835.2013.865529>

Vaughn, B. E., & Santos, A. J. (2009). Structural descriptions of social transactions among young children: Affiliation and dominance in preschool groups. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 195–214). The Guilford Press.

Veiga, G., Guerreiro, D., Marmeleira, J., Santos, G. D., & Pomar, C. (2023). OUT to IN: A body-oriented intervention program to promote preschoolers' self-regulation and relationship skills in the outdoors. *Frontiers in Psychology*, 14.

Verhoef, R. E. J., van Dijk, A., & de Castro, B. O. (2022). A Dual-Mode Social-Information-Processing Model to Explain Individual Differences in Children's Aggressive Behavior. In *Clinical Psychological Science* (Vol. 10, Issue 1, pp. 41–57). SAGE Publications Inc. <https://doi.org/10.1177/21677026211016396>

Walcott, C. M., Upton, A., Bolen, L. M., & Brown, M. B. (2008). Associations between peer-perceived status and aggression in young adolescents. *Psychology in the Schools*, 45(6), 550–561. <https://doi.org/10.1002/pits.20323>

