

Information processing of social exclusion: Links with bullying, moral disengagement and guilt

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ABSTRACT

The Social Information Processing (SIP) theory and the Social Cognitive Theory of Moral Agency were integrated to investigate the associations between SIP and bullying, guilt, and moral disengagement. Participants were 341 children and early adolescents ($M_{age} = 11.14$). Two social exclusion vignettes were administered to assess three SIP steps (step 2: Attribution of hostile intent; step 3: Selection of antisocial goals, and step 4: Generation of aggressive responses). Guilt was assessed through five vignettes. A self-report measure was used to assess moral disengagement and peer nominations were used to assess bullying perpetration. Moderated mediation analyses were performed to test the hypotheses. Findings indicated that attribution of hostile intent was associated with selection of antisocial goals, which in turn, was associated with the generation of aggressive responses among participants with high levels of bullying and low levels of guilt and moral disengagement. Results are discussed in terms of their theoretical and practical relevance.

Being excluded from the peer group is a common experience among children and adolescents. Previous research showed an increased sensitivity to social exclusion during late childhood and early adolescence due to the importance attached to the peer group during these developmental stages (Abrams, Weick, Thomas, Colbe, & Franklin, 2011). Even brief and single episodes of social exclusion induce negative feelings, such as anger, which in turn increase the likelihood of generating aggressive responses (Li, Zhao, & Yu, 2019).

An investigation into children's social information processing may explain how children process each step of the social situations that they encounter, especially those that may trigger conflict and rejection (e.g., social exclusion). According to the Social Information Processing model (SIP; Crick & Dodge, 1994), social behaviour depends upon a sequence of six steps, in which individuals 1) encode social information, 2) interpret it and attribute intent to others, 3) select the goals they want to achieve, 4) generate possible responses, 5) choose a behavioural response, and, finally, 6) enact the behaviour. The SIP model postulates that these steps occur sequentially and that each step has an impact on the following one. The whole process is influenced by past events and

social experiences as well as by emotions and moral knowledge (Arsenio & Lemerise, 2004). However, the examination of the sequential nature of the SIP steps has been mostly neglected, and the association between each step has only partially been supported in empirical studies (Pössel, Seemann, Ahrens, & Hautzinger, 2006).

Social information processing and bullying

Benign attribution of intent and generation of prosocial responses lead to social competent behaviours, whereas biased processing may lead to aggression and social deviance (Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002). Whereas children who show low levels of aggressive behaviour tend to generate positive responses when confronted with relational provocations (e.g., exclusion), children who bully their peers are more likely to respond with aggression (Camodeca & Goossens, 2005; McDonald & Asher, 2018). The SIP model posits that aggressive children and adolescents have deficits in the processing of social information; however, very few studies are available to show similar deficits in children involved in bullying (Camodeca & Goossens,

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2005).

Bullying perpetration has been described as a deliberate, repeated, and proactive form of aggressive behaviour against one or more peers who are unable to stand up for themselves (Salmivalli, 2010). Children who show proactive aggressive behaviour, such as those who perpetrate bullying, do not present any significant bias in the early stages of social information processing, as compared to other groups (i.e., targets of bullying and bully-victims) (Guy, Lee, & Wolke, 2017). In contrast, children who show proactive aggressive behaviour present deficits in the other SIP steps and tend to plan their behaviour based on their social goals (e.g., dominance; social power) (Peeters, Cillessen, & Scholte, 2010). However, findings in previous literature are mixed, as some research studies outlined that children showing bullying behaviour interpret others' intentions as hostile, aim to take revenge, select aggressive responses, and evaluate aggression as an effective solution (Camodeca & Goossens, 2005; Godleski & Ostrov, 2010). Children and adolescents enacting bullying behaviour strive for dominance and power (Reijntjes et al., 2013), which could facilitate the selection of antisocial goals and the generation of aggressive responses when they are confronted with ambiguous experiences of exclusion (Godleski & Ostrov, 2010). However, whether the association between the SIP steps is moderated by bullying behaviour has not been investigated in previous studies. Given the mixed findings in the literature, more research is needed to clarify the associations of the social information processing steps among children and adolescents who bully others. In addition, the SIP model has been primarily adopted in the context of children's aggressive behaviour (Crick & Dodge, 1996), rather than in the investigation of bullying. However, this model could be effectively applied to the examination of bullying behaviour as well (Camodeca & Goossens, 2005; Peeters et al., 2010), which is the focus of the present study.

Social information processing and moral disengagement

Throughout the course of moral development (i.e., development of judgements, reasoning, and emotional reactions in relation to welfare, rights, fairness, and justice) (Dahl, 2019), children and adolescents internalise moral rules, which guide their moral reasoning and behaviour (Bandura, 1999). Social information processing requires the retrieval of moral rules knowledge from the long-term memory, which in turn constitutes the precondition for enacting moral behaviours and avoiding immoral actions (Arsenio & Lemerise, 2004). For instance, in the context of processing social exclusion cues, children might be aware that counteracting through aggression is morally wrong (Gasser & Malti, 2012). However, in some instances, children disengage from their internalised moral rules, while justifying their own immoral behaviour (Bandura, 1999). According to the Social Cognitive Theory of Moral Agency (Bandura, 1999), moral disengagement involves a series of self-serving cognitive mechanisms that redefine immoral behaviours (e.g., aggression), with the aim to make them appear congruent with the standards of moral conduct (Bandura, 1999). The tendency to condone immoral behaviours facilitates the generation of aggressive responses to social exclusion, especially among adolescents who bully their peers (Mulvey, Boswell, & Zheng, 2017). Previous studies investigating the role of moral disengagement in explaining the gap between adolescent moral knowledge and aggressive behaviour have shown that moral disengagement is associated with low levels of guilt and empathy (Mazzone, Yanagida, Caravita, & Strohmeier, 2019; Perren, Gutzwiller-Helfenfinger, Malti & Hymel, 2012). The positive associations between moral disengagement and different forms of undesirable social conduct, including aggression, bullying, and delinquent behaviour have been confirmed in several studies (Bandura, 1999; Killer, Bussey, Hawes, & Hunt, 2019; Obermann, 2013). Adolescents who justify and rationalise their immoral behaviour (thus showing moral disengagement) could select and generate aggressive or immoral behavioural responses (Fontaine, Salzer Burks, & Dodge, 2002). For instance, in the face of provocative social situations, aggressive

responses may reflect a tendency to either reject or ignore one's own moral knowledge and values about fairness and respect, while deliberately using aggression to obtain desirable material goals or social power at the expense of others (Arsenio, Adams, & Gold, 2009). Moral disengagement could enhance the attribution of hostile intent, the selection of antisocial goals, and the generation of aggressive responses in ambiguous social exclusion situations. In other words, adolescents could deactivate their own moral knowledge via moral disengagement when processing ambiguous social exclusion cues and, in turn, they could generate aggressive responses.

To date, the SIP model was only rarely combined with theories of (im)moral behaviour, and the few previous studies that tried to combine them, failed to find any associations (Hyde, Shaw, & Moilanen, 2010). The current study proposes that an integrative model combining the SIP model with moral disengagement may provide new insights into the nature of social information processing.

Social information processing and guilt

The processing of social information involves both the cognitive and emotional components of morality (Arsenio, Adams & Gold, 2009). Guilt is a moral emotion encompassing feelings of regret over interpersonal transgressions, along with the tendency to take responsibility, and repair the harm done (Malti, 2016; Tracy & Robins, 2006). Guilt is involved in the retrieval of relevant moral knowledge when interpreting social cues and enacting social behaviours (Ettetal, Kochenderfer-Ladd, & Ladd, 2015). Children and early adolescents who show feelings of guilt are more likely to be prosocial (Menesini & Camodeca, 2008) and to generate competent strategies in the context of ambiguous social situations (Laible, McGinley, Carlo, Augustine, & Murphy, 2013). On the opposite, lower feelings of guilt may lead children and early adolescents to pursue social goals that impede the successful continuation of social interactions (e.g., taking revenge; Recchia, Wainryb, & Pasupathi, 2019).

For instance, children who anticipate guilt feelings in the context of moral transgressions are less likely to select aggressive responses, as compared to their peers showing low levels of guilt (Camodeca & Goossens, 2008; Fontaine et al., 2002). Anticipated guilt feelings may exert a strong influence on moral choices and behaviours by providing critical feedback on both anticipated and actual behaviour (Tangney, et al., 2007). For instance, the generation of aggressive responses could be restrained by the expectation that some social goals (e.g., taking revenge) and behaviours (e.g., aggression) may cause feelings of guilt. Thus, investigating guilt in the context of processing ambiguous social cues may provide a more complete picture of social information processing.

A developmental perspective

Between late childhood and early adolescence, children start experiencing more autonomy from parents and have more opportunities to socialise with their peers (Rubin, Bukowski, & Bowker, 2015). Peer interactions offer the opportunity to develop new social skills and largely contribute to children's socio-cognitive and moral development (Kilford et al., 2016). More specifically, throughout late childhood and early adolescence, children are increasingly able to coordinate social cognitions (e.g., social information processing) with moral emotions (e.g., guilt) and (im)moral cognition (e.g., moral disengagement), which, in turn, are related to morally relevant social behaviours (Dodge & Rabiner, 2004; Malti & Ongley, 2015). For instance, when processing social exclusion cues, children need to coordinate relevant moral rules (e.g., concerning the unfairness of counteracting), with any potential (im)moral justifications of aggression (i.e., moral disengagement). Throughout this process, they coordinate moral rules and (im)moral justifications with their feelings of guilt for enacting aggressive behaviours. The success of peer interactions is related to the ability to

coordinate these processes as well as to children's ability to produce positive (i.e., constructive) responses even when confronted with problematic social situations, such as social exclusion (Killen & Rutland, 2011). In sum, from a developmental point of view, late childhood and early adolescence are key stages to investigate the intertwinement between socio-cognitive, moral, and emotional processes in relation to social exclusion.

The present study

Scholars have called for an integrative approach to the study of moral development and social cognition (Arsenio & Lemerise, 2004; Lemerise & Arsenio, 2000). However, to date these constructs have only been linked on a theoretical level and have never been empirically investigated. To bridge the research in these two fields, the present study will investigate the associations between social information processing, bullying, guilt, and moral disengagement in social exclusion situations, by drawing upon two theoretical frameworks, namely the Social Information Processing model (Crick & Dodge, 1994) and the Social Cognitive Theory of Moral Agency (Bandura, 1999). More specifically, this study aims to understand the moderating role of bullying, moral disengagement, and guilt in relation to the processing of social exclusion cues when investigating three interrelated SIP steps: the attribution of hostile intent (SIP step 2), the selection of antisocial goals (SIP step 3), and the generation of aggressive responses (SIP step 4).

The following hypotheses were formulated.

Hypothesis 1a. Direct Associations between the SIP Steps.

A positive association was expected between each contiguous SIP step (i.e., step 2 is associated with step 3, which in turn is associated with step 4).

Hypothesis 1b. Indirect Associations between the SIP Steps.

As outlined above, previous research has only partially supported the mediating association between the preceding and subsequent SIP steps (Pössel et al., 2006). Hence, this study aims to test the proposed mediation hypothesis, i.e., attribution of hostile intent (step 2) was expected to show an indirect effect on the generation of aggressive responses (step 4) through selection of antisocial goals (step 3).

Hypothesis 2. Association between the SIP Steps and Bullying Perpetration.

Children and adolescents who attributed hostile intent (step 2) and selected antisocial goals (step 3) were expected to select aggressive responses (step 4) when they also showed high levels of bullying.

Hypothesis 3. Association between the SIP Steps and Moral Disengagement.

Children and adolescents who attributed hostile intent (step 2) and selected antisocial goals (step 3) were expected to select aggressive responses (step 4) when they also showed high levels of moral disengagement (Dodge & Rabiner, 2004; Visconti, Ladd, & Kochenderfer-Ladd, 2015).

Hypothesis 4. Association between the SIP Steps and Guilt.

Children and adolescents with low levels of guilt were expected to select antisocial goals (step 3) and generate aggressive responses (step 4), whereas the opposite pattern was expected for those with high levels of guilt (Roos, Hodges, & Salmivalli, 2014).

Age and gender differences

Previous studies investigating gender differences in social information processing produced mixed findings. While some studies found that boys choose more aggressive and assertive responses (SIP step 5) compared to girls, when confronted with ambiguous or provocative

scenarios (Camodeca & Goossens, 2005), some other studies documented no gender differences (Camodeca, Goossens, Schuengel, & Meerum Terwogt, 2003). Bullying and moral disengagement were suggested to decrease with age (Paciello, Fida, Tramontano, Lupinetti, & Caprara, 2008; Pellegrini & Long, 2002), and guilt typically increases throughout child development (Walter & Burnaford, 2006). Therefore, gender and age were controlled for in the analyses.

Method

Sample

Participants were 341 students (51.91% girls and 48.09% males; age range: 9–15; $M_{age} = 11.14$; $SD = 0.93$), attending twelve primary (fifth grade) and middle schools (i.e., sixth, seventh, and eighth grades) located in urban areas in Southern-Central Italy and in Northern Italy. Despite the relatively broad age-range, most children (85%) in the sample were aged 10 to 12. Participants' socio-economic background was not assessed; however, like in most public schools in Italy, the sampled schools served different cultural and socio-economic backgrounds and can be considered as mixed regarding their socio-economic status, ranging between lower, middle, and upper middle classes.

Measures

Social exclusion vignettes

Two hypothetical ambiguous vignettes were administered to assess the second, third, and fourth SIP steps. Given the centrality of the peer group during late childhood and early adolescence, the vignettes adopted in this study involved social exclusion situations by peers. The texts of the two vignettes were developed by the first and third author, who have a background in bullying and adolescent research. The vignettes were based on similar vignettes adopted in previous social information processing literature (see Arsenio et al., 2009; Crick, 1995; Kokkinos, Karagianni, & Voulgaridou, 2017; Ziv, Leibovich, & Schechtman, 2013), and were adjusted for the purposes of this study. The vignettes were then discussed and refined to ensure that the portrayed situations described social exclusion scenarios and were face valid. They were ambiguous as the intentions of the peers responsible for the negative action were unclear. The two vignettes are as follows: "Your classmates are playing football/volleyball in the school yard. You ask whether you could join them. However, they do not reply to your question even though you repeat the question three more times. How do you feel?" and "Your classmate just threw a party for his/her own birthday. All your classmates were invited. The day after, at school, all of them are talking about the party. Then, you realise that you were the only one who was not invited. How do you feel?"

We asked students to imagine themselves in each situation and presented them with three items per each vignette. One item assessed step 2 ("I think that my classmate(s) did not reply/ did not invite me on purpose"), one item assessed step 3 ("I would like to take revenge on the classmate(s) who did not let me join the game/ who did not invite me"), and one item assessed step 4 ("I react aggressively - e.g., I insult, or I beat up, the classmate(s) who did not let me play/ who did not invite me"). Participants expressed their degree of agreement on a 4-point Likert scale (1 = *totally false* to 4 = *totally true*). Scores were averaged within each SIP step across the two vignettes and yielded three scales: Hostile intent ($\alpha = 0.58$; $r = 0.41$, $p < 0.01$), revenge (or antisocial goals) ($\alpha = 0.77$; $r = 0.62$, $p < 0.01$), and generation of aggressive responses ($\alpha = 0.72$; $r = 0.56$, $p < 0.01$).

Bullying behaviour

Peer nominations were used to assess bullying (Pozzoli, Gini, & Vieno, 2012). The following written definition of the term "bullying", adapted from Olweus (1993), was provided: "Being bullied means that a student is repeatedly beaten, kicked, and pushed away by a peer, or a group of

peers. It is also bullying when a student is repeatedly excluded, threatened, or badly teased and he/she is not able to defend himself/herself. It's not bullying if two students of about the same strength quarrel or fight". Furthermore, the administrators gave further oral clarifications concerning the bullying definition, including examples of bullying. They also explained the difference between bullying, conflicts, and general aggressive behaviour (e.g., arguments and disagreements among children and adolescents, teasing, and rough play).

To protect anonymity, students were provided with a class roster, including the names of all their classmates corresponding to a number. Participants were asked to write down the numbers matching the classmates who fit each of the four behaviours proposed (covering relational, verbal, and physical types of bullying). They could nominate an unlimited number of classmates (including themselves), who bullied their peers (e.g., "Among your classmates, who teases some other kids calling them nasty nicknames, threatening, or offending them?") The nominations obtained by each student were divided by the total number of nominators in each classroom, in order to adjust for classroom sizes. Reliability for the bullying scale was $\alpha = 0.89$.

Moral disengagement

The Moral Disengagement Scale for Bullying (Caravita, Gini, & Pozzoli, 2012) was used to investigate moral disengagement in bullying situations. A 27-item version was administered to middle school students, whereas an abbreviated and modified 17-item version was administered to primary school students (Caravita et al., 2012). Except for being shorter and with a simpler wording, the items for younger participants were the same as those in the other version. Examples of items are as follows: "Teasing a classmate is not really hurtful"; "Victimised children usually deserve being bullied". Participants expressed on a 5-point Likert scale the degree of agreement with each item (1 = completely false to 5 = completely true). A moral disengagement score was computed for each participant, by averaging their responses across all items, so that high scores indicated high tendency to morally disengage ($\alpha = 0.80$ and $\alpha = 0.84$ for primary and middle school, respectively).

Guilt

The Shame and Guilt Questionnaire (Olthof, Schouten, Kuiper, Stegge, & Jennekens-Schinkel, 2000; Italian adaptation by Camodeca & Menesini, 2007) was administered to detect guilt proneness in moral situations. Five vignettes eliciting guilt in everyday life situations were administered. A sample vignette is as follows: "Today you are in a bad mood. At home you quarrel with everyone. At school you are also in a bad mood. When a classmate accidentally steps on your toes, you lose your temper and shout out loud: 'Hey, look where you're walking!' The other boy is terrified and everyone in the class is staring at you. How do you feel?"

For each vignette, students were asked to rate on a 5-point Likert scale how much they would feel guilty (1 = not at all to 5 = highly). Participants' scores were computed by averaging the responses across the five vignettes ($\alpha = 0.68$).

Procedure

The project was firstly presented to school principals, who gave their consent for the schools to participate. Parents received a letter describing the goals of the research project and were asked to provide their written informed consent for their children's participation in the study, which was agreed for 76% of the whole school population contacted. Participants were informed about the goals of the research project and were told that they could withdraw from the study at any time, though none of them did. They received a booklet marked with a code, to protect their own identity, and were assured anonymity and confidentiality of the information provided. Participants completed the study measures (in counterbalanced order) during a classroom session lasting approximately 45–60 min, in which they were asked to carefully read each question and to respond based on their thoughts and personal

experiences. Data were collected by the first author and by two trained postgraduate students.

The research project was conducted in accordance with the ethical standards of the Italian Association of Psychology (AIP) and with the 1964 Helsinki declaration and its later amendments.

Missing data

A total of 9.71% of data were missing, stemming from 129 incomplete records. The percentage of missing values ranged from 0.00% to 19.35%. Full information maximum likelihood (FIML) under the missing at random (MAR) assumption was used to deal with the missing data (see Enders, 2010). A series of two-sample *t*-tests was conducted to compare students with and without missing data on all study variables. Results showed that students with missing data were older ($d = 0.49$) and had lower guilt ($d = 0.40$) than students without missing values.

Analytic strategy

Statistical mediation analysis (MacKinnon & Tofighi, 2013) was conducted in Mplus 8.2 (Muthén & Muthén, 1998–2017) to investigate direct and indirect effects of hostile intent (SIP step 2) on generation of aggressive response (SIP step 4) via selection of antisocial goals (SIP step 3) in the context of experiences of exclusion by peers (hypotheses 1a and 1b). Moderated mediation analysis (Preacher, Rucker, & Hayes, 2007, Model 59) was conducted to investigate the role of bullying, moral disengagement, and guilt in moderating the indirect and direct effects between the three SIP steps (hypotheses 2 to 4). More specifically, interaction terms (SIP step 2 - attribution of hostile intent x moderator variable and SIP step 3 - selection of antisocial goals x moderator variable) were added to the mediation model to test for moderated mediation (see Panel B in Fig. 1). Statistical significance of the direct and indirect effects was tested at specific moderator values, i.e., at the mean value and at one standard deviation below and above the mean value. This procedure was chosen to better interpret the results. The conceptual diagram of the moderated mediation analysis is depicted in Panel A in Fig. 1, while the statistical diagram is depicted in Panel B in Fig. 1. Age and gender were included in all models as control variables.

Model parameters were estimated using the maximum likelihood method. Statistical significance of the direct and indirect effects was tested using bias-corrected bootstrapping confidence intervals based on 1000 bootstrap draws.

Results

Descriptive statistics

Means, standard deviations, and correlation coefficients for all variables are shown in Table 1. Attribution of hostile intent positively correlated with selection of antisocial goals, which in turn was positively correlated with generation of aggressive responses. As for the moderator variables, bullying positively correlated with selection of antisocial goals and generation of aggressive responses. Likewise, moral disengagement positively correlated with selection of antisocial goals and generation of aggressive responses. Guilt negatively correlated with selection of antisocial goals and generation of aggressive responses.

In all the following analyses, the answers to the dependent variables were collapsed between the two vignettes. However, we also run all analyses separately for the two vignettes to check for the robustness of the results presented below (see supplementary material). These separate analyses were largely in line with the analyses reported here.

Hypotheses 1a and 1b: direct and indirect associations between the SIP steps (mediation hypothesis)

Results of the mediation analysis are shown in Table 2. Confirming

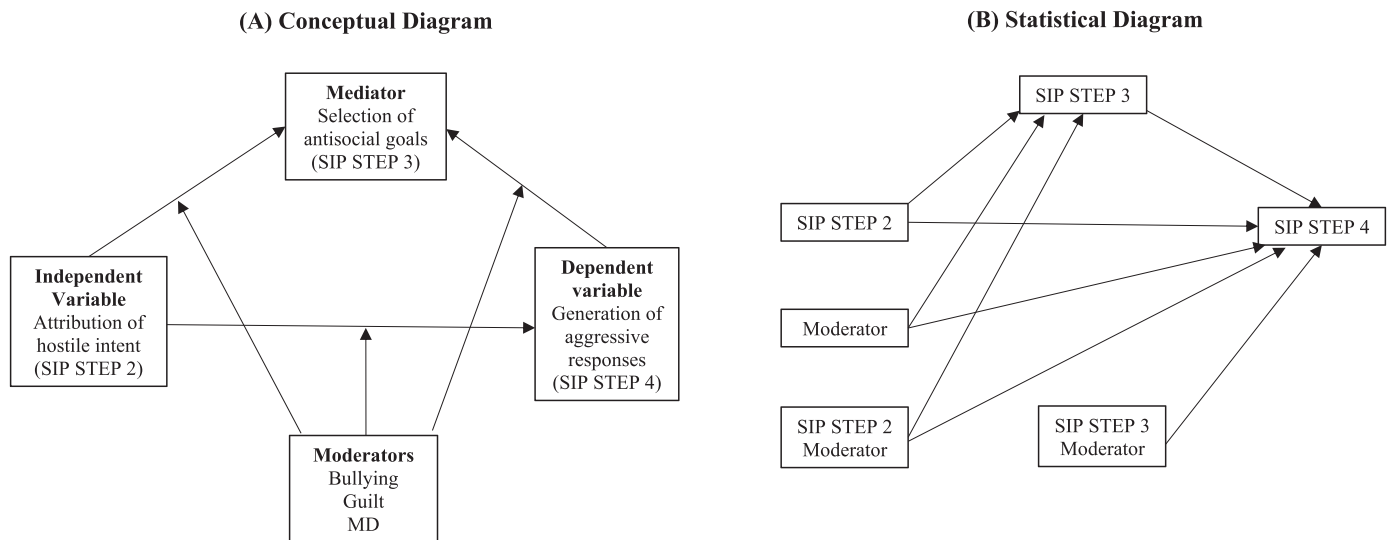


Fig. 1. Conceptual (Panel A) and statistical diagram (Panel B) of the moderated mediation model. Note: SIP = Social Information Processing; MD = Moral disengagement.

Table 1 Mean, standard deviation, and correlation matrix of the study variables.

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Age								
2. Gender (0 = boys, 1 = girls)	0.01							
3. SIP step 2	0.04	-0.01						
4. SIP step 3	0.10	-0.22	0.12					
5. SIP step 4	0.14	-0.23	0.00	0.53				
6. Bullying	-0.02	-0.26	-0.00	0.23	0.32			
7. MD	0.07	-0.18	-0.02	0.37	0.42	0.35		
8. Guilt	-0.05	0.23	0.12	-0.27	-0.34	-0.31	-0.48	
M	11.14	0.52	1.39	1.95	2.87	0.08	2.18	3.98
SD	0.93	0.65	0.65	0.86	0.76	0.12	0.56	0.79

Note. N = 341; Full information maximum likelihood estimates; SIP step 2= Attribution of hostile intent; SIP step 3= Selection of antisocial goals; SIP step 4 = Generation of aggressive responses; MD = Moral disengagement; Statistically significant results at $\alpha = 0.05$ are in boldface. Mean for gender indicates the proportion of girls who participated in this study (52%).

Table 2 Results of the mediation analysis: attribution of hostile intent, antisocial goals, and generation of aggressive responses.

Independent variable	Mediating variable	Dependent variable	Est. (SE)	95% CI	Std. est.
Individual components of the indirect effect					
SIP step 2	SIP step 3		0.13 (0.07)	[-0.00, 0.26]	0.12
	SIP step 3	SIP step 4	0.39 (0.05)	[0.28, 0.50]	0.50
Indirect effect					
SIP step 2	SIP step 3	SIP step 4	0.05 (0.03)	[0.00, 0.11]	0.06
Direct effect controlling for the indirect effect					
SIP step 2		SIP step 4	-0.06 (0.05)	[-0.14, 0.03]	-0.07

Note. SIP step 2= Attribution of hostile intent; SIP step 3= Selection of antisocial goals; SIP step 4 = Generation of aggressive responses. Est. = Unstandardized parameter estimate; SE = Standard error; 95% CI = 95% Bias-corrected bootstrap confidence interval; Std. Est. = Standardized estimate; Statistically significant results at $\alpha = 0.05$ are in boldface; $R^2_{\text{selection of antisocial goals}} = 0.07$; $R^2_{\text{generation of aggressive responses}} = .31$.

our hypothesis, there was a significant indirect effect of attribution of hostile intent (SIP step 2) on generation of aggressive responses (SIP step 4) through selection of antisocial goals (SIP step 3) while controlling for

age and gender ($B = 0.05$, 95% CI [0.00, 0.11]). The direct effect of step 2 on step 4, controlling for the indirect effect, age, and gender, was not significant ($B = -0.06$, 95% CI [-0.14, 0.03]), indicating that for both girls and boys and children of all ages the direct effect was not significant. As for the control variables, gender was associated with selection of antisocial goals ($B = -0.37$, 95% CI [-0.57, -0.18]) and generation of aggressive responses ($B = -0.16$, 95% CI [-0.29, -0.03]), indicating that girls were less willing than boys to plan revenge and to generate aggressive responses when confronted with a scenario of exclusion. No statistically significant results were found for age.

Hypothesis 2: bullying as a moderator of the direct and indirect associations between the SIP steps

Results of the moderated mediation analysis for bullying are displayed in Table 3. Results showed a statistically significant interaction between selection of antisocial goals and bullying in predicting generation of aggressive responses ($B = 0.97$, 95% CI [0.03, 1.62]), indicating that the association between selection of antisocial goals and generation of aggressive responses was stronger for participants who scored high on bullying. Moreover, there was a statistically significant interaction between attribution of hostile intent and bullying in predicting generation of aggressive responses ($B = -0.87$, 95% CI [-2.42, -0.08]), indicating a weaker association between attribution of hostile intent and generation of aggressive responses among participants who scored higher on bullying.

Table 3
Results of the moderated mediation analysis: indirect and direct effects moderated by bullying.

Independent variable	Mediating variable	Dependent variable	Est. (SE)	95% CI	Std. est.
Individual components of the indirect and direct effects					
SIP step 2	SIP step 3		0.09 (0.08)	[-0.06, 0.22]	0.08
Bullying	SIP step 3		-0.05 (1.81)	[-4.53, 2.68]	-0.01
SIP step 2x Bullying	SIP step 3		0.54 (0.62)	[-0.62, 1.93]	0.22
	SIP step 3	SIP step 4	0.29 (0.06)	[0.19, 0.42]	0.38
Bullying		SIP step 4	0.94 (1.68)	[-2.15, 4.77]	0.17
	SIP step 3 x Bullying	SIP step 4	0.97 (0.39)	[0.03, 1.62]	0.52
SIP step 2x Bullying		SIP step 4	-0.87 (0.56)	[-2.42, -0.08]	-0.46
Indirect effects between SIP steps given low level of bullying (i.e., M - SD = 0.00)					
SIP step 2	SIP step 3	SIP step 4	0.03 (0.02)	[-0.02, 0.07]	
Indirect effect given average level of bullying (i.e., M = 0.08)					
SIP step 2	SIP step 3	SIP step 4	0.05 (0.03)	[0.00, 0.10]	
Indirect effect given high level of bullying (i.e., M + SD = 0.19)					
SIP step 2	SIP step 3	SIP step 4	0.09 (0.06)	[0.00, 0.22]	
Direct effect controlling for the indirect effect given low level of bullying (i.e., M - SD = 0.00)					
SIP step 2		SIP step 4	0.00 (0.05)	[-0.08, 0.11]	
Direct effect controlling for the indirect effect given average level of bullying (i.e., M = 0.07)					
SIP step 2		SIP step 4	-0.06 (0.04)	[-0.14, 0.02]	
Direct effect controlling for the indirect effect given high level of bullying (i.e., M + SD = 0.19)					
SIP step 2		SIP step 4	-0.16 (0.09)	[-0.39, -0.03]	

Note. SIP step 2= Attribution of hostile intent; SIP step 3= Selection of antisocial goals; SIP step 4 = Generation of aggressive responses. Est. = Unstandardized parameter estimate; SE = Standard error; 95% CI = 95% Bias-corrected bootstrap confidence interval; Std. Est. = Standardized estimate; Statistically significant results at $\alpha = 0.05$ are in boldface; $R^2_{\text{selection of antisocial goals}} = 0.11$; $R^2_{\text{generation of aggressive responses}} = 0.38$.

The indirect effect of attribution of hostile intent on generation of aggressive responses through the mediation of antisocial goals was statistically significant for medium ($B = 0.05$, 95% CI [0.00, 0.10]) and high levels of bullying ($B = 0.09$, 95% CI [0.00, 0.22]), but not for low levels of bullying. The direct effect controlling for the indirect effect, was statistically significant only for high levels of bullying ($B = -0.16$, 95% CI [-0.39, -0.03]) indicating a partial mediation, while there was a full mediation for medium levels of bullying.

There was no statistically significant interaction between attribution of hostile intent and bullying in predicting antisocial goals.

Hypothesis 3: moral disengagement as a moderator of the direct and indirect associations between the SIP steps

Results of the moderated mediation analysis for moral disengagement are shown in Table 4. Results showed a statistically significant interaction between antisocial goals and moral disengagement in predicting generation of aggressive responses ($B = 0.19$, 95% CI [0.04, 0.29]), indicating that the association between step 3 and 4 was stronger for participants who scored higher on moral disengagement. There was no statistically significant interaction between attribution of hostile intent and moral disengagement in predicting antisocial goals or

Table 4
Results of the moderated mediation analysis: indirect and direct effects moderated by moral disengagement.

Independent variable	Mediating variable	Dependent variable	Est. (SE)	95% CI	Std. est.
Individual components of the indirect and direct effect					
SIP step 2	SIP step 3		0.47 (0.29)	[-0.08, 1.05]	0.42
MD	SIP step 3		0.99 (0.40)	[0.22, 1.81]	0.64
SIP step 2 x MD	SIP step 3		-0.15 (0.14)	[-0.44, 0.09]	-0.42
	SIP step 3	SIP step 4	-0.12 (0.18)	[-0.40, 0.29]	-0.15
MD		SIP step 4	-0.31 (0.25)	[-0.86, 0.14]	-0.26
	SIP step 3x MD	SIP step 4	0.19 (0.07)	[0.04, 0.29]	0.83
SIP step 2 x MD		SIP step 4	0.03 (0.09)	[-0.13, 0.23]	0.12
Indirect effect given low level of moral disengagement (i.e., M - SD = 1.61)					
SIP step 2	SIP step 3	SIP step 4	0.04 (0.02)	[0.01, 0.11]	
Indirect effect given average level of moral disengagement (i.e., M = 2.18)					
SIP step 2	SIP step 3	SIP step 4	0.04 (0.02)	[0.00, 0.08]	
Indirect effect given high level of moral disengagement (i.e., M + SD = 2.73)					
SIP step 2	SIP step 3	SIP step 4	0.02 (0.05)	[-0.07, 0.11]	
Direct effect controlling for the indirect effect given low level of moral disengagement (i.e., M - SD = 1.61)					
SIP step 2		SIP step 3	-0.06 (0.07)	[-0.21, 0.06]	
Direct effect controlling for the indirect effect given average level of moral disengagement (i.e., M = 2.17)					
SIP step 2		SIP step 4	-0.04 (0.05)	[-0.13, 0.05]	
Direct effect controlling for the indirect effect given high level of moral disengagement (i.e., M + SD = 2.73)					
SIP step 2		SIP step 4	-0.02 (0.07)	[-0.16, 0.11]	

Note. SIP step 2= Attribution of hostile intent; SIP step 3= Selection of antisocial goals; SIP step 4 = Generation of aggressive responses. MD = Moral Disengagement; Est. = Unstandardized parameter estimate; SE = Standard error; 95% CI = 95% Bias-corrected bootstrap confidence interval; Std. Est. = Standardized estimate; Statistically significant results at $\alpha = 0.05$ are in boldface; $R^2_{\text{selection of antisocial goals}} = 0.19$; $R^2_{\text{generation of aggressive responses}} = 0.39$.

Table 5
Results of the moderated mediation analysis: indirect and direct effects moderated by guilt.

Independent variable	Mediating variable	Dependent variable	Est. (SE)	95% CI	Std. Est.
Individual components of the indirect and direct effect					
SIP step 2	SIP step 3		1.03 (0.31)	[0.41, 1.66]	0.91
Guilt	SIP step 3		0.26 (0.21)	[-0.14, 0.68]	0.24
SIP step 2 x Guilt	SIP step 3		-0.21 (0.08)	[-0.37, -0.07]	-0.99
	SIP step 3	SIP step 4	1.30 (0.26)	[0.72, 1.75]	1.70
Guilt		SIP step 4	0.26 (0.20)	[-0.14, 0.66]	0.31
	SIP step 3x Guilt	SIP step 4	-0.24 (0.06)	[-0.35, -0.10]	-1.24
SIP step 2 x Guilt		SIP step 4	0.04 (0.06)	[-0.07, 0.16]	0.24
Indirect effect given low level of guilt (i.e., M - SD = 3.19)					
SIP step 2	SIP step 3	SIP step 4	0.19 (0.06)	[0.09, 0.31]	
Indirect effect given average level of guilt (i.e., M = 3.98)					
SIP step 2	SIP step 3	SIP step 4	0.06 (0.02)	[0.02, 0.11]	
Indirect effect given high level of guilt (i.e., M + SD = 4.78)					
SIP step 2	SIP step 3	SIP step 4	0.00 (0.01)	[-0.03, 0.03]	
Direct effect controlling for the indirect effect given low level of guilt (i.e., M - SD = 3.19)					
SIP step 2		SIP step 4	-0.09 (0.07)	[-0.26, 0.04]	
Direct effect controlling for the indirect effect given average level of guilt (i.e., M = 3.99)					
SIP step 2		SIP step 4	-0.06 (0.05)	[-0.14, 0.03]	
Direct effect controlling for the indirect effect given high level of guilt (i.e., M + SD = 4.78)					
SIP step 2		SIP step 4	-0.03 (0.06)	[-0.13, 0.10]	

Note. SIP step 2= Attribution of hostile intent; SIP step 3= Selection of antisocial goals; SIP step 4 = Generation of aggressive responses. Est. = Unstandardized parameter estimate; SE = Standard error; 95% CI = 95% Bias-corrected bootstrap confidence interval; Std. Est. = Standardized estimate; Statistically significant results at $\alpha = 0.05$ are in boldface; $R^2_{\text{selection of antisocial goals}} = 0.17$; $R^2_{\text{generation of aggressive responses}} = 0.41$.

generation of aggressive responses.

The indirect effect was statistically significant for low levels ($B = 0.04$, 95% CI [0.01, 0.11]) and medium levels of moral disengagement ($B = 0.04$, 95% CI [0.00, 0.08]). That is, for participants with low and medium levels of moral disengagement, the selection of antisocial goals (SIP step 3) fully mediated the association between attribution of hostile intent (SIP step 2) and generation of aggressive responses (SIP step 4).

Direct effects controlling for the indirect effect were not statistically significant for any level of moral disengagement indicating that, for low and medium levels of moral disengagement, there was a full mediation, but there was no mediation for high levels of moral disengagement.

Hypothesis 4: guilt as a moderator of the direct and indirect associations between the SIP steps

Results (Table 5) showed a statistically significant interaction between attribution of hostile intent and guilt in predicting antisocial goals ($B = -0.21$, 95% CI [-0.37, -0.07]) and between antisocial goals and guilt in predicting generation of aggressive response ($B = -0.24$, 95% CI [-0.35, -0.10]). In both cases, the associations between the two SIP steps were weaker for participants with high levels of guilt.

The indirect effects were statistically significant for low levels of guilt ($B = 0.19$, 95% CI [0.09, 0.31]) and medium levels of guilt ($B = 0.06$, 95% CI [0.02, 0.11]), indicating that for low and medium levels of guilt there was a full mediation, but there was no mediation for high levels of guilt.

Discussion

Direct and indirect associations between the SIP steps (H1a and H1b)

This study aimed to integrate the SIP model (Crick & Dodge, 1994) and the Social Cognitive Theory of Moral Agency (Bandura, 1999), to better understand the nature of social information processing. Findings suggest that selection of antisocial goals and generation of aggressive responses positively correlated with each other. Moreover, findings of

the mediation analysis showed that attribution of hostile intent had an indirect effect on generation of aggressive responses through the selection of antisocial goals. Based on the design of this study, it is not possible to infer causality; however, the link between these steps indicates that adolescents who believed that they were excluded on purpose were also more likely to plan revenge, which, in turn, leads to view aggressive responses as a possible response to social exclusion cues. These results confirm the theoretically postulated sequential nature of social information processing: As suggested by Crick and Dodge (1994), these SIP steps follow a pattern according to which each step affects the following one.

Associations between the SIP steps and bullying perpetration (H2)

The selection of antisocial goals and the generation of aggressive responses correlated positively with bullying, which confirms previous research findings (Camodeca & Goossens, 2005). Children who perpetrate bullying may select antisocial goals and respond with aggression in an effort to re-establish the social hierarchy (Underwood & Ehrenreich, 2014). Also, they may be vigilant of social exclusion cues in an attempt to avoid being excluded by peers, which is very relevant during early adolescence, when experiences of exclusion could be perceived as particularly threatening (Abrams et al., 2011; Underwood & Ehrenreich, 2014).

Treating bullying as a moderator of the association between the SIP steps adds important and new knowledge to our understanding of social information processing in the context of hypothetical ambiguous social exclusion situations. Participants who scored high on bullying others showed a weaker link between attributions of hostile intent and the generation of aggressive responses. These findings suggest that early adolescents who bully their peers do not necessarily generate aggressive responses due to a "negativity bias" (i.e., they do not tend to interpret ambiguous exclusion cues as hostile) (Guy et al., 2017). Rather, they may respond with aggression to gain power and social dominance (Reijntjes et al., 2013). Aggressive responses could also be approved in their social environment (i.e., peer group). This assumption is in line

with previous findings indicating that perpetrators of bullying are rarely confronted by other children (Craig, Pepler, & Atlas, 2000), which could lead them to believe that their behaviour is acceptable.

However, the assumption that, for perpetrators of bullying, attribution of hostile intent is weakly associated with generation of aggressive responses did not hold when including step 3 (i.e., selection of antisocial goals) in the moderated mediation model. The moderated mediation findings highlighted that the selection of antisocial goals (SIP step 3) mediated the association between attribution of hostile intent (SIP step 2) and generation of aggressive responses (SIP step 4) among participants with medium and high levels of bullying. Thus, the link between hostile intent and generation of aggressive responses can be better understood when taking into consideration children and adolescents' selection of antisocial goals. These findings corroborate the assumption that perpetrators of bullying enact a proactive and deliberate form of aggression, which is based on cold cognition, and leads to planning revenge and selecting aggressive responses (Crick & Dodge, 1996; Dodge & Coie, 1987). It is likely that children and adolescents who perpetrate bullying manipulate the social environment to their own advantage and strategically plan their own behaviour (Salmivalli & Nieminen, 2002). Retaliation may also help to restore a damaged mood when confronted with social exclusion cues (Chester & De Wall, 2016). Thus, looking at the three SIP steps together could give a better picture of social information processing of exclusion cues among children and adolescents showing bullying behaviour.

Associations between the SIP steps and moral disengagement (H3)

The selection of antisocial goals and the generation of aggressive responses steps positively correlated with moral disengagement. These findings corroborate the theoretical assumption regarding the intertwinement between moral disengagement and social information processing (Arsenio & Lemerise, 2004; Lemerise & Arsenio, 2000).

The selection of antisocial goals (SIP step 3) fully mediated the association between the attribution of hostile intent (SIP step 2) and the generation of aggressive responses (SIP step 4) among participants with low or medium levels of moral disengagement. Thus, only low and medium levels of moral disengagement facilitate the interpretation of ambiguous social exclusion cues as hostile, the selection of antisocial goals and the generation of aggressive responses. Surprisingly, these results were not yielded for participants with high levels of moral disengagement. However, participants who scored high on moral disengagement were inclined to select antisocial goals and to generate aggressive responses. These findings might suggest that selecting antisocial goals and responding with aggression is independent from the interpretation of the situation as hostile among participants with high moral disengagement. In line with the Socio-Cognitive Theory of Moral Agency (Bandura, 1999), children and adolescents with high levels of moral disengagement might become accustomed to behaving in immoral ways, i.e., moral disengagement could become crystallised (Obermann, 2013). The crystallisation of moral disengagement could make it easier to select antisocial goals and generate aggressive responses, even when social situations are not framed as hostile. Unlike children and early adolescents with high levels of moral disengagement, their peers showing low and medium levels of moral disengagement might need to frame the situation as hostile in order to justify the selection of antisocial goals and the generation of aggressive responses. Taken together, these findings suggest that different levels of moral disengagement could be associated with distinct social information processing patterns.

Associations between the SIP steps and guilt (H4)

The selection of antisocial goals and the generation of aggressive responses steps negatively correlated with guilt. Also, findings indicated an indirect effect of attribution of hostile intent on predicting the

generation of aggressive responses through selection of antisocial goals only for students with medium and low levels of guilt. Children and early adolescents who are prone to showing feelings of guilt tend to be prosocial (Menesini & Camodeca, 2008); they are also concerned about others and about keeping strong social bonds (Tangney, et al., 2007). This could make them inclined to attribute benign intentions and unlikely to select antisocial goals and generate aggressive responses (Laible et al., 2013). In addition, they could be aware that responding negatively to social exclusion cues might lead to further exclusion and, in turn, weaken social bonds. This explanation needs to find further validation in future research; however, it resonates with previous research findings showing that guilt restrains from immoral behaviour (e.g., aggression) and helps maintaining social relationships (Olthof, 2012). Finally, these results are coherent with Arsenio and Lemerise's (2004) argumentation of the relevance of emotions in social information processing.

Gender and age differences

Findings indicated no age differences. As pointed out above, participants were rather homogeneous in terms of age, which could explain why no significant findings were yielded for age. In terms of gender, girls were less willing to plan revenge and generate aggressive responses as compared to boys. While previous research has shown that social exclusion increases aggressive behaviour in both boys and girls (Gabbadini & Riva, 2018), the explanation for the gender differences yielded in this study can be found in cultural factors. Planning revenge and counteracting through physical aggression could be relatively more acceptable for boys as compared to girls, whereas girls may respond through relational forms of aggression (Björkqvist, 2018) when confronted with social exclusion cues.

Limitations and future directions

Some limitations in the present study should be acknowledged. First, only three steps, out of the six postulated in the SIP theory were assessed, and only two items (one per vignette) were administered to assess each SIP step, which may have affected the strength of our findings. In addition, the Cronbach's alpha of the items assessing hostile intent was low. This may be due to the fact that the vignettes could generate different levels of hostile attributions, as one of the vignettes depicts a more indirect form of exclusion (i.e., not being invited to a party), whereas the other vignette depicts a more direct form of social exclusion (i.e., not being allowed to join a game). The vignettes adopted in this study may not completely overlap with similar vignettes used in previous research, due to some distinctive elements, including the specific type of exclusion investigated in each scenario, the response options, the response scale, and the combination of two distinct scenarios into one.

A body of research has shown that the link between social behaviours, cognition, emotions, and social information processing might be bidirectional (Laible et al., 2013). Given the cross-sectional design of the study, these mediation findings should be interpreted cautiously, i.e., mediation consists of causal processes that unfold over time (Maxwell & Cole, 2007; Maxwell, Cole, & Mitchell, 2011), and is more informative when applied to longitudinal findings or in experimental designs. To overcome these limitations, longitudinal and experimental investigations are warranted. Longitudinal designs could also shed light on the stability and change of the variables assessed in this study, throughout socio-cognitive and moral development. Aside from vignette studies, more ecologically valid observational studies could also be conducted in the future to shed light on reasoning in naturally occurring social exclusion situations.

The present study has both methodological and theoretical strengths. The adoption of self-report questionnaires, vignettes, and peer nominations contributes to overcome the potential shared method variance issues that are related to using a single-measurement approach. The

integration of distinct theoretical models has revealed to be a useful approach to understand the associations between social information processing and different behavioural and moral moderators. This has implication also in relation to the developmental stage investigated in this study. Based on the present findings, children and early adolescents are able to coordinate the socio-cognitive domain (SIP) with the moral domains (feelings of guilt and moral disengagement) when processing social exclusion cues. The ability to coordinate these domains could be a reflex of sophisticated cognitive processes allowing early adolescents to consider simultaneously others' intentions and the (im)moral implications of their own (planned) behavioural responses to social exclusion (Smetana, Jambon, & Ball, 2014). Previous social experiences with peers (bullying) also contribute to the processing of social exclusion cues, indicating that behavioural factors also intervene in the processing of social information.

Practical implications

Findings of this study have implications in relation to children and adolescents' behavioural, socio-moral, and emotional functioning. Social information processing problems can be related to social difficulties with peers (e.g., bullying) and to later school achievement issues, which may negatively impact children's psychological wellbeing (Konold, Jamison, Stanton-Chapman, & Rimm-Kaufman, 2010). Thus, anti-bullying intervention programs should include a social information processing component aimed to encourage benign or neutral attributions in front of ambiguous social situations, while fostering the selection of social goals alternative to revenge (e.g., social problem-solving). Such an approach might be particularly valuable for children and adolescents who are prone to bully others as their hostile attributions encourage the selection of antisocial goals. Learning strategies alternative to aggression (i.e., assertiveness) and reflecting upon the consequences of aggressive responses could help all children and adolescents to avoid further experiences of exclusion.

Children who tend to morally disengage could benefit from a socio-moral training aimed at tackling the justification of immoral actions. Scenarios, role-play activities, and group discussions can help children who tend to morally disengage to reflect upon the consequences of their (planned) behaviours from a moral standpoint (e.g., fairness; justice; other children's welfare), (Wang & Goldberg, 2016). Such activities could also be effective in terms of anticipating feelings of guilt for causing a potential harm to other children, and, as a result, could prevent aggressive behaviour. Given the intertwining of social information processing, aspects of morality, and social behaviours, it is hoped that future intervention programs will translate a holistic theoretical approach into practical interventions. A combined focus on social information processing, morality components, and social conduct might be promising in fostering positive and prosocial behaviours and in preventing aggressive responses.

Declaration of Competing Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Appendix A. Supplementary data

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