

# **HOSTILE COGNITIONS AND AGGRESSIVE RESPONSES TOWARD EXCLUDERS**

## **Hostile Cognitions and Aggressive Responses Toward Excluders in Young Children**

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### **Ethical Approval**

This study was approved by the Ethics Committee of the Unit for Advanced Studies of the Human Mind, Kyoto University (No. 4-P-33).

### **Competing Interests**

We have no conflict of interest to disclose.

### **Authors' contributions**

NY and YM developed the concept for this study. NY collected and coded the data. NY and YM performed data analysis and interpretation. NY drafted the manuscript. YM revised the manuscript. All authors approved the final version of the manuscript for submission.

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### **Availability of Data and Materials**

The data used in this study are publicly available in the Open Science Framework at

[https://osf.io/2htws/?view\\_only=14c2faf2d1104d6da69aaf5510734433](https://osf.io/2htws/?view_only=14c2faf2d1104d6da69aaf5510734433)

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## Abstract

Social exclusion heightens hostile cognition and aggressive responses toward excluders. However, its direct causal effects and relationship with self-construal are unclear in early childhood. This study experimentally investigated the effects of social exclusion on later hostile cognition and aggressive responses toward excluders (vs. includers) in Japanese 5- to 6-year-old preschoolers ( $N = 35$ ;  $M_{\text{age}} = 70.51$  months; 18 females) and explored the role of caregivers' independent selves on those children's responses. The results showed that regardless of the caregivers' independent selves, exclusion increased children's later hostile cognition and aggressive responses toward excluders, particularly in context related to previous exclusive situations. However, hostile cognition did not mediate the relationship between exclusion and aggressive responses, suggesting that preschoolers' aggressive responses toward excluders not be substantially influenced by their hostility. These findings support existing developmental findings and expand knowledge of retaliative behaviors in young children, highlighting the need for further developmental and cultural research.

*Keywords:* social exclusion, hostility, aggression, children

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Social exclusion is defined broadly as being left out, ignored, or rejected by others (Molden et al., 2009). It is known as a common phenomenon in human social life that negatively affects well-being. For example, excluded individuals often report threatened fundamental needs (Sandstrom et al., 2017; Williams & Nida, 2022), negative cognitions (Birk et al., 2016; DeWall et al., 2009; Hwang & Markson, 2020), and antisocial behaviors (DeWall et al., 2009; Quarmley et al., 2022). Understanding this phenomenon is crucial for human well-being.

Theoretical (Anderson & Bushman, 2002; DeWall et al., 2011) and empirical (Quarmley et al., 2022) findings support that socially excluded individuals exhibit aggressive behavior. The relationship between social exclusion and subsequent aggressive responses has been revealed in both experimental (Chow et al., 2008; DeWall et al., 2009; Quan et al., 2024) and nonexperimental (Dodge et al., 2003; Quan et al., 2024; Stenseng et al., 2014) settings. For example, Quan et al. (2024) revealed that both long-term (measured nonexperimentally using a questionnaire) and short-term (manipulated experimentally using a game) exclusion predicted adolescents' aggressive responses. Recent meta-analyses have concluded that experiencing exclusion robustly increases later aggressive responses, even when individuals can respond in prosocial ways (Quarmley et al., 2022).

Hostile cognition elicited by exclusion is believed to play an important role in later aggressive behaviors (Quan et al., 2024; Reijntjes et al., 2011). Specifically, social exclusion

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fosters feelings of hostility from excluders, motivating aggressive behaviors for self-defense or retaliation. Experimental studies indicate that adolescents (Quan et al., 2024) and upper-grade children (Reijntjes et al., 2011) who experience exclusion report higher hostile cognition toward excluders, which later mediates higher aggressive responses toward them.

Using non-experimental methodologies, studies have revealed that young children who experience exclusion also predict later hostile cognitions and aggression (Dodge et al., 2003; Lansford et al., 2010; Stenseng et al., 2014). For example, Dodge et al. (2003) reported that children's experiences of exclusion, assessed by sociometric interviews in the school, predicted their later aggression by mediating their social information processing (including hostile cognitions). These studies address exclusion as a relatively long-term experience. However, non-experimental methods have limitations in determining whether social exclusion directly influences hostile cognition and aggressive behavior in young children, particularly towards specific excluders.

Recently, researchers have begun exploring children's responses to social exclusion at an early age. These emerging studies suggest that children exhibit negative responses to exclusions from infancy (Quadrelli et al., 2023) and well develop their hostile cognition toward excluders during preschool years, at the latest at age 5-6 (Hwang & Markson, 2020; Woodward et al., 2023; Yamamoto et al., 2025). However, these studies did not examine whether hostile cognition toward excluders predicts later aggressive behaviors toward them. Moreover, few

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studies have assessed the aggressive responses in young children. Therefore, investigating whether preschool children, especially at ages of 5-6, when their hostile cognition would be well developed, show aggressive responses mediated by hostile cognition toward excluders experimentally contributes to understanding early social interaction development.

Exploring the effect of self-construal on children's responses provides valuable implications, as several studies have theorized and documented potential self-construal impacts on aggression-related factors (Allen et al., 2018; Anderson & Bushman, 2002; Kimel et al., 2017). Self-construal refers to the view of themselves in relationship to others, for example, viewing themselves as more independent from others, which the tendency differ across cultures: Western view themselves as more independent than non-Westerns (Markus & Kitayama, 1991). For example, while anger plays an important role in aggression after exclusion (Chow et al., 2008), adults with low-independence report higher sadness and anger and those with high-independence report lower sadness and higher anger in experimental exclusion (Kimel et al., 2017). This difference is suggested to stem from low independence characteristics, viewing situations as holistic and inevitable (Yates & de Oliveira, 2016), leading to a sense of helplessness and increased sadness (Kimel et al., 2017; Smith & Ellsworth, 1985). Moreover, self-construal-related differences in responses to exclusion have been partially confirmed around preschool age (Over & Uskul, 2016). Therefore, exploring whether preschool children exhibit different hostile and aggressive responses depending on their self-

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construal provides important insights. If the low-independent children also experience different feelings to high-independent children as in adults during exclusion, low-independent children's sadness could work in reducing aggressive feelings and high-independent children may report more hostile cognition and aggressive responses.

The current study examined whether Japanese preschoolers (as one of the low-independence samples) report higher hostile cognition and whether this mediates higher aggressive responses toward the excluders compared to includers. Additionally, we explored whether level of independence moderates the relationship between exclusion and aggression. Social inclusion and exclusion were manipulated by using a ball-tossing game, which was based on a cyberball game (Williams & Jarvis, 2006). This game could let the participants either included (e.g., receiving the ball tosses equally to other players) and excluded (e.g., receiving the ball tosses unequally less than other players) by other players which were controlled. The exclusion condition was assumed to highlight children's excluded feelings by the amount of the tosses. The game was followed by three questions: (a) amount of received throws (manipulation check), (b) hostile cognition toward the players, and (c) aggressive responses toward the players. (a) Amount of throws received was assessed by asking children about the extent of throws they received during the game. (b) Hostile cognition toward the players was assessed by asking children how nice or mean the previous players were. (c) Aggressive responses were assessed in two tasks: (c-1) asking children to what extent they

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would like to give the ball to previous players the next time, where fewer indicates more aggressive, and (c-2) asking children to distribute stickers, some of which were torn, to previous players, with more torn stickers indicating more aggressiveness (Slagt et al., 2017; van Dijk et al., 2019). Task (c-1) aimed to assess whether children showed a willingness to retaliate similarly as in the previous game. Although this method was developed not based on previous studies such as in (c-2), receiving fewer balls from others in ball-tossing games are often reported as hostile behaviors in 5-6-year-old children (Hwang & Markson, 2020), in turn, selecting to give few balls to others similarly was assumed to be linked to the children's aggression-relevant intentions. Task (c-2) aimed to assess whether they generalized their aggressiveness to other situations with increasing ecological validity. Giving more torn stickers has been suggested to be related to children's aggression-relevant variables such as hostile cognitions (Slagt et al., 2017; van Dijk et al., 2019). We tried to ensure that the children's anti-social intentions were reflected as much as possible by letting the children choose their most preferred stickers at the beginning of the procedure and using them in the measurement with torn and untorn forms (see Methods). In assessing children's independent selves, this study focused on their caregivers' self-construal as Over and Uskul (2016) did, because preschool children have difficulty to answer such questionnaires and their caregivers significantly shape their children's understanding of the social world through parenting (Over & Uskul, 2016). Caregivers reported their self-construal using questionnaires (Park & Kitayama, 2014; Park et

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al., 2016).

The current study hypothesized that children report higher hostile cognition toward excluders than includers. Second, this study hypothesized that children report higher aggressive responses toward excluders than includers. Third, if both relationships were confirmed, this study hypothesized that the relationship between exclusion and later aggression would be mediated by hostile cognition toward excluders. Lastly, this study exploratory hypothesized that caregivers of children with high levels of independent selves would report more hostile cognition and aggressive responses than of children with low levels of independent selves.

### Methods

The study was pre-registered at the Open Science Framework on June 28, 2024, before data collection [[https://osf.io/587eu/?view\\_only=97592572b9ad4d4e9f4fa326cc2431f2](https://osf.io/587eu/?view_only=97592572b9ad4d4e9f4fa326cc2431f2)]. Data were collected from July 8, 2024, to September 4, 2024.

### Participants

A priori power analysis by G\*Power indicated that  $N = 34$  would provide 80.78% power to detect a medium effect size ( $d = 0.5$ ) in aggressive responses between the inclusion and exclusion conditions. Thirty-eight children ( $M_{\text{age}} = 70.47$  months,  $SD = 3.59$ ; 19 females) who were in preschool years and their caregivers ( $M_{\text{age}} = 39.26$ ,  $SD = 5.30$ ; 38 females) participated in the study. Three participants were excluded from the analyses (e.g., responding incorrectly

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to the manipulation check, such as reporting the amount of ball tosses as “received a lot” in the exclusion condition). Therefore, 35 children ( $M_{\text{age}} = 70.51$  months;  $SD = 3.58$ ; 18 females) and their caregivers ( $M_{\text{age}} = 39.31$ ;  $SD = 5.50$ ; 35 females) were included in the final sample. All participants were from Kyoto and nearby areas in Japan, which were urban locales, and spoke Japanese as their first language.

Informed consent was obtained from all participants before they participated in the study according to the principles of the Declaration of Helsinki. This study was approved by the Ethics Committee of [blinded for review] (No. 4-P-33).

### Procedure

On the day of the experiment, the experimenter first asked the children to choose the sticker they preferred from two options with different star-shaped designs. This sticker was used to measure aggressive responses toward the players (see Materials (c-2)). Next, the experimenter instructed the children to play the ball-tossing game with two players. The game was developed based on Hwang and Markson (2020) and Yamamoto et al. (2024), with some modifications to PsychoPy (Peirce, 2007). The children choose one icon from six color for use in the game. First, they practiced throwing balls while playing famous Japanese characters. In the practice phase, the children received the ball twice out of five throws, giving them two chances to throw. After practice, the children's icons appeared on the screen, alongside randomly selected colored icons of the other players (Figure 1). The game lasted for

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approximately 1 min, with 20 rows. All children participated in the social inclusion and exclusion conditions in a counterbalanced order. In the inclusion condition, the children received a ball in one-third of the 20 throws. In the exclusion condition, the children received the ball twice in the first half and never thereafter. The experimenter positioned themselves out of the sight of the screen under each condition.

After completing each condition, participants answered the following questions: (a) amount of throws received, (b) their evaluation of the players as hostile/nice, and (c) aggressive responses toward the players. After answering all questions in both conditions, they played the game again, designed as an inclusion condition for all participants to foster positive thoughts. During this time, caregivers completed a questionnaire regarding their self-construal.

### Materials

#### *(a) Amounts of Received Throws (Manipulation Check)*

We created four illustrations representing different amount of balls (i.e., zero, one, four, and seven) indicating the extent of throws received during the previous game (i.e., “never received,” “received not much,” “received a little,” and “received a lot;” 4-point scale). Children were asked to choose the item closest to their thoughts regarding the extent of the throws they received, with scores ranged from 1 (“never received”) to 4 (“received a lot”).

#### *(b) Hostile/Nice Evaluation Toward the Players*

We asked the children to evaluate how nice or mean the previous players were (i.e.,

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“very nice,” “a little nice,” “a little mean,” and “very mean;” 4-point scale). Children were asked to choose the item that was closest to their thoughts, with scores ranging from 1 (“very nice”) to 4 (“very mean”).

### *(c-1) Aggressive Responses Toward the Players (Amount of Giving the Ball)*

We asked the children the extent to which they would like to give the ball to the players if they could play with them again. Four illustrations represented the amount of balls (i.e., seven, four, one, and zero), with scores representing the extent of throws (i.e., “giving a lot,” “giving a little,” “not much giving,” “never giving;” 4-point scale). Fewer throws indicated greater aggressiveness in retaliating against previous players. Children were asked to choose the item that was closest to their thoughts, with scores ranging from 1 (“giving a lot”) to 4 (“never giving”). The colors of the illustrations of the balls were distinguished from the colors used in the measurement in (a).

### *(c-2) Aggressive Responses Toward the Players (Distribution of Torn Stickers)*

We asked children to distribute stickers, some of which were torn (Slagt et al., 2017; van Dijk et al., 2019). Specifically, we handed a box of 14 stickers (the sticker design was selected by the children at the beginning of the procedure) with seven torn stickers. We told the children that, although some were torn, they could choose seven from the box to give to the previous players by putting them into an envelope. They were left alone to select and putting stickers, calling for the experimenter when they were done. The rate of torn stickers distributed

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was computed as an aggressive response, with the scores ranging from 0 to 100 (percentage).

### *(d) Questionnaire of Self-Constraint (Reported by Caregivers)*

We asked caregivers to answer a questionnaire on their self-construal to assess their independence (Park & Kitayama, 2014; Park et al., 2016). Caregivers rated their agreement with 10 items (e.g., “I always try to have my own opinions.”) on 5-point scale (from “strongly disagree” to “strongly agree”), with scores ranging from 1 to 5 (Cronbach’s  $\alpha = 0.67$ ).

### **Analytic Strategies**

All analyses were performed using R (version 4.0.0) and RStudio (version 2024.04.2+764). We performed paired t-tests to examine the effects of conditions (inclusion, exclusion, within factor) on manipulation checks, hostile cognition, and aggressive responses toward players. Mediation analysis using the bootstrapping method (2,000 samples) in “lavaan” package examined the relationship between exclusion and later aggression mediated by hostile evaluation. Correlation analysis assessed the effects of caregivers’ self-construal on children’s hostile cognition and aggressive responses toward players.

## **Results**

### **(a) Manipulation Check**

We conducted a paired t-test to examine the differences in scores for the extent of throws received during the previous game between conditions. The results revealed that children reported significantly fewer balls received in the exclusion condition ( $M = 2.09$ ,  $SD =$

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0.66) than in the inclusion condition ( $M = 3.46$ ,  $SD = 0.61$ ;  $t(34) = -11.76$ ,  $p < .01$ ,  $d = -2.16$ ; Figure 1 (a)).

### **(b) Hostile/Nice Evaluation Toward the Game Players**

We conducted a paired t-test to examine the differences in scores of the hostile/nice evaluation of the previous game players between conditions. The results revealed that children reported previous players as significantly more hostile in the exclusion condition ( $M = 2.86$ ,  $SD = 0.88$ ) than in the inclusion condition ( $M = 1.34$ ,  $SD = 0.59$ ;  $t(34) = 10.95$ ,  $p < .01$ ,  $d = 2.02$ ; Figure 1 (b)).

### **(c-1) Aggressive Responses Toward the Players (Amount of Giving the Ball)**

We conducted a paired t-test to examine the differences in scores of aggressive responses (amount of ball given) toward previous game players between conditions. The results revealed that children reported that they would like to give fewer balls to previous players in the exclusion condition ( $M = 2.14$ ,  $SD = 0.77$ ) than in the inclusion condition ( $M = 1.63$ ,  $SD = 0.73$ ;  $t(34) = 2.65$ ,  $p = .01$ ,  $d = 0.68$ ; Figure 1 (c-1)).

Next, we conducted a mediation analysis of the relationship between conditions and aggressive responses, using hostile/nice evaluations as a mediator because children reported significantly higher hostile cognition and aggressive responses toward players in the exclusion condition. The estimated indirect effect between conditions and aggressive responses through hostile/nice evaluation was not significant ( $\beta = -0.08$ ,  $SE = 0.18$ ,  $p = .49$ ); however, the total

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effect was significant ( $\beta = -0.33$ ,  $SE = 0.18$ ,  $p < .01$ ).

### **(c-2) Aggressive Responses Toward the Players (Distribution of Torn Stickers)**

We conducted a paired t-test to examine the differences in scores of aggressive responses (distribution of torn stickers) toward previous game players between conditions. The results revealed no significant difference in the distribution rate of torn stickers between the conditions (exclusion condition  $M = 28.74$ ,  $SD = 33.88$ ; inclusion condition  $M = 19.49$ ,  $SD = 31.89$ ;  $t(34) = 1.90$ ,  $p = .07$ ,  $d = 0.28$ ; Figure 1 (c-2)).

### **(d) Relationships with Self-Construal (Reported by Caregivers)**

We conducted exploratory correlation analyses on the relationship between caregivers' independence and other main variables (i.e., hostile cognition and aggressive responses). The results revealed that the caregivers' independence was not significantly correlated to children's (b) hostile cognition ( $r = -.03$ ,  $p_{adjusted} = 1.00$ ), (c-1) responses on ball amounts ( $r = .02$ ,  $p_{adjusted} = 1.00$ ), and (c-2) responses on sticker distributions ( $r = -.01$ ,  $p_{adjusted} = 1.00$ ) in the exclusion condition.

## **Discussion**

This study examined the effects of social exclusion on later hostile cognition and aggressive responses toward previous players in preschool children aged 5- to 6-year-old. Social exclusion and inclusion were manipulated using a ball-tossing game. We hypothesized that excluded children would report higher hostile cognition and more aggressive responses

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toward excluders. Moreover, if both relationships were confirmed, it was hypothesized that hostile cognition toward excluders would mediate the relationship between exclusion and later aggression. This study also explored the hypothesis that children with more independent caregivers would report higher hostile cognition and aggressive responses than those with less independent caregivers.

Regarding the effects of social exclusion on later hostile cognition and aggressive responses, the results revealed that children reported the excluders as more hostile than the includers, consistent with previous studies indicating preschoolers develop hostile evaluations of excluders (Hwang & Markson, 2020; Woodward et al., 2023). Furthermore, children reported giving fewer balls to the excluders the next time, indicating more aggressive action against the previous players. However, aggressive responses in the torn sticker distribution were not significantly different between the conditions. In short, children responded aggressively toward the excluders, especially when the context was related to the original exclusionary situations.

There are several possible interpretations of these results. One possibility is that children might have reduced their intention to behave aggressively again after first aggressing in the ball task. Furthermore, the torn sticker task may not effectively assess aggressive behavior in children. Although the sticker task was partially based on the hot source allocation paradigm (Lieberman et al., 1999), adapted and used in several studies (Slagt et al., 2017; van

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Dijk et al., 2019), and has been correlated with children's antisocial intentions (Slagt et al., 2017), its validity as an experimental measure of aggressive behavior in young children has not been widely confirmed. Future studies should explore these points by controlling and including factors such as controlling task orders and asking about antisocial intentions.

Based on the significant results for hostile cognition and aggressive responses in ball tasks, we examined whether hostile cognition toward excluders mediated the relationship between exclusion and later aggression in ball tasks but found no significant mediation effect. This result differs from previous non-experimental findings and theoretical model showing mediation of hostile cognition between exclusion and aggression (Crick & Dodge, 1994; Dodge et al., 2003; Lansford et al., 2010). This inconsistency could be explained by insufficient sample size in the current study (the estimation was not based on mediation analysis) or the possibility of that children respond aggressively toward excluders without considering hostility. While the insufficient sample size needs to be addressed in future studies, the possibility that children less consider of hostility while aggressing could align with the development of cognitive skills necessary to process multiple types of information (e.g., working memory to consider both current hostility and next aggressive options; Cowan, 2014). As children's cognitive abilities develop throughout early childhood and beyond, they might get better to process hostility and aggressive responses, resulting in significant mediation effects of hostility, as confirmed by age above the upper grades (Quan et al., 2024; Reijntjes et al., 2011). These

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possibilities also suggest that the mechanisms of the link exclusion-aggression underlying long-term (e.g., deprivation of social opportunities to learn adaptive social skills leads to maladaptive hostile thinking and aggression) and short-term (e.g., feeling clear hostility from the excluders motivates them to behave aggressively to defend themselves or retaliate) exclusion are different in young children. Future studies should address these points and explore these possibilities further.

Finally, regarding the effects of self-construal on children's hostile cognition and aggressive responses, no significant correlations were found, suggesting that self-construal may not relate to children's hostile cognition and aggressive behavior. However, all the participants were from Japanese communities, indicating low cultural diversity and relatively small variability. Children's self-construal was indirectly measured by their caregivers. These factors may make it more difficult to detect these effects. Future studies should further investigate the potential mechanisms regarding self-construal differences in exclusion by exploring ways to enable children to report culturally construal-relevant indicators themselves (Over & Uskul, 2016; Rübeling et al., 2011).

Our findings support and expand on the existing research. Specifically, while supporting existing developmental findings on the relationship between exclusion and hostile cognition (Hwang & Markson, 2020; Woodward et al., 2023), we highlighted that preschool-aged children can respond aggressively toward excluders such as upper-grade children and

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adolescents do (Quan et al., 2024; Reijntjes et al., 2011). Although the role of cognitive and other factors on preschoolers' aggressive responses remains unclear, these finding should be examined further by adding other cultural and developmental perspectives.

Although this study expands our knowledge of children's social exclusion, it has several limitations. First, this study was conducted in laboratory settings. The ball-tossing games may not be similar to real-world exclusions and the measurement of aggressive responses (especially for (c-1)) are not widely validated as generalized aggression measure. Therefore, this study's results may not be generalizable to daily life. Further studies should include such as observational methodologies. Second, the absence of actual cultural comparisons and the focus on only one cultural dimension (i.e., independence) should be noted. Future studies should not only by cultural construal questions but also consider other factors, including comparisons with Western cultures, to further understand cultural variances in exclusion.

In conclusion, this study investigated the effects of social exclusion on later hostile cognition and aggressive responses toward excluders among Japanese preschoolers. The results showed that, regardless of caregivers' self-construal, experimental exclusion increased children's later hostile cognition and aggressive responses toward excluders, especially when related to previous exclusive situations. However, hostile cognition did not mediate this relationship, suggesting that preschoolers' aggressive responses toward excluders not be substantially influenced by their hostility. These findings provide valuable insights into the

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mechanisms underlying aggressive responses to social exclusion in young children.

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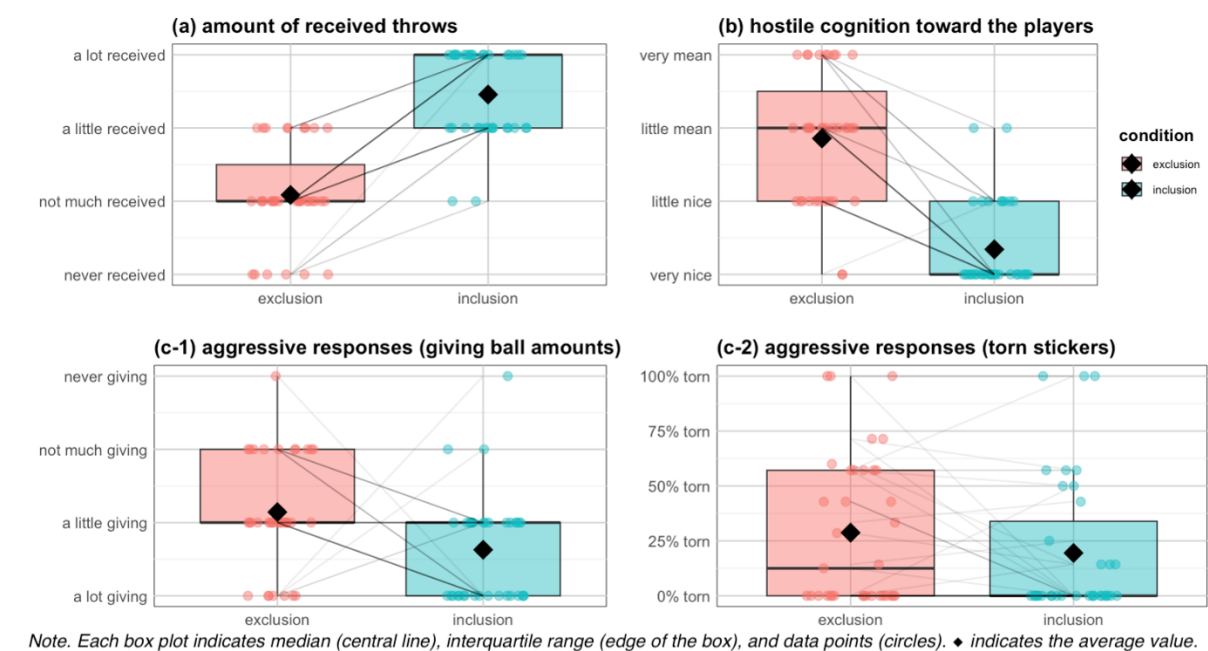
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## Figure Legends

Figure 1. *The responses of children in (a), (b), (c-1), and (c-2)*



*Note.* Each box plot indicates median (central line), interquartile range (edge of the box), and data points (circles). ♦ indicates the average value.