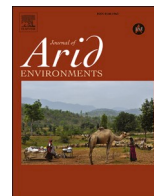




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If giving money to the Red Cross increases well-being, does taking money from the Red Cross increase ill-being? – Evidence from three experiments

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ABSTRACT

Does having a negative impact on others decrease one's well-being? In three separate pre-registered studies ($n = 111$, $n = 445$, & $n = 447$), participants engaged in a button-pushing activity for 4 min in three conditions: earning money for themselves (~60c), also earning money for the Red Cross (~15c), or also reducing the money distributed to the Red Cross (~15c). The results of the individual studies and a meta-analysis across them showed that positive impact increased well-being, but even though participants were aware of the negative impact they were having, there was no increased ill-being in the negative impact condition. In Study 3 we examined whether participants in the negative impact condition are mentally compensating by emphasizing the positive impact they are having towards science.

Several experimental studies have demonstrated that engaging in prosocial behavior such as spending money to help others increases helpers' well-being (e.g. Aknin et al., 2013; Dunn et al., 2008; Weinstein & Ryan, 2010), even when prosocial behavior is anonymous with no possibility for reciprocating (Aknin et al., 2014; Martela & Ryan, 2016a). Two recent meta-analyses identified 201 studies in general (Hui et al., 2020) and 27 experimental studies (Curry et al., 2018) of prosocial behavior and well-being, both confirming a small-to-medium positive link between them. Thus, it is relatively well established that having a positive impact in the lives of other people has a positive impact on one's own well-being. In fact, it has been argued to be a "psychological universal" (Aknin et al., 2013) with some researchers examining whether beneficence – the need to have a positive impact in the lives of other people – could exhibit similar traits as the basic psychological needs (Martela & Ryan, 2016b, 2020).

However, the opposite side of the coin, whether having a negative impact in the lives of other people similarly increases ill-being, has been much less studied. If humans indeed have a need to experience that their influence in other people's lives is positive, then one could argue that knowing one's impact has been negative could contribute to ill-being (Martela & Ryan, 2020). Although benefiting others and hurting others are distinct constructs, there are clear reasons for why hurting others can increase one's ill-being. As social animals human beings are highly attuned to the impact they are having on others, with a capacity

to empathize (Batson, 1990; Batson et al., 2009) and feel compassion for those suffering (Goetz et al., 2010; Singer & Klimecki, 2014). If seeing others suffering decreases one's well-being, being the cause of their suffering is arguably even more detrimental for one's well-being. People are sensitive to their social value (Leary & Baumeister, 2000) and need to see themselves as moral (Tsang, 2002), and having a negative impact on other can be detrimental to one's self-image and ability to uphold a view of oneself as socially valuable and moral. Thus it can be argued that "hurting you hurts me too" (Legate et al., 2013) in the sense that realizing one has a negative impact on others can decrease one's own well-being.

Although this hypothesis has rarely been the main focus of research, a few studies have shown that engaging in behaviors that harm others can produce ill being in the harmer. In a replication of Milgram's classic study on obedience – where one has to give electric shocks to a victim – within an immersive virtual environment, compliant participants showed increased anxiety (Dambrun & Vatiné, 2010) and somatic symptoms (Slater et al., 2006). Furthermore, Legate et al. (2013) showed increases in negative affect in participants who followed instructions to ostracize another person. Having a sense of negative impact also correlates strongly with ill-being indicators such as negative affect, depression, and anxiety (Martela & Ryan, 2020). Thus, it could be argued that realizing we have hurt other people can hurt ourselves and increase our ill-being. However, none of these studies contrasted similar

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amounts of harm versus good, assessing their relative positive and negative effects, respectively.

Accordingly, utilizing a novel paradigm that involves three groups of participants doing the same activity, but with prosocial, antisocial or neutral consequences, we wanted to examine both sides of the coin simultaneously, administering the participants in different conditions the same ‘dosage’ (cf. Rottman & Young, 2019) of prosocial impact and antisocial impact, to determine whether antisocial impact hurts as much as prosocial impact helps. Based on recent research that has shown that need satisfaction is particularly strongly related to well-being indicators, while need frustration is particularly strongly related to ill-being indicators (e.g. Bartholomew et al., 2011; Martela & Ryan, 2020; Vansteenkiste & Ryan, 2013), we expected that people in positive impact condition would demonstrate significant increases in well-being indicators but not necessarily decreases in ill-being indicators, and similarly people in negative impact condition would demonstrate significant increases in ill-being indicators but not necessarily decreases in well-being indicators.

The preregistered hypotheses, explored across all three studies, were the following:

- 1) Participants in the positive impact condition, as compared to the neutral condition and negative impact condition, will report afterwards higher scores on indicators of well-being.
- 2) As compared to the neutral condition, participants in the positive impact condition will report afterwards lower or similar score on indicators of ill-being.
- 3) Participants in the negative impact condition, as compared to the neutral condition and positive impact condition, will report afterwards higher scores on indicators of ill-being.
- 4) As compared to the neutral condition, participants in the negative impact condition will report afterwards lower or similar score on indicators of well-being.

1. Study 1

1.1. Participants

Before starting the data collection, the study was preregistered at OSF: <https://osf.io/j29nw>. Based on an examination of effect sizes in previous studies where prosocial/antisocial impact was manipulated and the manipulation’s effect on well-being was measured (Aknin et al., 2013; Legate et al., 2015; Martela & Ryan, 2016a), we expected an effect size around Cohen’s $f = 0.50$. Given alpha level of 0.05 and desired power of 0.95, the needed total sample size (calculated with G*Power 3.1) was 66. Accordingly, we needed at least 22 participants in each of the three conditions, but we decided to aim for at least 30 per condition. To account for participant exclusion based on inattention or other problems, and in accordance with our preregistered goal, we recruited 120 participants from Mturk. This sample size was determined before any data analysis. A one-way ANOVA revealed no significant differences between conditions on earnings $F(2, 117) = 0.538, p = .585, \eta^2 = 0.009$. Of the 120 who answered, based on the preregistered exclusion criteria, four were excluded as they failed to answer correctly the inattention check question (“It’s important that you pay attention. Please answer ‘1. Not at all true.’”) and five because they earned more than 30% below the average earnings, leaving a final sample size of 111, with 38 in negative impact condition, 29 in neutral condition and 44 in positive impact condition. A sensitivity analysis with alpha level at 0.05 revealed that an ANOVA has 80% power to detect an effect size of 0.299. Age of the participants ranged from 20 to 66 (average 37), with 74 identifying as female and 37 as male, and 72% reporting being Caucasian, 12% African American, 11% Asian, and 5% Hispanic, with 1% preferring not to say. We report all measures, manipulations, and exclusions in this and the other two studies.

1.2. Procedure

The participants were randomly assigned to one of three groups. The participants in all three groups played a simple game that involved a screen where a new letter is shown every fourth second and the participant has to push the corresponding button on their keyboard. All participants were informed that they will play the game for 4 min and “as long as you push the right keyboard buttons you will earn some money. You will get 1 cent for every correct letter,” meaning that if they pushed all the correct buttons, they would earn 60 cents (90% of participants earned 56 cents or more).

Participants in the *control condition* didn’t receive any additional instructions but participants in the *positive impact condition* received the following instruction: “As long as you push the right keyboard buttons Red Cross will earn some money. Red Cross will get 1 cent for every fourth keystroke. After the experiments, the researchers will pay the gathered sum to Red Cross.” Participants in the *negative impact condition*, in contrast, received the following instruction: “As long as you push the right keyboard buttons Red Cross will earn less money. After the experiments, the researchers will make a donation to the Red Cross. For every fourth keystroke you do, the sum donated to Red Cross will *diminish* by 1 cent.”

While playing, all three groups saw a box that displayed how much money they have earned for themselves. Furthermore, participants in the positive impact group saw a box displaying how much money they have earned for the Red Cross, and participants in the negative impact condition saw a box displaying how much money will be deducted from the donation to the Red Cross. After playing the game for four minutes, all participants answered the same brief survey about their current mood and how they felt during the activity.

1.3. Measures

Sense of prosocial impact was assessed with the Beneficence Satisfaction Scale (Martela & Ryan, 2016b) that asked participants to assess the sense of prosocial impact they felt during the activity with 4 items (e.g., I felt that my actions had a positive impact on the people around me) rated on a scale from 1 (*not at all true*) to 7 (*very true*), $\alpha = 0.904$. *Sense of antisocial impact* during the activity was measured with Beneficence Frustration Scale (Martela & Ryan, 2020) that includes 4 items (e.g., I felt that I was making other people worse off.) rated on a scale from 1 (*not at all true*) to 7 (*very true*), $\alpha = 0.936$.

Positive and negative affect were assessed with the Scale of Positive and Negative Experience (SPANE; Diener et al., 2010), comprised of 6 positive (e.g. happy, pleasant; $\alpha = 0.948$) and 6 negative (e.g. 6 sad, unpleasant, $\alpha = 0.891$) emotions, rated on a scale from 1 (*very rarely or never*) to 5 (*very often or always*). *Vitality* was measured with five items (e.g. “I feel alive and vital.”) from the Subjective Vitality Scale (SVS; Ryan & Frederick, 1997) rated on a scale from 1 (*not at all true*) to 7 (*very true*), $\alpha = 0.940$. *Situational meaningfulness* was measured with the 2 questions that King and Hicks (2009) used to measure subjective meaningfulness of the experience (e.g. “The activity was very meaningful to me.”) supplemented with five new questions created for this study (e.g. “I felt that doing this activity was highly meaningful.”) rated on a scale from 1 (*not at all true*) to 7 (*very true*), $\alpha = .956$. *Situational anxiety* was assessed with six items (e.g. “nervous, anxious or on edge”) adapted from Generalized Anxiety Disorder scale (GAD-7; Spitzer et al., 2006) rated on a scale from 1 (*not at all true*) to 7 (*very true*), $\alpha = 0.891$. *Situational depression* was assessed with four items (e.g. “I felt depressed”, “I felt that everything I did was an effort”) adapted from Center for Epidemiologic Studies –Depression Scale (CES-D; Radloff, 1977) rated on a scale from 1 (*not at all true*) to 7 (*very true*), $\alpha = 0.542$. In addition, as background variables, the participants were asked about their age, gender, and ethnicity.

1.4. Analytical strategy

For the statistical analyses in this and subsequent studies, SPSS v. 26.0 was used. The effectiveness of manipulations in affecting beneficence satisfaction and frustration and the main hypotheses about the impact of conditions on each of the dependent variable were examined using analysis of variance (ANOVA) with Tukey's post-hoc tests. These analyses were repeated with ANCOVAs controlling for potential demographic predictors of variables of interest.

1.5. Results

Means and standard deviations of study variables in the three conditions are represented in Table 1. A one-way ANOVA revealed no differences in how much participants earned in the three different conditions. Age and ethnicity were not significantly associated with any of the dependent variables (for latter, given that Caucasians comprised 72% of sample with all other categories having less than 15 participants, we examined for differences between Caucasians and non-Caucasians). As regards gender, interestingly, males reported significantly more beneficence frustration, negative affect, and situational anxiety. Thus, as planned, we conducted the main analyses for these three dependent variables first without controlling for gender, and then again controlling for it.

We conducted analysis of variance (ANOVA) separately for beneficence satisfaction and frustration scores using condition (positive impact vs. neutral vs. negative impact) as independent variable. For beneficence satisfaction there was a significant main effect, $F(2, 108) = 17.9, p < .001, \eta^2 = 0.249$, with Tukey's post-hoc test revealing that participants in the positive impact condition experienced more prosocial impact than participants in two other conditions (both p 's < 0.001), with no significant difference between negative impact and neutral condition ($p = .996$). For beneficence frustration the main effect also was significant, $F(2, 108) = 14.1, p < .001, \eta^2 = 0.207$ with Tukey's post-hoc test revealing that participants in the negative impact condition reported significantly more antisocial impact than participants in the two other conditions (both p 's < 0.001), with no significant difference between positive impact and neutral condition ($p = .818$). The results remained the same when controlling for gender. Positive impact and negative impact manipulations thus worked as expected.

Zero-order correlations, presented in Table 2, reveal in line with past experimental work (e.g., Martela & Ryan, 2016) that beneficence satisfaction has strong positive correlations with well-being indicators and beneficence frustration has strong positive correlations with ill-being indicators. These relations show the expected pattern of beneficence satisfaction being associated with greater well-being, and unrelated to ill-being, whereas beneficence frustration was not associated with well-being, but predicted higher ill-being.

To test our main hypotheses concerning whether condition (positive impact vs. neutral vs. negative impact) had significant effects on well-being indicators, we conducted analysis of variance (ANOVA) separately for each dependent variable. No main effects were detected for positive affect, vitality, meaning, or anxiety. However, it is worth noting that Tukey's post-hoc test revealed differences that approached significance between neutral and positive impact condition for vitality ($p = .096$) and meaning ($p = .058$) with those in the positive impact condition experiencing more of them.

For negative affect, the main effect was significant, $F(2, 108) = 3.24, p = .043, \eta^2 = 0.057$, with Tukey's post-hoc test revealing that participants in the negative impact condition reported significantly more negative affect than participants in the neutral condition (95% CI for mean difference [0.020, 0.661], $p = .035$), but there was no significant difference between negative impact and positive impact condition ([-0.103, 0.473], $p = .283$) or between positive impact and neutral condition ([-0.467, 0.156], $p = .464$). Yet, when the analysis was repeated using ANCOVA controlling for gender, $F(3, 107) = 4.14, p =$

.008, $\eta^2 = 0.104$, the main effect of condition became insignificant ($F(2, 107) = 2.76, p = .068, \eta^2 = 0.049$) even though the LSD comparison of estimated marginal means between negative impact and neutral conditions remained significant (mean difference = 0.312, 95% CI [0.049, 0.575], $p = .021$). For situational depression, the main effect was also significant, $F(2, 108) = 3.27, p = .042, \eta^2 = 0.057$. However, the difference between participants in the negative impact condition and those in the neutral ([-0.067, 0.980], $p = .100$) and positive impact ([-0.013, 0.927], $p = .059$) conditions only approached significance, with no difference between positive impact and neutral conditions ([-0.507, 0.508], $p = .999$).

1.6. Discussion

The main results are depicted in Fig. 1. The manipulations in both the positive impact and negative impact condition seemed to work, given the significant increase in beneficence satisfaction in the positive impact condition and beneficence frustration in the negative impact condition compared to the neutral and opposite condition. The zero-order correlations also showed clear associations between beneficence satisfaction and well-being indicators, and beneficence frustration and ill-being indicators, respectively. However, there was not much difference as regards well-being indicators between the three conditions. Essentially the only found difference was that negative affect was higher in the negative impact versus neutral condition.

Given that with this sample size we were able to reliably detect only mid-size effects, there remains, however, the possibility of false negatives in that we might not have identified some smaller yet systematic effects between conditions. As the paradigm seemed to work in terms of manipulating a sense of prosocial and antisocial impact, we decided to replicate the study using a larger sample with enough power to detect more subtle effects

2. Study 2

2.1. Participants

The second study, preregistered at <https://osf.io/86gsu>, aimed to examine the same hypotheses using the same manipulation as Study 1, only this time with a significantly larger sample. In particular, we wanted to be able to detect effect sizes of $d = 0.30$, which meant that given alpha level of 0.05 and desired power of 0.80, the needed sample size (calculated with G*Power 3.1) to find a significant (one-tailed) difference between two groups required 139 participants per group. Accordingly, given that we had three groups, and to account for participant exclusion based on inattention or other problems, we recruited 477 participants from Amazon Mechanical Turk. This sample size was determined before any data analysis. From this original sample we excluded, based on the preregistered exclusion criteria, 8 who failed to answer correctly the inattention check question and 5 because they earned more than 30% below the average earnings, leaving a sample size of 464, of which 144 were in negative impact condition, 163 in neutral condition, and 157 in positive impact condition. However, a one-way ANOVA revealed a significant difference in how much participants earned in the three different conditions, $F(2, 461) = 4.11, p = .017, \eta^2 = 0.018$, with Tukey's post-hoc test revealing that participants in the negative impact condition reported significantly less earnings than participants in the neutral condition (95% CI for mean difference [-1.41, -0.06], $p = .028$) or in the positive impact condition ([-1.38, -0.02], $p = .041$). To further eliminate outliers, we decided to discard those 19 participants who scored less than 55. After this, there were no

Table 1
The means and standard deviations of study variables in the three conditions in Studies 1, 2 & 3.

Variable	Study 1 conditions			Study 2 conditions		
	Positive impact M (SD)	Neutral M (SD)	Negative impact M (SD)	Positive impact M (SD)	Neutral M (SD)	Negative impact M (SD)
Benevolence satisfaction	4.02 (1.56)	2.29 (1.44)	2.32 (1.41)	3.30 (1.69)	2.17 (1.28)	2.57 (1.53)
Benevolence frustration	1.37 (0.80)	1.20 (0.55)	2.55 (1.77)	1.32 (0.87)	1.30 (0.80)	2.04 (1.24)
Positive affect	3.50 (0.95)	3.35 (1.20)	3.32 (1.06)	3.26 (0.96)	3.12 (1.00)	3.31 (1.02)
Vitality	3.70 (1.70)	2.86 (1.68)	3.16 (1.65)	3.18 (1.48)	2.73 (1.57)	3.12 (1.55)
Meaningfulness	3.72 (1.66)	2.81 (1.75)	3.09 (1.56)	3.10 (1.49)	2.43 (1.44)	2.84 (1.48)
Negative affect	1.31 (0.54)	1.16 (0.35)	1.50 (0.67)	1.33 (0.67)	1.29 (0.55)	1.31 (0.53)
Situational anxiety	1.69 (0.97)	1.71 (0.90)	2.08 (1.39)	1.69 (1.04)	1.82 (1.10)	1.84 (1.06)
Situational depression	1.77 (0.80)	1.77 (0.82)	2.22 (1.04)	1.83 (0.91)	2.00 (1.07)	1.94 (0.91)
Study 3 conditions						
Variable	Positive impact	Neutral	Negative impact			
Benevolence satisfaction	3.42 (1.71)	2.15 (1.47)	2.34 (1.63)			
Benevolence frustration	1.26 (0.69)	1.20 (0.64)	2.08 (1.41)			
Positive affect	3.35 (1.09)	3.00 (1.09)	3.19 (1.05)			
Vitality	3.14 (1.66)	2.70 (1.54)	2.92 (1.67)			
Meaningfulness	3.09 (1.65)	2.31 (1.52)	2.76 (1.53)			
Negative affect	1.25 (0.56)	1.31 (0.58)	1.36 (0.68)			
Situational anxiety	1.64 (0.94)	1.77 (0.92)	1.86 (1.14)			
Situational depression	1.86 (0.93)	1.94 (0.94)	2.00 (0.94)			
Helping science	4.51 (1.79)	4.05 (1.73)	4.54 (1.81)			
Helping Red Cross	4.81 (1.68)	1.88 (1.44)	2.29 (1.91)			

Table 2
Zero-order correlations between study variables in Studies 1, 2, and 3.

<u>Study 1 Correlations</u>										
	1.	2.	3.	4.	5.	6.	7.	8.		
1. Benevolence satisfaction		-0.149	0.412**	0.644**	0.708**	-0.097	-0.008	0.008		
2. Benevolence frustration			-0.190*	0.031	0.081	0.537**	0.607**	0.508**		
3. Positive affect				0.659**	0.484**	-0.423**	-0.255**	-0.239*		
4. Vitality					0.828**	-0.220*	-0.064	-0.07		
5. Meaningfulness						-0.14	0.008	-0.021		
6. Negative affect							0.658**	0.567**		
7. Situational anxiety								0.711**		
8. Situational depression										
<u>Study 2 Correlations</u>										
	1.	2.	3.	4.	5.	6.	7.	8.		
1. Benevolence satisfaction		0.109*	0.438**	0.679**	0.756**	-0.059	0.053	0.096*		
2. Benevolence frustration			-0.047	0.160**	0.218**	0.348**	0.595**	0.456**		
3. Positive affect				0.628**	0.527**	-0.429**	-0.221**	-0.186**		
4. Vitality					0.805**	-0.145**	0.009	0.036		
5. Meaningfulness						-0.077	0.07	0.101*		
6. Negative affect							0.551**	0.488**		
7. Situational anxiety								0.701**		
8. Situational depression										
<u>Study 3 Correlations</u>										
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Benevolence satisfaction		0.088	0.448**	0.643**	0.519**	0.735**	0.829**	-0.137**	0.034	0.113*
2. Benevolence frustration			0.187**	-0.059	-0.018	0.130**	0.195**	0.279**	0.566**	0.490**
3. Helping science				0.317**	0.351**	0.485**	0.485**	-0.134**	-0.029	0.012
4. Helping Red Cross					0.278**	0.379**	0.479**	-0.036	-0.001	0.068
5. Positive affect						0.648**	0.532**	-0.460**	-0.246**	-0.132**
6. Vitality							0.822**	-0.165**	0.028	0.061
7. Meaningfulness								-0.112*	0.047	0.157**
8. Negative affect									0.575**	0.514**
9. Situational anxiety										0.679**
10. Situational depression										

Note. * Correlation significant at the 0.05 level (2-tailed). ** Correlation significant at the 0.01 level (2-tailed).

longer any significant differences in earnings between the three conditions, $F(2, 442) = 2.18, p = .114, \eta^2 = 0.010$. Thus the final sample size for analyses was 445¹, of which 133 were in negative impact condition, 158 in neutral condition, and 154 in positive impact condition. A

sensitivity analysis with alpha level at 0.05 revealed that an ANOVA has 80% power to detect an effect size of 0.148. Age of the participants ranged from 18 to 71 (average 37), with 66% identifying as female and 33% as male, and 1% as other. 73% reported being Caucasian, 10% Asian, 9% African American, 6% Hispanic, 1% as American Indian, with 1% preferring not to say.

¹ Given that this elimination of participants was not part of our preregistered plan, we repeat the main analyses in this study also using the original sample of 464 participants.

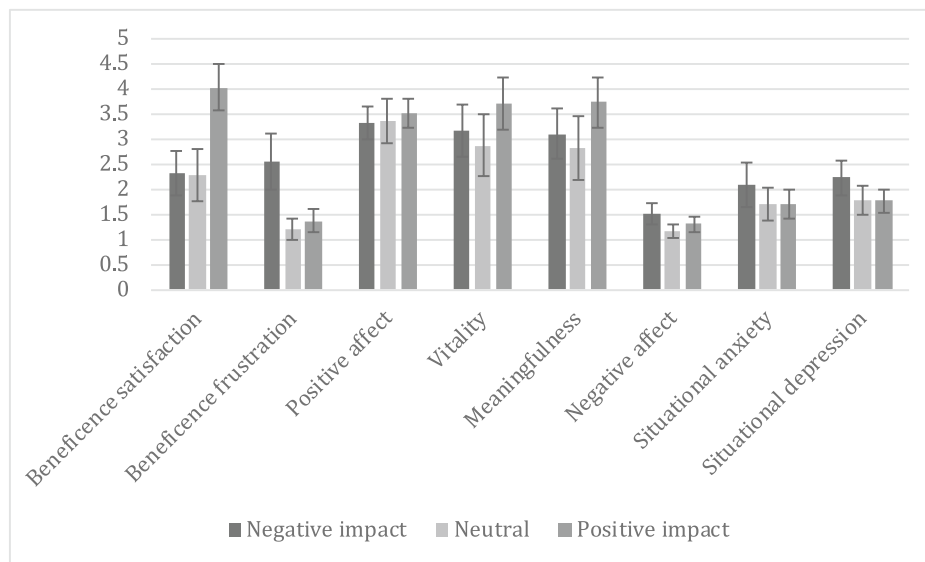


Fig. 1. The impact of condition on dependent variables in Study 1 with 95% confidence intervals.

2.2. Procedure

Procedures were identical to Study 1, with participant randomly assigned to play the key pushing game for four minutes in either positive impact, negative impact, or control condition, and answering a survey immediately afterwards.

2.3. Measures

The scales used and constructs measured were the same as in Study 1. In particular, participants were asked about *beneficence satisfaction* (Martela & Ryan, 2020), $\alpha = 0.911$, *beneficence frustration* (Martela & Ryan, 2020), $\alpha = 0.897$, *positive and negative affect* (SPANE; Diener et al., 2010), $\alpha = 0.937$ and $\alpha = 0.902$, respectively, *vitality* (SVS; Ryan & Frederick, 1997), $\alpha = 0.907$, *situational meaningfulness*, $\alpha = 0.941$, *situational anxiety* (GAD-7; Spitzer et al., 2006), $\alpha = 0.874$, and *situational depression* (CES-D; Radloff, 1977), $\alpha = 0.612$ as well as their age, gender, and ethnicity.

2.4. Results

For the statistical analyses the same analytical strategy was used as in Study 1. The means and standard deviations of the study variables in the three conditions are presented in Table 1. Examination of age, gender, and ethnicity revealed some significant relations with study variables: Older participants experienced less negative affect, anxiety, and depression, while Caucasian participants experienced less negative affect, prosocial impact, antisocial impact, vitality, anxiety, depression, and meaning, and females experienced less antisocial impact. Thus, according to our plan, we first conducted analyses involving these variables without controlling for relevant background factors, and then repeated these analyses controlling for these factors.

We started by investigating differences in sense of prosocial impact between three conditions, with ANOVA revealing significant differences, $F(2, 442) = 22.7, p < .001, \eta^2 = 0.093$, and Tukey's post-hoc test demonstrating that beneficence satisfaction was higher in positive impact condition as compared to the neutral condition ([0.732, 1.533], $p < .001$) and negative impact condition ([0.317, 1.154], $p < .001$) with the difference between negative impact condition and neutral condition approaching significance ([-0.019, 0.813], $p = .065$). Interestingly, when the same analysis was replicated while controlling for ethnicity $F(3, 441) = 23.8, p < .001, \eta^2 = 0.097$, the results in positive impact

condition remained significantly higher than neutral or negative impact condition, while the difference between negative impact and neutral condition also became significant ([0.060, 0.750], $p = .021$). For sense of antisocial impact, there were also significant differences, $F(2, 442) = 25.9, p < .001, \eta^2 = 0.105$ with participants in the negative impact condition reporting higher levels of beneficence frustration than participants in the neutral ([0.465, 1.001], $p < .001$) or positive impact conditions ([0.442, 0.983], $p < .001$). When controlling for gender and ethnicity, these differences remained the same. Positive impact and negative impact manipulations thus were working as expected in inducing a sense of prosocial and antisocial impact, respectively, yet unexpectedly, being in the negative impact condition seemed to also increase the sense of prosocial impact.

Next, zero-order correlations, in Table 2, again showed clear positive correlation between beneficence satisfaction and well-being indicators, and between beneficence frustration and ill-being indicators, replicating the pattern from Study 1.

Turning to the effects of condition, we conducted ANOVAs for each well-being and ill-being indicator. No differences emerged for positive affect, negative affect, situational anxiety, or situational depression (p 's > 0.20). For vitality, $F(2, 442) = 3.94, p = .020, \eta^2 = 0.018$, and for meaningfulness, $F(2, 442) = 8.23, p < .001, \eta^2 = 0.036$, there were significant differences, with post-hoc tests revealing that participants in the positive impact condition experienced more vitality ([0.042, 0.858], $p = .027$) and meaningfulness ([0.278, 1.060], $p < .001$) than participants in the neutral condition, and participants in the negative impact condition experiencing more meaningfulness than those in the neutral condition, ([0.005, 0.818], $p = .046$), with the difference between negative impact and neutral condition as regards vitality approaching significance ([-0.031, 0.818], $p = .076$). Repeating these analyses controlling for ethnicity, $F(3, 441) = 6.69, p < .001, \eta^2 = 0.019$, left results largely unchanged, although the difference in vitality between negative impact and neutral condition became significant ([0.053, 0.754], $p = .024$).

Finally, as an exploratory analysis suggested by a reviewer, we quantified the behavioral differences between conditions. For this, we utilized the original sample before any exclusions ($n = 477$) to examine any differences between conditions on earnings. A one-way ANOVA revealed significant differences, $F(2, 474) = 4.16, p = .016, \eta^2 = 0.017$, with Tukey's post-hoc test demonstrating that participants in the negative impact condition earned less than participants in the neutral condition ([-1.41, -0.01], $p = .045$) and in the positive impact

condition ($[-1.41, 0.01], p = .024$) with no difference between positive impact and neutral conditions ($p = .960$). In positive impact condition 92% of participants earned 58c or more (out of 60c), in neutral condition 90%, while in negative impact condition only 84%. There thus seemed to be larger minority of participants in the negative impact condition showing lower motivation to push the button than in the positive and neutral conditions. Of note, however, is that there were no participants in any of the three conditions who earned less than 42c, suggesting that every participant pushed the button for the majority of the experiment.

2.5. Discussion

The main results are depicted in Fig. 2. There were few key findings in these results: First, positive impact condition increased sense of prosocial impact and negative impact condition increased sense of antisocial impact, as expected. Second, participants in the positive impact condition experienced more vitality and meaning than participants in the neutral condition, supporting the hypothesis that prosocial behavior increases well-being, in accordance with past research (e.g. Aknin et al., 2013; Martela & Ryan, 2016a). Third, we didn't find any parallel support for the hypothesis that having an antisocial impact would increase people's ill-being. No significant differences emerged as regards negative affect, situational anxiety, and situational depression. So, while behavior resulting in a small contribution to the Red Cross increased well-being, taking away from the Red Cross a similar amount of money didn't increase ill-being.

In addition to these main results were a few curious new findings. First, being in the negative impact condition increased participants' sense of beneficence satisfaction (while also increasing their sense of beneficence frustration), and their sense of vitality and meaning, compared to being in the neutral condition. Thus, although participants recognized they were having an antisocial impact, they also felt an increased sense of prosocial impact, vitality and meaning. Zero-order correlations also showed that while beneficence frustration had stronger positive correlations with depression and anxiety, it also had small positive correlations with vitality and meaning. We return to these findings in introducing Study 3.

Furthermore, there was a significant difference in how much participants earned in the three conditions. While 96% of participants earned 55c or more out of 60c possible, among those 4% earning less there were 11 people from negative impact condition while only 5 from neutral and 3 from positive impact condition. Given the difference

between conditions in terms of earnings, there seemed to be a small minority of "resisters" who found negative impact condition demotivating, leading them to push the button less regularly. The exclusion of this minority might have distorted the results as those excluded might have been most sensitive to the negative impact manipulation and thus most likely to have negative well-being effects when engaging in it. Accordingly, we repeated the main analyses including these participants, but this did not change the results: Positive impact condition participants still reported higher beneficence satisfaction, meaning, and vitality compared to those in the neutral condition; and negative impact condition participants still showed higher beneficence satisfaction, beneficence frustration, meaning, and vitality as compared to the neutral condition. Although inclusion or exclusion of these participants didn't change these main results, identifying them is interesting result in its own right, supporting previous research demonstrating that a minority of people actively avoid engaging in antisocial behavior even when incentivized to comply (e.g. Legate et al., 2013, 2015).

3. Study 3

3.1. Participants

In Study 2, we found that engaging in behavior with a positive impact on the Red Cross increased well-being, but having a similarly sized negative impact didn't result in any comparable increases in ill-being. However, given the interesting finding that people in the negative impact condition experienced both more beneficence satisfaction and frustration than participants in the neutral condition, we reasoned that people may be rationalizing their negative impact by emphasizing more the prosocial aspects of their participation in the study – for example, that their efforts were contributing to science – to help compensate for any negative well-being effects that being in the negative impact condition might otherwise engender.

Following this line of thinking, we formulated a new hypothesis: People in the negative impact condition might try to rationalize their negative impact by emphasizing to themselves their contribution to science through participating. Accordingly, in Study 3, preregistered at <https://osf.io/zyp48>, we replicate the previous studies while also measuring how much people feel they are contributing towards both: a) the Red Cross; and b) science. The study thus examines the same hypotheses as Studies 1 and 2 but in addition includes a novel hypothesis: Participants in the negative impact condition will report higher

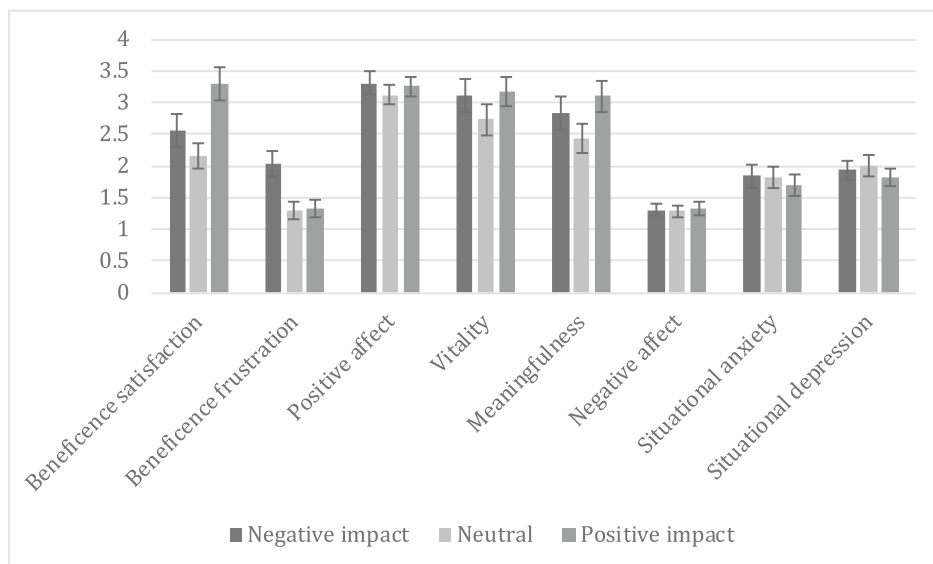


Fig. 2. The impact of condition on dependent variables in Study 2 with 95% confidence intervals.

contribution towards science than participants in the two other conditions. Further, if the well-being of participants in the negative impact condition is higher than in the neutral condition, sense of contributing towards science will mediate these relations.

The sample size was determined using the same parameters and expected effect size in the power analysis as in Study 2, leading us to plan to recruit 500 participants from Mturk. We initially received 498 responders. This sample size was determined before any data analysis. A one-way ANOVA on earnings revealed no significant differences between conditions $F(2, 495) = 0.629, p = .534, \eta^2 = 0.003$. From this sample we excluded 15 who earned more than 30% below the average earnings, and 12 who failed to answer correctly the inattention check question, leaving a sample of 471. A one-way ANOVA revealed a significant difference in how much participants earned in the three different conditions, $F(2, 468) = 3.07, p = .047, \eta^2 = 0.013$, with Tukey's post-hoc test revealing that participants in the negative impact condition reported significantly less earnings than participants in the neutral condition $([-1.22, -0.02], p = .042)$. In accordance with the procedure conducted in Study 2, we discarded those 24 participants scoring less than 55 for a final sample size of 447 with 149 participants in the positive impact condition, 146 in the neutral, and 152 in the negative impact condition. A sensitivity analysis with alpha level at 0.05 revealed that an ANOVA has 80% power to detect an effect size of 0.147. There was still a significant difference in earning between conditions $F(2, 444) = 5.30, p = .005, \eta^2 = 0.023$, with participants in the neutral condition earning more than participants in the negative impact $([0.08, 0.61], p = .007)$ and positive impact condition $([0.02, 0.55], p = .030)$ with no difference between positive impact and negative impact conditions $(p = .882)$. Thus, we decided to include earnings as one of the control variables when replicating the main analyses. Ages of participants ranged from 18 to 70 (average 37), with 58% identifying as female and 42% as male; 76% as Caucasian, 9% Asian, 7% African American, 5% Hispanic, and 2% American Indian, with 0.4% preferring not to say.

3.2. Procedure

The procedures were identical to Studies 1 and 2, with participant randomly assigned to play the key pushing game for four minutes in either positive impact, negative impact, or control condition, and answering a survey immediately afterwards.

3.3. Measures

The scales used and constructs measured were the same as in Studies 1 and 2. In particular, participants were asked about *beneficence satisfaction* (Martela & Ryan, 2016b), $\alpha = 0.932$, *beneficence frustration* (Martela & Ryan, 2020), $\alpha = 0.911$, *positive and negative affect* (SPANE; Diener et al., 2010), $\alpha = 0.952$ and $\alpha = 0.909$, respectively, *vitality* (SVS; Ryan & Frederick, 1997), $\alpha = 0.920$, *situational meaningfulness*, $\alpha = 0.949$, *situational anxiety* (GAD-7; Spitzer et al., 2006), $\alpha = 0.834$, and *situational depression* (CES-D; Radloff, 1977), $\alpha = 0.517$ as well as their age, gender, and ethnicity. As new questions, participants were inquired about their contribution to science and the Red Cross by asking how much they agreed with the following statements, assessed on a scale from 1 'not true at all' to 7 'very true': "By participating in this study, I feel I helped scientific research" and "By participating in this study, I feel I helped the Red Cross."

3.4. Results

For the statistical analyses the same analytical strategy was used as in Studies 1 and 2. The means and standard deviations of study variables in the three conditions are presented in Table 1. Zero order correlations, displayed in Table 2, again showed that beneficence frustration had strong positive correlations with depression and anxiety but interestingly also had small positive correlations with vitality and meaning.

Examining the control variables, we found that age was positively associated with beneficence satisfaction, positive affect, vitality, and meaning, and negatively with anxiety and depression; that females experienced more positive affect; and Caucasians less meaning, vitality, beneficence satisfaction, and helping the Red Cross. These factors will thus be controlled in analyses.

Starting our analysis with beneficence satisfaction, ANOVA revealed significant differences between conditions, $F(2, 444) = 27.4, p < .001, \eta^2 = 0.110$, with participants in the positive impact condition experiencing more beneficence satisfaction than participants in the neutral $([0.838, 1.712], p < .001)$ or negative impact conditions $([0.652, 1.522], p < .001)$. No difference emerged between participants in the negative impact and neutral conditions $(p = .564)$. Controlling for age, ethnicity, and earnings didn't change this pattern of results.

For beneficence frustration, ANOVA also revealed significant differences, $F(2, 444) = 38.0, p < .001, \eta^2 = 0.146$, with participants in the negative impact condition experiencing more need frustration than those in neutral $([0.617, 1.154], p < .001)$ or positive impact conditions $([0.559, 1.092], p < .001)$, with no difference between positive impact and neutral conditions $(p = .861)$. Replicating this analysis controlling for earnings yielded the same results.

As regards condition effects on well-being and ill-being, there were no significant differences for negative affect, situational anxiety, or situational depression. For positive affect, $F(2, 444) = 3.91, p = .021, \eta^2 = 0.017$, participants in the positive impact condition experienced more of it than participants in the neutral condition $([0.055, 0.643], p = .015)$ with no other differences. Replicating the analysis controlling for age, gender, and earnings yielded the same results. For situational meaning, $F(2, 444) = 9.18, p < .001, \eta^2 = 0.040$, participants in the positive impact condition experienced more of it than participants in the neutral condition $([0.351, 1.211], p < .001)$, while participants in the negative impact condition also experienced more of it than participants in the neutral condition $([0.017, 0.872], p = .040)$. Replicating this analysis controlling for age, ethnicity, and earnings yielded the same results. For vitality, while the ANOVA was not significant, $F(2, 444) = 2.62, p = .074, \eta^2 = 0.012$, the difference between positive impact and neutral condition approached significance $([-0.012, 0.878], p = .058)$. Replicating the analysis controlling for age, ethnicity, and earnings yielded the same result $([-0.032, 0.698], p = .073)$.

With respect to the perception that one is helping science, we examined for differences between positive impact ($M = 4.51, SD = 1.79$), neutral ($M = 4.05, SD = 1.73$), and negative impact conditions ($M = 4.54, SD = 1.81$). The analysis revealed significant differences between groups $F(2, 444) = 3.45, p = .033, \eta^2 = 0.015$, with participants in the negative impact group experiencing more helpfulness to science than participants in the neutral group $([0.0003, 0.97], p = .0498)$. The difference between participants in the positive impact and neutral conditions did not reach conventional standards of significance $([-0.031, 0.942], p = .072)$, and there were no differences between positive impact and negative impact conditions $([-0.452, 0.511], p = .989)$. When controlling for age and earnings, participants in the negative impact condition were still higher in their ratings of helpfulness to science than participants in the neutral condition $([0.077, 0.893], p = .020)$ but the difference between neutral and positive impact group became significant $([0.037, 0.854], p = .033)$, with positive impact participants feeling more helpful (the difference between positive impact and negative impact conditions remained insignificant $([-0.362, 0.442], p = .845)$). As regards sense of helping the Red Cross, there were also differences, $F(2, 444) = 130.46, p < .001, \eta^2 = 0.370$, with participants in the positive impact condition being higher than those in the neutral $([2.47, 3.39], p < .001)$, and negative impact $([2.06, 2.97], p < .001)$ conditions, and the difference between participants in the negative impact and neutral group approaching significance $([-0.048, 0.874], p = .090)$. When controlling for ethnicity and earnings, these results remained the same.

3.5. Discussion

In Study 3 we set out to replicate results of the two previous studies, with the main results depicted in Fig. 3. We found again that participants in the positive impact condition reported more situational meaning and had higher positive affect than those in the neutral condition. Participants in the positive impact group also felt that they had helped the Red Cross more than participants in either negative impact or neutral conditions, as expected. In contrast, there were no differences across conditions in any ill-being indicators, with results showing that being in the negative impact condition neither increased ill-being nor decreased well-being. Yet, like those in the positive impact condition, people in the negative impact condition experienced more situational meaning and thought they were helping science more than did participants in the neutral condition. This lent support for our hypothesis that people in the negative impact condition might buffer the experience of their negative impact by emphasizing the positive contribution they made as participants.

4. Meta-analysis across the three studies

In line with recent calls for meta-analytic approach to experimental research (Cumming, 2014), we conducted a meta-analysis across the three studies to estimate the overall effect sizes between the groups thus providing an additional robustness test of the key results. For the purpose of this meta-analysis, we calculated the overall Cohen's *d* effect sizes for each of the variables using ESCI software (Cumming, 2012). Given homogeneity between the studies in terms of manipulations and measures used, we used a fixed effects model. Starting with the differences between neutral and positive impact conditions, the estimated effect size for beneficence satisfaction was 1.26 [1.024, 1.489], for beneficence frustration 0.058 [-0.053, 0.169], for positive affect 0.223 [0.068, 0.379], for vitality 0.478 [0.241, 0.714], for meaningfulness 0.735 [0.504, 0.967], for negative affect 0.014 [-0.073, 100], for anxiety -0.118 [-0.267, 0.031], and for depression -0.103 [-0.245, 0.039]. The results thus support the conclusions of the individual studies: the positive impact condition leads to an enhancement effect, with increased beneficence satisfaction and more positive well-being as evidenced by increases in positive affect, vitality, and meaningfulness, with no effect on the three ill-being indicators.

Comparing the difference between neutral and negative impact conditions, the estimated effect size for beneficence satisfaction was

0.273 [0.049, 0.498], for beneficence frustration 0.839 [0.673, 1.006], for positive affect 0.173 [0.013, 0.334], for vitality 0.306 [0.062, 0.550], for meaningfulness 0.416 [0.185, 0.646], for negative affect 0.067 [-0.022, 0.156], for anxiety 0.087 [-0.077, 0.252], and for depression 0.056 [-0.092, 0.204]. Thus meta-analysis showed no effect of the negative impact condition on ill-being indicators. Instead, being in the negative impact condition seemed to increase positive affect, vitality, and meaningfulness as well as both beneficence satisfaction and beneficence frustration.

5. General discussion

In this series of studies we set out to examine whether engaging in behavior that has negative social impact would lead to ill-being in a fashion mirroring the positive effects of engaging in behaviors with positive social impact. More particularly, in three studies, we examined participants who were exposed to similar dosage of positive impact and negative impact effect – in this case donating money to the Red Cross or taking money away from the Red Cross – to examine whether prosocial impact would increase well-being and antisocial impact increase ill-being.

First, findings from our initial study showed that although the manipulations were effective, effect sizes were modest. We thus moved to larger samples in Studies 2 and 3. In line with previous findings (e.g., Martela & Ryan, 2016; 2020), the zero-order correlations in both studies revealed that beneficence satisfaction and frustration were associated with increased well-being and ill-being, respectively. Also in line with previous research (e.g. Aknin et al., 2013; Martela & Ryan, 2016a), these studies demonstrated that engaging in prosocial behavior increased participants' sense of vitality (Study 2), situational meaning (Studies 2 & 3), and positive affect (Study 3). Meta-analysis across the three studies confirmed these positive effects on positive affect, vitality, and situational meaning. However, even though we used three different indicators of ill-being and two sufficiently powered studies, we found no evidence that the negative impact condition increased people's ill-being, either when examining the studies individually or when conducting a meta-analysis across them. Instead, people in the negative impact condition, as compared to the neutral condition, experienced more prosocial impact, vitality, and meaningfulness in Study 2, and more situational meaningfulness and a sense that they were helping science in Study 3. The meta-analysis across three studies confirmed both these positive effects of being in the negative impact condition on well-being

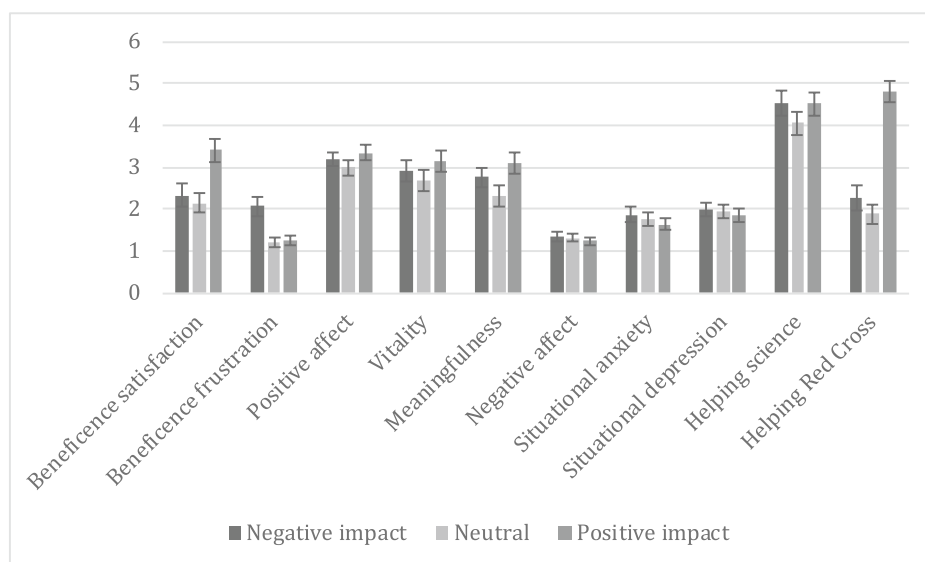


Fig. 3. The impact of condition on dependent variables in Study 3 with 95% confidence intervals.

indicators as well as showing positive effects on both beneficence satisfaction and frustration relative to participants in the neutral condition. Perhaps partially explaining this result, findings in Study 3 showed that participants in the negative impact condition also reported feeling that they contributed more towards science than participants in the neutral condition. In recognizing the potentially negative impact they were having, the participants might have consciously or unconsciously focused upon the positive impact of their activity, perhaps to mitigate any feelings associated with their negative impact.

Feeling one is harming others is arguably hard to integrate (Martela & Ryan, 2020; Ryan & Deci, 2017), leading people to engage in defenses and rationalizations (Simler & Hanson, 2018; Tsang, 2002; Weinstein et al., 2012), as well as attempts to repair harm where possible (Legate et al., 2015). The psychological well-being dynamics in antisocial situations thus might be more complex and less straightforward than often thought – this could also explain why so little research on the topic has been previously published. The present results thus emphasize the need for more research in the future to further identify the defense mechanisms that might lead participants having an antisocial impact not suffering from it but instead even having a higher well-being because of it.

Certain limitations need to be acknowledged. First, all samples were gathered within one country and through the same online channel, Mturk, making it important to replicate the findings in other samples and cultures. Second, well-being was measured using self-reports, calling for future research utilizing others ways of measuring it. Third, one of our key findings was negative – we didn't find any effect of antisocial behavior on well-being and ill-being indicators raising the question as to the adequacy of the research design. Yet arguing against this, manipulation checks showed that participants realized that they were having a negative impact in the negative impact condition, and on the other side of the ledger, the positive impact condition demonstrated that the paradigm could in principle cause differences in well-being. Minimally, what this study thus appears to show is that the same “dosage” of impact, which when positive is capable of increasing participants well-being is not enough, when negative, to increase participants ill-being to a similar degree. This led us to look for and find that participants might be compensating for the negative impact by emphasizing the positive impacts the same activity was causing. We hope this research spurs more inquiry into the potential asymmetry of impact on well-being and ill-being from beneficial and harmful results of one's actions.

6. Conclusion

In a way, the present investigation raises as many questions as it answers. While finding an expected positive effect on need satisfaction and wellness from positively contributing to others, we did not find evidence for increased ill-being when having a negative impact of comparable magnitude. Instead, there were unanticipated findings that being in our negative impact condition was associated with an increased sense of meaning in both Studies 2 and 3, relative to those in a neutral group.

While it has been customary for researchers to mainly publish positive findings where hypotheses are confirmed, more recently an increasing amount of voices have raised concerns about how this “prejudice against the null hypothesis” contributes to a file drawer problem, *p*-hacking, and artificially inflated effect sizes (Nelson et al., 2018; Schooler, 2011; Simmons et al., 2011). Having well-justified hypotheses not confirmed by well-powered studies can be as informative for the progress of science as having them confirmed. For example, the unexpected findings in Study 2 led us to ask whether people in the negative impact condition might cognitively compensate their negative impact by focusing on the positive impact they were having towards science. We indeed found support for this novel hypothesis in Study 3, which thus opens up paths for more research on the various compensatory and defensive mechanisms participants might engage in when

facing the possibility of having a negative impact on others. When people feel that they have had a negative on others, does this activate a search for compensating positive impacts so that the person can retain a sense of having an overall positive effect on others? When their actions are the result of external instructions, are people more willing to see any resulting positive impact as their own responsibility, while seeing any resulting negative impact as the responsibility of the instructor? These are research questions awakened by this study that need to be explored in future studies.

We thus believe that the mixed but seemingly reliable findings of the present research can stimulate new research utilizing other paradigms to further examine whether hurting others in other situations indeed would decrease the well-being of the participants, or be associated with defensive and compensatory mechanisms to avoid feeling one's negative impact on others. Rather than closing the question of what are the psychological effects of having a negative impact on others, the present studies have further opened this question, inviting more research before firm conclusions can be drawn about the complex psychological effects of feeling one is hurting others.

Open practices

Preregistration: All three studies were preregistered at OSF.

Data: The data for all three studies is publicly available at: https://osf.io/5h4cr/?view_only=641468da56d24730b92f1b4a3b666f8e.

Contribution statement

F.M. and R.M. developed the study concept and designed the study together. F.M. performed the data collection and analysis. F.M. drafted the first version of the manuscript, and it was revised by both F.M. and R.M. Both authors approved the final version of the manuscript for submission.

References

- Aknin, L. B., Barrington-Leigh, C. P., Dunn, E. W., Helliwell, J. F., Burns, J., Biswas-Diener, R., Kemeza, I., Nyende, P., Ashton-James, C. E., & Norton, M. I. (2013). Prosocial spending and well-being: Cross-cultural evidence for a psychological universal. *Journal of Personality and Social Psychology*, 104(4), 635–652. <https://doi.org/10.1037/a0031578>
- Aknin, L. B., Fleerackers, A. L., & Hamlin, J. K. (2014). Can third-party observers detect the emotional rewards of generous spending? *The Journal of Positive Psychology*, 9(3), 198–203. <https://doi.org/10.1080/17439760.2014.888578>
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, 37(11), 1459–1473. <https://doi.org/10.1177/0146167211413125>
- Batson, C. D. (1990). How social an animal? The human capacity for caring. *American Psychologist*, 45(3), 336–346. <https://doi.org/10.1037/0003-066X.45.3.336>
- Batson, C. D., Ahmad, N., & Lishner, D. A. (2009). Empathy and altruism. In S. J. Lopez, & C. R. Snyder (Eds.), *The Oxford handbook of positive psychology* (pp. 417–426). Oxford University Press.
- Cumming, G. (2012). *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. Routledge.
- Cumming, G. (2014). The new statistics: Why and how. *Psychological Science*, 25(1), 7–29. <https://doi.org/10.1177/0956797613504966>
- Curry, O. S., Rowland, L. A., Van Lissa, C. J., Zlotowitz, S., McAlaney, J., & Whitehouse, H. (2018). Happy to help? A systematic review and meta-analysis of the effects of performing acts of kindness on the well-being of the actor. *Journal of Experimental Social Psychology*, 76, 320–329. <https://doi.org/10.1016/j.jesp.2018.02.014>
- Damburn, M., & Vatiné, E. (2010). Reopening the study of extreme social behaviors: Obedience to authority within an immersive video environment. *European Journal of Social Psychology*, 40(5), 760–773. <https://doi.org/10.1002/ejsp.646>
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research*, 97(2), 143–156. <https://doi.org/10.1007/s11205-009-9493-y>
- Dunn, E. W., Aknin, L. B., & Norton, M. I. (2008). Spending money on others promotes happiness. *Science*, 319(5870), 1687–1688. <https://doi.org/10.1126/science.1150952>
- Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: An evolutionary analysis and empirical review. *Psychological Bulletin*, 136(3), 351–374. <https://doi.org/10.1037/a0018807>
- Hui, B. P. H., Ng, J. C. K., Berzaghi, E., Cunningham-Amos, L. A., & Kogan, A. (2020). Rewards of kindness? A meta-analysis of the link between prosociality and well-being. *Psychological Bulletin*, Advance Online Publication. <https://doi.org/10.1037/bul0000298>.

- King, L. A., & Hicks, J. A. (2009). Detecting and constructing meaning in life events. *The Journal of Positive Psychology, 4*(5), 317–330. <https://doi.org/10.1080/17439760902992316>
- Leary, M. R., & Baumeister, R. F. (2000). The nature and function of self-esteem: Sociometer theory. *Advances in Experimental Social Psychology, 32*, 1–62. [https://doi.org/10.1016/S0065-2601\(00\)80003-9](https://doi.org/10.1016/S0065-2601(00)80003-9)
- Legate, N., DeHaan, C. R., & Ryan, R. (2015). Righting the wrong: Reparative coping after going along with ostracism. *The Journal of Social Psychology, 155*(5), 471–482. <https://doi.org/10.1080/00224545.2015.1062352>
- Legate, N., DeHaan, C. R., Weinstein, N., & Ryan, R. M. (2013). Hurting you hurts me too: The psychological costs of complying with ostracism. *Psychological Science, 24*(4), 583–588. <https://doi.org/10.1177/0956797612457951>
- Martela, F., & Ryan, R. M. (2016a). Prosocial behavior increases well-being and vitality even without contact with the beneficiary: Causal and behavioral evidence. *Motivation and Emotion, 40*(3), 351–357. <https://doi.org/10.1007/s11031-016-9552-z>
- Martela, F., & Ryan, R. M. (2016b). The Benefits of benevolence: Basic psychological needs, beneficence, and the enhancement of well-being. *Journal of Personality, 84*(6), 750–764. <https://doi.org/10.1111/jopy.12215>
- Martela, F., & Ryan, R. M. (2020). Distinguishing between basic psychological needs and basic wellness enhancers: The case of beneficence as a candidate psychological need. *Motivation and Emotion, 44*, 116–133. <https://doi.org/10.1007/s11031-019-09800-x>
- Nelson, L. D., Simmons, J., & Simonsohn, U. (2018). Psychology's renaissance. *Annual Review of Psychology, 69*, 511–534. <https://doi.org/10.1146/annurev-psych-122216-011836>
- Radloff, L. S. (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385–401. <https://doi.org/10.1177/014662167700100306>
- Rottman, J., & Young, L. (2019). Specks of dirt and tons of pain: Dosage distinguishes impurity from harm. *Psychological Science, 30*(8), 1151–1160. <https://doi.org/10.1177/0956797619855382>
- Ryan, Richard M., & Deci, Edward L. (2017). *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. New York: Guilford Press.
- Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality, 65*(3), 529–565. <https://doi.org/10.1111/j.1467-6494.1997.tb00326.x>
- Schooler, J. (2011). Unpublished results hide the decline effect. *Nature, 470*(7335), 437–437. <https://doi.org/10.1038/470437a>
- Simler, K., & Hanson, R. (2018). *The elephant in the brain: Hidden motives in everyday life*. Oxford University Press.
- Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science, 22*(11), 1359–1366. <https://doi.org/10.1177/0956797611417632>
- Singer, T., & Klimecki, O. M. (2014). Empathy and compassion. *Current Biology, 24*(18), R875–R878. <https://doi.org/10.1016/j.cub.2014.06.054>
- Slater, M., Antley, A., Davison, A., Swapp, D., Guger, C., Barker, C., Pistrang, N., & Sanchez-Vives, M. V. (2006). A virtual reprise of the stanley milgram obedience experiments. *PLoS ONE, 1*(1), Article e39. <https://doi.org/10.1371/journal.pone.0000039>
- Spitzer, R. L., Kroenke, K., Williams, J. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The gad-7. *Archives of Internal Medicine, 166*(10), 1092–1097. <https://doi.org/10.1001/archinte.166.10.1092>
- Tsang, J.-A. (2002). Moral rationalization and the integration of situational factors and psychological processes in immoral behavior. *Review of General Psychology, 6*(1), 25–50. <https://doi.org/10.1037/1089-2680.6.1.25>
- Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263–280. <https://doi.org/10.1037/a0032359>
- Weinstein, N., & Ryan, R. M. (2010). When helping helps: Autonomous motivation for prosocial behavior and its influence on well-being for the helper and recipient. *Journal of Personality and Social Psychology, 98*(2), 222–244. <https://doi.org/10.1037/a0016984>
- Weinstein, N., Ryan, W. S., DeHaan, C. R., Przybylski, A. K., Legate, N., & Ryan, R. M. (2012). Parental autonomy support and discrepancies between implicit and explicit sexual identities: Dynamics of self-acceptance and defense. *Journal of Personality and Social Psychology, 102*(4), 815–832. <https://doi.org/10.1037/a0026854>