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Research Paper

# Children's friendship quality in early childhood education: the interplay with classroom quality, participation practices, and length of exposure to the ECE teacher

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ABSTRACT

Friendships are crucial for children, and high-quality friendships encompass positive, supportive, and low-conflict interactions. Early childhood education (ECE) teachers spend considerable time with children and influence their relationships through high-quality teacher-child interactions and opportunities for child participation. This study examined the associations between observed classroom quality, observed participation practices, and children's friendship quality, considering the moderating role of the length of exposure to the lead ECE teacher (i.e., months with the lead teacher). Participants in this study were 336 children (163 boys), aged 42 to 76 months ($M$ = 60.14, $SD$ = 7.86), from 58 ECE classrooms in the Lisbon area, Portugal, and their lead teachers. Findings suggest (i) a positive relationship between instructional support and closeness in children's friendships, when children spent more months with the lead teacher; (ii) a negative relationship between emotional support and conflict in children's friendships, when children spent more months with the lead teacher; (iii) a positive relationship between classroom organization and conflict in children's friendships, when children spent fewer months with the lead teacher; and (iv) a negative relationship between conditions for participation and conflict in children's friendships, when children spent more time with the lead teacher. These findings have implications for practice and policymaking, emphasizing the relevance of sustained high-quality teacher-child interactions and participation practices to enhance children's friendship quality in ECE.

Friendships are of paramount importance to children (OECD, 2019). From an early age, children engage in peer experiences that are crucial for their socioemotional development and help them develop social skills, adjust to new environments, and expand their social networks (Rubin et al., 2006). Friendship quality is particularly relevant, as it represents positive, supportive, and less conflictual exchanges between children (Clark & Ladd, 2000).

Early childhood education (ECE) teachers, who spend considerable amounts of time with children, may play a significant role in promoting and guiding children's relationships through high-quality teacher-child interactions (Hamre, 2014), and the creation of opportunities for child participation (Gal, 2017; Lundy, 2007). In effect, positive, high-quality teacher-child interactions and participation practices that allow children to express themselves and influence decisions are often associated with making friends and friendship development (Pianta et al., 2012; Sheridan & Samuelsson, 2001). This rationale aligns with both the Teaching Through Interactions framework (Pianta et al., 2012; Hamre, 2014) and a rights-based approach (Robinson et al., 2024; United Nations, 1989).

Further, research emphasizes the importance of enduring positive teacher-child relationships in ECE for fostering children's socioemotional development (Votruba-Drzal et al., 2004; Zaslow et al., 2010), whereas inconsistent or low-quality interactions may compromise it (Aguiar et al., 2019). Consistent support through stable interactions enables children to explore the environment, engage in classroom activities, and develop positive peer relationships (Burchinal et al., 2016;

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Downer, 2010). Therefore, the main purpose of this study is to investigate the unexamined associations between classroom quality, teachers' participation practices, and children's friendship quality, while also investigating the moderating role of the length of exposure to the lead ECE teacher (and his/her interactions and practices).

## 1. Children's friendship quality in ECE

ECE constitutes a crucial microsystem for young children (Bronfenbrenner & Morris, 2006) and the development of high-quality friendships with peers (Carter, 2023; Clark & Ladd, 2000). Friendships, usually defined as mutual or reciprocal relationships, depend on children's socioemotional development (Hoffman et al., 2021). Further, friendships may involve playing or doing activities together at a certain moment, or more complex needs for trust and interdependence (e.g., Carter, 2023; Dunn, 2004).

Three aspects are commonly described when outlining the developmental significance of friendships: whether the child has friends, the characteristics of the child's friends, and the quality of those friendships (e.g., Engle et al., 2011; Hartup, 2021). Previous studies have examined diverse facets of the friendship construct (Hoffmann et al., 2021), investigating children's friendships from both children's and teachers' perspectives (e.g., Peceguina et al., 2019), looking at children's backgrounds (e.g., Arvola et al., 2017), or examining the stability of children's peer relationships over time and ECE teachers' role in supporting the development of children's friendships (Einarsdottir & Ólafsdóttir, 2023). However, studies focusing on the quality of friendships, particularly in ECE, remain scarce (e.g., Engle et al., 2011; Rubin et al., 2006).

Although different conceptualizations exist (see Bukowski et al., 1994; Malcom, 2006), children's friendship quality generally refers to the positive and supportive forms of interaction that children establish with their friends, with higher-quality friendships encompassing greater involvement (i.e., closeness, mutual positive engagement, with children supporting each other and interacting with greater harmony) and less conflict (i.e., disruptive interactions, marked by negative affect and hostility among children) (Clark & Ladd, 2000). While some children may experience friendships marked by high levels of positive affect, closeness, involvement, and support, others may experience friendships characterized by high levels of negative affect and conflict. Importantly, the quality of friendships seems to predict developmental outcomes (e.g., Li et al., 2024). For example, evidence suggests associations between friendships characterized by high levels of support, positive affect, closeness, and involvement, and higher prosocial behaviours (Sebanc, 2003), self-esteem, and school adjustment (Li et al., 2024). In contrast, friendships involving hostility and conflict have been associated with adjustment problems, namely increased aggression and peer rejection (Sebanc, 2003), loneliness, and school avoidance (Ladd, 2006). In addition, friendship quality can be particularly important when the number of friends is low (e.g., Avramidis & Wilde, 2009), may be associated with increased trust, sympathy, and inclusivity between peers (e.g., Grütter et al., 2018), and may protect against bullying (Malcolm et al., 2006).

Therefore, beyond the number of friendships, it is worth investigating the quality of children's interactions with their friends, particularly whether these interactions are positive, supportive, and/or conflictual (Clark & Ladd, 2000). Relatedly, the variables influencing children's friendships need to be considered. For instance, age is a key variable, as children progressively develop more prosocial behaviours involving caring, sharing, and assisting their peers. Furthermore, the nature of conflict seems to change as children grow older (e.g., shifting from focusing on objects or toys, to progressively focusing more on the ideas, attitudes, or actions of peers) (Rubin et al., 2006).

Teacher-child interactions and ECE practices, namely classroom participation practices, may be associated with positive relationships among children, by supporting an increased sense of competence and belongingness (Deci & Ryan, 2000). Nevertheless, research specifically investigating the associations between teacher-child interactions (i.e., classroom quality), ECE teachers' participation practices, other relevant variables (e.g., children's age and sex), and children's friendship quality is warranted.

### 1.1. ECE classroom quality

ECE classroom quality is commonly analysed in terms of structure (e.g., regulatable features), process (e.g., teacher-child interactions), and outcomes (e.g., children's behavioural and social-emotional outcomes) (OECD, 2018). Several studies have reported lasting benefits from attending high-quality ECE settings (e.g., Mashburn et al., 2008), with process quality considered the primary driver of children's development (e.g., Melhuish et al., 2015).

Classroom processes encompass children's direct experiences, such as teacher-child interactions, classroom routines, and activities. Within the Teaching Through Interactions framework, three domains of classroom quality have been proposed: Emotional Support, Classroom Organisation, and Instructional Support (Pianta et al., 2012; Hamre, 2014). Emotional Support is anchored in attachment (e.g., Ainsworth et al., 1978) and self-determination theories (Deci & Ryan, 2000). In emotionally supportive ECE classrooms, teachers respond sensitively to children's emotions and needs, respect their perspectives, and nurture their feelings of competence and autonomy, fostering a secure base for exploration (Pianta et al., 2012). Classroom Organisation is related to self-regulation (e.g., Raver, 2004), constructivist and information-processing theories (e.g., Schunk, 2005), and effective teachers set clear and consistent rules, structured routines, and engaging activities (Pianta et al., 2012). Instructional Support relies on cognitive and language development research (e.g., Vygotsky, 1991), focusing on practices that build children's higher-order thinking and language skills (Pianta et al., 2012).

Although not consensual, research suggests that classroom quality is positively related to children's social skills and negatively related to children's behaviour problems (Broekhuizen et al., 2016). Positive associations have been documented between Emotional Support, higher levels of activity engagement, and positive social development (Pianta et al., 2012). Classroom Organization has been linked to children's social, academic, and behaviour outcomes (e.g., Rimm-Kaufman et al., 2009), and Instructional Support has been associated with children's cognitive, academic, and language development (Pianta et al., 2012).

The extent of exposure to quality teacher-child interactions (i.e., proximal processes) has also been described as influencing children's development (Bronfenbrenner & Morris, 2006). Therefore, studies examining the combined effects of ECE classroom quality and length of exposure have increased in number. Although the length of exposure can be defined and measured in various ways, such as the total number of hours or days of attendance over several years, or the number of hours the child spends per day, week, or year in a setting (Zaslow et al., 2010), in this study, we considered the total number of months the child spent with the lead teacher (i.e., cumulative exposure to specific ECE interactions and practices).

Previous research suggested that lower Classroom Organization predicted lower social skills and higher externalizing behaviour, at higher levels of exposure to the ECE teacher (Aguiar et al., 2019). However, the evidence is inconsistent, especially regarding social outcomes (Zaslow et al., 2010). While some studies suggest that the positive effects of attending high-quality ECE classrooms (e.g., increased positive interactions, decreased behaviour problems) are stronger for children who spend more time (i.e., number of hours per week) in these settings (Votruba-Drzal et al., 2004; Zaslow et al., 2010), other studies suggest that problem behaviours increase with the number of hours per week and cumulative length of exposure (e.g., Torres et al., 2015). Researchers have suggested that ECE quality may work as a buffer for the undesirable effects of increased exposure (McCartney et al., 2010), and that the length of exposure can reinforce the positive effects of

high-quality ECE (Votruba-Drzal et al., 2004).

Studies conducted in Portugal have documented no effects of classroom quality on children's social acceptance and friendships, and no effects of ECE dosage on this association (Ferreira et al., 2019). Nevertheless, previous research has suggested positive associations between classroom quality and children's friendships, namely between overall classroom quality and the number of friends (West, 2008). Thus, more research is needed on the association between ECE classroom quality and children's friendship quality, accounting for the potential moderating role of the length of exposure to the lead teacher.

Another central aspect of ECE classroom quality is ensuring supportive environments that consider children's perspectives and enable their participation (e.g., Hamre, 2014; Sheridan, 2007). ECE teachers' participation practices may also be important for the development of children's friendships in ECE (Buysse et al., 2003).

### 1.2. ECE teachers' participation practices

Practices supporting children's autonomy have been previously associated with higher peer connectedness and described as enabling children to develop meaningful and high-quality friendships (Clark & Ladd, 2000). Such practices, recognizing children's agency, are aligned with child participation rights, and have been considered indicators of ECE quality (e.g., Sheridan, 2007).

Rooted in the United Nations Convention on the Rights of the Child, particularly in Articles 12 and 13 (United Nations, 1989), the promotion of children's participation rights has become an important premise in ECE. This is due to a growing acknowledgement that, in the early years, children have the right to express their views and actively participate in decisions and activities that impact their lives, particularly their educational experiences (United Nations Committee on the Rights of the Child, 2005).

As gatekeepers of participation, ECE teachers can encourage children to share their thoughts, ideas, and perspectives. ECE teachers can also engage in participatory practices by valuing and integrating children's voices and inputs into decision-making processes, such as setting classroom rules and planning activities within age-appropriate boundaries (Gal, 2017). Through their practices, ECE teachers can establish a safe, inclusive space in which children have equal opportunities to express themselves in various ways, freely moving, and selecting materials. Equally important is establishing an audience of adults responsible for informing children and considering their perspectives and proposals, allowing them to decide, for instance, what, where, or with whom to play (Correia et al., 2020, 2022; Lundy, 2007).

Although mostly at a conceptual level, participation practices have been linked to benefits for children's socioemotional development (Sinclair, 2004). For example, a review of participation practices and projects has highlighted the potential of participation to increase children's opportunities to make friends (Kirby & Bryson, 2002). Further, previous research has documented positive associations between ECE teachers' participation practices (i.e., providing opportunities for children's choice and ensuring conditions for participation) and children's socioemotional outcomes (e.g., self-concept) (Correia et al., 2024).

To date, empirical studies have mostly focused on the associations between teacher participation practices and children's socioemotional development at the individual level, considering outcomes such as self-concept and self-regulation (Correia et al., 2024; Kangas et al., 2015). Therefore, there is a gap in understanding how and under which circumstances participation practices are associated with children's interpersonal outcomes, namely friendship quality. By recognizing and promoting children's participation, particularly by involving them in decision-making, ECE teachers can create environments in which children's voices and choices are valued (e.g., Lundy, 2007; Sinclair, 2004). This not only empowers children and strengthens their sense of competence and agency in friendships but also supports the development of responsibility (O'Brien, 2013) and fosters deeper, more meaningful, and higher-quality connections (Carter, 2023; Clark & Ladd, 2000).

Research has documented associations between ECE teachers' ideas, their participation practices, features of classroom quality (e.g., Emotional Support), and children's perceptions of participation (Correia et al., 2020). However, research is lacking on the associations between participation practices, ECE classroom quality, and children's friendship quality, while also accounting for children's length of exposure to teacher practices, thus capturing a specific dimension of time (e.g., Bronfenbrenner & Morris, 2006).

### 1.3. Current study

This study aimed to investigate the associations between observed classroom quality, ECE teachers' observed participation practices, and teachers' reports of children's friendship quality, while examining the moderating role of the length of exposure to the ECE teacher. We controlled for children's age, sex, verbal competence, social skills, and mother education, when testing the proposed associations. Further, we established four moderation hypotheses: H1: The positive association between Classroom Quality and children's Closeness with their friends is moderated the length of exposure to the ECE teacher, such as children exposed to teachers who ensure higher levels of Classroom Quality for a longer period of time exhibit higher Closeness with their friends; H2: The negative association between Classroom Quality and children's Conflict with their friends is moderated by the length of exposure to the ECE teacher, such as children exposed to teachers who ensure higher levels of Classroom Quality for a longer period of time exhibit lower Conflict with their friends; H3: The positive association between participation practices and children's Closeness with their friends is moderated by the length of exposure to the ECE teacher, such as children exposed to teachers who ensure higher levels of participation practices for a longer period of time exhibit higher Closeness with their friends; H4: The negative association between participation practices and children's Conflict with their friends is children exposed to teachers who ensure higher levels of participation practices for a longer period of time exhibit lower Conflict with their friends. The underlying conceptual model is outlined in Fig. S1 - Supplementary Material.

## 2. Method

### 2.1. The Portuguese context

This study was conducted in Portugal, a southwestern European country, and traditionally a collectivist society (Hofstede, 2001). Over the last 30 years, extensive investments have been made in Portuguese ECE, supervised by the Ministry of Education, Science, and Innovation. The ECE system includes public, private for-profit, and private non-profit centres, and is available from age 3 until the age of compulsory education (i.e., 6 years by September 15$^{th}$; children born after September 15th may remain in ECEC until the following school year, based on parental choice). Although optional, universal access to ECE is legally established from the age of 3 (Law No. 22/2025). Current ECE enrolment exceeds 90 % and ECE schedules are relatively homogeneous, with children generally attending centres for at least five hours per day, five days a week (Direcção-Geral de Estatísticas da Educação e Ciência, 2019; OECD, 2020). In Portugal, it is common for children to have the same teacher for more than one year, with continuity and consistency in educational practices being valued. A Master's degree is the minimum qualification required for ECE teachers (European Commission/EACEA/Eurydice, 2019), although some professionals still hold a bachelor's degree, completed before the current regulations were implemented.

### 2.2. Participants

Participants in this study included 336 children (48.5 % boys), aged between 42 and 76 months ($M$ = 60.14, $SD$ = 7.86), from 58 ECE classrooms in the Lisbon area, Portugal. Mothers had between 2 and 24 years of education ($M$ = 14.24, $SD$ = 3.83), with information missing for 2.4 % of the mothers. Participants also included 58 ECE teachers (all female), aged between 26 and 60 years old ($M$ = 43.07, $SD$ = 8.45). Professional experience ranged from 2 to 39 years ($M$ = 18.99, $SD$ = 8.28), and teachers were responsible for groups of 8 to 27 children ($M$ = 20.87, $SD$ = 4.09). Most participating classrooms (75.6 %) included mixed-aged groups (i.e., children aged 3 to 6 years old). All teachers had at least a higher-education degree in ECE or equivalent, with 12.5 % holding a Master's degree and 19.6 % having completed a specialization course (e.g., early intervention, special education).

The participating ECE teachers were responsible for 58 ECE classrooms, within a 24 ECE randomly selected centres located in the Lisbon metropolitan area. The classrooms were from public (48.2 %), private for-profit (27.7 %), and private non-profit centres (24.1 %), reflecting the distribution of the national ECE network (Direcção-Geral de Estatísticas da Educação e Ciência, 2019). The Lisbon metropolitan area, encompassing urban and semi-urban areas, is classified as non-interior and corresponds to 36.7 % of the Portuguese population (Pinto et al., 2014).

## 3. Measures

**Children's friendship quality.** The quality of children's friendships was assessed based on ECE teachers' reports, with the Dyadic Friendship Quality (DFQ) scale, adapted from Guralnick et al. (2011) and Simpkins and Parke (2001). Prior to administering the DQF, sociometric procedures were used, encompassing a peer nomination task (i.e., children were asked to nominate three peers with whom they liked to play the most and three peers with whom they liked to play the least), and a peer rating task (i.e., children were asked to sort the photos of their peers into one of three boxes, indicating if they liked to play a lot, they liked to play sometimes, or did not like to play with each peer), frequently used with preschool-aged children (e.g., Cillessen, 2011). Based on these peer nominations and/or ratings, a friend was identified by the researchers for each child. Reciprocal choices in both sociometric peer nominations and ratings were considered for 69.4 % of the dyads, reciprocal peer ratings were considered for 24.3 % of the dyads, and reciprocal nominations were considered for 3.1 % of the dyads. For 3.2 % of children, a preferred peer was identified based on non-reciprocal children's nominations/ratings.

Teachers were then asked to rate the quality of the identified friendship for each child using the DFQ. DFQ is composed of 8 items, 3 from the Teacher Social Network Questionnaire (Guralnick et al., 2011), and 5 from DFQ (Simpkins & Parke, 2001), rated on a 5-point scale (1 = *not typical* to 5 = *extremely typical*). Mean scores were used. A structure with two components, previously identified (Marcelino, 2020), was used in this study: Closeness in children's friendships (5 items; α = .92), referring to closeness, involvement, proximity, cooperation, and positive interactions between children (e.g., "during playtime, children are involved with each other"; "children relate to each other positively)"; and Conflict in children's friendships (3 items; α = .85), referring to the occurrence of conflict, competitiveness, and disruption between children (e.g., "conflict occurs between the children"; "children are competitive with each other").

**Observed classroom quality.** Classroom quality was assessed using the Classroom Assessment Scoring System, Pre-K version (CLASS; Pianta et al., 2008). CLASS Pre-k is comprised of 10 dimensions, coded on a 7-point scale (1-2 = *low quality,* 3-5 = *middle quality, and* 6-7 = *high quality*). The original structure of the scale was confirmed by a CFA from a previous study with the same sample, suggesting a good model fit (see Correia et al., 2020). Therefore, three classroom quality domains were used: Emotional Support (α = .88), comprising Positive climate, Negative climate (reversed), Teacher sensitivity, and Regard for student perspectives; Classroom Organization (α = .60, and mean inter-item correlation = .35, within the recommended range .15–.50; Clark & Watson, 1995), including Behaviour management, Productivity, and Instructional learning formats; Instructional Support (α = .84), including Concept development, Quality of feedback, and Language modelling.

**Teachers' observed participation practices.** The implementation of participation practices by ECE teachers was assessed with Observed Teachers' Participation Practices Scale (OTPP), an observation measure composed of 13 items rated on a 5-point scale (1 = *not typical* to 5 = *extremely typical*). We identified a structure composed of 10 items organised in two factors, with an acceptable model fit (see Correia et al., 2020): Children's Choice (5 items; factor loadings between .62 and .93, α = .92), referring to observed practices that promote children's choice and initiative (e.g., "children make proposals of activities and play to the adults"; "children choose the materials they use in the activities") and Observed Conditions for Participation (5 items; factor loadings between .55 and .78; α =.74), referring to material and classroom conditions enabling participation (e.g., "exposed works and materials are at the child level and reach"; "children are responsible for daily tasks needed for collective life (e.g., feeding a pet, documenting attendance"). Scores were computed as the mean of the 5 items, for each factor.

**Length of exposure to the ECE teacher.** The total number of months children spent with the lead teacher, based on the teacher's report, was used as an indicator of ECE exposure. The length of exposure to the ECE lead teacher ranged from 8 to 46 months ($M$ = 18.94, $SD$ = 10.28).

**Control variables.** Children's age and sex were reported by teachers, and mother education was reported by mothers themselves. Children's verbal competence was measured using the Portuguese version of the Peabody Picture Vocabulary Test– Revised (PPVT–R; Dunn, 1986), which has been used in previous studies (Cadima et al., 2016; Correia et al., 2024). The task consisted of sets of four pictures presented to each child, who was asked to point to the picture matching the word read aloud by the researcher; raw scores were used (i.e., direct score obtained by subtracting the errors from the highest item answered by the child), with higher scores suggesting higher levels of receptive vocabulary. Children's social skills were assessed using the Portuguese version (Fialho & Aguiar, 2017) of the Social Skills Rating System (SSRS; Gresham & Elliott, 1990, 2007), and 30 items were used, rated on a 3-point scale, to describe the frequency of children's behaviours (0 = *never*, 1 = *sometimes*, 2 = *very often*). Ten items referred to cooperation (e.g., "cooperates with peers without encouragement from the teacher"), 10 items referred to assertiveness (e.g., "invites others to join in activities"), and 10 items referred to self-control (e.g., "responds appropriately when pushed or hit by other children"). In this study, the Cronbach's alpha for the composite scale was .91.

**Demographic data.** Teachers were given a questionnaire and asked to report their age, sex, education and additional training, teaching experience, classroom size, type of group, and type of setting.

## 4. Procedure

This study was conducted within a broader research project, "Children's right to participate in early childhood education: From rights to empirical evidence", which was approved by the National Data Protection Commission and the Ethics Committee at Iscte-IUL Institutional Review Board. In each participating classroom, teachers and parents provided written consent, and all the children provided verbal assent. We followed the same procedures as in previous studies (see Correia et al., 2020, 2024). Recruitment and data collection were conducted over two school years – for half the sample during the first year and for the other half during the second year. All ECE settings were randomly selected from existing databases (comprising a total of 170 ECE settings

in the Lisbon metropolitan area) to ensure the representation of the existing types of ECE settings. A response rate of 19.4 % (i.e., 33 ECE settings) was obtained, and data were collected from 72.7 % (i.e., 24 ECE settings and 58 classrooms) of the settings that responded. Data were collected in each classroom at three time points (T1, T2, and T3) within the same school year. In T1 (November – January), we collected data on children's age, sex, and social skills, reported by ECE teachers, children's verbal competence assessed directly with children, and mother education, reported by mothers. In T2 (February to June), two independent observers conducted observations of ECE teachers' participation practices and classroom quality during a typical morning. The procedures and reliability checks were those reported in previous studies (i.e., 25 % of classrooms, resulting in good intraclass coefficient correlations, for both observation measures) (Correia et al., 2020, 2024). In T3 (June – July), we collected data on children's outcomes (i.e., friendship quality) and the length of exposure to the ECE teacher, both reported by ECE teachers. There was a five-month interval between T1 and T3, allowing for children's individual assessments to be conducted in winter and summer. As reported in previous studies, six typically developing children were selected in each classroom based on age and gender (i.e., whenever possible, in each classroom, we interviewed three boys and three girls aged 4 to 6 years old) (see Correia et al., 2020, 2024).

### 4.1. Analytical strategy

The data in this study had a hierarchical structure in which children were nested within classrooms. Therefore, the hypotheses were tested using a multilevel moderation analysis. Linear two-level mixed-effects models with random intercepts at the classroom level were estimated. Following Preacher et al. (2016), the current research employed a moderation design of **1** x (**2** → **1**) with a level **1** moderator (i.e., length of exposure), a level **2** predictor (i.e., classroom quality or participation practices) and a level **1** outcome (i.e., Closeness in children's friendships or Conflict in children's friendships). To test the multilevel moderation hypotheses, it was necessary to decompose the between- and within-cluster interaction effects. This decomposition eliminates the problems of conflated multilevel effects, reducing bias in parameter estimates, as recommended by Preacher et al. (2016). Specifically, the model included i) the between interaction effect ($Z._j$ x $X_j$), where (Z.j) represents the average number of months the children spent with the lead teacher (measure of dosage) per classroom, and ii) the within interaction effect ($Z_i$ x $X_j$), where $Z_i$ represents the total number of months spent with the lead teacher. Regarding missing data, approximately 14 % of the data for the two dependent variables—Closeness in children's friendships and children's conflict—were missing. A missing value analysis (MVA) was conducted. The chi-square test of missing completely at random (MCAR) for multivariate quantitative data indicated that the data were missing completely at random because the *p*-value was not significant. Part R-squared was calculated as a measure of effect size (Cohen, 2016). This coefficient indicates the unique contribution of each interaction effect to the outcome after controlling for other predictors in the model.

## 5. Results

### 5.1. Preliminary findings

The means, standard deviations, and reliabilities of the study variables are presented in Table 1. The table also presents zero-order correlations among variables, most corresponding to small to moderate effect sizes (Cohen, 2016) and generally in line with the theoretically expected pattern of relationships. For instance, Closeness in children's friendships was positively correlated with children's age, verbal competence, and social skills, as well as mother education. Observed Children's Choice and Observed Conditions for Participation,

**Table 1**
Descriptive statistics, correlations, and reliabilities for the study variables.

| | | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Level 1 Child | 1. Children's sex[1] | 0.49 | – | | | | | | | | | | | | | |
| | 2. Children's age (months) (T1) | 60.14 | 7.86 | .10* | | | | | | | | | | | | |
| | 3. Children's verbal competence (T1) | 38.36 | 12.94 | -.10 | .55*** | | | | | | | | | | | |
| | 4. Children's social skills (T1) | 1.49 | 0.32 | -.22*** | .16** | .24*** | | | | | | | | | | |
| | 5. Mothers' education (T1) | 14.24 | 3.83 | -.08 | -.06 | .13* | .07 | | | | | | | | | |
| | 6. Length of exposure (months with lead teacher) (T2) | 18.94 | 10.14 | -.00 | .09* | .08 | -.05 | .18** | | | | | | | | |
| | 7. Closeness in children's friendships (T3) | 3.88 | 0.79 | -.03 | .11* | .22*** | .32*** | .10* | -.01 | (.92) | | | | | | |
| | 8. Conflict in children's friendships (T3) | 2.08 | 0.88 | .00 | -.03 | -.01 | .03 | .06 | .08 | .07 | (.85) | | | | | |
| Level 2 Classroom | 9. Observed Children's Choice (T2) (OCC) | 3.19 | 1.11 | .08 | .23* | .03 | -.28* | -.04 | -.12 | -.02 | -.22* | (.92) | | | | |
| | 10. Observed Conditions for Participation (T2) | 2.25 | 0.79 | .19 | .26* | .14 | -.08 | -.18 | -.15 | -.09 | -.32** | .45*** | (.74) | | | |
| | 11. Emotional Support (T2) | 4.64 | 0.76 | .09 | .17 | .21 | -.07 | .21 | -.01 | .03 | -.18 | .54*** | .36** | (.88) | | |
| | 12. Classroom Organisation (T2) | 4.98 | 0.71 | .08 | .44*** | .35** | .04 | .17 | .01 | .14 | -.03 | .33** | .38** | .63*** | (.60)[2] | |
| | 13. Instructional Support (T2) | 1.51 | 0.36 | .10 | .10 | .15 | -.11 | .07 | .07 | .15 | .11 | -.21 | .03 | .07 | .31* | (.84) |

*Notes.* Level 1 ($N = 336$). Level 2 ($N = 58$). T1 – Time point 1. T2 – Time point 2. T3 – Time point 3. To calculate the correlations between the level 2 variables, the variables of the level 1 were averaged according to classroom. Cronbach's alpha is reported in parentheses.

[1] Dummy variable: 0 = female, 1 = male. Proportion of males is reported.

[2] Mean of inter-item correlations = .35.

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

dimensions of observed participation practices, were negatively correlated with Conflict in children's friendships, and positively correlated with dimensions of classroom quality (i.e., Emotional Support, Classroom Organization). Contrary to our expectations, we did not find any significant zero-order correlations, for instance, between dimensions of observed participation practices or dimensions of classroom quality and Closeness in children's friendships. In addition, we did not find any significant zero-order correlations between the length of exposure to the ECE teacher and dimensions of observed participation practices, dimensions of classroom quality, or friendship outcomes.

To assess the suitability of the multilevel analysis, the intra-class correlation (ICC) was calculated. Approximately 16 % of the variability in children's closeness with their friends and 27 % of the variability in children's conflict with their friends could be attributed to the classroom level (ICC = .157, LRT (1) = 14.992, $p < .001$, and ICC = .274, LRT (1) = 41.066, $p < .001$, respectively). These findings justify the use of multilevel moderation tests.

### 5.2. Testing the hypotheses

Hypothesis tests were conducted with the inclusion of level 1 control variables: children's sex, age, verbal competence, social skills, and mother's education. Hypothesis 1 predicted that children exposed to teachers who ensure higher levels of classroom quality for a longer period of time exhibit higher closeness with their friends. The results indicated that the interaction between Instructional Support and length of exposure significantly contributed to Closeness in children's friendships ($B = 0.059$, $t = 2.448$, $p = .015$, Table 2). The effect size was small (*part* R-squared = .02) according to Cohen's guidelines Cohen (2016). As the length of exposure only interacted significantly with one classroom quality domain, Hypothesis 1 was partially supported. Further analysis of the interaction (Table S1 – Supplementary Material) revealed that at a low length of exposure (−1 *SD*), there was a non-significant relationship between Instructional Support and Closeness in children's friendships (Simple slope = −0.380, $t = -1.378$, $p = .170$). Conversely, at a high length of exposure (+1 *SD*), there was a positive and significant relationship between Instructional Support and Closeness in children's friendships (Simple slope = 0.637, $t = 2.551$, $p = .012$). Thus, the relationship was positive and stronger at a higher length of exposure.

Hypothesis 2 proposed that children exposed to teachers who ensure higher classroom quality for a longer period of time exhibit lower conflict with their friends. The results showed that the length of exposure significantly moderated the relationship between two classroom quality domains – Emotional Support and Classroom Organisation – and the level of conflict in children's friendships ($B = -0.030$, $t = -2.030$, $p = .044$, and $B = -0.057$, $t = -3.029$, $p = .002$, respectively, Table 2). The effect sizes were small, with part R-squared values of .04 and .02, respectively (Cohen, 2016). Thus, Hypothesis 2 was also partially supported. As shown in Table 4, for classrooms with a low length of exposure, the relationship between Emotional Support and conflict in children's friendships was non-significant (*Simple slope* = 0.112, $t = 0.583$, $p = .561$). As predicted, the relationship between Emotional Support and conflict in children's friendships was negative and stronger in classrooms with higher length of exposure (*Simple slope* = −0.416, $t = -1.919$, $p = .051$, Table 4). The relationship between classroom organisation and conflict in children's friendships was positive and significant for classrooms with low length of exposure (*Simple slope* = 0.501, $t = 2.332$, $p = .021$). In line with Hypothesis 2, the relationship between classroom organisation and conflict in children's friendships was negative in classrooms with a higher length of exposure levels, but it was not significant (*Simple slope* = −0.488, $t = -1.881$, $p = .063$).

Hypothesis 3 stated that children exposed to teachers who ensure higher levels of participation practices for a longer period of time exhibit higher closeness with their friends. These results did not support Hypothesis 3. Specifically, the interaction between each participation practice factor – Children's Observed Choice and Observed Conditions

**Table 2**
Results of the moderated hierarchical regression on the relationship between classroom quality and children's friendship quality.

| | Children's friendship quality | | | | | |
|---|---|---|---|---|---|---|
| | Closeness in children's friendships (T3) | | | Conflict in children's friendships (T3) | | |
| | Coef. | *SE* | *p* | Coef. | *SE* | *p* |
| **Model 1** | | | | | | |
| *(Level 2) Control variables* | | | | | | |
| Classroom Organisation (T2) | 0.042 | 0.100 | .679 | 0.163 | 0.139 | .247 |
| Instructional Support (T2) | 0.171 | 0.146 | .246 | −0.168 | 0.241 | .489 |
| *(Level 1) Control variables* | | | | | | |
| Children's sex[1] (T1) | 0.047 | 0.081 | .563 | 0.017 | 0.101 | .871 |
| Children's age (T1) | −0.001 | 0.007 | .846 | −0.009 | 0.007 | .197 |
| Children's verbal competence (T1) | 0.009 | 0.004 | -.023 | 0.002 | 0.004 | .613 |
| Children's social skills (T1) | 0.667 | 0.143 | <.001 | −0.067 | 0.153 | .662 |
| Mothers' education (T1) | 0.010 | 0.012 | .377 | 0.010 | 0.013 | .429 |
| *(Level 2) Predictor* Emotional Support (T2) | −0.067 | 0.146 | .648 | −0.152 | 0.124 | .226 |
| *Moderator and interaction effects* | | | | | | |
| *(Level 2) Moderator* Mean Length of Exposure (T2) | −0.014 | 0.012 | .823 | −0.001 | 0.012 | .984 |
| *Interaction* Emotional Support * Mean Length of Exposure | 0.001 | 0.013 | .996 | −0.030 | 0.015 | .044 |
| *(Level 1) Moderator* Length of Exposure (T2) | 0.001 | 0.056 | .995 | 0.001 | 0.008 | .879 |
| *Interaction* Emotional Support * Length of Exposure | 0.002 | 0.011 | .877 | 0.047 | 0.011 | .001 |
| **Model 2** | | | | | | |
| *(Level 2) Control variables* | | | | | | |
| Emotional Support (T2) | −0.040 | 0.082 | .628 | −0.100 | 0.138 | .472 |
| Instructional Support (T2) | 0.164 | 0.141 | .251 | −0.061 | 0.257 | .814 |
| *(Level 1) Control variables* | | | | | | |
| Children's sex[1] | 0.044 | 0.081 | .585 | 0.028 | 0.083 | .737 |
| Children's age (T1) | −0.001 | 0.007 | .872 | −0.006 | 0.007 | .413 |
| Children's verbal competence (T1) | 0.009 | 0.004 | .021 | 0.001 | 0.004 | .760 |
| Children's social skills (T1) | 0.644 | 0.144 | <.001 | −0.076 | 0.158 | .642 |
| Mothers' education (T1) | 0.012 | 0.012 | .307 | 0.010 | 0.013 | .452 |
| *(Level 2) Predictor* Classroom Organisation (T2) | −0.113 | 0.167 | .502 | 0.214 | 0.252 | .372 |
| *Moderator and interaction effects* | | | | | | |
| *(Level 2) Moderator* Mean Length of Exposure (T2) | −0.052 | 0.081 | .521 | 0.282 | 0.094 | .003 |
| Classroom Organisation * Mean Length of Exposure | 0.008 | 0.015 | .622 | −0.057 | 0.018 | .002 |
| *(Level 1) Moderator* Length of Exposure (T2) | 0.002 | 0.071 | .979 | −0.227 | 0.072 | .002 |
| Classroom Organisation * Length of Exposure | 0.001 | 0.013 | .919 | 0.046 | 0.014 | <.001 |
| **Model 3** | | | | | | |
| *(Level 2) Control variables* | | | | | | |
| Emotional Support (T2) | −0.013 | 0.082 | .872 | −0.148 | 0.130 | .259 |

(*continued on next page*)

**Table 2** (*continued*)

| | Children's friendship quality | | | | | |
|---|---|---|---|---|---|---|
| | Closeness in children's friendships (T3) | | | Conflict in children's friendships (T3) | | |
| | Coef. | *SE* | *p* | Coef. | *SE* | *p* |
| Classroom Organisation (T2) | 0.045 | 0.097 | .643 | 0.093 | 0.149 | .534 |
| *(Level 1) Control variables* | | | | | | |
| Children's sex[1] | 0.037 | 0.081 | .644 | 0.048 | 0.085 | .578 |
| Children's age (T1) | −0.003 | 0.007 | .678 | −0.004 | 0.008 | .586 |
| Children's verbal competence (T1) | 0.009 | 0.004 | .025 | 0.001 | 0.004 | .828 |
| Children's social skills (T1) | 0.683 | 0.141 | <.001 | −0.035 | 0.164 | .831 |
| Mothers' education (T1) | 0.014 | 0.012 | .239 | 0.009 | 0.014 | .509 |
| *(Level 2) Predictor* Instructional Support (T2) | −0.322 | 0.343 | .352 | −0.417 | 0.542 | .445 |
| *Moderator and interaction effects* | | | | | | |
| *(Level 2) Moderator* Mean Length of Exposure (T2) | −0.108 | 0.039 | .006 | −0.050 | 0.051 | .325 |
| Instructional Support * Mean Length of Exposure | 0.059 | 0.024 | .015 | 0.024 | 0.031 | .447 |
| *(Level 1) Moderator* Length of Exposure (T2) | 0.064 | 0.030 | .031 | 0.009 | 0.031 | .766 |
| Instructional Support * Length of Exposure | −0.035 | 0.018 | .056 | 0.004 | 0.019 | .838 |

*Notes*. Model 1 – Predictor Emotional Support. Model 2 – Predictor Classroom Organisation. Model 3 – Predictor Instructional Support. Level 1 – Children $N = 336$; Level 2 – Classroom $N = 58$. T1 – Time point 1; T2 – Time point 2; T3 – Time point 3.

[1] Dummy variable: 0 = female, 1 = male.

for Participation – and the moderator length of exposure did not contribute significantly to children's closeness with their friends ($p > .05$, Table 3).

Hypothesis 4 posited that children exposed to teachers who ensure higher levels of participation practices for a longer period of time exhibit lower conflict with their friends. The results partially supported Hypothesis 4. Specifically, the interaction between Observed Conditions for Participation and length of exposure significantly contributed to conflict in children's friendships ($B = -0.030$, $t = -1.949$, $p = .054$, Table 3). The effect size was small (part R-squared = 0.04, Cohen, 2016). To interpret the moderating effect of the length of exposure, simple slopes were examined for low length of exposure levels (1 SD below the mean) and high length of exposure levels (1 SD above the mean) with reference to the classroom mean. As shown in Table 4, the relationship between the Observed Conditions for Participation and conflict in children's friendships was negative and significant for classrooms with high length of exposure (*Simple slope* $= -0.474$, $t = -2.776$, $p = .007$).

## 6. Discussion

This study investigated the unexamined associations between classroom quality, ECE teachers' participation practices, and children's friendship quality, analysing the moderating role of the length of exposure to the ECE teacher at the classroom level. Except for the hypothesis on the associations between participation practices and Closeness in children's friendships, moderated by the length of exposure, all the other hypotheses were partially confirmed, as discussed below. Importantly, the interpretation of these findings must consider the low effect sizes observed.

**Table 3**
Results of the moderated hierarchical regression on the relationship between observed participation practices and children's friendship quality.

| | Children's friendship quality | | | | | |
|---|---|---|---|---|---|---|
| | Closeness in children's friendships (T3) | | | Conflict in children's friendships (T3) | | |
| | Coef. | *SE* | *p* | Coef. | *SE* | *p* |
| **Model 1** | | | | | | |
| *(Level 2) Control variables* | | | | | | |
| Observed Conditions for Participation (T2) | −0.116 | 0.084 | .176 | −0.179 | 0.106 | .098 |
| *(Level 1) Control variables* | | | | | | |
| Children's sex[1] (T1) | 0.069 | 0.093 | .460 | 0.038 | 0.084 | .653 |
| Children's age (T1) | −0.001 | 0.008 | .929 | −0.001 | 0.007 | .893 |
| Children's verbal competence (T1) | 0.010 | 0.004 | .023 | 0.000 | 0.004 | .987 |
| Children's social skills (T1) | 0.782 | 0.169 | <.001 | −0.079 | 0.164 | .632 |
| Mothers' education (T1) | 0.014 | 0.014 | .305 | 0.009 | 0.013 | .485 |
| *(Level 2) Predictor* Observed Children's Choice (T2) | 0.096 | 0.135 | .477 | −0.168 | 0.176 | .368 |
| *Moderator and interaction effects* | | | | | | |
| *(Level 2) Moderator* Mean Length of Exposure (T2) | −0.003 | 0.029 | .927 | 0.018 | 0.032 | .573 |
| Observed Children's Choice * Mean Length of Exposure | −0.004 | 0.008 | .631 | −0.008 | 0.009 | .383 |
| *(Level 1) Moderator* Length of Exposure (T2) | 0.002 | 0.023 | .917 | −0.033 | 0.022 | .135 |
| Observed Children's Choice * Length of Exposure | 0.002 | 0.006 | .769 | 0.014 | 0.006 | .062 |
| **Model 2** | | | | | | |
| *(Level 2) Control variables* | | | | | | |
| Observed Children's Choice (T2) | 0.040 | 0.050 | .431 | −0.047 | 0.075 | .537 |
| *(Level 1) Control variables* | | | | | | |
| Children's sex[1] | 0.051 | 0.081 | .530 | 0.039 | 0.084 | .647 |
| Children's age (T1) | −0.001 | 0.07 | .936 | 0.001 | 0.007 | .879 |
| Children's verbal competence (T1) | 0.009 | 0.004 | .021 | 0.000 | 0.004 | .997 |
| Children's social skills (T1) | 0.664 | 0.146 | <.001 | −0.082 | 0.163 | .615 |
| Mothers' education (T1) | 0.009 | 0.012 | .423 | 0.010 | 0.013 | .478 |
| *(Level 2) Predictor* Observed Conditions for Participation (T2) | −0.102 | 0.178 | .570 | −0.240 | 0.093 | .012 |
| *Moderator and interaction effects* | | | | | | |
| *(Level 2) Moderator* Mean Length of Exposure (T2) | −0.003 | 0.029 | .917 | 0.034 | 0.036 | .346 |
| Observed Conditions * Mean Length of Exposure | −0.005 | 0.012 | .680 | −0.030 | 0.015 | .054 |
| *(Level 1) Moderator* Length of Exposure (T2) | −0.005 | 0.022 | .828 | −0.040 | 0.022 | .072 |
| Observed Conditions * Length of Exposure | 0.006 | 0.009 | .508 | 0.029 | 0.009 | .002 |

*Notes*. Model 1 – Observed Children's Choice. Model 2 – Observed Conditions for Participation. Level 1 – Children $N = 336$; Level 2 – Classroom $N = 58$. T1 – Time point 1; T2 – Time point 2; T3 – Time point 3.

[1] Dummy variable: 0 = female, 1 = male.

### 6.1. Observed classroom quality, length of exposure, and quality of children's friendships

Our first hypothesis, that children exposed to teachers who ensure higher levels of classroom quality for a longer period of time exhibit higher closeness with their friends, was partially confirmed. Specifically,

there was a positive and significant relationship between Instructional Support and Closeness in children's friendships when children were exposed to the lead teacher for a longer time. Instructional Support, encompassing scaffolding, guidance, and encouragement, is extensively described as fostering children's academic competence (Pianta et al., 2012). Our findings further suggest that Instructional Support may positively impact children's social development, which is traditionally more associated with the promotion of Emotional Support (e.g., Perlman et al., 2016). Instructional Support has been linked to the development of language skills (Pianta et al., 2012), which may help children establish and maintain positive interactions with peers, thus supporting Closeness in friendships (Menting et al., 2011). This finding aligns with previous evidence of cross-domain associations between classroom quality and children's developmental outcomes (Downer et al., 2010). Importantly, as the mean values of Instructional Support in our study were low, these findings may suggest that even small variations in this classroom quality domain may be important for fostering children's friendship closeness (Perlman et al., 2016).

Importantly, although the effect size is small, this finding aligns with evidence highlighting the combined positive effects of classroom quality and length of exposure (Votruba-Drzal et al., 2004; Zaslow et al., 2010). By reinforcing the relevance of enduring exposure to higher-quality teacher-child interactions (Zaslow et al., 2010), this finding has practical significance for ECE teachers and policymakers. For teachers, it highlights the importance of integrating Instructional Support into daily classroom practices to enhance children's social and academic outcomes. Drawing from the Teaching Through Interactions framework (Hamre, 2014; Pianta et al., 2012), ECE teachers can enhance Instructional Support by providing scaffolding, encouraging higher-order thinking, and offering specific, contingent feedback to promote children's cognitive and socioemotional development. For policymakers, this suggests the need to support policies that enable stable, long-term teacher-child relationships and sustained professional development focusing on instructional strategies.

Our second hypothesis, that children exposed to teachers who ensure higher classroom quality for a longer period of time exhibit lower conflict with their friends, was also partially confirmed. The results indicated that the length of exposure significantly moderated the relationship between two classroom quality domains—Emotional Support and Classroom Organization—and Conflict in children's friendships. Specifically, we found a negative relationship between Emotional Support and Conflict in children's friendships at higher length of exposure. Despite the small effect size, this finding suggests that when children experience higher Emotional Support and attend classrooms with increased exposure to lead teacher practices, conflicts in their friendships tend to be less frequent. Emotional Support refers to aspects such as empathy, encouragement, and sensitivity to children's emotional needs and preferences (Pianta et al., 2012). Therefore, when Emotional Support is consistently provided and children in the classroom experience it over extended periods, they seem to manage their friendships more effectively, engaging in fewer conflicts. This finding aligns with research suggesting negative relationships between classroom quality and externalizing behaviour problems, at higher levels of exposure (e.g., Aguiar et al., 2019).

Additionally, our findings suggested that when children were exposed to the ECE teacher for a shorter period of time, higher levels of Classroom Organization were unexpectedly associated with increased Conflict in children's friendships. It is possible that when children are exposed to higher levels of Classroom Organization – characterized by clear routines, rules, and behavioural expectations (Perlman et al., 2016) – but have spent less time with the teacher implementing these practices, they may experience some uncertainty or disruptions, leading to higher levels of conflictual, competitive, or oppositional behaviours among friendship dyads. However, our findings also suggested that when children were exposed to the teacher for longer periods of time, this relationship was negative, as expected, though not significant. Considering the small magnitude of this effect, further research is needed to test this hypothesis. This finding may, nevertheless, point to the potential links between Classroom Organization and children's peer relationships, as proposed within the Teaching Through Interactions framework (Pianta et al., 2012; Hamre, 2014), which may depend on the length of exposure to the teacher. Specifically, the potential benefits of higher Classroom Organization may emerge with longer exposure, highlighting the role of relational continuity in supporting positive peer dynamics. Previous research has highlighted the importance of stable daily practices and routines in effectively managing conflicts (Sagastui et al., 2024).

In our study, conflict was reported by teachers. It is possible that teachers who adopt practices focusing on behavioural and relational aspects (e.g., rules, redirection of misbehaviour) and have known children for a shorter period may be more attentive and report more conflict situations. These reports may be influenced by the immediate visible events that shape conflict, as well as by teachers' conceptions of and awareness of peer-related conflict (Shin et al., 2014). Furthermore, the low levels of friendship conflict reported in our study might reflect less disruptive forms of conflict and competition among friends. This could be due to the focus on reciprocal dyads identified by children's reports on their peer preferences. Conflicts between mutual friends may be less intense or more manageable (Hartup, 2021). Nevertheless, conflict is inevitable in children's friendships, and certain levels of conflict, when managed constructively, can provide opportunities for children to become aware of others and their distinct perspectives, which is important for their socialization (Sagastui et al., 2024). Indeed, low levels of conflict, as reported in our sample, may not be detrimental and instead offer opportunities for children to develop critical socioemotional skills such as conflict resolution, negotiation, perspective-taking, and empathy (Arcaro-McPhee et al., 2002; Sorrells et al., 2024; Yang et al., 2021). Therefore, successfully managing conflicts can enhance children's understanding of others' viewpoints, foster emotional resilience, and promote the development of effective communication strategies, contributing to their overall social competence and relationship quality (Sagastui et al., 2024).

### 6.2. *Observed participation practices, length of exposure, and quality of children's friendships*

Our third hypothesis, which proposed that children exposed to teachers who ensure higher levels of participation practices for a longer period of time exhibit higher closeness with their friends, was not confirmed in this study. The combined effects of these variables may unfold over a longer period than that considered in this study. In this regard, longitudinal studies could offer a more comprehensive understanding of the developmental trajectories of these relationships, potentially capturing subtle and long-term effects.

In addition, the moderate levels of participation practices observed in our sample may not have been sufficient for associations with children's friendship closeness to be established. Furthermore, future research should consider other dimensions of participation practices beyond those analysed in this study. For example, practices fostering children's participation in decision-making, children's opportunities to approach a responsible adult, or ensuring timely feedback about the decisions in which children participated could be important avenues for subsequent examination (Correia et al., 2024). Moreover, considering additional variables (e.g., children's temperament) that may interact with participation practices and length of exposure in complex ways could provide a more nuanced understanding of how participation practices impact friendship closeness.

Our fourth hypothesis, that children exposed to teachers who ensure higher levels of participation practices for a longer period of time exhibit lower conflict with their friends, was partially confirmed. Our findings suggested a significant interaction between Observed Conditions for Participation and length of exposure, contributing to Conflict in

children's friendships. Specifically, there was a negative relationship between conditions for participation and Conflict in children's friendships, in classrooms where children had spent more time with the teacher. Although this effect is small, it suggests that increased exposure to material and organizational conditions supporting participation at the classroom level may be associated with less conflict with friends, potentially due to more opportunities to build relationships. This finding reinforces the importance of ensuring material and classroom conditions for child participation, as widely stated in the literature (e.g., Sinclair, 2004), and adds that prolonged exposure to such practices, in contrast to more situated or episodic participation opportunities, can contribute to more positive peer relationships in ECE (Lansdown et al., 2014).

Interestingly, while conditions for participation emerged as a significant predictor in our findings, children's choice did not. This finding suggests that participation dimensions contribute differently to children's peer relationships, and additional research is needed to understand these nuances (Correia, Aguiar, & Participa, 2022; Lundy, 2007).

The nuanced role of length of exposure in shaping the relationship between classroom quality, participation practices, and Conflict in children's friendships, reflects the complexity of these interactions. Remarkably, extant evidence on the length of exposure is relatively scarce and particularly inconsistent regarding social outcomes (Aguiar et al., 2019). Given the intricate nature of the effects of the length of exposure to ECE practices and interactions, further research is needed to examine the mechanisms underlying cumulative exposure effects (Zaslow et al., 2010). Such research can provide valuable insights into supporting children's friendship quality in ECE.

### 6.3. Study limitations and future research

When interpreting our findings, some limitations and specificities are worth noting. First, this study focused on preschool-aged children, and future research could examine the links between participation practices, classroom quality, length of exposure, and friendship quality across broader age ranges. Another limitation is the exclusive representation of female ECE teachers, which reflects a broader gender imbalance in the ECE workforce in Portugal and across Europe. Furthermore, this study was conducted solely in the Lisbon area, and broader geographical areas could be considered (e.g., comparative studies across different regions). Our sample included mostly mixed-age groups. Although this study did not investigate mixed-age versus same-age dynamics, group composition may influence children's interactions and teacher-child relationships, and future research could delve further into these group dynamics. It is also important to mention other specificities related to children's age and time spent with the ECE teacher in Portugal. Specifically, children may remain in ECE settings after completing 6 years of age if they were born after September 15$^{th}$; therefore, they are older than children attending ECE in other countries. This also means that children may spend an extended period of time with the same teacher. These two aspects may limit the replication of our findings across different educational systems and underscore the importance of considering cultural and structural differences when interpreting the research findings.

Considering the measures used, reliance on the same coders for observing participation practices and classroom quality may have resulted in potential issues of shared variance. Furthermore, the effect sizes found in this study are relatively small, although such magnitudes are common in social science research, where outcomes are typically influenced by a range of different factors. As Götz et al. (2022) argue, recognizing small effects as typical outcomes is essential for advancing cumulative and realistic psychological science. Our findings also point to the need for further development of measures, particularly self-report (e.g., capturing young children's perspectives on their friendships' quality) and observation measures (e.g., capturing children's friendship quality, children's participation experiences) to capture important experiences and mechanisms underlying children's friendship quality more comprehensively.

Furthermore, while we considered the associations between participation practices and classroom quality and children's friendship quality, accounting for the role of length of exposure, longitudinal studies encompassing extended time intervals between measurements are still needed to assess sustained effects. Moreover, incorporating additional variables, such as children's self-perceptions of competence, self-regulation, or temperament, could provide a more comprehensive understanding of these relationships (e.g., Kangas et al., 2015).

## 7. Conclusion

This study contributed to a deeper understanding of the variables associated with friendship quality in ECE. Our findings underscore the relevance of sustained high-quality teacher-child interactions (Zaslow et al., 2010) and participation practices (Lundy, 2007) in enhancing children's friendship quality. Importantly, teachers' reports on friendship quality were based on children's initial reports of their own peer preferences, thus valuing children's perspectives (Marshford-Scott et al., 2012). Remarkably, the interaction between classroom quality and length of exposure to the ECE teacher seems to be relevant for the quality of peer interactions (Aguiar et al., 2019; Bronfenbrenner & Morris, 2006). These findings have implications for practice and policymaking, emphasizing the prominent role of ECE teachers in ensuring high-quality interactions (Pianta et al., 2012) and conditions for child participation (Gal, 2017). Therefore, this study has the potential to inform pedagogical approaches, targeted professional development initiatives, and practices aimed at fostering children's friendship quality in ECE.

## CRediT authorship contribution statement

**Nadine Correia:** Writing – review & editing, Writing – original draft, Methodology, Funding acquisition, Conceptualization. **Helena Carvalho:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Cecília Aguiar:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization.

## Declaration of competing interests

The authors do not have any competing interests to declare.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ecresq.2025.08.006.

## Data availability

Data will be made available on request.

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