

One Takes on the Color of One's Company: The Effect of Peer Donation Decision Information on Adolescent Prosocial Behavior and the Role of Belief in a Just World (Postprint)

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Abstract

Adolescents' social behavior is susceptible to peer influence; however, previous research has predominantly focused on its negative effects, with limited investigation into the impact of peers on adolescent prosocial behavior. This study recruited 77 adolescent participants aged 12-15 years ($M_{age} = 14.06 \pm 0.74$ years, 32 females) and employed a combination of adaptive behavioral experimental paradigm and conflicting information source paradigm to examine the effects of information providers (peer vs. adult) and the nature of social information (altruistic, selfish, conflicting) on adolescents' donation behavior (involving actual costs), as well as the moderating role of belief in a just world trait. The findings revealed that, compared to the influence of selfish information, adolescents were more susceptible to altruistic information, resulting in increased donation amounts. Notably, even when simultaneously presented with conflicting information, adolescents continued to be influenced by altruistic cues. Adolescents were more readily influenced by peer models than by adult models. Belief in a just world moderated the prosocial influence on adolescents. The results confirm that adolescents are more susceptible to positive peer influence, and peer moral models are beneficial for adolescent prosocial behavior.

Full Text

Abstract

Social influence refers to the process by which the thoughts, feelings, and behaviors of individuals are directly or indirectly influenced by others. Adolescents' social behavior is easily influenced by peers. However, most previous studies on peer effects have focused on the negative aspects of peer influence, such as peer influence on adolescent aggressive behavior, antisocial behavior, and risk-taking

behavior, whereas the positive effects of peers have received relatively less attention. Existing work has not reached consensus on whether adolescents' prosocial behavior is more likely to be influenced by altruistic peers or egoistic peers, and the underlying mechanism is also unclear. The present study focuses on the positive effects of peers. Furthermore, the impact of different information providers is also an issue examined in this study. Given that children in Chinese culture are more subordinate to authority, Chinese adolescents may be more influenced by adults than peers. The belief in a just world may also play a moderating role in the peer influence, which would be explored in this study.

The present study used the adaptive behavioral experimental paradigm and the conflicting source paradigm in developmental research on selective trust to investigate the effects of social information (prosocial, selfish, conflict) provided by peers or adults on adolescents' donation behavior at real cost, and the role of the belief in a just world in it. The sample included 77 adolescents aged 12-15 years ($M_{age} = 14.06 \pm 0.74$ years, 32 girls). The specific setting of the adaptive paradigm was as follows: under the condition of prosocial influence, the decision of the peer observed by the participants is always more altruistic than their initial decision; similarly, under the condition of selfish influence, the decision of the peer was more selfish than their initial decision. In other words, the amount of donation that participants observed was determined by their initial donation.

The results showed that the secondary donation after viewing the peer's decision was more altruistic than the initial donation in both the prosocial and the conflict conditions, while the difference between the two rounds of donation was not significant in the selfish condition, which indicates that the prosocial behavior of adolescents was more susceptible to prosocial influence. In addition, compared with the conflict condition and the selfish condition, the second donation of the participants in the prosocial information condition changed the most, which again confirmed the reliability and stability of the results. Moreover, adolescents were more likely to be influenced by information provided by peers than that provided by adults: adolescents changed their donation amount more in the peer influence condition than in the adult influence condition. We further focused on the performance of participants in the conflict condition: when adolescents observed both prosocial information and selfish information, their secondary donations were more likely to change in the direction of altruism, and this transition was more likely to occur in the peer influence condition, which indicates that adolescents are more likely to be influenced by peer role models than by adult role models. The belief in a just world moderated the prosocial influence of adolescents: individuals with high belief in the just world were more likely to be affected by positive social influence.

The results indicate that adolescents are more likely to be positively influenced by peers. This study expands the theory of social learning theory, reveals the benefit of peer moral models on adolescents' prosocial behavior, and provides reference for improving the educational practice of adolescents' prosocial behavior.

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Keywords: adolescents, prosocial behavior, social information, the conflicting source paradigm, peer influence.

1.1 The Influence of Peers on Adolescents' Prosocial Behavior

The world is complex and uncertain, and individuals have limited resources (time and cognition) to explore it. Therefore, in most cases, relying solely on one's own knowledge and experience is insufficient, and one can utilize the knowledge of others. Social learning theory assumes that individuals learn behaviors, attitudes, and social norms by observing and imitating others (Bandura, 1965), and this ability emerges in infancy (Wood et al., 2013). Social learning can enhance people's confidence in making decisions in complex and uncertain environments (FeldmanHall & Shenhav, 2019). Peers are often regarded as people who are in the same social status, or at least have similar behavioral complexity in the present moment (Lewis & Rosenblum, 1975). Peers are important social learning objects, i.e., role models, and their influence on adolescent development is particularly important (Knoll et al., 2015). A large number of previous studies have found the influence of peers on adolescents' negative behaviors (e.g., Jung et al., 2019; Ragan, 2020), but only recently have researchers begun to explore the influence of peers on adolescents' prosocial behavior. van Hoorn, van Dijk, Güroğlu, and Crone (2016) found that the prosocial behavior of 12-16-year-old adolescents increased with the presence of peers, especially when participants received evaluative feedback from peers. Subsequently, researchers (van Hoorn, van Dijk, Meuwese, et al., 2016) further manipulated the conditions of peer evaluative feedback and found that adolescents' prosocial behavior increased after receiving prosocial feedback from peers, while their prosocial behavior decreased after receiving antisocial feedback from peers.

Foulkes et al. (2018) first asked 755 participants aged 8-59 to assess their likelihood of engaging in prosocial behavior. Afterward, participants were told the average ratings of others (peers and adults) on the same question, and then they were asked to rate their likelihood of engaging in the same behavior again. The results showed that both children aged 8-11 and adolescents aged 12-18 significantly changed their ratings, especially when the difference between their initial ratings and the observed ratings was large, they were more likely to change their ratings. The information about others presented in Foulkes et al. (2018) was actually a randomly generated number, which could be more altruistic or more egoistic than the participants' initial ratings, but they did not examine the influence of the nature of the information. Subsequent studies manipulated the social properties of the information by presenting altruistic or egoistic information to examine the social influence on adolescents. For example, Ahmed et al. (2020) used a two-stage decision-making paradigm (first stage for initial decision, second stage for secondary decision after observing others' decision results) and found that when the average rating of peers was more prosocial (e.g., donating

more) and less antisocial (e.g., not teasing classmates) than participants' own initial ratings, early adolescents were more likely to be socially influenced and change their initial decisions, indicating that adolescents around 11-15 years old were more likely to be positively influenced. Chierchia et al. (2020) used a charitable donation task and a similar procedure to examine the influence of social influence on prosocial behavior (at real cost) in three groups (early adolescents aged 11-14, middle adolescents aged 15-18, and adults aged 23-35), and found no significant difference in behavior change between adolescents under altruistic influence and egoistic influence.

Previous studies have found contradictory results regarding whether adolescents' prosocial behavior is more likely to be influenced by altruistic or egoistic information, which may be due to inconsistent manipulation of the nature of others' information (more altruistic vs. more egoistic). For example, in the studies of Foulkes et al. (2018) and Ahmed et al. (2020), the peer decision results observed by participants were actually randomly generated numbers. Although Ahmed et al. (2020) attempted to examine the influence of information nature, they did not strictly manipulate it, and it was uncertain whether the information observed by participants was more altruistic or more egoistic than their initial decisions. Therefore, this study borrowed from Chierchia et al. (2020) and used an adaptive method to strictly manipulate the nature of the information: under the altruistic influence condition, the other people's decision information observed by participants was always more altruistic than their initial decision; similarly, under the egoistic influence condition, the other people's information was more selfish than their initial decision. That is, the amount of donation that participants observed from others was determined by their initial donation amount, thus it was adaptive. Such manipulation helps to more clearly explore whether different observed information nature has different effects on participants' decisions. In addition, previous experimental manipulations examining the influence of peers on adolescents' decision-making or behavior generally focused on whether peers were present or presented a group (on a certain issue) evaluation result to participants. Toelch and Dolan (2015) pointed out that such experimental operations often examine the influence of social norms. Individuals show a sense of belonging and reduce social tension by complying with established group norms or general social expectations (Deutsch & Gerard, 1955). However, in most studies on advice-taking or social information influence, participants generally make their initial and final decisions privately, at which time they may be less influenced by social norms and more based on the information itself to make final decisions. Social information refers to individuals using social cues to obtain information about current adaptive behavior (Deutsch & Gerard, 1955), and its influence on adolescents' prosocial behavior has been less explored (Reiter et al., 2021). Ruggeri et al. (2018) attempted to explore this area: they first presented advice from a peer or an adult to participants, and then asked them to make sharing decisions. The results found that adult advice had no significant effect on adolescents' sharing decisions; however, compared with peers' less fair advice, when peers' advice was fairer, 12-year-old

adolescents in both Italy and Singapore were more generous, showing selective social learning.

Most of the above studies used a single information source paradigm (e.g., Foulkes et al., 2018; Knoll et al., 2015). In each experimental trial, the other people's decision information observed by participants was either altruistic or egoistic. For example, in the study of Chierchia et al. (2020), adolescents in both the altruistic influence condition and the egoistic influence condition changed their behavior, and there was no significant difference in information nature, making it impossible to determine whether adolescents were just showing indifferent compliance or conformity to social information or were truly influenced. In fact, children and adolescents are exposed to rich and diverse information, and selectively learning from different information sources is the key to effective learning for individuals (Hermansen et al., 2021). Considering the diversity of information in the real world, when examining the influence of social information on adolescents' prosocial behavior, we should not only consider a single information source, but should further provide adolescents with two conflicting information sources to examine their decision-making reactions (Hermansen et al., 2021), ultimately revealing what kind of information they are influenced by and how they are influenced. Therefore, this study borrowed from the research paradigm of selective trust in children, namely the conflicting sources paradigm (Koenig & Harris, 2005). Specifically, this study used an adaptive behavioral experimental method to set up conflicting information source conditions: in each trial, two pieces of information were presented to participants simultaneously—one piece of information was more altruistic than the participant's initial decision, and the other piece of information was more egoistic than the participant's initial decision—to explore the social influence on adolescents' prosocial behavior. Ahmed et al. (2020) suggested that adolescents are more likely to be influenced by altruistic information, which may be because adolescents usually use positive impression management to "adapt" to the school environment. Combined with the prosocial behavior of being kind to others and caring for others emphasized in our education system and the basic principles following the Confucian tradition (Chen, 2010), this study used an adaptive method to manipulate the direction of information nature into conflicting information source conditions, as well as non-conflicting information source conditions of all altruistic and all egoistic, and proposed Hypothesis 1: Adolescents are more likely to be influenced by altruistic information.

1.2 The Specificity of Peer Influence

For adolescents, social interaction with peers is a very important part of their socialization process (Lam et al., 2014). Research shows that preschool children are more inclined to learn from authority (reliable, knowledgeable, or high-status adults) rather than peers (Mills et al., 2011), while adolescents may be more likely to be influenced by peers rather than adults (Ruggeri et al., 2018). Most previous studies on risk-taking behavior have found the specificity of peer influ-

ence on adolescents (Knoll et al., 2015), that is, adolescents are more inclined to make corresponding changes based on peers' decisions or advice rather than adults' advice. In the prosocial domain, Ruggeri et al. (2018) found that 12-year-old children were more likely to be influenced by peers than adults, and considering the influence of cultural environment, Singaporean adolescents were more likely to be influenced by peers than Italian adolescents. The peer influence on adolescents may have certain cultural differences, and individuals in societies with high collectivism and conservatism and low autonomy show higher levels of conformity (Bond & Smith, 1996). Researchers believe that little is known about cultural and ethnic differences in peer influence (Chen et al., 2018; Laursen & Veenstra, 2023), and almost all studies on peer influence come from North American or European samples, making research in non-Western countries urgently needed (Laursen & Veenstra, 2023). Not all cultures emphasize the importance of peer relationships to the same extent, and peer influence may vary across cultures. Compared with collectivist cultures, in individualistic cultures, peers have a more significant impact on children's self-worth (Chen & French, 2008). One of the main reasons North American children and adolescents maintain friendships is that peer praise makes them feel good about themselves. In group- or collective-oriented societies, such as China (Chen et al., 2004) and Indonesia (French et al., 2005), the instrumental help provided by peers (e.g., in social adaptive behavior, academics, etc.) is more important to children and adolescents. Therefore, exploring whether the influence of peers on adolescents' prosocial behavior in Chinese adolescents has cultural specificity or cross-cultural consistency is theoretically meaningful. In addition, Chinese culture has high demands for children's obedience. In East Asian cultures such as China, children usually learn how to comply with parents' or authorities' requirements and understand social standards for their behavior at a very young age (Chen et al., 2018). Considering that children in Chinese culture are more subordinate to authority (Chen et al., 2000), we propose Hypothesis 2: Adolescents are more likely to be influenced by adults than by peers.

1.3 The Role of Belief in a Just World

Not everyone benefits from peer influence, and there are individual differences in the positive effects of peer influence (Laursen & Veenstra, 2023). Socioecological theory posits that individual behavior is jointly influenced by personal and environmental factors (Bronfenbrenner, 1979). Hackel et al. (2020) also point out that individual traits and social situations jointly shape people's cooperative or selfish behavior. Differential susceptibility theory (Belsky & Pluess, 2009) assumes that some individuals have higher sensitivity to their environment, which leads to more adaptive outcomes in positive environments and more maladaptive outcomes in negative environments. Belief in a just world (BJW) is regarded as a stable personality trait, with its core being the individual's belief that people get what they deserve and deserve what they get (Lerner & Miller, 1978). As an implicit justice motivation, BJW has positive effects on individual physical and mental development, such as maintaining individual mental health

(Nudelman, 2013), increasing prosocial behavior (Ji et al., 2014), and helping individuals adapt to complex social environments. Strong BJW makes individuals firmly believe that even if current efforts do not immediately pay off, they will be rewarded in the future, thus making them more likely to exhibit prosocial behavior by helping others. In other words, people with strong belief in a just world are more likely to engage in prosocial behavior (L. Li et al., 2022). Researchers have found that belief in a just world can moderate the relationship between social cognition and prosocial behavior. L. Li et al. (2022) found that individuals' belief in a just world (BJW) moderated the relationship between social self-efficacy and prosocial behavior, that is, when individuals have strong BJW, the positive association between social self-efficacy and prosocial behavior is stronger. Individuals with stronger belief in a just world are more inclined to solve problems with positive thoughts and attitudes, and their prosocial behavior is also greater than others (Kaliuzhna, 2020). In peer interactions, peer relationships have an important impact on the development of adolescents' belief in a just world. Healthy peer relationships lead to a series of positive outcomes, while unhealthy peer relationships produce opposite effects. For example, BJW is negatively correlated with peer victimization (school bullying) during adolescence (Correia & Dalbert, 2008). Yang and Chen (2022) found that individuals with high BJW overestimate others' prosocial behavior to some extent and are thus more likely to be influenced by prosocial influence and behave more altruistically. BJW is associated with benevolent motivations or values and the desire to know more about others and make them feel better (Bartholomaeus & Strelan, 2019). If someone asks for help, individuals with high BJW are more willing to exhibit prosocial behavior when they have confidence and ability to help (Patrick et al., 2018). The behavior of others' generous donation is consistent with the benevolent concept held by individuals with high BJW, and they may be more easily influenced when observing others' generous donations. Therefore, this paper proposes Hypothesis 3: Belief in a just world moderates the degree of social influence individuals receive, and individuals with high BJW are more likely to be influenced when observing others' generous donations and thus increase subsequent donations.

In summary, the purpose of this study is to examine the influence of the nature of social information provided by peers or adults on adolescents' charitable donations, as well as the moderating role of belief in a just world. The study recruited 77 adolescent participants aged 12-15 and used an adaptive behavioral experimental method to test the following hypotheses: adolescents are more likely to be influenced by altruistic information; adolescents are more likely to be influenced by adults than by peers; belief in a just world moderates the degree of social influence individuals receive.

2.2 Experimental Materials

This study used a within-subjects design of 3 (nature of dual information sources: all altruistic, all egoistic, conflicting; the three conditions are shown in

Figure 1 [Figure 1: see original paper]) $\times 2$ (information source: peer, adult). The dependent variable was measured using a charitable donation task. The individual trait variable was measured using the Belief in a Just World Scale.

Charitable Donation Task (Chierchia et al., 2020): In this task, each participant read 18 different scenarios (in random order). In each charitable donation scenario, participants were first presented with a picture and a brief text description of the charitable project, then allocated 100 tokens, and asked to make a decision: how many tokens to donate to a certain charitable project. Tokens had real monetary value. After the task, the more tokens participants accumulated, the more real monetary reward they received. That is, any tokens not donated to the charitable project would be converted into real money and paid to them.

Belief in a Just World Scale: The scale developed by Dalbert (1999) and revised by Su et al. (2012) was used. The scale has two dimensions. This study selected the general belief in a just world dimension for measurement, which has 6 items (Cronbach's $\alpha = 0.86$ in this study), such as "I think this world is basically just." The questionnaire used a 6-point Likert scale, with 1 representing "strongly disagree" with the statement and 6 representing "strongly agree." Higher scores indicated stronger belief in a just world.

2.3 Experimental Procedure

To enhance the ecological validity of the peer influence manipulation, we tested all participants in a centralized time period. The task consisted of two parts. Participants first completed the experimental task and then completed the questionnaire task. The total duration of the task was about 30 minutes.

The experimental task in this study was conducted in two stages. The first stage was the initial donation, where participants first made an initial individual decision alone. After the first stage, participants were told that the program would randomly select two peers of the same gender who were participating in the test or two adults who were participating in the experiment, and that they would see their decision results in the next stage. In the second stage, participants first observed how much two peers or adults donated to the same charitable institution, and then were asked to donate again. To further control the gap between others' decision information and individuals' initial decisions, we set up the adaptive method with reference to Chierchia et al. (2020). In each round, 100 tokens were allocated to participants. The participant's initial decision was FD (first decision; range [0, 100]), and others' decision was OD (other's decision). The difference Δ between OD and FD had a maximum range of no more than 30, because we found in previous experiments that the average initial donation of adolescents was 63.12 (SD = 33.00). In addition, Foulkes et al. (2018) found that when the difference between participants' initial ratings and observed ratings was large, they were more likely to change their decisions. Therefore, to further control the difference between altruistic and egoistic conditions for OD, we set the range of Δ as [0, 30]. Under the altruistic

condition, $OD = FD + \Delta$. If $FD < 70$, Δ took values within $[10, 30]$; if $70 \leq FD < 90$, Δ took values within $[10, 100 - FD]$; if $90 \leq FD < 100$, Δ took values within $[1, 100 - FD]$; if $FD = 100$, then OD was 100. The egoistic condition followed the same logic: $OD = FD - \Delta$. If $FD < 10$, then OD was 0; if $10 < FD \leq 30$, Δ took values within $[10, FD]$; if $30 < FD \leq 100$, Δ took values within $[10, 30]$. We presented peer influence and adult influence in two separate blocks and balanced the presentation order. There were 18 trials in both the first stage and the second stage, with 3 trials presented under each condition.

The experiment was programmed using jsPsych 7.0 (<https://www.jspsych.org/7.0/>; de Leeuw, 2015) and run on the Cognition website (<https://www.cognition.run/>).

3.1 Charitable Donation Task

3.1.1 Differences Between Secondary and Initial Decisions Under Different Conditions

We analyzed the social influence on individuals' prosocial decisions (descriptive statistical results are shown in Table 1).

A linear mixed model (LMM) was conducted with social information nature (within-subjects: all altruistic, all egoistic, conflicting), information source (within-subjects: peer, adult), and decision round (within-subjects: initial decision, secondary decision) as independent variables. In this LMM and subsequent models, two factors were included as random effects: participant ID and donation scenario, to control for individual differences and differences in sensitivity to social influence caused by specific scenarios. The LMM results showed that the main effect of decision round was significant, $F(1, 2672) = 25.69$, $p < 0.001$; the main effect of social information nature was not significant, $F(2, 12) = 3.44$, $p = 0.066$; the interaction effect between social information nature and decision round was significant, $F(2, 2672) = 11.99$, $p < 0.001$. Other effects were not significant. The effect size of fixed effects was $R^2 = 0.56$. Simple effect tests of the two-way interaction showed that under the all altruistic condition, the donation amount in the secondary decision was significantly higher than that in the initial decision ($M_{\text{secondary}} - M_{\text{initial}} = 9.27$, $p < 0.001$); under the conflicting condition, the secondary decision was also more altruistic than the initial decision ($M_{\text{secondary}} - M_{\text{initial}} = 4.34$, $p = 0.003$); while under the all egoistic condition, the difference between decision rounds was not significant ($p = 0.573$).

3.1.2 Influence Proportion and Influence Degree Under Different Conditions

We analyzed the influence proportion under different conditions. With reference to the coding method of Chierchia et al. (2020), the dependent variable was coded as follows: participants' secondary decision was coded as 1 if it changed in the direction of social information, otherwise it was coded as 0.

Social information nature (within-subjects: all altruistic, all egoistic, conflicting) and information source (within-subjects: peer, adult) were included as independent variables, and participant ID and donation scenario were included as random factors. The generalized linear mixed model (GLMM) results showed that the main effect of social information nature was significant, $\chi^2(2) = 8.41$, $p = 0.015$. Post-hoc comparisons showed that adolescents were more likely to be influenced by the all altruistic condition than by the all egoistic condition ($M_{\text{all}} \text{ altruistic} - M_{\text{all}} \text{ egoistic} = 0.42$, $p = 0.014$, see Figure 2 [Figure 2: see original paper]). The main effect of information source was not significant, $\chi^2(1) = 3.21$, $p = 0.073$. The interaction effect was not significant, $\chi^2(2) = 1.52$, $p = 0.468$. The effect size of fixed effects was $R^2 = 0.01$.

How large was the change amplitude when participants' secondary decisions changed? To address this, we next analyzed the influence degree under different conditions. First, we extracted the trials in which participants changed in the direction of information nature; second, we calculated the difference between secondary and initial decisions; finally, we included the difference as the dependent variable in the analysis. Social information nature (within-subjects: all altruistic, all egoistic, conflicting) and information source (within-subjects: peer, adult) were included as independent variables, and participant ID and donation scenario were included as random factors. The linear mixed model (LMM) results showed (see Figure 3 [Figure 3: see original paper]) that the main effect of social information nature was significant, $F(2, 522) = 30.88$, $p < 0.001$. Post-hoc tests found that the change was largest under the all altruistic condition and smallest under the conflicting condition ($M_{\text{all}} \text{ altruistic} - M_{\text{conflicting}} = 12.78$, $p < 0.001$; $M_{\text{all}} \text{ egoistic} - M_{\text{conflicting}} = 10.72$, $p < 0.001$). The main effect of information source was significant, $F(1, 507) = 3.92$, $p = 0.048$, with adolescents changing more under peer influence than under adult influence. The interaction effect was not significant, $F(2, 506) = 1.44$, $p = 0.238$. The total effect size of fixed effects was $R^2 = 0.33$.

3.1.3 Decision Result Changes Under Conflicting Conditions

We used non-parametric tests to analyze participants' decision changes under different information source conditions. Here, we focused on whether the trials in which changes occurred shifted in the altruistic direction or the egoistic direction. Under the peer influence condition, 33.33% of participants shifted in the altruistic direction (accounting for 76.24% of the trials in which changes occurred), while 10.39% shifted in the egoistic direction, and the difference was significant, $\chi^2(1) = 27.81$, $p < 0.001$. Under the adult influence condition, 26.84% of participants shifted in the altruistic direction (accounting for 64.58% of the trials in which changes occurred), while 14.72% shifted in the egoistic direction, and the difference was also significant, $\chi^2(1) = 8.17$, $p = 0.004$. From the descriptive statistical results, adolescents were more likely to be positively influenced by peers and less likely to be negatively influenced by peers. We further conducted a related-samples McNemar test on information source and

behavior change. The results showed that adolescents' behavior patterns were indeed significantly different under peer and adult role model influences, $F(1) = 15.92$, $p < 0.001$ (see Figure 4 [Figure 4: see original paper]).

3.2 The Role of Belief in a Just World

We first analyzed the correlation between belief in a just world and initial donation. The results showed that belief in a just world was significantly positively correlated with prosocial behavior ($r = 0.08$, $p = 0.002$).

Although adolescents changed their donation amount more significantly under peer influence than under adult influence, considering that adolescents' behavior patterns under peer and adult influence were similar (both were more likely to be influenced by altruistic information than by egoistic information), this part did not distinguish between information sources. This part used hierarchical regression to analyze the moderating role of belief in a just world in the social influence on adolescents. First, social information nature (all altruistic, all egoistic, and conflicting conditions) was converted into two dummy variables (Dummy D1: all altruistic = 1, all egoistic = 0, conflicting condition = 0; Dummy D2: all altruistic = 0, conflicting condition = 1, all egoistic = 0). Second, belief in a just world scores were centered. With secondary decision result as the dependent variable, initial decision was entered as the first layer of control variables; then the two dummy variables of social information nature and centered belief in a just world were entered as the second layer; finally, the product terms of the two dummy variables and belief in a just world were entered as the third layer variables.

The analysis results showed that dummy variable D1 (altruistic) significantly predicted secondary decision result ($B = 10.68$, $t = 8.90$, $p < 0.001$, 95% CI = [8.33, 13.04]), and dummy variable D2 (conflicting condition) also significantly predicted secondary decision result ($B = 5.06$, $t = 4.22$, $p < 0.001$, 95% CI = [2.70, 7.41]), indicating that there were significant differences between the altruistic condition, the conflicting condition, and the egoistic condition. The interaction term between altruistic and belief in a just world significantly predicted secondary decision result ($B = 3.55$, $t = 3.15$, $p = 0.002$, 95% CI = [1.34, 5.76]), indicating that belief in a just world had a moderating effect between altruistic and secondary decision result. The interaction term between conflicting condition and belief in a just world also significantly predicted secondary decision result ($B = 2.84$, $t = 2.52$, $p = 0.012$, 95% CI = [0.63, 5.05]).

We used the PROCESS plugin in SPSS for simple slope analysis. When D1 was the independent variable, D2 and the interaction term between D2 and the moderating variable were included as covariates (Fang et al., 2022). Simple slope analysis for D1 found that for individuals with low belief in a just world, information nature significantly predicted secondary decision ($B = 6.90$, $t = 4.07$, $p < 0.001$, LLCI = 3.57, ULCI = 10.23); for individuals with high belief in a just world, information nature had stronger predictive power for secondary

decision ($B = 14.47$, $t = 8.52$, $p < 0.001$, $LLCI = 11.14$, $ULCI = 17.79$), that is, the predictive effect of the altruistic condition on secondary donation result was stronger in individuals with high belief in a just world (as shown in Figure 5a [Figure 5: see original paper]). Simple slope analysis for D2 found that for individuals with low belief in a just world, information nature could not significantly predict secondary decision ($B = 2.04$, $t = 1.20$, $p = 0.230$, $LLCI = -1.29$, $ULCI = 5.37$); for individuals with high belief in a just world, information nature significantly predicted secondary decision ($B = 8.08$, $t = 4.76$, $p < 0.001$, $LLCI = 4.75$, $ULCI = 11.40$), that is, the conflicting condition had significant predictive power for secondary donation result in individuals with high belief in a just world (as shown in Figure 5b [Figure 5: see original paper]).

4.1 Peer Influence on Adolescents' Prosocial Behavior

This study used an adaptive behavioral experimental method to examine the influence of different information providers (peer vs. adult) and social information nature (all altruistic, all egoistic, conflicting) on adolescents' prosocial behavior, as well as the moderating role of belief in a just world. The study found that under the all altruistic and conflicting conditions, the secondary decision was more altruistic than the initial decision, while under the all egoistic condition, the difference between the two donation amounts was not significant, indicating that adolescents' prosocial behavior is more likely to be influenced by altruistic influence, verifying Hypothesis 1. In addition, the change in participants' secondary donation amount was largest under the all altruistic condition, which again confirmed the reliability and stability of the results. This result is similar to the findings of Ruggeri et al. (2018) and Ahmed et al. (2020). Contrary to Hypothesis 2, we found that compared with information provided by adults, adolescents were more likely to be influenced by information provided by peers: adolescents changed their donation amount more in the peer influence condition than in the adult influence condition. We focused on analyzing participants' performance under the conflicting information source condition: when adolescents observed both altruistic and egoistic information simultaneously, their secondary donations were more likely to change in the altruistic direction, and this change was more likely to occur in the peer influence condition.

The difference between this study and previous related studies, that is, the innovation of this study, is that it borrowed from the research paradigm of selective trust in children: in each trial, two information providers (peer or adult) were introduced to participants, one of whom (peer or adult) provided altruistic information (the information provider's donation was higher than the participant's initial donation), and the other peer (or adult) provided egoistic information (the information provider's donation was lower than the participant's initial donation), and we recorded whether the participant's secondary donation result was influenced by others. The study found that when adolescents observed both altruistic and egoistic information simultaneously, their secondary donations were more likely to change in the altruistic direction. This conflicting informa-

tion source paradigm can exclude the possibility that children's and adolescents' reactions in the laboratory environment may reflect compliance tendencies or blind following (Eisenberg & Mussen, 1989), but rather reflect that adolescents are truly influenced by the internalization of peer information or altruistic tendencies (Ahmed et al., 2020). At the same time, adolescents are also striving to adapt to the school environment by using positive impression management (Ahmed et al., 2020). The view of selective social learning or selective trust also points out that children do not passively accept all information provided by others, but selectively believe it (Koenig & Harris, 2005; Koenig & Sabbagh, 2013). Why do children and adolescents have selectivity for social information? On the one hand, developmental and evolutionary processes may endow them with a tendency to learn from trustworthy people in some way (Koenig & Sabbagh, 2013). For example, some evidence from neuroendocrinology shows that being in the presence of close people triggers a surge of oxytocin, which is related to prosocial behaviors such as trust (Donaldson & Young, 2008). On the other hand, children and adolescents can obtain information through direct or indirect experience (Koenig & Sabbagh, 2013). Adolescents prioritize following social information provided by peer role models, which indicates that in moral-related situations, they consider peers more competent and trustworthy than adults (Ruggeri et al., 2018).

Social learning theory points out that individuals learn behaviors, attitudes, and social norms by observing and imitating others (Bandura, 1965), and this ability emerges in infancy (Wood et al., 2013). Social learning theory was originally developed to describe criminal and deviant behavior, but its views can also be applied to the field of positive social learning (Telzer et al., 2018). The results of this study support and expand the view of social learning theory: observing others' decision results can influence adolescents' prosocial behavior. Moreover, adolescents show selectivity in this social learning process: compared with the influence of egoistic information, adolescents' prosocial behavior is more likely to be influenced by altruistic influence; compared with adult role models, adolescents are more likely to be influenced by peer role models. This may reflect that adolescents have internalized peer influence or altruistic tendencies, rather than blindly following and obeying social information (Ahmed et al., 2020).

This study also examined the difference between peer and adult influence on adolescents' prosocial behavior. The results found that compared with information provided by adults, adolescents were more likely to be influenced by information provided by peers: the magnitude of change in donation amount after observing peer behavior was greater than that under adult influence. We focused on analyzing participants' performance under the conflicting information source condition: when adolescents' secondary donations changed toward altruism rather than egoism, this transition was more likely to occur under peer influence conditions. This result is inconsistent with the findings of Foulkes et al. (2018) and Chierchia et al. (2020), but consistent with the performance of adolescents in Ruggeri et al. (2018). Ruggeri et al. (2018) found that 12-year-old children's initial decisions were more likely to be influenced by peers than by

adults, and the influence of peers on Singaporean adolescents was stronger than that on Italian adolescents. This may be because there are certain cultural differences in the field of prosocial influence. Chinese culture is a typical collectivist culture and is also deeply influenced by Confucianism (Chen, 2010). Prosocial behavior, such as being kind to others and caring for others, follows the basic principles of the Confucian tradition and is highly emphasized in the Chinese education system (Chen, 2010). The emphasis on collectivist values (such as interdependence and cooperation) is related to the development of children's prosocial behavior, and Chinese children show higher prosocial behavior norms (Y. Li et al., 2012). Rochat et al. (2009) surveyed children from seven different cultural backgrounds and found that children raised in collectivist cultures distributed more fairly. Moreover, compared with North American children, Chinese children showed more cooperative behavior in peer interactions (Orlick et al., 1990). Chinese adolescents in collectivist cultures are more likely to be influenced by peers to change their initial beliefs in a more altruistic direction, supporting the claims of group socialization theory (Harris, 1995): families have an important influence on children's initial socialization, but these influences gradually weaken later and are replaced by peer group influence.

4.2 The Moderating Role of Belief in a Just World

Not everyone benefits from peer influence, and there are individual differences in the positive effects of peer influence (Laursen & Veenstra, 2023). Differential susceptibility theory (Belsky & Pluess, 2009) suggests that some individuals have higher sensitivity to their environment, which leads to more adaptive outcomes in positive environments and more maladaptive outcomes in negative environments. This study found that belief in a just world (BJW) moderated the prosocial influence on adolescents aged 12-15. Compared with individuals with low belief in a just world, the predictive effect of altruistic information on secondary donation results was more significant in individuals with high belief in a just world, verifying Hypothesis 3. Individual behavior is influenced not only by situational factors but also by individual traits (Bronfenbrenner, 1979; Malti & Dys, 2018). Second, prosocial behavior has individual differences (Poulin et al., 2012). BJW is correlated with prosocial behavior (L. Li et al., 2022; Kalizhna, 2020), and the higher the BJW, the greater the tendency of individuals to engage in prosocial behavior. Strong BJW makes individuals firmly believe that even if current efforts do not immediately pay off, they will be rewarded in the future, thus exhibiting prosocial behavior (L. Li et al., 2022).

Research has found that individuals with stronger BJW are more willing to pay a certain price to punish violators and maintain justice (Strelan et al., 2017). The moderating role of BJW in social influence further indicates that when individuals have strong BJW, they are more likely to be influenced by altruistic influence and exhibit prosocial behavior. Adolescents with high BJW can effectively adjust their attitudes toward negative stimuli or unjust behavior, thus having less antisocial or aggressive behavior; adolescents with low BJW

have unfair cognitive patterns and are more likely to be influenced by negative stimuli or information (Zhang et al., 2022). BJW is associated with benevolent motivational values and the desire to know more about others and make them feel better (Bartholomaeus & Strelan, 2019). The perspective of the resource conservation model can explain the moderating role of BJW to some extent. The model points out that people strive to protect and build resources. What threatens individuals is the potential or actual loss of resources, and individuals with more psychological resources (high belief in justice) are less threatened by resource loss, more capable of acquiring resources, and thus form an upward spiral (Hobfoll et al., 2003; L. Li et al., 2022). That is, when it is necessary to sacrifice one's own interests to help others, BJW, as an additional resource, makes this loss more bearable. Hafer and Bègue (2005) believe that individuals' belief in a just world is a "sense of entitlement" based on a "personal contract," that is, individuals believe that their efforts will be rewarded, and others should also be rewarded for their efforts. Weaker belief in a just world may lead to lower identification with the belief that "good deeds are rewarded," so when observing others being more altruistic, they are less likely to be influenced (Yang & Chen, 2022).

4.3 Study Limitations

This study also has some limitations. First, we found that the magnitude of prosocial influence depends on the joint effect of information nature and information source. Previous studies have shown that peer intimacy also affects the social influence individuals receive (Mason et al., 2017). Future research can further explore what kind of peers have the greatest influence on adolescents' moral behavior by further distinguishing peers with different intimacy levels. Furthermore, direct cross-cultural research in this field, especially cross-cultural research between East and West, is still rare, so the role of culture needs to be explored in subsequent studies.

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