Dyadic association between aggressive pretend play and children’s anger expression

Zhen Rao1*, Elian Fink1,2 and Jenny Gibson1

1Faculty of Education, Centre for Research on Play in Education, Development and Learning, University of Cambridge, UK
2Centre for Family Research, University of Cambridge, UK

This study investigates the association between children’s peer-reported expression of anger and their pretend play with aggressive/negative themes observed during spontaneous play with classmates. Participants comprised 104 Chinese children (Mage = 8.98 years, SD = 0.97, 49% girls) and were filmed playing in peer dyads with toys. Aggressive and non-aggressive negative pretend themes were coded at five-second intervals for 10 minutes. Children’s expression of anger in real situations was reported by peers. Analysis using actor–partner interdependence modelling (APIM) revealed significant partner effects, indicating that children were more likely to engage in pretend play with aggressive themes when they were playing with a partner who was perceived by their peers as more easily angered. It was also found that boys were more likely to engage in pretend play with both aggressive and non-aggressive negative themes compared with girls.

Statement of Contribution

What is already known on this subject

- High levels of anger expression in real situations have been associated with negative child outcomes. However, much less is known about anger expression in the pretend play context, with only a limited number of studies having examined the association between pretend play with aggressive/negative themes and children’s anger expression in real situations.
- These associations have been reported only at the individual child level. This may be either because pretend themes were examined by eliciting pretend narratives in individual children using stories, or because the interdependence of data collected during social play was not accounted for.
- Recent studies have suggested that children’s play behaviour is often influenced by their play partner.

What the present study adds

- This study investigates how pretend play with aggressive/negative themes spontaneously occurring during peer play is associated with children’s anger expression reported by peers, at both individual and dyadic levels.
- Using the actor–partner interdependence model, this study found that playing with a partner who was reported by peers as more easily angered increased the chance of a child engaging in pretend play with aggressive themes.

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Correspondence should be addressed to Zhen Rao, Faculty of Education, 184 Hills Road, Cambridge CB2 8PQ, UK (e-mail: zr230@cam.ac.uk).

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This study highlights the importance of accounting for the interdependence of dyadic data and of examining the social nature of pretend play.

**Background**

High levels of anger expression in real-life situations have long been associated with negative child outcomes such as aggression, externalizing behaviours, and physical health risks (e.g., Kerr & Schneider, 2008; Schultz *et al.*, 2004; Zeman *et al.*, 2002). However, much less is known regarding the expression of anger specifically in the context of children’s pretend play. This is an important knowledge gap to address given the proposed link between pretend play and emotional expression and the use of play-based therapies for children with behavioural difficulties (Bratton *et al.*, 2005; Rao & Gibson, 2019).

While some studies have found associations between pretend play with aggressive (or emotionally negative) themes and children’s anger expression and antisocial behaviour in real-life situations (e.g., Dunn & Hughes, 2001; Emde, 2003; Huesmann, 1988; von Klitzing, Kelsay, Emde, Robinson, & Schmitz, 2000), other studies have found the opposite (i.e., that more pretend play with aggressive/negative themes is associated with fewer expressions of anger in real-life situations (e.g., Fehr & Russ, 2013; Feshbach, 1984). A common approach in studies investigating links between aggressive themes in pretend play and expression of anger is that the associations are considered for individual children. However, increasing evidence has shown that children’s play behaviour is often influenced by their play partner (e.g., Etel & Slaughter, 2019; Gibson, Fink, Torres, Browne, & Mareva, 2019) and it has been suggested that failure to account for partner effects may possibly explain the inconsistent findings in the literature (Gibson *et al.*, 2019).

A further argument for considering partner influences comes from studies showing that play interaction with peers may increase the likelihood of displays of anger and behavioural problems (Dishion & Tipsord, 2011; Snyder *et al.*, 1997). The current study therefore aimed to understand the link between aggressive and negative emotional themes in pretend play in a peer context and children’s expression of anger. In the remainder of the introduction, we review extant evidence on the topic.

**Associations between pretend play and expression of anger**

An explanation for associations between pretend play with aggressive/negative themes and anger expression has been suggested by the information processing model proposed by Huesmann (1988). According to this model, children learn and store cognitive scripts (i.e., programmes for behaviour) in their memory and use these scripts to guide social behaviour. When children recall, fantasize about or play–act aggressive scripts, these scripts are rehearsed and maintained in memory, which could evoke future aggressive behaviour. According to Huesmann (1988), enacting pretend play with aggressive/negative themes, or observing such pretend play by others, may be practice for, or learning about, anger expression and aggression in real-life situations. Regarding children’s narratives as emotional meaning-making, Emde (2003) has suggested that children’s pretend narratives (e.g., emotion-based themes and conflicts) provide an internal representation of children’s real-life experience and a window to their inner feelings. From this perspective, pretend narratives with aggressive/negative themes may represent a child’s anger expression and other externalizing behaviour problems in real-
life situations. Although a positive link between pretend play with aggressive/negative themes and anger expression is suggested by both Huesmann (1988) and Edme (2003), the explanatory mechanisms they propose are different (i.e., practice vs. representation).

Also, in line with a hypothesized positive association between children’s pretend play with aggressive/negative themes and their expression of anger, two studies using the MacArthur Story-Stem battery with children in the United States found that 5-year-olds who were observed to enact greater aggressive/destructive pretend themes (e.g., enacting physical aggression or injury) and/or atypical negative responses (e.g., house catches on fire) were more likely to be rated by both parents and teachers as having externalizing behaviour problems, a common feature of which is an inability to manage expressions of anger (von Klitzing et al., 2000; Warren et al., 1996). Similarly, Dunn and Hughes (2001) observed spontaneous pretend play in 80 four-year-old friends in the United Kingdom and found that children who engaged in greater pretend play with violent themes exhibited more anger, antisocial behaviour, and unhelpful responses to playmates. Although supporting a positive association between pretend play with aggressive/negative themes, these studies have used European and American samples only, raising questions over whether such associations are likely to hold across countries and cultures. Research has shown that both pretend play and emotion expression can be influenced by culture. For example, it has been found that play is less valued and supported by parents in Asian countries compared with European countries (Parmar et al., 2004), whereas anger is more likely to be discouraged and avoided in cultures emphasizing interdependence among individuals (e.g., many Asian cultures) than in cultures emphasizing independence (e.g., American, Markus & Kitayama, 1991).

As opposed to a positive association, a negative association between aggressive pretend play and anger expression has also been proposed, with aggressive pretend play serving as means to give vent to one’s emotion and therefore lead to the reduction in actual aggression (Feshbach, 1984). In this way, pretend play is viewed as providing children with a safe context to express emotional concerns and responses, and practice self-control (Erikson, 1995; Vygotsky, 1933). There has been some empirical support of this hypothesis. For example, Fehr and Russ (2013) with a sample of 4- and 5-year-olds in the United States found that frequency of oral aggression (e.g., an animal biting another or saying, ‘I’m going to eat you’) in children’s pretend play was negatively associated with physical aggression as reported by their teacher. However, no association between aggression in pretend play (e.g., an animal hitting another or saying, ‘I’m going to get you’ to another animal) and teacher-reported physical aggression was found.

Compared with a positive association between pretend play with aggressive/negative themes and anger expression, a negative association seems to be supported by fewer studies. However, findings of associations in both directions are not necessarily incompatible. It is possible that such associations differ according to children’s social circumstances (e.g., level of exposure to aggression) or their individual characteristics (e.g., presence or absence of externalizing problems). This has been suggested by findings from a longitudinal study by Zahn-Waxler et al. (2008) following 82 children between 4 and 9 years of age. In this study, children’s pretend themes were examined using stories with interpersonal conflicts (e.g., playmates flight) and distress dilemmas (e.g., a child trips and is injured) with children’s behavioural problems assessed by parent and teacher reports. Across all children, pretend narratives containing physical aggression were found to increase with age among boys and decrease with age among girls. For children without behavioural problems, pretend narratives with purely verbal aggression and prosocial caring themes were found to increase with age, from which the authors suggested that a
certain degree of aggression in pretend play might allow children to ‘let off steam in a safe setting’ (Zahn-Waxler et al., 2008, p. 114). However, for children whose behavioural problems continued or worsened with age, pretend narratives with physical aggression were found high in the most disruptive boys, whereas heightened use of intimidating posture and gestures and prosocial themes in pretend narratives was found among girls. It appears that the link between pretend themes and behavioural outcomes may differ among boys and girls, and among children with and without existing behavioural problems.

In sum, when appraising the relevant literature to date, several gaps clearly exist regarding the understanding of the aggressive pretend play–anger expression link. First, studies of this link have largely relied on using stories related to specific themes (e.g., social conflict, separation, physical injury) to elicit pretend narratives. While this technique has its merits, children’s spontaneous pretend play may differ from their pretend narratives created at the request of adults (Bergen, 2013) and in such scenarios the content of children’s pretend play is likely to be constrained by the themes designated by adults.

Second, studies of the association between pretend play with aggressive/negative themes and anger expression have largely used parent and teacher report to measure children’s expression of anger in day-to-day situations. Whereas parents and teachers may have access to younger children’s anger expression, peers may also be in a strong position to provide information on children’s anger expression, given that children spend considerable time with peers and may observe one another’s emotional expression in more diverse contexts than parents and teachers (e.g., Clemans et al., 2014; Peets & Kikas, 2006). Although anger expression is a feature of externalizing behaviour problems, it is not always accompanied by aggressive/antisocial behaviour and warrants a particular focus of examination in relation to pretend play with aggressive/negative themes. This is because anger expression is widely manifested among children and the inability to control anger expression may be a precursor of aggression (Hay, 2017).

Third, findings on the association between aggressive pretend play and anger expression have primarily come from studies on children in Western cultures. However, as mentioned previously, both play behaviour and expression of anger can vary across cultures (Gaskins, 2013; Roopnarine, 2011). Given the possible variations of pretend play and anger expression across cultures, it is important to examine how aggressive pretend play may be associated with anger expression in non-Western cultures. This could advance our understanding of the similarities and variations of such association. Similarities could suggest the existence of universal links between pretend play and emotion expression, while differences could reveal possible cultural influences on the pathways through which such association is formed.

Finally, previous studies have taken an individual child lens when examining the interplay between aggressive pretend play and expressions of anger, but given both are inherently social in nature, a more nuanced understanding of this association is likely when accounting for the interactional context. Indeed, recent work has demonstrated the importance of accounting for both the child and their play partner when attempting to explain behaviours in play (Etel & Slaughter, 2019; Gibson et al., 2019).

**The current study**

The current study investigates the association between spontaneous pretend play observed in peer dyads aged between 7 and 10 and children’s day-to-day anger expression
as reported by peers. Although most studies on play have focused on early childhood, evidence has suggested that pretend play continues into middle childhood, with increased elaboration and complexity (Bergen & Fromberg, 2015; Rao et al., 2020). Pretend play in middle childhood may be less supported by parents and teachers than in early childhood, perhaps due to lower recognition of its role and importance and pressures to focus on academic performance. Developmental change also takes place in middle childhood regarding anger expression, with children becoming more aware of display rules and developing better control of anger expression (Lemerise & Dodge, 2008). Difficulty in regulating anger at this stage, on the other hand, could lead to aggression and peer rejection. Using a sample of 7- to 10-year-old Chinese children, the current study afforded the opportunity to extend current understanding of anger expression–aggressive pretend play association from early childhood to middle childhood, from Western cultures to a non-Western culture. Observation of pretend play between peers has the advantage of capturing spontaneous pretend play in social contexts (Bergen, 2013), and peer perspectives provide important information on children’s expression of anger across contexts (Clemans et al., 2014; Peets & Kikas, 2006).

The main research question of the current study is whether children’s pretend play with aggressive and non-aggressive negative themes is associated with their own and their play partner’s expression of anger in other contexts. This question is addressed by testing two hypotheses. The first hypothesis is that the frequency of children’s pretend play with aggressive themes will be associated with both their own and their play partner’s expression of anger in real situations reported by peers. The second hypothesis is that the frequency of children’s pretend play with non-aggressive negative themes will be predicted by both their own and their play partner’s expression of anger in real situations reported by peers. Given that both positive and negative associations have been found in the literature, these hypotheses do not specify the direction of the association.

Method

Participants
Participants comprised 104 Chinese children ($M_{age} = 8.98$ years, $SD = 0.97$, 49% girls) from seven classes in a boarding school of Guangzhou, China. The 104 participants were part of a larger study of 136 children ($M_{age} = 8.97$ years, $SD = 0.97$, 52.2% girls) recruited from 12 classes in the school for a project on pretend play and children’s emotional development (Rao, 2019). Because a peer report measure was used in the current study, only the 104 children from the seven classes that had the largest numbers of children participating in the larger study were included for the current study (cut-off value: 10, ranging from 10 to 22 for each class, comprising between 33% and 73% of the total class size).

All participants spoke Mandarin and were recruited through letters distributed by the class teachers. Prior to recruitment, the project was reviewed and approved by the institution’s ethics committee. Parental consent and child assent were obtained for each participant prior to data collection. Parental consent rate for the study was 37%.

Children were paired into play dyads based on their nomination of friends. Of the 52 dyads who participated in the play observation, three dyads were excluded for analysis due to poor video quality. Among the remaining 49 dyads, 44 dyads comprised children who had either mutually nominated each other as friends or who had nominated or been nominated by their play partners as friends. As familiarity could affect children’s play
behaviour, the five dyads who had not nominated nor been nominated by their play partners as friends were excluded for analysis regarding play behaviours. Among the remaining 44 dyads, all but one comprised same-sex dyads. In order to use gender as a between-group variable, the only mixed-sex dyad was excluded for analysis. This resulted in a final sample of 43 same-sex dyads (86 children, $M_{age} = 8.92$ years, $SD = 0.98$, 51% girls).

Approximately 1 month after the play session ($M = 35$ days, $SD = 9.84$), 69 children (66% of the total sample; $M_{age} = 9.01$ years, $SD = 0.98$, 53.6% girls) participated in peer report sessions and reported on the expression of anger for the full sample of 104 children (see Figure 1 for a flow chart detailing included participants). The average proportion of children in each class who participated in the peer-report sessions was 66.1% (range: 56.3%–77.3%). The decision to have only a subset of the total sample to provide peer report on this index was due to time and access constraints, but notably previous research has used proportions of class for peer report (e.g., children rated an average of 7.96 children, range = 4–12; Eisenberg et al., 1997) and has suggested acceptable reliability from use of 4 assessors for peer report (Sung et al., 2010). The 69 children who were selected to rate their peers on expressions of anger included individuals with a variety of emotional experience and expression based on a self-report questionnaire. They did not differ significantly from the remaining 44% children on age, $t(102) = -0.419, p = .676$, gender, $\chi^2(1) = 1.724, p = .189$, and pretend play, $t(96) = -0.203, p = .84$. Each child was reported on by an average of 9.96 children (range: 6–17) from the same class.

**Measures**

**Play observation**

Each pair of children was invited to play with toys (comprising LEGO figures and blocks) in a play area set up in a large quiet room at school for 20 minutes, which was video-recorded, then transcribed, and coded using ELAN (Version 5.1; 2017). Neutral figures and blocks rather than theme-related ones (e.g., police, cooking toys) were used to minimize the potential influence of toys on children’s pretend themes.

Each child’s verbal and non-verbal behaviour was coded at five-second intervals for 10 minutes (starting from one minute after the pair was left to play on their own), resulting in 120 five-second segments per child. 10 minutes of coding was considered sufficient for capturing a wide range of and considerable individual differences in pretend play behaviour. For example, Gibson et al. (2019) coded an average of 7.69 minutes ($SD = 59$ seconds) of dyadic play interaction to examine pretend play, while Fehr and Russ (2013) analysed pretend play based on a 5-minute task.

A detailed coding scheme was developed to categorize children’s play behaviour (Rao, 2019). For the current study, three play behaviours were coded as present or absent in each 5-second segment for each child: (i) pretend play, coded as present when a child’s speech or behaviour indicated using one object to substitute for another, attributing pretend property, or creating an imaginary object (Leslie, 1987); (ii) aggressive pretend themes, coded when a child’s speech or behaviour indicated pretend scenarios related to aggressive behaviour (e.g., pretending fighting, kicking, and killing); and (iii) non-aggressive negative pretend themes, coded when a child’s speech or behaviour indicated pretend scenarios related to negative but not aggressive events, such as ignorance, rejection, isolation, abandonment, cheating, and separation, illness, danger, ineptness, and failure (Fein, 1989).
A second coder unaware of the study hypotheses coded a random selection of 22% of available videos. Kappa values for pretend play, aggressive pretend themes, and non-aggressive negative pretend themes were .87, .84, and .87, respectively, indicating good inter-rater reliability. The number of 5-second segments coded as containing each code was used as the final score for the variable for each child. A higher score indicated a higher frequency of the observed behaviour.

**Peer-reported expression of anger**

Each child was shown a paper listing the names of all his or her classmates who had participated in the play observation session. One of two random orders of peer names was used for children from each class. Children were asked which one of the following three categories best described each classmate, (i) good at keeping his/her temper and not easily angered (in Chinese: ‘pi-qi-hao’, ‘bu-rong-yi-sheng-qi’), (ii) readily loses his/her temper
and is easily angered (in Chinese: ‘pi-qi-bu-hao’, ‘rong-yi-sheng-qi’), and (iii) somewhere in between.

A child received a score of 1 when reported by a classmate as ‘good at keeping his/her temper and not easily angered’. A score of −1 was given to a child for being reported as ‘readily loses his/her temper and is easily angered’ by a peer. A score of 0 was assigned to a child for being reported as ‘somewhere in between’. Each child’s score was summed and then divided by the number of peers who rated the child, to account for the different sizes of classes, with higher score corresponding to peer perceptions of being better able to keep one’s temper.

This type of scale of anger expression was chosen as it has been widely used in research on children’s emotional expression (e.g. Jacobs et al., 1989; Zeman & Garber, 1996). Additionally, descriptions such as keeping one’s temper and being easy to get angry have been used in previous studies to examine children’s expression of anger (e.g., Jacobs et al., 1989; Weiss et al., 2002).

**Analytic plan**

First, intra-class correlations (ICC) were calculated to measure the interdependence of the dyadic data on pretend play, aggressive pretend themes, and non-aggressive negative pretend themes. ICC was used because the dyads in the current study were indistinguishable (i.e., children in a pair cannot be distinguished in a meaningful way).

Next, two hypotheses were tested to answer the main research question of the current study. First, it was hypothesized that children’s aggressive pretend play was predicted by their own and their play partner’s anger expression. Second, it was hypothesized that children’s non-aggressive negative pretend play was predicted by their own and their play partner’s anger expression.

Given that gender differences in pretend play with aggressive/negative themes have been reported in previous studies (Dunn & Hughes, 2001; Zahn-Waxler et al., 2008), gender was used as a control variable. To account for the overall engagement of pretend play, the total frequencies of a child’s and his/her partner’s pretend play observed in 10-minute duration were controlled.

An actor–partner interdependence model (APIM; Kenny et al., 2006) was estimated to test these two hypotheses. As a model of dyadic behaviour, the APIM allows the simultaneous study of the influence of an individual’s own predictor variable on his/her own outcome variable (called the actor effect), and the influence of an individual’s own predictor variable on his/her partner’s outcome variable (called the partner effect), while allowing for non-independence in the two individual’s responses. With a sample size of 43 indistinguishable dyads, the current study had 87% power to detect standardized effect sizes of 0.3 actor effect and 0.3 partner effect, at the 5% significance level, when the correlation of the two members’ predictor scores and the correlation of the errors both set to 0.3 (Ackerman & Kenny, 2016).

Multilevel modelling (individual as level 1 and dyad as level 2) was used to test the APIM model, with gender used as a level 2 variable (because all dyads were same-sex) and peer-reported expression of anger, total pretend play, aggressive pretend themes, and non-aggressive negative pretend themes as level 1 variables. Restricted generalized least squared (RGLS) was used to estimate APIM in MLwiN version 3.02 (Charlton et al., 2017). This was because RGLS provides less biased estimates of the variance than generalized least squared (IGLS) when the number of highest-level units is small. Negative binomial models were fitted with untransformed data. This was because the two outcome variables
(aggressive pretend themes and non-aggressive negative pretend themes) were severely positively skewed (Table 1) with many scores of zero. Square root, log, or inverse transformations did not normalize the data and could make it difficult to interpret the results; therefore, the untransformed data were used for analysis. Although both Poisson models and negative binomial models accommodate discrete data with high frequency of zero counts, the latter allows greater flexibility and a more complex variance structure to address overdispersion (Rasbash et al., 2017).

**Results**

**Descriptive statistics**

Descriptive statistics for children’s peer-reported anger expression and observed pretend play codes are presented in Table 1. During the 10-minute observation (120 five-second segments), children engaged in pretend play for an average of 17.74% (21.29 out of 120) five-second segments, among which only 9.39% (2 out of 21.29) were pretend play with aggressive themes and 8.41% (1.79 out of 21.29) were pretend with non-aggressive negative themes. All children engaged in pretend play, with pretend aggressive themes and non-aggressive negative themes observed in 53.5% (18.2% of girls and 69% of boys) and 43% (31.8% of girls and 76.2% of boys) of the total sample, respectively.

**APIM model results**

Hypothesis 1: A child’s own score on peer-reported expression of anger and his/her play partner’s score on peer-reported expression of anger will predict the child’s own score on aggressive pretend themes, controlling for the child’s and his/her play partner’s score on pretend play and the dyad’s gender. The estimates from the APIM model show that children whose play partners scored higher on peer-reported expression of anger (higher scores indicated being better able to keep one’s temper) were less likely to engage in aggressive pretend themes ($\beta = -.80, p = .025$) (Table 2). In other words, children were more likely to engage in pretend play with aggressive themes when their play partner was rated as easier to get angry. Children’s own anger expressivity did not significantly predict their aggressive pretend themes ($\beta = -.42, p = .255$). The results also indicate that boys were 6.11 times as likely as girls to engage in pretend play with aggressive themes.

Hypothesis 2: A child’s own score on peer-reported expression of anger and his/her play partner’s score on peer-reported expression of anger will predict the child’s own scores on non-aggressive negative pretend themes, controlling for the child’s and his/her play partner’s score on pretend play and the dyad’s gender. The estimates from the APIM model show that the effect of either the child’s own score on anger expression or his/her play partner’s score on anger expression is not significant ($\beta = .02, p = .969$ and $\beta = -.46, p = .252$, respectively) (Table 2). Therefore, no evidence was found to

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$^1$ If the five dyads who had not nominated nor been nominated by their play partners as friends are included in the analysis, both the actor and the partner effects of anger expression on aggressive pretend play are not significant ($\beta = -.46, p = .18$ and $\beta = -.31, p = .362$, respectively). The exclusions of these five dyads for analysis were decided a priori due to the influence of friendship on play behaviours (Dunn & Cutting, 1999). The differences in findings with and without this data exclusion add further support to the relevance of friendship status.

$^2$ In this case, reanalysis with inclusion of the five excluded pairs did not change statistical significance of findings ($\beta = .1, p = .736$ and $\beta = -.40, p = .19$, respectively).
| Variable                      | n      | M(SD)     | Range | Skewness (SE) | Kurtosis (SE) | ICC 1  | 2  | 3  | 4  |
|-------------------------------|--------|-----------|-------|---------------|---------------|--------|----|----|----|
| 1. Peer-reported anger expression | 104    | 0.08 (0.40) | 0.02 (0.41) | 0.14 (0.39) | −0.81–1 | −0.02 (0.24) | −0.48 (0.47) | .19 |
| 2. Total pretend play        | 86     | 21.29 (12.70) | 18.80 (12.05) | 23.9 (12.92) | 0–55   | 0.52 (0.26) | −0.08 (0.51) | .39 | .035 |
| 3. Aggressive themes         | 86     | 2.00 (3.23) | 0.45 (1.13) | 3.62 (3.87) | 0–13   | 1.77 (0.26) | 2.45 (0.51) | .75 | −.090 | .517** |
| 4. Non-aggressive themes     | 86     | 1.79 (2.73) | 0.95 (1.88) | 2.67 (3.19) | 0–14   | 2.41 (0.26) | 7.02 (0.51) | .70 | −.014 | .588** | .400** |

Note. Scores for the three pretend variables represent numbers of segments coded as present for the variable out of 120 five-second segments (10 minutes). Scores on peer-reported anger expression were from 51 girls and 53 boys. Scores on the three pretend variables were from 44 girls and 42 boys.

**Correlation is significant at the 0.01 level (2-tailed).
support the hypothesis that a child’s score on non-aggressive negative pretend themes was predicted by his/her own score or his/her play partner’s score on anger expression. The results also indicate that boys were 2.64 times as likely as girls to engage in pretend play with non-aggressive negative themes.

### Table 2. Effect estimates of child (actor) and play partner (partner) expression of anger, pretend play, and dyad gender predicting aggressive pretend play \((N = 43\) dyads)

| Predictor                      | Aggressive themes | Non-aggressive negative themes |
|--------------------------------|-------------------|-------------------------------|
|                                | B     | SE    | p       | B     | SE    | p       |
| Gender                         | 1.81* | .40   | .000    | .97* | .37   | .008    |
| Actor                          |       |       |         |       |       |         |
| Peer-reported anger expression | -.42  | .35   | .235    | .02  | .40   | .969    |
| Total pretend play             | .07*  | .01   | .000    | .07* | .01   | .000    |
| Partner                        |       |       |         |       |       |         |
| Peer-reported anger expression | -.80* | .36   | .025    | -.46 | .40   | .252    |
| Total pretend play             | .03*  | .01   | .001    | .01  | .01   | .275    |

*Note. B, parameter estimate; SE, standard error of the estimate. All continuous predictors are grand mean-centred. Reference category for gender is female. *p < .05.

Discussion
The current study investigated the association between aggressive/negative themes in pretend play and peer perceptions of children’s anger expression in 7- to 10-year-old Chinese children. An actor–partner interdependence model revealed significant partner effects, suggesting that children were more likely to engage in aggressive pretend play when they played with peers who were perceived as more easily angered. Whereas previous studies have reported positive associations between pretend play with aggressive themes and anger expression (e.g. Dunn & Hughes, 2001; Emde, 2003; Huesmann, 1988; von Klitzing, Kelsay, Emde, Robinson, & Schmitz, 2000), to our knowledge, a positive association between one’s pretend play with aggressive theme and one’s play partner’s anger expression found in the current study has not been documented before. One possible explanation for this finding is that aggressive themes in pretend play may function to regulate emotion. When interacting with a partner who angers more easily, a child may use pretend play with aggressive themes to express or regulate his/her own and/or his/her social partner’s emotions. This is consistent with the evidence of co-regulation during children’s pretend play with peers (Gottman, 1986; Gottman & Mettetal, 1986). As the way children pretend with their peers may differ depending on their quality of friendship (Dunn & Cutting, 1999), it is possible the partner effect of anger expression on aggressive pretend play varies in peers with different relationships. In the current study, only dyads where at least one child was nominated by their partner as playmate were included in the analysis. Future studies are needed to further examine whether and how prior relationship between the peers may affect the nature of the partner effects.
Interestingly, although a child's engagement in pretend play with aggressive themes was positively predicted by his/her play partner's anger expression reported by peers, it was not predicted by children's perceived anger expressivity. Such an absence of actor effects might be explained by cultural variation of emotional expression (e.g., anger is more likely to be discouraged in Asian cultures compared with European and American cultures) (Markus & Kitayama, 1991). Another possible explanation is that anger expression and aggressive behaviour differ in their relations to aggressive pretend themes. Although anger expression is not always accompanied by aggressive behaviour, previous studies did not separate these two constructs when examining their relations to pretend themes. The current study, on the other hand, highlights the importance of examining anger expression on its own in relation to pretend themes. As the current study examines pretend play in peer dyads, an absence of actor factor might also suggest that aggressive pretend play in peer contexts serves functions different from solitary aggressive pretend play.

The results did not reveal any significant actor or partner effect in the association between non-aggressive negative pretend themes and peer-reported anger expression. As the peer report measure in the current study focused on children's expression of anger, it is possible that children's engagement in pretend play with non-aggressive negative emotions is related to their expression of other negative emotions such as sadness or fear. Future research is needed to examine the links between various pretend themes and a range of different emotions. Furthermore, as the findings of Zahn-Waxler et al. (2008) suggest, some pretend themes may be associated with anger expression longitudinally rather than concurrently. Examining longitudinal association between non-aggressive negative pretend themes and anger expression is therefore a suggested avenue for future research.

The current study also found that boys were more likely than girls to engage in pretend play with both aggressive and non-aggressive negative pretend themes. This adds support to the gender differences in aggressive pretend play reported in previous studies (Dunn & Hughes, 2001; Zahn-Waxler et al., 2008). Although an increase in complexity and elaboration in middle childhood pretend play has been suggested (Bergen & Fromberg, 2015; Rao et al., 2020), more evidence is needed to better understand the gender difference in different pretend themes at this stage. Furthermore, other changes in the developmental context, such as fewer opportunities to play and continued socialization on emotional expression, might also influence how aggressive pretend themes and anger expression are associated in middle childhood.

The observation of pretend play in peers allows for the examination of pretend themes as children spontaneously emerge in social play. Compared with studies using stories to elicit pretend narratives, the current study arguably provided children with greater autonomy in their play. This is critical for understanding aggressive and negative pretend themes naturally emerging in spontaneous play, as spontaneous pretend play may differ from pretend narratives created under the request of adults (Bergen, 2013) and play specialists have emphasized the important role of child intrinsic motivation in play (Kilvington & Wood, 2010). The current study coded children’s play for 120 short intervals (5 seconds), which allowed the capture of the general pattern of an individual’s frequency of engaging in pretend themes in the specific dyadic context. Although the overall frequencies of aggressive and non-aggressive themes were low (especially among girls), a negative binomial model was fitted to account for the skewness of the data. Nevertheless, there are other important aspects of pretend themes (e.g., the intensity of
the themes and how they are introduced, developed, and/or resolved. Different methods (e.g., event sampling) could be used to investigate these aspects in future studies.

The peer report measure in the current study allows the examination of children’s general anger expression from the perspectives of peers. Although peer report might be affected by factors such as friendship, given the age range of the participants and the fact that attended a boarding school, it could be argued that peers may have access to each other’s anger expression across a wider range of situations compared with teachers and parents. Nevertheless, future studies could usefully include multi-informant, multi-context measures to allow exploration of broader influences on anger expression, for example by contrasting issues with specific interpersonal dynamics with more generalized temperamental issues. The current study uses a sample of children from a Chinese boarding school, which has its unique value, but also limits its generalizability. Future studies with children from diverse cultural and social-economic backgrounds are certainly needed.

In conclusion, the current study suggests significant partner effects of anger expression on children’s pretend play with aggressive themes in a dyadic play context. An actor–partner interdependence model (APIM) indicates that children were more likely to engage in pretend play with aggressive themes when playing with a partner who was perceived by their peers as more easily angered. This suggests that pretend play with specific themes (e.g., aggressive themes) may serve the function of regulating specific emotion (anger) in peer play context.

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Author contribution

Zhen Rao (Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Validation; Visualization; Writing – original draft; Writing – review & editing) Elian Fink (Conceptualization; Methodology; Resources; Supervision; Writing – original draft; Writing – review & editing) Jenny Gibson (Conceptualization; Methodology; Resources; Supervision; Writing – original draft; Writing – review & editing)

Conflict of interest

All authors declare no conflict of interest.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.
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