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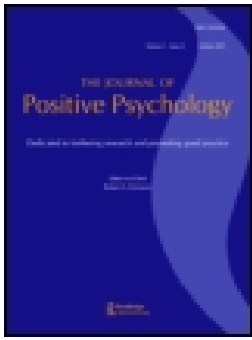
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## Comparing the effects of performing and recalling acts of kindness

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### ABSTRACT

Research suggests that both performing prosocial behaviors (i.e. acts of kindness towards others) and simply recalling them can increase well-being. Do performing and recalling prosocial behaviors impact well-being equally? To investigate this question, we conducted a study with a  $2 \times 2$  design in which participants were randomly assigned either to perform prosocial behaviors, recall prosocial behaviors, both perform and recall prosocial behaviors, or do neither (control). Participants in all conditions assigned to perform and/or recall prosocial behaviors increased in well-being more than those in the control condition. However, participants in the three prosocial conditions did not significantly differ in their well-being gains. Presumably, it is much easier to recall, rather than perform, prosocial behavior. Accordingly, our results suggest that happiness seekers and well-being interventionists consider recalling acts of kindness as a cost-effective practice to raise well-being.

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### KEYWORDS

Prosocial behavior; positive affect; negative affect; well-being; happiness

How can people become happier? Happiness seekers have been found to pursue a wide range of activities, from chasing their dream jobs to playing sports to practicing meditation (Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012). One of the most common – and the most fruitful – ways to increase well-being is to engage in prosocial behavior (i.e. perform acts of kindness for others; e.g. Nelson, Layous, Cole, & Lyubomirsky, 2016; Parks et al., 2012; Weinstein & Ryan, 2010). For example, spending money on others has been shown to improve people's well-being more than spending on oneself (Dunn, Aknin, & Norton, 2008). Interestingly, however, the 'act' portion of an 'act of kindness' may be optional; in multiple studies, simply *recalling* acts of kindness improved participant well-being (Aknin, Dunn, & Norton, 2012; Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006). If both recalling and performing prosocial behaviors promote well-being, are these effects similar in magnitude? Furthermore, if an individual both performs and recalls prosocial behavior (as often occurs in kindness interventions), are the effects additive, synergistic, or antagonistic? In the current study, we tested these two prosocial interventions (i.e. performing and recalling acts of kindness) to compare their effectiveness and to explore potential interactions between them in promoting well-being.

### Prosocial behavior

Prosocial behavior is a term that was originally coined by psychologists to describe the opposite of antisocial

behavior (Wispé, 1972). Broadly, prosocial behavior can be defined as intentional acts undertaken to benefit others, regardless of the underlying motive (Batson & Powell, 2003; Penner, Dovidio, Piliavin, & Schroeder, 2005). Examples include acts of kindness for others, such as giving a compliment, paying for another's meal, helping a colleague with a work task.

Research suggests that those who report performing more prosocial behaviors – for example, regular volunteers – tend to also report higher well-being and other related benefits (Meier & Stutzer, 2008; Schwartz, Meisenhelder, Ma, & Reed, 2003; Thoits & Hewitt, 2001; Wheeler, Gorey, & Greenblatt, 1998). Such correlations have led researchers to question whether prosociality is the chicken or the egg in its relationship with well-being, and thus to probe at establishing the causal direction using experimental work.

Recently, acts of kindness have been used in 'positive activity interventions' – that is, activities aimed at increasing well-being, which are tested in randomized controlled trials (Bolier et al., 2013; Lyubomirsky & Layous, 2013; Sin & Lyubomirsky, 2009). The results of such studies suggest that kind acts yield numerous benefits for not just the *target* (i.e. the recipient of the kindness), but also the *actor* (i.e. the person being kind). For instance, prosocial behaviors have been demonstrated to improve the actor's well-being (Chancellor, Margolis, Jacobs Bao, & Lyubomirsky, *in press*; Dunn et al., 2008; Sheldon, Boehm, & Lyubomirsky, 2012), job performance (Anik, Aknin, Norton, Dunn, & Quoidbach, 2013), and peer acceptance (Layous, Nelson, Oberle,

Schonert-Reichl, & Lyubomirsky, 2012). One study even found that those who perform prosocial acts tend to benefit more than their recipients (Chancellor et al., *in press*), possibly because recipients do not feel more 'good' or competent after receiving kind acts, and may even feel indebted or incompetent (Fisher, Nadler, & Whitcher-Alagna, 1982; Fritz & Lyubomirsky, 2018).

Prosocial activities are likely to contribute to well-being by satisfying an individual's need to feel competent, autonomous, and connected – that is, all three of the fundamental human psychological needs as posited by self-determination theory (Chancellor et al., *in press*; Deci & Ryan, 2000). In other words, individuals can use their prosocial behavior as favorable evidence when evaluating themselves and their lives. Successfully completing kind acts can increase people's confidence that they have the resources and capability to make an impact on others' lives – that is, that they are competent. Choosing the type of act to perform – as well as when, where, how, and for whom to perform that act – may bolster feelings of autonomy. Lastly, prosocial behavior often creates positive social interactions with the target, which can be used as evidence that one is a connected and valuable member of one's community.

### ***Conflating recalling and performing***

Most experimental research on prosocial behavior has focused on the effects of performing kind acts (see Crocker, Canevello, & Brown, 2017). However, prior studies that have tested how prosocial behavior can influence outcomes related to well-being have failed to disentangle the effects of *performing* kind acts from the effects of *recalling* kind acts. In a typical study, participants engage in some sort of prosociality, either by their own spontaneous volition (i.e. in longitudinal or correlational studies), or because they were randomly assigned to a condition asking them to be prosocial (i.e. in interventions). In both scenarios, after participants have completed their assigned kind act(s), they are directed to recall the act(s) – by endorsing, listing, or sometimes describing what they did in detail. This report is often administered shortly before participants report on their well-being. For most intents and purposes, such a design is logical; it gives researchers the opportunity to confirm that kind acts indeed took place, and to code the acts if needed. Perhaps due to this logic, this design is extremely common; the majority of kindness interventions appear to require actors to report (i.e. recall) their prosocial acts (Anik et al., 2013, 2a and 2b; Buchanan & Bardi, 2010; Dunn et al., 2008; Layous et al., 2012; Layous, Lee, Choi, & Lyubomirsky, 2013; Nelson et al., 2015, 2016; Sheldon et al., 2012).

However, having participants both perform and recall their prosocial behavior prior to reporting their well-being

leaves ambiguity as to whether any potential benefits stem primarily from the kind action itself or from the process of revisiting it during recall. It is possible that the most substantial well-being benefits – or at least the most positive feelings – emerge during the recall process, when, upon reflection, participants may be reminded of their own goodness, the control they have over their own lives, or the effects such actions might have on their reputation and relationships. Indeed, some studies have found changes in gratitude (Aknin, Barrington-Leigh, et al., 2013, Studies 2a and 2b; Otake et al., 2006, Study, p. 2), and generosity (Aknin et al., 2012) after participants merely counted the kindnesses they had done for others, with no additional instructions to be prosocial. Other studies of this ilk have found that participants who recalled prosocial behaviors (e.g. spending money on others) tended to report feeling happier and were also more likely to engage in future prosocial spending (Aknin et al., 2012; Exline, Lisan, & Lisan, 2012). This handful of studies provides some evidence that, even without engaging in deliberate extra acts of kindness, individuals can reap benefits from simply remembering their own prosociality.

It is worth emphasizing that not all published studies follow the described procedures. For example, in a few studies, participants did not report their prosocial behavior at all. Instead, they completed the follow-up happiness or affect surveys either immediately after engaging in prosocial behavior (Aknin, Dunn, Sandstrom, & Norton, 2013, Study 1 & 2; Anik et al., 2013, Study 1), or on the same evening of the prosocial behavior (Aknin et al., 2013, study 3; Dunn et al., 2008, study 3). Alternatively, participants were asked to recall prosocial acts only after reporting on their happiness (Dunn et al., 2008).

The existence of studies that leave only a short gap between the prosocial action and reports of affect or well-being may reflect a hunch that a very fresh – if fleeting – memory of kindness will produce substantial and measurable effects on well-being. Indeed, it is reasonable to conclude that the kind act must be easily mentally accessible for a kindness intervention to succeed. However, to our knowledge, no studies have directly compared the effects of performing kind acts to the effects of recalling one's kind acts, or compared either condition alone to the effects of doing both.

If the benefits of doing and of recalling kindness is greater when combined, it could be because doing and recalling increase well-being in entirely separate ways and they have an additive effect, or, alternatively, that the components of each interact with one another. However, it is also possible that the underlying mechanisms are redundant with one another and the second task brings little or no additional benefit. In this case, to

obtain the benefits of kindness, a person would need to choose and complete only one of the tasks (i.e. either perform kindness or recall kindness).

Understanding the independent and combined effects of performing and recalling has both theoretical and practical implications. If recalling acts of kindness and performing acts of kindness have similar effects on well-being (or other outcomes), it could be substantially more efficient to remember an (old) kind act than actually perform a (new) one. This finding would benefit and shape the actions of both happiness-seekers and researchers who test the effects of prosocial behavior. Our study seeks to address this gap in the literature by disentangling the unique effects of recalling and performing acts of kindness.

### Current study

We conducted a 3-day longitudinal experiment comparing how, when alone or combined, performing kindness and recalling kindness affected participants' reports of subjective well-being (i.e. positive affect, negative affect, and life satisfaction), as well the three psychological needs derived from self-determination theory (i.e. connectedness, competence, and autonomy). In other words, we examined whether cognitive (recalling) versus behavioral (acting) prosocial interventions produce similar or discrepant effects. To this end, we sought to answer four specific questions. First, do performing and recalling acts of kindness have different effects when compared to one another? Second, when combined, will these two interventions (i.e. performing and recalling) lead to additive, synergistic, or antagonistic effects? Third, over the 3 days of this study, which effects will be present on the day of the intervention and which effects will be durable enough to impact measures the next day, when the intervention is likely less fresh in memory? To investigate these questions, we designed a  $2 \times 2$  study with participants assigned to perform kind acts, recall kind acts that they had performed in the past, perform and recall kind acts, or do neither (i.e. a measurement-only control condition) (see Table 1).

## Method

### Participants

We recruited undergraduate students ( $N = 532$ ) from a medium-sized public university. The majority of our sample

reported that they were Asian (39%) or Latino (36%), whereas others endorsed that they were White (9%), African American (3%), or from other/mixed ethnicities (13%). Approximately 69.5% of our sample was female. The average age of our participants was 19.12 years old ( $SD = 2.45$ ).

### Procedure

Our study spanned 3 days, with all assessments completed online (see Table 1). On Day 1, participants completed demographics (gender and ethnicity) and psychological measures (see below). At the end of this assessment, participants were randomly assigned to one of four conditions: Perform Only, Recall Only, Perform & Recall, or Control. Thus, participants were assigned to 1) perform acts of kindness without recalling them; 2) recall acts of kindness without performing them; 3) both perform and recall acts of kindness; or 4) neither perform nor recall acts of kindness (i.e. a measurement-only control). On the first day, those assigned to either of the two Performing conditions were instructed to do at least three kind acts for someone else in the next 24 hours. These participants had the freedom to choose which acts they performed and the beneficiaries of those acts (see Appendix A, top). The other two conditions were not assigned to perform kind acts on Day 1, and all participants were told that a new questionnaire will be emailed to them within 24 hours (see Table 1).

On Day 2, participants filled out the same psychological measures as on Day 1. However, participants in both of the Recall conditions were assigned to recall acts of kindness that they had performed in the past, before starting on the well-being assessment (see Appendix A, bottom). No participants were asked to perform or recall acts of kindness after the Day 2 assessment.

On Day 3, participants were administered the same assessment as on Days 1 and 2. At the end of the assessment, we included a manipulation check for the two Recall groups, which asked whether participants who recalled acts of kindness had recalled fictitious acts. Furthermore, participants in the two Perform groups were asked about the number of kind acts they did. Participants were notified that their responses to these questions would not affect their compensation.

Table 1. Study timeline.

Condition	Day 1	Day 2	Day 3
Perform	(1) Well-being assessment (2) Assigned to perform 3 acts of kindness within 24 hours	Well-being assessment	(1) Well-being assessment (2) Manipulation check
Perform & Recall	(1) Well-being assessment (2) Assigned to perform 3 acts of kindness within 24 hours	(1) Recall acts of kindness (2) Well-being assessment	(1) Well-being assessment (2) Manipulation check
Recall	Well-being assessment	(1) Recall acts of kindness (2) Well-being assessment	(1) Well-being assessment (2) Manipulation check
Control	Well-being assessment	Well-being assessment	Well-being assessment

Assessments that were not completed on the correct day (e.g. Day 2 completed on Day 3) or that indicated any failure in the manipulation check (i.e. the participant recalled fictitious acts or did not perform any kind acts) were excluded from our analyses. However, we included as many assessments from each participant as possible. For example, if a participant finished Day 1 and Day 2 assessments on time, but failed to complete Day 3, we would only exclude the Day 3 assessment. We collected 532 assessments on Day 1. After excluding incomplete assessments and assessments that failed the manipulation check, 512 responses remained on Day 2, and 480 responses on Day 3. A sample size of 480 participants yields 80% power to detect an effect of  $r = .13$  at the  $p < .05$  level. Neither dropouts at Day 2 nor dropouts at Day 3 correlated with initial levels of any of our outcomes (all  $r$ s below .06 in magnitude, all  $p$ s  $> .25$ ).

## Measures

### Positive and negative affect

Participants completed the Affect-Adjective Scale (Diener & Emmons, 1984), which asks respondents to rate the extent to which they experienced a specific positive or negative emotion (e.g. 'pleased' and 'depressed/blue') over the past 24 hours on a 7-point Likert scale. Three low-arousal items ('peaceful/serene,' 'dull/bored,' and 'relaxed/calm') were added to the original 9-item scale to ensure an equal number of high and low arousal emotions. Across Days 1–3, McDonald's  $\omega_s$  were .88, .91, and .92, respectively, for positive affect and .76, .82, and .84 for negative affect.

### Life satisfaction

Participants completed the Satisfaction With Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). They were asked to rate the extent to which they agreed with items that indicate high life satisfaction (e.g. 'The conditions of my life are excellent' and 'If I could live my life over, I would change almost nothing') on a 7-point Likert scale. Across Days 1–3, McDonald's  $\omega_s$  were .84, .86, and .89.

### Psychological needs

Lastly, participants completed the Balanced Measure of Psychological Needs (Sheldon & Hilpert, 2012). They were asked to rate the extent to which they agree with items that assess connectedness (e.g. 'I felt a sense of contact with people who care for me, and whom I care for'), competence (e.g. 'I was successfully completing difficult tasks and projects'), and autonomy (e.g. 'I was free to do things my own way') on a 5-point Likert scale. McDonald's  $\omega_s$  across Days 1–3 were .72, .76, and .77 for connectedness, .68, .68, and .74 for competence, and .63, .70, and .73 for autonomy.

## Analytic approach

We first tested for measurement invariance in each of our outcomes and then created second-order latent growth models that imposed the achieved level of measurement invariance on the items. We also correlated the residuals of the same items over time. We extracted intercept and slope latent variables from the latent-growth models and regressed slope on intercept and dummy codes representing condition. We examined growth over Days 1–2 and growth over Days 1–3 as outcomes. Finally, we tested for potential moderators such as demographic factors (i.e. ethnicity and gender) and the number of acts performed (if applicable) by predicting growth in outcomes from moderator variables. All data, measures, and R code for this study can be found at: [osf.io/m8v43](https://osf.io/m8v43).

## Results

### Measurement invariance

Before analyzing our outcomes, we assessed longitudinal measurement invariance – i.e. whether the measure was actually assessing the same construct on the same scale at the different time points. Invariance is measured by testing four progressively stricter models of the data. At each level of invariance, researchers set certain parameters to be equal across time, then test how accurately the model still fit the data given these constraints. If the model fit (the CFI) decreases by less than 0.01, the measure is thought to achieve the next level of invariance (Cheung & Rensvold, 2002). First, configural invariance indicates whether constructs have the same patterns of free and fixed loadings at each time point (i.e. whether the model has the same form) and is used as a baseline model. Next, weak factorial invariance indicates whether each item contributes to the latent construct equally – that is, if a given factor loading on a latent variable is the same across time points. Third, strong factorial invariance indicates whether the item intercepts are the same, and finally strict invariance is achieved if items have the same residuals at each time point. We aimed to achieve at minimum strong measurement invariance between outcomes at each time point.

Each of our measures achieved at least strong measurement invariance, except for connectedness, which achieved weak invariance. To assess growth in connectedness, we analyzed two second-order latent growth models, one with weak invariance constraints and the other with strong invariance constraints. Because the differences between the models were minimal, we report estimates from the latter model (Widaman, Ferrer, & Conger, 2010).

### Acts of kindness conditions versus control

Using dummy coding, we compared the growth rates of each kind acts condition with the control condition. We then collapsed across the three acts of kindness conditions and compared those who performed and/or recalled acts of kindness to control participants (who did neither) using dummy coding. The results of these analyses are displayed in Table 2.

All acts of kindness conditions displayed an increase in well-being during the intervention period (i.e. Days 1–2), and most of these effects were significant. Interestingly, negative affect was impacted more than other well-being outcomes (see Figure 1). We found inconsistent results with competence, connectedness, and autonomy over Days 1–2. Finally, over Days 1–3, participants in the three acts of kindness conditions tended to increase in well-being, as well in competence, connectedness, and autonomy, but effect sizes were small and inconsistently had  $p$ -values below .05.

### Comparison of recall only, perform only, and recall & perform conditions

We compared the effects of each of the three active conditions to examine whether they yielded differences in the longitudinal trajectory of multiple well-being related outcomes. To this end, we predicted latent slopes from latent intercepts and then added condition pseudovariates and tested whether R-squared increased significantly. We found no significant effects in any outcomes across the intervention period (i.e. Days 1–2). These outcomes include positive

affect ( $p = .614$ ), negative affect ( $p = .544$ ), life satisfaction ( $p = .058$ ), competence ( $p = .962$ ), connectedness ( $p = .056$ ), and autonomy ( $p = .057$ ). Thus, all three acts of kindness conditions yielded similar increases in well-being.

### Recalling impacting immediately subsequent assessments

We examined whether recalling acts of kindness immediately before a well-being assessment impacted that assessment more than an assessment completed one day later. Accordingly, we analyzed the growth of our outcomes in the Recall Only group and the Perform & Recall group from Days 2–3. If recalling acts of kindness has a greater impact immediately than a day later, we would expect to see well-being decreases over Days 2–3. However, across outcomes, well-being seemed to be rather stable from Day 2 to Day 3, with most decreases in well-being being small (see Table 3).

### Moderators

We tested gender, ethnicity, and the number of kind acts performed (if applicable) as potential moderators of the effects of condition on well-being outcomes. The demographic moderators displayed inconsistent and nonsignificant effects. However, the number of kind acts performed predicted increases in positive affect over Days 1–2 ( $b = 0.10$  [0.00, 0.19],  $p = 0.043$ ) and over Days 1–3 ( $b = 0.09$  [0.03, 0.16],  $p = 0.004$ ). The number of acts performed also predicted increases in autonomy ( $b = 0.08$  [0.01, 0.14],  $p = .021$ ) over Days 1–2,

**Table 2.** The effects of performing and recalling acts of kindness on well-being outcomes.

Outcome	Comparison	Days 1–2 $b$ [95% CI]	Days 1–2 $p$	Days 1–3 $b$ [95% CI]	Days 1–3 $p$
Positive Affect	Perform vs. Control	0.14 [−0.02, 0.31]	.087	0.10 [−0.00, 0.20]	.058
Positive Affect	Recall vs. Control	0.08 [−0.08, 0.25]	.318	0.12 [0.02, 0.22]	.021
Positive Affect	Perform & Recall vs. Control	0.16 [0.00, 0.32]	.047	0.04 [−0.06, 0.14]	.392
Positive Affect	Experimental vs. Control	0.13 [−0.00, 0.27]	.056	0.08 [0.00, 0.17]	.048
Negative Affect	Perform vs. Control	−0.22 [−0.36, −0.08]	.002	−0.08 [−0.17, 0.02]	.114
Negative Affect	Recall vs. Control	−0.14 [−0.29, −0.00]	.048	−0.12 [−0.22, −0.02]	.016
Negative Affect	Perform & Recall vs. Control	−0.18 [−0.31, −0.04]	.013	−0.05 [−0.15, 0.04]	.274
Negative Affect	Experimental vs. Control	−0.18 [−0.30, −0.06]	.002	−0.08 [−0.16, −0.00]	.044
Life Satisfaction	Perform vs. Control	0.08 [−0.01, 0.17]	.091	0.04 [−0.01, 0.09]	.082
Life Satisfaction	Recall vs. Control	0.03 [−0.06, 0.13]	.472	0.04 [0.00, 0.09]	.074
Life Satisfaction	Perform & Recall vs. Control	0.13 [0.05, 0.22]	.003	0.05 [0.00, 0.10]	.036
Life Satisfaction	Experimental vs. Control	0.08 [0.01, 0.16]	.026	0.05 [0.01, 0.08]	.023
Competence	Perform vs. Control	−0.00 [−0.11, 0.11]	.993	0.07 [0.00, 0.14]	.039
Competence	Recall vs. Control	−0.01 [−0.12, 0.10]	.847	0.03 [−0.04, 0.11]	.347
Competence	Perform & Recall vs. Control	0.00 [−0.10, 0.11]	.964	0.02 [−0.05, 0.09]	.589
Competence	Experimental vs. Control	0.00 [−0.09, 0.09]	.956	0.04 [−0.02, 0.10]	.159
Connectedness	Perform vs. Control	0.15 [0.02, 0.27]	.020	0.09 [0.00, 0.17]	.043
Connectedness	Recall vs. Control	0.01 [−0.11, 0.14]	.822	0.09 [−0.00, 0.17]	.052
Connectedness	Perform & Recall vs. Control	0.02 [−0.10, 0.14]	.758	0.04 [−0.05, 0.12]	.403
Connectedness	Experimental vs. Control	0.06 [−0.04, 0.16]	.258	0.07 [0.00, 0.14]	.059
Autonomy	Perform vs. Control	0.05 [−0.06, −0.16]	.383	0.03 [−0.02, 0.08]	.274
Autonomy	Recall vs. Control	−0.03 [−0.14, 0.08]	.600	0.02 [−0.03, 0.07]	.389
Autonomy	Perform & Recall vs. Control	0.09 [−0.01, 0.20]	.077	0.03 [−0.02, 0.08]	.283
Autonomy	Experimental vs. Control	0.04 [−0.05, 0.13]	.362	0.03 [−0.02, 0.07]	.221

Note. Experimental = All three experimental conditions.

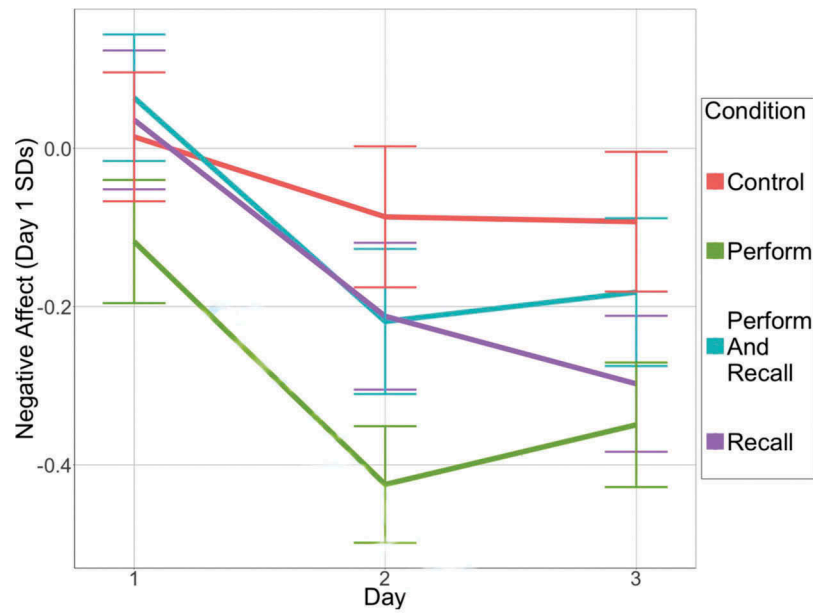


Figure 1. Negative affect by condition over the 3 days of the study.

Table 3. Growth rate of recalling acts of kindness over days 2 to 3.

Outcome	Condition	Growth Rate $b$ [95% CI]	$p$
Positive Affect	Recall	0.07 [-0.06, 0.19]	.153
Positive Affect	Perform & Recall	-0.12 [-0.22, -0.02]	.009
Negative Affect	Recall	-0.12 [-0.23, -0.02]	.001
Negative Affect	Perform & Recall	0.03 [-0.08, 0.13]	.319
Life Satisfaction	Recall	0.03 [-0.01, 0.08]	.091
Life Satisfaction	Perform & Recall	-0.04 [-0.08, -0.00]	.021
Competence	Recall	-0.02 [-0.07, 0.03]	.248
Competence	Perform & Recall	-0.01 [-0.06, 0.03]	.281
Connectedness	Recall	0.01 [-0.08, 0.09]	.444
Connectedness	Perform & Recall	-0.09 [-0.18, -0.00]	.020
Autonomy	Recall	0.06 [0.01, 0.12]	.016
Autonomy	Perform & Recall	0.03 [-0.09, 0.03]	.147

but showed a nonsignificant effect over Days 1–3 ( $b = 0.02$  [-0.01, 0.05],  $p = .29$ ). The number of kind acts performed was not a significant predictor of other outcomes.

## Discussion

Supporting previous research (e.g. Chancellor et al., *in press*; Otake et al., 2006), we found that both performing and recalling acts of kindness – either individually or together – improved well-being outcomes when compared to a control group. However, our study did not find differences in the benefits of performing kindness versus recalling kindness versus doing both. Interestingly, participants who both performed and recalled acts of kindness did not improve in well-being significantly more than those who did just one of those activities. Thus, performing and

recalling prosocial behavior showed neither an additive nor a synergistic interaction (nor an antagonistic one). Participants in the three kindness conditions (Perform Only, Recall Only, and Perform & Recall) did show increases in positive affect, decreases in negative affect, and increases in life satisfaction from Day 1 to Day 2, as well as from Day 1 to Day 3. However, we generally did not find evidence that competence or autonomy were impacted by the interventions, with mixed results for connectedness. Although this finding could be interpreted as evidence that competence, autonomy, and connectedness are not affected by prosociality, it is also possible that a single (and very brief) intervention only slightly nudges a person's global assessments of her identity and whether her needs are met, much like how a single trip to the gym may not yield measurable changes, but a habit of going to the gym can greatly influence one's health, well-being, and self-concept. Overall, these results suggest that 'cognitive' prosocial interventions can be just as effective as 'behavioral' prosocial interventions.

In addition, most of our well-being outcomes were stable over Days 2–3, which suggests that performing and recalling kind acts do have effects that persist past 24 hours. Furthermore, recalling kind acts immediately prior to an assessment did not affect that assessment more than the assessment taken a day after, as decreases in well-being from Days 2–3 were small. This finding offers interventionists some flexibility in the timing of the administration of well-being measures.

Lastly, corroborating prior research on the hedonic benefits of prosocial behavior, our results suggest that



previous studies that assessed well-being after both recalling and performing kind acts did not have exaggerated effect sizes. However, we found that those assigned to both perform and recall acts of kindness experienced no greater benefits than those who only performed or only recalled. Thus, in future research or practical applications, it may only be necessary to have individuals either recall or perform.

### Limitations and future directions

Our study examined a relatively heterogeneous population of students, and we were able to leverage this diversity to examine demographic variables as moderators of our effects. However, our sample certainly does not represent the world's diversity. For example, recent data from our laboratory suggest that members of Asian (but not Western) cultures increase in well-being only when recalling kind acts toward close (as opposed to distant) others (Shin & Lyubomirsky, 2017). Thus, future researchers could compare recalling and performing kind acts in different populations and investigate other potential moderators not explored in this study (such as the target of the act recalled/performed) to examine the generalizability of our findings.

Like many other studies in this field, our outcomes were assessed through self-report measures. This approach increases the likelihood of biases like socially desirable responding and experimental demand. However, subjective well-being and psychological needs may be best assessed from the subjective perspective of the individual (Diener, 1984).

We did not ask participants in the Perform Only condition to list the kind acts they performed, as this would have caused the participants to engage in recall. Thus, we do not know the specific acts that were carried out by participants in this condition. However, we do not expect the kind acts of the Perform Only group to be substantively different from those of the Recall Only and Perform & Recall groups, because whether they were going to recall their kind acts was not known to participants until after the acts were performed.

Unlike many previous prosocial interventions (e.g. Buchanan & Bardi, 2010; Kerr, O'Donovan, & Pepping, 2015; Layous et al., 2012; Nelson et al., 2016), which have taken place over multiple days or weeks, our study assessed changes over a period of only 1 day or 2 days. Additionally, our participants were assigned to perform and/or recall only once, which limits the generalizability of the results. Performing kind acts repeatedly may form a habit and produce greater well-being gains in time, whereas recalling acts may not become habitual. This may explain why the

two experimental conditions produced similar results. Although we believe that the effects of engaging in prosocial behavior endures over longer periods, our findings describe how these effects may begin to unfold.

Lastly, our study primarily focused on subjective well-being outcomes. Performing and recalling acts of kindness may have different effects on outcomes that were not assessed in this study. For example, performing kindness might be associated with better physical health outcomes than recalling kindness (see Brown & Brown, 2015; Brown, Nesse, Vinokur, & Smith, 2003; Brown et al., 2009; Burr, Han, & Tavares, 2015; Konrath, Fuhrel-Forbis, Lou, & Brown, 2012; Nelson-Coffey, Fritz, Lyubomirsky, & Cole, 2017). Thus, future researchers may wish to investigate outcomes beyond well-being.

### Concluding remarks

Our findings support past research demonstrating that both performing and recalling acts of kindness promote well-being (e.g. Aknin et al., 2012; Nelson et al., 2016). A novel contribution of our study, however, is that the effects on well-being were similar whether individuals performed acts of kindness or simply recalled them, and were not strengthened by doing both activities. Thus, future experimental research on prosocial behavior could rely more on recall interventions, which are arguably much easier to implement. Similarly, individuals who seek to efficiently improve their well-being may be just as successful by remembering kind acts that they have performed in the past as actually doing more such acts in the future. Of course, we do not suggest that people should stop being kind to others. Indeed, happiness seekers should continue to act prosocially towards others to create more memories of these acts. Recollections such as giving one's grandparents a hug, buying lunch for one's coworker, and picking up one's younger sibling from school are some actual examples that promoted our participants' well-being. Our data suggest that, when it comes to boosting well-being over 1 to 2 days, these recollections are just as effective as performing new acts of kindness. Indeed, directing one's attention to positive behaviors may foster the same benefits – for example, feeling like a good person, feeling more optimistic about one's relationships, feeling closer to others – as engaging in those behaviors.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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## Appendix A

### Instructions for perform groups

In our daily lives, we all perform acts of kindness, generosity, and thoughtfulness – both large and small – for others. Examples include cooking dinner for friends or family, doing a chore for a family member, paying for someone’s coffee in line behind you, visiting an elderly relative, or writing a thank you letter. Tomorrow, you are to perform three nice things for others, all three in one day. These acts of kindness do not need to be for the same person, the person may or may not be aware of the act, and the act may or may not be similar to the acts listed above. Tomorrow, you may be asked to report what nice things you chose to perform. Please do not perform any kind acts that may place yourself or others in danger.

### Instructions for recall groups

For the next 5 minutes, please recall a time when you performed kind acts for someone else. Examples include cooking dinner for friends or family, doing a chore for a family member, paying for someone’s coffee in line behind you, visiting an elderly relative, or writing a thank you letter. Briefly summarize the kind act you did, and who the act was for. Finally, as you write, don’t worry about perfect grammar and spelling, and remember that anything you write will remain strictly confidential. Should an experimenter read this entry in the future, it will be identifiable only by a participant number and not by a name.