

Prosocial behavior increases well-being and vitality even without contact with the beneficiary: Causal and behavioral evidence

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Abstract A number of studies have shown that prosocial behavior is associated with enhanced well-being, but most prior experimental studies have involved actual or potential face-to-face contact with the beneficiary. To establish that it is prosocial behavior *itself*, and not only an increased sense of social relatedness to the recipient that improves well-being, participants ($n = 76$) were invited to play a simple computer game, where half were made aware of a chance to have an anonymous prosocial impact through gameplay. As compared to the control condition, this group experienced more positive affect, meaningfulness and marginally more vitality. Going beyond self-reported outcomes, they also demonstrated better post-game performance on a subsequent Stroop task, providing behavioral evidence for the positive effects of prosocial behavior. Also supported was the hypothesis that these positive effects of prosocial behavior on well-being were mediated by subjectively assessed autonomy and competence need satisfactions.

Keywords Prosocial behavior · Prosocial giving · Prosocial impact · Well-being · Self-determination theory

Introduction

The association between prosocial behavior and well-being has become a target of increasing amount of empirical work (e.g. Aknin et al. 2013a; Poulin et al. 2012; Shariff and Norenzayan 2007). In addition to extensive amount of cross-sectional work connecting various forms of prosocial behavior with well-being (partially reviewed in Piliavin 2003; Post 2005), a number of studies that have used experimental manipulation have established that prosocial behavior leads to increased well-being (e.g. Harris 1977; Weinstein and Ryan 2010; Williamson and Clark 1989).

However, most causal studies to date have involved direct or potential face-to-face contact with the beneficiary, where the improved well-being could arguably also be the result of increased sense of belonging and relatedness resulting from connecting with the other person (cf. Baumeister and Leary 1995; Weinstein and Ryan 2010). Indeed, Aknin et al. (2013b) showed in three studies that prosocial spending leads to stronger improvements in happiness in situations that actually promote social connection. Only a few papers have addressed this shortcoming: Aknin et al. (2013a) offered participants in Canada and South Africa a chance to purchase a goody bag either for themselves (control condition) or for a sick child at a nearby children's hospital (prosocial condition). In both countries those engaged in prosocial spending reported improved positive affect as compared to the personal spenders. Another study using similar goody bag task replicated these findings measuring also observer-rated mood of participants (Aknin et al. 2014). Third study offered more mixed results: Participants were asked for a donation to either *Spread the Net* charity organization or *UNICEF* charity organization (Aknin et al. 2013c). Larger donations to *Spread the Net* predicted higher subjective

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well-being, while larger donations to UNICEF didn't, a result the researchers attributed to the more concrete and descriptive appeal made by *Spread the Net* organization.

The current paper uses an anonymous prosocial task to expand on these findings in a couple of ways. First, we aim to measure a wider range of well-being outcomes: In addition to positive and negative affect, we measure also vitality, meaning and interest/enjoyment. Secondly, the existing research—with the exception of neurological research by Harbaugh et al. (2007) and Gray's (2010) research on moral transformation—has used self-reports of mood and well-being as outcomes. The present study aims to extend the literature by providing a causal study of prosocial behavior that involves no contact with the beneficiary, and that includes a behavioral outcome—performance in a Stroop task—in addition to subjective well-being outcomes.

Third, in addition to asking *whether* prosocial behavior leads to well-being, the present study further aims to ask *why* prosocial behavior improves well-being (cf. Martela and Ryan 2015). In particular, we wanted to look whether the three psychological needs for autonomy, competence, and relatedness from self-determination theory (SDT; Deci and Ryan 2000) would mediate the relations between prosocial behavior and well-being outcomes in an experimental setting. In a number of studies, Weinstein and Ryan (2010) have showed that autonomy, competence, and relatedness mediate the positive well-being effects of prosocial behavior, with all three needs having an independent contribution. Here we aim to replicate these findings using a novel type of manipulation that doesn't involve any face-to-face contact with the beneficiary and with new types of well-being outcomes.

The present study thus aims to manipulate prosocial behavior in a situation that doesn't involve any contact with the beneficiary with two main hypotheses: First, we propose that prosocial behavior will increase the benefactor's well-being and vitality as measured both by subjective evaluation and objective outcomes. Second, we propose that this positive effect is mediated by the satisfaction of the three psychological needs for autonomy, competence, and relatedness.

Present study

In the present study we adopted an experimental design where participants had a real life possibility to contribute to others, but where there would be no contact with the recipient of that help. Accordingly, all participants played the same word-related computer game, but half were informed that for every correct answer the game donates rice to the *United Nations World Food Program*

(benevolence condition), whereas the other half were not aware of this fact (control condition).

We also wanted to have wider range of outcome measures than most existing studies, including a performance-based measure. Thus, in addition to measures of positive affect, negative affect and vitality, we also measured meaningfulness, game interest/enjoyment, and performance on a subsequent Stroop task. It was predicted that those in the benevolence condition would experience more vitality, meaningfulness and interest/enjoyment in the game than people in the control condition. Further, as vitality and ego depletion are both about energy available to the self (Ryan and Deci 2008), it was hypothesized that people in benevolence condition would actually have more energy left to perform better in the subsequent Stroop task, which is often used as a measure of ego depletion (e.g. Gailliot et al. 2007; Kazén et al. 2015).

In addition, we wanted to see whether the increased beneficence satisfaction and increased satisfaction of the three psychological needs of autonomy, competence, and relatedness from SDT (Deci and Ryan 2000) would mediate this relationship.

Methods

Participants

With the aim of recruiting around 80 participants, 79 University students participated in exchange for extra course credit. Of these 64 % were women, and the average age was 20.4. The majority identified as Caucasian (45 %) or Asian (38 %), with the rest being African American (11 %), Hispanic (4 %) or preferring not to say (3 %). 3 subjects were omitted due to technical problems in the gameplay, leaving a final sample size of 76, of which 34 were in the benevolence condition and 42 in the control condition.

Procedure

Participants were invited to a computer lab in small groups of eight or less, where they were seated in front of shielded computers. Half were randomly assigned to the beneficence condition, the other half to the control condition. The procedure for all participants was the same: They were first asked to play the word-related game for 20 min. Afterwards, they were asked to answer a short survey about their experiences during game-play, after which they conducted a Stroop task with 24 trials to measure ego depletion (Gailliot et al. 2007).

The game, freerice.com, is simple and straightforward: the player is given a word and four alternatives, and one's task is to click on the synonymous word. The difference

between the two conditions was that only in the benevolence condition were the participants made aware of the benevolent impact of their gameplay.

For the benevolence condition the instructions were as follows:

This is a simple game where you will be asked to identify the correct synonym for the displayed word from four alternatives. For each answer you get right, the game automatically donates 10 grains of rice to the United Nations World Food Program. This food is distributed worldwide to those most in need. World Food Program is the world's largest humanitarian organization fighting hunger, and it helps over 90 million people in 75 countries. This means that by playing the game, you can make a real-life contribution to world poverty and society at large.

In addition, in benevolence condition there was a banner on the screen above the game stating 'For each answer you get right, we donate 10 grains of rice to the World Food Program to help end hunger.' On the right of the game area the site listed how many grains of rice the participant had donated in total.

For the control condition, the instructions read:

This is a simple game where you will be asked to identify the correct synonym for the displayed word from four alternatives. For each answer you get right, your points will increase. See how many points you can get.

The participant in the control condition used the same website and game, but the website was altered so that all information about rice donation was hidden. After each session, participants in the control condition were asked whether they knew about freerice.com and 12 participants reported hearing about it before. As a control measure, we wanted to see whether this knowledge would affect the results and thus below we report any differences to the main results that resulted from omitting these 12 participants from the analysis. The game itself was otherwise the same for both groups, the only difference was whether information about rice donation was disclosed or hidden.

Measures

Well-being

Several variables assessed well-being after the task in this post-only experimental design. *Positive and negative affect* were measured using Scale of Positive and Negative Experience (SPANE; Diener et al. 2010) which asks the subjects the extent to which they are experiencing 6

positive (e.g. happy, pleasant, $\alpha = .93$), and 6 negative emotions (e.g. sad, unpleasant, $\alpha = .94$) on a scale from 1 (Very rarely or never) to 5 (Very often or Always). *Vitality* was assessed using five items ($\alpha = .92$) from Subjective Vitality Scale (SVS; Ryan and Frederick 1997). *Interest/enjoyment* was assessed with two items (I enjoyed the challenges this game provided & I would be interested in playing this game again, $\alpha = .85$) taken from Sheldon and Filak (2008), and rated on a scale from 1 to 7. *Subjective meaningfulness* of the experience was assessed with two items used by King and Hicks (2009) ("The event was very meaningful to me"; "This was a very significant experience to me", $\alpha = .92$) using ratings from 1 (not at all true) to 7 (very true).

Benevolence

Benevolence Scale (Martela and Ryan 2015) was used in the present study as a manipulation check. The scale assesses sense of prosocial impact and has four items (e.g. "My actions have a positive impact on the people around me", $\alpha = .85$) rated on a scale from 1 (not at all true) to 7 (very true). The participants were asked to 'Think about how you felt during the gameplay' in rating these items.

Need satisfaction

For satisfaction of the three basic psychological needs for autonomy, competence, and relatedness, the satisfaction items from the Basic Need Satisfaction and Frustration Scales (Chen et al. 2015) were used. The participants were asked to 'Think about how you felt during the gameplay' and rate four items measuring satisfaction of each of the three needs (e.g. "I feel my choices express who I really am" for autonomy, $\alpha = .87$, "I feel capable at what I do" for competence, $\alpha = .93$, and "I feel connected with people who care for me, and for whom I care" for relatedness, $\alpha = .91$). Furthermore, the four items for autonomy frustration from the same scale (e.g. "The activity felt like an obligation", $\alpha = .91$) were used to assess how much the participants felt controlled through external pressures. Items were rated on a scale from 1 (not at all true) to 7 (very true).

Outcomes

The Stroop task has been widely used as a standard measure of ego depletion (e.g. Gailliot et al. 2007; Job et al. 2010; Kazén et al., in press). In the present version, a word (e.g. red, blue, green) appeared on the screen and participants were instructed to click on the corresponding button based on the color of the letters of the word (e.g. red, blue, green). Participants completed 12 congruent (e.g. word red

in red color) and 12 incongruent (e.g. word *red* in green color) trials in random order. A difference score was calculated by subtracting the average congruent trial time from average incongruent trial time to find out how much longer did it take for participants to answer on incongruent trials (DeWall et al. 2008; Richeson and Trawalter 2005). The assumption behind the measure is that overriding the initial response in incongruent words requires self-control and thus participants who are depleted take longer on trials. *Task performance* was measured with the number of correct answers the participants got in total during the gameplay.

Results

Main analysis

Means, standard deviations and zero-order correlations of study variables are shown in Table 1. Initial analysis showed that there were no gender differences on any of the variables studied, so gender was not considered further. As regards the difference between the study conditions, means, confidence intervals, standard deviations and test statistics for differences between the two conditions for well-being outcomes, psychological needs, behavioral results and manipulation check are shown in Table 2. As can be seen, the sense of beneficence participants experienced differed significantly between the two conditions ($M = 8.5$ vs. $M = 19.9$) so the manipulation was deemed successful in increasing participants’ sense of prosocial impact. There was no difference in interest/enjoyment in the game between the two conditions.

As regards the psychological needs and well-being outcomes, there was a significant difference in the expected direction between the two conditions in all three basic psychological need satisfactions, as well as in positive affect, and sense of meaningfulness. As regards behavioral outcomes, there was not any significant difference in the task performance of the participants. However, there was a significant difference in the subsequent Stroop task performance, with people in the benevolence condition demonstrating better performance in that task. Corresponding to this there was also a marginally significant ($p = .053$) effect of condition on vitality, with those in the benevolence condition higher in self-reported energy after the task. The results thus support the hypothesis that even anonymous forms of being benevolent can increase positive affect, vitality, and meaningfulness of the experience, as well as performance on a subsequent Stroop task.

As an additional check on the robustness of these main results, we next removed the 12 participants in the control condition who indicated that they had heard about freerice

Table 1 Means, standard deviations, and zero-order correlations of the study variables across conditions

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Positive affect	17.20	5.34	-												
2. Negative affect	9.65	4.44		-.41**											
3. Interest/enjoyment	9.78	3.01			.59**										
4. Vitality	17.26	6.71				.71**									
5. Meaning	5.92	3.22					.60**								
6. Feeling controlled	11.24	5.85						.60**							
7. Benevolence	13.61	7.89							.43**						
8. Autonomy	13.14	5.61								.33**					
9. Competence	18.37	5.48									.35**				
10. Relatedness	11.43	6.14										.47**			
11. Task performance	185	35.8											.65**		
12. Stroop task	217.5	223.3												.13	
13. Experimental condition															

In Stroop task lower scores mean better performance. In experimental condition positive correlation means positive correlation with benevolence condition
 * Correlation is significant at the .05 level; ** correlation is significant at the .01 level

Table 2 Means, SD's, CI's and difference statistics of measured variables in benevolence and control conditions

	Control condition (n = 42)			Benevolence condition (n = 34)			Difference	
	M	CI	SD	M	CI	SD	t(72)	p*
Positive affect	15.93	[14.27, 17.58]	5.31	18.77	[17.02, 20.51]	5.01	2.37	.020
Negative affect	10.45	[9.00, 11.91]	4.67	8.62	[7.23, 10.01]	3.99	−1.82	.073
Interest/enjoyment	9.41	[8.36, 10.45]	3.34	10.24	[9.36, 11.11]	2.51	1.20	.234
Vitality	15.93	[13.88, 17.97]	6.56	18.91	[16.60, 21.22]	6.62	1.96	.053
Meaning	4.81	[4.02, 5.60]	2.53	7.29	[6.08, 8.50]	3.47	3.61	.001
Feeling controlled	11.64	[9.80, 13.49]	5.93	10.74	[8.71, 12.76]	5.80	−.67	.505
Benevolence	8.55	[6.87, 10.23]	5.39	19.85	[17.86, 21.84]	5.70	8.86	<.001
Autonomy	11.81	[10.13, 13.49]	5.38	14.79	[12.87, 16.72]	5.53	2.38	.020
Competence	16.86	[15.28, 18.44]	5.07	20.24	[18.33, 22.14]	5.46	2.79	.007
Relatedness	9.19	[7.52, 10.86]	5.37	14.21	[12.12, 16.29]	5.97	3.85	<.001
Task performance	1909	[1792, 2025]	373	1777	[1662, 1892]	330	−.61	.112
Stroop task	271	[194.5, 347.2]	245	152	[90.6, 212.5]	175	−2.39	.020

* Two tailed *p* values

before. The difference between conditions for positive affect, meaning, benevolence and the three psychological needs remained significant even in this situation, the difference between conditions on vitality became significant ($p = .009$), while the difference in Stroop task performance approached significance ($M = 254$ vs. $M = 152$, $t = 1.759$, $p = .084$).

Do three psychological needs mediate the relations between condition and well-being?

Next, we wanted to see if the satisfaction of the three needs would mediate the relations between experimental condition and well-being outcomes. For this purpose, we used PROCESS macro Model 4, which conducts a mediation analysis for multiple mediators (Hayes 2013). Using positive affect as the outcome variable, the results showed that the paths from condition to autonomy ($B = 2.98$, $SE = 1.26$, $p = .020$), competence ($B = 3.38$, $SE = 1.21$, $p = .007$), and relatedness ($B = 5.02$, $SE = 1.30$, $p < .001$) were all significant. Also, the paths from autonomy ($B = .249$, $SE = .115$, $p = .034$) and competence ($B = .482$, $SE = .096$, $p < .001$) to positive affect were significant. The path from relatedness to positive affect was not significant ($B = .108$, $SE = .098$, $p = .271$). The direct path from condition to positive affect was rendered insignificant ($B = -.077$, $SE = .915$, $p = .933$), indicating full mediation. The bootstrapping for indirect effects showed that the total indirect effect (2.91 CI [1.16, 5.14]), as well as the indirect effects through autonomy (.743 [.060, 1.984]) and competence (1.628 [.525, 3.402]) were significant, while the indirect effect through relatedness (.543 [−.404, 1.673]) was not significant. Similar mediation analyses with meaning and vitality as outcome variables showed that in both cases the effect of condition on well-

being was fully mediated by the psychological needs, and that the indirect effects through autonomy and competence were significant, while the indirect effect through relatedness was not significant.

As a control measure, we conducted similar mediation analyses using two independent variables: experimental condition and task performance. The analyses were done with MEDIANTE macro that allows multiple independent variables (Hayes and Preacher 2014) and their results showed that even in this situation the experimental condition had a significant total effect on all three well-being indicators and that the indirect effects through autonomy and competence remained significant.

Discussion

The results of this study provide causal evidence to show that benevolent acts lead to increased positive affect and meaningfulness of the experience, and marginally increased vitality. As other elements of the conditions were held constant and no direct contact with the recipient of prosocial behavior was possible, this gives more direct evidence that it indeed was the benevolent nature of these acts that improved well-being. Further, the present study went beyond self-report measurements to show that including a benevolent component into an experimental game led to improved performance on a subsequent Stroop task, which has been used in past studies as a measure of ego depletion (e.g. Gailliot et al. 2007). This result seems to indicate that benevolent game-play was less draining for the players, and subsequently they performed better during the Stroop task compared to controls.

The study also examined psychological need satisfaction as potential mediators of these positive effects of the prosocial condition on well-being. The results showed that the three psychological needs fully mediated the relations between experiential condition and well-being outcomes: positive affect, vitality, and meaningfulness. This pattern is consistent with Weinstein and Ryan (2010) who suggested that benevolent acts satisfy all three basic psychological needs. An analysis of the indirect effects indicated that it was especially the sense of autonomy and competence that were responsible for this mediation.

As regards the manipulation used in the current study it is interesting to note that it incurred no cost to the benefactor. Some definitions of altruistic behavior include the requirement that the helping must be costly to the benefactor (e.g. Krebs 1982). However, as the focus of the present study was on the benefits received by the recipient, and the well-being gains this might have on the benefactor, the presence or absence of costs is not a central question here (cf. Schroeder and Graziano 2015). Nevertheless, it would be important in future studies to look whether the same positive effect is found also when the benefactor engages in more costly forms of helping.

It is also worth noting that Gray (2010) reported three studies that tested whether doing good or evil acts would increase people's sense of agency, strength, and capacity for self-control. In two of the three studies only doing good was tested, and in each case doing good resulted in increased strength or self-control in holding a weight or squeezing a hand grip. In one study (study 2) people were asked to write about themselves doing good or doing harm to others and in that study both conditions resulted in greater strength in holding a weight. Writing about doing good was associated with more positive affect, writing about harm with greater guilt. Yet in none of the studies or conditions did affect account for the strength outcome. Since the strength tasks have been used as depletion measures in some past studies, the implication of this for the current study is that the effects of prosocial behavior on mood and on Stroop task as a measure of ego depletion may well represent two separate effects.

The present study makes a number of contributions to research on the well-being effects of prosocial behavior. In addition to involving no contact with the recipient of help, and including a wider range of outcome variables than most prior studies, it also shows how prosocial behavior has a positive impact on a behavioral measure, in this case performance on a Stroop task. This provides evidence for suggesting that prosocial behavior is less ego depleting and can even be energizing for those engaged in it (see also Muraven et al. 2008). The paper is also a methodological advance as it demonstrates a new way to manipulate prosocial behavior in a way that doesn't involve any face-

to-face interaction with the beneficiary. In addition, the positive effects in the absence of potential reciprocity have implications for evolutionary theorizing (e.g., Hawley 2014; Ryan and Hawley, in press). In sum, the present study strengthens the case for suggesting that prosocial behavior indeed can enhance well-being and energy, even without contact with the beneficiary.

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References

- Aknin, L. B., Barrington-Leigh, C. P., Dunn, E. W., Helliwell, J. F., Burns, J., Biswas-Diener, R., et al. (2013a). Prosocial spending and well-being: Cross-cultural evidence for a psychological universal. *Journal of Personality and Social Psychology*, *104*(4), 635–652.
- Aknin, L. B., Dunn, E. W., Sandstrom, G. M., & Norton, M. I. (2013b). Does social connection turn good deeds into good feelings? On the value of putting the “social” in prosocial spending. *International Journal of Happiness and Development*, *1*(2), 155–171. doi:[10.1504/IJHD.2013.055643](https://doi.org/10.1504/IJHD.2013.055643).
- Aknin, L. B., Dunn, E. W., Whillans, A. V., Grant, A. M., & Norton, M. I. (2013c). Making a difference matters: Impact unlocks the emotional benefits of prosocial spending. *Journal of Economic Behavior & Organization*, *88*, 90–95.
- Aknin, L. B., Fleerackers, A. L., & Hamlin, J. K. (2014). Can third-party observers detect the emotional rewards of generous spending? *The Journal of Positive Psychology*, *9*(3), 198–203. doi:[10.1080/17439760.2014.888578](https://doi.org/10.1080/17439760.2014.888578).
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497–529.
- Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Deeder, J., et al. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*(2), 216–236.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268.
- DeWall, C. N., Baumeister, R. F., & Vohs, K. D. (2008). Satiated with belongingness? Effects of acceptance, rejection, and task framing on self-regulatory performance. *Journal of Personality and Social Psychology*, *95*(6), 1367–1382. doi:[10.1037/a0012632](https://doi.org/10.1037/a0012632).
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research*, *97*(2), 143–156.
- Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., et al. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology*, *92*(2), 325–336.
- Gray, K. (2010). Moral transformation: Good and evil turn the weak into the mighty. *Social Psychological and Personality Science*, *1*(3), 253–258.
- Harbaugh, W. T., Mayr, U., & Burghart, D. R. (2007). Neural responses to taxation and voluntary giving reveal motives for charitable donations. *Science*, *316*(5831), 1622–1625.

- Harris, M. B. (1977). Effects of altruism on mood. *The Journal of Social Psychology, 102*(2), 197–208.
- Hawley, P. H. (2014). Evolution, prosocial behavior, and altruism: A roadmap for understanding where the proximate meets the ultimate. In L. Padilla-Walker & G. Carlo (Eds.), *Prosocial development: A multidimensional approach* (pp. 43–69). Oxford: Oxford University Press.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology, 67*, 451–470.
- Job, V., Dweck, C. S., & Walton, G. M. (2010). Ego depletion—is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science, 21*(11), 1686–1693. doi:10.1177/0956797610384745.
- Kazén, M., Kuhl, J., & Leicht, E.-M. (2015). When the going gets tough...: Self-motivation is associated with invigoration and fun. *Psychological Research*. doi:10.1007/s00426-014-0631-z.
- King, L. A., & Hicks, J. A. (2009). Detecting and constructing meaning in life events. *The Journal of Positive Psychology, 4*(5), 317–330. doi:10.1080/17439760902992316.
- Krebs, D. (1982). Psychological approaches to altruism: An evaluation. *Ethics, 92*, 447–458.
- Martela, F., & Ryan, R. M. (2015). The benefits of benevolence: Basic psychological needs, beneficence, and the enhancement of well-being. *Journal of Personality*. doi:10.1111/jopy.12215.
- Muraven, M., Gagné, M., & Rosman, H. (2008). Helpful self-control: Autonomy support, vitality, and depletion. *Journal of Experimental Social Psychology, 44*(3), 573–585.
- Piliavin, J. A. (2003). Doing well by doing good: Benefits for the benefactor. In C. L. Keyes, J. Haidt, & M. E. P. Seligman (Eds.), *Flourishing: Positive psychology and the life well-lived* (pp. 227–247). Washington, DC: American Psychological Association.
- Post, S. G. (2005). Altruism, happiness, and health: It's good to be good. *International Journal of Behavioral Medicine, 12*(2), 66–77.
- Poulin, M. J., Holman, E. A., & Buffone, A. (2012). The neurogenetics of nice receptor genes for oxytocin and vasopressin interact with threat to predict prosocial behavior. *Psychological Science, 23*(5), 446–452.
- Richeson, J. A., & Trawalter, S. (2005). Why do interracial interactions impair executive function? A resource depletion account. *Journal of Personality and Social Psychology, 88*(6), 934–947.
- Ryan, R. M., & Deci, E. L. (2008). From ego depletion to vitality: Theory and findings concerning the facilitation of energy available to the self. *Social and Personality Psychology Compass, 2*(2), 702–717.
- Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality, 65*(3), 529–565.
- Ryan, R. M., & Hawley, P. (in press). Naturally good? Basic psychological needs and the proximal and evolutionary bases of human benevolence. In M. Leary & K. W. Brown (Eds.), *The psychology of hypoegoic behavior*. New York: Guilford Press.
- Schroeder, D. A., & Graziano, W. G. (2015). The field of prosocial behavior: An introduction and overview. In D. A. Schroeder & W. G. Graziano (Eds.), *The Oxford handbook of prosocial behavior* (pp. 3–34). Oxford: Oxford University Press.
- Shariff, A. F., & Norenzayan, A. (2007). God is watching you priming god concepts increases prosocial behavior in an anonymous economic game. *Psychological Science, 18*(9), 803–809.
- Sheldon, K. M., & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *British Journal of Social Psychology, 47*(2), 267–283.
- 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.
- Williamson, G. M., & Clark, M. S. (1989). Providing help and desired relationship type as determinants of changes in moods and self-evaluations. *Journal of Personality and Social Psychology, 56*(5), 722–734.