

Can too much similarity between donors crowd out charitable donations? An experimental investigation of the role of similarity in social influence on giving behavior



Yuan Tian, Doctoral Fellows Program 2017

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Research Question

Does too much similarity between actual and potential donors actually decrease the chances that a potential donor will give or decrease the amount they will give?

Brief Abstract

Previous research suggests that people are motivated to donate to a cause when other people who are similar to them have generously donated to this cause. This study examines whether there is such a thing as too much visual similarity between generous donors and potential donors, and if there is a level at which potential donors become *less likely to give* or *give a smaller amount*. It finds that while people are more likely to donate (or donate more) when other generous donors appear *moderately* similar to themselves, they are less likely to donate (or are likely to donate less) when other generous donors are highly similar to themselves. This suggests that organizations seeking donations should aim to emphasize moderate, but not high, facial similarity between generous donors and potential donors.

Key Findings

- ▶ Potential donors are more likely to give (and give a larger amount) when others who look moderately similar to them give generously.
- ▶ Potential donors are less likely to give (or are likely to give less) when others who look highly similar to them give generously.

Opportunities for Action

- ▶ Nonprofits' fundraising strategies should take into account the fact that moderate similarity of appearance between generous donors and potential donors works best to promote giving.
- ▶ Emphasizing a *high* amount of similarity may not always be successful.

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This paper is published in *Current psychology*.
DOI: [10.1007/s12144-020-00616-4](https://doi.org/10.1007/s12144-020-00616-4)





Can too much similarity between donors crowd out charitable donations? an experimental investigation of the role of similarity in social influence on giving behavior

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Abstract

How is charitable giving influenced by other donors' giving? Do people give more in the presence of donors who are similar to themselves? Most research suggests that individuals are positively influenced by similar others across a variety of behaviors. In the charitable giving context, if similar others donate, individuals are more likely to donate (or donate more) to the same cause. Yet, prior research has paid little attention to a potential non-linear relationship between similarity and charitable giving. Is there such thing as too much similarity? A between-subject laboratory experiment ($N = 140$) was designed to test a non-linear relationship between individuals' similarity to other donors and their charitable giving. The study concludes that moderate similarity promotes more giving, yet too much similarity between donors may actually crowd out charitable giving.

Keywords Social influence · Philanthropy · Charitable giving · Charitable donations · Similarity · Facial morphing

Introduction

In 2018, individual Americans donated \$292.09 billion, which accounted for 68% of the total giving amount in the United States (Giving USA 2019). Given this, it is important to understand factors that influence people's decision making in charitable giving. Why do people give their money to others? Research has identified many factors that affect charitable giving, including other-oriented motives (i.e. altruism, trust) and self-oriented motives (i.e. egoism, tax breaks; Konrath and Handy 2018). The current paper focuses on the role of *social influence*, when people's decision-making and behaviors are influenced by others (Cialdini and Goldstein 2004;

Kelman 1958). Specifically, we examine whether charitable donations are driven by one's similarity to other donors.

How Similarity Influences Behavior

Similarity is an important psychological construct, and usually positively affects many kinds of individual behaviors, such as aggression (Baron 1971), counter-aggression (aggressive reactions to others' aggression) (Hendrick and Taylor 1971), interpersonal attraction (Byrne 1961; Secord and Backman 1964), consumer purchasing behavior (Woodside and Davenport 1974), alcohol consumption (Andsager et al. 2006), and compliance (Burger et al. 2004; Silvia 2005).

In general, similarity also affects a variety of prosocial behaviors in a positive way, such as helping (Sole et al. 1975), comforting and rescuing (Eagly and Koenig 2006), cooperation (Sinervo and Clobert 2003), and positive social interactions (Boivin et al. 1995; Lee et al. 1999).

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s12144-020-00616-4>) contains supplementary material, which is available to authorized users.

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Similarity in Charitable Giving

Similarity also plays an important role in charitable giving, specifically. With charitable giving, there are different ways that similarity can affect donation behavior because of the different roles involved.

Donor Similarity to Solicitors People are more likely to give (and give more) when they are asked by similar others (or asked in the presence of similar others), for example, by those who share the same religious background or first name (Bekkers 2010; Yinon and Sharon 1985).

Donor Similarity to Recipients In addition, individuals are more likely to give (and give more) to similar recipients, for example, to those who share the same religious beliefs (Helms and Thornton 2012; Yinon and Sharon 1985) or to other in-group recipients who share the same political views, sports-team preferences, or music preferences (Ben-Ner et al. 2009).

Donor Similarity to Other Donors In the current paper, we examine how individuals' responses differ depending upon their level of facial similarity to other donors. Studies have found that people are influenced when they see similar others making donations. For example, a field experiment on tourist skiers found that 44% of participants made a charitable donation when they were told that other fellow skiers made a donation, while only 22% of participants donated when participants did not have any information about previous donors' charitable giving (Heldt 2005). Another field experiment on a sample of National Public Radio (NPR) members found that participants donated more after being told that another NPR member of the same gender donated, than when they were told that another NPR member of the other gender donated (Shang et al. 2007). Thus, at times, people may be more likely to donate in the presence of a similar other.

Research Question and Hypothesis Development

We aim to extend previous work on the effect of facial similarity to other donors in charitable giving. As reported above, similarity can affect donation behavior, yet, these studies only manipulate a single level of facial similarity. To our knowledge, studies rarely investigate the effects of multiple levels of facial similarity on behaviors (i.e. only in the context of political voting; see Bailenson et al. 2009) and no study has directly manipulated different levels of facial similarity to investigate its effects on charitable donations (Tian and Konrath 2019). This is important to do because one should not assume that just because moderate levels of similarity appear to be beneficial, that higher levels of facial similarity will also be beneficial.

Scholars have only rarely manipulated multiple levels of similarity in domains other than charitable giving, with inconsistent effects. For example, one study found a potential backfiring effect of too much similarity (Konrath et al. 2006). The study manipulated similarity by telling participants that they shared either a common fingerprint type (moderate similarity) or a rare one (high similarity). Increasing levels of similarity led to lower aggression, but only among those who

scored high in narcissism. For less narcissistic people, similarity appeared to backfire, with higher similarity leading to *more* aggression (see Fig. 2 in their paper). Another study measured different levels of similarity using participants' self-report rating of another person's photograph. It found that participants reported *lower* attraction when similarity was too high (Penton-Voak et al. 1999). Another study used facial morphing to manipulate similarity between voters and political candidates. It found that among females, but not males, high similarity led to *lower* warm feelings, voting intentions, and attractiveness ratings of the candidates (Bailenson et al. 2009).

Yet, some research has found a positive effect of increasing levels of similarity. For example, one study manipulated four levels of similarity that participants shared with other people (i.e., 2, 4, 6, or 8 shared activity preferences). The greater number of activities that participants believed they shared with others (i.e. higher similarity), the more attractive those others were rated (Moreland and Zajonc 1982). Another study found that participants in an uncommon fingerprint condition (high similarity) were more likely to comply with the requester than participants in the common fingerprint (moderate similarity) or control conditions (Burger et al. 2004). Another study used facial morphing to manipulate high similarity, and found that high similarity increased participants' cooperation in public good games compared with no morphing (i.e. low similarity) (Krupp et al. 2008).

Taken together, because there are very few studies that manipulate more than one level of similarity, it is difficult to know if there is such thing as too much similarity. In addition, no studies that we are aware of have examined potential negative effects of high similarity within charitable giving contexts. In this study, we manipulate different levels of donor-donor similarity using facial morphing software, so that we can examine how different degrees of facial similarity between donors affect giving behavior.

Based on the theories outlined below, we specifically hypothesize that other donors who are moderately facially similar to participants will increase their donation behavior, but other donors that are highly facially similar to participants will actually cause donation behavior to *decrease*.

Similarity Attraction Theory posits that interpersonal attraction increases as similarity increases. In Byrne's original (Byrne 1961) paper, he manipulated similarity through attitude sharing and found that participants liked a stranger better if the stranger had similar attitudes compared to dissimilar attitudes. This positive relationship between similarity and attraction has been tested and confirmed in a variety of contexts, including small groups (Lott and Lott 1965), applicant-employee fit (Van Hove and Turban 2015), friendship (Mitteness et al. 2016), and supervisor-subordinate relationships (Bakar and McCann 2014).

However, research has found some mixed effects of similarity; that is, interpersonal similarity could have either positive or negative effects on attraction (Penton-Voak et al. 1999). Additionally, similarity could also have a curvilinear effect in intergroup relationships (Jetten et al. 1998).

Optimal Distinctiveness Theory can help to explain these results. It posits that individuals have two fundamental yet competing needs: the need for *assimilation* and the need for *differentiation*. Brewer (1991) argues that individuals constantly adjust the levels of both needs based upon feelings of belongingness to a group. When these feelings are high, their need for assimilation decreases, and their need for differentiation increases. But when these feelings are low, their need for assimilation increases, and their need for differentiation decreases. Simply speaking, individuals try to reach the most optimal, or comfortable, condition by balancing these two competing needs.

Applying *Similarity Attraction Theory* to charitable giving, we posit that individuals are more likely to give (or give more) when moderately similar others give, compared to when less similar others give (or no information is given). This is because moderately similar others are seen as more attractive to them. Yet, what if the self-other similarity becomes too high? Research has found initial evidence of the potential negative effects of similarity in intergroup contexts (Jetten et al. 1998) and interpersonal relationships (Penton-Voak et al. 1999), and it is possible that the effects of similarity in charitable giving could be non-linear as well. Based on *Optimal Distinctiveness Theory*, the need for assimilation and the need for differentiation are continually in tension. In the charitable giving context, people might be *less likely* to donate when a highly similar other donates, in order to differentiate themselves from that person.

Thus overall, this paper hypothesizes curvilinear effects of self-other facial similarity between donors on individuals' charitable giving (See Fig. 1). We expect to find a higher likelihood of giving (and larger amounts) from individuals when *moderately* similar donors give generously to charity, whereas a lower likelihood of giving (and smaller amounts) when *highly* similar donors give generously.

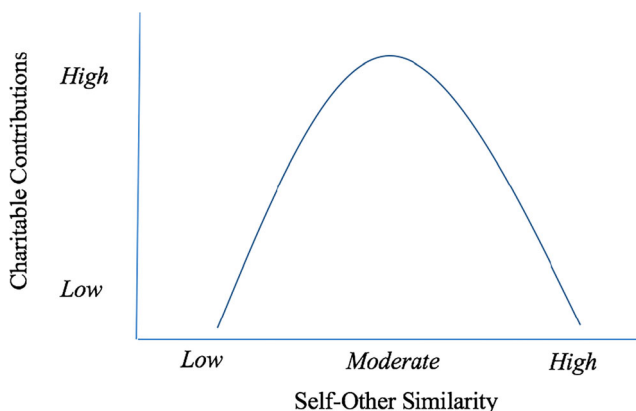


Fig. 1 Study hypotheses

Brief Overview of the Current Study

In a college student sample, we used facial morphing technology to manipulate three different levels of self-other similarity: *Low*, *Moderate*, and *High*. We then gave participants an opportunity to make a real charitable donation. To our knowledge, this is the first time that researchers have tested the effects of three different levels of facial similarity on prosocial behavior. (See Fig. 2 for study flow.)

The current study is important for both theory and real life. The major contribution of the study is to investigate a curvilinear relationship between facial similarity and charitable behavior, which can help us to better understand social influence processes in charitable giving. Practically, most people likely believe that similarity to other donors would increase donations, and that the more similarity, the better. However, is there a certain amount of similarity that is too much? This study investigates the effect of facial similarity at different levels including a high level of similarity that could be too much, and could backfire in charitable giving.

Method

Participants and Design

The current study recruited 140 fluent English-speaking students over the age of 18 from a Midwestern university campus for a four group experimental study conducted between March 2016 and July 2017 (Mean age = 22.6, SD = 5.4). The final sample ($N = 140$) was 76% female, with an ethnic distribution of: 56% Caucasian, 24% Asian, 18% African-American, and 2% Hispanic/Latino.

The sample size was determined prior to data collection and data analyses were conducted after the completion of data collection. The study was approved by the local Institutional Review Board (IRB). All procedures performed in the study involving human participants were in accordance with the ethical standards of the local IRB.

Power Analysis

We used G*Power 3.1 software to conduct a power analysis at $\alpha = .05$ (two-tailed) with a power of .80. The results indicated that our sample size of 140 was sufficient to detect a small effect size of Cohen's $d = .0566$ ($\eta^2 = .07$) or larger with 80% power for a simple design of four conditions.

Procedures

Cover Story Participants were told that this study examined online social interactions, and that in order to protect their confidentiality, experimenters scheduled participants at

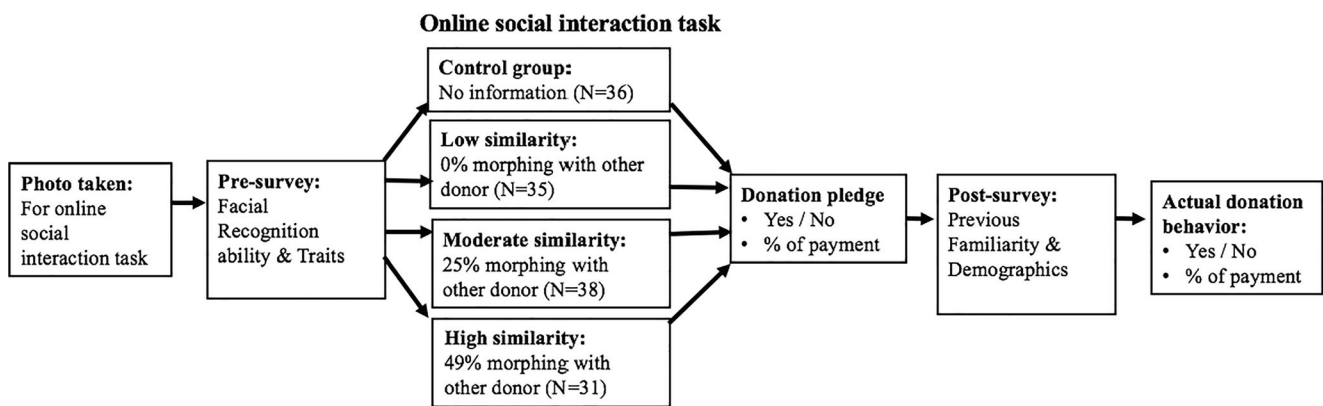


Fig. 2 Study flow

different individual sessions. Experimenters told them that they would take a photo, and then they might be paired with a participant from a previous session for an online social interaction, and that their photo might be used for future sessions on a random basis. During debriefing, all participants reported believing the cover story.

Participants were paired with a hypothetical other person to control for confounding variables, by matching participants and the other person on gender, ethnicity, age, hair style, and (neutral) facial expression. Eight standard photographs were taken from the Chicago Faces Database to represent four major ethnic groups (Asian, Black, White, and Latino) in both genders. These eight standard photographs were converted into US visa photo size and stored in the lab computer for manipulating different levels of self-other facial similarity.

Self-Other Facial Similarity Manipulation This study borrowed the similarity manipulation from a prior study finding that individuals are more likely to vote for a political candidate whose face appears similar to their own (Bailenson et al. 2009). This experiment adopted similar manipulation methods using the facial morphing software, Magic Morph, to morph a participant's photograph with a hypothetical donor's photograph in the following combinations, to which participants were randomly assigned (See Table 1). Specifically, in the *No Information* (control) condition, participants completed the donation task without any information about another donor. In the *Low Similarity* condition, participants saw an unmorphed photograph of a hypothetical donor and were given information about his/her donation amount

which was 80% of the study payment. In the *Moderate Similarity* condition, participants saw a photograph that consisted of 25% of themselves and 75% of the hypothetical donor. They were also given information about his/her donation amount (80% of study payment). In the *High Similarity* condition, participants saw a photograph that consisted of 49% of themselves and 51% of the hypothetical donor. They were also given information about his/her donation amount (80% of study payment).

Figure 3 shows two sets of examples using two research assistants' photos on the right column to represent participants' original photos. The hypothetical standard donors' photos on the left column represent the unmorphed photos of the other donor that participants would see on the computer screen in the *Low Similarity* condition. The middle two columns represent morphing examples in the *Moderate Similarity* condition (25% from the research assistants and 75% from the hypothetical donor) and in the *High Similarity* condition (49% from the research assistants and 51% from the hypothetical donor) respectively.¹

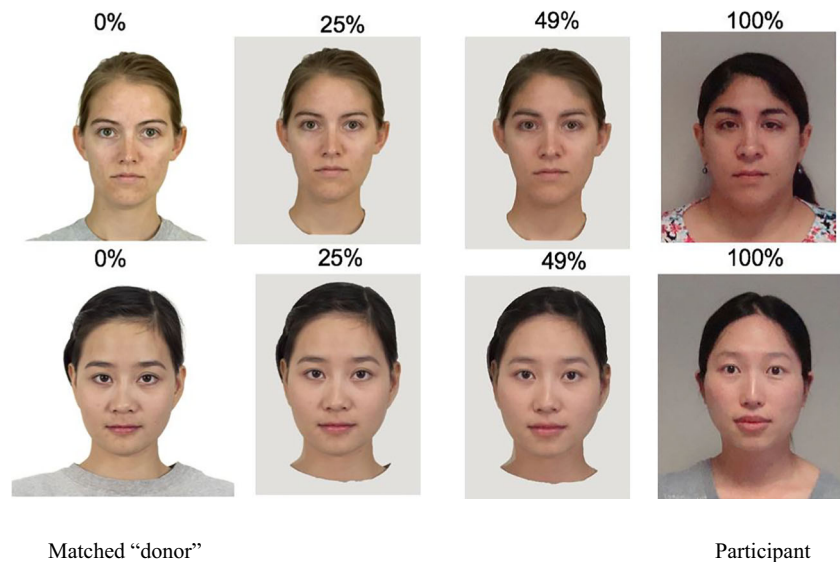
Morphing Procedures and Pre-Survey After providing consent, participants' color photographs were taken using a digital camera and ensuring that all participants had a standard presentation (i.e. no facial hair, hair tied back, and neutral facial expression). While the researcher was morphing participants' photographs in a back room, participants completed a paper-based pre-survey with a number of measures.

The morphing steps were as follows. First, the researcher selected a standard hypothetical donor's photograph, matched

Table 1 Experimental conditions in different morphing combinations

Conditions	Facial features % from matched other "donor"	Facial features % from participant
No Information Condition (n = 36)	No information about another donor	No information about another donor
Low Similarity Condition (n = 35)	100 other donor	0 self
Moderate Similarity Condition (n = 38)	75 other donor	25 self
High Similarity Condition (n = 31)	51 other donor	49 self

Fig. 3 Morphing examples



to participants' gender and ethnicity. Next, the researcher resized the participant's photo into a standard visa photo size at a free online photo generator website (<https://www.persofoto.com/upload/visa-photo>). Then, the researcher used the morphing software, Magic Morph, to morph the participant's photo with a hypothetical donor's photo in three different combinations for the three similarity conditions: the *Low Similarity*, the *Moderate Similarity*, and the *High Similarity*. After the morphing was complete, the researcher uploaded the morphed photographs to the Qualtrics survey program, which randomly assigned participants to one of the four conditions. Thus, researchers were blind to the experimental condition. Only participants assigned into one of the three similarity conditions saw a hypothetical donor's photo.

The pre-survey included the following two key measures, along with some filler measures that allowed the researcher enough time to morph the photograph. The 18 item *Prosopagnosia Index* assessed participants' self-reported ability to recognize faces (e.g. "My face recognition ability is worse than most people"; Cronbach $\alpha = .96$ (Shah et al. 2015)). The 10 item *Marlowe-Crowne Social Desirability Scale* assessed participants' concerns about looking good using a true-false inventory (e.g. "I never hesitate to go out of my way to help someone in trouble"; (Strahan and Gerbasi 1972)).

Online Charitable Donation Decision Participants next completed a computer-based charitable donation task, in which they were randomly assigned to one of the experimental conditions. Except for those in the control condition, participants saw a hypothetical donor's photograph (named "Alex") with the information that Alex (who was gender and ethnicity matched to them) had donated 80% of his/her study payment² to the Road for Recovery (local program of the American Cancer

Society³), which provides cancer patients with taxi rides to attend their cancer treatment appointments.

Participants were also asked to rate different items so that the following variables could be measured. First, for *Self-Other Similarity*, participants were asked to rate their facial similarity with the hypothetical donor they saw on the screen on a Likert scale ranging from 1 ("not at all") to 7 ("extremely"). Then, participants were asked to select their sense of self-other overlap by choosing one figure from seven in which two circles overlapped at different degrees from no overlap to extremely high overlap (Aron et al. 1991). These items were averaged into a single measure (Cronbach $\alpha = .64$). Second, for *Liking and Attraction*, participants were asked to rate their liking and attraction of the hypothetical donor using a Likert scale from 1 ("not at all") to 7 ("extremely"), which were averaged into a single score (Cronbach $\alpha = .57$). Finally, participants were asked to rate the *impact* of their donations to the local program and to the community using a Likert scale from 1 ("not important at all") to 7 ("extremely important"). These were averaged into a single item (Cronbach $\alpha = .89$).

Next, participants were asked whether they would like to make a donation today as well. Participants were given an option to make a donation to the same program as the hypothetical donor by entering a pledge in the online survey that could range from \$0 to the full study payment amount, in 25-cent increments.

Post-Survey The paper-based post-survey contained questions regarding participants' previous familiarity with the *American Cancer Society*, the *Road for Recovery Program*, and their *past experiences with cancer patients* as well as some demographic questions (i.e. age, ethnicity, and gender).

Participants' *Previous Familiarity* was measured by summing up 13 different items on a binary choice "yes" or "no", (i.e. "Have you ever heard of the American Cancer Society,"

“Have you ever made a donation to the American Cancer Society,” or “Is there someone who is close to you who had cancer?”) In addition, participants also reported their frequency of hearing about the American Cancer Society and the Road for Recovery before participating in the study (1 = very few times or never, 5 = several times a day). We standardized and combined the binary measures and the frequency measures into a single familiarity item (Cronbach $\alpha = .79$).

Actual Giving Behavior Finally, participants received their full payment in an envelope, in a combination of four quarters and the rest one dollar bills. In order to assure participants that the donation was voluntary and anonymous, the researcher asked participants to leave whatever amount they pledged in the envelope and to put the envelope back in a black donation box (even if the envelope was empty). The black donation box was placed on one side of the lab and the researcher sat behind a wall and was unable to see the donation process. Participants were told that another researcher would come later to collect all the donation envelopes and the current researcher would not know whether the participants donated or how much they left in the envelope. 100% of participants' donations were donated to the American Cancer Society at the end of the study.

In our study, we measured the variables for the manipulation check (Perceived Facial Similarity and Self-Other Overlap) and variables that we expected to be mediators (Liking, Attraction, and Beliefs of the Donation Impact) before measuring the online donation pledge and the actual donation behavior because such an order would allow us to examine whether our manipulation of similarity is successful and what the potential underlying process of the similarity effects on donation behavior is.

Results

Descriptive Statistics

Among the 140 participants, 102 (73%) donated and 38 (27%) did not. Among donors, the average donation was 29% of their study earnings ($SD = .28$). There were no gender differences in the decision to donate, $\chi(1,140) = 0.30$, $p = .59$, Males = 77%, Females = 72%. There were also no differences by ethnicity, $\chi(3,140) = 1.56$, $p = .67$, Caucasian = 73%, Asian = 76%, African-American = 68%, and Hispanic/Latino = 100%.

Correlations

We report the correlations between dependent measures in Table 2. The results indicated that two measures of our key dependent variables, *donated yes/no* and *% donated*, were

highly correlated with each other $r(140) = .48$, $p < .001$, which was expected. We ran separate analyses of the condition effect on these two measures. Additionally, *Liking and Attraction* was highly correlated with the manipulation check variable-*Self-Other Similarity*, $r(104) = .43$, $p < .001$. Additionally, *Beliefs about Donation Impact* was highly correlated with both donation measures: *donation yes/no*, $r(139) = .28$, $p < .001$, and *% donated*, $r(139) = .41$, $p < .001$. Thus, we conducted additional ANOVAs to investigate the condition effects on *Liking and Attraction* and *Belief about Donation Impact*.

Manipulation Check

In order to ensure that our manipulation through facial morphing was effective, we ran an ANOVA on *Self-Other Similarity*, $F(2,103) = 7.53$, $p < .001$, $\eta^2 = .13$, 95% CI [0.03, 0.24]; *High Similarity*: $M = 4.19$, $SD = 1.40$, $n = 31$; *Moderate Similarity*: $M = 3.47$, $SD = 1.02$, $n = 38$; and *Low Similarity*: $M = 3.06$, $SD = 1.18$, $n = 35$. Post-hoc pairwise comparisons indicated that participants in the *High Similarity condition* felt more similar to the hypothetical donor that they saw on the computer screen than participants in other two conditions (*High VS Low*, $t(65) = 3.85$, $p < .001$, 95% CI [0.55, 1.72]; *High VS Moderate*, $t(68) = 2.49$, $p = .02$, 95% CI [0.15, 1.30]). Even though the average *Self-Other Similarity* was higher in the *Moderate condition* than in the *Low Similarity condition*, these conditions were not significantly different from each other, $t(72) = 1.49$, $p = .14$, 95% CI [-0.14, 0.97] (See Fig. 4).

Randomization Check

The randomization process was first checked to ensure its effectiveness by confirming that no statistical significant differences existed across conditions.

Prosopagnosia Index This index measures participants' facial recognition (Cronbach $\alpha = .92$). This ability is only relevant to the three conditions where participants saw the other donor, thus, our analyses focus on these three conditions. There were no differences between these three conditions in facial recognition, $F(2,103) = 0.20$, $p = .82$, $\eta^2 = .004$, 95% CI [0.00, 0.13].

Social Desirability Scale A check was conducted to investigate the differences in participants' desire to look good (Cronbach $\alpha = .50$) across all four conditions (three similarity conditions and the control condition). There were no differences across conditions in social desirability, $F(3,139) = 0.41$, $p = .75$, $\eta^2 = .01$, 95% CI [0.00, 0.04].

Table 2 Correlations

Measures	1	2	3	4	5	6	7	8
1.Donation (yes/no)	1							
2.Donation (%)	.48***	1						
3. Self-other Similarity	-.07	.03	1					
4.Prosopagnosia Index	.11	.13	-.12	1				
5.Social Desirability Scale	.20*	.06	.02	-.33	1			
6.Previous Familiarity	-.13	-.02	-.04	-.11	.02	1		
7.Liking and Attraction	.22*	.17	.43***	-.02	.15	.03	1	
8.Belief about Impact	.28***	.41***	-.08	-.07	.15~	.08	.07	1

~ ($p < .10$), * ($p < .05$), ** ($p < .01$) and *** ($p < .001$)

Previous Familiarity This measure captured participants’ previous familiarity with the recipient nonprofit organization and the program in this study (the American Cancer Society and the Road for Recovery) as well as their previous experiences with cancer patients (Cronbach $\alpha = .79$). A check was conducted to investigate the differences of participants’ self-reported previous familiarity across all four conditions. There were no differences across the four conditions in previous familiarity, $F(3,139) = 1.77$, $p = .16$, $\eta^2 = .04$, 95% CI [0.00, 0.10].

Effect of Condition on Decision to Donate

An omnibus Chi-Square analysis was conducted to examine the effect of condition on participants’ decision to donate (1 = *donated*, 0 = *did not donate*). This test confirmed that there was a statistically significant difference between the highest and the lowest conditions, $\chi (3,140) = 8.33$, $p = .04$. The results are presented in order from the highest to the lowest percentage of donors: *Moderate Similarity* (86.84%), *Low Similarity* (77.14%), *High Similarity* (67.74%), *No Information* (58.33%) (See Fig. 5).

However, a planned pairwise comparison was needed to test our specific hypothesis that in the *Moderate Similarity* condition, participants would be more likely to donate

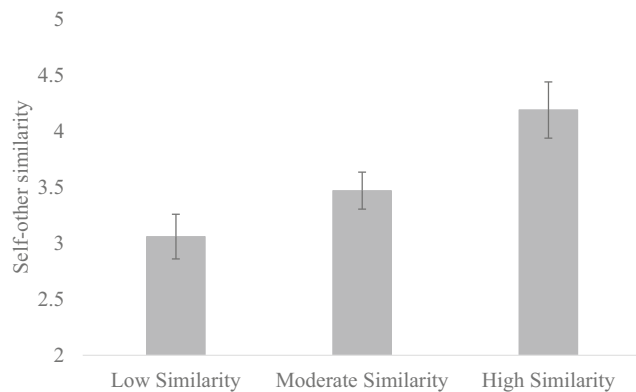
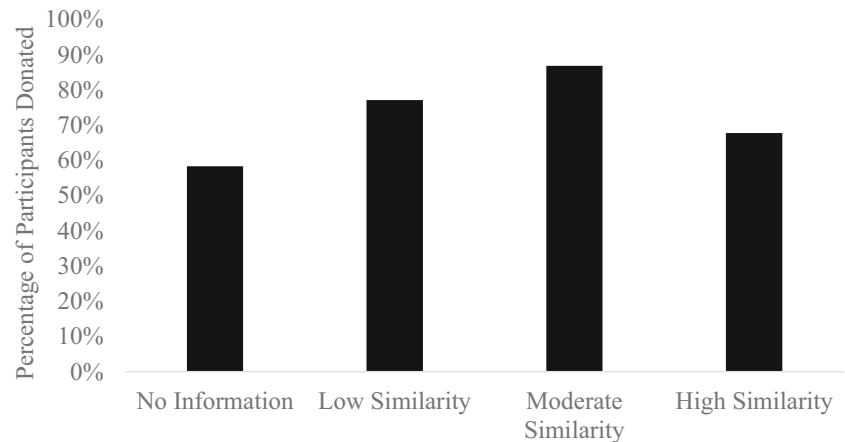


Fig. 4 Average Self-other similarity across conditions

compared to participants in all other conditions. Thus, a dummy variable was created that compared *Moderate Similarity* to all other similarity conditions combined, and found that there was indeed a statistically significant result, $\chi(1,140) = 5.16$, $p = .02$, odds ratio = 6.60, 95% CI [2.58, 16.91]. In order to examine all six pairs of comparisons on any two conditions, we used a binomial logit model. The pairwise comparisons based upon the binomial logit regression indicated that the probability of donating in the *Moderate Similarity* condition was higher than the *No Information* condition, $Z = 2.64$, $p = .01$, 95% CI [1.49, 14.90]. The differences were marginally statistical significant in two pairs: (1) *Low Similarity* was marginally higher than the *No Information* condition, $Z = 1.67$, $p = .09$, 95% CI [0.86, 6.76] and (2) *High Similarity* was marginally lower than the *Moderate Similarity* condition, $Z = -1.86$, $p = .06$, 95% CI [0.10, 1.06] (See Table 3). Overall, the results suggested a curvilinear pattern on decision to donate (See Fig. 5).

Effect of Condition on Percentage Donated

Next, an ANOVA was conducted to examine the effect of condition on the percentage of the study payment donated (see Fig. 6). An omnibus ANOVA result on the full sample, including both donors and non-donors, indicated that the highest average percentage donated was significantly different from the lowest percentage donated, $F(3,139) = 3.54$, $p = .02$, $\eta^2 = .07$, 95% CI [0.002, 0.15]. The average percentage donated is presented in order: *Moderate Similarity*: $M = 0.30$, $SD = .28$, $n = 38$; *Low Similarity*: $M = 0.23$, $SD = .28$, $n = 35$; *No Information*: $M = 0.18$, $SD = .30$, $n = 36$, and *High Similarity*: $M = 0.11$, $SD = .15$, $n = 31$. The post-hoc pairwise comparisons indicated there were statistically significant differences in two pairs: (1) participants in the *Moderate Similarity* condition donated significantly more of their study payment than participants in the *No Information* condition, $t(73) = 2.07$, $p = .04$, 95% CI [0.01, 0.25]. Yet (2) participants in the *High Similarity* condition donated significantly less of the study payment than participants in the *Moderate Similarity*

Fig. 5 Percentage of participants donated across conditions

condition, $t(68) = -3.14$, $p = .003$, 95% CI [-0.32, -0.07]. In addition, participants in the *High Similarity* condition donated marginally less of the study payment than participants in the *Low Similarity* condition, $t(65) = -1.93$, $p = .06$, 95% CI [-0.25, -0.003].

The same procedures were used to investigate the sample that only included donors. An omnibus ANOVA test yielded the same pattern as we obtained from the full sample, but was only close to marginally significant, $F(3,101) = 2.27$, $p = .09$, $\eta^2 = .07$, 95% CI [0.00, 0.15]. In the donor only sample, we found evidence to support the backfiring effect of oversimilarity on percentage of study payment donated: donors in the *High Similarity* condition donated statistically and significantly lower than donors in the *Moderate Similarity* condition, $t(68) = -2.56$, $p = .01$, 95% CI [-0.71, -0.96]. In addition, donors in the *High Similarity* condition donated marginally less than donors in the other two conditions (*High Similarity* VS *No Information*, $t(66) = -1.79$, $p = .08$, 95% CI [-0.73, -1.02]; and *High Similarity* VS *Low Similarity*, $t(65) = -1.80$, $p = .08$, 95% CI [-0.74, -1.02]).

Robustness Check of the Results

The randomization check confirmed that participants' facial recognition (*Prosopagnosia Index*), desire to look good (*Social Desirability Scale*), and familiarity with the

organization and cause (*Previous Familiarity*) were not significantly different across conditions. Yet, they may be factors that could potentially affect individuals' charitable donations. Thus, these three variables were added as covariates in the above analyses to check the robustness of the condition effect on the two measures of charitable giving. The results based upon a Logit regression (decision to donate as the dependent variable) indicated that both the condition effect and participants' desire to look good were statistically significant predictors: $Z = 2.36$, $p = .02$ (*Moderate* VS *No Information*), $Z = -1.79$, $p = .07$ (*Moderate* VS *High*) and $Z = 2.73$, $p = .01$ (*Social Desirability*). In addition, the results based upon ANCOVAs (for percentage donated) indicated that the effect of condition was still significant on the full sample, $F(3,139) = 3.05$, $p = .03$ and close to the marginal significance on the donor only sample, $F(3,101) = 2.15$, $p = .099$, while none of the three covariates were statistically significant predictors, $ps > .13$ (See Table 4). In short, the effect of condition did not change after adding the covariates (*Prosopagnosia Index*, *Social Desirability Scale*, and *Previous Familiarity*), which indicated that these results were robust.

Effect of Condition on Liking and Attraction

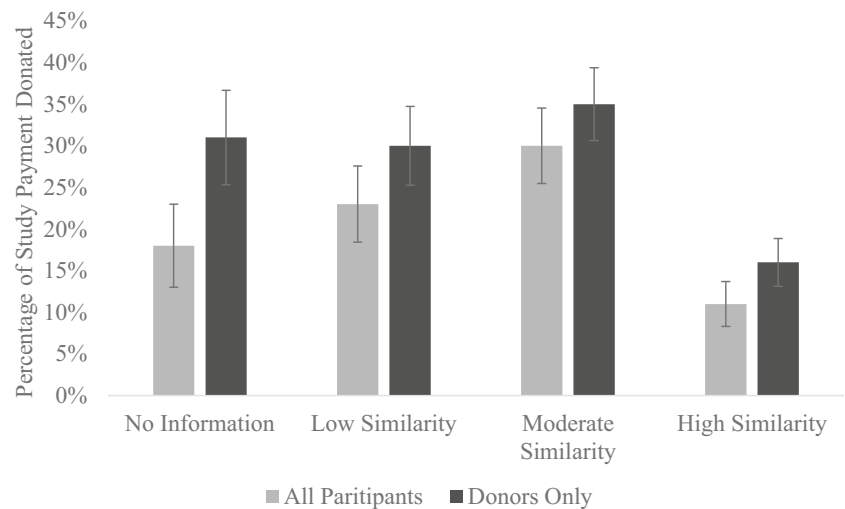
An ANOVA was conducted to examine the effect of condition on *Liking and Attraction*. The ANOVA was significant, $F(2,103) = 5.72$, $p = .004$, $\eta^2 = .10$, 95% CI [0.01, 0.21] and

Table 3 Pairwise comparison marginal odds ratios

Pairwise comparisons	Marginal odds ratios w/o controls
Low Similarity VS No Information	2.41~
Moderate Similarity VS No Information	4.71**
High Similarity VS No Information	1.50
Moderate Similarity VS Low Similarity	2.00
High Similarity VS Low Similarity	-0.63
High Similarity VS Moderate Similarity	-0.32~

~ ($p < .10$), * ($p < .05$), and ** ($p < .01$)

Fig. 6 Average percentage donated across conditions



the results are presented in order from the highest to the lowest: *Moderate Similarity*: $M = 4.43$, $SD = .97$, $n = 38$; *High Similarity*: $M = 4.03$, $SD = 1.00$, $n = 31$; and *Low Similarity*: $M = 3.64$, $SD = 1.02$, $n = 35$. Post-hoc pairwise comparisons indicated that participants in the *Moderate Similarity* condition reported higher *Liking and Attraction* towards the hypothetical donor than participants in the *Low Similarity* condition, $t(72) = 3.38$, $p = .001$, 95% CI [0.33, 1.26] (See Fig. 7). Yet, there was no difference in *Liking and Attraction* between *High Similarity* and *Moderate Similarity* condition, $t(68) = -1.66$, $p = .10$, 95% CI [-0.88, 0.08] and between *High* and *Low Similarity*, $t(65) = 1.58$, $p = .12$, 95% CI [-0.10, 0.08]. The findings confirmed a positive effect of similarity on *Liking and Attraction* when similarity moved from a low to a moderate level, yet the results did not provide strong supporting evidence for a backfiring effect of similarity on *Liking and Attraction* when similarity kept increasing. Therefore, we are unable to examine the mediating role of *Liking and Attraction* in a curvilinear relationship between similarity and donations in this study.

Effect of Condition on Beliefs about Donation Impact

An ANOVA was conducted to examine the effect of condition on *Beliefs about Donation Impact*. The ANOVA was significant based upon the p value but not significant based upon the 95% confidence interval, $F(2,103) = 3.53$, $p = .03$, $\eta^2 = .07$, 95% CI [0.00, 0.16], suggesting that at least one pair comparison might be significant. The results are presented in order from the highest to the lowest impact: *Moderate Similarity*: $M = 3.74$, $SD = 1.34$, $n = 38$; *Low Similarity*: $M = 3.64$, $SD = 1.85$, $n = 35$; and *High Similarity*: $M = 2.81$, $SD = 1.45$, $n = 31$. Post-hoc pairwise comparisons indicated that the *Beliefs about Donation Impact* in the *High Similarity* condition was significantly lower than the other two conditions (*High* VS *Low Similarity* condition, $t(65) = -2.17$, $p = .03$, 95% CI

[-1.60, -0.07], and *High* VS *Moderate Similarity* condition, $t(68) = -2.46$, $p = .02$, 95% CI [-1.68, -0.18] (See Fig. 8). The findings suggested a backfiring effect of similarity on the *Beliefs about Donation Impact* when similarity became too high, yet the results did not confirm a positive effect of similarity when similarity moved from a low to a moderate level. Therefore, there is also no strong supporting evidence for the mediating role of *Beliefs about Donation Impact* in a non-linear relationship between similarity and donations.

Discussion

Although much research has found that similarity to self has a positive influence on a variety of behaviors, including prosocial behaviors, very little research has suggested that too much similarity could have a negative influence. This experimental study added to this literature by examining how different levels of similarity to self (low, moderate, high) among donors could affect charitable giving. With respect to charitable donations, the study found that when other donors were moderately similar to the self, participants were more likely to donate to charity (and gave more; See Figs. 5 and 6). However, when other donors were high in similarity to the self, participants were actually *less* likely to give (and gave less) to charity. The results of this study were robust to social desirability, degree of self-reported face-blindness (prosopagnosia), and previous familiarity with the organization and cause. Taken together, this suggests that there can be such a thing as too much similarity to the self in these types of interactions, and people should not assume that more similarity will necessarily lead to more giving in the presence of other generous donors.

Byrne's (1961) Similarity Attraction Theory may help to explain why moving from low to moderate similarity led to increased charitable donations in the presence of a generous

Table 4 Robustness check of the results

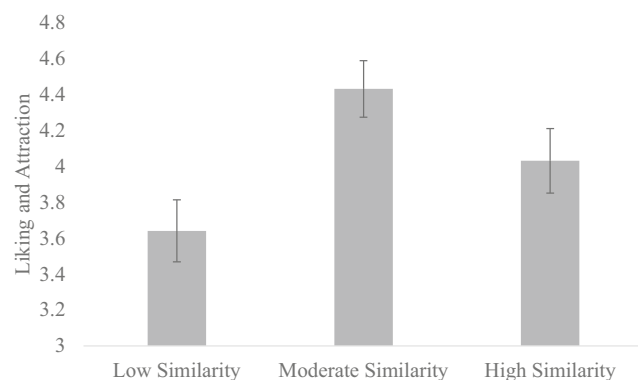
	Decision to donate (Logit), N = 140	Percentage donated (ANCOVA)-All Participants, N = 140	Percentage donated (ANCOVA)-Donors Only, N = 102
<i>Condition</i>	Moderate condition as the baseline. No vs Moderate: Odds ratio = 0.23, SE = .14, Z = -2.36, $p = .02^*$ Low vs Moderate: Odds ratio = 0.46, SE = .30, Z = -1.19, $p = .23$ High vs Moderate: Odds ratio = 0.32, SE = .21, Z = -1.79, $p = .07^{\sim}$	$F(3,139) = 3.05, p = .03$	$F(3,101) = 2.15, p = .099^{\sim}$
Prosopagnosia Index	Odds ratio = 1.75, SE = .64, Z = 1.54, $p = .124$	$F(1,139) = 2.30, p = .13$	$F(1,101) = 0.90, p = .35$
Social Desirability Scale	Odds ratio = 1.39, SE = .17, Z = 2.73, $p = .006^{**}$	$F(1,139) = 0.96, p = .33$	$F(1,101) = 0.15, p = .70$
Previous Familiarity	Odds ratio = 0.72, SE = .20, Z = -1.20, $p = .23$	$F(1,139) = 0.04, p = .85$	$F(1,101) = 0.68, p = .41$

All the p values are reported

$\sim (p < .10)$, $^*(p < .05)$, and $^{**}(p < .01)$

donor. The kinship literature may also help to explain why similarity (especially physical similarity) may influence the perception and evaluation of a similar other. The kinship literature indicates that individuals can distinguish between close genetic kin and non-kin via cue-based mechanisms, thus behaving differentially towards kin and non-kin (Hamilton 1964). *Genetic Similarity Theory* has been developed to incorporate the kin selection theory of altruism based upon genetic similarity. That is, people are more likely to be altruistic towards those genetically similar to them (Rushton et al. 1984). Extending *Genetic Similarity Theory*, empirical research has found that attitudinal similarity also serves as a heuristic cue for kinship recognition, and consequently, people tend to behave more prosocially to others who are perceived to be high in attitudinal similarity (Park and Schaller 2005). Indeed, in our study, we found that participants liked the other participants more in the moderate similarity condition compared to the low similarity condition.

However, according to these theories, even more similarity should have an even greater positive effect on donations. In fact, in the current study, donations were *less* likely (and were smaller) in the highest similarity condition. Indeed, participants reported liking the other participants *less* in the high similarity condition

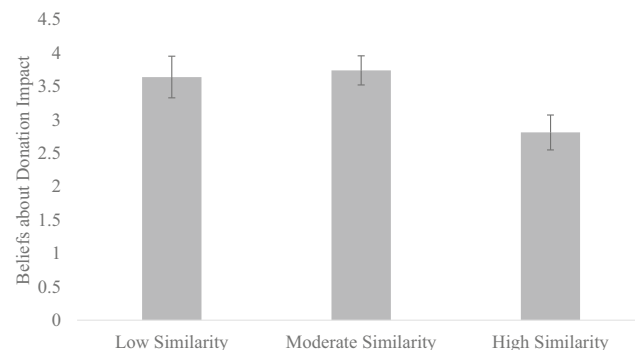
**Fig. 7** Average liking and attraction across conditions

according to the comparisons of group means (See Fig. 7), indicating that too much similarity might cause lower attraction and liking compared to similarity at moderate levels, which is contradictory to the prediction based upon Similarity Attraction Theory. However, since the condition effect on attraction and liking was marginally significant, more future studies are needed to better understand whether there is a potential negative effect of similarity on attraction and liking, which may lead to lower donations.

A better explanation for our results is provided by Optimal Distinctiveness Theory (Brewer 1991). Perhaps when individuals see that highly similar others have already donated generously, they may want to distinguish themselves or their contribution from others, and thus may donate less (or be less likely to donate). In addition, if individuals believe that they have already given via a substitution effect, then there should be no more reason to give, and the impact of any donation they make should be perceived as lower. Indeed, participants in the high similarity condition rated the impact of their donation as lower than those in the low and moderate similarity conditions (See Fig. 8).

Limitations, and Future Research

To date, the curvilinear relationship between similarity and charitable giving has received limited attention in prior

**Fig. 8** Average beliefs about donation impact across conditions

research. To our knowledge, little evidence has confirmed the negative effects at high similarity levels, and no study has yet investigated the effects of different levels of similarity on prosocial behavior. In order to address this gap in the literature, our study used an innovative approach, facial morphing, to manipulate different levels of similarity to other donors in order to investigate the potential curvilinear effects of similarity on prosocial behavior. Our study findings indicate that the facial morphing manipulation works not only in political voting contexts, but also in charitable giving contexts. Future research should also test this effect in other domains of persuasion, such as consumer behavior. Although we manipulate three levels of similarity, which is rarely done in the literature, in our future studies, we will examine even more similarity levels (i.e. 80%, 85%, 90%, 95%) and similarity types (i.e. perspective similarity, attitudes similarity, physical similarity and social similarity, etc.) to help determine the threshold point of too much similarity.

When interpreting our results, readers should be aware that they are based on a situation in which the other donors gave generously and that they are also based on a sample of college students. Thus, future research is needed to determine if these results would generalize in other contexts, such as when others donate stingily, and in other samples beyond college students. Future studies should replicate and extend these results, and try to better understand why they occur.

In addition, this study examines the potential for too much similarity in the context of donor-donor dyads. But future studies are needed in order to examine whether this theory is generalizable to other charitable giving contexts, such as donor-recipient or donor-solicitor dyads. Since research has also indicated a positive effect of similarity on other behaviors such as compliance, consumer behaviors, aggression, and dating (See Introduction), future research should also go beyond the charitable giving context to see whether there is a such thing as too much similarity in these domains as well. We think that over-similarity may be a general principle that would likely apply to a variety of contexts, but future research will help to determine this.

Additionally, we intended to examine the underlying process of the similarity effect on donation behavior by investigating the relevant measures, such as *Liking*, *Attraction* and *Donors' Beliefs of Donation Impact* in our study, because the literature suggested that those might be the mediator factors. However, we did not find strong supporting evidence that these factors explained the curvilinear relationship between similarity and donation behavior in our study. Based upon these unexpected findings, it is still unclear what caused the curvilinear effect of similarity on donations. It is possible that the positive and negative effects of similarity on donation could be explained by two different mechanisms. For example, *Liking* and *Attraction* might explain *positive* similarity effects, and *Donor's Beliefs about Donation Impact* might

explain *negative* similarity effects. More future research is needed to investigate this possibility.

In addition, if we simply divide the gifts into two different kinds, tangible ones (i.e. money) and intangible ones (i.e. volunteering), it is possible for a substitution effect to be happening. For instance, people may feel like their responsibility to give is diminished when someone very close to them gives. This is because tangible gifts can be jointly owned. However, we might not expect a similar effect with an intangible gift like giving time. For example, because a wife volunteers her time doesn't imply that the husband has also donated his time to the same organization, although it might inspire him to be more likely to do so.

In terms of the real world implications of the study findings, this study suggests that nonprofits should be careful when they use similarity to encourage donations, because too much similarity could potentially backfire in charitable giving. Until more research is conducted, nonprofits should aim for moderate similarity (e.g. same gender; see Shang et al. 2007) when encouraging donations, but should avoid high similarity.

Conclusion

This paper addressed some gaps in the literature by positing a curvilinear relationship between donor-donor similarity and one kind of prosocial behavior, charitable giving. Research finds positive relationships between similarity and a variety of behaviors. Yet, comparatively little is known about whether individuals could respond negatively to others' generous donations when they are too similar to the self. What we do know, based upon the results of this paper, is that there is not a simple linear and positive relationship, but rather a curvilinear relationship, between self-other similarity and charitable giving. That is, too much similarity between donors can sometimes backfire when others give generously.

Compliance with Ethical Standards

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Research Involving Human Participants All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Data Statement The datasets generated during and/or analyzed during the current study are not publicly available due the funding restriction but are available from the corresponding author on reasonable request.

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