

Emotional, motivational and attitudinal consequences of autonomous prosocial behaviour

Article

Published Version

Creative Commons: Attribution 4.0 (CC-BY)

Open Access

Kelley, N. J., Weinstein, N. ORCID: <https://orcid.org/0000-0003-2200-6617>, Smith, E. E., Davis, W. E., Christy, A. G., Sedikides, C. and Schlegel, R. J. (2022) Emotional, motivational and attitudinal consequences of autonomous prosocial behaviour. *European Journal of Social Psychology*. ISSN 0046-2772 doi: 10.1002/ejsp.2916 Available at <https://centaur.reading.ac.uk/108990/>

It is advisable to refer to the publisher's version if you intend to cite from the work. See [Guidance on citing](#).

To link to this article DOI: <http://dx.doi.org/10.1002/ejsp.2916>

Publisher: Wiley

All outputs in CentAUR are protected by Intellectual Property Rights law, including copyright law. Copyright and IPR is retained by the creators or other copyright holders. Terms and conditions for use of this material are defined in the [End User Agreement](#).

www.reading.ac.uk/centaur

CentAUR

Central Archive at the University of Reading

Reading's research outputs online

RESEARCH ARTICLE

Emotional, motivational and attitudinal consequences of autonomous prosocial behaviour

Nicholas J. Kelley¹ | Netta Weinstein² | Emily E. Smith³ | William E. Davis⁴ |
Andrew G. Christy⁵ | Constantine Sedikides¹ | Rebecca J. Schlegel⁶

¹Centre for Research on Self and Identity, School of Psychology, University of Southampton, Southampton, UK

²School of Psychology and Clinical Language Sciences, University of Reading, Reading, UK

³Medical College of Georgia, Augusta University, Augusta, Georgia, USA

⁴Department of Psychology, Wittenberg University, Springfield, Ohio, USA

⁵Department of Psychology, State University of New York at Plattsburgh, Plattsburgh, New York, USA

⁶Department of Psychological and Brain Science, Texas A&M University, College Station, Texas, USA

Correspondence

Nicholas J. Kelley, Center for Research on Self and Identity, School of Psychology, University of Southampton, B44 University Road, Southampton, SO17 1BJ, UK.
Email: n.j.kelley@soton.ac.uk

Portions of the findings were presented at the 19th Annual Meeting of the Society for Personality and Social Psychology, Atlanta, GA, USA.

Abstract

When do prosocial actors experience positive versus negative psychological outcomes from helping others? In four studies and an internal meta-analysis, we tested the hypothesis that autonomy shapes the psychological consequences of helping others. In Study 1, prosocial behaviour was associated with a robust pattern of negative well-being outcomes (i.e., depression, anxiety, stress) for individuals low but not high in autonomy. In Studies 2–4, relative to reflecting on a neutral interpersonal experience, reflecting on an autonomous helping experience increased sadness and happiness, strengthened intentions to help in the future and raised support for social welfare. By contrast, reflecting on a controlled helping experience increased negative emotions and decreased positive emotions, but did not affect attitudes or behavioural intentions. Collectively, the findings indicate that autonomy (or lack thereof) shapes the emotional, motivational and attitudinal consequences of helping behaviour.

KEYWORDS

attitudes, autonomy, behavioural intentions, emotion, prosocial behaviour

1 | INTRODUCTION

Helping others feels good. Indeed, research suggests that prosocial behaviour confers well-being benefits to helpers, including increased positive emotions (Aknin & Whillans, 2021) decreased negative emotions (Nelson et al., 2016), and higher self-worth (Klein, 2017). However, the well-being benefits of helping others are not unconditional; researchers have begun to appreciate that helpers' motivations may influence whether and how helping promotes well-being. Specifically, helping that is driven by self-imposed pressure, social pressure or external influences—experienced as controlled—may not yield the

same benefits as helping that feels more volitional (Weinstein & Ryan, 2010). In the current research, we sought to extend these findings by examining how autonomous motivation shapes the emotional, motivational and attitudinal consequences of prosocial behaviour.

1.1 | Prosocial behaviour and helpers' well-being

Prosocial behaviours span formal helping such as volunteering (Meier & Stutzer, 2008) and everyday acts of assistance or kindness (Weinstein & Ryan, 2010). Beyond the evident benefits to recipients and

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2022 The Authors. *European Journal of Social Psychology* published by John Wiley & Sons Ltd.

communities, the literature over the past decade has identified potential well-being benefits to helpers themselves. However, this research has documented considerable variation in how strongly helping behaviour relates to helpers' subsequent well-being. For example, a recent meta-analysis of over 200 independent studies involving nearly 200,000 participants reported a small effect size of prosocial behaviour on well-being ($r = .13$), but with substantial variability and larger effects in certain helping contexts (Hui et al., 2020). Although many studies correlate prosocial behaviour with well-being, randomized controlled trials assigning individuals to engage in kind acts similarly show sustained positive affect benefits above and beyond comparison conditions that include non-helping tasks (Alden & Trew, 2013). Taken together, prosocial behaviour generally has a positive influence on emotional well-being, though this pattern is not without exceptions.

To explain the source of variability in prosocial behaviour's influence on well-being outcomes, researchers have applied self-determination theory (SDT; Ryan & Deci, 2017), which is concerned with human motivation and its behavioural and well-being outcomes. According to SDT, the form of motivation that underlies behaviour influences subsequent emotions and ongoing behavioural engagement. According to SDT, motivation can be differentiated into two forms: autonomous and controlled. Autonomous motivation refers to acting based on personal interest, enjoyment or important goals. Autonomous motivation is energy for behaviour that emanates from the 'self' because it is self-endorsed and self-congruent. Controlled motivation, by comparison, is characterized by action taken because of others' expectations, threats, rewards or due to partially internalized societal demands. In the context of prosocial behaviour, autonomously motivated helping is energized through recognizing the helping behaviour as important, finding interest in it, or from a sense of caring for others. Conversely, control-motivated helping is driven by feeling guilt and shame when failing to help, or via a sense of choicelessness arising from pressure, demands or coercion from the social environment.

Research stemming from SDT has shown that effects of prosocial behaviour on helpers' well-being differ as a function of helpers' motivations. In early experience-sampling and laboratory contexts in which motivation for helping was observed naturally or manipulated experimentally, participants reported higher well-being when their helping was autonomous rather than controlled (Weinstein & Ryan, 2010). Conceptually similar results were obtained in a study of workplace helping where negative effects of helping were only found among those low in autonomy (Kibler et al., 2019). Specifically, high levels of prosocial motivation increased stress, which in turn reduced life satisfaction, but only for those low in autonomous motivation (Kibler et al., 2019). Other studies reported that the relationship between prosocial behaviour and well-being is explained, in part, by satisfaction of the need for autonomy (Martela & Ryan, 2016). Helping others promotes a sense of personal volition and self-congruence—a finding that provides indirect evidence for the beneficial role of autonomous motivation. There is a strong link between being autonomously motivated for an activity and experiencing autonomy need satisfaction by engaging in that activity (Weinstein & Ryan, 2010). Thus, it stands to reason that helping behaviours that lack autonomy would be less

likely to foster helpers' well-being. Yet, counter to these findings and the logical derivation, an experience-sampling study examining hedonic and eudaimonic well-being at subsequent time points did not find evidence for a moderating effect of autonomy need satisfaction on the prosocial engagement–well-being link (Hui & Kogan, 2018). Hence, although most research in this area has implicated autonomy in the relationship between helping and helpers' well-being, findings are mixed. To clarify these mixed findings, one aim of the current studies was to test whether autonomous *motivation* shapes the relationship between prosociality and well-being using correlational and experimental methods.

If autonomous prosocial behaviour does engender greater well-being among helpers, it is plausible that it also encourages future desires to help others. This supposition is supported by research showing that autonomous motivation for a behaviour predicts behavioural intentions in a variety of contexts, including public health (Chung et al., 2018), sports (Stanley et al., 2012), school (Roth, 2014) and work (Lin et al., 2019). Yet, relevant evidence within the prosocial domain is limited and mixed. On the one hand, autonomous motivation promotes effort and productivity invested into two prosocial professions (i.e., firefighters and fundraisers; Grant, 2007). On the other hand, autonomous motivation induced through implicit priming or through self-affirmation does not encourage prosocial motivation (Pavey et al., 2011). Collectively, these findings demonstrate mixed support for the hypothesis that autonomous helping promotes the desire to help in the future. Correlational studies link autonomy to future helping in several contexts, and indirect support comes from the well-being benefits of autonomy in helping professions. However, laboratory experiments that have induced an autonomy mindset using priming have not shown increases in prosocial motivation. The current research sought to clarify and advance this literature using improved experimental designs.

We also sought to extend this literature by examining whether autonomous helping might impact how likely people are to support political candidates and policies that promote prosocial behaviour (e.g., social welfare). Most studies of prosocial behaviour involve some kind of cost to the participants (e.g., time and effort, at a minimum). By comparison, attitudes toward social policy have little to no cost to the individual. Given that people are motivated to reap the benefits of prosocial behaviour while minimizing costs (e.g., Batson et al., 1997, 2002), we might expect autonomous helping to be particularly likely to engender support for these policies given the relative lower cost to the individual. That is, to the extent that autonomous helping promotes prosocial motivation, it may be even easier to promote support for prosocial policies than other forms of prosocial behaviour that come at a higher cost.

1.2 | Overview

In four studies, we examined the moderating role of autonomous motivation in shaping the emotional (Studies 1–4), motivational (Studies 2–4) and attitudinal (Studies 3–4) consequences of prosocial behaviour.

We hypothesized that, relative to not helping, autonomous motivation for helping would be associated with increased positive emotions, decreased negative emotions, intentions to help in the future and more positive attitudes toward social welfare. Conversely, we hypothesized that controlled motivation for helping would show an opposite pattern. We tested these hypotheses in a confirmatory (model-testing) fashion incorporating open research practices (Wagenmakers et al., 2012). Accordingly, we pre-registered the hypotheses, analyses and exclusion criteria for all studies (Studies 1–4), and have made all data and stimulus materials available on OSF.¹ In these studies, we report all measures, manipulations and exclusions. For each study, we report correlations between all study variables in Supplemental Materials (Tables S1–S4). Across studies, participants read that this project was concerned with ‘Personality, Mood, and Behaviour’. All studies were approved by the [BLINDED] Institutional Review Board and all participants provided informed consent.

2 | STUDY 1

In Study 1, we tested the hypothesis that autonomy shapes the emotional consequences of helping using a cross-sectional design. Individuals who are dispositionally oriented toward autonomy experience their behaviour as more autonomously motivated across contexts, whereas those dispositionally low in autonomy perceive their cross-situational behaviour as controlled by external forces (Ryan & Deci, 2006). If autonomy (or lack thereof) operates cross-situationally, we can make several inferences about the prosocial behaviour of people varying in general autonomy. First, for those who engage in high (vs. low) levels of prosocial behaviour and report low general autonomy, prosocial behaviours are less autonomously motivated. Conversely, for those who engage in high (vs. low) levels of prosocial behaviour and report high general autonomy, prosocial behaviours are highly autonomously motivated. Consistent with our proposal that autonomy shapes the link between prosocial behaviour and emotions, we derived two hypotheses. First, for high-autonomy participants, prosocial behaviour is associated with greater subjective well-being and lower psychological distress (i.e., depression, anxiety, stress). Second, for low-autonomy participants, prosocial behaviour is associated with lower subjective well-being and higher psychological distress.

2.1 | Method

2.1.1 | Participants

We conducted a power analysis in G*Power 3.1 (Faul et al., 2009) using the ‘linear multiple regression Fixed model, R^2 increase’ procedure.

Weinstein and Ryan’s (2010) studies were largely experimental and did not include cross-sectional correlational analyses to inform our power calculations. Thus, erring on the side of caution, we assumed a small effect size. In addition to effect size $f = .03$, ‘ α err prob’ = .05, and ‘Power ($1 - \beta$ err prob) = .80’, we specified ‘Number of tested predictors’ = 1 and ‘Total number of predictors’ = 3 as input parameters, because we had three predictors in the full model and only one of them captured the effect of interest (i.e., interaction). This power analysis suggested that approximately 264 participants were needed to detect a small interaction effect.

We recruited 264 MTurk workers from North America, each compensated with \$0.25. Participants were 20–82 years old ($M = 35.48$, $SD = 12.47$), predominantly white ($n = 157$, 60.38%) and non-Hispanic ($n = 221$, 85.00%). We excluded participants for three reasons. First, at the end of the procedure, we asked them if they took the study seriously and excluded those who responded ‘No’. Second, we asked participants after debriefing whether we should use their data and excluded those who responded ‘No’. Finally, we excluded those who provided incomplete data. The final sample comprised 260 participants (142 women, 118 men). A sensitivity analysis in G*Power for a 3-predictor linear regression model indicated that this study had 80% power to detect effects of $f^2 = .03$ (corresponding to $R^2 = .03$).

2.1.2 | Procedure

We administered measures of autonomy, prosocial behaviour, subjective well-being, depression, anxiety and stress. The measures were presented in a separate random order for each participant.

Autonomy. We derived our measure of autonomy from the Comprehensive Inventory of Thriving (Su et al., 2014), which assesses 18 psychological well-being constructs. The three-item autonomy subscale pertains to participants’ sense of control over decisions (i.e., ‘Other people decide most of my life decisions’, ‘Other people decide what I can and cannot do’) and life choices (i.e., ‘The life choices I make are not really mine’; 1 = *strongly disagree*, 5 = *strongly agree*; $M = 3.44$, $SD = 1.26$, $\alpha = .93$).

Prosocial behaviour. The self-report altruism scale (Rushton et al., 1981) asks participants to rate how frequently they have enacted 20 prosocial behaviours (e.g., ‘I have helped push a stranger’s car out of the snow’, ‘I have done volunteer work for charity’) (1 = *never*, 5 = *very often*; $M = 2.81$, $SD = 0.67$, $\alpha = .90$).

Subjective well-being. We also derived our nine-item measure of subjective well-being from the Comprehensive Inventory of Thriving. Consistent with the literature (Diener, 1984). We operationalized subjective well-being as a composite of three constructs: life satisfaction (e.g., ‘In most ways my life is close to my ideal’), positive affect (e.g., ‘I feel positive most of the time’) and negative affect (e.g., ‘I feel negative most of the time’), each consisting of three items. We reverse-scored negative affect items, and then averaged across the three subjective well-being indicators (1 = *strongly disagree*, 5 = *strongly agree*; $M = 3.62$, $SD = 0.99$, $\alpha = .93$).

¹ In our pre-registration, we proposed secondary analyses to examine the extent to which emotional states mediated the relationship between our experimental manipulation and behavioural intentions (Studies 2–4) and social welfare attitudes (Studies 3–4). We did not conduct these secondary analyses because the current studies were not designed to test a causal pathway (Spencer et al., 2005) and due to broader concerns about the ability of mediational analysis to test causality (Fiedler et al., 2018).

Depression, anxiety and stress. The Depression, Anxiety and Stress Scale short form (Lovibond & Lovibond, 1995) requests participants to indicate the applicability of 21 statements to their experiences over the last week (0 = *did not apply to me at all*, 3 = *applied to me very much, or most of the time*). This scale contains a seven-item anxiety sub-scale (e.g., 'I was worried about situations in which I might panic and make a fool of myself'), a seven-item depression sub-scale (e.g., 'I couldn't seem to experience any positive feeling at all') and a seven-item stress sub-scale (e.g., 'I found it hard to wind down'). For each sub-scale, the items are summed, then multiplied by two to make the measure comparable to the 42-item long form of the scale. The average total anxiety score was 10.51 ($SD = 11.32$, $\alpha = .92$), the average total depression score was 11.63 ($SD = 11.83$, $\alpha = .93$) and the average total stress score was 12.48 ($SD = 10.93$, $\alpha = .92$).

2.2 | Results

2.2.1 | Subjective well-being

We used the PROCESS macro (Hayes, 2017; Model 1; 5000 bootstrap samples) to examine the interactive effects of autonomy and prosocial behaviour on subjective well-being. Higher prosocial behaviour was associated with greater subjective well-being, $b = 0.40$, $SE = 0.09$, $t(256) = 4.54$, $p < .001$, 95% CI [0.23, 0.58]. Also, higher autonomy was associated with greater subjective well-being, $b = 0.33$, $SE = 0.05$, $t(256) = 7.36$, $p < .001$, 95% CI [0.24, 0.42]. The prosocial behaviour \times autonomy interaction was not statistically significant, $b = -0.09$, $SE = 0.07$, $t(256) = -1.35$, $p = .179$, 95% CI [-0.22, 0.04].

2.2.2 | Depression, anxiety and stress

We used the PROCESS macro (Hayes, 2017; Model 1; 5000 bootstrap samples) to examine the effects of autonomy and prosocial behaviour separately on depression, anxiety and stress. Prosocial behaviour was not associated with depression ($b = 0.33$, $SE = 0.97$, $t[256] = 0.34$, $p = .732$, 95% CI [-1.57, 2.24]), anxiety ($b = 0.92$, $SE = 0.93$, $t[256] = 0.99$, $p = .324$, 95% CI [-0.91, 2.75]) or stress ($b = 1.04$, $SE = 0.92$, $t[256] = 1.12$, $p = .259$, 95% CI [-0.77, 2.8]). Higher autonomy was associated with reduced depression, ($b = -5.15$, $SE = 0.49$, $t[256] = -10.51$, $p < .001$, 95% CI [-6.11, -4.18]), anxiety ($b = -4.38$, $SE = 0.47$, $t[256] = 9.32$, $p < .001$, 95% CI [-5.30, -3.45]) and stress ($b = -4.15$, $SE = 0.47$, $t[256] = 8.88$, $p < .001$, 95% CI [-5.07, -3.23]). The prosocial behaviour \times autonomy interaction was statistically significant for depression ($b = -1.52$, $SE = 0.71$, $t[256] = -2.13$, $p = .034$, 95% CI [-2.93, -0.11]), anxiety ($b = -2.60$, $SE = 0.69$, $t[256] = -3.80$, $p < .001$, 95% CI [-3.95, -1.25]) and stress ($b = -1.76$, $SE = 0.68$, $t[256] = -2.58$, $p = .011$, 95% CI [-3.10, -0.41]). To probe each interaction, we examined the association between prosocial behaviour and each outcome measure at ± 1 SD from the mean score of autonomy (Figure 1).

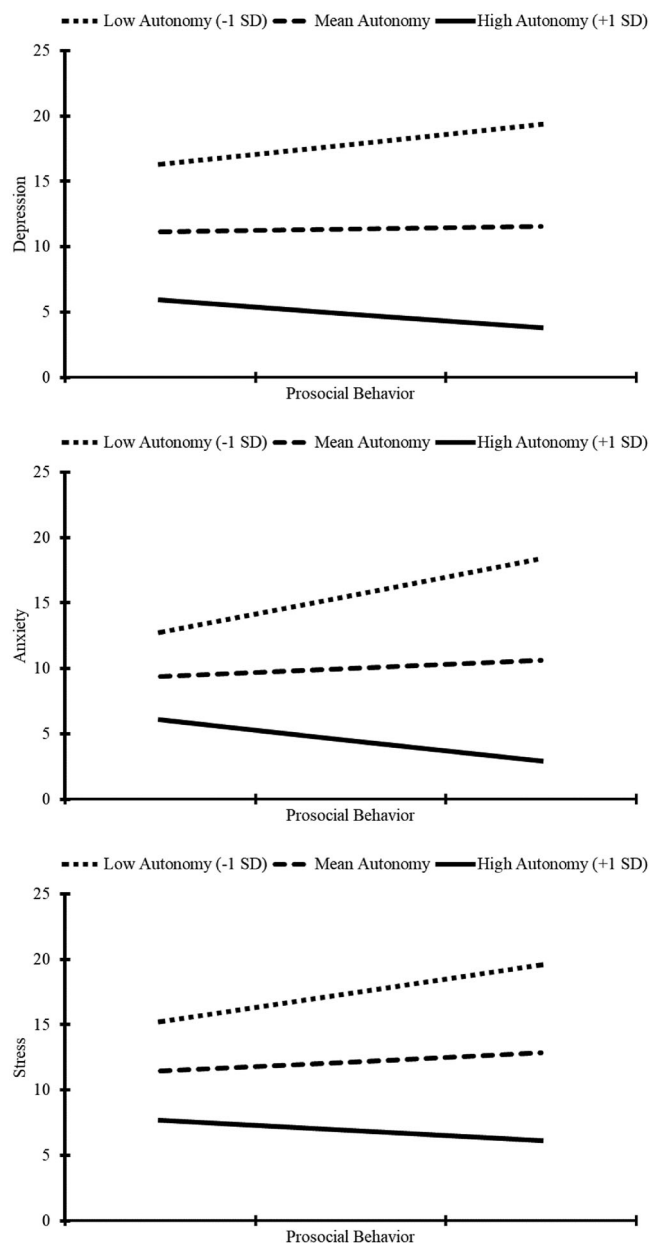


FIGURE 1 Prosocial behaviour is associated with elevated psychological distress for those low in autonomy (Study 1).

All three interactions took the same basic form. Among highly autonomous participants (+1 SD), there was no association between prosocial behaviour and depression ($b = -1.59$, $SE = 1.52$, $t[256] = -1.04$, $p = .299$, 95% CI [-4.59, 1.42]), anxiety ($b = -2.36$, $SE = 1.46$, $t[256] = -1.62$, $p = .107$, 95% CI [-5.24, 0.515]) or stress ($b = -1.17$, $SE = 1.45$, $t[256] = -0.81$, $p = .421$, 95% CI [-4.04, 1.69]). Among participants at mean levels of autonomy, there was no association between prosocial behaviour and depression ($b = 0.33$, $SE = 0.97$, $t[256] = 0.34$, $p = .732$, 95% CI [-1.57, 2.24]), anxiety ($b = 0.92$, $SE = 0.93$, $t[256] = 0.99$, $p = .324$, 95% CI [-0.91, 2.75]) or stress ($b = 1.04$, $SE = 0.92$, $t[256] = 1.13$, $p = .259$, 95% CI [-0.77, 2.86]). However, among less-autonomous participants (-1 SD), higher prosocial behaviour was associated with greater depression ($b = 2.25$,

$SE = 1.08$, $t[256] = 2.07$, $p = .039$, 95% CI [0.11, 4.38]), anxiety ($b = 4.20$, $SE = 1.04$, $t[256] = 4.03$, $p < .001$, 95% CI [2.15, 6.25]) and stress ($b = 3.26$, $SE = 1.04$, $t[256] = 3.15$, $p = .002$, 95% CI [1.22, 5.30]).

2.3 | Discussion

Study 1 tested the hypothesis that autonomy shapes the relationship between prosocial behaviour and emotion. Contrary to our hypothesis, autonomy did not moderate the association between prosocial behavioural and subjective well-being. However, results for psychological distress were consistent with our hypothesis. Among participants reporting lower autonomy, altruistic behaviours were associated with greater depression, anxiety and stress. Among participants reporting higher autonomy, altruistic behaviours were unrelated to these indicators of psychological distress. Collectively, the results partially support our hypotheses about diverging emotional trajectories of helping behaviour contingent upon autonomy.

By asking in Study 1 how variation in general autonomy shapes the link between prosocial behaviour and well-being, we tested our hypothesis broadly. We did not specifically assess experiences of autonomous helping, which may explain why our hypotheses were not fully supported. In the following studies, we used a more precise approach and tested causally the emotional and motivational after-effects of reflecting upon *specific experiences* with autonomous and controlled helping.

3 | STUDY 2

In Study 2, we experimentally tested autonomy's role in shaping the emotional and motivational consequences of prosocial behaviour. Previous meta-analyses have linked autonomous motivation, in general, to well-being (Yu et al., 2018) and causally to the well-being of prosocial actors (Curry et al., 2018). However, limited work has examined the underlying motives (e.g., autonomy) of prosocial actors, or the relationship between those underlying motives and well-being. Laboratory experiments examining the consequences of helping motivations are scarce and problematic. In one experiment (Weinstein & Ryan, 2010, study 3), participants were randomly assigned to help (or not help) another participant to win a prize by completing a remote-association test (Mednick, 1962). Next, participants in the helping condition were classified as autonomous or controlled helpers post hoc based on the motivation to help scale (see Method section below). Although the authors did randomly assign participants to help or not, they did not experimentally manipulate autonomous versus controlled motives. In another experiment (Martela & Ryan, 2016), autonomous helping was compared to a neutral control condition, but the controlled motivation was not manipulated. In a third experiment (Lin et al., 2019, study 1), autonomous and controlled helping were manipulated, but a neutral control condition was not included. Thus, more rigorous experimental testing is warranted. Experiments that simultaneously manipulate autonomous and controlled motivation (and include a neutral con-

trol condition) are needed for two reasons. First, without this more complete experimental design, it is difficult to determine whether the effects of autonomous motivation on affect, cognition or behaviour are driven by high or low autonomy. Second, in line with emerging evidence of dual-process pathways, autonomous and controlled motivations have divergent emotional and well-being trajectories (Donald et al., 2021; Haerens et al., 2015; Jang et al., 2016) that must be examined independently.

In the current study (and those that follow), we manipulated prosocial behaviour using an autobiographical recall task. Recent evidence suggests that autobiographical recall of prosocial behaviours boasts effects on well-being that are comparable to behavioural manipulations (Ko et al., 2021). In addition, recall methods are more cost-effective and amenable to high-powered direct replications relative to behavioural manipulations of prosocial behaviour. We hypothesized that recalling an autonomous helping experience (vs. a neutral interpersonal experience) would increase positive emotions, decrease negative emotions and strengthen intentions to help in the future. We also hypothesized that recalling a controlled helping experience would produce the opposite pattern. In testing these hypotheses, we instructed participants to (1) complete an autobiographical recall task in which they reflected on an instance of autonomous helping, controlled helping or neither (neutral), and (2) report their emotions and behavioural intentions.

3.1 | Method

3.1.1 | Participants

We conducted a power analysis in G*Power 3.1 (Faul et al., 2009) using the 'ANOVA: Fixed effects, omnibus, one-way' procedure from the 'F-tests' test family. We assumed a moderate effect size based on Weinstein and Ryan (2010, study 3), who found that non-autonomous helpers reported less positive emotion than autonomous helpers ($d = 0.57$). Thus, we specified the following parameters: effect size $f = .25$, ' α err prob' = .05, 'Power ($1 - \beta$ err prob)' = .80 and 'Number of groups' = 3. This analysis suggested that 159 participants were needed for a moderate effect with 80% power. To account for attrition, we recruited 200 MTurk workers and paid \$1.00 each. Participants were 21–71 years old ($M = 36.82$, $SD = 11.53$), predominantly white ($n = 148$, 74.74%) and non-Hispanic ($n = 177$, 89.39%). Following exclusions, the final sample comprised 198 participants (103 women, 94 men, 1 transgender). Sensitivity analyses in G*Power indicated that this study was able to detect effects as small as $f = .22$ (equivalent to $\eta^2_{\text{partial}} = .04$) with 80% power in a one-way ANOVA with a three-level fixed factor. Further sensitivity analyses for a mixed ANOVA with a three-level between-subjects factor and an eight-level within-subjects factor indicated that this study had 80% power to detect between-subjects effects as small as $f = .28$ (equivalent to $\eta^2_{\text{partial}} = .07$), within-subjects effects as small as $f = .27$ (equivalent to $\eta^2_{\text{partial}} = .07$) and interaction effects as small as $f = .31$ (equivalent to $\eta^2_{\text{partial}} = .09$).

3.1.2 | Procedure

We randomly assigned participants to the autonomous-helping condition ($n = 62$), the controlled-helping condition ($n = 67$) or the no-helping condition ($n = 69$). In the two helping conditions, participants read:

Altruism, or prosocial behaviour, refers to intentional actions which are costly to YOU and beneficial to SOMEONE ELSE (other than friends and family). Please remember a SPECIFIC time when you engaged in altruistic or prosocial behaviour. This could include volunteer work, donating time, donating money, donating blood or any other action which was costly to YOU but helpful to SOMEONE ELSE (other than friends and family). Importantly, we want you to think of a time when you were engaged in prosocial behaviour because ... **[autonomous-helping condition: you genuinely valued this behaviour or were personally interested in doing it; controlled-helping condition: of some external force or pressure beyond your control]**. In other words, think of a time when you behaved altruistically and ... **[autonomous-helping condition: felt like you had a lot of personal choice in helping; controlled-helping condition: felt like you had very little/no personal choice in helping]**. For the next few minutes, we would like you to retrieve, relive, and write down your memories below. Please try to be as detailed as possible as if you were writing a short story. This description needs to be at least 100 words long.

In the no-helping condition, participants recalled a social interaction (other than with friends or family members) where nothing out of the ordinary happened and they felt neutral. They received the same supplementary instructions about story length and details.

3.1.3 | Measures

Autonomy manipulation check. Next, participants completed the motivation to help scale (Weinstein & Ryan, 2010). This scale asks 11 questions about motivations for a particular behaviour. We modified the task by instructing participants to rate how well each item reflected their motivation for engaging in the interaction they described during the writing task (1 = *not at all*, 7 = *an extreme amount*). Six items assessed autonomous motivation (e.g., 'because I valued doing so') and five items assessed controlled motivation (e.g., 'so I would be liked'). We reverse-scored the controlled items so that higher values reflected more autonomous motivation for engaging in the behaviours described ($M = 4.64$, $SD = 1.01$, $\alpha = .78$).

The discrete emotions questionnaire. The discrete emotions questionnaire (Harmon-Jones et al., 2016) assesses self-reported discrete

emotional states, namely, anger ($\alpha = .88$), disgust ($\alpha = .79$), fear ($\alpha = .88$), anxiety ($\alpha = .86$), sadness ($\alpha = .76$), desire ($\alpha = .83$), relaxation ($\alpha = .87$) and happiness ($\alpha = .93$) in response to an emotion elicitor (i.e., the writing task). Each discrete emotion is measured with four items (1 = *not at all*, 7 = *an extreme amount*). We present descriptive statistics in Table 1.

Future helping. We assessed helping intentions with a future-oriented version of the self-report altruism scale (Rushton et al., 1981). We instructed participants to rate the frequency with which they *will engage* in 20 prosocial behaviours (e.g., 'Help push a stranger's car out of the snow', 'Do volunteer work for charity') (1 = *extremely unlikely*, 5 = *extremely likely*) in the future ($M = 5.13$, $SD = 1.01$, $\alpha = .91$).

3.2 | Results

3.2.1 | Autonomy manipulation check

A one-way analysis of variance (ANOVA) revealed a main effect of the autonomy manipulation on motivation to help, $F(2, 195) = 30.92$, $p < .001$, $\eta^2_{\text{partial}} = .241$. We followed this up with Bonferroni-corrected comparisons, comparing the no-helping condition to the autonomous-helping and controlled-helping conditions. Participants in the autonomous-helping condition reported feeling more autonomous regarding the behaviour they wrote about ($M = 5.33$, $SD = 0.75$) than those in the no-helping condition ($M = 4.39$, $SD = 0.88$), $t(129) = 5.42$, $p < .001$, Cohen's $d = 1.14$, 95% CI [0.77, 1.51]. Participants in the controlled-helping condition ($M = 4.17$, $SD = 1.01$) did not differ from the no-helping condition, $t(134) = -2.37$, $p = .057$, Cohen's $d = -0.23$, 95% CI [-0.57, 0.11]. These results indicate that participants in the autonomous-helping condition did indeed write about more autonomously motivated actions than those in the other two conditions.

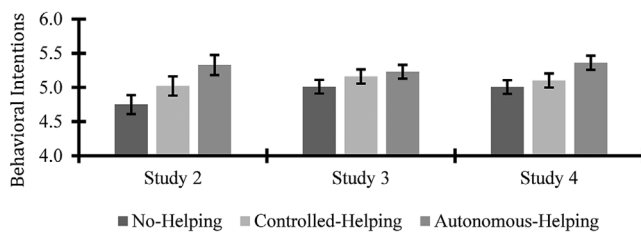
3.2.2 | Emotions

We next examined the consequences of the prosocial recall manipulation on emotions in a 3 (autonomy manipulation: autonomous-helping, controlled-helping, no-helping) \times 8 (emotion: anger, disgust, fear, anxiety, sadness, desire, relaxation, happiness) mixed-model ANOVA. We obtained the main effects of autonomy manipulation, $F(2, 195) = 5.09$, $p = .007$, $\eta^2_{\text{partial}} = .05$, and of emotion, $F(7, 1365) = 210.20$, $p < .001$, $\eta^2_{\text{partial}} = .52$, which were qualified by the Autonomy manipulation \times emotion interaction, $F(14, 1365) = 6.42$, $p < .001$, $\eta^2_{\text{partial}} = .06$. See Figure 2.

We unpacked this interaction by examining the simple main effect of autonomy manipulation on each emotion. We followed up statistically significant simple main effects with pairwise comparisons of both the autonomous-helping and controlled-helping conditions to the no-helping condition. These analyses revealed statistically significant simple main effects of autonomy manipulation on all five negative discrete emotions ($F_s > 6.69$, $p_s < .002$) and happiness, $F(2, 195) = 5.36$,

TABLE 1 Descriptive statistics for the effects of experimental manipulation on self-reported emotions (studies 2–4)

Emotion	Helping condition	Study 2		Study 3		Study 4	
		M	SD	M	SD	M	SD
Anger	No	1.03	0.15	1.16	0.72	1.40	0.88
	Controlled	1.75	1.09	1.55	0.90	1.70	1.36
	Autonomous	1.16	0.42	1.25	0.77	1.28	0.86
Disgust	No	1.03	0.14	1.08	0.40	1.33	0.81
	Controlled	1.54	0.95	1.29	0.90	1.29	0.77
	Autonomous	1.19	0.45	1.17	0.54	1.17	0.53
Fear	No	1.05	0.18	1.08	0.43	1.40	0.93
	Controlled	1.41	0.84	1.31	0.86	1.38	1.02
	Autonomous	1.21	0.52	1.22	0.75	1.17	0.62
Anxiety	No	1.26	0.77	1.40	0.91	1.64	1.05
	Controlled	2.04	1.28	2.02	1.14	2.05	1.28
	Autonomous	1.63	1.01	1.52	0.95	1.41	0.76
Sadness	No	1.10	0.37	1.17	0.51	1.42	0.86
	Controlled	1.70	1.03	1.53	0.93	1.43	0.77
	Autonomous	1.29	0.48	1.44	0.79	1.38	0.75
Desire	No	1.57	1.17	1.62	1.07	1.71	1.08
	Controlled	1.72	0.98	1.50	0.78	1.49	0.80
	Autonomous	1.50	0.87	1.69	1.00	1.70	0.90
Relaxation	No	4.03	1.39	4.36	1.49	4.05	1.52
	Controlled	3.36	1.94	2.56	1.52	2.83	1.65
	Autonomous	3.54	1.71	3.60	1.65	3.59	1.60
Happiness	No	3.33	1.73	3.80	1.71	3.46	1.74
	Controlled	3.33	1.83	2.67	1.72	2.83	1.77
	Autonomous	4.22	1.75	3.91	1.88	4.07	1.72

**FIGURE 2** Effects of the experimental manipulation on self-reported emotions (Studies 2–4)

$p = .005$, $\eta^2_{\text{partial}} = .05$. Autonomy manipulation did not influence relaxation, $F(2, 195) = 2.79$, $p = .064$, $\eta^2_{\text{partial}} = .03$, or desire, $F(2, 195) = 0.83$, $p = .438$, $\eta^2_{\text{partial}} = .01$. Bonferroni-corrected pairwise comparisons revealed that reflecting upon autonomous helping (vs. no helping) did not influence negative emotions: anger ($t [129] = 1.08$, $p = .848$, Cohen's $d = 0.42$, 95% CI [0.07, 0.77]), disgust ($t [129] = 1.53$, $p = .382$, Cohen's $d = 0.49$, 95% CI [0.14, 0.84]), fear ($t [129] = 1.60$, $p = .330$, Cohen's $d = 0.42$, 95% CI [0.07, 0.76]), anxiety ($t [129] = 2.02$, $p = .133$, Cohen's $d = 0.41$, 95% CI [0.07, 0.76]) or sadness ($t [129] = 1.53$,

$p = .384$, Cohen's $d = 0.44$, 95% CI [0.10, 0.79]). However, reflecting upon autonomous helping (vs. no helping) increased happiness ($t [129] = 2.88$, $p = .013$, Cohen's $d = 0.51$, 95% CI [0.16, 0.86]). By contrast, the controlled-helping (vs. no-helping) condition increased all negative emotions: anger ($t [134] = 6.13$, $p < .001$, Cohen's $d = 0.93$, 95% CI [0.57, 1.28]), disgust ($t [134] = 4.94$, $p < .001$, Cohen's $d = 0.75$, 95% CI [0.40, 1.10]), fear ($t [134] = 3.67$, $p < .001$, Cohen's $d = 0.59$, 95% CI [0.25, 0.94]), anxiety ($t [134] = 4.38$, $p < .001$, Cohen's $d = 0.74$, 95% CI [0.39, 1.08]) and sadness ($t [134] = 5.05$, $p < .001$, Cohen's $d = 0.78$, 95% CI [0.43, 1.12]). ($ps < .001$) but did not influence happiness ($t [134] = 0.02$, $p = .999$, Cohen's $d = 0.00$, 95% CI [−0.34, 0.34]). We present descriptive statistics in Table 1.

3.2.3 | Future helping

A one-way ANOVA yielded a main effect of autonomy manipulation on helping intentions, $F(2, 195) = 4.12$, $p = .018$, $\eta^2_{\text{partial}} = .04$. Bonferroni-corrected pairwise comparisons revealed that participants in the autonomous-helping condition ($M = 5.35$, $SD = 1.01$) reported

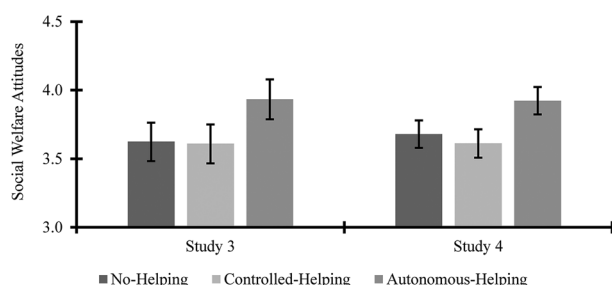


FIGURE 3 Effects of the experimental manipulation on behavioural intentions (Studies 2–4). *Note:* Error bars reflect the standard error of the mean. We measured behavioural intentions using a future-oriented version of the self-report altruism scale (Rushton et al. 1981).

stronger intentions to help relative to those in the no-helping condition ($M = 4.75$, $SD = 1.33$), $t(129) = 2.87$, $p = .014$, Cohen's $d = 0.50$, 95% [0.15, 0.85]. The no-helping and controlled-helping conditions did not differ, $t(134) = 1.37$, $p = .512$, Cohen's $d = 0.22$, 95% [−0.12, 0.56]. (Figure 3).

3.3 | Discussion

In Study 2, we experimentally tested autonomy's role in shaping the emotional and motivational consequences of prosocial behaviour. Consistent with our hypotheses, recalling autonomous helping experiences (vs. neutral interpersonal experiences) increased happiness. However, negative emotions were unaffected. Consistent with our hypotheses and the results of Study 1, recalling controlled helping experiences (vs. neutral interpersonal experiences) increased negative emotions. However, positive emotions were unaffected. Finally, recalling autonomous helping experiences (vs. neutral interpersonal experiences) strengthened intentions to help in the future relative to the no-helping condition. Finally, the controlled helping condition did not differ from the no-helping condition in terms of their motivation during the experience they wrote about (i.e., the manipulation check) or strengthened intentions to help in the future. In summary, high autonomy drove positive emotional reactions to helping and strengthened intentions to help in the future, whereas low autonomy drove negative emotional reactions to helping.

4 | STUDY 3

The purpose of Study 3 was to replicate directly, rather than conceptually, and extend the Study 2 results. Conceptual replications play a critical role in theory development by appraising the generalizability of a set of findings (Crandall & Sherman, 2016). Such replications rely on the robustness of findings produced by direct replications. Given that previous experiments testing our hypotheses are scarce, we took a direct replication approach to Studies 3–4.

As in Study 2, we examined the aftereffects of recalling an instance of autonomous and controlled helping behaviour on self-reported emotions and behavioural intentions. We extended the results of Study 2 by asking how autonomous and controlled helping shape another outcome relevant to future helping: attitudes toward social welfare. We hypothesized that autonomous helping would increase positive emotions, strengthen future helping intentions and engender more positive attitudes toward social welfare. As before, we hypothesized an opposite pattern for controlled helping. We instructed participants to complete the same manipulation and measures as in Study 2, plus two questions about putative government policies and political candidates assessing attitudes toward social welfare.

4.1 | Method

4.1.1 | Participants

To provide a higher-powered direct replication of the previous study, we surveyed 300 MTurkers whom we paid \$1.00. Participants were 20–74 years old ($M = 41.16$, $SD = 12.64$), predominantly white ($n = 244$, 81.88%) and non-Hispanic ($n = 285$, 95.64%). Following exclusions, we arrived at a final sample of $N = 298$ (145 women, 152 men, one unreported). Sensitivity analyses in G*Power indicated that this study was able to detect effects as small as $f = .18$ (equivalent to $\eta^2_{\text{partial}} = .03$) with 80% power in a one-way ANOVA with a three-level fixed factor. Further sensitivity analyses for a mixed ANOVA with a three-level between-subjects factor and an eight-level within-subjects factor indicated that this study had 80% power to detect between-subjects effects as small as $f = .23$ (equivalent to $\eta^2_{\text{partial}} = .05$), within-subjects effects as small as $f = .22$ (equivalent to $\eta^2_{\text{partial}} = .05$) and interaction effects as small as $f = .25$ (equivalent to $\eta^2_{\text{partial}} = .06$). A sensitivity analysis for an ANCOVA with a three-level fixed factor and one covariate indicated that this study had 80% power to detect effects as small as $f = .18$ (equivalent to $\eta^2_{\text{partial}} = .03$).

4.1.2 | Procedure

We randomly assigned participants to the autonomous-helping ($n = 102$), controlled-helping ($n = 95$) or no-helping condition ($n = 101$) condition. Next, participants completed the same measures as Study 2. Afterwards, they responded to two questions aimed at capturing their broader social attitudes toward helping behaviour: 'How do you feel about federal government policies which use tax dollars to support public assistance programmes? These are government programmes which provide benefits to the needy' and 'How do you feel about political candidates who support using tax dollars to support public assistance programmes?' (1 was denoted with a frowning face implying disapproval, 5 with a smiling face implying approval). Responses were correlated, $r(284) = .28$, $p < .001$, and so we summed them to yield an overall index of attitudes toward public assistance. Given that political orientation influences attitudes toward public assistance (Skitka &

Tetlock, 1993), we pre-registered controlling for political orientation in this analysis.

4.2 | Results

4.2.1 | Autonomy manipulation check

A one-way ANOVA produced a main effect of autonomy manipulation on motivation to help, $F(2, 295) = 45.33, p < .001, \eta^2_{\text{partial}} = .24$. As in Study 2, we observed that participants in the autonomous-helping condition reported feeling more autonomous regarding the behaviour about which they wrote ($M = 5.20, SD = 0.78$) than participants in the no-helping condition, ($M = 4.61, SD = 0.84$), $t(201) = 4.88, p < .001$, Cohen's $d = 0.73$, 95% CI [0.44, 1.01]. Participants also reported feeling less autonomous in the controlled-helping condition ($M = 4.03, SD = 0.96$) versus the no-helping condition, $t(194) = -4.88, p < .001$, Cohen's $d = -0.64$, 95% CI [-0.35, -0.93]. In all, participants in the autonomous-helping condition wrote about more autonomously motivated actions than those in either comparison condition. The manipulation was effective.

4.2.2 | Emotions

We next examined the consequences of autonomy manipulation on emotions in a 3 (autonomy manipulation: autonomous-helping, controlled-helping, no-helping) \times 8 (emotion: anger, disgust, fear, anxiety, sadness, desire, relaxation, happiness) mixed-model ANOVA. We obtained the main effects of autonomy manipulation, $F(2, 295) = 3.10, p = .046, \eta^2_{\text{partial}} = .02$, and of emotion, $F(7, 2065) = 273.95, p < .001, \eta^2_{\text{partial}} = .48$, which were qualified by an autonomy manipulation \times emotion interaction, $F(14, 2065) = 19.02, p < .001, \eta^2_{\text{partial}} = .11$. See Figure 2.

We observed simple main effects of autonomy manipulation on anger, $F(2, 295) = 6.44, p = .002, \eta^2_{\text{partial}} = .04$, anxiety, $F(2, 295) = 10.50, p < .001, \eta^2_{\text{partial}} = .07$, sadness, $F(2, 295) = 5.80, p = .003, \eta^2_{\text{partial}} = .04$, relaxation, $F(2, 295) = 33.01, p < .001, \eta^2_{\text{partial}} = .18$, and happiness, $F(2, 295) = 14.55, p < .001, \eta^2_{\text{partial}} = .09$. Bonferroni-corrected pairwise comparisons revealed that reflecting upon an autonomous helping (vs. no helping) experience increased sadness ($t[201] = 2.48, p = .042$, Cohen's $d = 0.40$, 95% CI [0.13, 0.68]) and decreased relaxation ($t[201] = -3.48, p = .002$, Cohen's $d = -0.48$, 95% CI [-0.76, -0.20]). Finally, the controlled-helping condition (vs. the no-helping condition) increased anger ($t[194] = 3.44, p = .002$, Cohen's $d = 0.48$, 95% CI [0.19, 0.76]), anxiety ($t[194] = 4.34, p < .001$, Cohen's $d = 0.60$, 95% CI [0.31, 0.89]) and sadness ($t[194] = 3.27, p = .004$, Cohen's $d = 0.48$, 95% CI [0.20, 0.77]). Controlled helping (vs. the no-helping condition) decreased happiness ($t[194] = -4.46, p < .001$, Cohen's $d = -0.66$, 95% CI [-0.94, -0.37]) and relaxation ($t[194] = -8.11, p < .001$, Cohen's $d = -1.19$, 95% CI [-1.50, -0.89]). We report descriptive statistics in Table 1.

4.2.3 | Future helping

A one-way ANOVA yielded no main effect of autonomy manipulation on behavioural intentions for future helping, $F(2, 295) = 1.24, p = .292, \eta^2_{\text{partial}} = .04$. Bonferroni-corrected pairwise comparisons revealed that participants in the autonomous-helping condition ($M = 5.23, SD = 1.03$) and the no-helping condition ($M = 5.01, SD = 1.02$) did not differ, $t(201) = 1.54, p = .376$, Cohen's $d = 0.21$, 95% CI [-0.07, 0.49]. Also, the no-helping and controlled-helping condition ($M = 5.16, SD = 0.98$) did not differ, $t(194) = 1.04, p = .893$, Cohen's $d = -0.15$, 95% CI [-0.43, 0.13] (Figure 3).

4.2.4 | Social welfare attitudes

A one-way analysis of covariance (ANCOVA) yielded a main effect of autonomy manipulation on the two-item composite measure, $F(2, 292) = 3.67, p = .027, \eta^2_{\text{partial}} = .03$. Political orientation was a statistically significant covariate, $F(1, 292) = 113.64, p < .001, \eta^2_{\text{partial}} = .28$. Bonferroni-corrected post hoc tests revealed that participants in the autonomous-helping condition ($M = 3.91, SD = 0.99$) reported directionally more positive attitudes than those in the no-helping condition ($M = 3.67, SD = 1.24$), $t(201) = 2.29, p = .067$, Cohen's $d = 0.21$, 95% CI [-0.06, 0.49]. Participants in the controlled-helping condition ($M = 3.59, SD = 1.14$) and the no-helping condition did not differ, $t(194) = -.11, p = .999$, Cohen's $d = -0.07$, 95% CI [-0.35, 0.21] (Figure 4).

As the correlation between two items was low ($r = .28$), we repeated the analyses above separately for each item. The analysis was not statistically significant for the first question (i.e., government policies), $F(2, 283) = 2.30, p = .103, \eta^2_{\text{partial}} = .016$ but was statistically significant for the second question (i.e., political candidates), $F(2, 289) = 4.59, p = .011, \eta^2_{\text{partial}} = .031$. Bonferroni-corrected pairwise comparisons showed that participants in the autonomous-helping condition reported more positive attitudes toward candidates who supported tax-funded public assistance programmes relative to the controlled-helping condition ($t[195] = 2.72, p = .021$, Cohen's $d = 0.33$, 95% CI [0.04, 0.61]) and the no-helping condition ($t[201] = 2.48, p = .041$, Cohen's $d = 0.24$, 95% CI [-0.04, 0.52]).

4.3 | Discussion

As in study 2, a lack of autonomy (i.e., the controlled-helping condition) drove negative emotional reactions to prosocial behaviour. Unlike Study 2, we found in Study 3 that a lack of autonomy also reduced positive emotional reactions to prosocial behaviour. We also observed that reflecting on autonomous helping experiences led to more favourable attitudes toward public assistance programmes, particularly political candidates who support such policies. Although we did not replicate the effect of autonomy manipulation on future helping intentions, the

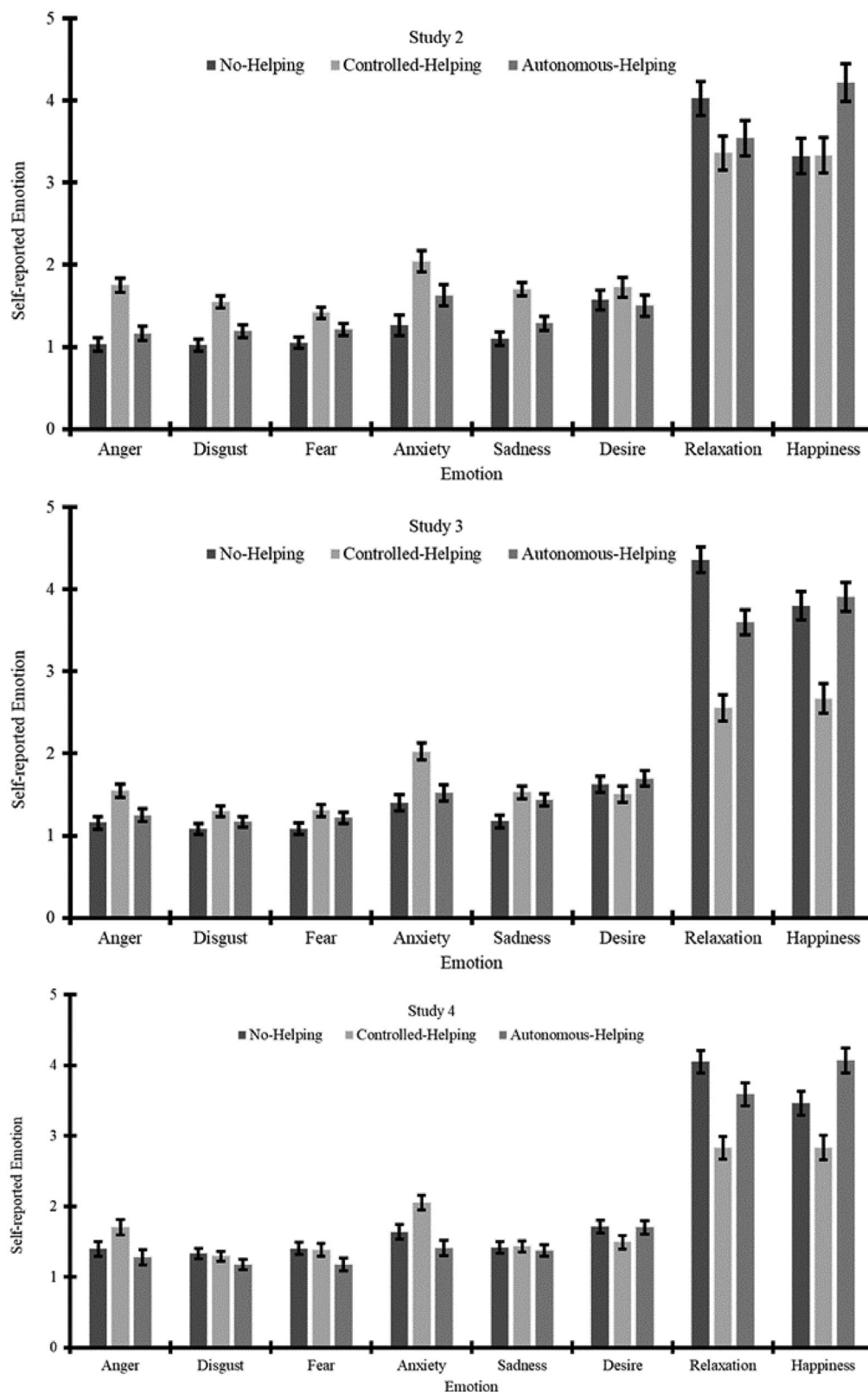


FIGURE 4 Effects of the experimental manipulation on social welfare attitudes (Studies 3–4). *Note:* Error bars reflect the standard error of the mean. We measured social welfare attitudes using a two-item composite. The items were: ‘How do you feel about federal government policies which use tax dollars to support public assistance programmes? These are government programmes which provide benefits to the needy’ and ‘How do you feel about political candidates who support using tax dollars to support public assistance programmes?’

pattern of means was in the predicted direction. Helping intentions in the autonomous-helping condition were similar across Studies 2 and 3 ($M = 5.35$ vs. 5.23), but this was not the case in the no-helping condition ($M = 4.39$ vs. 5.01).

5 | STUDY 4

In Study 4, we re-tested the hypothesis that autonomy shapes the emotional, motivational and attitudinal consequences of prosocial behaviour while seeking to clarify inconsistent results. We hypothesized that low autonomy (i.e., controlled motivation) would drive negative emotional reactions to prosocial behaviour (as in Studies 1–3), whereas we offered competing hypotheses about positive emotion (i.e., happiness). One possibility is that, in the presence of autonomy, reflecting on previous helping increases happiness (as in Study 2). Another possibility is that, in the absence of autonomy, reflecting on previous helping decreases happiness (as in Study 3). Put differently, we sought to test whether shifts in positive emotion are due to high or low autonomy. To gain a more precise characterization of behavioural intentions, we again tested the hypothesis that reflecting on autonomous helping increases intentions to help in the future, which was supported in Study 2 but not necessarily in Study 3. We also re-tested the hypothesis that reflecting on autonomous helping increases favourable attitudes toward social welfare (as in Study 3). Finally, we explored the effects of reflecting on autonomous helping on actual helping behaviour. Participants completed the same manipulation and measures as in Studies 2 and 3, after which they had an opportunity to engage in actual helping behaviour.

5.1 | Method

5.1.1 | Participants

In line with the power analysis for Study 3, we sought to survey approximately 300 MTurk workers for \$0.75. Participants were 19–77 years old ($M = 40.60$, $SD = 13.42$), predominantly white ($n = 233$, 78.45%) and non-Hispanic ($n = 275$, 92.59%). After pre-registered exclusions, 297 participants (156 women, 139 men, two unreported) remained for analysis. Sensitivity analyses in G*Power indicated that this study was able to detect effects as small as $f = .18$ (equivalent to $\eta^2_{\text{partial}} = .03$) with 80% power in a one-way ANOVA with a three-level fixed factor. Further sensitivity analyses for a mixed ANOVA with a three-level between-subjects factor and an eight-level within-subjects factor indicated that this study had 80% power to detect between-subjects effects as small as $f = .23$ (equivalent to $\eta^2_{\text{partial}} = .05$), within-subjects effects as small as $f = .22$ (equivalent to $\eta^2_{\text{partial}} = .05$) and interaction effects as small as $f = .25$ (equivalent to $\eta^2_{\text{partial}} = .06$). A sensitivity analysis for an ANCOVA with a three-level fixed factor and one covariate indicated

that this study had 80% power to detect effects as small as $f = .18$ (equivalent to $\eta^2_{\text{partial}} = .03$).

5.1.2 | Procedure

We randomly assigned participants to the autonomous-helping ($n = 96$), controlled-helping ($n = 99$) or no-helping ($n = 102$) condition. Afterwards, participants completed the motivation to help scale, discrete emotions questionnaire, the modified self-report prosocial behaviour measure and the public policy questions as in Study 3. We also included a measure of altruistic behaviour: interest in taking part in an additional study for free. Participants were led to believe that the study was over after completing the measures used above in Study 3 and then asked to volunteer their time for an additional study. Specifically, they were instructed:

Now that you have completed the study, we would like to invite you to participate in a second study. This second study will take about 5 minutes. Unfortunately, we are unable to pay participants for this second study. We understand that your time is valuable, but if you could spare a few minutes we believe that it can help us make important contributions to science. Are you willing to volunteer 5 minutes of your time to complete a second study? IMPORTANT: You will be paid for the study you just completed regardless of how you answer this question.

Altruistic behaviour is defined as costly to the individual and beneficial to someone else. Insofar as taking part in an additional study is beneficial to the research team and costly to the participant (in terms of time and lost income), it represents a practical measure of altruistic behaviour (Schnall et al., 2010).

5.2 | Results

5.2.1 | Autonomy manipulation check

A one-way ANOVA yielded a main effect of autonomy manipulation on motivation to help, $F(2, 294) = 36.99$, $p < .001$, $\eta^2_{\text{partial}} = .20$. We followed this up with Bonferroni-corrected comparisons. Participants in the autonomous-helping condition ($M = 4.70$, $SD = 0.81$) reported feeling more autonomous regarding their chosen behaviour than those in the no-helping condition ($M = 4.11$, $SD = 0.85$), $t(196) = 4.71$, $p < .001$, Cohen's $d = 0.71$, 95% CI [0.42, 0.99]. Participants also reported feeling less autonomous in the controlled-helping condition ($M = 3.62$, $SD = 0.97$) versus the no-helping condition, $t(196) = -3.98$, $p < .001$, Cohen's $d = -0.54$, 95% CI [-0.82, -0.25]. The manipulation was effective.

5.2.2 | Emotions

We next examined the effects of autonomy manipulation on emotions in a 3 (autonomy manipulation: autonomous-helping, controlled-helping, no-helping) \times 8 (emotion: anger, disgust, fear, anxiety, sadness, desire, relaxation, happiness) mixed-model ANOVA. As before, we obtained the main effects of autonomy manipulation, $F(2, 294) = 2.14$, $p = .119$, $\eta^2_{\text{partial}} = .01$, and of emotion, $F(7, 2058) = 237.04$, $\eta^2_{\text{partial}} = .45$, which were qualified by the autonomy manipulation \times emotion interaction, $F(14, 2058) = 11.37$, $p < .001$, $\eta^2_{\text{partial}} = .07$. See Figure 2.

We unpacked this interaction by examining the simple main effects of autonomy manipulation on each discrete emotion. We followed up statistically significant simple main effects with pairwise comparisons. These analyses revealed statistically significant simple main effects of autonomy manipulation on anger, $F(2, 294) = 4.20$, $p = .016$, $\eta^2_{\text{partial}} = .03$, anxiety, $F(2, 294) = 9.32$, $p < .001$, $\eta^2_{\text{partial}} = .06$, relaxation, $F(2, 294) = 15.05$, $p < .001$, $\eta^2_{\text{partial}} = .09$ and happiness, $F(2, 294) = 12.32$, $p < .001$, $\eta^2_{\text{partial}} = .08$. We proceeded with Bonferroni-corrected pairwise comparisons. Relative to the no-helping control condition, the autonomous-helping condition increased happiness ($t[196] = 2.46$, $p = .044$, Cohen's $d = 0.35$, 95% CI [0.07, 0.63]). Also, the controlled-helping condition (vs. the no-helping condition) increased anxiety ($t[199] = 2.79$, $p = .017$, Cohen's $d = 0.29$, 95% CI [0.01, 0.57]), and decreased relaxation ($t[199] = -5.45$, $p < .001$, Cohen's $d = -0.77$, 95% CI [-1.05, -0.48]) and happiness ($t[199] = -2.57$, $p = .032$, Cohen's $d = -0.36$, 95% CI [-0.64, -0.08]). We present descriptive statistics in Table 1.

5.2.3 | Future helping

A one-way ANOVA yielded a main effect of autonomy manipulation on behavioural intentions for future helping, $F(2, 294) = 3.19$, $p = .043$, $\eta^2_{\text{partial}} = .02$. Bonferroni-corrected pairwise comparison revealed that participants in the autonomous-helping condition ($M = 5.36$, $SD = 0.98$) reported stronger intentions to help in the future compared to the no-helping condition ($M = 5.00$, $SD = 0.98$), $t(196) = 2.45$, $p = .044$, Cohen's $d = 0.37$, 95% CI [0.08, 0.65]; the no-helping and controlled-helping condition ($M = 5.10$, $SD = 1.10$) did not differ, $t(199) = 0.68$, $p = .999$, Cohen's $d = 0.10$, 95% CI [-0.18, 0.37]) (Figure 3).

5.2.4 | Social welfare attitudes

A one-way ANCOVA produced a non-statistically significant effect of autonomy manipulation on the two-item composite measure, $F(2, 289) = 2.76$, $p = .065$, $\eta^2_{\text{partial}} = .02$. Political orientation was a statistically significant covariate, $F(1, 289) = 134.56$, $p < .001$, $\eta^2_{\text{partial}} = .32$. Bonferroni-corrected pairwise comparisons revealed that participants in the autonomous-helping condition ($M = 3.95$, $SD = 1.11$) and the no-helping condition ($M = 3.62$, $SD = 1.13$) did not differ, $t(196) = 1.76$, $p = .237$, Cohen's $d = 0.29$, 95% CI [0.01, 0.57]). Also, participants in the

controlled-helping condition ($M = 3.64$, $SD = 1.25$) and the no-helping condition did not differ, $t(199) = -0.49$, $p = .999$, Cohen's $d = 0.02$, 95% CI [-0.26, 0.29]). As the two items were highly correlated ($r = .84$, $p < .001$), we did not conduct further analyses (Figure 4).

5.2.5 | Volunteer behaviour

Across all conditions, 111 individuals reported a willingness to take part in a second study for free (37.7%). This proportion did not vary statistically significantly as a function of autonomy manipulation: autonomous-helping condition (36.46%), controlled-helping condition (39.39%), no-helping control condition (36.27%), $\chi^2(2) = 0.26$, $p = .878$.

5.3 | Discussion

First, relative to reflecting on a neutral interpersonal experience, reflecting on a controlled helping experience increased negative emotion (i.e., anxiety) and decreased positive emotion (i.e., happiness, relaxation). Again, consistent with our hypotheses and Study 2, relative to reflecting on a neutral interpersonal experience, reflecting on an autonomous helping experience increased intentions to help in the future. Second, relative to reflecting on a neutral interpersonal experience, those who reflected on autonomous helping experiences reported greater intentions to help in the future. Third, we did not replicate the effects of autonomous helping on social welfare attitudes, though the pattern of means was in the hypothesized direction. Lastly, we implemented a measure of helping behaviour (i.e., agreeing to participate in a future study for free), which was uninfluenced by autonomy manipulation.

6 | INTERNAL META-ANALYSIS: ESTIMATING THE EFFECT SIZE OF AUTONOMOUS HELPING ON EMOTIONS, BEHAVIOURAL INTENTIONS AND ATTITUDES

Finally, we conducted an internal meta-analysis, using a fixed-effects approach (Goh et al., 2016), to achieve more precise estimate of the aftereffects of (1) autonomous helping (vs. no helping), and (2) controlled helping (vs. no helping) in an effort to address some results inconsistencies. We extracted effect sizes for each comparison for emotions and behavioural intentions from Studies 2–4 and for social welfare attitudes from Studies 3–4.

6.1 | Emotions

6.1.1 | Autonomous helping versus no helping

In terms of negative emotions, the overall weighted mean effect of autonomous helping (vs. no helping) was statistically significant and

positive for sadness ($d = 0.26$, 95% CI [0.09, 0.43], $Z = 2.97$, $p = .003$),² but not anger ($d = 0.10$, 95% CI [−0.07, 0.27], $Z = 1.14$, $p = .256$), disgust ($d = 0.10$, 95% CI [−0.07, 0.28], $Z = 1.19$, $p = .232$), fear ($d = 0.10$, 95% CI [−0.07, 0.27], $Z = 1.16$, $p = .246$) or anxiety ($d = 0.06$, 95% CI [−0.11, 0.23], $Z = 0.67$, $p = .506$). In terms of positive emotions, the overall weighted mean effect of autonomous helping (vs. no helping) was statistically significant and negative for relaxation ($d = -0.37$, 95% CI [−0.54, −0.20], $Z = -4.23$, $p < .001$),³ statistically significant and positive for happiness ($d = 0.28$, 95% CI [0.11, 0.45], $Z = 7.20$, $p < .001$), but non-statistically significant for desire ($d = 0.01$, 95% CI [−0.16, 0.18], $Z = 0.08$, $p = .939$). Taken together, participants who wrote about an autonomous helping experience (vs. non-helping experience) reported a mixed emotional experience with more sadness, more happiness and less relaxation.

6.1.2 | Controlled helping versus no helping

The overall weighted mean effect of controlled-helping (vs. no helping) was statistically significant for each of the following negative emotions: anger ($d = 0.51$, 95% CI [0.33, 0.68], $Z = 5.73$, $p < .001$), disgust ($d = 0.28$, 95% CI [0.11, 0.46], $Z = 3.23$, $p = .001$), fear ($d = 0.27$, 95% CI [0.09, 0.44], $Z = 3.03$, $p = .002$), anxiety ($d = 0.54$, 95% CI [0.37, 0.72], $Z = 6.14$, $p < .001$) and sadness ($d = 0.37$, 95% CI [0.20, 0.54], $Z = 4.23$, $p < .001$). Similarly, the overall weighted mean effect of controlled-helping (vs. the no-helping condition) was statistically significant for both relaxation ($d = -0.81$, 95% CI [−0.99, −0.64], $Z = -8.97$, $p < .001$) and happiness ($d = -0.37$, 95% CI [−0.54, −0.20], $Z = -4.24$, $p < .001$), but not desire ($d = -0.10$, 95% CI [−0.27, 0.07], $Z = -1.10$, $p = .27$). In summary, participants who wrote about a controlled-helping experience (vs. a non-helping experience) reported more negative emotions and less relaxation/happiness.

6.2 | Behavioural intentions

The overall weighted mean effect of autonomous helping (vs. no helping) on behavioural intentions was statistically significant, $d = 0.45$, 95% CI [0.28, 0.63], $Z = 5.11$, $p < .001$.⁴ The overall weighted mean effect of controlled helping (vs. no helping) on behavioural intentions was not statistically significant, $d = 0.15$, 95% CI [−0.02, 0.32], $Z = 1.73$, $p = .084$. In all, participants in the autonomous-helping conditions reported stronger intentions to engage in future helping relative to no-helping, whereas controlled helping did not impact intentions to engage in future helping.

² Autonomous (vs. controlled) helping decreased sadness ($d = -0.55$, 95% CI [−0.72, −0.37], $Z = -6.13$, $p < .001$).

³ Autonomous (vs. controlled) helping increased relaxation ($d = 0.44$, 95% CI [0.27, 0.62], $Z = 4.98$, $p < .001$).

⁴ The effect of autonomous (vs. controlled) helping was significant for behavioural intentions ($d = 0.19$, 95% CI [0.019, 0.363], $Z = 2.17$, $p = .030$) and public policy attitudes ($d = 0.28$, 95% CI [0.08, 0.48], $Z = 2.75$, $p = .006$).

6.3 | Attitudes

The overall weighted mean effect of autonomous helping (vs. no helping) on public policy attitudes was statistically significant, $d = 0.26$, 95% CI [0.06, 0.45], $Z = 2.53$, $p = .011$.³ The overall weighted mean effect of controlled helping (vs. no helping) on public policy attitudes was not statistically significant, $d = -0.02$, 95% CI [−0.22, 0.18], $Z = -0.22$, $p = .829$. In all, participants in the autonomous helping (vs. no helping) condition reported more favourable attitudes toward social welfare, whereas controlled helping did not impact attitude toward social welfare.

7 | GENERAL DISCUSSION

We examined how autonomy shapes the emotional (Studies 1–4), motivational (Studies 2–4) and attitudinal (Studies 3–4) consequences of prosocial behaviour. In Study 1, participants reported their history of prosocial behaviour, autonomy, depression, anxiety and stress. Highly prosocial participants who felt less autonomous also reported greater depression, anxiety and stress. Among highly prosocial participants who felt more autonomous, an opposite, albeit non-statistically significant, pattern emerged. Next, we tested causally the emotional (Studies 2–4), motivational (Studies 2–4) and attitudinal (Studies 3–4) aftereffects of reflecting on autonomous helping. Consistent with Study 1, reflecting upon controlled helping increased negative emotions. In terms of positive emotion, reflecting on autonomous helping experiences increased positive emotions in two of our three experimental studies (Studies 2 and 4). Regarding behavioural intentions, reflecting on autonomous helping increased motivation to help in the future in two studies (Studies 2 and 4), with null results in another (Study 3). Further, in Study 3, reflecting on autonomous helping engendered more positive attitudes toward social welfare policy. The Study 4 results were consistent with our hypotheses and Study 3 results but were not statistically significant.

Finally, we conducted an internal meta-analysis to estimate the aftereffects of autonomous and controlled helping more precisely, addressing the inconsistent results noted above. The meta-analytic findings indicated that, relative to reflecting on neutral interpersonal experiences, reflecting on autonomous helping produced a mixed emotional experience with more sadness, more happiness and less relaxation. By contrast, relative to reflecting on neutral interpersonal experiences, reflecting on controlled helping produced more negative emotions and fewer positive emotions. Further, in addition to their mixed emotional profile, those who reflected on autonomous helping (vs. neutral interpersonal experiences) reported stronger intentions to engage in future helping and increased support for social welfare. By comparison, reflecting on controlled helping did not seem to impact future intentions to help or social-welfare attitudes.

7.1 | Theoretical implications

7.1.1 | Self-determination theory

SDT proposes that autonomy shapes the relationship between prosocial behaviour and well-being (Weinstein & Ryan, 2010). Much of this literature has focused on how autonomy increases well-being. We expanded the literature by underscoring ways in which low autonomy (i.e., controlled motivation) undermines well-being both correlationally (higher rates of depression, anxiety and stress) and experimentally (increased negative emotions, decreased positive emotions). Although SDT suggests that autonomous motivation predicts behavioural intentions, attempts to extend these findings into the prosocial domain have been limited and mixed. Prior work has relied on indirect support from correlational studies of prosocial professions (Grant, 2007), and the limited experimental research has used weak manipulations (e.g., implicit priming; Pavey et al., 2011). Our experimental findings clarify and broaden this body of research by showing that autonomous helping strengthens intentions to continue acting prosocially in the future. Finally, we demonstrated for the first time that the benefits of autonomous motivation for prosocial intentions may extend to prosocial collective action.

Some research inspired by SDT has not found a link between autonomy and prosocial behaviour. For example, Hui and Kogan (2018) hypothesized that engaging in prosocial behaviour would increase hedonic and eudaimonic well-being in an experience sampling study and that these links would be affected by autonomy need satisfaction. Contrary to their hypotheses, autonomy did not influence the link between prosocial behaviour and well-being. Our results may be inconsistent with Hui and Kogan's because of differential conceptions of autonomy across our studies. Namely, they assessed autonomy as need satisfaction (e.g., 'I feel free to be who I am'), whereas we did so as motivation (e.g., 'I help because it is important to me'). Autonomy need satisfaction and motivation are related, but distinct (Ryan & Deci, 2000). When individuals have more autonomous motivation for action, they will experience more autonomy need satisfaction as a result of that action. However, previous research on the relationship between prosocial behaviour and well-being suggests that satisfaction of autonomy needs may be a mediating mechanism, with helpers experiencing greater well-being to the extent that helping behaviour supports a sense of autonomy (Weinstein & Ryan, 2010). In contrast, the degree to which helpers' original motivations for helping are autonomous is more likely to shape (i.e., moderate) the psychological impacts of helping they ultimately experience. Indeed, in addition to moderating the relationship between prosocial behaviour and helpers' well-being, we would expect autonomous motivations to moderate the relationship between prosocial behaviour and satisfaction of helpers' autonomy needs. If Hui and Kogan had assessed autonomy from a motivational perspective, as we did, they may have obtained similar results. Future research should test this possibility.

A recent meta-analysis of 167 independent studies found a robust relationship between autonomous motivation and prosocial behaviour

as well as a robust relationship between controlled motivation and anti-social behaviour (Donald et al., 2021). The results of the current study may provide some insights into explanatory mechanisms for these relationships. Reflecting on an autonomous helping experience increased sadness and happiness, strengthened intentions to help in the future, and raised support for social welfare. Indeed, autonomous motivation may causally impact emotion and motivation in a manner consistent with our findings (i.e., increased sadness and happiness, strengthened behavioural intentions, increased support for collective action), which may facilitate actual prosocial behaviour. Insofar as the effects of controlled motivation were exclusive to emotion (i.e., increased negative emotions and decreased positive emotion), we would anticipate that the link between controlled motivation and antisocial behaviour be largely emotionally driven, and encourage follow-up work to examine these ideas.

Recall that we observed a mixed emotional profile of both increased happiness and sadness for those who reflected upon an autonomous helping experience. This increase in sadness observed in the autonomous helping condition is consistent with SDT-based models of emotion regulation (Roth et al., 2014). According to these models, autonomy-supportive forms of emotion regulation (i.e., integrative regulation) help people engage with negative emotions in tolerant, accepting ways that facilitate optimal functioning. When people recall cases of autonomous helping, they may re-experience some of the sad feelings (i.e., recalling witnessing and empathizing with the person in need of help) that originally motivated them to provide help. From the perspective of integrative regulation, this experience of sadness may have been processed in a tolerant, accepting way that (1) differs from how negative emotions are processed in non-autonomy support forms of emotion regulation and (2) facilitates empathizing and helping others in the future. Moreover, the mixed emotional profile for autonomous helping is also consistent with contemporary theorizing on prosocial behaviour. On one hand, helping others feels good (Alden & Trew, 2013) and this may be reflected in the increase in happiness we observed. On the other hand, helping others is costly (Batson et al., 1997, 2002), and this be my reflected in the increase in sadness we observed.

7.1.2 | Negative consequences of helping

Our findings may indicate why helpers sometimes experience negative psychological outcomes. Indicators of poor mental health (e.g., stress, burnout) are relatively prevalent among professional (Stanley et al., 2016; Woo et al., 2020; Yang & Hayes, 2020) and non-professional (Pinquart & Sörensen, 2003) helpers. Our findings suggest that a lack of autonomous motivation may confer a risk for these negative outcomes. When helpers feel they are helping primarily for extrinsic reasons (e.g., because of relational obligations, because they are being paid), this may limit their ability to derive satisfaction and meaning from helping and make negative outcomes more likely. This explanation is consistent with the heightened negative emotions and reduced positive emotions

we observed among participants in our controlled-helping conditions, and with theorizing that emphasizes the role that helpers' subjective evaluations of their situations play in predicting the well-being outcomes they experience (Gérain & Zech, 2019).

Of course, in many cases, helpers' autonomy may be objectively limited. Professional helpers are contractually obligated to help and may not have a great deal of choice about when, where or how they do it. Also, many non-professional helpers have little choice (e.g., parents of children with disabilities). Even people who engage in 'one-off' instances of prosocial behaviour, such as returning a lost dog to its owner, may do so out of a sense of moral obligation and feel that doing otherwise was not really an option. Nevertheless, it may be possible for these helpers to *experience* their helping as autonomously motivated. An emergency-room nurse may lack control over the hours they work and who they must care for, but they can still experience autonomy by recalling why they chose this career path in the first place. It may be possible for even the most objectively choiceless helpers to experience greater autonomy by reflecting on ways in which their helping behaviour is 'choice worthy' (e.g., because it upholds important personal values) or by reframing their situations in ways that make choice more salient (e.g., 'We could have put our son up for adoption after learning he would be born with a disability—but we chose not to'). Although we did not test these ideas, our findings are consistent with them, thus inviting further investigation.

7.1.3 | Pro-social attitudes and behaviour

The current studies enrich the literature on emotional outcomes of helping by focusing on behavioural intentions and attitudes toward prosocial public policies. In the two latter studies, we asked participants to consider support for public assistance programmes and the needy. Support for these policies can facilitate public health initiatives in general (Gentilini et al., 2019) and especially during health crises such as the COVID-19 pandemic (Dunn et al., 2020). Our findings indicate that, through promoting more autonomous forms of motivation for helping, parents, educators and other influential figures might be able to encourage further prosocial attitudes and behaviours that contribute positively to society. Motivation may, therefore, merit more recognition by parents or educators aiming to promote a deeper societal contribution within the youth for whom they are responsible. This view is consistent with research in sports and coaching, where satisfying the need for autonomy encourages more moral and prosocial behaviour in athletes (Delrue et al., 2017).

7.2 | Limitations

Our studies were the first to provide a pre-registered test of an SDT-inspired motivational model of helping, but they are not without limitations. First, all experiments implemented an autobiographical recall task. Autobiographical recall is the second-most-common

emotion manipulation but produces smaller effects than other manipulations (Joseph et al., 2020). However, in the context of prosocial behaviour, recall and behavioural manipulations yield comparable results (Ko et al., 2021). Nonetheless, future investigations involving behavioural manipulations are needed to conceptually replicate our findings.

In Study 4, we attempted to elicit prosocial behaviour by asking participants to volunteer for an additional study. However, reflecting on previous experiences with helping did not influence behaviour. There are at least two explanations for this null effect. The first concerns the link between intentions and behaviour. Moderate-to-large changes in behavioural intentions ($d = 0.66$) result in small-to-moderate changes in behaviour ($d = 0.36$; Webb & Sheeran, 2006). Expressing these as a percentage, approximately 54% of changes in behavioural intentions may result in behavioural change. In the current research, the weighted effect of the manipulation was small ($d = 0.19$) and, given that only about half of behavioural intentions translate into changes in behaviour, it is not surprising that we found no behavioural effects. The second explanation concerns floor effects: regardless of condition, most participants opted not to sign up for another study for free. Rather than asking participants to donate time for an additional study, researchers could ask them to donate a portion of their earnings to charity (Juhl et al., 2020, study 5) or to an individual in need (e.g., the Katie Banks paradigm; see Batson et al., 1989). Although this approach circumvents the floor effects of Study 4, future investigations could also use measures of helping behaviour that have translational relevance outside the laboratory.

7.3 | Coda

Under what circumstances does prosocial behaviour produce positive outcomes? This research shows that, despite a mixed emotional profile, helping others for autonomous reasons makes people want to do good in the future. Future research should continue to explore the diverse ways in which autonomous motivation may amplify the positive consequences of helping behaviour for the benefactor and the recipient.

8 | OPEN PRACTICES

The experiment in this article earned Pre-Registered, Open Materials, Open Data badges for transparent practices. Materials and data for the experiment are available on the Open Science Framework.

ACKNOWLEDGEMENT

This research was supported in part by a Northwestern University Undergraduate Research Grant to Emily E. Smith.

CONFLICT OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

DATA AVAILABILITY STATEMENT

The data that support these findings are available on the Open Science Framework https://osf.io/jr9qn/?view_only=fa0c5068f41c44509aeca1e82d38ff1

TRANSPARENCY STATEMENT

The experiment in this article earned Pre-Registered, Open Materials, Open Data badges for transparent practices. Materials and data for the experiment are available on the Open Science Framework: <https://osf.io/jr9qn>

ETHICAL APPROVAL

All studies were approved by the Northwestern University Institutional Review Board. All participants provided informed consent.

REFERENCES

- Aknin, L. B., & Whillans, A. V. (2021). Helping and happiness: A review and guide for public policy. *Social Issues and Policy Review*, 15(1), 3–34. <https://doi.org/10.1111/sipr.12069>
- Alden, L. E., & Trew, J. L. (2013). If it makes you happy: Engaging in kind acts increases positive affect in socially anxious individuals. *Emotion*, 13(1), 64–75. <https://doi.org/10.1037/a0027761>
- Batson, C. D., Batson, J. G., Griffitt, C. A., Barrientos, S., Brandt, J. R., Sprengelmeyer, P., & Bayly, M. J. (1989). Negative-state relief and the empathy–altruism hypothesis. *Journal of Personality and Social Psychology*, 56(6), 922–933. <https://doi.org/10.1037/0022-3514.56.6.922>
- Batson, C. D., Kobryniewicz, D., Dinnerstein, J. L., Kampf, H. C., & Wilson, A. D. (1997). In a very different voice: Unmasking moral hypocrisy. *Journal of Personality and Social Psychology*, 72(6), 1335–1348. <https://doi.org/10.1037/0022-3514.72.6.1335>
- Batson, C. D., Thompson, E. R., & Chen, H. (2002). Moral hypocrisy: Addressing some alternatives. *Journal of Personality and Social Psychology*, 83(2), 330–339. <https://doi.org/10.1037/0022-3514.83.2.330>
- Chung, P. K., Zhang, C. Q., Liu, J. D., Chan, D. K. C., Si, G., & Hagger, M. S. (2018). The process by which perceived autonomy support predicts motivation, intention, and behavior for seasonal influenza prevention in Hong Kong older adults. *BMC Public Health*, 18(1), 1–9. <https://doi.org/10.1186/s12889-017-4608-x>
- Crandall, C. S., & Sherman, J. W. (2016). On the scientific superiority of conceptual replications for scientific progress. *Journal of Experimental Social Psychology*, 66, 93–99.
- 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.
- Delrue, J., Vansteenkiste, M., Mouratidis, A., Gevaert, K., Broek, G. V., & Haerens, L. (2017). A game-to-game investigation of the relation between need-supportive and need-thwarting coaching and moral behavior in soccer. *Psychology of Sport and Exercise*, 31, 1–10. <https://doi.org/10.1016/j.psychsport.2017.03.010>
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95(3), 542–575. <https://doi.org/10.1037/0033-2909.95>
- Donald, J. N., Bradshaw, E. L., Conigrave, J. H., Parker, P. D., Byatt, L. L., Noetel, M., & Ryan, R. M. (2021). Paths to the light and dark sides of human nature: A meta-analytic review of the prosocial benefits of autonomy and the antisocial costs of control. *Psychological Bulletin*, 147(9), 921–946. <https://doi.org/10.1037/bul0000338>
- Dunn, C. G., Kenney, E., Fleischhacker, S. E., & Bleich, S. N. (2020). Feeding low-income children during the covid-19 pandemic. *New England Journal of Medicine*, 382(18), e40. <http://doi.org/10.1056/NEJMp2005638>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G* power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4>
- Fiedler, K., Harris, C., & Schott, M. (2018). Unwarranted inferences from statistical mediation tests – an analysis of articles published in 2015. *Journal of Experimental Social Psychology*, 75, 95–102. <https://doi.org/10.1016/j.jesp.2017.11.008>
- Gentilini, U., Grosh, M., Rigolini, J., & Yemtsov, R. (Eds.). (2019). *Exploring universal basic income: A guide to navigating concepts, evidence, and practices*. World Bank.
- Gérain, P., & Zech, E. (2019). Informal caregiver burnout? Development of a theoretical framework to understand the impact of caregiving. *Frontiers in Psychology*, 10, 1748. <http://doi.org/10.3389/fpsyg.2019.01748>
- Goh, J. X., Hall, J. A., & Rosenthal, R. (2016). Mini meta-analysis of your own studies: Some arguments on why and a primer on how. *Social and Personality Psychology Compass*, 10(10), 535–549. <https://doi.org/10.1111/spc3.12267>
- Grant, A. M. (2007). Relational job design and the motivation to make a prosocial difference. *Academy of Management Review*, 32(2), 393–417. <https://doi.org/10.5465/amr.2007.24351328>
- Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise*, 16, 26–36. <https://doi.org/10.1016/j.psychsport.2014.08.013>
- Harmon-Jones, C., Bastian, B., & Harmon-Jones, E. (2016). The discrete emotions questionnaire: A new tool for measuring state self-reported emotions. *PloS ONE*, 11(8), e0159915. <https://doi.org/10.1371/journal.pone.0159915>
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications.
- Hui, B. P. H., & Kogan, A. (2018). Daily ups and downs: An event-sampling study of the mediated moderation of prosocial engagement on well-being. *Social Psychological and Personality Science*, 9(6), 675–688. <https://doi.org/10.1177/1948550617722197>
- 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*, 146(12), 1084–1116. <https://doi.org/10.1037/bul0000298>
- Jang, H., Kim, E. J., & Reeve, J. (2016). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction*, 43, 27–388. <https://doi.org/10.1016/j.learninstruc.2016.01.002>
- Joseph, D. L., Chan, M. Y., Heintzelman, S. J., Tay, L., Diener, E., & Scotney, V. S. (2020). The manipulation of affect: A meta-analysis of affect induction procedures. *Psychological Bulletin*, 146(4), 355–375. <https://doi.org/10.1037/bul0000224>
- Juhl, J., Wildschut, T., Sedikides, C., Diebel, T., Cheung, W. Y., & Vingerhoets, A. J. J. M. (2020). Nostalgia proneness and empathy: Generality, underlying mechanism, and implications for prosocial behavior. *Journal of Personality*, 88(3), 485–500. <https://doi.org/10.1111/jopy.12505>
- Kibler, E., Wincent, J., Kautonen, T., Cacciotti, G., & Obschonka, M. (2019). Can prosocial motivation harm entrepreneurs' subjective well-being? *Journal of Business Venturing*, 34(4), 608–624. <https://doi.org/10.1016/j.jbusvent.2018.10.003>
- Klein, N. (2017). Prosocial behavior increases perceptions of meaning in life. *The Journal of Positive Psychology*, 12(4), 354–361. <https://doi.org/10.1080/17439760.2016.1209541>
- Ko, K., Margolis, S., Revord, J., & Lyubomirsky, S. (2021). Comparing the effects of performing and recalling acts of kindness. *The Journal of Positive Psychology*, 16(1), 73–81. <https://doi.org/10.1080/17439760.2019.1663252>

- Lin, K. J., Savani, K., & Ilies, R. (2019). Doing good, feeling good? The roles of helping motivation and citizenship pressure. *Journal of Applied Psychology*, 104(8), 1020–1035. <https://doi.org/10.1037/apl0000392>
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the beck depression and anxiety inventories. *Behaviour Research and Therapy*, 33(3), 335–343. [https://doi.org/10.1016/0005-7967\(94\)00075-u](https://doi.org/10.1016/0005-7967(94)00075-u)
- Martela, F., & Ryan, R. M. (2016). 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>
- Mednick, S. (1962). The associative basis of the creative process. *Psychological Review*, 69(3), 220–232. <https://doi.org/10.1037/h0048850>
- Meier, S., & Stutzer, A. (2008). Is volunteering rewarding in itself? *Economica*, 75(297), 39–59.
- Nelson, S. K., Layous, K., Cole, S. W., & Lyubomirsky, S. (2016). Do unto others or treat yourself? The effects of prosocial and self-focused behavior on psychological flourishing. *Emotion*, 16(6), 850–861. <https://doi.org/10.1037/emo0000178>
- Pavey, L., Greitemeyer, T., & Sparks, P. (2011). Highlighting relatedness promotes prosocial motives and behavior. *Personality and Social Psychology Bulletin*, 37(7), 905–917. <https://doi.org/10.1177/0146167211405994>
- Pinquant, M., & Sörensen, S. (2003). Differences between caregivers and noncaregivers in psychological health and physical health: A meta-analysis. *Psychology and Aging*, 18(2), 250–267. <https://doi.org/10.1037/0882-7974.18.2.250>
- Roth, G. (2014). Antecedents and outcomes of teachers' autonomous motivation. In P. Richardson, S. A. Karabenik, & H. M. G. Watt, (Eds.), *Teacher motivation: theory and practice* (pp. 36–51). Routledge.
- Roth, G., Benita, M., Amrani, C., Shachar, B.-H., Asoulin, H., Moed, A., Bibi, U., & Kanat-Maymon, Y. (2014). Integration of negative emotional experience versus suppression: Addressing the question of adaptive functioning. *Emotion*, 14(5), 908–919. <https://doi.org/10.1037/a0037051>
- Rushton, J. P., Chrisjohn, R. D., & Fekken, G. C. (1981). The altruistic personality and the self-report altruism scale. *Personality and Individual Differences*, 2(4), 293–302. [https://doi.org/10.1016/0191-8869\(81\)90084-2](https://doi.org/10.1016/0191-8869(81)90084-2)
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2006). Self-regulation and the problem of human autonomy: Does psychology need choice, self-determination, and will? *Journal of Personality*, 74(6), 1557–1586. <https://doi.org/10.1111/j.1467-6494.2006.00420.x>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.
- Schnall, S., Roper, J., & Fessler, D. M. (2010). Elevation leads to altruistic behavior. *Psychological Science*, 21(3), 315–320. <https://doi.org/10.1177/0956797609359882>
- Skitka, L. J., & Tetlock, P. E. (1993). Providing public assistance: Cognitive and motivational processes underlying liberal and conservative policy preferences. *Journal of Personality and Social Psychology*, 65(6), 1205–1223. <https://doi.org/10.1037/0022-3514.65.6.1205>
- Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology*, 89(6), 845–851. <https://doi.org/10.1037/0022-3514.89.6.845>
- Stanley, D. M., Cumming, J., Standage, M., & Duda, J. L. (2012). Images of exercising: Exploring the links between exercise imagery use, autonomous and controlled motivation to exercise, and exercise intention and behavior. *Psychology of Sport and Exercise*, 13(2), 133–141. <https://doi.org/10.1016/j.psychsport.2011.10.002>
- Stanley, I. H., Hom, M. A., & Joiner, T. E. (2016). A systematic review of suicidal thoughts and behaviors among police officers, firefighters, EMTs, and paramedics. *Clinical Psychology Review*, 44, 25–44. <http://doi.org/10.1016/j.cpr.2015.12.002>
- Su, R., Tay, L., & Diener, E. (2014). The development and validation of the comprehensive inventory of thriving (CIT) and the brief inventory of thriving (BIT). *Applied Psychology: Health and Well-Being*, 6(3), 251–279. <https://doi.org/10.1111/aphw.12027>
- Wagemakers, E. J., Wetzels, R., Borsboom, D., van der Maas, H. L., & Kievit, R. A. (2012). An agenda for purely confirmatory research. *Perspectives on Psychological Science*, 7(6), 632–638. <https://doi.org/10.1177/1745691612463078>
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, 132(2), 249–268. <https://doi.org/10.1037/0033-2909.132.2.249>
- 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>
- Woo, T., Ho, R., Tang, A., & Tam, W. (2020). Global prevalence of burnout symptoms among nurses: A systematic review and meta-analysis. *Journal of Psychiatric Research*, 123, 9–20. <http://doi.org/10.1016/j.jpsychires.2019.12.015>
- Yang, Y., & Hayes, J. A. (2020). Causes and consequences of burnout among mental health professionals: A practice-oriented review of recent literature. *Psychotherapy*, 57(3), 426–436. <http://doi.org/10.1037/pst0000317>
- Yu, S., Levesque-Bristol, C., & Maeda, Y. (2018). General need for autonomy and subjective well-being: A meta-analysis of studies in the US and East Asia. *Journal of Happiness Studies*, 19(6), 1863–1882. <https://doi.org/10.1007/s10902-017-9898-2>

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Kelley, N. J., Weinstein, N., Smith, E. E., Davis, W. E., Christy, A. G., Sedikides, C., & Schlegel, R. J. (2022). Emotional, motivational and attitudinal consequences of autonomous prosocial behaviour. *European Journal of Social Psychology*, 1–17. <https://doi.org/10.1002/ejsp.2916>