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Effects of Cost and Benefit of Prosocial Behavior on Reputation

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Abstract

Prosocial behavior consists of a cost to the actor and a benefit of others. Previous studies have shown that prosocial actors generally receive positive social evaluations from observers. However, it is unknown how each component of prosocial behavior (i.e., cost and benefit) influences the two dimensions of person perception (i.e., warmth and competence). Thus, three studies investigated the independent effects of cost and benefit on the perceived warmth and competence of the actor. In Study 1, participants read a series of vignettes about a protagonist incurring a cost to benefit another individual and rated the warmth and competence of each protagonist. Although benefit enhanced both perceived warmth and competence, cost enhanced only perceived warmth. Studies 2a and 2b separately manipulated costs and benefits of prosocial behaviors in vignettes, and confirmed the results of Study 1. Thus, this study demonstrated the independent effects of cost and benefit on person perception.

Keywords: altruism, helping/prosocial behavior, reputation, person perception, warmth,
competence

1 Effects of Cost and Benefit of Prosocial Behavior on Reputation

2 On a daily basis, people exhibit various forms of prosocial behavior. Although the
3 definition of prosocial behavior is debatable, prosocial behaviors typically entail benefits toward
4 someone else and a cost to the individual performing the behavior (e.g., Fehr & Fischbacher,
5 2003; Kurzban, Burton-Chellew, & West, 2015; West, Griffin, & Gardner, 2007). Such prosocial
6 behaviors are generally praised by others. However, the cost-benefit ratio varies substantially
7 across instances of prosocial behaviors. For example, suppose that someone donates used
8 household items to a disaster zone. Disaster victims may find them extremely valuable even
9 when the cost is negligible to the donor. Now suppose that the donor spent substantial money on
10 canned foods. Despite the donor's cost, the donated canned foods would be almost worthless if
11 there are no can openers available in the disaster zone. In these two instances, how do people
12 evaluate the donors? In the present study, we independently manipulated the level of costs to the
13 prosocial actors and benefits to the recipients and examined the effects of these two variables on
14 impressions of prosocial actors.

15 People generally praise prosocial behaviors and even confer a high status upon the
16 prosocial actors (Hardy & Van Vugt, 2006; Willer, 2009). Similarly, people tend to trust (Barclay,
17 2004) and empathize with (Zheng et al., 2016) prosocial actors. Moreover, charitable
18 organizations praise major donors by providing them with symbolic awards, such as medals (see
19 Lacetera & Macis, 2010). As such, it is well-established that prosocial behaviors are favorably
20 evaluated. However, previous studies have not separately examined the effects of two
21 components of prosocial behaviors: the costs to the actors and benefits to the recipients.
22 Although one might assume that the relationship between the cost of prosocial behaviors and
23 benefits to the recipients is linear (i.e., the more costly to the actor, the more beneficial for the

1 recipient), this does not necessarily hold true in the real world. For example, expensive gifts
2 sometimes fail to please recipients (e.g., Dorsch & Kelley, 1994; Flynn & Adams, 2009), and
3 generously motivated behaviors sometimes displease recipients (e.g., Bolger & Amarel, 2007;
4 Feeney, 2004). Moreover, in real-life social exchanges, costs and benefits can take various forms:
5 costs can comprise effort, time, and money (e.g., Duval, Duval, & Neely, 1979) and benefits can
6 be physical, financial, or psychological. Therefore, it is possible that costs and benefits differ in
7 terms of their resource type. For example, one's time cost (e.g., listening to a partner's problems
8 for a long period of time) may produce a psychological benefit in the partner (e.g., relief of
9 stresses). In such cases, it is not reasonable to expect a linear relationship between cost and
10 benefit because they are not convertible from one form to the other.

11 Previous studies have examined many factors that influence the evaluation of prosocial
12 actors, which include incentives for prosocial behaviors (Barasch, Levine, Berman, & Small,
13 2014; Lin-Healy & Small, 2012), the type of relationship between the actor and beneficiary
14 (Kawamura & Kusumi, 2017; Lin-Healy & Small, 2013), and motives of prosocial behaviors
15 (Carlson & Zaki, 2018; Newman & Cain, 2014). However, only a few studies have separated the
16 effects of the costs and benefits of prosocial behaviors (Flynn & Adams, 2009; Zhang & Epley,
17 2009). In an exceptional study, Flynn and Adams (2009) demonstrated that gift givers tend to
18 expect that the cost, rather than the benefit, determines the gratitude of gift recipients, whereas
19 the recipients' gratitude was in fact determined by the benefits accruing from the gift.
20 Nevertheless, how the costs and benefits of prosocial behaviors independently impact third-party
21 observers' evaluation of prosocial actors has not been systematically investigated.

22 **Relationship between Cost/Benefit and Warmth/Competence**

23 Many studies on impression formation/person perception emphasize two dimensions of

1 individual differences: warmth and competence (e.g., Fiske, Cuddy, & Glick, 2007; Fiske,
2 Cuddy, Glick, & Xu, 2002). The present study also focused on these fundamental dimensions in
3 examining the effects of costs and benefits of prosocial behaviors on impressions of actors.
4 Although a few studies have investigated the relationship between prosocial behaviors and these
5 dimensions (Klein & Epley, 2014), it is not known which aspects of prosocial behaviors (i.e.,
6 cost and benefit) influence the perception of warmth and competence. These distinctions are
7 important because, as we explain below, it is expected that the two aspects of prosocial behaviors
8 may be differentially associated with perceived warmth and competence (cf. Klein & Epley,
9 2014).

10 In the dimension of warmth, it is expected for both the cost and benefit of prosocial
11 behavior to be positively correlated with the actor's warmth: other things (including competence)
12 being equal, the warmer an individual is, he/she is more willing to incur greater cost for someone
13 else, and brings about more benefit to the beneficiaries. Consistent with this natural reasoning,
14 major psychological causes of prosocial behaviors include warmth-related emotion (e.g.,
15 empathy; Batson, 2011) and personality (e.g., agreeableness; Habashi, Graziano, & Hoover,
16 2016). Regarding the actors' costs, many economic games, which are used to assess prosocial
17 tendencies, incentivize “not acting in a prosocial manner” (e.g., Camerer, 2003)—it is assumed
18 that actors would not incur any costs without other-regarding preferences (i.e., warmth). In other
19 words, the cost of prosocial behavior reflects the strength of warmth. Regarding benefit to
20 beneficiaries, most people consider that the goals of others' prosocial acts are contributinge to
21 other's benefit (Carlson & Zaki, 2019; Gebauer, Sedikides, Leary, & Asendorpf, 2015).
22 Therefore, we predicted that both cost and benefit of prosocial behaviors are positively correlated
23 with *perceived* warmth.

1 In the domain of competence, the effects of cost and benefit of prosocial behavior on
2 perceived competence may not be monolithic, and thus more complicated. Although it is
3 reasonable to assume the positive correlation between competence and benefit (i.e., the more
4 competent is an individual, he/she can bring about greater benefit with a fixed amount of cost),
5 the game theoretic reasoning leads us to assume the negative correlation between competence
6 and cost (Gintis, Smith, & Bowles, 2001). For example, in an emergency situation, less
7 competent members of a rescue crew may need to put forth more physical effort and take longer
8 to save a single victim than more competent members. In reality, however, this negative
9 correlation might not hold. Consider certain types of prosocial behavior that might fail to
10 produce benefit (e.g., Bolger & Amarel, 2007; Feeney, 2004): for example, advice from prosocial
11 actors may or may not be useful for the recipients. In such cases, competence is positively
12 correlated with benefit—a socially competent actor can provide useful advice. However, the cost
13 (e.g., the time and effort that the actor put forth giving the advice) may not be correlated with
14 competence—competent individuals may be able to provide useful advice (i.e., benefit) with
15 little effort (i.e., high benefit and low cost), whereas incompetent individuals may fail to provide
16 useful advice no matter how long they keep thinking (i.e., low benefit and high cost). Therefore,
17 cost may not correlate with perceived competence, or if cost and perceived competence were
18 ever related, it should be a negative, rather than a positive, relationship. In sum, different
19 predictions can be formed according to costs and benefits: the size of the benefit (but not cost)
20 would enhance perceived competence.

21 **The Current Study**

22 We conducted a set of three vignette studies (Studies 1, 2a, and 2b) to investigate the
23 effects of cost and benefit on the perceptions of warmth and competence. We hypothesized that

1 both the costs and benefits of prosocial behaviors will enhance perceived warmth, while the
2 benefits of prosocial behaviors, and not the costs, will enhance perceived competence. Study 1
3 employed a 2 (cost of the prosocial behaviors: high vs. low) \times 2 (benefit: high vs. low) within-
4 participant factorial design, in which participants evaluated fictitious generous individuals in
5 terms of warmth, competence, likeability as a friend, likeability as a coworker, and willingness to
6 help. In Studies 2a and 2b, to confirm the robustness of the findings of Study 1, we manipulated
7 the cost (Study 2a) and benefit (Study 2b) separately.

8

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Study 1

10 In Study 1, we independently manipulated the costs and benefits of prosocial behaviors.
11 Participants read a series of vignettes, each depicting a prosocial behavior, and rated their
12 perceived warmth and competence of the actor. We hypothesized that both the costs and benefits
13 of prosocial behaviors would enhance perceived warmth, while only the benefits of prosocial
14 behaviors would enhance perceived competence.

15 As auxiliary measures, we also examined how the costs and benefits of prosocial
16 behaviors would influence perceived likeability of the prosocial individual as a friend, perceived
17 likeability as a coworker, and willingness to help the prosocial individual (when he/she is in
18 need). We predicted that both the cost and benefit would be positively associated with the two
19 warmth-relevant items (i.e., likeability as a friend and willingness-to-help), whereas only the
20 benefit would be positively associated with the competence-relevant item (i.e., likeability as a
21 coworker).

22 **Methods**

23 **Participants and design.** We recruited 280 participants (143 men, 137 women) through

1 a Japanese crowdsourcing service, CrowdWorks. The average age of the participants was 39.2
2 years ($SD = 9.32$; range: 20–59). Sample size was determined before data collection. The study
3 used a 2 (Cost: High vs. Low) \times 2 (Benefit: High vs. Low) within-participant factorial design. A
4 sensitivity power analysis using [Power ANalysis for GEneral Anova designs \(PANGEA;](#)
5 [Westfall, 2016\)](#) indicated that our final sample size ($N = 274$) had 80% power to detect a
6 medium-sized main effect of $d = .52$ with $\alpha = .05$. The study was approved by the ethics
7 committee of the third author's institution.

8 **Vignettes.** Participants read and rated 48 vignettes. We prepared 12 settings and each
9 setting had four (2 [cost] \times 2 [benefit]) versions. Therefore, each vignette included both the cost
10 and benefit information. An example setting is as follows:

11 [A protagonist] heard that his/her close, male/female colleague had failed in his/her job.
12 For each evaluation session, such a setting scenario was followed by additional information
13 corresponding to one of the 2 (Cost) \times 2 (Benefit) conditions. For the above setting, one of the
14 following pieces of information was provided to manipulate the cost:

15 [The protagonist] spent many hours listening to the colleague's complaints and giving
16 him/her some advice. (High Cost)

17 [The protagonist] spent a few minutes listening to the colleague's complaints and giving
18 him/her some advice. (Low Cost)

19 For the above setting, one of the following pieces of information was provided to manipulate the
20 benefit:

21 His/her advice helped the colleague a lot because it was appropriate for the colleague's
22 situation. (High Benefit)

23 His/her advice did not help the colleague because it was slightly irrelevant. (Low

1 Benefit)

2 We matched participants' own gender with the gender of the protagonist and the
3 beneficiary and referred to the protagonist by a gender-specific name and/or pronouns.
4 Therefore, all participants assumed that the described interaction occurred between two
5 individuals whose gender was same as their own.

6 The vignettes included various situations such as gift-giving, charitable donations, and
7 helping to clean up. The 12 settings were adapted from two questionnaires to measure prosocial
8 behaviors, one of which were developed based on a pilot study on real-world prosocial behaviors
9 (Johnson et al., 1989; Oda et al., 2013). We associated various types of costs (e.g., effort, time, or
10 money) and benefits (e.g., physical, financial, or psychological) with the 12 settings. Therefore,
11 we think the general themes of our 12 settings and the following cost and benefit scenarios retain
12 external validity. All vignettes can be found at

13 https://osf.io/hp6kq/?view_only=38ab48e33eba4ef8b4592257e46ae174

14 The order of the 48 vignettes were semi-randomized in the following manner. The 48
15 vignettes were first divided into four blocks, each of which contained the 12 settings. Within
16 each block, the 12 settings were followed by one of the four (cost × benefit) conditions. For each
17 participant, the order of blocks and the order of the 12 settings in each block were randomized.
18 Therefore, the order of the 48 vignettes was mostly randomized except that the 12 settings were
19 distributed sparsely through the 48 trials.

20 **Measures.** After reading each vignette, participants rated their perceived cost and
21 benefit of the behavior on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*) as
22 manipulation checks. Subsequently, they rated perceived warmth with two items (good-natured
23 and warm; $r = .87$) and perceived competence with two items (competent and capable; $r = .94$)

1 on a 7-point scale (1 = *not at all*, 7 = *extremely*). These items were adapted from Fiske et al.
2 (2002). The two warmth items and two competence items were aggregated to obtain single
3 scores of warmth and competence, respectively. In addition, participants rated the likeability of
4 the protagonist as a friend, the likeability as a coworker, and their willingness to help the
5 protagonist if he/she is in need on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

6 After the 48 vignettes, an attention check task was included. Participants were presented
7 the four trait items included in the study (i.e., good-natured, warm, competent, and capable) and
8 one irrelevant item (i.e., tall) and asked to select the item that was not used to evaluate the
9 protagonists. Based on this attention check, data from six participants were discarded, resulting
10 in a final sample comprised of 274 Japanese individuals aged 20–59 years ($M = 39.2$, $SD = 9.32$;
11 141 men, 133 women).

12 **Results and Discussion**

13 The descriptive statistics are shown in Table 1 (for the descriptive statistics per vignette,
14 see Tables S1-S7). The correlation between warmth and competence was .42. For each variable,
15 we conducted linear mixed model (LMM) analyses with participants and vignettes as random
16 effects and two dummy variables of cost (Low = -0.5, High = 0.5) and benefit (Low = -0.5, High
17 = 0.5) as fixed effects. The results of the random effect aspects are reported only in
18 Supplementary Materials (Tables S24–S30). We also entered a dummy-coded variable
19 representing gender (Men = -0.5, Women = 0.5) as a control variable because the protagonist's
20 gender in the vignettes differed according to the participant's gender (we conducted the
21 comparable analyses excluding gender and confirmed that the exclusion of gender did not alter
22 the reported pattern of significance; see Tables S14-S16). In addition, although we tested the
23 interaction between cost and benefit, it was not significant (see Tables S12–S13). These analyses

1 were conducted using R 3.5.1 with lme4 (Bates, Mächler, Bolker, & Walker, 2015), lmerTest

2 *Table 1. Means and SDs for Each Scale in Study 1 (N = 274).*

Measures	High Benefit				Low Benefit			
	High Cost		Low Cost		High Cost		Low Cost	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Manipulation Check								
Perceived Cost	6.06	0.93	5.33	1.01	5.93	0.80	5.16	0.82
Perceived Benefit	6.35	0.55	6.23	0.55	2.67	0.80	2.72	0.79
Impression								
Perceived Warmth	6.39	0.57	6.04	0.63	5.96	0.72	5.53	0.71
Perceived Competence	5.73	0.75	5.76	0.65	3.38	0.90	3.47	0.84
Auxiliary Variables								
Likeability as a Friend	5.71	0.81	5.57	0.72	4.62	1.01	4.47	0.91
Likeability as a Coworker	5.63	0.82	5.62	0.73	3.93	1.01	3.93	0.93
Willingness-to-Help	5.83	0.77	5.65	0.74	4.98	0.94	4.79	0.92

3 Note: All scales range from 1 to 7.

4

5 (Kuznetsova, Brockhoff, & Christensen, 2017), and sjstats (Lüdtke, 2019) packages. Following

6 the recommendations of Barr, Levy, Scheepers, and Tily (2013), we adapted a maximal random

7 effects structure for model specification (see also Judd, Westfall, & Kenny, 2017). However, the

8 model with perceived benefit as the dependent variable did not converge. In this case, we

9 adapted a no-random-correlation model (Barr et al., 2013).

1 **Manipulation checks.** We first conducted LMM analyses on perceived cost and benefit
2 (Tables S12, S24, and S25). Overall, the manipulations were successful: participants perceived
3 the prosocial behaviors as being more costly in the high cost than in the low cost condition ($B =$
4 0.75 , 95% CI [0.63 , 0.88], $\beta = .31$, $t(20.24) = 11.90$, $p < .001$). The effect of cost manipulation on
5 perceived benefit was not significant ($B = 0.04$, 95% CI [-0.01 , 0.08], $\beta = .01$, $t(11.61) = 1.61$, p
6 $= .135$). Participants also perceived prosocial behaviors as being more beneficial in the high
7 benefit than in the low benefit condition ($B = 3.60$, 95% CI [3.27 , 3.93], $\beta = .85$, $t(14.39) =$
8 21.51 , $p < .001$). Unexpectedly, participants perceived prosocial behaviors as being more costly
9 in the high benefit than in the low benefit condition ($B = 0.15$, 95% CI [0.05 , 0.25], $\beta = .06$,
10 $t(56.96) = 2.92$, $p = .005$). However, this unexpected effect of the benefit manipulation on
11 perceived cost was much smaller than its effect on perceived benefit ($\beta = .85$ vs. $.06$).

12 **Warmth and competence.** Confirming the success in the manipulations of cost and
13 benefit, we conducted LMM analyses with perceived warmth and competence as dependent
14 variables (Tables 2, S26-S27). The effects of cost and benefit on perceived warmth were
15 significant. Participants found the protagonist as a warmer person in the high cost than in the low
16 cost condition ($B = 0.39$, 95% CI [0.29 , 0.49], $\beta = .20$, $t(15.78) = 7.70$, $p < .001$), as well as a
17 warmer person in the high benefit than in the low benefit condition ($B = 0.47$, 95% CI [0.35 ,
18 0.58], $\beta = .24$, $t(16.18) = 8.07$, $p < .001$).

19 Regarding perceived competence, only the effect of benefit was significant. Participants
20 found the protagonist as a more competent person in the high benefit than in the low benefit
21 condition ($B = 2.32$, 95% CI [2.03 , 2.61], $\beta = .70$, $t(15.31) = 15.67$, $p < .001$). The effect of cost
22 on perceived competence was not significant ($B = -0.06$, 95% CI [-0.18 , 0.06], $\beta = -.02$, $t(11.90)$
23 $= -1.04$, $p = .320$).

1 To assess the robustness of these results, we conducted the comparable analyses

2 *Table 2. Fixed Effects of Linear Mixed Model Analyses on Perceived Warmth and Competence*
 3 *(Study 1).*

Measures	Perceived Warmth (Study 1)						
	<i>B</i>	95 % CI	β	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>
(Intercept)	5.98	[5.87, 6.10]		0.06	26.18	102.30	<.001
SEX (-0.5: Male, 0.5: Female)	0.06	[-0.07, 0.18]	.03	0.07	272.00	0.86	.391
Cost (-0.5: Low, 0.5: High)	0.39	[0.29, 0.49]	.20	0.05	15.78	7.70	<.001
Benefit (-0.5: Low, 0.5: High)	0.47	[0.35, 0.58]	.24	0.06	16.18	8.07	<.001
Cost*Benefit	-0.07	[-0.17, 0.02]	-.02	0.05	11.84	-1.54	.150
Measures	Perceived Competence (Study 1)						
	<i>B</i>	95 % CI	β	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>
(Intercept)	4.59	[4.42, 4.75]		0.08	16.03	54.59	<.001
SEX (-0.5: Male, 0.5: Female)	0.08	[-0.05, 0.21]	.02	0.07	272.01	1.20	.230
Cost (-0.5: Low, 0.5: High)	-0.06	[-0.18, 0.06]	-.02	0.06	11.90	-1.04	.320
Benefit (-0.5: Low, 0.5: High)	2.32	[2.03, 2.61]	.70	0.15	15.31	15.67	<.001
Cost*Benefit	0.07	[-0.19, 0.33]	.01	0.13	11.09	0.55	.596

4
 5 including perceived cost and benefit, instead of the dummy-coded cost and benefit variables, as
 6 the predictor variables. The results were consistent with the hypotheses: both perceived cost and
 7 benefit predicted perceived warmth, whereas only perceived benefit (not perceived cost)
 8 predicted perceived competence (Tables S17, S38-S39).

9 **Auxiliary variables.** We also conducted LMM analyses on likeability as a friend,

1 likeability as a coworker, and willingness-to-help (Tables S13, S28–S30). Participants perceived
2 the protagonist as being more likeable as a friend in the high cost than in the low cost condition
3 ($B = 0.14$, 95% CI [0.07, 0.22], $\beta = .05$, $t(17.61) = 3.76$, $p = .001$). Participants also perceived the
4 protagonist as being more likeable as a friend in the high benefit than in the low benefit
5 condition ($B = 1.10$, 95% CI [0.88, 1.31], $\beta = .41$, $t(15.01) = 9.99$, $p < .001$).

6 As for likeability as a coworker, only the effect of benefit was significant. Participants
7 perceived the protagonist as being more likeable as a coworker in the high benefit than in the low
8 benefit condition ($B = 1.69$, 95% CI [1.40, 1.98], $\beta = .55$, $t(14.40) = 11.39$, $p < .001$). However,
9 the effect of cost on likeability as a coworker was not significant ($B = 0.01$, 95% CI [-0.07, 0.09],
10 $\beta = .00$, $t(14.74) = 0.14$, $p = .889$).

11 As for willingness to help, participants reported greater willingness to help the
12 protagonist in the high cost than in the low cost condition ($B = 0.18$, 95% CI [0.11, 0.26], β
13 $= .08$, $t(15.87) = 4.60$, $p < .001$) and greater willingness to help the protagonist in the high
14 benefit than in the low benefit condition ($B = 0.85$, 95% CI [0.69, 1.01], $\beta = .36$, $t(18.78) =$
15 10.44 , $p < .001$).

16 In Study 1, we investigated the associations between the costs and benefits of prosocial
17 behaviors and the perceived warmth and competence of the actor. In line with our hypotheses,
18 both the costs and benefits of prosocial behaviors enhanced perceived warmth, whereas only the
19 benefit enhanced perceived competence. The auxiliary analyses confirmed this pattern: both the
20 cost and benefit increased perceived likeability of the prosocial individual as a friend and
21 participants' willingness to help the individual. By contrast, only the benefits of prosocial
22 behaviors increased the perceived likeability of the prosocial individual as a coworker.

23 In Study 1, participants were exposed to a series of vignettes in which both the cost and

1 benefit were systematically manipulated. This design may be associated with a problem of
2 demand characteristics—it might have unwittingly urged participants to consider the effects of
3 cost and benefit separately. Therefore, in Studies 2a and 2b, we manipulated only one of the two
4 aspects of prosocial behaviors to avoid unwittingly leading participants to consider the two
5 aspects separately.

6

7

Studies 2a and 2b

8 In Studies 2a and 2b, participants were asked to rate their perception of the protagonist
9 based on either the level of cost (Study 2a) or benefit (Study 2b). Unlike in Study 1 where the
10 perceptions of warmth and competence were measured by two items each, we increased the
11 number of warmth/competence items to more comprehensively measure each construct.

12 Methods

13 **Participants and design.** Participants were recruited through a Japanese crowdsourcing
14 service, Lancers. Study 2a contained 99 participants whose average age was 38.9 years ($SD =$
15 8.77 ; range = 21–59; 56 men, 43 women). Study 2b contained 101 participants whose average
16 age was 41.7 years ($SD = 8.45$; range = 21–59; 57 men, 44 women). Sample size was determined
17 before data collection. Each experiment manipulated only one aspect of prosocial behavior (cost
18 and benefit in Studies 2a and 2b, respectively) as a within-participant condition. A series of
19 sensitivity power analyses using PANGEA (Westfall, 2016) indicated that the final sample sizes
20 of both studies ($N = 99$ and 101 for Studies 2a and 2b, respectively) had 80% power to detect a
21 medium main effect of $d = .65$ and $.64$ with $\alpha = .05$. This study was approved by the ethics
22 committee of the third author's institution.

23 **Vignettes.** The vignettes were similar to the ones used in Study 1. However, the

1 description of the benefit accruing from the protagonist's behavior was removed from each
2 vignette in Study 2a. In Study 2b, the descriptions of the cost of prosocial behaviors were
3 removed from the vignettes.

4 In both studies, the order of the 24 vignettes was semi-randomized in the same manner
5 as in Study 1. In Studies 2a and 2b, the 24 vignettes were divided into two blocks, instead of four
6 blocks.

7 **Measures.** The manipulation check items were identical with those in Study 1.
8 However, in Study 2, we removed the three auxiliary variables to increase the number of items of
9 the main two variables (perceived warmth and competence). Perceived warmth was assessed
10 with the following four items, which were adapted from Fiske et al.'s (2002) study: good-
11 natured, warm, sincere, and well-intentioned: Cronbach's α coefficients were .93 and .93 in
12 Studies 2a and 2b, respectively. Perceived competence was assessed with the following four
13 items: competent, capable, confident, and intelligent: Cronbach's α coefficients were .89 and .90
14 in Studies 2a and 2b, respectively. All items were rated on a 7-point scale (1 = *not at all*, 7 =
15 *extremely*). Although we administered the same attention check task as in Study 1, no
16 participants were discarded due to the attention check task in Studies 2a and 2b.

17 **Results and Discussion**

18 The descriptive statistics are shown in Table 3 (for the descriptive statistics per
19 vignettes, see Tables S8-S11). The correlations between warmth and competence were .59
20 and .51 in Study 2a and 2b, respectively. Using the same R packages as in Study 1, we conducted
21 LMM analyses with participants and vignettes as random effects and the dummy-coded variable
22 of cost (Low = -0.5, High = 0.5; Study 2a) or benefit (Low = -0.5, High = 0.5; Study 2b) as a
23 fixed effect. We also entered a dummy-coded variable of gender (Men = -0.5, Women = 0.5) in

1 the model as a control variable.

2 *Table 3. Means and SDs for Each Scale in Study 2a (N = 99) and 2b (N = 101).*

Measures	Study 2a				Study 2b			
	High Cost		Low Cost		High Benefit		Low Benefit	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Manipulation Check								
Perceived Cost	5.84	1.02	4.94	0.94	5.64	0.87	5.56	0.68
Perceived Benefit	5.45	0.80	5.13	0.57	6.29	0.64	2.83	0.67
Impression								
Perceived Warmth	6.00	0.69	5.56	0.63	6.16	0.79	5.73	0.79
Perceived Competence	4.95	0.76	4.83	0.63	5.45	0.79	3.91	0.57

3 Note: All scales range from 1 to 7.

4

5 **Manipulation check (Study 2a).** LMM analyses on perceived cost and benefit showed
 6 that the manipulation of cost significantly increased perceived cost and benefit (Tables S19, S41-
 7 S42). Participants perceived the prosocial behavior as being more costly in the high cost than in
 8 the low cost condition ($B = 0.90$, 95% CI [0.73, 1.07], $\beta = .35$, $t(30.40) = 10.50$, $p < .001$).
 9 Unexpectedly, participants perceived the prosocial behavior as being more beneficial, too, in the
 10 high cost than in the low cost condition ($B = 0.32$, 95% CI [0.14, 0.49], $\beta = .14$, $t(15.61) = 3.48$,
 11 $p = .003$). However, the effect of cost on perceived benefit was smaller than its effect on
 12 perceived cost ($\beta = .35$ vs. $.14$).

13 **Manipulation check (Study 2b).** LMM analyses on perceived cost and benefit showed
 14 that the manipulation of benefit increased only perceived benefit (Tables S19, S43-S44).

1 Participants perceived the prosocial behavior as being more beneficial in the high benefit than in
2 the low benefit condition ($B = 3.46$, 95% CI [3.01, 3.91], $\beta = .85$, $t(17.05) = 15.06$, $p < .001$).
3 The manipulation of benefit did not affect the perception of cost ($B = 0.07$, 95% CI [-0.05, 0.20],
4 $\beta = .03$, $t(54.92) = 1.14$, $p = .260$).

5 **Effect of cost on warmth and competence (Study 2a).** We then conducted a series of
6 LMM analyses on perceived warmth and competence (Tables 4, S45-S46). Participants found the
7 protagonist as a warmer person in the high cost than in the low cost condition ($B = 0.44$, 95% CI
8 [0.28, 0.59], $\beta = .23$, $t(16.22) = 5.60$, $p < .001$). Confirming Study 1, the effect of cost on perceived
9 competence was not significant ($B = 0.12$, 95% CI [-0.13, 0.37], $\beta = .06$, $t(12.87) = 0.93$, $p = .371$).
10 The comparable analyses including the perceived cost variable, instead of dummy-coded cost
11 variable, confirmed these results (Tables S22, S57-S58)

12 **Effect of benefit on warmth and competence (Study 2b).** A series of LMM analyses on
13 perceived warmth and competence showed that the effects of benefit on perceived warmth and
14 competence were significant (Tables 4, S47-S48). Participants found the protagonist as a warmer
15 person ($B = 0.43$, 95% CI [0.29, 0.57], $\beta = .22$, $t(21.52) = 6.16$, $p < .001$) and a more competent
16 person ($B = 1.54$, 95% CI [1.24, 1.84], $\beta = .62$, $t(17.54) = 10.05$, $p < .001$) in the high benefit than
17 in the low benefit condition. The comparable analyses including the perceived benefit variable,
18 instead of dummy-coded benefit variables, confirmed these results (Tables S22, S59-S60)

19 In Studies 2a and 2b, we manipulated only one aspect of prosocial behaviors (i.e., either
20 cost or benefit) to avoid any suggestion that we were interested in differentiating the effects of
21 costs and benefits of prosocial behaviors on impression of prosocial individuals. The results of
22 these two studies confirmed the results of Study 1: the costs of prosocial behaviors only
23 enhanced perceived warmth, while the benefits of prosocial behaviors enhanced both perceived

- 1 warmth and competence.

1 *Table 4. Fixed Effects of Linear Mixed Model Analyses on Perceived Warmth and Competence (Studies 2a and 2b).*

Measures	Perceived Warmth (Study 2a)							Perceived Warmth (Study 2b)						
	<i>B</i>	95 % CI	β	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>B</i>	95 % CI	β	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>
(Intercept)	5.80	[5.62, 5.98]		0.09	32.74	62.70	<.001	5.94	[5.75, 6.13]		0.10	54.83	60.59	<.001
SEX (-0.5: Male, 0.5: Female)	0.26	[0.01, 0.50]	.14	0.12	97.00	2.07	.041	-0.07	[-0.38, 0.23]	-.04	0.15	99.00	-0.48	.629
Cost (-0.5: Low, 0.5: High)	0.44	[0.28, 0.59]	.23	0.08	16.22	5.60	<.001							
Benefit (-0.5: Low, 0.5: High)								0.43	[0.29, 0.57]	.22	0.07	21.52	6.16	<.001
Measures	Perceived Competence (Study 2a)							Perceived Competence (Study 2b)						
	<i>B</i>	95 % CI	β	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>B</i>	95 % CI	β	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>
(Intercept)	4.91	[4.69, 5.12]		0.11	24.74	44.88	<.001	4.68	[4.51, 4.85]		0.09	31.04	53.76	<.001
SEX (-0.5: Male, 0.5: Female)	0.21	[-0.04, 0.46]	.10	0.13	97.00	1.66	.100	0.02	[-0.20, 0.23]	.01	0.11	99.00	0.15	.883
Cost (-0.5: Low, 0.5: High)	0.12	[-0.13, 0.37]	.06	0.13	12.87	0.93	.371							
Benefit (-0.5: Low, 0.5: High)								1.54	[1.24, 1.84]	.62	0.15	17.54	10.05	<.001

2

3

General Discussion

1
2 Although previous studies have repeatedly shown that prosocial behaviors confers a
3 positive reputation on individuals (e.g., Barclay, 2004; Hardy & Van Vugt, 2006; Willer, 2009),
4 the different effects of the cost and benefit of prosocial behaviors have not been systematically
5 examined. The present three studies investigated the effects of the costs and benefits of prosocial
6 behaviors on the two dominant dimensions of person perception—warmth and competence
7 (Fiske et al., 2007; Fiske et al., 2002). The results showed that cost enhanced perceived warmth,
8 whereas benefit enhanced both perceived warmth and competence. These associations were
9 observed regardless of whether the cost and benefit were manipulated simultaneously (Study 1)
10 or separately (Studies 2a and 2b).

11 The present study revealed clear evidence that the cost and benefit of prosocial
12 behaviors are differently accounted for in person perception, especially in determining the
13 benefactor's competence. However, this study has several limitations. First, participants did not
14 observe real behavior, which should be examined in future studies. Second, the present study
15 adopted within-participant factorial design; therefore, it might have been easier for participants
16 to compare the high and low cost/benefit. If these factors were manipulated as between-
17 participants factors, the effect sizes might have been smaller. Third, this study exclusively
18 focused on the third-party perspective and did not consider the beneficiaries' perceptions of the
19 benefactors. However, it is possible that third-party observers and beneficiaries of altruistic
20 behaviors disagree on how they evaluate prosocial individuals (cf. Flynn & Adams, 2009; Zhang
21 & Epley, 2009). Fourth, the present study focused only on warmth and competence. However,
22 some studies have shown that morality is a distinct dimension from warmth and competence, and
23 more central in person perception (e.g., Goodwin, Piazza, & Rozin, 2014). Thus, future studies

1 need to include measures of perceived morality of the prosocial actors. Fifth, the present studies
2 did not distinguish the objective benefits and how well the benefits are matched to the needs of
3 the recipients. Future studies need to independently manipulate these factors. Sixth, in the
4 vignettes used in the present study, the size of benefit was, at least partly, related to the
5 protagonists' competence. However, the benefit size is not solely determined by the actors'
6 competence (e.g., when actors happen to know information desperately needed by someone).
7 Whether the benefit size would also enhance perceived competence in such cases is an
8 interesting empirical question. Finally, it may be worth investigating how observers' evaluations
9 influence the actors' prosocial behavior.

10 Although the present study was conducted in the context of person perception, it is of
11 great relevance to the growing interest in effective altruism movement (e.g., Berman, Barasch,
12 Levine, & Small, 2018; MacAskill, 2015): the movement to promote charitable behaviors
13 conducted in an effective way (i.e., maximizing benefits at constant costs). The present study,
14 which distinguished the cost and benefit of prosocial behaviors, can be readily modified and
15 extended to this context: for example, a person who donates to more effective charities might be
16 seen as a warmer and more competent person. As it is important to efficiently promote the
17 greater good, separate assessments of the cost and benefit aspects of prosocial behaviors can
18 deepen our understanding of prosocial behaviors.

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References

- 1
2 Barasch, A., Levine, E. E., Berman, J. Z., & Small, D. A. (2014). Selfish or selfless? On the
3 signal value of emotion in altruistic behavior. *Journal of Personality and Social
4 Psychology, 107*, 393-413. doi:10.1037/a0037207
- 5 Barclay, P. (2004). Trustworthiness and competitive altruism can also solve the “tragedy of the
6 commons”. *Evolution and Human Behavior, 25*, 209-220.
7 doi:10.1016/j.evolhumbehav.2004.04.002
- 8 Barr, D. J., Levy, R., Scheepers, C., & Tily, H. J. (2013). Random effects structure for
9 confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language, 68*,
10 255-278. doi:10.1016/j.jml.2012.11.001
- 11 Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models
12 Usinglme4. *Journal of Statistical Software, 67*. doi:10.18637/jss.v067.i01
- 13 Batson, C. D. (2011). *Altruism in humans*. USA: Oxford University Press.
- 14 Berman, J. Z., Barasch, A., Levine, E. E., & Small, D. A. (2018). Impediments to Effective
15 Altruism: The Role of Subjective Preferences in Charitable Giving. *Psychol Sci, 29*, 834-
16 844. doi:10.1177/0956797617747648
- 17 Bolger, N., & Amarel, D. (2007). Effects of social support visibility on adjustment to stress:
18 experimental evidence. *Journal of Personality and Social Psychology, 92*, 458-475.
19 doi:10.1037/0022-3514.92.3.458
- 20 Camerer, C., F. (2003). *Behavioral game theory: Experiments in strategic interaction*. Princeton,
21 NJ: Princeton University Press.
- 22 Carlson, R. W., & Zaki, J. (2018). Good deeds gone bad: Lay theories of altruism and
23 selfishness. *Journal of Experimental Social Psychology, 75*.

- 1 doi:10.1016/j.jesp.2017.11.005
- 2 Carlson, R. W., & Zaki, J. (2019). Belief in altruistic motives predicts prosocial actions and
3 inferences. doi:10.31234/osf.io/sa6q8
- 4 Dorsch, M. J., & Kelley, S. W. (1994). An investigation into the Intentions of Purchasing
5 Executives to Reciprocate Vendor Gifts. *Journal of the Academy of Marketing Science*,
6 22, 315-327. doi:10.1177/0092070394224001
- 7 Duval, S., Duval, V. H., & Neely, R. (1979). Self-focus, felt responsibility, and helping behavior.
8 *Journal of Personality and Social Psychology*, 37, 1769-1778. doi:10.1037/0022-
9 3514.37.10.1769
- 10 Feeney, B. C. (2004). A secure base: responsive support of goal strivings and exploration in adult
11 intimate relationships. *Journal of Personality and Social Psychology*, 87, 631-648.
12 doi:10.1037/0022-3514.87.5.631
- 13 Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, 425, 785-791.
14 doi:10.1038/nature02043
- 15 Fiske, S. T., Cuddy, A. J., & Glick, P. (2007). Universal dimensions of social cognition: warmth
16 and competence. *Trends in Cognitive Sciences*, 11, 77-83. doi:10.1016/j.tics.2006.11.005
- 17 Fiske, S. T., Cuddy, A. J., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype
18 content : competence and warmth respectively follow from perceived status and
19 competition. *Journal of Personality and Social Psychology*, 82, 878-902.
20 doi:10.1037//0022-3514.82.6.878
- 21 Flynn, F. J., & Adams, G. S. (2009). Money can't buy love: Asymmetric beliefs about gift price
22 and feelings of appreciation. *Journal of Experimental Social Psychology*, 45, 404-409.
23 doi:10.1016/j.jesp.2008.11.003

- 1 Gebauer, J. E., Sedikides, C., Leary, M. R., & Asendorpf, J. B. (2015). Lay beliefs in true
2 altruism versus universal egoism. In C. B. Miller, R. M. Furr, A. Knobel, & W. Fleeson
3 (Eds.), *Character: New Directions from Philosophy, Psychology, and Theology* (pp. 75-
4 99). Oxford, UK: Oxford University Press.
- 5 Gintis, H., Smith, E. A., & Bowles, S. (2001). Costly signaling and cooperation. *Journal of*
6 *theoretical biology*, *213*, 103-119. doi:10.1006/jtbi.2001.2406
- 7 Goodwin, G. P., Piazza, J., & Rozin, P. (2014). Moral character predominates in person
8 perception and evaluation. *Journal of Personality and Social Psychology*, *106*, 148-168.
9 doi:10.1037/a0034726
- 10 Habashi, M. M., Graziano, W. G., & Hoover, A. H. (2016). Searching for the Prosocial
11 Personality: A Big Five Approach to Linking Personality and Prosocial Behavior.
12 *Personality and Social Psychology Bulletin*, *42*, 1177-1192.
13 doi:10.1177/0146167216652859
- 14 Hardy, C. L., & Van Vugt, M. (2006). Nice guys finish first: the competitive altruism hypothesis.
15 *Personality and Social Psychology Bulletin*, *32*, 1402-1413.
16 doi:10.1177/0146167206291006
- 17 Johnson, R. C., Danko, G. P., Darvill, T. J., Bochner, S., Bowers, J. K., Huang, Y. H., . . .
18 Pennington, D. (1989). Cross-Cultural Assessment of Altruism and Its Correlates.
19 *Personality and Individual Differences*, *10*, 855-868. doi:10.1016/0191-8869(89)90021-4
- 20 Judd, C. M., Westfall, J., & Kenny, D. A. (2017). Experiments with More Than One Random
21 Factor: Designs, Analytic Models, and Statistical Power. *Annual Review of Psychology*,
22 *68*, 601-625. doi:10.1146/annurev-psych-122414-033702
- 23 Kawamura, Y., & Kusumi, T. (2017). Selfishness is attributed to men who help young women:

- 1 Signaling function of male altruism. *Letters on Evolutionary Behavioral Science*, 8, 45-
2 48. doi:10.5178/lebs.2017.64
- 3 Klein, N., & Epley, N. (2014). The topography of generosity: asymmetric evaluations of
4 prosocial actions. *Journal of Experimental Psychology: General*, 143, 2366-2379.
5 doi:10.1037/xge0000025
- 6 Kurzban, R., Burton-Chellew, M. N., & West, S. A. (2015). The evolution of altruism in humans.
7 *Annual Review of Psychology*, 66, 575-599. doi:10.1146/annurev-psych-010814-015355
- 8 Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest Package: Tests in
9 Linear Mixed Effects Models. *Journal of Statistical Software*, 82, 1-26.
10 doi:10.18637/jss.v082.i13
- 11 Lüdtke, D. (2019). sjstats: Statistical Functions for Regression Models (Version 0.17.5).
12 doi:10.5281/zenodo.1284472
- 13 Lacetera, N., & Macis, M. (2010). Social image concerns and prosocial behavior: Field evidence
14 from a nonlinear incentive scheme. *Journal of Economic Behavior & Organization*, 76,
15 225-237. doi:10.1016/j.jebo.2010.08.007
- 16 Lin-Healy, F., & Small, D. A. (2012). Cheapened altruism: Discounting personally affected
17 prosocial actors. *Organizational Behavior and Human Decision Processes*, 117, 269–274.
18 doi:10.1016/j.obhdp.2011.11.006
- 19 Lin-Healy, F., & Small, D. A. (2013). Nice Guys Finish Last and Guys in Last Are Nice: The
20 Clash Between Doing Well and Doing Good. *Social Psychological and Personality*
21 *Science*, 4, 692–698. doi:10.1177/1948550613476308
- 22 MacAskill, W. (2015). *Doing good better : How effective altruism can help you make a*
23 *difference*. New York, N.Y.: Gotham Books.

- 1 Newman, G. E., & Cain, D. M. (2014). Tainted altruism: when doing some good is evaluated as
2 worse than doing no good at all. *Psychological Science*, 25, 648-655.
3 doi:10.1177/0956797613504785
- 4 Oda, R., Dai, M., Niwa, Y., Ihobe, H., Kiyonari, T., Takeda, M., & Hiraishi, K. (2013). Self-
5 Report Altruism Scale Distinguished by the Recipient (SRAS-DR): Validity and
6 reliability. *The Japanese journal of psychology*, 84, 28-36. doi:10.4992/jjpsy.84.28
- 7 West, S. A., Griffin, A. S., & Gardner, A. (2007). Social semantics: altruism, cooperation,
8 mutualism, strong reciprocity and group selection. *Journal of Evolutionary Biology*, 20,
9 415-432. doi:10.1111/j.1420-9101.2006.01258.x
- 10 Westfall, J. (2016). *PANGEA: Power ANalysis for GEneral Anova designs*. Unpublished
11 manuscript. Retrieved from <http://jakewestfall.org/publications/pangea.pdf>
- 12 Willer, R. (2009). Groups reward individual sacrifice : The status solution to the collective
13 action problem. *American Sociological Review*, 74, 23-43.
14 doi:10.1177/000312240907400102
- 15 Zhang, Y., & Epley, N. (2009). Self-centered social exchange: differential use of costs versus
16 benefits in prosocial reciprocity. *Journal of Personality and Social Psychology*, 97, 796-
17 810. doi:10.1037/a0016233
- 18 Zheng, L., Wang, Q., Cheng, X., Li, L., Yang, G., Sun, L., . . . Guo, X. (2016). Perceived
19 reputation of others modulates empathic neural responses. *Experimental Brain Research*,
20 234, 125-132. doi:10.1007/s00221-015-4434-2
- 21