



Asymmetry between cost and benefit: The role of social value orientation, attention, and age

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ABSTRACT

Previous work showed that the willingness to help is impacted by the perception of the cost for the donor and the benefit for the recipient. Here we set up to extend this literature by investigating the role played by social value orientation (SVO), attention, and age (early adolescents vs. middle-late adolescents vs. young adults). Results showed that these three variables have a significant impact on the perception of the cost and the benefit of a donation. Exploratory analyses showed that perception of the cost is predicted by a three-way interaction between SVO, attention, and age (but the same three-way interaction does not predict the perception of the benefit). Finally, we found that the way the perceived cost and the perceived benefit impact the willingness to help is different for early adolescents compared to the other two groups. Early adolescents' decisions are less impacted by perceived cost (and more impacted by perceived benefit).

Introduction

Human altruism might be seen as a set of different positive social behaviors that support society and promote harmonious relations among members of any social group (Hay and Cook, 2007). It allows for the generation of acts like helping, sharing food and objects with others, or comforting a distressed individual. All these other-oriented behaviors might be defined as 'prosocial behavior', a more general term coined by Wispé (1972) as a counterpart to 'antisocial behavior', because they are aimed, at least in part, at benefiting another individual (Warneken and Tomasello, 2009a). Prosocial and helping behaviors more in general are an integral part of human life and they play an important role in successful social interactions and peer acceptance (Dekovic and Janssens, 1992; Eisenberg et al., 1996; Hampson, 1984; Raviv et al., 1980).

Here, we started from previous work showing that willingness to donate is influenced by people's perception of the cost of giving (e.g., the donation amount) and the benefit for the recipients (e.g., the number of people helped; see Rubaltelli et al., 2020). In addition and specifically, with the current study, we set up to extend these findings in several directions: (i) adding a measure of individual differences in social value orientation; (ii) investigating attentional patterns towards information pertaining to the cost and benefit dimensions; (iii) assessing how the

impact of cost and benefit changes in three different age groups (early adolescents, middle-late adolescents, and young adults).

Cost and benefit in prosocial behavior

Among many factors, the decision whether to help or not is influenced by the perceived balance between the resources a donor must invest and his/her perception of the beneficial effect of the helping intervention (e.g., Caserotti et al., 2019; Pittarello et al., 2020). Recent work showed that adults' willingness to help decreased as donation amounts and number of lives helped increased at the same rate (Rubaltelli et al., 2020). Although in this specific case, cost and benefit are referred to different people (the donor who donates his/her resources and the recipients who benefits from the donation), Rubaltelli and colleagues (2020) showed that this result is consistent with the asymmetry between losses and gains, postulated by prospect theory (i.e., a greater sensitivity to losses than gains; Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). In the domain of charitable giving, the cost for the donor falls in the loss domain, since it entails that the donor gives away part of his/her resources and experience a negative affect because of this loss (Genevsky et al., 2013; Rubaltelli and Agnoli, 2012). Conversely, the number of lives helped falls in the gain domain, since the

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donation helps improve the life conditions of individuals who had otherwise been likely to suffer or even to die. Rubaltelli et al. (2020) have found that the evaluation of the benefit of helping tends to be more scope-insensitive than the evaluation of cost. In other words, helping a particular cause can have high or low benefits for the recipients, but how many people can be helped seems to be less important to this type of judgment. Consistently, prospect theory implies that perceived cost for the donor should follow a steeper function than perceived benefit for the recipients. Therefore, we expect to replicate in our study the existing work and hypothesize that:

Hypothesis 1a: Willingness to help should be higher when cost is perceived as low (vs. high).

Hypothesis 1b: Willingness to help should be higher when benefit is perceived as high (vs. low).

Social value orientation

In addition to the way people perceive the details of a charitable appeal (i.e., cost and benefit), prosocial behavior is also shaped by individual differences in social value orientation (SVO; Van Lange et al., 2004; Van Lange et al., 2007). As stated by Li et al. (2013), humans vary systematically in the way they approach interdependent others. Accordingly, the literature identifies different profiles of social value orientation: individualist, competitor, cooperator, egalitarian, and altruist (Murphy et al., 2011; Van Lange, 2004; Van Lange et al., 2007). These profiles can be primarily clustered together in two macro-labels: 'proself' for individualists and competitors versus 'prosocial' for cooperators, egalitarians, and altruists (Li et al., 2013; Van Lange and Kuhlman, 1994). Thus, proself individuals tend to accept unfair distributions of resources that are tilted in their favor, whereas prosocial individuals tend to prefer fair distributions even when they could take advantage from unfair ones.

SVO has shown to predict different types of prosocial behavior, such as monetary donations, volunteering, and postmortem organ donations (Bakkers, 2006; Manesi et al., 2019; McClintock and Allison, 1989; Van Lange et al., 2007). Here, we set to establish a link between SVO and the perception of the cost and benefit of giving. Specifically, because of the link between SVO and prosocial behavior, we hypothesize that:

Hypothesis 2a: Prosocial individuals should perceive the cost of the donation as lower than proself individuals.

Hypothesis 2b: Prosocial individuals should perceive the benefit of the donation as higher than proself individuals.

Attention and prosocial behavior

An additional way to assess how the perception of the cost and benefit of the donation impacts people's decisions is to assess people's attentional patterns. This goal can be reached by measuring eye movements. Through measures of fixation duration and fixation count it is possible to achieve an objective and unobtrusive measure of process tracing in decision research (Fiedler et al., 2013; Franco-Watkins and Johnson, 2011; Orquin and Mueller Loose, 2013; Reisen et al., 2008). Measures such as fixation duration and fixation count permit a detailed investigation of process models in several decision-making fields (Fiedler and Glöckner, 2012). A vast array of research findings has indicated that individuals pay more attention to information deemed psychologically prominent, useful, and relevant (Bee et al., 2006; Glöckner et al., 2012; Glöckner and Herbold, 2011; Halevy and Chou, 2014). Finally, process tracing and information-processing have been linked to prosocial behavior (Rahal and Fiedler, 2022), thus it makes sense to measure them in relation to other variables such as the perceived cost for the donor and benefit for the recipients.

In the case of the present work, the asymmetry between the perceived cost and benefit could impact decisions by altering the tradeoff between these two dimensions. Therefore, we should expect that an overall higher number of fixations (on both the cost and the

benefit information) should be a cue that people are assessing whether it is worth to donate their resources (or they should keep them and support another cause where the benefit for the recipients is higher compared to the cost they are going to face). On the contrary, when the benefit clearly outweighs the cost, people may not need to attend to the information too long, thus leading to less fixations. These predictions are consistent with the view that people experience more positive affective reactions when the benefit outweighs the cost (Rubaltelli et al., 2020), possibly allowing them to follow their intuitions, pay less attention to the information at hand, and spend less time to decide. As a result, we expect that:

Hypothesis 3a: A high (vs. low) number of fixations on the cost and benefit information should lead to perceive a higher cost.

Hypothesis 3b: A low (vs. high) number of fixations on the cost and benefit information should lead to perceive a higher benefit.

Prosocial behavior from childhood to adolescence

Prosocial behavior comes in many forms, possibly supported by different psychological mechanisms that may emerge at different times, follow different developmental schedules, and be heterogeneous in terms of its social cognitive constituents and environmental influences (Dunfield and Kuhlmeier, 2013; Thompson and Newton, 2013; Warneken and Tomasello, 2006, 2009b). Most of the prosocial behaviors have been found to be present very early on in human ontogeny (e.g., Dunfield and Kuhlmeier, 2010; Eisenberg et al., 2006; Hay and Cook, 2007; Surian and Franchin, 2017; Warneken and Tomasello, 2009a). However, to our knowledge, only a few studies investigated the development of prosocial behaviors during childhood and adolescence. Benson et al. (2007) tested children aged 4, 6 and 9 years in the dictator game and found that most of them behave altruistically by donating at least one sticker to an anonymous classmate. In addition, with increasing age, children behave more and more altruistically. Similarly, Smith et al. (2013) studied two groups of children aged 3–6 and 7–8 years and found that the older ones were more likely to share equally.

However, research shows that during the years of middle childhood and early adolescence the motivation to act in a prosocial manner becomes more complex because of social desirability; children are aware of norms and care about the reputation this behavior creates. As children grow older, they become increasingly concerned with appearing fair to others (see Shaw et al., 2014) and they are more sensitive to ulterior motives when evaluating prosocial behavior (e.g., offering gifts to peers who needed help in either a public or private setting; Heyman et al., 2014). The present study investigates the differences in how early adolescents, middle-late adolescents and young adults perceive the cost and benefit of giving and how these differences translate into their willingness to help. The age groups that we decided to investigate are particularly interesting and were chosen because the first (early adolescents) precedes the critical period of adolescence, while the third (young adults) follows it. Therefore, we were well positioned to study how the target behavior is impacted during the particular changes that take place between early and middle-late adolescence as well as between middle-late adolescence and young adulthood. Adolescence is a critical period over rules: adolescents have strong independent desires and challenge the authority of adults (Steinberg and Morris, 2001). Yet, an open question concerns how adolescents' prosocial behavior compares to that of younger and older age groups. Despite the scant literature assessing the differences in prosocial behavior between early adolescence and adulthood, based on the level of prosocial behavior that characterizes younger children and the asymmetry between cost and benefit found in adults, we hypothesize that:

Hypothesis 4a: Early adolescents should perceive the cost of the donation as lower compared to the other two groups (middle-late adolescents and young adults).

Hypothesis 4b: Early adolescents should perceive the benefit of the donation as higher compared to the other two groups (middle-late adolescents and young adults).

Finally, previous work has shown that the interaction between the perceived cost and benefit of the donation is an important predictor of donation decisions (Caserotti et al., 2019; Pittarello et al., 2020; Rubaltelli et al., 2020). Here we added the age factor and hypothesized that it should moderate the way in which the cost and the benefit impact willingness to help. Consistent with the literature showing that prosocial behavior is more influenced by environmental factors as people grow up (Kogut et al., 2016), we hypothesized that early adolescents should be more influenced by the perceived benefit than the other, older groups. As a result, their decisions should be impacted more by perceived benefit than cost. Overall, these predictions mean that younger participants should have a general higher willingness to help than older ones when perceived cost is high and especially if perceived benefit is high as well. This prediction would partially support and, more importantly, expand on previous findings by Warneken and Tomasello (2009a). Therefore, we expected that:

Hypothesis 5: Willingness to help should be impacted by the interactive effect of the perceived cost and benefit and this effect should be further moderated by age group; specifically, early adolescents' willingness to help should be less influenced by perceived cost and more by benefit than the willingness to help of middle-late adolescents and young adults.

Interplay between social value orientation, attention, and age

Furthermore, it is an open question if individual differences in social value orientation or attention can explain the differences in the perception of the cost and benefit across the three age groups (and in turn the impact of these dimensions on the willingness to help). Developmental research has demonstrated age differences in cooperative, competitive, and individualistic social values. At the end of the primary school, children are in the 'good child' phase and obey social rules to obtain others' support and safeguard social order (Li et al., 2013). Knight et al. (1985) investigated the developmental difference in social values. The authors found that 6- to 10-year-old children expressed a social value involving equality more frequently than younger children. However, Li et al. (2013) found an increase of competition orientation and a decrease of altruistic orientation in 14-year-old children compared with 11-year-old children. Therefore, it is reasonable to expect that the impact of social value orientation may moderate the impact of age on the perception of the cost and the benefit of the donation.

Furthermore, previous work on social dilemmas showed that differences in social value orientation are related to changes in weights given to outcomes for the self and others (Fiedler et al., 2013). Interestingly, the same work measured eye movements and concluded that information-processing varies according to people's social value orientation (for further work on social value orientation and information-processing, see Mischkowski and Glöckner, 2016).

However, there is not enough the literature on prosocial behavior linking these three variables. As a result, it is hard to predict how the interplay between SVO, attention, and age can shape the perception of the cost and the benefit of helping. Still, as shown in the previous sections, all these variables have been linked to helping behaviors and we believe that it is important to investigate this point. Thus, we decided to explore if, in the perception of the cost and the benefit, a three way interaction is observed between SVO, attention patterns, and age.

Method

Participants

Three different age groups took part in the study, for an overall sample size of one hundred thirty-four participants, all recruited in the same geographical area. The three age groups were the following: (a) early adolescents ($n = 43$; 49 % girls; Mage = 11.79 years, SD = 0.40, ranging between 11 and 12 years) attending middle school (6th and 7th

grade); (b) middle-late adolescents ($n = 46$; 39 % girls; Mage = 17.80 years, SD = 0.40, ranging between 17 and 18 years) attending high school (12th grade); (c) young adults ($n = 45$; 82 % women¹; Mage = 22.89 years, SD = 2.77, ranging between 20 and 39 years) enrolled at the University of Trento (Italy). A total of three participants were excluded due to poor eye-tracking data (e.g., poor calibration and lack of accurate eye-tracking). Two of them were in the early adolescents' group, whereas the third was in the young adults group.

All participants had normal or corrected-to-normal vision and completed the study individually. Data were collected in dedicated quiet rooms located at the University for the university students and at two local schools for the early adolescents and middle-late adolescents, where data were collected during regular classroom hours. The experimental session took about 20 min. The research project was approved by the Ethical Committee of the University of Trento (Protocol Number: 2016-013), and all participants or their parents (for minors) gave informed consent.

Materials and procedure

Participants were told that they would participate in a computer task with an eye-tracker and a brief paper and pencil task. They were informed about the eye-tracking equipment and how it worked. Participants were told that they would see a set of different donations, expressed either in money or hours of volunteering. The experimenter explained to the participants that their help with both types of donations would go to support children with muscular dystrophy. The following brief description of this disease was presented to each participant: "Muscular dystrophy is a very serious genetic and degenerative neuromuscular disease that causes progressive atrophy of the skeletal musculature. Atrophy refers to the reduction of the muscle mass that results in partial or complete loss of the motor function". For the early adolescent and middle-late adolescent groups, this definition was also orally explained to be sure that they understood the scenario.

In addition to the monetary donation, we also included a second type of donation, that is volunteering time; considering the age of the youngest participants and the fact that they probably do not handle money as often or in the same amounts as adults, we considered volunteering time as a second variable that should support the effects found with the monetary donations. More in detail, the description of the cause presented to participants made clear that, in the donation condition, money would be used to help with the costs of the muscularly dystrophic patients' treatment. In the volunteering condition, the time would be spent helping to package the drugs that would be delivered to the patients.

Participants' eye-movements were measured with a Tobii T120 eye-tracker. It was integrated into a 17 inch monitor where the stimuli were presented via a computer running the Tobii Studio 3.0 software. Participants sat in a chair placed 60 cm away from the stimulus monitor. The room lights were lowered. In a within-subjects design, we presented all participants with two blocks of seven scenarios each asking for two different types of donations: contributions of time (volunteering) and money. For each type of donation, we repeated the same cover story outlined above. An eye-tracker 5-point calibration was performed before each block of trials.

Participants were instructed to consider each donation request separately and independently from each other. In each scenario, participants were presented with a possible donation and a corresponding number of children that could be helped (see Table 1 and Fig. 1). We counterbalanced the order of presentation of the two types of donations

¹ We acknowledge that gender is fairly equally distributed in the early adolescents and middle-late adolescents' groups, whereas the majority of the young adults are women; to ascertain the possible distorting effect of gender, we re-run all analyses controlling for gender and the results did not change.

Table 1
Donation amounts (hours or euros) and number of lives helped in the seven scenarios.

	Amount of the donation	Number of children helped	Donation decisions		
			Early adolescents	Middle-late adolescents	Young adults
Scenario 1	5	2 children	100.00 %	97.67 %	100.00 %
Scenario 2	15	6 children	90.54 %	97.67 %	97.73 %
Scenario 3	25	10 children	91.89 %	100.00 %	97.73 %
Scenario 4	50	20 children	89.19 %	97.67 %	89.77 %
Scenario 5	75	30 children	77.03 %	86.05 %	85.23 %
Scenario 6	150	60 children	70.27 %	80.23 %	75.00 %
Scenario 7	225	90 children	56.16 %	58.14 %	64.73 %

Note. Throughout all scenarios we kept the ratio of children helped constant with each amount of money, which was equal to two children for every five hours or euros. Here, scenarios are reported in order from the lowest donation to the highest one, but the order of presentation was randomized for each participant.

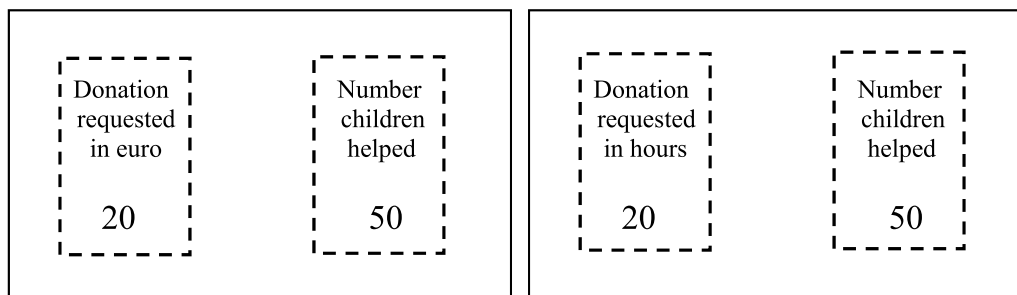


Fig. 1. Two examples of scenarios used in the study with a donation in Euro on the left and a donation of time on the right. The dashed square corresponds to the area of interest for each type of information.

(time and money) and the side in which the donation amounts and number of children helped appeared on the computer screen (either on the right or the left), presenting the seven scenarios for each type of donation in a pre-fixed quasi-random order. Two main areas of interest (AOI) that corresponded to the possible donation and to the number of children helped were selected. Each AOI measured 5.3 cm in width and 9.5 cm in height and they were non-overlapping (see Fig. 1). Using Tobii Studio software, participants' fixation count and duration were calculated for the selected AOI.

After each scenario participants were requested to answer three questions: the first question asked whether the participant was willing to donate an amount of money (or volunteer a number of hours) to help a corresponding number of children (for details about the specific amounts of money/time and numbers of children, see Table 1). This question was answered by agreeing (yes) or not (no) to helping. The other two questions measured the perceived cost for the donor and the perceived benefit for the recipients (i.e., "How much do you perceive your donation as a cost for you?"; "How much do you perceive your donation as beneficial for children?"); these questions were answered using 7-point scales ranging from 1 (*not at all*) to 7 (*very*). The materials were very similar to those previously used by Rubaltelli et al. (2020). Participants had to say their answers aloud to allow the experimenter to write down the responses.

After viewing all scenarios, participants were asked to complete the Social Value Orientation scale (SVO slider; Murphy et al., 2011), a paper-based choice task. The measure has six primary items. In each item participants were asked to allocate resources between the self and another person over a well-defined continuum of joint payoffs. Although

participants can be classified as prosocial and proself individuals based on their answers, here we used SVO as a continuous score, which indicates the increasing tendency to behave in a prosocial fashion (e.g., De Cremer and Van Lange, 2001; Declerck and Bogaert, 2008; McClintock and Allison, 1989; Van Lange and Liebrand, 1991). At the end of the experiment participants were debriefed and thanked.

Data analyses

In the analyses, we first checked correlations and descriptive statistics. Next, using the R software (R Development Core Team, 2015) and the "lme4" package (Bates et al., 2019), we ran a series of multilevel models controlling for the random effect of participants and scenario. Two linear multilevel models tested the role of SVO, fixation count, and age group in predicting participants' perception of the cost (first model) and the benefit (second model) of the donation. These models included the scenario and the type of donation (money or time) among the predictors. Finally, the model also included the three-way interaction between SVO, fixation count, and age group, and the two-way interaction between these three variables². These models tested hypotheses from 1a to 4b as well as to perform the exploratory analyses on the interactive role of SVO, fixation count, and age on the perception of the cost and the

benefit of the donation. Further, a logistic multilevel model was run to assess the role of perceived cost, perceived benefit, and age group in predicting participants' willingness to help. Again, we included in the model the scenario and the type of donation (money or time) variables. Finally, the model included the three-way interaction between perceived cost, perceived benefit, and age group, and the two-way interactions between these three variables³. This model tested hypothesis 5.

The R syntax of these models, as well as additional analyses, are reported in the Supplementary Materials. In all models, age group was included as a categorical variable with three levels. Thus, we created two contrasts: Contrast 1 compared early adolescents (-2) with middle-late adolescents (1) + young adults (1); Contrast 2 compared middle-late adolescents (-1) with young adults (1). Scenario was included in all models as a continuous variable. Finally, using the "lavaan" package (Rosell, 2021), we ran an exploratory analysis to assess a mediation model with SVO as the main predictor of the willingness to help and

² We also tested models including a four-way interaction between SVO, fixation count, age group, and type of donation (money or time) to assess whether results changed based on the request to give money or volunteer time. Results showed that, both for cost and benefit, the four-way interaction was not significant.

³ We also tested a model including a four-way interaction between perceived cost, perceived benefit, age group, and type of donation (money or time) to assess whether results changed based on the request to give money or volunteer time. Results showed that the four-way interaction was not significant.

perceived cost as the mediator, while age group and fixation count were added as moderators of the relationship between SVO and the perceived cost, and age group and the perceived benefit as moderators of the relationship between the perceived cost and the willingness to help.

Results

Descriptive statistics and correlations

Descriptive statistics aggregated across the seven scenarios are reported in Table 2. Willingness to help was quite similar across the three age groups, although early adolescents were a little less likely to give than the other groups. On average, early adolescents perceived both the cost and the benefit of the donation as higher than the other two groups. The three groups were also comparable in the number (and length) of fixations as well as in their SVO.

In Supplementary Materials, we report figures of perceived cost, perceived benefit, and willingness to help split by both age group and scenario; we also report analyses testing the differences among groups in fixation count and SVO and for the fixations on each specific AOI (cost vs. benefit).

In line with our reasoning, correlations showed that SVO was negatively correlated with cost for two of the three age groups, the only exception being the young adults (Table 3). SVO correlation with benefit was positive for the early and middle-late adolescent groups, but negative for the young adults. This indicates that increasing prosociality led to a lower perception of cost and higher perception of benefit for the two youngest groups, whereas it led to a lower perception of benefit for the young adults. SVO was also negatively correlated with fixations but only for the young adult group, indicating that increasing prosociality led to less fixations for older participants. Finally, fixations correlated positively with both cost and benefit. However, it is worth considering that most of these correlations were quite low and only significant because we aggregated data across scenarios.

Cost and benefit perceptions

Perception of cost. To explore the subjective ratings of cost and benefit we run two multilevel models controlling for the random effect of participant and scenario. A first model tested the effects of scenario, type of donation (money vs. time), SVO, fixation count (log transformed⁴), age group on the perceived cost of the donation. In addition, we included in the model the two-way interactions between SVO and fixation count, SVO and age group, fixation count and age group, and the

Table 2

Perceived cost and benefit of the donation and percentage of people who rated benefit higher than risk for each age group.

	Early adolescents	Middle-late adolescents	Young adults
Cost M (SD)	4.00 (1.97)	2.92 (1.72)	3.37 (1.86)
Benefit M (SD)	5.36 (1.71)	4.82 (1.66)	4.70 (1.65)
benefit > cost (%)	59.96	71.76	62.01
Willingness to help (%)	82.21	88.21	87.18
Fixation count M (SD)	9.29 (6.95)	8.08 (5.52)	8.98 (6.20)
Fixation duration M (SD)	2.18 (1.87)	1.89 (1.56)	1.93 (1.47)
SVO M (SD)	27.46 (15.63)	35.52 (10.04)	31.03 (11.14)

Note. Data in the table were aggregated across the seven scenarios.

⁴ We run an additional model with the fixation duration (log-transformed) instead of the fixation count and found the same pattern of results.

Table 3

Correlations.

Early adolescents	1.	2.	3.	4.	5.
1. Cost	—				
2. Benefit	0.41***	—			
3. Fixation count	0.01	-0.03	—		
4. Fixation duration	-0.03	-0.03	.84***	—	
5. SVO	-0.13***	.08*	-0.02	0.01	—
Middle-late adolescents	1.	2.	3.	4.	5.
1. Cost	—				
2. Benefit	0.17***	—			
3. Fixation count	0.08**	0.09**	—		
4. Fixation duration	0.08**	0.09**	0.81***	—	
5. SVO	-0.21***	.15***	-0.04	-0.03	—
Young adults	1.	2.	3.	4.	5.
1. Cost	—				
2. Benefit	0.19***	—			
3. Fixation count	0.12**	0.09**	—		
4. Fixation duration	0.11**	0.05	0.86***	—	
5. SVO	-0.05	-0.12***	-0.10***	-0.14***	—

Note. ⁺ < 0.10, * < 0.05, ** < 0.01, *** < 0.001. Correlations are reported aggregating the ratings of perceived cost and benefit across the seven scenario and the duration and count of fixations across the two AOIs (benefit and cost).

three-way interaction between SVO, fixation count, and age group. Results showed significant effects for scenario, showing that as the donation amount (and the number of children helped) increased the perception of cost increased as well (Table 4, left panel); this result replicated previous data from Rubaltelli et al. (2020) and supports Hypothesis 1a. In addition, we found a significant effect of SVO showing that a lower perception of cost was associated with higher SVO scores (more prosocial individuals); this result supports Hypothesis 2a. Consistent with Hypothesis 3a, a higher fixation count was associated with a higher perception of cost. We also found a significant effect of the age group. However, it showed that the perception of cost was the lowest for early adolescents compared to the two other groups (Contrast 1), while no difference emerged between middle-late adolescents and young adults (Contrast 2). These results are in the opposite direction to what we expected (Hypothesis 4a).

Finally, the three-way interaction was significant. Simple slope analyses run separately for each age group showed that, for early adolescents, the effect of fixation count was positive and significant when the SVO score was high (more prosocial individuals; $B = 0.19, SE = 0.08, t = 2.42, p = .02$), whereas it was negative and significant when the SVO score was low (more prosocial individuals; $B = -0.14, SE = 0.06, t = 2.37, p = .02$). In other words, for early adolescents, as the number of fixations increased more prosocial and more prosocial participants tended to converge towards a similar perception of the cost of the donation (Fig. 2, left panel). For the middle-late adolescents, the perception of the cost of the donation was higher when they engaged in a higher number of fixations although this result was significant only for more prosocial individuals ($B = 0.16, SE = 0.11, t = 1.40, p = .16$ for low SVO scores vs. $B = 0.17, SE = 0.08, t = 2.08, p = .04$ for high SVO scores; Fig. 2, middle panel). Finally, no significant effect emerged for the young adults ($ps > 0.13$ or higher). These results are exploratory but lend a first support to the link between SVO, attention, and age in explaining how people perceived the cost of a donation.

Perception of benefit. We then ran a second model with the same predictors and perceived benefit of the donation as the dependent variable (Table 4, right panel). Results showed a significant effect of scenario, indicating that as the number of children helped increased, the perceived benefit increased as well; this finding replicate previous work (Rubaltelli et al., 2020) and supports Hypothesis 1b. We also found that a higher perception of the benefit was associated with higher SVO scores (more prosocial individuals); this finding supports Hypothesis 2b. However, the effect of fixation count was not significant, thus we failed to support Hypothesis 3b. Finally, early adolescents perceived a higher benefit of the donation compared to the other two groups (Contrast 1),

Table 4
Multilevel models predicting the perception of the cost and the perception of the benefit of the donation.

	Perceived cost					Perceived benefit				
	B	SE	t	Sig.	95 % C.I.	B	SE	t	Sig.	95 % C.I.
Intercept	-1.74	.15	-11.53	< 0.001	[-2.04, -1.44]	-0.28	.06	-4.40	<0.001	[-0.40, -0.15]
Scenario	.46	.03	15.35	< 0.001	[.40, 0.52]	.12	.03	4.86	<0.001	[.07, 0.17]
Age group (contrast 1)	-0.24	.19	-13.15	<0.001	[-0.28, -0.21]	-0.24	.02	-12.16	<0.001	[-0.28, -0.20]
Age group (contrast 2)	.17	.03	5.78	<0.001	[.11, 0.23]	-0.002	.003	-0.07	.95	[-0.06, 0.06]
Type of donation	-0.10	-0.05	-1.98	.05	[-0.19, -0.001]	-0.33	.05	-6.32	<0.001	[-0.43, -0.23]
SVO	-0.02	.003	-7.36	<0.001	[-0.03, -0.01]	.001	.003	4.92	<0.001	[.008, 0.02]
Fixation count (log transformed)	.09	.03	2.69	.01	[.02, 0.15]	.05	.004	1.34	.18	[-0.02, 0.12]
SVO x Fixation count	.006	.003	1.92	.06	[-0.0001, 0.01]	.0004	.003	.10	.92	[-0.007, 0.006]
Contrast 1 x SVO	.001	.002	.78	.44	[-0.002, 0.005]	-0.002	.002	-1.34	.18	[-0.006, 0.001]
Contrast 2 x SVO	.01	.003	4.09	<0.001	[.007, 0.02]	-0.02	.003	-6.89	<0.001	[-0.03, -0.02]
Contrast 1 x Fixation count	.03	.03	1.44	.15	[-0.01, 0.08]	.009	.002	3.79	<0.001	[.05, 0.14]
Contrast 1 x Fixation count	-0.04	.04	-1.06	.29	[-0.12, 0.04]	-0.006	.004	-0.13	.90	[-0.09, 0.08]
Contrast 1 x SVO x Fixation count	-0.004	.002	-2.23	.03	[-0.007, -0.004]	.0008	.002	.41	.68	[-0.03, 0.004]
Contrast 2 x SVO x Fixation count	-0.001	.004	.30	.76	[-0.007, 0.009]	.003	.004	.69	.49	[-0.006, 0.01]

Note: Contrast 1: early adolescents (-2), middle-late adolescents (1); young adults (1); Contrast 2: middle-late adolescents (-1), young adults (1).

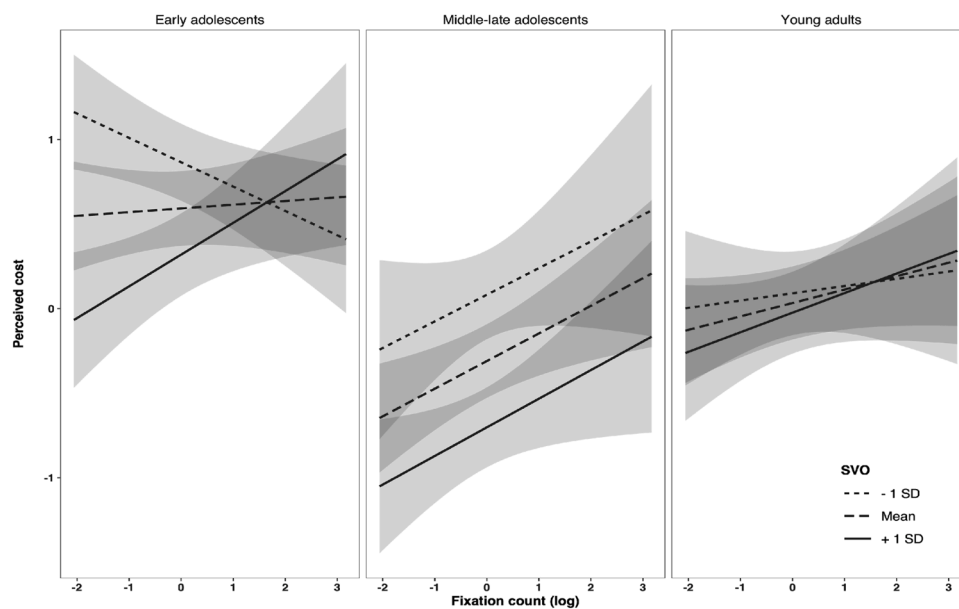


Fig. 2. Three-way interaction between age group, SVO and fixation count, with perceived cost as the dependent variable.

while no difference emerged between middle-late adolescents and young adults (Contrast 2). This finding supports Hypothesis 4b. However, the three-way interaction between SVO, fixation count, and age group was not significant, showing that the interplay between these variables is different for the perceived benefit of the donation and for the perceived cost.

Donation decisions

We then investigated participants' willingness to help. We ran a logistic multilevel model controlling for the random of participant and scenario. We included as predictors the perception of the cost, the perception of the benefit, the age group, the scenario, and the type of donation (money or time). In addition, we included the two-way interaction between cost and benefit, cost and age group, and benefit and age group and the three-way interaction between these three variables. The dependent variable was the yes or no decision participants made in each scenario when asked whether they were willing to donate. Results showed a significant effect of scenario indicating that as the donation amount (and the number of children helped) increased at a constant ratio, participants became less and less willing to help (Table 5). In addition, we found a significant effect of the type of donation, showing

that participants were more likely to help when they were asked to volunteer rather than donate money. Importantly, the results showed a significant effect of the perception of the cost of the donation, showing that as the perception cost increased the willingness to help decreased. On the contrary, we found a significant effect of the perception of the benefit, indicating that when the perception of the benefit increased the willingness to help increased as well. In addition, there was also a significant effect of age group. The early adolescents were the least willing to help (Contrast 1), followed by middle-late adolescents, while young adults were the most willing to donate (Contrast 2).

Finally, the three-way interaction between the perception of the cost, the perception of the benefit, and the age group was also significant. In particular, the effect was significant only for the Contrast 1 (early adolescents vs. other two groups). This finding supports Hypothesis 5 and indicates that the interactive effect of cost and benefit weighs differently on the decisions made by early adolescents compared to the other two groups (Fig. 3). Simple slope analyses ran separately for each age group revealed that, for early adolescents, the effect of the perceived cost decreased as the perception of the benefit increased ($B = -0.25, SE = 0.11, z = 2.21, p = .03$ when the benefit was low vs. $B = -0.18, SE = 0.10, z = -1.70, p = .09$ when the benefit was high). In other words, although the early adolescents were generally less willing to help, they

Table 5
Within-subjects logistic regression controlling for the random effect of participants and with donation decisions as the dependent variable.

	B	SE	z	Sig.	95 % C.I.
Intercept	5.61	.41	13.62	<0.001	[4.81, 6.42]
Scenario	-0.44	.06	-6.59	<0.001	[-0.57, -0.31]
Type of donation	-0.16	.19	-0.83	.40	[-0.52, 0.21]
Cost	-1.07	.10	-10.31	<0.001	[-1.27, -0.87]
Benefit	.85	.11	7.98	<0.001	[.64, 1.06]
Age group (Contrast 1)	.93	.13	7.15	<0.001	[.67, 1.18]
Age group (Contrast 2)	.78	.35	2.27	.02	[.11, 1.46]
Cost X Benefit	-0.13	.04	-3.26	.001	[-0.20, -0.05]
Contrast 1 X Cost	-0.43	.06	-7.40	<0.001	[-0.54, -0.31]
Contrast 2 X Cost	-0.18	.14	-1.29	.20	[-0.46, 0.09]
Contrast 1 X Benefit	.17	.06	2.81	.005	[.05, 0.28]
Contrast 2 X Benefit	.23	.15	1.54	.12	[-0.06, 0.52]
Contrast 1 X Cost X Benefit	-0.07	.02	-2.95	.003	[-0.11, -0.02]
Contrast 2 X Cost X Benefit	-0.07	.05	-0.99	.32	[-0.16, 0.05]

Note: Contrast 1: early adolescents (-2), middle-late adolescents (1), young adults (1); Contrast 2: middle-late adolescents (-1), young adults (1).

also showed the smallest drop in willingness to help when the benefit was high. In contrast, for the other two groups the effect of the perceived cost became more relevant as the perception of the benefit increased (respectively, for middle-late adolescents: $B = -1.06$, $SE = 0.18$, $z = -6.03$, $p < .001$ for low benefit vs. $B = -1.44$, $SE = 0.23$, $z = -6.26$, $p < .001$ for high benefit; and for young adults: $B = -1.14$, $SE = 0.16$, $z = -7.09$, $p < .001$ for low benefit vs. $B = -1.85$, $SE = 0.30$, $z = -6.22$, $p < .001$ for high benefit).

Mediation analysis

Finally, we ran an exploratory mediation analysis to assess whether the variables predicting the perception of the cost also have an effect on willingness to help. We tested a model with SVO as the main predictor of willingness to help (c) and perceived cost as the mediator. However, based on the results reported above, we added age group and fixation

count as moderators of the relationship between SVO and perceived cost (a); similarly, age group and perceived benefit were added as moderators of the relationship between perceived cost and willingness to help (Fig. 4). Overall, the results showed that willingness to help was predicted by the SVO, the perception of the cost, the perception of the benefit, and the three-way interaction between cost, benefit, and age group (Table 6). The indirect path was significant ($B = -0.0001$, $SE < 0.00001$, $z = -2.54$, $p = .01$) and the model explained 19 % of the variance in donation decisions.

Discussion

The aim of the present study was to extend previous work showing the impact of the perception of the cost for the donor and of the benefit for the donation recipients on people’s willingness to help (Rubaltelli et al., 2020). Specifically, we contributed to this literature by investigating the moderating effect of SVO, attention, and age. We replicated previous findings showing that when the quantity of resources required to help and the number of lives helped increase at a constant ratio, willingness to donate decreases. This happens because people experience a more intense increase in the perception of the cost for the donor ($B = 0.46$) than the benefit for the recipients ($B = 0.12$). These findings supported Hypotheses 1a and 1b.

Then, regarding the factors we investigated here for the first time we found that they are indeed associated to how people perceive the cost and the benefit of the donation. First, we showed that as the SVO scores increase, that is when there is an increasing tendency to be prosocial, the perception of the cost decreases while the perception of the benefit increases. This is an important result, which is consistent with the literature on SVO that shows how prosocial individuals are more likely to engage in helping behaviors than prosocial individuals (Bakkers, 2006; Manesi et al., 2019; McClintock and Allison, 1989; Van Lange et al., 2007). These findings supported Hypotheses 2a and 2b. Thanks to our results we were able to offer a new account of how SVO can translate into different degrees of helping behavior. Of course, we are not suggesting that the perception of the cost and the benefit are the only processes by which SVO impacts helping behavior. Other factors are likely to play a role (e.g., empathy or perception of effectiveness) and future work should try to assess which processes account for the most variability in helping behavior.

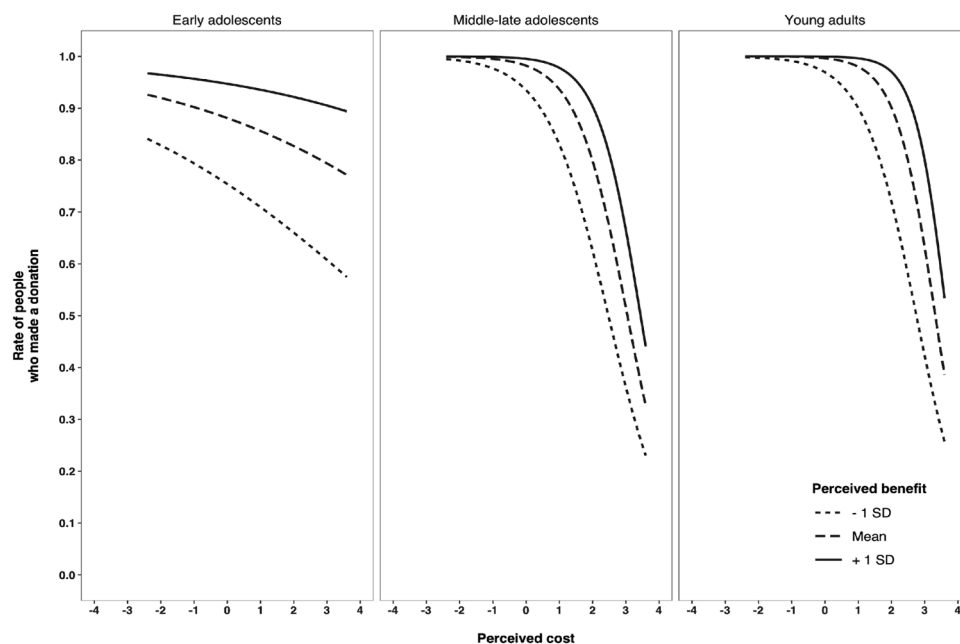


Fig. 3. Interaction between perceived cost, perceived benefit, and age group predicting participants’ willingness to help.

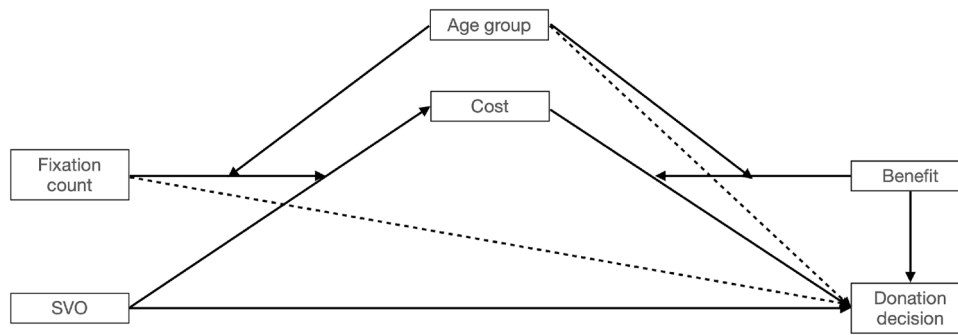


Fig. 4. Mediation analyses for the effect of the three-way interaction between SVO, fixation count, and age group on donations. Note. Age group was included in the model collapsing the middle-late adolescent and young adult groups and comparing them with the early adolescents.

Table 6
Mediation analysis output.

	B	SE	z	Sig.	95 % C.I.
<i>Age group x Benefit x Cost</i>					
Age group x SVO x fixation count (a)	-0.01	.003	-4.07	<0.001	[-0.02, -0.006]
<i>Donation decision</i>					
Age group	.00003	.02	.002	1.00	[-0.04, 0.04]
SVO	.003	.0004	4.67	<0.001	[.002, 0.004]
Fixation count	-0.003	.02	-0.17	.86	[-0.03, 0.03]
Benefit	.05	.005	9.43	<0.001	[.04, 0.05]
Cost	-0.08	.004	-17.53	<0.001	[-0.08, -0.07]
Age group x SVO x fixation count (c)	.0004	.0006	.71	.48	[-0.001, 0.002]
Age group x Benefit x Cost (b)	.009	.003	3.24	.001	[.004, 0.01]
Indirect effect (ab)	-0.0001	.00004	-2.54	.01	[-0.0002, -0.00003]
Total effect (c + ab)	.0003	.0006	.52	.60	[-0.001, 0.001]

Note. For the mediation analysis we collapsed the middle-late adolescent group with the young adult group since the effects we described were significant only for Contrast 1. (c) is the direct path testing the effect of the SVO x fixation count x age group interaction on donation decisions. (a) tests the effect of the interaction SVO x fixation count x age group interaction on the cost x benefit x age group interaction, while (b) tests the effect of the cost x benefit x age group condition on donation decisions. Thus, (a) and (b) constitute the indirect effect.

Second, we showed that attention is associated with the perception of the cost. Specifically, we found that when people engage in more fixations on the information concerning the helping request, they perceive a higher cost. This finding supports Hypothesis 3a and we interpret it as a sign of people trying to compute a tradeoff between the cost and the benefit and to assess if their help is worth the resources they are going to spend. Here the reasoning is that, when the benefit for the recipients clearly outweighs the cost for the donor, helping is clearly worth and there is no need to spend too much time lingering over what to do. When the benefit does not outweigh the cost, people might be less convinced about what to do and in need of focusing more on the information to reach a decision. Although we expected also to find that lower fixations were associated to a higher perception of the benefit (Hypothesis 3b), results did not support this conclusion.

Third, we found that age does indeed have an effect on the perception of the cost, thus supporting Hypothesis 4a. Similarly, and consistent with Hypothesis 4b, age had also an effect on the perception of the benefit. For both dimensions, we found that the perception was higher for the early adolescents compared to the other two groups we tested (middle-late adolescents and young adults). These findings are consistent with the tendency of younger children to engage in prosocial

behaviors (Benenson et al., 2007; Smith et al., 2013) as well as with the asymmetry in the perception of cost and benefit among adults (Rubaltelli et al., 2020). It is also in line with work showing an increase in prosocial values among adolescents (Li et al., 2013). Altogether, these results seem to support the conclusion that adolescence is a time in which people start to weigh more on the worthiness of their helping acts. However, our results are far from conclusive on this point and despite constituting interesting evidence more work is needed to lend a convincing support to this conclusion.

Finally, for what concerns the perception of the cost and the benefit of the donation, we explored the possible interplay of these factors. Results showed that the three-way interaction between SVO, attention, and age does predict the perception of cost, although it does not predict the perception of benefit. Specifically, among early adolescents, the effect of attention allocation on the perception of cost was significant, but in opposite directions, for prosocial and prosocial individuals. As a result, the more fixations these participants made, the more they tended to converge towards a similar perception of cost (higher for prosocial individuals and lower for prosocial ones). For middle-late adolescents the effect of fixations was significant for prosocial participants but not for prosocial ones, although the coefficients were quite similar and, in both cases, they perceived a higher cost when making more fixations (in addition, prosocial individuals always perceived a higher cost than prosocial individuals). No effects of SVO or fixations emerged for the young adults, instead.

These findings are only initial evidence of the interplay between SVO, attention, and age and further work is required to provide further support to our conclusion. Still, an interpretation that can be made from these findings is that as age increases the role of individual differences (SVO) and attention (fixations) seems to reduce, thus leading young adults to be the least impacted by these variables when rating perceived cost. One possible interpretation can be based on the experience that these different groups of people have with giving and, as a result, their ability to weigh cost over and beyond their own individual tendencies or the amount of attention directed to the relevant information. Based on this interpretation, young adults should be more able to quickly gauge the cost required by helping and to compare it with other uses of the same amount of money, thus counteracting the effect of different levels of attention; they could also be more able to balance their individual characteristics (SVO) with socially responsible views (e.g., do not outweigh the cost of helping).

Another interesting result emerging from this study is that the effect of the perceived cost on donation decisions was moderated not only by the perceived benefit but by age as well. For all age groups the willingness to help was high when the cost was perceived as low (and it decreased as the perception of cost increased). However, early adolescents were less impacted by their perception of cost and more influenced by their perception of the benefit. Indeed, their willingness to donate dropped less than for the other two groups when the perception of the cost was high, and this was particularly true when they were also

perceiving a high benefit for the recipients. Another difference between the early adolescents and the other two age groups is that when perceiving the benefit as low they were less willing to give regardless of how high they perceived the cost. In contrast, middle-late adolescents and young adults were very much willing to help when perceiving a high benefit and a low cost. However, their willingness to help dropped sharply as the perception of cost increased and benefit had only a role in determining how quickly the drop took place. When people in these two groups perceived a high benefit, the decrease in willingness to help occurred at a point in which the cost was already perceived as quite high, whereas when the benefit was low the drop happened already for a mild level of cost.

Overall, these results seem to highlight that for the early adolescents the perception of benefit and cost is somewhat detached from their subsequent donation decisions. The understanding of the cost for the donor and benefit for the recipients seems particularly complex for this age group; its comprehension passes indeed both through environmental information and through individual differences in social attitudes. Future studies are therefore needed to further explore the main drivers of the donation behavior in this age group as well as the interplay of the variables investigated in the present study. For the other two groups, instead, the perception of the cost (moderated by the benefit) seems to drive the willingness to help. As age increased in the different groups, the perception of the cost became increasingly more consistent and less influenced by individual differences. At the same time, the willingness to help became even more closely associated with the cost dimension and showed a clear drop after a specific cost threshold, which was based on how high people perceive the benefit.

An alternative interpretation of the present findings could be based on the order in which questions were presented. In all scenarios, participants were asked to report their willingness to help before the ratings of the perceived cost and benefit. It is possible that middle-late adolescents and young adults were simply better than early adolescents at adapting their ratings to the donation decision. As a result, the order in which we presented the question is a potential limitation to our study and should be further investigated in the future. We believe that this order of the question was a sensible solution to ensure that willingness to help was not influenced by other factors (ratings of cost and benefit), since this was our main dependent variable. This order of the questions is also consistent with work by Rubaltelli et al. (2020) that used a similar experimental task as well as to what is often done in the charitable giving literature when measuring variables that can influence donations, such as empathy or warm glow (see, for instance, Kogut and Ritov, 2005a, 2005b; Small et al., 2007; Dickert et al., 2011; Rubaltelli and Agnoli, 2012). Further, to gather further support for our methodological decision, we collected additional data with a sample of adults, in which we counterbalanced the order of the questions (see Supplementary Materials). These data showed that neither willingness to help nor the perception of the cost or the perception of benefit were impacted by the order in which questions were presented (decision first vs. rating first). Still, more work should be done to fully rule out this explanation (for instance, counterbalancing the order of the questions while comparing different age groups).

Limitations and future developments

The present study is not without limitations. For instance, we had a constrain in term of the number of students we had access to. Therefore, it would be important to replicate our findings, and especially the three-way interaction, with a larger sample. In addition, we only measured hypothetical donation decisions. Although this is a common solution in charitable giving research (see, for instance, Kogut and Ritov, 2005a, 2005b; Dickert et al., 2011; Rubaltelli and Agnoli, 2012; Caviola et al., 2014; Caserotti et al., 2019; Pittarello et al., 2020; Rubaltelli et al., 2020), it is clearly limiting the validity of the results. Future studies should try to address this limitation by either run a lab study with real

donations or by teaming up with a charitable organization to assess the real world behavior of donors belonging to different age groups. It is also important to highlight that in our study, participants were asked to help children suffering from muscular dystrophy. As such, the targets of the helping were closer in age to the early adolescents than the young adults, thus introducing a potential confounding variable that should be investigated more systematically in future studies. One additional limitation to the ecological validity of the study is that all young adults were college students, thus a likely narrower group in terms of their characteristics compared to school students (early adolescents and middle-late adolescents). However, the results for this group closely resemble what was reported by Rubaltelli et al. (2020) with a sample of adults recruited on Amazon Mechanical Turk, which was likely to have a broader mix of characteristics than the college students. Still, thinking about the possible impact of variables like intelligence or family socio-economic status arise an interesting question on further factors that can impact the perception of cost and benefit and willingness to help across different age groups. Finally, we employed a cross-sectional design rather than a longitudinal one, that would arguably be more suited to study the development of individual differences like SVO and attentional patterns.

Despite these limitations, we believe that this study opens interesting avenues for the future. First, we hope that future work could extend the present investigation to other age groups, such as elderly adults or younger children, even if in the latter case an adaptation of the tasks would be necessary to allow them to understand the quantity of resources required to help. For instance, money could be substituted with a different type of resource (e.g., candies). In addition, here we did not consider the impact of culture on the development of the prosocial behaviors. Future experiments could be devised with the goal of examining the contributions of social value orientation and attentional processes in a developmental perspective comparing individualistic versus collectivistic cultures.

In conclusion, we were able to extend the previous work on the role of perceived cost and perceived benefit on helping behavior in several ways showing the role of factors like SVO, attention, and age. From a developmental perspective, our results show a peculiar difference in prosocial behaviors from early adolescence to adulthood. This study constitutes an important step for understanding how the perception of the cost and benefit of giving is influenced by individual differences across different ages, and how this translates into people's willingness to help. Interesting implications from our findings arise for future research. For instance, future work could focus on other cognitive, emotional, or environmental factors that might influence the differences willingness to help across ages that we described here.

Declaration of Competing Interest

The authors declare no conflict of interest.

Data availability

The datasets generated during the current study are available from the corresponding author upon reasonable request.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.crbeha.2023.100138](https://doi.org/10.1016/j.crbeha.2023.100138).

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