

The Prosocial Cyberball Game:
Compensating for social exclusion and its associations with empathic concern
and bullying in adolescents

Abstract

In this study we examined prosocial compensating behavior towards socially excluded ingroup and outgroup members by using a 'Prosocial Cyberball Game' in 9-17 year old Dutch adolescents (N=133). Results showed that adolescents compensated for the social exclusion of an unknown peer in a virtual ball tossing game, by tossing the ball more often to that player in compensation conditions compared to the fair play condition. The proportion of tosses towards the excluded player did not significantly differ as a function of the group status of that player. Although compensating behavior towards ingroup versus outgroup members did not differ, the underlying motivation for this behavior may vary. More empathic concern was associated with more prosocial tosses towards an ingroup member, while more self-reported bullying behavior was associated with less compensating behavior in the outgroup condition. These findings may have practical implications for programs intending to change bystander behavior in bullying situations.

Keywords: prosocial behavior; Cyberball; social exclusion; group status; adolescence

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Prosocial behavior can be broadly defined as voluntary actions benefitting others and it has been suggested to include behaviors like helping, sharing, donating, comforting, and cooperation (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Fabes & Eisenberg, 1998; Schroeder & Graziano, 2015). Prosocial behavior in children and adolescents predicts future social adjustment (Crick, 1996), academic achievement (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000) and self-esteem (Laible, Carlo, & Roesch, 2004). Moreover, it seems to be a particularly interesting factor in determining children's and adolescents' likeability or acceptance as rated by peers, as the presence of prosocial behavior predicts peer acceptance, while the absence of verbal and physical aggressive behavior does not (Caprara, et al., 2000; Denham, Mckinley, Couchoud, & Holt, 1990). Social support has a great influence on people's life, and peer acceptance for example, has been found to moderate the relation between family adversities and externalizing problem behavior (Criss, Pettit, Bates, Dodge, & Lapp, 2002).

Altogether, early prosocial behavior influences a person's development and life outcomes in numerous ways and it is therefore important to study this behavior reliably. However, research focusing on prosocial behavior of children and adolescents generally relies on self- or other-reports, which does not necessarily reflect actual behavior. Therefore, it is important to investigate these behaviors also in a more objective way by using behavioral assessments. The aim of the current study was to observe prosocial behavior in early to mid-adolescents (nine- to

seventeen-year-olds) with an adapted version of a virtual ball tossing game, the 'Prosocial Cyberball Game' (PCG), and to examine the associations with age, gender, group status of the excluded participant and personality characteristics.

The original Cyberball Game (Williams, Cheung, & Choi, 2000) consists of three players, one of whom is the participant, who is going to be excluded from tossing a ball by the two other (virtual) players. This provokes strong feelings of rejection and being bullied (Williams, et al., 2000; Zadro, Williams, & Richardson, 2004). Previously, Cyberball has been used mainly to study the effects of social exclusion on the participant. The prosocial variant however can be used to study prosocial behavior after observing social exclusion.

The PCG was based on the task developed by Riem and colleagues (Riem, Bakermans-Kranenburg, Huffmeijer, & Van Ijzendoorn, 2013; see also Wesselmann, Wirth, Pryor, Reeder, & Williams, 2013). After a fair play block with equal numbers of tosses to every player, two of the virtual players started to exclude the third virtual player in the observation and compensation blocks. In the compensation blocks the participant could either choose to join the excluders by tossing less balls to the excluded player than in the fair play block (a complicit bystander), take a neutral position (passive bystander) or compensate for their behavior by tossing more balls to the excluded player than in the fair play block (active defender), which would be considered prosocial behavior.

Results of previous studies in college student samples showed that (under)graduate students compensated for the exclusion of another player by throwing more balls to the excluded player (Nozaki, 2015; Riem, et al., 2013; Wesselmann, Wirth, et al., 2013). The same result was found in a study focusing on ten-to-fifteen year old boys (Howard, Landau, & Pryor, 2014). In this study, the participants played the four-player Cyberball Game after they watched a video of the three alleged confederates. In the video, one of the boys was bullied by one of the other boys,

while the third boy either played the role of an active defender of the victim, a passive bystander or a complicit bystander. In the Cyberball Game that followed, the bully did not throw any balls to the victim after the first 20 trials, while the bystander threw a third of the balls to the victim. Participants tossed significantly more balls to the victim than to the bully.

To our knowledge, the prosocial compensating behavior of adolescent girls has not yet been studied. However, research suggests that with growing age, females are more empathic than males (Fabes & Eisenberg, 1996, as described in Fabes & Eisenberg, 1998; Van der Graaff, et al., 2014). Therefore, female adolescents may be expected to be more prosocial than male adolescents. By including both adolescent boys and girls, our study adds to the existing literature on prosocial behavior towards socially excluded individuals. We included quite a broad age range to investigate possible effects of age on the participants' behavior. A meta-analysis by Fabes and Eisenberg (1998) on age differences in prosocial behavior showed that 13 to 17-year olds are generally more prosocial than 7 to 12-year-olds. However, these age differences vary considerably among different forms of prosocial behavior and methods to investigate prosocial behavior.

Another distinctive characteristic of this study is the ingroup-outgroup manipulation that we added to the paradigm. Since people tend to be more cooperative with ingroup members compared to outgroup members (Balliet, Wu, & De Dreu, 2014; Goette, Huffman, & Meier, 2006) and share more resources with ingroup members (Baldassarri & Grossman, 2013; Chen & Li, 2009), prosocial compensating behavior in response to social exclusion may vary as a function of the group status of the excluded player. In order to investigate differences in prosocial behavior of adolescents towards ingroup and outgroup members, we added an ingroup versus outgroup feature to the PCG by using colors to suggest group membership of the players (Wirth & Williams, 2009), which can be characterized as a minimal group method (Tajfel, Billig,

Bundy, & Flament, 1971). A meta-analytic review showed that minimal group paradigms reliably produce ingroup preference of moderate magnitude (Mullen, Brown, & Smith, 1992). Recently, a study by Dunham and colleagues (2011) showed that minimal groups paradigms can result in ingroup favoritism, even in children as young as four to six years old.

Differences in prosocial compensating behavior between adolescents may at least partly be explained by differences in empathic capacities. According to Eisenberg and colleagues (2010), definitions of empathy generally include the ability to understand others' emotions or perspectives and to resonate with others' emotional states. Empathy therefore is an important correlate of prosocial behavior as was demonstrated in a study on African-American adolescents (McMahon, Wernsman, & Parnes, 2006) showing that adolescents who scored higher on empathy also showed more prosocial behavior. Furthermore, Nozaki (2015) found a positive relation between emotional competence, operationalized as individual differences in the identification, understanding, expression, regulation and use of one's own emotions and those of others (Brasseur, Gregoire, Bourdu, & Mikolajczak, 2013) and the proportion of tosses towards the socially excluded participant of students in a Cyberball Game.

The link between empathy and prosocial behavior towards an excluded individual may be explained by the fact that highly empathic individuals activate not only the regions of their brain involved in mentalizing, but also the social pain-related regions (Masten, Morelli, & Eisenberger, 2011), indicating that these individuals might vicariously experience the social pain experienced by a socially excluded individual (Wesselmann, Williams, & Hales, 2013). This empathy-related activation in especially the medial prefrontal cortex was found to mediate the relation between trait empathy and prosocial behavior towards a socially excluded person, which was assessed by rating the emails the participants wrote to the victim for level of prosocial behavior (e.g. helping, comforting) (Masten, et al., 2011).

Individual differences in prosocial behavior may also be related to bullying. Bullying and being bullied have been found to be associated with lower levels of empathy (Van Noorden, Haselager, Cillessen, & Bukowski, 2015), which in turn could be related to less prosocial behavior. Therefore, it is important to examine experience with bullying and being bullied when investigating prosocial behavior, especially in the context of a social exclusion paradigm. Furthermore, higher rates of externalizing problem behavior and physical aggression seem to be associated with less prosocial behavior (Flynn, Ehrenreich, Beron, & Underwood, 2014; Kokko, Tremblay, Lacourse, Nagin, & Vitaro, 2006; Nantel-Vivier, Pihl, Cote, & Tremblay, 2014). Previous research has shown that children with clinical levels of behavioral problems show deficits in the development of concern for others (Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000), which might be the reason why they display less prosocial behavior. Therefore, the influence of problem behavior on prosocial compensating behavior during the Cyberball Game was investigated as well.

In sum, we expected that participants would compensate for the social exclusion of another player by tossing the ball more often to that player in the compensation blocks compared to the fair play block (Howard, et al., 2014; Nozaki, 2015; Riem, et al., 2013; Wesselmann, Wirth, et al., 2013). Furthermore, we hypothesized that participants would be more likely to act prosocially towards an ingroup member than towards an outgroup member (Balliet, et al., 2014; Goette, et al., 2006). We also expected that individuals who reported higher levels of empathy and lower levels of problem behavior (Flynn, et al., 2014), bullying and victimization (Van Noorden, et al., 2015) would be more likely to act prosocially. Lastly we hypothesized that older participants would show more prosocial behavior than younger participants and that girls would act more prosocially than boys, since they are thought to be more empathic (Fabes & Eisenberg, 1996, as described in Fabes & Eisenberg, 1998; Van der Graaff, et al., 2014).

Method

Participants

Recruitment was aimed at sampling typically developing early (nine to twelve years old) to mid-adolescents (thirteen to seventeen years old) (Crone & Dahl, 2012) from different educational levels. We made phone calls to several regular schools in the western part of the Netherlands, and asked if they were interested in participating in our study. In the Netherlands, students with severe behavioral or psychiatric problems, intellectual deficits or physical disabilities receive special (needs) education, therefore we assumed all participants from regular schools to be typically developing students. After the phone call schools received an information letter about the study. Schools that decided to participate (N=6) handed out information letters to parents describing the aim and procedure of the study. Participants and their parents were told that the focus of the study was on processes involved in decision making. Permission for this study was obtained from the Ethics Committee of the Psychology Department of Leiden University.

In total, one hundred and thirty-six subjects from primary (25%), vocational (12.5%), and high schools (62.5%) in the western part of the Netherlands participated in this study. Two high-school students with missing data on the PCG and one high-school student with a deviant response pattern (tossing all balls to the player at the right side in the fair and outgroup block and all balls to the player at the top of the screen in the ingroup block) were excluded, resulting in a total sample size of one-hundred and thirty-three adolescents. The mean age of the participants was 13.93 years ($SD = 2.33$, range 9-17 years old) and 54% percent of them were boys. Forty participants were early adolescents (55% boys, M age = 10.82), and ninety-three participants were mid-adolescents (54% boys, M age = 15.27). All but one participant reported their nationality, 85% reported only a Dutch nationality, 6% reported both a Dutch and another

nationality (for example Turkish or Surinamese) and 8% reported a non-Dutch nationality (for example Turkish, Chinese or Bulgarian). Informed consent was obtained for all participants included in the study and their parents.

Procedure

As part of a larger pilot study, all participants were tested on three different occasions. Test sessions were conducted at the schools in an allocated classroom. During the first session, which lasted approximately 20 minutes, participants created an online profile on a website that was designed for this study. This profile was used in one of the computer tasks performed by the participants in the second session. During this session that lasted about forty-five minutes, participants also performed the PCG. In the third session, which lasted also about forty-five minutes, participants filled out several online questionnaires. Due to computer problems, the order of session two and three was changed for a few participants. At the end of the last test session, participants were debriefed and received a gift certificate of 10 Euro as a reward for participation. Data was collected by a group of six well-trained undergraduate psychology students and one graduate student.

Measures

The Prosocial Cyberball Game

We used an adapted version of the four player Cyberball Game previously developed by Riem et al. (2013), see also (Wesselmann, Wirth, et al., 2013). Participants were led to believe that they were about to play an online ball game with three unfamiliar peers who also participated in this study. In fact, the other players were computerized confederates. Similar to studies using the original Cyberball Game, we instructed the participants to play the game by tossing the ball to

the other players using the arrow buttons on the keyboard and to mentally visualize the game (Williams, et al., 2000). The participants were completely free to decide for themselves to which of other players he or she would toss the ball. The participant was an animated player at the bottom of the screen (player 2), and three other animated figures, representing the three other participants, were positioned at the left (player 1), right (player 3) and upper side of the screen (player 4), see Figure 1. The game consisted of five blocks (detailed below): A fair play block consisting of forty-eight trials, an ingroup observation block consisting of twenty trials, an ingroup compensation block consisting of forty-eight trials, an outgroup observation block of twenty trials and an outgroup compensation block of forty-eight trials. All five blocks were played by the participants.

In the fair play block (see Figure 1a), all players had the same neutral color and received about one fourth of the tosses. In the other four blocks, player 4 was excluded from the game and did not receive any tosses from player 1 and player 3. We counterbalanced the order of the four unfair blocks in a way that half of the participants played the ingroup blocks first, while the other half played the outgroup blocks first. In the ingroup observation block, the participant was asked to observe the other players while they were playing the game. This block was inserted to make sure that the participant noticed the exclusion of player 4 by player 1 and player 3, before playing the compensation block. In the ingroup compensation block, the participant could play along again and had the possibility to compensate for the social exclusion by tossing the ball more often to the excluded player (player 4). To elicit the idea of belongingness to the same group, the animated figure that represented the excluded player was the same color as the participant (yellow), while the animated figures that represented the excluders were purple (see Figure 1b). The same procedure was used for the outgroup observation and compensation blocks. However, in these blocks, the excluded player did not belong to the same group as the participant, therefore

the animated figure representing the excluded person was purple, while the figures representing the participant and excluders were yellow (see Figure 1c).

Insert Fig. 1 about here

To correct for small differences in the total number of tosses per participant per block (fair play block; 11 - 13 tosses, ingroup and outgroup compensation block; 14 -16 tosses) we computed the proportion of tosses to player 1, 3 and 4 by dividing the number of tosses to that player by the total number of tosses of the participant in each specific block. Since participants could not play along in the observation blocks, these blocks were excluded from the analyses.

Interpersonal Reactivity Index (IRI)

Empathy was measured with two subscales of the Dutch IRI self-report (De Corte, et al., 2007): empathic concern (five items, one item was removed to improve the inter-item reliability) and perspective taking (six items). The empathic concern subscale assesses feelings of warmth, compassion and concern for others undergoing negative experiences, while the perspective taking subscale reflects the ability to adopt the perspective, or point of view, of other people (Davis, 1983). Participants were asked to rate to what extent the statements described their feelings and behaviors on a five point scale (1 = does not describe me well, 5 = describes me very well). One participant only completed two items, one of each subscale. We replaced the scores of this participant by the mean scores of same age, same sex, same educational level participants. The internal consistency of the empathic concern subscale as well as the perspective taking subscale was just acceptable ($\alpha = 0.65$ and $\alpha = 0.68$ respectively).

Strengths and difficulties Questionnaire (SDQ)

Prosocial and problem behavior of the adolescents was assessed with the Dutch version of the SDQ (Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). The questionnaire consists of twenty-five items divided over five subscales; emotional symptoms, conduct problems, hyperactivity, peer problems and prosocial behavior. Five items consist of two parts (e.g. I try to be nice to other people. I take their feelings into account.) and were split in two items, resulting in a total number of thirty items. An average score was computed for the items that were split in two parts. Participants were asked to report if the behavior described was applicable to them on a 3-point scale (1 = not true, 3 = certainly true). Since the SDQ was designed for eleven-year-olds and older, 20 participants who were younger than eleven years did not fill out the questionnaire.

Because the reliability of some of the subscales regarding problem behavior was too low (conduct problems and peer problems), we made a composite score for internalizing (emotional symptoms and peer problems) and externalizing (conduct problems and hyperactivity) problem behavior (Goodman, Lamping, & Ploubidis, 2010). For the SDQ, no outliers were detected. The internal consistency of both the internalizing and externalizing problem behavior subscale was satisfactory ($\alpha = 0.72$ and $\alpha = 0.70$ respectively). The internal consistency of the prosocial behavior scale was just acceptable ($\alpha = 0.60$).

Olweus Bully/Victim Questionnaire (OBVQ)

Exposure to direct bullying by peers and bullying of peers was measured with the Dutch version of the OBVQ questionnaire (Olweus, 1986) consisting of nine items divided over two subscales; victimization (five items) and bullying other students (four items, one item was removed to improve reliability). Participants rated the questions on a 4- or 5-point rating scale depending on the question. A high score implies frequent exposure to bullying or frequent

bullying behavior towards others. The internal consistency of the victimization and bullying subscales was acceptable to good ($\alpha = 0.80$, $N = 130$ and $\alpha = 0.68$, $N = 128$ respectively).

Analysis Plan

We used SPSS 21 to analyze our data. Variables were inspected for possible outliers, defined as values more than 3.29 *SD* below or above the mean (Tabachnick & Fidell, 2012). No outliers were detected for the IRI and SDQ subscales. On the OBVQ we detected three outliers, these scores were winsorized (Tabachnick & Fidell, 2012). Mean scores on each of the subscales were computed by dividing the mean score of the participant by the number of valid items. We checked if the scores were normally distributed. Since the scores on both subscales of the OBVQ were positively skewed, we performed square root transformations (Tabachnick & Fidell, 2012).

First, correlations between the proportion of tosses to player 1, 3 and 4 across the fair, ingroup and outgroup condition were inspected. Analyses of covariance with repeated measures were used to analyze the response pattern of the participants in the PCG. To examine the individual tossing behavior of the participants more detailed, we computed difference scores by subtracting the proportion of tosses to player 4 in the fair play block from either the proportion of tosses to this player in the ingroup or outgroup compensating block and dividing this number by the proportion of tosses to player 4 in the fair play block. Finally, a series of backward regression analyses were conducted in order to examine the relations between the tosses to player 4 in the ingroup and outgroup condition and the scores on the IRI, SDQ and OBVQ subscales. Backward regression starts with inclusion of all variables in the equation and successively removes non-significant predictors from the equation. The advantage above stepwise or forward regression is that a sub-set of variables might be significant whereas individual variables remain below threshold. Age and gender were included as covariates in all analyses.

Results

Correlations between the proportion of tosses to player 1, 3 and 4

In all three conditions (fair play, ingroup and outgroup), a higher proportion of tosses to player 4 was strongly associated with a lower proportion of tosses to both player 1 ($r = -0.56, p < 0.01$; $r = -0.80, p < 0.01$ and $r = -0.77, p < 0.01$ respectively) and player 3 ($r = -0.63, p < 0.01$; $r = -0.80, p < 0.01$ and $r = -0.77, p < 0.01$ respectively), see the correlation matrix (Table S1; online supporting information). Therefore, only the proportion of tosses to player 4 was examined in the repeated measures ANCOVAs and the regression analyses. Furthermore, since the proportion of tosses to player 4 in the fair play condition was positively correlated to the proportion of tosses to player 4 in the ingroup condition ($r = 0.22, p = 0.01$) as well as the outgroup condition ($r = 0.18, p < 0.04$), see the correlation matrix (Table S1; online supporting information), we took the proportion of tosses to player 4 in the fair play condition into account as a covariate in the regression analyses with either the proportion of tosses to player 4 in the ingroup or outgroup condition as dependent variable.

Repeated measures ANCOVA and individual difference scores

To examine whether participants compensated for the exclusion of player 4 by tossing the ball more often to player 4, a repeated measures analysis was performed with the proportion of tosses to player 4 as the dependent variable and condition (fair play, ingroup and outgroup) as the within-subject variable (Bonferroni corrected). The results showed a main effect of condition on the proportion of tosses to player 4 ($F(2, 260) = 3.45, p = 0.03, \text{partial } \eta^2 = 0.03$). Participants tossed the ball more often to the excluded player in the ingroup condition ($p < 0.01$) and in the outgroup condition ($p < 0.01$) than in the fair play condition (see Fig. 2). No significant

difference was found between the proportion of tosses to player 4 in the ingroup condition and the outgroup condition, ($p = 1.00$). No main or interaction effects of age or gender were found.

Insert Fig. 2 about here

We checked whether early and mid-adolescents responded similarly to the social exclusion of player 4 by performing a repeated measures analysis with age group (early versus mid-adolescents) as a between-subject variable. Gender was included as a covariate. The results showed a main effect for condition ($F(2,260) = 15.19, p < 0.01$, partial $\eta^2 = 0.11$), but no interaction effect between condition and age group ($F(2, 260) = 0.21, p = 0.81$, partial $\eta^2 < 0.01$).

The pattern of individual difference scores for the fair play block compared to the ingroup compensation block was almost identical to the pattern of the fair play versus outgroup compensation block. About 13% of the participants showed a decrease in the proportion of tosses to player 4 in the compensation block compared to the fair play block, while approximately 2% did not change their proportion of tosses in the compensation blocks compared to the fair play block. The majority of the participants however (85%) showed an increase in the proportion of tosses to player 4 compared to the fair play block.

Correlations between the IRI, SDQ and OBVQ subscales

Higher levels of perspective taking were associated with more self-reported prosociality and less externalizing behavior problems and being bullied (see Table 1 for correlation matrix). Adolescents who reported high levels of empathic concern, described themselves as more prosocial than adolescents who reported lower levels of empathic concern. Moreover, they reported less bullying behavior as well. More externalizing problem behavior was related to more

internalizing behavior and to less self-reported prosociality. Adolescents with higher scores on internalizing or externalizing problem behavior were bullied more often than children who reported lower levels of problem behaviors, which was in turn related to more bullying behavior.

Insert Table 1 about here

Regression analyses

In order to examine whether the rationale for the compensating behavior of adolescents differed in the ingroup and outgroup condition, we conducted a series of backward regression analyses to test the relation between the proportion of tosses to player 4 and the scores on the IRI, SDQ and OBVQ subscales. The dependent variable was the proportion of tosses to player 4 in the ingroup or outgroup condition.

In the regression analysis with the ingroup condition as dependent variable, a model with four predictors was significant ($F(4,108) = 3.84, p < 0.01, R^2 = 0.12$). Two predictors were significant: gender ($\beta = -0.22, p = 0.02$) and the proportion of tosses to player 4 in the fair play condition ($\beta = 0.22, p = 0.02$). Boys tossed more balls to player 4 than girls, and participants who tossed more often to player 4 in the fair play condition, tossed more balls to player 4 in the ingroup condition. Empathic concern ($\beta = 0.21, p = 0.06$) and prosocial behavior ($\beta = -0.18, p = 0.10$) were not significant.

The proportion of tosses to player 4 in the outgroup compensation block was predicted by two variables ($F(2,110) = 5.00, p < 0.01, R^2 = 0.08$): the proportion of tosses to player 4 in the fair play condition ($\beta = 0.20, p = 0.03$) and by bullying ($\beta = -0.21, p = 0.02$). Participants who tossed the ball more often to player 4 in the fair play condition, tossed more balls to player 4 in the outgroup condition. Furthermore, adolescents who bullied others more often tossed significantly fewer balls to player 4 in the outgroup condition.

Discussion

In line with previous studies (Howard, et al., 2014; Nozaki, 2015; Riem, et al., 2013; Wesselmann, Wirth, et al., 2013), the current study showed that adolescents showed prosocial compensating behavior towards the excluded player by tossing the ball more often to that player in the compensation conditions compared to the fair play condition. Surprisingly, no differences were found in compensating behavior towards ingroup versus outgroup members. This is not in line with previous research showing that people are more likely to act prosocial towards ingroup compared to outgroup members (Baldassarri & Grossman, 2013; Balliet, et al., 2014; Chen & Li, 2009; Goette, et al., 2006).

A possible explanation for this discrepancy is related to the manipulation we applied. We used a subtle manipulation of group status in which we did not provide any information about the meaning of the different colors. It could be that our manipulation was not strong enough to promote ingroup favoritism. In the study by Dunham and colleagues for example, the child was told that he or she would be assigned to either a red or blue group and was then asked to put on a t-shirt of the appropriate color. Other studies investigating ingroup versus outgroup differences in prosocial behavior used various more explicit strategies. Studies focusing on helping behavior for example, created groups based on sexual orientation (Sturmer, Snyder, & Omoto, 2005) or cultural background (Sturmer, Snyder, Kropp, & Siem, 2006). Future studies investigating prosocial compensating behavior in adolescents might use these more explicit manipulations to examine ingroup versus outgroup differences.

Although the actual behavior towards ingroup and outgroup members did not differ, follow-up analyses suggested that the compensating behavior in the two conditions might be predicted by different child characteristics. The model that predicted compensating behavior of

adolescents in the ingroup condition included empathic concern, prosocial behavior and gender, while the model that predicted compensating behavior in the outgroup condition only included bullying. These results suggest that there might be motivational differences for prosocial behavior to an ingroup versus an outgroup member.

Concerning age and gender we did not find consistent or substantial associations with prosocial compensating behavior. The repeated measures analyses, did not reveal any main or interaction effects of age or gender for the proportion of tosses to the excluded player. In the regression analysis regarding the ingroup condition however, a significant relation emerged between gender and the proportion of tosses to the excluded player. Surprisingly, boys compensated more than girls.

Previous studies on gender differences in prosocial behavior showed inconsistent results. A meta-analysis by Fabes and Eisenberg (1998) showed that the magnitude of the effect of gender on prosocial behavior is influenced by the type of prosocial behavior. The same meta-analysis (Fabes & Eisenberg, 1998) revealed that the effect sizes for the effect of age on prosocial behavior varied by subtype of prosocial behavior; a comparison of the group of 13- to 17-year olds to 7- to 12-year-olds led to an effect size of .02 for instrumental help .33 for comforting and .65 for sharing/donating. Compensating for the social exclusion of another player seems to relate more to helping than comforting or sharing/donating. These different types of prosocial behaviors have different personal and situational correlates (Carlo & Randall, 2002; Padilla-Walker & Carlo, 2014), which may explain the inconsistent results regarding, amongst others, age and gender effects on the global construct of prosocial behavior.

Future research and limitations

Further research is needed to investigate the possible influence of gender differences on prosocial compensating behavior. Are boys really more inclined than girls to show prosocial compensating behavior towards an excluded person? Although speculative, our findings may be related to gender differences in type of bullying. Some researchers have argued that although boys may generally bully more, this pattern is reversed in case of relational bullying (Ostrov & Crick, 2007; Wang, Iannotti, & Nansel, 2009) which refers to indirect forms of bullying such as social exclusion. Since the PCG is about social exclusion, it would be interesting to investigate whether this might explain why girls compensate less than boys.

Some limitations should be taken into account when interpreting the results. First, the internal consistency of some of the questionnaire subscales was relatively low, therefore any related results should be interpreted with caution. However, the relations among the subscales within a domain (e.g. empathy/prosocial behavior and problem behavior/bullying) were significant and in the expected direction. Furthermore, we did not find a relation between levels of self-reported prosocial behavior and prosocial behavior observed in PCG. Previous studies showed that mismatches between self-reported and observed behavior are common and that multiple measurements should be used for complex constructs like prosocial behavior (Duckworth & Kern, 2011; Meyer, et al., 2001).

Another limitation is that the excluded player always was the player at the top of the screen. One could argue that the compensating behavior might be influenced by possible symmetry preferences of the participant. We used the number of balls tossed to the fourth player in the fair condition as covariate to compensate for this possible symmetry preference of participants. However Wesselmann and colleagues (2013) used a design in which the excluded player was always positioned on the right hand side of the participant in study 1a and 1b, with

similar numbers of compensating tosses. In Study 2 they did counterbalance the position of the excluded player and found a comparable proportion of tosses to the excluded player. For this reasons, we do not expect to find different results when the position of the (excluded) player would have been different.

Conclusion

We found that both male and female early to mid-adolescents generally compensated for the exclusion of another player in a virtual ball tossing game. These findings contribute to the growing body of research focusing on prosocial responses of individuals after observing social exclusion. The PCG may be used to observe prosocial behavior instead of relying on self-reports. The PCG can be used in nine to seventeen year-old boys and girls, which makes it a suitable instrument for longitudinal research designs. Our findings might also have practical implications for programs intending to change bystander intervention behavior in bullying situations. It is important to focus on bystanders of bullying in interventions, since the behavior of bystanders in a situation in which a person is socially excluded by another person influences the willingness of other individuals to include the victim in subsequent social situations (Howard, et al., 2014). We found that individuals with high scores on empathic concern and low scores on bullying seem to feel more compelled to help a peer when he or she is socially excluded and are more likely to act upon these feelings. Since bullying has been related to lower levels of empathy (Van Noorden, et al., 2015), it seems to be important to focus on enhancing empathic concern in anti-bullying programs focusing on bystanders.

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