

Acting on Observed Social Exclusion: Developmental Perspectives on Punishment of Excluders and Compensation of Victims

Geert-Jan Will
Leiden University

Eveline A. Crone
Leiden University and University of Amsterdam

Wouter van den Bos
Stanford University

Berna Güroğlu
Leiden University

This study examined punishment of excluders and compensation of victims after observing an instance of social exclusion at various phases of adolescent development. Participants ($n = 183$; age 9 to 22 years) were first included in a virtual ball-tossing game, Cyberball, and then *observed* the exclusion of a peer. Subsequently, they played economic games in which they divided money between themselves and the including players, the excluders, and the victim. The results demonstrate a gradual age-related increase in money given to the victim from age 9 to 22 and a gradual decrease in money allocated to the excluders from age 9 to 16 with an increase in 22-year-olds. Affective perspective-taking predicted both compensation of the victim and punishment of the excluders. Taken together these results show that across adolescence individuals sacrifice an increasingly bigger share of their own resources to punish excluders and to compensate victims and that taking the perspective of the victim enhances these decisions.

Keywords: adolescence, social exclusion, altruistic punishment, prosocial behavior, perspective taking

Adolescence is a developmental period characterized by a social reorientation away from primary caregivers and toward the peer group (Brown, 2004). In the transition from childhood to adolescence, youths spend more time with peers and become increasingly concerned about integration within the peer group (O'Brien & Bierman, 1988; Steinberg & Morris, 2001). As concerns about peer acceptance rise, social exclusion becomes a dominant form of peer victimization during early adolescence (Brown, 1990). Social exclusion has been linked to a variety of negative outcomes, such as loneliness, depression, and poor academic achievement (Juvonen, Nishina, & Graham, 2000; Rigby, 2000). Even *witnessing* peer harassment, including social exclusion, has been associated with negative consequences for psychosocial well-being (Nishina & Juvonen, 2005).

Observing the exclusion of another person elicits negative affect similar to the distress caused by self-experienced exclusion (Masten, Morelli, & Eisenberger, 2011; Wesselmann, Bagg, & Williams, 2009). When people are asked to take the targeted person's perspective and "imagine themselves in their shoes," their own distress is even exacerbated (Wesselmann et al., 2009). People are likely to engage in prosocial acts toward the victim of exclusion, such as helping, sharing, and comforting. These behaviors are possibly motivated by an affective response congruent with the perceived distress of the victim (Batson, Early, & Salvarani, 1997). Indeed, increased activation in brain regions sensitive to "social pain" during the observation of social exclusion has been associated with increased prosocial concern toward the victim, both in adults (Masten et al., 2011) and in adolescents (Masten, Eisenberger, Pfeifer, & Dapretto, 2010).

Prior research has demonstrated that during adolescence social interactions become progressively more prosocial and that these changes are related to an increased capacity for perspective taking (Eisenberg, Carlo, & Murphy, 1995; Eisenberg, Miller, Shell, McNalley, & Shea, 1991). Core components of perspective taking, such as a "theory of mind," mature before adolescence as children acquire the ability to understand that other people's mental states might differ from their own (Wellman, Cross, & Watson, 2001). However, more advanced forms of perspective taking, such as affective perspective-taking, undergo crucial developmental changes during adolescence (Hoffman, 2000; Selman, 1980). Affective perspective-taking can be defined as the ability to put oneself in the shoes of another person in order to infer what the other is feeling without explicit emotional cues. Given the importance of affective perspective-taking for prosocial behavior (Eisenberg, Cumberland, Guthrie, Murphy, & Shepard, 2005), develop-

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Geert-Jan Will, Institute of Psychology and Leiden Institute for Brain and Cognition (LIBC), Leiden University, Leiden, the Netherlands; Eveline A. Crone, Institute of Psychology and LIBC, Leiden University, and Department of Psychology, University of Amsterdam, Amsterdam, the Netherlands; Wouter van den Bos, Department of Psychology, Stanford University; Berna Güroğlu, Institute of Psychology and LIBC, Leiden University.

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Correspondence concerning this article should be addressed to Geert-Jan Will, Institute of Psychology, Leiden University, Wassenaarseweg 52, 2333 AK, Leiden, the Netherlands. E-mail: g.j.will@fsw.leidenuniv.nl

mental change in understanding the distress in a target of social exclusion would be expected to enhance prosocial responding toward such a victim.

The current study set out to investigate the development of social interactions with victims and initiators of social exclusion (i.e., the excluders) and how these changes are related to developing perspective-taking skills. We hypothesized that developmental changes in perspective-taking skills are related to both increased prosocial behavior toward the victim and decreased prosocial behavior toward the excluders. These questions were addressed using experimental games with real monetary consequences in combination with self-reported *trait* perspective-taking skills and an index of *state* affective perspective-taking.

Economic Games and Social Development

Studies employing economic paradigms, such as the Ultimatum Game (UG), have proven to be effective in examining developmental differences in perspective-taking skills (Güroğlu, van den Bos, & Crone, 2009; Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010). The UG is a simple two-person economic game in which the first player (i.e., the proposer) proposes a division of a certain amount of money (i.e., the stake). The second player (i.e., the responder) can then either *accept* the proposed split and both players are paid accordingly, or decide to *reject* the offer which results in neither player receiving anything (Güth, Schmittberger, & Schwarze, 1982). An alternative version of this game is the Dictator Game (DG), in which the second player (i.e., the recipient) does not have the possibility to reject (Forsythe, Horowitz, Savin, & Sefton, 1994). Offering an equal split in the DG therefore represents costly prosocial behavior, since the allocator sacrifices personal gain in order to share half of the money with the recipient. In the UG, however, offering half of the stake might also reflect *strategic* fairness, as self-gain is maximized by proposing a fair offer in order to decrease the probability of rejection (Pillutla & Murnighan, 1995).

Basic fairness considerations concerning anonymous others do not undergo considerable developmental changes during adolescence (Güroğlu, et al., 2009). This is reflected by the notion that 9-year-old children's DG offers do not differ from DG offers made by adolescents and adults. However, with increasing age, adolescents typically show more strategic behavior by offering more money in the UG than in the DG (Leman, Keller, Takezawa, & Gummerum, 2009). Based on this notion, a growing body of research has suggested an age-related increase in incorporating the perspective of others in social decision making across adolescence (Güroğlu, et al., 2009; Sutter, 2007; van den Bos, Westenberg, Van Dijk, & Crone, 2010).

Importantly, decisions in these economic games are strongly influenced by prior experiences with, and social knowledge about, the people these games are played with (Delgado, Frank, & Phelps, 2005; Fehr & Fischbacher, 2003). For instance, people differ in their DG allocations toward players who previously included or excluded them (Gunther Moor, et al., 2012). That is, both adolescents and young adults offer an equal split of the stake to players who previously included them in a virtual ball-tossing game, but selectively punish excluders by offering them less than half of the stake. Notably, early- and mid-adolescents have been shown to opt for a more severe punishment than young adults by offering the

excluders even less money (Gunther Moor, et al., 2012). The question then arises whether this propensity to punish excluders develops in a similar manner when participants *witness* the exclusion of a peer and thus are not a victim themselves (Gunther Moor, et al., 2012).

Previous research has shown that when uninvolved bystanders witness social exclusion from a third-party perspective they direct prosocial behavior toward the victim (Masten et al., 2011). Furthermore, adults display a tendency for *altruistic punishment* (i.e., voluntarily incurring costs to punish others who violated social norms), even when they are not part of the interaction themselves (Fehr & Fischbacher, 2004; Fehr & Gächter, 2002). Could there be a similar motivation to punish excluders? And is the willingness to sacrifice rewards in order to compensate victims or to punish excluders the same across development? Acting based on third-party observations of peers' behavior is crucial for the development of adolescents' peer relationships, as they often infer through these observations whether they want to interact with a specific peer. Thus, considering the continued development of perspective-taking skills involved in making such inferences about peers' behavior (Hoffman, 2000; Selman, 1980), we hypothesized that both prosocial behavior displayed toward the victim and third-party punishment of the excluders would differ at various phases of adolescent development.

The Present Study

The aim of the present study was to investigate developmental differences in interactions with victims and excluders after observing an instance of social exclusion and its relation with perspective taking. Accordingly, participants in distinct phases of adolescent development in the age range of 9–22 years (pre-adolescence to young adulthood) were first included in a virtual ball-tossing game (i.e., Cyberball) and then *observed* the exclusion of a peer in the same game. Subsequently, they played one-shot versions of two different economic games in which they could divide money between themselves and the including players, the excluders, and the victim from the Cyberball interactions.

The first goal of the study was to examine developmental differences in how another person's prior behavior during an observed episode of social exclusion (i.e., whether he or she was a victim or a perpetrator) impacts prosocial behavior toward these excluders and victims in a DG. DG offers reflect generosity and a preference for fairness, because the recipient has no influence on how the stake is split. Thus, each amount of money transferred to the recipient is a form of costly prosocial behavior.

The second goal was to examine whether individuals are also willing to pay to punish excluders in an Altruistic Punishment/Compensation Game (APCG; Leliveld, van Dijk, & van Beest, 2012). In this game, participants can either do nothing or invest some money, which is then multiplied by 3 and either added to (compensation) or subtracted from (punishment) the other player's total. In the DG compensation is costly, but punishment (i.e., withholding money) also leads to maximization of one's own outcomes. Furthermore, in the DG, an equal split (5/5) can be offered as a form of compensation but can also be offered to avoid an unequal distribution of money (inequity aversion). In the APCG the least costly option (not investing any points at all) results in an equal allocation. Thus, by employing two different games we

aimed to disentangle motivations to punish excluders from self-maximization (maximizing one's own outcomes) and motivations to compensate the victim from inequity aversion. We predicted that with increasing age, participants would differentiate more between recipients based on prior experiences with these peers. Accordingly, we expected an age-related increase in money allocated to the victim and an age-related decrease in money allocated to the excluders.

The third goal of the current study was to explore the relationship between perspective taking and the age-related changes in these punishment and compensation behaviors. Accordingly, we obtained a self-report measure of the ability to take someone else's perspective (trait) and a state measure of affective perspective-taking, in which participants were probed for inferences about the distress of the victim of exclusion. "Trait" measures reflect people's stable dispositions that may generalize to different types of situations, but "state" measures are more directly linked to a specific situation. We predicted age-related increases in both trait perspective-taking and state affective perspective-taking. We expected the latter to result in an increased understanding of the affective state of the victim (e.g., mood) with age, such that older participants were expected to perceive the mood of the victim to be lower than their own mood. Given the positive relationship between prosocial behavior and both dispositional and situationally induced perspective-taking (Eisenberg et al., 2005), we examined how both forms of perspective-taking were related to developmental and individual differences in compensation of the victim and punishment of the excluders.

Method

Participants

One hundred ninety-two participants were recruited from local schools in urban and suburban areas in the west of the Netherlands. Nine participants (five 9-year-olds and four 11-year-olds) who failed to write down the IDs of the other Cyberball players (which were necessary to identify each player in the economic games) during at least one of the two Cyberball games were excluded from the analyses. The total of 183 participants included in the analyses were subdivided into five age groups: 9-year-olds ($n = 27$, M age = 9.0, $SD = 0.49$, 17 girls), 11-year-olds ($n = 44$, M age = 10.7, $SD = 0.70$, 21 girls), 14-year-olds ($n = 46$, M age = 13.7 years, $SD = 0.66$, 22 girls), 16-year-olds ($n = 42$, M age = 16.4, $SD = 0.58$, 18 girls), and 22-year-olds ($n = 24$, M age = 22.1, $SD = 2.45$, 15 women). Nine- and 11-year-olds attended primary schools, 14- and 16-year-old participants attended college-preparatory high schools, and the 22-year-olds were college students. Gender distributions did not differ across the five age groups, $\chi^2(4) = 4.2$, $p = .38$. Sixty participants only played the DG and thus 123 participants played the DG and the APCG. The distribution for the participants who also played the APCG into five age groups was as follows: 9-year-olds ($n = 27$, M age = 9.0, $SD = 0.49$, 17 girls), 11-year-olds ($n = 28$, M age = 11.1, $SD = 0.61$, 11 girls), 14-year-olds ($n = 23$, M age = 14.1 years, $SD = 0.41$, 11 girls), 16-year-olds ($n = 21$, M age = 16.4, $SD = 0.51$, 10 girls), and 22-year-olds ($n = 24$, M age = 22.1, $SD = 2.45$, 15 women). Gender distributions did not differ across the five age groups, $\chi^2(4) = 4.50$, $p = .34$.

No data were collected about the children and adolescents' ethnicity. School records indicated that the ethnic composition was as follows: 60.6% of the children and 42.7% of the adolescents had two parents with a Dutch background, and 39.4% of the children and 56.2% of the adolescents had either one or two parents who belonged to ethnic minorities (e.g., Surinamese, Antillean, Moroccan, Turkish) or were born in another country. The majority of the 22-year-olds (79.2%) had two Dutch parents, 12.5% had at least one non-Dutch parent, and 8.3% were missing data on ethnicity. No information was collected about the language(s) spoken in the home and family socioeconomic status.

Materials

Cyberball. Participants played a modified version of the virtual ball-tossing game "Cyberball" (Williams, Cheung, & Choi, 2000). At the start of the experiment participants were told that they were about to play an online ball-tossing game with unfamiliar, anonymous peers at another school with whom they were connected through the Internet. In reality, all throws by the other players were preprogrammed. Furthermore, it was explained that all players would receive a point for every time that he or she would catch the ball. Additionally, it was emphasized that points were valuable and would be converted into money, which participants would receive upon completion of the experiment. In order to avoid possible influence of familiarity with the names on decisions in the economic games, players in the Cyberball game were given player IDs (e.g., "Player 421").

Participants carried out the two Cyberball games in a fixed order (i.e., first the "inclusion condition" followed by the "observed exclusion condition") based on prior research that employed a within-subject design (Gunther Moor, et al., 2012; Masten et al., 2011). By doing so, participants had a feeling for how the game worked and were familiarized with the social nature of the game and the possible consequences of exclusion. In the "inclusion condition" participants played with two players (includers) where each of the three players received the ball an equal number of times (10 out of 30 trials). Participants could throw the ball to either one of the players by a mouse click on the player's ID. Next, participants played the "observed exclusion condition," during which they witnessed the exclusion of an unfamiliar peer by two novel players (excluders). Both excluders and the excluded player (victim) were novel players with unique player IDs. In this game, the victim received the ball once at the start of the game and did not receive the ball on any of the following 28 trials. Following the standard cover story used in the Cyberball experiments, participants were instructed to imagine what the other players looked like, what kind of personalities they would have and how the game would be played in real life (Williams, 2007). In the current study, to keep the participants further engaged in the task, they were asked to keep track of the number of times each player received the ball during both Cyberball games. They could write down the IDs of each player on a form with a depiction of the characters in the game and score each player's ball possession. The player IDs were of use during the economic games and other questions about the Cyberball players later in the experiment. Participants were omitted from further analyses when they failed to write down these IDs.

Economic games. Following the two games of Cyberball, participants played one-shot versions of economic games with

each player (i.e., the two includers, two excluders and the victim). Participants were informed that they would be allocators and that the other players would be recipients. It was emphasized that their decisions determined both their own payoffs and those of the recipients. Furthermore, the economic games were introduced as the final games of the experiment. Consequently, it was clear to the participants that their allocations would have no consequences for possible future interactions, and the allocations were therefore not confounded by strategic motivations.

Dictator Game. In the Dictator Game the participants were asked to divide a set of 10 points between themselves and each recipient. Participants could choose from seven fixed divisions, namely: 10 points for themselves, 0 for the other player (10/0); 8 for themselves, and 2 for the other player (8/2); 6 for themselves, 4 for the other player (6/4); 5 for themselves, 5 for the other player (5/5); 4 for themselves, 6 for the other player (6/4); 2 for themselves, 8 for the other player (2/8); or 0 for themselves, 10 for the other player (0/10). These divisions were depicted by numbers on the computer screen from left to right with the 5/5 option in the middle of the screen.

Altruistic Punishment/Compensation Game. The Altruistic Punishment/Compensation Game (APCG) is based on classic altruistic punishment studies, where a third-party individual (C) can invest money in order to punish a violator (A) of economic fairness norms in an exchange with B (Fehr & Gächter, 2002). For each point used to punish, A's outcomes are reduced by 3 points. In the modified version introduced by Leliveld et al. (2012), there is also an altruistic compensation condition where participants can choose to compensate the victim of inequality (B) by increasing B's outcomes by 3 points for each point paid. In the current experiment, participants were given 10 points, of which they could invest 0, 1, 2, or 3 points to either compensate or punish each player (the two includers, two excluders and the victim). For each point invested, three points would be either added to (compensation) or subtracted from (punishment) the outcome of the recipient. To make the task clear to participants of all ages and to keep the number of decision-moments to a minimum, participants could choose from seven fixed divisions: three compensation options (7 points for themselves and 19 for the other player [7/19], 8 for themselves and 16 for the other player [8/16], 9 for themselves and 13 for the other player [9/13]), one equitable option (10 for themselves, 10 for the other player [10/10]), and 3 punishment options (9 for themselves and 7 for the other player [9/7], 8 for themselves and 4 for the other player [8/4], or 7 for themselves and 1 for the other player [7/1]). These divisions were depicted by numbers on the computer screen from left to right with the 10/10 option in the middle of the screen.

Mood reports and state affective perspective-taking. Mood ratings were taken at three time points: (a) at baseline prior to playing the first Cyberball game, (b) after inclusion, and (c) after the observed exclusion condition. Besides reporting their own mood, participants were asked to give an estimate of the victim's mood. This perceived mood of the victim was used to calculate an index of state affective perspective-taking, defined as the discrimination between mood of the self and perceived mood of the victim (mood self–mood victim). The mood questionnaire consisted of eight mood items (feeling good, bad, happy, sad, relaxed, tense, friendly and unfriendly; see also Gunther Moor, et al., 2012). All of the mood items were rated on a scale from 1 (*not at all*) to 7

(*very much*) and negative mood items (bad, sad, tense, unfriendly) were recoded. Internal consistency of the scale proved to be adequate (Cronbach's $\alpha > .69$ at each time point). Therefore, all eight items were averaged to calculate a composite score for mood.

Trait perspective-taking. Participants completed the perspective taking subscale (six items) of the Interpersonal Reactivity Index (IRI; Davis, 1983) to assess dispositional perspective taking, i.e., the tendency to adopt another person's point of view (e.g., "I sometimes try to understand my friends better by imagining how things look from their perspective"; "When I get mad at someone, I try to imagine what they might be thinking"). All items were rated on a scale from 1 (*not at all*) to 5 (*very much*). Internal consistency of the subscale was adequate (Cronbach's $\alpha = .67$) resulting in all six items to be averaged to a composite score of self-reported trait perspective taking.

Procedure

First, permission was obtained from teachers and school authorities. Next, informed consent was acquired from the parents of all participating children and adolescents. Children and adolescents filled out the perspective taking subscale of the IRI in their classroom, while their teacher and two researchers were present. Subsequently, participants were taken to separate quiet testing rooms in their school where they completed the Cyberball games, mood ratings and economic games on a laptop in approximately 30–45 min. At the end of the experiment, the participants were fully debriefed in their classroom. They were told that total profits in their class ranged from 1.70 to 2.30 and that each participant would be paid 2 Euros.

Adults were recruited through flyers and the university's course credits system. After signing consent forms, they were tested in separate testing booths in a lab at the university. They were debriefed immediately after the experiment. Finally, adult subjects could opt either for course credit or an endowment of money (6.50 Euros), in addition to the amount they earned during the game. The procedure was approved by the local ethics committee.

Data Analysis

Points that were allocated to the two includers and the two excluders were averaged separately and submitted to a within-subject analysis of point transfer to the includers, excluders and the victim. Since DG and APCG allocations were not distributed normally, the data were analyzed using comparable nonparametric tests as well. These analyses yielded the same results as the parametric tests. In case Mauchly's test indicated that the assumption of sphericity had been violated, the degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity.

Results

Age Differences in Fairness Considerations Following Observed Social Exclusion

The first question that was tested was whether fairness considerations toward includers, excluders and the victim differ at various phases of adolescent development. To this end, a repeated-measures analysis of variance (ANOVA) was performed with

recipient (three levels: includers vs. excluders vs. victim) as the within-subject factor and age group (five levels: 9-, 11-, 14-, 16-, and 22-years) as the between-subjects factor for number of points transferred in the DG. There was a significant main effect of recipient, $F(2, 356) = 48.86, p < .001, \eta_p^2 = .22$, and a significant interaction effect between recipient and age group, $F(8, 356) = 5.04, p < .001, \eta_p^2 = .10$. There was no main effect of age group, $F(4, 178) = 1.63, p = .17, \eta_p^2 = .04$.

Post hoc repeated-measures ANOVAs were performed for each age group separately to further examine the interaction effect. These analyses demonstrated that there was a significant effect of recipient for 11-, 14-, 16-, and 22-year-olds (all $ps < .01$, all $\eta_p^2 > .14$) but not for 9-year-olds, $F(2, 52) = 1.44, p = .247, \eta_p^2 = .05$. These analyses further revealed that (a) 11-year-olds transferred more points to the victim as opposed to the other recipients (both $ps < .01$), there was no difference between points allocated to the includers and the excluders ($p = .17$), and (b) participants in the three older age groups allocated most points to the victim, fewer to the includers and least to the excluders (all $ps < .05$; see Figure 1).

Regression analyses with age as a predictor for each recipient separately confirmed that there was an age-related linear increase in points allocated to the victim, $F(1, 181) = 6.34, p < .05, r = .18$, and no age difference in points allocated to the includers, $F(1, 181) = 1.63, p = .20, r = .09$. With respect to the excluders there was no significant linear decrease with age, $F(1, 181) = 0.38, p = .54, r = .05$, but a significant quadratic trend, $F(2, 180) = 3.75, p < .05, r = .20$. Examination of this quadratic trend indicated a gradual decrease in points allocated to the excluders with age across adolescence with a negative peak around age 16, followed by an increase in young adults. Taken together, these findings indicate that with increasing age participants differentiated more between excluders and victims, with includers being in an intermediate position.

Age Differences in Altruistic Punishment of Excluders and Compensation of the Victim

To investigate developmental differences in altruistic punishment of excluders and compensation of victims, a repeated-

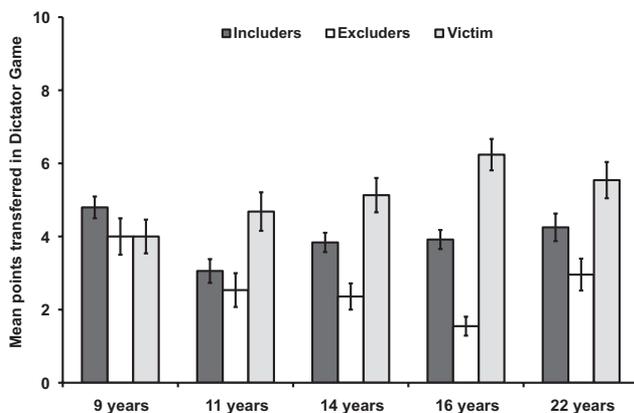


Figure 1. Mean points transferred in the Dictator Game to the three different recipients previously encountered in the Cyberball games displayed for each age group (error bars represent standard errors of the mean).

measures ANOVA was performed with recipient (three levels: includers vs. excluders vs. victim) as the within-subject factor and age group (five levels: 9-, 11-, 14-, 16-, and 22-years) as the between-subjects factor and the number of points allocated in the APCG as the dependent variable. There was a significant main effect of recipient, $F(2, 236) = 63.04, p < .001, \eta_p^2 = .35$ and a significant interaction effect between recipient and age group, $F(8, 236) = 4.78, p < .001, \eta_p^2 = .14$. There was no main effect of age group, $F(4, 118) = 0.46, p = .77, \eta_p^2 = .02$.

Post hoc repeated-measures ANOVAs were performed for each age group separately to further investigate the interaction effect. These analyses demonstrated that there was a significant effect of recipient for all age-groups (all $ps < .05$, all $\eta_p^2 > .12$), except for 11-year-olds, $F(2, 54) = 2.81, p = .087, \eta_p^2 = .09$. These analyses further revealed that (a) 9-year-old children transferred more points to the victim as opposed to the other recipients (both $ps < .05$), but there was no difference between points awarded to the includers and the excluders ($p = .74$); (b) 14-year-olds significantly awarded less points to the excluders ($p < .01$ compared to the includers and victim) but did not significantly differentiate between the victim and the includers ($p = .50$); and (c) participants in the two older age groups granted most points to the victim, fewer to the includers and least to the excluders (all $ps < .01$; see Figure 2).

Regression analyses with age as a predictor for each recipient separately demonstrated that there were no age-related changes in points granted to the victim and to the includers, all $F(1, 121) < 1.98, p > .16$. With respect to the excluders, however, we found a quadratic trend, $F(2, 120) = 5.27, p < .01$, which indicated a gradual decrease in the number of points granted to the excluders with age across adolescence with a peak at 16 years, followed by an increase in the young adults.

Mood and State Affective Perspective-Taking

To investigate the influence of observing social exclusion on mood, a repeated-measures ANOVA was performed with time point (four levels: baseline, inclusion, observed exclusion, and victim) as the within-subject factor and age group (five levels: 9-, 11-, 14-, 16-, and 22-years) as the between-subjects factor for overall mood scores. There was a significant main effect of time point, $F(3, 531) = 235.81, p < .001, \eta_p^2 = .57$, and a significant interaction effect between time point and age group, $F(12, 531) = 2.43, p < .05, \eta_p^2 = .05$. There was no main effect of age group, $F(4, 177) = 1.52, p = .20, \eta_p^2 = .03$.

Post hoc repeated-measures ANOVAs showed that there was no significant difference in mood between baseline and inclusion ($p = .14$). However, mood scores significantly dropped following observed exclusion ($p < .001$), and this did not differ between age groups ($p = .87$). Thus, participants in each age group reported lower mood after observing the exclusion of a peer. Furthermore, these analyses revealed developmental differences in state affective perspective-taking, such that 9-year-olds did not report a difference between their own mood and the mood of the victim ($p = .32$), while participants of the other age groups perceived the mood of the victim to be lower than their own mood (all $ps < .001$; see Figure 3).

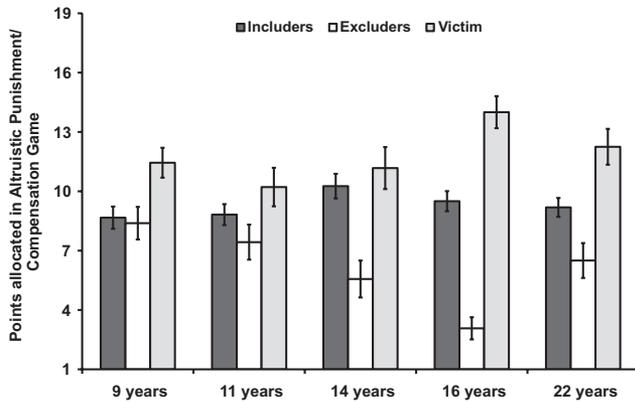


Figure 2. Mean points allocated in the Altruistic Punishment/Compensation Game to the three different recipients previously encountered in the Cyberball games displayed for each age group (error bars represent standard errors of the mean).

Perspective-Taking and Exchange Behavior

The two measures of perspective-taking were not significantly correlated ($r = -.07, p = .38$), indicating that these measures reflect independent aspects of perspective-taking skills. The analyses examining the relation between perspective-taking and allocations in the DG toward the victim and the excluder were thus performed separately for our self-report measure of trait perspective-taking and state affective perspective-taking. Affective perspective-taking correlated positively with age ($r = .16, p < .05$). A multiple regression analysis with affective perspective-taking and age as predictors significantly predicted compensation of the victim (DG allocation victim–DG allocation includers), $R^2 = .04, F(2, 179) = 3.95, p < .05$. However, only affective perspective-taking was a significant predictor of compensation of the victim, $\beta = .166, t(179) = 2.24, p < .05$, whereas age was not, $\beta = .098, t(179) = 1.32, p = .19$. With respect to punishment of the excluders (DG allocation excluders–DG allocation includers) we found a similar effect, $R^2 = .04, F(2, 179) = 3.43, p < .05$. Again, age was not a significant predictor, $\beta = -0.097, t(179) = -1.31, p = .19$, but affective perspective-taking was, $\beta = -0.15, t(179) = -2.03, p < .05$. Thus, individual differences in estimating the mood of the victim to be lower than one's own mood were related to an increase in point transfer in the DG toward the victim and a decrease toward excluders, when controlling for age.

Self-reported trait perspective taking scores as measured by the IRI subscale also correlated with age ($r = .20, p < .01$). A multiple regression analysis with trait perspective-taking and age as predictors did not predict compensation of the victim (DG allocation victim–DG allocation includers), $R^2 = .03, F(2, 175) = 2.46, p = .09$. Neither trait perspective-taking, $\beta = -.112, t(175) = -1.48, p = .14$, nor age, $\beta = .146, t(175) = 1.91, p = .06$, were significant predictors in this model. Also punishment of the excluders (DG allocation excluders–DG allocation includers) could not be predicted by trait perspective-taking, $R^2 = .02, F(2, 175) = 1.48, p = .23$. Again, IRI perspective-taking was not a significant predictor, $\beta = -0.53, t(175) = -0.69, p = .49$, and neither was age in this model, $\beta = -0.108, t(175) = -1.41, p = .16$.

Discussion

The current study set out to investigate punishment of excluders and compensation of victims after observing an instance of social exclusion at various phases of adolescent development. The results make four significant contributions to the literature on the development of social decision making with peers and perspective taking. First, observers of social exclusion show age-related differential treatment of victims and excluders when making decisions about fairness. Second, altruistic punishment of the excluders displayed a protracted developmental pattern compared to altruistic compensation of the victim. Third, we obtained evidence of developmental differences between late childhood and early adolescence in a state measure of affective perspective-taking, defined as the discrimination between mood of the self and perceived mood of the victim. Fourth, individual differences in affective perspective-taking predicted both more pronounced compensation of the victim and stronger punishment of the excluders.

Fairness Considerations Following Observed Social Exclusion

The first main finding is that fairness considerations toward victims and excluders differ at various points of adolescent development. With increasing age, participants shared more of their money with the victim and less with the excluders, compared to the includers. This result adds to the growing body of evidence that during adolescence fairness considerations become less strictly egalitarian and progressively more complex. That is, adolescents incorporate gradually more social information when deciding what is fair or not, e.g., their interaction partner's intentionality (Güroğlu, et al., 2009) or individual contributions to a group effort (Almås, Cappelen, Sørensen, & Tungodden, 2010). Furthermore, our results show that 9-year-olds on average shared 40 to 50% of the stake with unfamiliar peers (regardless of the recipient's prior behavior). This supports the notion that a preference for equal outcomes develops as a strong motivator in fairness considerations prior to entering adolescence (Blake & McAuliffe, 2011; Fehr,

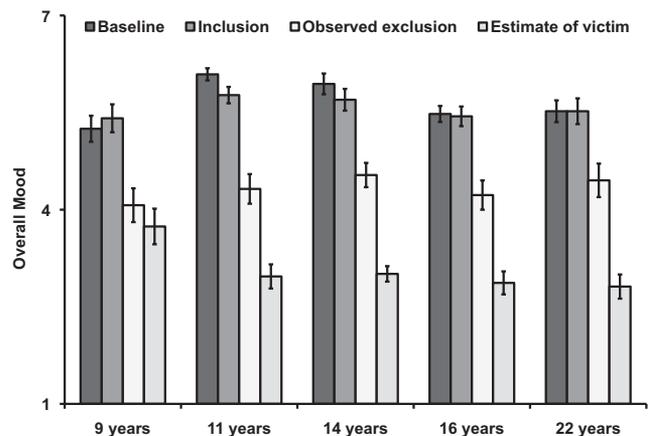


Figure 3. Overall mood ratings for each of the five age groups at different time points: at baseline, after being included, after observing the exclusion of a peer, and a mood estimate for the victim of exclusion (error bars represent standard errors of the mean).

Bernhard, & Rockenbach, 2008). Further, while treatment of the victim and the excluders differed between age groups, we found no developmental differences in mood levels following observed exclusion. This result suggests a crude automatic affective response to the social exclusion of another person (Wesselmann et al., 2009), which develops before adolescence.

Punishment of Excluders and Compensation of the Victim

While altruistic punishment and compensation have been shown to be crucial for the enforcement of social norms and maintenance of large-scale cooperation (Fehr & Gächter, 2002; Yamagishi, 1986), its developmental trajectory has remained largely overlooked (but see Kenward & Dahl, 2011; Kenward & Östth, 2012). Here, we show that third-party decision making (e.g., altruistic punishment and compensation) in a setting of observed social exclusion differs at various points across adolescent development. Moreover, altruistic punishment and compensation were shown to have differential developmental patterns.

With respect to compensation of the victims, the results of the two games show slightly different patterns. In the DG, participants allocated progressively more points to the victim compared to the other players, with increasing age. This suggests an increased concern for the excluded peer and more compensation behavior at the expense of the participants' own gain. However, when comparing the two games, the 9-year-olds displayed more compensation behavior in the APCG than in the DG. It could be that 9-year-olds give more precedence to norms of distributive equality, which is reflected in their sharing of 40% to 50% of the stake with all recipients. Consequently, when offering each recipient an equal split (regardless of prior behavior), compensation of the victim would require offering more than 50% of the stake, which could have been regarded as too generous. In the APCG on the other hand, compensating the victim was less costly (ranging from 10 to 30% of the stake) and yielded a relatively easier way for compensation (as three times the offer was given to the recipient). Thus, the context of the game (i.e., the possible options) may have guided participants to more compensation in the APCG.

The second important issue was whether children and adolescents exhibit third-party punishment of excluders and how this develops across adolescence. Here, we differentiated between self-beneficial punishment (in the DG) and costly or altruistic punishment (in the APCG). Results from both games in the present study demonstrate the same slower developmental trajectory compared to compensation. Furthermore, analyses also revealed an age-related *quadratic* trend, showing that adults punished less severely than 16-year-olds. This was not likely due to an age-related increase in self-maximization after age 16, because the quadratic trend was also observed in the DG, where adults allocated *more* money to the excluders than the adolescents. This corroborates previous findings on a developmental decrease between late adolescence and early adulthood in punishment severity using a DG (Gunther Moor, et al., 2012) and a Costly Punishment Game (van den Bos, van Dijk, & Crone, 2012) when participants are victims of a social norm-violation themselves.

What could account for these developmental declines in punishment severity between late adolescence and young adulthood? First, while the negative affect associated with witnessing social

exclusion might be similar for adolescents and adults, adults might punish less severely due to increased levels of emotion-regulation. Emotions, such as anger, have been associated with an increased likelihood of altruistic punishment (Seip, Van Dijk, & Rotteveel, 2009) and age-related decreases in costly punishment are mediated by decreases in anger (van den Bos, et al., 2012). Other possibilities include developmental differences in social desirability, involvement in the situation and social norms. It could be that adolescents view social exclusion as a more critical transgression compared to young adults, which in turn demands more rigorous punishment. Indeed, the extent to which adolescents worry about peer acceptance has been found to increase during adolescence and to decline around age 17–18 (Kloep, 1999). Furthermore, adolescents perceive peer evaluations as crucial determinants of self-worth (O'Brien & Bierman, 1988). Nonetheless, this hypersensitivity to rejection in adolescence cannot explain why the 16-year-olds demonstrated more punishment behavior than the 14-year-olds. In future research it will be of considerable interest to examine these different explanations for the developmental trend in punishment following observed exclusion.

Punishment, Compensation, and Perspective-Taking

The developmental difference between late childhood and early adolescence in affective perspective-taking is supported by research demonstrating continued development of affective theory of mind during adolescence (Sebastian et al., 2012). Importantly, the index of state affective perspective-taking not only predicted increased prosocial behavior toward the victim but also decreased prosocial behavior toward the excluders. What could account for the result that the state measure of affective perspective-taking is a better predictor of behavior toward excluders and the victim than individual differences in dispositional perspective-taking? Perhaps it is the specific nature of the situation (e.g., social exclusion) that does not elicit prosocial responses in individuals generally high in trait perspective-taking, or conversely, witnessing social exclusion might evoke punishment and compensation behavior also in individuals low in trait perspective taking. Our findings suggest that people not only have to possess the tendency to adopt someone else's point of view, but actually have to infer the affective state of the victim to be lower than their own in order to act more prosocially toward them as a result.

Consequently, we believe that our index of the discrimination between mood of the self and perceived mood of the victim could be a valuable measure for assessing state affective perspective-taking. By employing a difference score as opposed to merely using perceived mood of the victim we control for personal distress, which might result from the observation of exclusion. Personal distress is a self-oriented aversive emotional response to the apprehension of another person's affective state and has been associated with *decreases* in prosocial behavior (Decety & Meyer, 2008). Nonetheless, the findings of the current study do not allow us to determine precisely whether the developmental differences in affective perspective-taking are due to an inability to inhibit one's own perspective when asked about another person's perspective or a failure to deduct the victim's distress (Birch & Bloom, 2004; Decety & Meyer, 2008). Future research could address this issue and further investigate the links between this state measure of

affective perspective-taking and measures of dispositional perspective-taking.

Limitations

Several limitations to the current study should be considered. First, it could be argued that our study was susceptible to demand characteristics, e.g., an artifact that could make participants aware of the study's goals, which possibly could have influenced their behavior. We aimed to reduce possible consequences of demand characteristics by using economic games to measure social behavior. That is, economic games are anonymous, so concerns about participants presenting themselves as more generous, empathic or moral were likely reduced. Moreover, the participant's decisions had actual consequences for their payoffs.

Second, to make our data comparable to the adult literature on altruistic punishment and compensation, we used a version of Cyberball in which ball possession resulted in receiving points (van Beest & Williams, 2006). Behavior in the economic games thus reflects other-regarding preferences aimed at increasing or decreasing another person's welfare, either motivated by a concern for economic fairness or a pure motivation to compensate or punish. Future research should test whether a study design where exclusion does not have monetary consequences results in different patterns of punishment and compensation behavior.

Third, future studies should examine the developmental trends in punishment and compensation behavior longitudinally using comparable paradigms in order to rule out the role of possible cohort differences and to further study the role of participant characteristics that might be associated with the developmental effects.

Conclusions and Future Directions

The current findings revealed developmental differences across adolescence in treatment of victims and initiators of social exclusion. With increasing age, adolescents sacrificed an increasingly bigger share of their own resources to compensate victims of social exclusion and to punish excluders. Our results confirm the hypothesis that affective perspective taking is important for acting prosocially in situations where the victim's feelings need to be inferred without explicit emotional cues. Independent of age, people who perceived the mood of the victim to be lower than their own, showed increased prosocial behavior toward the victim and punished the excluders.

To conclude, a better understanding of the development of the cognitive and affective mechanisms underlying social decision-making processes is indispensable for the study of social and moral development across adolescence. While elucidating developmental differences is a crucial first step, future research should investigate individual differences in children and adolescents' reactions to social exclusion and other forms of victimization. Individual differences related to peer status, pubertal development, or rejection sensitivity are highly relevant and might be particularly crucial in identifying those children and adolescents who are at risk for developing psychosocial problems.

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