

A Short-Term Longitudinal Investigation of Turkish Preschoolers' Aggressive Behavior and Emotion Regulation Skills

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Aggression in early childhood is a multifaceted phenomenon that significantly impacts social development and long-term behavioral outcomes. Identifying the precursors of such behaviors and understanding the role of emotion regulation is crucial for effective intervention. This short-term longitudinal study investigates the developmental trajectory of physical and relational aggression among Turkish preschool children and examines whether early emotion regulation skills predict subsequent aggressive tendencies. Data were collected from 289 children (148 girls, 141 boys) aged 4 to 5 years, residing with their parents in Alanya, Antalya. Assessments were conducted at two time points over a seven-month period using the 'Aggression Orientation Scale' and the 'Emotion Regulation Scale'. While teachers reported on children's aggression levels, mothers evaluated their children's emotion regulation skills. Data analysis involved independent and paired sample t-tests to identify gender and temporal differences, alongside path analysis to test predictive relationships. The findings revealed that boys exhibited significantly higher levels of physical aggression than girls across both measurement points. Notably, relational aggression among all participants showed a significant increase from the first to the second assessment, whereas physical aggression levels remained relatively stable over time. Contrary to expectations, path analysis indicated that children's initial emotion regulation skills did not significantly predict physical or relational aggression at the second measurement. These results suggest that as children mature during the preschool years, they may increasingly adopt more subtle, relational forms of aggression. The study highlights the complexity of socio-emotional development and the need for culturally sensitive longitudinal research in early childhood.

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Introduction

Aggression, a complex and multifaceted behavior, has long been a major focus of research (Broidy et al., 2003; Moffitt et al., 1996). It refers to intentional behavior aimed at causing harm to oneself, others, or objects and is commonly classified as physical, verbal, or relational (Ettetal & Ladd, 2017; Girard et al., 2019). Physical aggression is defined as a person intentionally harming others and includes behaviors such as pushing, hitting, kicking, or damaging other people's property (Taylor & Jose, 2014). Relational aggression is a form of aggression that targets a person's social relationships and status rather than causing direct physical harm, involving behaviors such as exclusion from friendships, making social threats, spreading rumors, or disrupting social relationships (Coyne & Ostrov, 2018; Ostrov et al., 2013a). Aggression is among the most frequent behavioral problems in children, emerging early and peaking around ages 2–3, before declining into more subtle forms (Alink et al., 2006; Ostrov et al., 2006). Preschool is a critical period for addressing such behaviors, as children begin interacting with peers outside the family and may use aggression to navigate social challenges. Parents and teachers often identify aggression as a key concern during this stage (Ersan & Tok, 2020; Ostrov & Keating, 2004).

Gender differences are notable: boys generally display higher physical aggression (Archer, 2004; Card et al., 2008), while findings on relational aggression remain inconsistent, with Turkish studies showing little to no gender difference (Ersan & Tok, 2020). However, longitudinal evidence on this topic in Turkish preschoolers is still lacking.

Aggression in early childhood is often linked to difficulties in emotion regulation the ability to identify, manage, and express emotions appropriately (Koole, 2009; Ochsner & Gross, 2005). Effective emotion regulation supports social adaptation, while poor regulation can lead to maladaptive behaviors such as aggression or anger (Eisenberg et al., 2010). During the preschool years, children develop emotional awareness and vocabulary that help reduce frustration and enhance peer relationships (Denham et al., 2003; Shields & Cicchetti, 1997). Research consistently indicates that higher emotion regulation skills are associated with greater social competence and lower aggression levels (Blair, 2002; Calkins & Hill, 2009; Ersan & Tok, 2020).

Current Study

When preschool children begin institutional education, they encounter unfamiliar peers, and these early social interactions significantly influence their development and learning (Mamadaminova, 2021; Yenen & Ulucan, 2021). However, undesirable behaviors, particularly aggression, are inevitable and require early prevention (Tremblay et al., 2004). Children should learn socially acceptable problem-solving strategies instead of using aggression (Parker et al., 2022).

According to the social information processing model, aggressive children often misinterpret social cues and fail to anticipate the consequences of their actions (Trawick-Smith, 2014). Effective emotion regulation can help them interpret peers' behavior more accurately and reduce aggressive responses (Calkins & Hill, 2009; Ersan, 2020a). Consistently, studies show that children with better emotion regulation skills display less aggression when facing difficulties (Di Maggio et al., 2016; Ersan & Tok, 2020; Sedighi & Naziry, 2020). To better understand how these behaviors develop over time, longitudinal research is crucial (Caruana et al., 2015; Grammer et al., 2013). However, few studies have examined aggression and

emotion regulation together. For example, a recent review of longitudinal research on early childhood socio-emotional development found that while more than 40 studies focused on either aggression or emotion regulation, fewer than 10 examined both constructs over time (e.g., Blandon et al., 2010; Bowie, 2010; Flanders et al., 2010). Findings regarding the long-term relationship between these variables remain mixed; for instance, Blandon et al. (2010) and Flanders et al. (2010) reported no significant association.

To date, no longitudinal study has specifically examined changes in aggression and emotion regulation skills among Turkish preschool children. The culture in which a child grows up plays a crucial role in shaping behavior (Aguayo et al., 2021; Bornstein, 2015). Although aggression is universal, its expression varies across cultures (Yang et al., 2013). Children develop a behavioral repertoire shaped by genetic predispositions and the behaviors modelled by those around them, especially their parents (Dahl, 2018; Ersan, 2019). For instance, Yıldızbaşı and Şahin Sak (2020) found that positive parental attitudes were associated with lower aggressive behavior, while authoritarian parenting was linked to higher aggression in Turkish preschoolers. Similarly, children receiving more maternal attention tended to show less aggressive behavior (Tuzcuoğlu et al., 2020). Bayram Özdemir and Cheah (2017) reported that Turkish mothers' approaches to aggression depended on its perceived function, with reactive aggression in school generally considered more acceptable than proactive aggression.

Compared to children in many Western societies, where proactive aggression is often emphasized, Turkish preschoolers' aggression appears more influenced by parental attitudes and culturally accepted forms of reactive aggression. These findings highlight that while aggression is universal, cultural norms in Turkey shape its expression differently than in other societies, influencing both the forms of aggression exhibited and the strategies used to manage them (Osher et al., 2020).

Therefore, it is important to investigate the relationship between aggressive behaviors and emotion regulation skills in Turkish preschool children over time. To address this, the following questions will be explored:

- (1) Do aggressive behaviors among preschool children significantly differ by gender across both measures and all sub-dimensions (physical and relational)?
- (2) Are there significant differences in preschool children's aggressive behaviors across all sub-dimensions (physical and relational) between the results of measurement 1 and measurement 2?
- (3) Do preschool children's emotion regulation skills measured at the first assessment significantly predict their levels of physical aggression at the second assessment?
- (4) Do preschool children's emotion regulation skills measured at the first assessment significantly predict their levels of relational aggression at the second assessment?

Method

This longitudinal quantitative study examines the relationship between emotion regulation skills and physical and relational aggression in preschool children aged 4–5 years. It also investigates whether aggression levels differ by gender, whether they change over time, and whether early emotion regulation skills predict later aggression.



Participants

Instruments

The study sample consisted of 289 preschool children aged 4–5 years from public kindergartens in Alanya, Antalya. Of these, 148 were girls (51.2%) and 141 were boys (48.8%). The mean age was 4.54 years ($SD = .50$); 46% were four years old and 54% were five. All children lived with both parents, as family structure can affect aggressive behaviors (Ersan & Uslu, 2023). Regarding family income, 29.4% were low-, 24.2% medium-, and 15.6% high-income, while 30.8% did not report their income.

Aggression Orientation Scale

The Aggression Orientation Scale, developed by Kaynak, Kan, and Kurtulmuş (2016), measures aggression in children aged 36–72 months across four sub-dimensions: physical, relational, object-directed, and self-directed aggression. It is a 7-point Likert-type scale (1 = never, 4 = occasionally, 7 = always). Reported Cronbach's alphas were .95 for physical, .95 for relational, .85 for object-directed, and .92 for self-directed aggression. In this study, confirmatory factor analysis indicated acceptable model fit ($\chi^2/df = 3.40$, RMSEA = .07, SRMR = .06, TLI = .96, CFI = .98, IFI = .98). Only the physical ($\alpha = .94/.96$) and relational ($\alpha = .93/.95$) aggression subscales were used. Example items include “Hits another person to hurt them” (physical) and “Deliberately excludes another person” (relational).

Emotion Regulation Checklist

In this study, the Turkish version of the Emotion Regulation Checklist (Shields & Cicchetti, 1997) was used. The 24-item scale assesses children's emotion regulation and variability/negativity on a 4-point Likert scale (1 = never, 4 = always), rated by mothers and teachers. One filler item (item 12) is excluded from scoring. In this study, negative items were reverse coded to compute a total emotion regulation score. The Turkish adaptation by Batum and Yağmurlu (2007) reported a Cronbach's alpha of .73 for the maternal form. Confirmatory factor analysis indicated adequate model fit ($\chi^2/df = 1.31$, RMSEA = .03, SRMR = .03, TLI = .93, CFI = .94, IFI = .94). Internal consistency coefficients were $\alpha = .76$ for the first and $\alpha = .75$ for the second measurement.

Data Collection Process and Data Analysis

This study was approved by the Ethics Commission of Alanya Alaaddin Keykubat University (22.08.2022, No. 82535). During data collection, about 400 survey forms were distributed to four public kindergartens in Alanya, Türkiye. Teachers rated children's aggression, and mothers evaluated their emotion regulation. Data were collected twice between November 2022 and June 2023. In the first wave, 334 valid forms were obtained; in the second, 289 matched forms were included. Missing data were random according to Little's MCAR test ($p > .05$).

Descriptive and difference analyses were conducted in SPSS 24, and regression analyses in Amos 20. Independent and paired t-tests examined gender differences and temporal changes in aggression. Path analysis tested whether initial emotion regulation predicted later aggression, using item parceling (Little et al., 2002). Model fit was evaluated via χ^2/df , RMSEA, SRMR, TLI, IFI, and CFI, with standard thresholds indicating acceptable fit (Meydan & Şeşen, 2015).

Results

Correlations Between Variables

Table 1 displays the relationships among the study variables across both measurement periods. The findings indicate significant associations between various factors. Specifically, in the first measurement, physical aggression correlated significantly with relational aggression ($r = .51$; $p < .01$), as well as with emotion regulation ($r = -.21$; $p < .01$). Similarly, in the second measurement, physical aggression exhibited significant correlations with relational aggression ($r = .39$; $p < .01$). Relational aggression in the first measurement showed significant associations with physical aggression ($r = .23$; $p < .01$) and relational aggression ($r = .27$; $p < .01$) in the second measurement, but not with emotion regulation skills in the first measurement ($r = .06$; $p > .05$).

Furthermore, children's emotion regulation skills in the first measurement were significantly negatively correlated with physical aggression in the second measurement ($r = -.14$; $p < .01$), but not with relational aggression ($r = -.02$; $p > .05$). Similarly, in the second measurement, emotion regulation skills were significantly negatively associated with both physical aggression ($r = -.23$; $p < .01$) and relational aggression ($r = -.15$; $p < .05$) in both the first and second measurements. Additionally, a positive and significant relationship was observed between physical and relational aggression in the second measurement ($r = .56$; $p < .01$).

Table 1 Relationships between emotion regulation skills and physical and relational aggression levels of preschool children

| Time | Variable | M 1 | | | M 2 | | |
|------|----------|--------|-------|--------|--------|-------|-------|
| | | 1 PA | 2 RA | 3 ER | 4 PA | 5 RA | 6 ER |
| M 1 | 1 PA | 1 | | | | | |
| | 2 RA | .51** | 1 | | | | |
| | 3 ER | -.21** | -.06 | 1 | | | |
| M 2 | 4 PA | .39** | .23** | -.14** | 1 | | |
| | 5 RA | .15* | .27** | -.02 | .56** | 1 | |
| | 6 ER | -.20** | -.07 | .49** | -.23** | -.15* | 1 |
| | Mean | 6.11 | 5.05 | 36.7 | 6.31 | 5.65 | 37.29 |
| | Sd. | 3.41 | 2.01 | 4.19 | 3.41 | 2.78 | 4.03 |

** $p < .01$; * $p < .05$ M 1: Measurement 1, M 2: Measurement 2, PA: physical aggression, RA: relational aggression, ER: emotion regulation,

Analyses on the Differences of Children's Aggression Levels According to Gender and Time

As depicted in Table 2, significant differences were observed in the physical aggression levels of preschool children across both measurement periods concerning gender. In the first measurement, boys exhibited a mean physical aggression score of 6.81, whereas girls scored 5.45 on average. This discrepancy was statistically significant ($p < .05$). Likewise, in the second measurement, boys had a mean physical aggression score of 7.14, compared to girls' mean score of 5.51. Once more, this contrast was statistically significant ($p < .05$).



Table 2 also compares children's relational aggression levels based on gender and measurement variables. Regarding the first measurement scores, boys exhibited a mean relational aggression of 5.03, slightly lower than girls' mean of 5.06. Despite this difference favoring girls, it was not statistically significant ($p > .05$). Moving to the second measurement scores, boys had a mean relational aggression score of 5.72, slightly surpassing girls' mean score of 5.58. In contrast to the first measurement, boys' mean relational aggression scores were higher than girls', yet again, this difference was not statistically significant ($p > .05$).

Table 2 t test results regarding physical and relational aggression scores of preschool children in terms of measurement1 and measurement2 according to gender variables

| Time | Dependent Variable | Gender | n | \bar{X} | <i>Sd</i> | t | p | Cohen's d |
|------|-----------------------|--------|-----|-----------|-----------|-------|--------|-----------|
| M 1 | Physical Aggression | Girls | 148 | 5.45 | 2.57 | -3.46 | .001** | .40 |
| | | Boys | 141 | 6.81 | 3.99 | | | |
| | Relational Aggression | Girls | 148 | 5.06 | 1.97 | .106 | .916 | - |
| | | Boys | 141 | 5.03 | 2.05 | | | |
| M 2 | Physical Aggression | Girls | 148 | 5.51 | 2.28 | -4.15 | .000** | .49 |
| | | Boys | 141 | 7.14 | 4.14 | | | |
| | Relational Aggression | Girls | 148 | 5.58 | 2.85 | -.443 | .658 | - |
| | | Boys | 141 | 5.72 | 2.70 | | | |

** $p < .001$ M 1: Measurement 1, M 2: Measurement 2.

As depicted in Table 3, there was no significant difference in preschool children's physical aggression levels between the first and second measurements ($p > .05$). The mean score for the first measurement was 6.11, slightly lower than the mean score for the second measurement, which was 6.31. Although there was an increase in children's physical aggression levels over the 7-month period, this difference was not statistically significant.

Table 3 Paired Samples t Test Results for Physical and Relational Aggression Scores of Preschool Children According to Measurement1 and Measurement2

| Dependent Variable | Time | n | \bar{X} | <i>Sd</i> | t | p | Cohen's d |
|-----------------------|------|-----|-----------|-----------|-------|--------|-----------|
| Physical Aggression | M 1 | 289 | 6.11 | 3.41 | -.879 | .380 | - |
| | M 2 | 289 | 6.31 | 3.41 | | | |
| Relational Aggression | M 1 | 289 | 5.05 | 2.01 | -3.44 | .001** | .24 |
| | M 2 | 289 | 5.65 | 2.78 | | | |

** $p < .01$ M 1: Measurement 1, M 2: Measurement 2.

In contrast, significant differences were observed in preschool children's relational aggression levels between the first and second measurements ($p < .01$). The mean score for the sampled children in the first measurement was 5.05, while it increased to 5.65 in the second measurement. This indicated a statistically significant increase in preschool children's relational aggression levels over the 7-month period.

Path Analysis

Figure 1 displays the path analysis illustrating the prediction of preschool children's second measurement physical aggression levels based on their first measurement emotion regulation skills. The results indicated that the first measurement of emotion regulation skills did not significantly predict the second measurement of physical aggression levels ($\beta = -.08, p >.01, p=.25$).

The fit indices for the path analysis were calculated as follows: $\chi^2/df = 2.17$, RMSEA = .06, SRMS = .05, TLI = .93, CFI = .94, and IFI = .94. These indices suggested that the path analysis model fitted the data well (Meydan & Şeşen, 2015). In addition, gender was also included in the model. In this context, it was examined whether gender had an effect on children's physical aggression and emotion regulation skills in the second measurement. According to the results obtained, gender had a significant effect on physical aggression ($\beta = .16, p <.01; p=.007$) but not on emotion regulation ($\beta = -.10, p >.01; p=.095$).

The path analysis was repeated to determine whether the first measure of emotion regulation significantly predicted the second measure of relational aggression. As seen in Figure 2, children's emotion regulation skills in the first measurement did not significantly predict their relational aggression in the second measurement ($\beta = .04, p >.01; p=.57$). The fit indices for the path analysis were calculated as follows: $\chi^2/df = 1.92$, RMSEA = .05, SRMS = .05, TLI = .94, CFI = .95, and IFI = .95. Gender also had no significant effect on either relational aggression ($\beta = .03, p >.01; p=.57$) or emotion regulation ($\beta = -.11, p >.01; p=.051$).

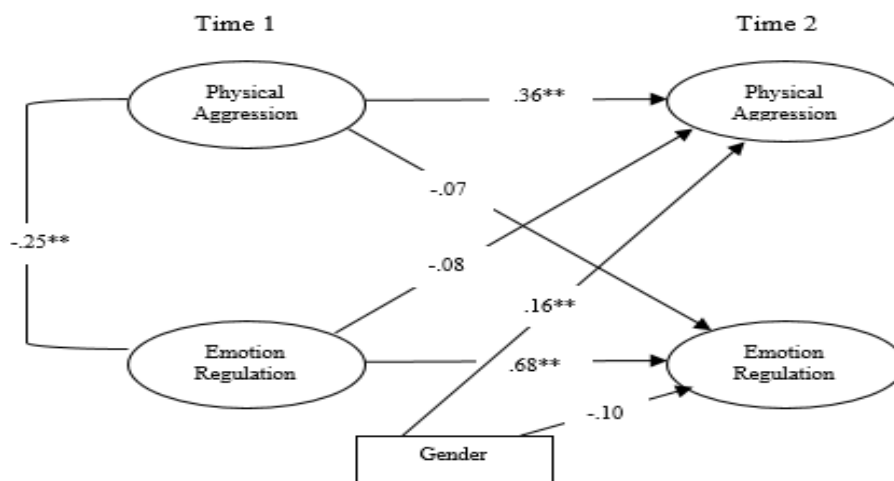


Figure 1 Path analysis regarding the prediction of preschool children's emotion regulation skills on physical aggressive behaviors obtained within the scope of measurement 1 and measurement 2

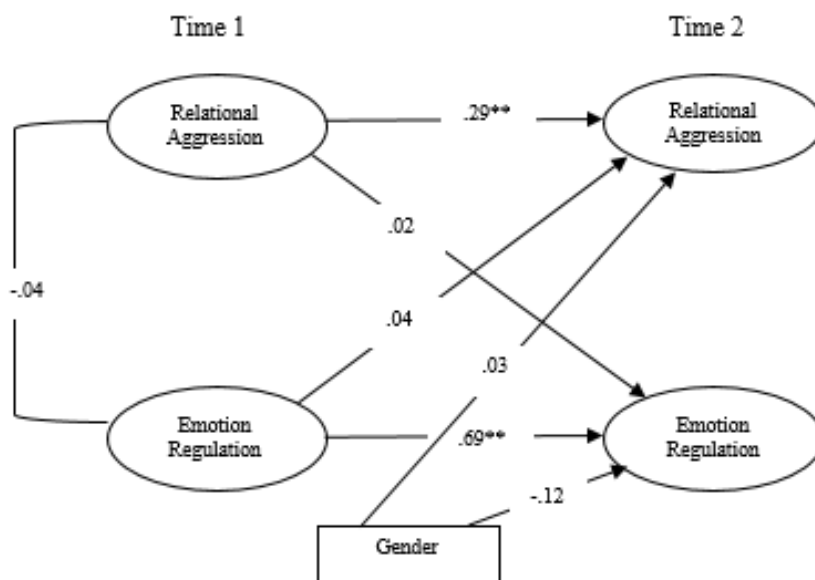


Figure 2 Path analysis regarding the prediction of preschool children's emotion regulation skills on relational aggressive behaviors obtained within the scope of measurement 1 and measurement 2

Discussion

The study examined whether there were significant gender differences in preschool children’s aggressive behaviors in both measures and in all sub-dimensions (physical and relational). The findings revealed that there were significant gender differences in children’s physical aggression levels in both the first and second measurements and that boys exhibited higher levels of physical aggression than girls. This result is in line with many scientific studies that reveal that preschool boys show significantly higher physical aggression than girls (Alink et al., 2006; Campbell et al., 2000; Ersan & Tok, 2020; Ostrov & Keating, 2004; Perry & Ostrov, 2023; Swit, 2019; Walker, 2005). Lansford et al. (2012) conducted a study with the participation of 1,410 children from nine different countries and revealed that boys exhibit significantly higher levels of physical aggression compared to girls. This trend has been consistently observed across several countries, indicating that male preschool children generally show more physical aggression than their female peers.

From an evolutionary perspective, factors such as the historical role of males in hunting, the instinct to protect family members, and the influence of testosterone may explain this pattern (Arnas & Erden, 2006; Muñoz Reyes et al., 2023). Indeed, studies show that there is a significant positive correlation between prenatal testosterone levels and subsequent levels of physical aggression in boys (Archer, 2004; Muñoz Reyes et al., 2023).

The higher rate of physical aggression in boys may be attributed to their relatively underdeveloped language skills. However, studies conducted internationally, such as Zhang et al. (2008), show that girls tend to exhibit superior language skills until around 36 months of age, with this difference gradually decreasing over time. In contrast, the findings of a longitudinal study in Turkey reveal significant differences between preschool girls and boys in terms of expressive language skills (Ergül et al., 2020). Moreover, Ersan (2020b) reported

that Turkish preschool children's expressive language skills had a negative and significant predictive effect on physical aggression, while receptive language skills did not significantly predict physical aggression. In this context, the higher levels of physical aggression observed in boys may be linked to weaker expressive language skills.

The gender differences in physical aggression may also be influenced by different socialization practices (Yıldızbaş & Şahin Sak, 2020). Preschool children may perceive certain behaviors as being specific to either girls or boys and develop beliefs about what is 'appropriate' for each gender due to societal expectations and adult guidance (Coyne et al., 2020). This could contribute to higher levels of physical aggression, particularly in boys. Additionally, boys may be more influenced by media products—such as cartoons, animations, and video games—which often feature aggressive content (Hastings et al., 2009; Fitzpatrick et al., 2016; Piotrowski, 2017; Polman et al., 2008). Ersan and Tok (2020) suggest that boys' physical aggression levels may increase as they are influenced by male superhero characters in cartoons and animations. Similarly, Arnas and Erden (2006) and Wilson (2008) highlight that boys are more affected by media with aggressive content.

Another important finding from the study was that there were no significant gender differences in the levels of relational aggression among preschool children. This result is consistent with studies conducted on Turkish preschool children (Ersan & Tok, 2020; Suna Şaka, 2020) as well as international research (Krygsman & Vaillancourt, 2019; Lansford et al., 2012), which also suggest that gender does not influence relational aggression levels in preschoolers. These findings align with the results of the current study. However, some other studies on preschool children (Crick et al., 2006; Ostrov & Keating, 2004; Swit, 2019) have suggested significant gender differences in relational aggression levels, which contradict the findings of the present study.

Unlike physical aggression, relational aggression involves more subtle and indirect actions (Coyne & Ostrov, 2018). While behaviors such as slapping, spitting, kicking, and pushing are widely recognized as socially unacceptable, they can still lead to serious harm (Tremblay et al., 1999). Therefore, preschool children, regardless of gender, may perceive relational aggression as a more "acceptable" alternative to physical aggression, as it might allow them to avoid negative reactions from parents, peers, and teachers (Herrenkohl et al., 2007). This could be because physical aggression is often seen as a more severe, less acceptable, and more harmful behavior by mothers, teachers, and society (Swit, 2019; Werner et al., 2006).

The literature also highlights the challenges in assessing relational aggression in children and adolescents. Many studies (Herrenkohl et al., 2007; Kuppens et al., 2013; Swit & Slater, 2021) emphasize the difficulties in recognizing, defining, and detecting relational aggression compared to physical aggression. In this context, there remain uncertainties regarding the reasons for gender differences in studies on relational aggression (Razmjooe et al., 2016). Discrepancies are often observed between peer reports and the assessments of teachers or mothers when evaluating preschool children's relational aggression. Moreover, scales that involve direct observation may yield different results concerning gender differences in relational aggression (Crick et al., 2006; Shahaiean et al., 2017; Swit & Slater, 2021). Additionally, both parents and teachers continue to face difficulties in recognizing and identifying relational aggression among preschool children (Ersan, 2020c; Herrenkohl et al., 2007; Kuppens et al., 2013; Swit & Slater, 2021).

The second finding of the study showed that the physical aggression levels of preschool



children did not significantly increase from measure 1 to measure 2. Longitudinal studies on this topic have yielded inconsistent results regarding changes in physical aggression as children age. Some studies suggest that physical aggression decreases with age (Alink et al., 2006; Dearing et al., 2015; Girard et al., 2019; Tremblay et al., 2004), while others report that aggression levels remain stable (Ostrov et al., 2006) or fluctuate throughout the year (Crick et al., 2006). This variability is likely linked to various factors, including parental attitudes towards aggression in early childhood (Chang et al., 2003), temperament (Croney et al., 2020), and teachers' responses to aggressive behavior (Dias & Ventura, 2017). For instance, a meta-analysis conducted in 2022 (Navarro et al., 2022) highlights how different family environment factors can increase the risk of preschool children developing aggressive behaviors. Additionally, teachers' attitudes and feedback can significantly influence children's aggression levels. Research indicates that preschool children display higher levels of physical aggression, especially when teacher supervision is reduced or absent (Crick et al., 2006). Even more secluded areas in preschool playgrounds have been associated with higher rates of physical aggression among children (Flouri et al., 2023).

In this context, the non-significant increase in physical aggression observed in this study may be attributed to factors such as parental attitudes, children's temperaments, sibling dynamics, or teachers' responses to aggression. Positive influences within the preschool environment may have also played a role in preventing a significant rise in physical aggression. This is supported by the preschool education program (MoNE, 2025) in Turkey, which focuses on reducing negative interactions while fostering positive social interactions. In line with this program, teachers emphasize values like friendship, sharing, and respect for others' rights through activities such as games, shared stories, finger plays, and songs (Seven et al., 2024; Uyanık et al., 2024; Yıldırım & Ersan, 2024). These interactions may have helped prevent a significant increase in the physical aggression levels among the children in the sample.

In contrast to physical aggression, a statistically significant increase in relational aggression levels was observed among preschool children. Specifically, relational aggression levels were significantly higher in the second measurement compared to the first. However, this finding contradicts the results of longitudinal studies on relational aggression. For instance, in studies by Ostrov et al. (2006) and Crick et al. (2006), no significant difference was found between two measurements in children's relational aggression levels.

When examining the literature, it becomes apparent that factors such as culture (Voulgaridou & Kokkinos, 2023), children's language development (Ersan, 2020b; Razmjooee et al., 2016), and cognitive skills (Shahaeian et al., 2017) significantly influence relational aggression. As mentioned earlier, when preschool children feel the urge to engage in physical aggression, they may shift to relational aggression, a subtler form. This shift may be driven by the fear of disapproval, particularly from teachers. Studies have shown that preschool children exhibit higher levels of physical aggression in environments with reduced teacher supervision (Crick et al., 2006; Flouri et al., 2023). Moreover, Tremblay et al. (1999) suggest that children over the age of four tend to seek alternatives to physical aggression when dealing with social difficulties. Relational aggression, which is less visible to both mothers and teachers and is often perceived as relatively harmless compared to physical aggression, becomes an effective alternative (Coyne & Ostrov, 2018; Swit, 2019; Werner et al., 2006).

In this context, the longitudinal study by Ostrov et al. (2013b) is also noteworthy. Their research examined the effect of exposure to educational media on aggressive behavior in preschool children. Data on children's aggression levels were collected from both teachers and

mothers. The study found no significant increase in physical aggression among children exposed to educational media, but it did observe an increase in relational aggression levels. Similarly, in our study, children engaged in various educational activities both directly and through technological tools over a seven month period. Thus, it is plausible that such educational content may have led the children in our sample toward relational aggression rather than physical aggression. This aligns with the findings of Ostrov et al. (2013b) and supports the results of our longitudinal study. On the other hand, it should not be overlooked that more research is needed to be able to say that children's participation in education, either directly or through educational media, increases relational aggression.

Another relevant study explored the effectiveness of a long-term intervention program for clinically diagnosed aggressive four-year olds. While the intervention led to a significant reduction in physical aggression, only a limited decrease in relational aggression was observed (Basso & Graham, 2016). This finding suggests that various interventions—such as preschool education, exposure to educational media, or experimental programs—can help reduce physical aggression in preschool children to some extent. However, when faced with triggers for physical aggression, children may resort to relational aggression as a more subtle and less noticeable way of resolving conflicts. This behavior, though less overt, can still lead to significant challenges. Essentially, preschool children appear to ‘turn to/prefer’ relational aggression as an alternative response to physical aggression. Research also indicates that children are more likely to engage in relational aggression from late preschool years through adolescence (Archer & Coyne, 2005; Coyne et al., 2020). In light of these findings, the tendency of preschool children to shift toward relational aggression instead of physical aggression warrants careful consideration, as relational aggression can be just as harmful as physical aggression (Ersan & Tok, 2020; Smith et al., 2009).

Finally, this study examined whether the emotion regulation skills of preschool children significantly predicted their levels of physical and relational aggression in the second measurement. However, the path analysis revealed that the emotion regulation skills assessed in the first measurement did not significantly predict the levels of physical and relational aggression in the second measurement. Cross sectional studies exploring the relationship between emotion regulation skills and aggressive behaviors in preschool children (Ersan & Tok, 2020; Veiga et al., 2022) consistently found a significant negative relationship between these two variables. However, in this longitudinal study, which tracked children’s emotion regulation skills and aggressive behaviors over time, emotion regulation skills did not significantly predict changes in physical and relational aggression.

The number of longitudinal studies examining the relationship between emotion regulation skills and aggressive behaviors in preschool children is quite limited (Bandon et al., 2010; Bowie, 2010; Hill et al., 2006; Flanders et al., 2010). Two studies (Bandon et al., 2010; Flanders et al., 2010) focused solely on the relationship between children’s physical aggression and emotion regulation skills, while the other two (Bowie, 2010; Hill et al., 2006), like the present study, explored the connections between emotion regulation and both physical and relational aggression. For instance, Bandon et al. (2010) conducted a five-year longitudinal study that investigated emotion regulation skills as well as aggressive and disruptive behaviors in preschool children. The study followed 440 children at four different ages (2, 4, 5, and 7 years old). While a significant negative relationship was found between children’s aggressive and disruptive behaviors and emotion regulation skills, no significant relationship was observed between emotion regulation and aggressive/disruptive behaviors over time.



Similarly, Bowie (2010) did not find a significant relationship between children's physical and relational aggression and emotion regulation skills in his longitudinal study. Hill et al. (2006) evaluated 383 preschool children at ages 2, 4, and 5, finding that girls' emotion regulation skills at age 2 significantly predicted externalizing behaviors at age 4, but this effect diminished by age 5. In contrast, emotion regulation did not significantly affect externalizing behaviors in boys. Flanders et al. (2010) conducted a five year longitudinal study investigating the relationship between emotion regulation skills and physical aggression in children who engaged in rough play with their fathers, but they found no significant relationship over time. In this context, the findings of the present study align with the results of all the other longitudinal studies (Bandon et al., 2010; Bowie, 2010; Hill et al., 2006; Flanders et al., 2010) that examined emotion regulation skills and physical and relational aggression in preschool children.

In the present study, the finding that children's emotion regulation skills in the first measurement were not significant predictors of their physical and relational aggression in the second measurement requires further explanation beyond merely comparing it to similar research findings. First, it is important to note that there was a negative and significant relationship of $-.21$ between children's emotion regulation skills in the first measurement and their physical aggression during the same period. After seven months, this relationship weakened to $-.14$ (see Table 1). The path analysis results indicated that emotion regulation in the first measurement predicted physical aggression in the second measurement at a non-significant level, with a regression coefficient of $-.08$ (see Figure 1).

The emotion regulation skills of the children in the sample were assessed by their mothers, while their aggression levels were evaluated by their teachers. Mothers assessed their children's emotion regulation skills in the first measurement, which was considered a fixed value. Teachers, on the other hand, assessed the children's aggression both in the first measurement and again seven months later. The teachers' initial assessments were based on their observations of the children over a period of approximately two months. In the second measurement, after roughly nine months of interaction, teachers had more opportunities to observe the children closely. During this time, preschool activities focused on addressing physical aggression as a negative behavior in interactions. Seven months after the first assessment, the children's aggression levels were re-evaluated. Although a slight increase in physical aggression was observed, it was not statistically significant. Therefore, it is possible that mothers' assessments of emotion regulation in the first measurement did not significantly correlate with teachers' assessments of physical aggression in the second measurement.

Various studies (Adynski et al., 2024; Ferreira et al., 2024; Schönmoser et al., 2022) suggest that the assessment of preschool children's emotion regulation skills and aggression levels by mothers and teachers can yield inconsistent results. Therefore, more reliable findings could have been obtained if both mothers and teachers had assessed children's emotion regulation skills in both the first and second measurements. This limitation should be acknowledged and considered as a suggestion for future research. A similar issue applies to the assessment of children's relational aggression levels.

In the first measurement, a statistically insignificant relationship of $-.06$ was found between children's emotion regulation skills and relational aggression levels, while in the second measurement, this relationship was $-.02$ (see Table 1). Path analysis also revealed a non-significant relationship of $-.02$ between these variables. This lack of significance may be attributed to the 'implicit and innocent' nature of relational aggression, which tends to be

perceived as less harmful by both mothers and teachers, in contrast to physical aggression.

When children in the sample exhibited physical behaviors such as slapping, kicking, or spitting at others, they may receive strong reactions from their peers and teachers. These reactions may prompt children to engage in more self-reflection and emotion behavior regulation in an effort to control their physical aggression. In contrast, relational aggression behaviors, like “not letting a friend play” or “looking at a peer in a condescending way,” may not raise significant concerns for peers or teachers, aside from the child directly affected. As a result, children’s emotion regulation skills did not have a significant impact on their relational aggression levels.

Conclusion

The study reveals that Turkish preschool children's emotion regulation skills do not predict subsequent levels of physical and relational aggression, in line with findings from other cultures. It also shows that Turkish preschool children tend to engage in/prefer relational aggression more than physical aggression over time. It is thought that the results of the study will contribute to the literature.

Limitations of the Study

This study has certain limitations. Data were collected only twice within seven months, which restricted the depth of longitudinal analysis. The sample size was also reduced due to unmatched data between measurements. Moreover, children’s emotion regulation and aggression were assessed solely through quantitative tools based on mothers’ and teachers’ reports, limiting the diversity of perspectives. Gender differences were not fully examined in the path analysis. Finally, as the sample consisted of children attending preschools in a single district, the findings may not be generalizable to all Turkish preschoolers, particularly those outside institutional education.

Suggestions

The findings of this study suggest several implications for policymakers and practitioners. Since emotion regulation skills did not predict subsequent levels of aggression, but children showed a tendency to engage more in relational than physical aggression, early childhood education policies should place greater emphasis on social–emotional learning (SEL) components beyond emotion regulation—particularly on empathy, communication, and positive peer interaction. National preschool curricula could integrate structured programs aimed at preventing relational aggression, which is often subtle yet harmful to children’s social adjustment.

For practitioners, in-service training programs can help preschool teachers recognize different forms of aggression and implement effective intervention strategies. Expert-developed guidebooks and instructional videos may further support both teachers and parents in identifying and addressing relational aggression in everyday settings. Additionally, incorporating practical courses on behavior management and conflict resolution into undergraduate and graduate teacher education programs would strengthen teachers’ ability to promote healthy peer relationships and classroom climates.

From a research perspective, future studies should include observational methods and consider evaluations of children’s emotion regulation by multiple informants (e.g., mothers



and teachers) to obtain a more comprehensive view of children's social-emotional functioning. Additionally, future research may include observational or experimental designs to triangulate and strengthen the validity of the findings. Expanding research to include children from both institutional and non-institutional preschools could also provide a broader understanding of the interplay between aggression and emotion regulation in early childhood.

Declarations

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