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Highlighting Relatedness Promotes Prosocial Motives and Behavior

Louisa Pavey[1], Tobias Greitemeyer[2], and Paul Sparks[3]

Abstract

According to self-determination theory, people have three basic psychological needs: relatedness, competence, and autonomy. Of these, the authors reasoned that relatedness need satisfaction is particularly important for promoting prosocial behavior because of the increased sense of connectedness to others that this engenders. In Experiment 1, the authors manipulated relatedness, autonomy, competence, or gave participants a neutral task, and found that highlighting relatedness led to higher interest in volunteering and intentions to volunteer relative to the other conditions. Experiment 2 found that writing about relatedness experiences promoted feelings of connectedness to others, which in turn predicted greater prosocial intentions. Experiment 3 found that relatedness manipulation participants donated significantly more money to charity than did participants given a neutral task. The results suggest that highlighting relatedness increases engagement in prosocial activities and are discussed in relation to the conflict and compatibility between individual and social outcomes.

Keywords

relatedness, priming, prosocial behavior, volunteering, self-determination theory

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The relation between individual and societal welfare represents a long-standing concern within the history of social thought (Graumann, 1988; Smith, 1993). Although some perspectives point to the apparent conflict between individual and societal benefit (e.g., Dawes, 1980), other positions indicate possibilities for the alignment of individual and social interests (e.g., Mansbridge, 1990). Further to this, empirical research has found that prosocial behavior such as voluntary work and charity giving benefit the actor as well as the recipient (Thoits & Hewitt, 2001; Weinstein & Ryan, 2010). Social psychology has long been interested in people's motives for prosocial behavior and the extent to which it is enacted for selfish versus altruistic reasons (e.g., Aderman & Berkowitz, 1970; Batson et al., 1988; Hoffman, 1981; Pomazal & Jaccard, 1976). More recently, research has focused on investigating people's motivation for helping others (e.g., Finkelstein, Penner, & Brannick, 2005; Gebauer, Riketta, Broemer, & Maio, 2008; Grant, 2008) and on determining the extent to which various demographic variables and personality traits predict engagement in prosocial activity (see Penner, Dovidio, Piliavin, & Schroeder, 2005, for a review). A further important and pressing issue is how one can actively encourage prosocial behavior.

One useful way in which social benefits might be achieved is via the promotion of individuals' feelings of connectedness toward others. Research indicates that people have a fundamental need for belonging (Baumeister & Leary, 1995), which when unsatisfied (e.g., through social exclusion) leads to increases in violence and aggression (Twenge, Baumeister, Tice, & Stucke, 2001) and reductions in cooperative and prosocial behavior (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). Other research has shown that when people are reminded of connectedness to others, they show a reduction in aggressive tendencies (Twenge, Zhang, et al., 2007).

One theory that suggests there is a fundamental and universal human need for relatedness is self-determination theory (SDT; Deci, 1980; Deci & Ryan, 1985; Ryan & Deci, 2000a). SDT proposes that people have three basic psychological needs: *relatedness, competence*, and *autonomy* (Deci & Ryan, 2000; Ryan, 1995). Relatedness is the extent to which a person feels connected to the people around him or her, competence is the extent to which a person feels capable of achieving his or her goals, and autonomy is the extent to which decisions and actions emanate from a person's integrated self

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rather than being the product of external influence or coercion (Ryan & Deci, 2000a, 2006; Sheldon, Elliot, Kim, & Kasser, 2001). SDT suggests that these needs are as essential to our psychological health as food, water, and shelter are to our physical health (Ryan & Deci, 2000b). Greater satisfaction of the needs for relatedness, autonomy, and competence are suggested to lead to optimal psychological functioning, fostering growth, integration, and constructive social development (Ryan & Deci, 2000a), with need satisfaction motivating greater engagement in further need-satisfying experiences. Empirical evidence shows that greater relatedness, autonomy, and competence satisfaction is indeed positively related to well-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sheldon & Elliot, 1999), happiness (Sheldon, Ryan, & Reis, 1996), and vitality (Nix, Ryan, Manly, & Deci, 1999).

Using a correlational design, Gagné (2003) showed that people's self-reported relatedness, autonomy, and competence were associated with greater engagement in prosocial activities such as donating to charity, volunteering, recycling, and blood donation. Weinstein and Ryan (2010) also reported associations between feelings of autonomy and relatedness satisfaction and prosocial tendencies. However, as with all correlational research, the direction of influence within these relations cannot be inferred. It is therefore important to examine the causal relation between need fulfillment and prosocial tendencies using experimental methods.

Moreover, it may be that some of the three basic psychological needs are more predictive of prosocial outcomes than are others. Relatedness need satisfaction is likely to be particularly important for promoting prosocial behavior because of the increased sense of connectedness to others that this engenders, and the current three experiments investigate the extent to which experimentally increasing feelings of relatedness can influence prosocial motives and behavior. We expected relatedness satisfaction to be more important in motivating acts of kindness toward others than would satisfaction of autonomy and competence, as relatedness directly concerns the extent to which people form strong social relationships and have a sense of community (Ryan & Deci, 2000a). SDT also suggests that when a particular need is satisfied, this may lead to further engagement with experiences that satisfy that need (Ryan & Deci, 2000a). For example, research has shown that satisfaction of the need for relatedness leads to incremental valuing of relatedness experiences (Moller, Deci, & Elliott, 2010). Therefore, if people are given an opportunity to feel that their need for relatedness is satisfied, this may motivate further engagement with prosocial action, which satisfies people's relatedness needs. It is therefore expected that increasing relatedness will elicit greater prosocial tendencies.

Previous research has shown that security of attachment can be experimentally primed to increase prosocial tendencies (Mikulincer & Shaver, 2005). La Guardia, Ryan, Couchman, and Deci (2000) demonstrated that SDT relatedness was a stronger predictor of secure attachment than was autonomy or competence, and research by Mikulincer and Shaver (2003, 2005) has demonstrated the importance of secure attachments in the development of prosocial tendencies. However, SDT theorists (e.g., Ryan, Brown, & Creswell, 2007) have suggested that security of attachment is just one aspect of positive relational experiences and that a broader conceptualization of relatedness is possibly more important for determining positive outcomes.

Recent experimental research has also indicated that it may be possible to prime people's autonomous motivation orientation and directly influence outcome measures such as more autonomous functioning (Levesque, Copeland, & Sutcliffe, 2008; Levesque & Pelletier, 2003), less self-handicapping (Hodgins, Yacko, & Gottlieb, 2006), less defensive self-esteem (Hodgins, Brown, & Carver, 2007), and greater acceptance of threatening health-risk information (Pavey & Sparks, in press), using sentence unscrambling methodology. Need-supportive instructions for a task have also been found to influence subsequent enjoyment and performance (Sheldon & Filak, 2008). The current research combines aspects of this previous methodology to determine whether temporarily increasing feelings of relatedness need satisfaction might elicit positive effects on prosocial tendencies.

Identifying causal relations could help inform interventions aimed at promoting prosocial behavior through accentuating satisfaction of the need for relatedness as outlined in SDT. In addition, the notion that promoting feelings of relatedness may lead to greater prosocial behaviors fits with the wider SDT framework (Ryan & Deci, 2000a) that suggests that need satisfaction fosters a tendency toward growth, positive social development, and integrated psychological functioning (Hodgins & Knee, 2002; Ryan & Brown, 2003). The three experiments will enable conclusions to be drawn about the extent to which increasing feelings of relatedness satisfaction can elicit prosocial tendencies. The research also represents an important theoretical and methodological advance in our understanding of how feelings of basic psychological need satisfaction can be experimentally manipulated to affect motivation and behavior.

Experiment 1

In Experiment 1, a task in which words associated with relatedness, autonomy, and competence were embedded in sentences, in addition to tailored instructions for the task, aimed to manipulate each of these constructs. The accessibility of relatedness, autonomy, and competence words (measured using a word stem completion exercise) following the tasks served as manipulation checks. The effects of the manipulations on participants' intentions to undertake volunteer work for a charity and their interest in volunteering were then recorded. We predicted that the relatedness, autonomy, and competence manipulations would increase the cognitive accessibility of each prime-related construct. We further predicted that participants in the relatedness manipulation

condition would report greater intentions to undertake volunteer work and greater interest in volunteering than would those in the other conditions.

Method

Design. An independent measures design was employed in which participants were randomly assigned to the relatedness manipulation, autonomy manipulation, competence manipulation, or neutral conditions and completed a battery of measures presented in an online questionnaire.

Participants. Participants were female psychology undergraduate students ($N = 155$) who participated for partial fulfillment of course requirements. Ages ranged from 19 to 46 ($M = 21.30$, $SD = 5.08$).

Materials and Procedure

Participants completed the questionnaire on individual PCs in a computer lab with between 20 and 40 participants in each group. Participants were asked to click on a URL link to an online questionnaire, which redirected them to one of the four experimental conditions. They were not given information about the study before taking part and were only told that the questionnaire would consist of a series of questions and cognitive tasks taking approximately 10 min to complete. Participants then completed the following measures in the order they are presented here.

Relatedness, autonomy, and competence manipulations. Depending on condition, relatedness, autonomy, and competence were manipulated using an implicit priming task in addition to two sets of tailored instructions. The implicit priming task was a sentence unscrambling task, adapted from that used by Levesque and Pelletier (2003). Participants were given a list of 20 sets of five words, with 15 sets containing words associated with either relatedness (e.g., *community, together, connected, relationship*), autonomy (e.g., *freedom, choice, preference, opportunity*), competence (e.g., *capable, skilled, expert, competent*), or neutral words (e.g., *book, tablecloth, lamp, shoe*).[1] The remaining 5 sets of words were neutral in all conditions. Participants were asked to make a sentence out of four of the five words in each set and to type out the four-word sentence underneath the five words in a box provided (e.g., the words "is to here served lunch" could be written as "lunch is served here"). Previous research has demonstrated that participants are unaware of the purpose of such tasks (Pavey & Sparks, in press).

In addition to the content of the priming task, the instructions for the task (adapted from Sheldon & Filak, 2008) were tailored to each condition, with words associated with either autonomy, competence, or relatedness implanted in the instructions. The autonomy priming task instructions read,

> Please feel free to complete the sentences in any way you choose (as long as the sentence makes sense). Just play around with the words in your head and see how they best fit together. There are no wrong answers, and many people find this task interesting and enjoyable.

Instructions for the competence priming task read,

> There is a lot of diversity in people's ability to complete this task and lots of people find it quite difficult. However, the task often gives people a sense of achievement and shows that they are capable of completing even challenging tasks.

Instructions for the relatedness priming task read,

> The researchers who developed this task are interested in your unique language style, and really appreciate and value your input. Do as best you can on your own, but please feel free to ask questions at any time; we are here to help and support you if you feel you need it.

The instructions for the word completion task (detailed below) were also tailored to condition to strengthen the manipulation effect: autonomy manipulation condition: "There are several correct ways of completing the words, but please enter the first thing that comes to mind"; competence manipulation condition: "Lots of people find it quite difficult, but just do the best you can"; relatedness manipulation condition: "We are here to help if you get stuck, and really value your effort on this task." The manipulation therefore consisted of three elements: (a) the instructions for the sentence unscrambling task, (b) the sentence unscrambling task, and (c) the instructions for the manipulation check.

Word completion task. Participants were given 12 word stem completion exercises (developed for this study). This involved part of a word being shown to participants, who were then asked to complete the word using the first solution that came to mind. Each word had several possible correct answers (e.g., *re _ _ te* could be written as *recite, remote*, or *relate*). Three of the solutions could potentially be words that were associated with relatedness (*connect, relate*, and *share*), three associated with autonomy (viz., *decide, free*, and *select*), and three associated with competence (*expert, skill*, and *clever*). Three were neutral words (*apple, book*, and *plant*). Participants therefore received a score of 0 to 3 for the relatedness, autonomy, and competence manipulation checks depending on the number of relevant words they completed.

Intentions to volunteer. Participants were asked, "To what extent do you intend to do volunteer work for a charity over the next six weeks?" (rated on a scale from 1 = *definitely will not do this* to 7 = *definitely will do this*).

Interest in volunteering. Participants were given a list of five types of volunteer work—"working with the elderly," "wildlife conservation," "fundraising activities," "working with people with disabilities," and "other (please specify)"—and

Table 1. Experiment 1: Descriptive Statistics

	Relatedness (n = 38)		Autonomy (n = 41)		Competence (n = 40)		Neutral (n = 36)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Accessibility of relatedness words	2.29_a	0.65	1.49_b	0.81	1.40_b	0.81	1.33_b	1.04
Accessibility of autonomy word	0.16_a	0.28	0.32_a	0.47	0.20_a	0.41	0.08_b	0.28
Accessibility of competence words	1.25_a	0.81	1.44_a	0.55	1.63_b	0.81	1.25_a	0.81
Intentions to volunteer	4.11_a	2.19	2.98_b	1.97	3.38_a	1.98	3.42_a	1.96
Interest in volunteering	2.50_a	1.47	1.88_b	1.31	1.90_{ab}	1.39	1.92_{ab}	1.30

Note: Using post hoc comparisons, means with different subscript letters within a row are significantly different at $p < .05$.

were asked to check boxes next to those which they would be interested to take part in. The number of boxes ticked (0-5) served as the measure of interest in volunteering.

Results

The means and standard deviations of each variable in each condition, and significant cell differences, are shown in Table 1. Planned contrasts were conducted to determine whether participants in the relatedness manipulation, autonomy manipulation, and competence manipulation conditions completed a greater number of words associated with the respective construct, compared to participants in the other three conditions. Participants in the relatedness manipulation condition completed a significantly greater number of words associated with relatedness ($M = 2.29$, $SD = 0.65$) than did participants in the three other conditions ($M = 1.41$, $SD = 0.88$), $t(151) = 5.65$, $p < .001$. Participants in the competence manipulation condition completed a significantly greater number of the three words associated with competence ($M = 1.63$, $SD = 0.81$) than did those in the other three conditions ($M = 1.32$, $SD = 0.68$), $t(151) = 2.34$, $p = .021$. The only word related to autonomy to differ because of condition was the word *select*; participants in the autonomy manipulation condition completed this word more often ($M = 0.32$, $SD = 0.47$) than did participants in the other three conditions ($M = 0.15$, $SD = 0.36$), $t(151) = 2.39$, $p = .018$. We were therefore satisfied that the manipulations were successful.

To test our hypothesis that participants in the relatedness prime condition would report greater interest in volunteering than would those in the other three conditions, planned contrasts were conducted. Participants in the relatedness prime condition showed greater interest in volunteering ($M = 2.50$, $SD = 1.47$) than did those in the other three conditions ($M = 1.90$, $SD = 1.32$), $t(151) = 2.36$, $p = .020$. This analysis was repeated for participants' intentions to volunteer: Participants in the relatedness prime condition reported greater intentions to volunteer ($M = 4.11$, $SD = 2.19$) than did those in other three conditions ($M = 3.25$, $SD = 1.96$), $t(151) = 2.24$, $p = .026$. There were no significant differences in interest in volunteering between the autonomy prime and other (competence and neutral) conditions, $t(151) = -0.12$, $p = .909$, or between the competence prime and other (autonomy and neutral) conditions, $t(151) = 0.01$, $p = .992$, and no significant differences in intentions to volunteer between the autonomy prime and other (competence and neutral) conditions, $t(151) = -1.07$, $p = .287$, or between the competence prime and other (autonomy and neutral) conditions, $t(151) = 0.45$, $p = .652$.

Discussion

The results showed that participants in the relatedness manipulation condition reported greater intentions to volunteer and interest in volunteering than did those in the other three conditions combined, suggesting that the simple procedure of highlighting participants' feelings of relatedness toward others was sufficient to motivate them to act more prosocially in the future. When each was compared with the remaining two conditions, neither autonomy nor competence manipulations led to greater volunteer interest or intentions. Experiment 1 reports evidence to suggest that the three basic psychological needs (as outlined by SDT) can be manipulated to enhance the accessibility of words related to people's feelings of need satisfaction. This represents a useful methodological advance, and this experimental design allows stronger evidence for the causal effect of the three basic psychological needs and outcome measures to be obtained.

Although we found the hypothesized effects of the relatedness manipulation condition on participants' interest in volunteering and prosocial intentions, the study did not investigate the mediating mechanisms between highlighting relatedness and prosocial intentions. We suspected that the relatedness manipulations might have increased feelings of connectedness to others, which in turn evoked prosocial intentions, but this was not tested. Further to this, we expected that highlighting relatedness would affect a wide range of prosocial outcomes; however, in this study we examined the effects of relatedness on only one prosocial intention (namely, the intention to volunteer). Thus, in

developing this research, it was important to subsequently assess whether the effects of increasing relatedness on prosocial intention were limited to volunteering or whether they generalized to other prosocial domains. Finally, it also was not known whether similar effects would be found using a different procedure to activate the relatedness concept; examining the effects of a different relatedness manipulation would enable further generalization of the results. These issues were addressed in Experiment 2.

Experiment 2

Experiment 2 used a different manipulation of relatedness, autonomy, and competence from that used in Experiment 1 and assessed whether this would have a similar effect on participants' prosocial tendencies. Participants were asked to write about times in the past that they had experienced relatedness, autonomy, or competence, and to complete measures of a range of prosocial intentions. Rather than relying only on intentions to engage in one prosocial behavior (as in Experiment 1), participants' intentions to carry out five different prosocial behaviors were assessed. By so doing, we sought to investigate whether the effects of relatedness on prosocial outcomes could be generalized beyond the domain of volunteering.

In addition, participants' feelings of connectedness were measured. Thwarting the need to belong may decrease helping (Twenge, Baumeister, et al., 2007) and increase aggression (Twenge et al., 2001), whereas increasing feelings of social connectedness may reduce aggression (Twenge, Zhang, et al., 2007). Accordingly, we expected the effects of relatedness on prosocial behaviors to be (at least partly) caused by a heightened feeling of connectedness toward others, reflected in greater feelings of care and respect for others, and in experiencing a stronger sense of identification with others. Experiment 2 aimed to determine whether feelings of connectedness would indeed mediate the effects of a relatedness manipulation on prosocial intentions.

Method

Design. An independent measures design was employed in which participants were randomly allocated to the relatedness salience, autonomy salience, competence salience, or neutral condition and completed questionnaire measures presented online.

Participants. Participants were recruited from a university participant pool ($N = 77$; 60 females and 17 males) and were entered into a prize drawing to win one of four £25 prizes as an incentive for completing the study. Ages ranged from 19 to 54 ($M = 24.32$, $SD = 6.55$).

Materials and Procedure

Participants were emailed a link to an online questionnaire titled "Questionnaire About Self and Others" that randomly assigned them to one of the four experimental conditions. Participants were told that the questionnaire would ask them a series of questions about their personal experiences and behaviors. Participants were asked to follow the online instructions and to complete the measures in the order in which they were presented. At the end of the questionnaire, participants were asked their age and gender and were fully debriefed.

Relatedness, autonomy, and competence manipulations. The relatedness, autonomy, competence, and neutral manipulations were adapted from the self-affirmation materials constructed by Reed and Aspinwall (1998). Participants were asked to answer *yes* or *no* to eight questions about times in the past when they had experienced either relatedness (e.g., "Have you ever felt a strong bond with someone you spend time with?"), autonomy (e.g., "Have you ever felt free to do something your own way?"), or competence (e.g., "Have you ever felt competent in something you have done?"). If participants answered *yes*, they were asked to provide a short example. All participants responded *yes* to five or more of the questions. In the neutral condition, participants were asked to answer *yes* or *no* to eight inconsequential questions unrelated to the three needs (e.g., "I think that the color blue looks great on most people"). If they responded *yes*, they were asked to provide a reason why.

Manipulation check. Participants were asked three questions: "To what extent did the answers you gave remind you of times when you had felt close and connected to other people?" "To what extent did the answers you gave remind you of times when you had felt free and autonomous?" and "To what extent did the answers you gave about remind you of times when you had felt competent?" (rated on a scale from 1 = *not at all* to 7 = *very much*).

Connectedness. Six items measured participants' feelings of connectedness toward others: "At the present moment . . ." ". . . I feel a bond with other people"; ". . . I identify with other people"; " . . . I care for other people"; ". . . I am concerned about other people"; ". . . I am respectful of other people"; ". . . I feel protective towards other people" (rated on a scale from 1 = *strongly disagree* to 7 = *strongly agree*; $\alpha = .72$). These items were adapted from a scale examining connectedness to the natural environment (Sparks, Hinds, & Curnock, 2010).

Prosocial intentions. Participants were asked about the extent to which they intended to carry out five prosocial behaviors over the next 6 weeks: give money to charity, donate goods or clothes to a charity, go out of their way to help a friend in need, give up their time to do something that will benefit the community, and go out of their way to help a stranger in need. The five items showed good internal reliability ($\alpha = .70$) and were combined to provide a general measure of prosocial intentions.

Results

The means and standard deviations of each variable in each condition, and significant cell differences, are shown in

Table 2. Experiment 2: Descriptive Statistics

	Relatedness (n = 19)		Autonomy (n = 17)		Competence (n = 19)		Neutral (n = 22)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Relatedness manipulation check	6.47_a	0.84	4.35_b	1.62	4.05_b	1.75	3.41_b	1.92
Autonomy manipulation check	4.74_a	1.52	5.53_a	0.87	4.53_a	1.93	4.55_a	2.13
Competence manipulation check	5.37_a	1.42	5.41_a	1.46	5.26_a	1.56	3.14_b	1.98
Connectedness	5.64_a	0.56	4.79_b	0.81	5.27_a	1.01	5.30_a	0.83
Prosocial intentions	3.87_a	0.65	3.33_b	0.79	3.43_a	0.88	3.63_a	0.76

Note: Using post hoc comparisons, means with different subscript letters within a row are significantly different at $p < .05$.

Table 2. To check that our manipulations had been successful, planned contrasts were conducted. Participants in the relatedness condition felt that the answers they gave reminded them of times they had felt close and connected to other people to a greater extent ($M = 6.47$, $SD = 0.84$) than did participants in the other three conditions ($M = 3.90$, $SD = 1.80$), $t(73) = 5.99$, $p < .001$. Participants in the autonomy salience condition felt that the answers they gave reminded them of times they had felt autonomous to a marginally significant greater extent ($M = 5.53$, $SD = 1.46$) than did participants in the three other conditions ($M = 4.60$, $SD = 1.86$), $t(73) = 1.96$, $p = .054$. There was no significant difference between the competence salience condition and the other three conditions for the competence manipulation check item, $t(73) = 1.44$, $p = .144$. However, participants in the competence salience manipulation felt that the answers they gave reminded them of times they had felt competent to a greater extent ($M = 5.26$, $SD = 1.56$) than did participants in the neutral condition ($M = 3.14$, $SD = 1.98$), $t(73) = 4..14$, $p < .001$. We were therefore satisfied that the manipulations were successful.

To test our hypothesis that participants in the relatedness salience condition would report greater connectedness than would those in the other three conditions, planned contrasts were conducted. Participants in the relatedness condition reported greater feelings of connectedness ($M = 5.64$, $SD = 0.56$) than did those in the other three conditions ($M = 5.14$, $SD = 0.90$), $t(73) = 2.19$, $p = .032$. There was also an unexpected difference, with participants in the autonomy salience condition ($M = 4.52$, $SD = 0.88$) reporting less connectedness than those in the other (competence and neutral) conditions ($M = 5.18$, $SD = 0.98$), $t(73) = 2.56$, $p = .013$. There was no difference between the connectedness of those in the competence salience condition and the other (autonomy and neutral) conditions, $t(73) = -1.15$, $p = .254$.

Participants in the relatedness salience condition also reported greater prosocial intentions ($M = 3.87$, $SD = 0.65$) than did those in other three conditions ($M = 3.47$, $SD = 0.10$), $t(73) = 2.09$, $p = .040$. There was no difference between participants' intentions in the autonomy salience condition and in the other (competence and neutral) conditions, $t(73) = 0.93$, $p = .355$, and no difference between the intentions of those in the competence salience condition and the other (autonomy and neutral) conditions, $t(73) = 0.22$, $p = .823$.

Connectedness was tested as a mediator of the effect of the relatedness salience manipulation on prosocial intentions. A bootstrapping procedure (Preacher & Hayes, 2004) with $n = 5{,}000$ resamples revealed that the path from the relatedness versus other contrast to connectedness, $\beta = .17$, $t = 2.27$; the direct effect from connectedness to intentions, $\beta = .27$, $t = 2.72$ (controlling for the relatedness vs. other contrast); and the direct effect from the relatedness versus other contrast to intentions, $\beta = .14$, $t = 2.03$, were each significant (all ps $< .05$). The indirect effect of the relatedness vs. other condition on prosocial intentions via connectedness also proved significant, with a point estimate of 0.04, 95% bootstrap CI [0.013, 0.107]. This suggests connectedness mediated the effect of the relatedness salience manipulation on prosocial intentions.

Discussion

The results of Experiment 2 bolster the findings of Experiment 1 by showing that relatedness can be manipulated to increase prosocial intentions. As in Experiment 1, highlighting autonomy and competence did not elicit higher prosocial tendencies. Experiment 2 employed a different type of relatedness manipulation and tested its effect on a wider measure of prosocial intentions. Feelings of connectedness were shown to mediate the effects of the manipulation on prosocial intentions. This suggests that relatedness increased prosocial motivation and behavior through increased feelings of connectedness to others.

Interestingly, Experiment 2 found that the autonomy manipulation participants reported lower levels of connectedness than did participants in the other conditions, and lower levels of prosocial intentions than did participants in the relatedness condition. It is possible that our autonomy manipulation represented a somewhat crude activation of autonomy, which also activated the related but distinct constructs of independence or separation from others. The activation of these types of concepts may therefore have led to lower feelings of connectedness to others. It is also possible that autonomy may only be beneficial

to feelings of connectedness if highlighted in conjunction with relatedness.

The results of Experiments 1 and 2 are consistent with the notion that feelings of relatedness can influence our prosocial motivation. However, these studies relied on self-report measures of prosocial intentions and did not include behavioral measures. It may be that participants exaggerated their intentions to help others or that the relatedness manipulations would not be sufficient to elicit actual prosocial behavior. Experiment 3 therefore examined whether a relatedness manipulation might influence an objective measure of behavior. In this experiment, we also controlled for the effect of the manipulations on mood and empathy, as these are often associated with prosocial behaviors (e.g., Batson et al., 1997; Cunningham, 1979; Davis, 1983).

Experiment 3

Positive, relative to neutral, mood states have been shown to be associated with prosocial behavior (e.g., Cunningham, 1979). In addition, empathy is considered a strong predictor of people's prosocial actions (e.g., Batson et al., 1988, 1997; Davis, 1983). It is therefore possible that the effects of the relatedness manipulations on prosocial tendencies in Experiments 1 and 2 were due to increases in positive mood and/or empathy. Therefore, Experiment 3 investigated further the effect of a relatedness prime on prosocial behaviors, controlling for any impact of the prime on mood and empathetic concern. This would assess the possibility that the prime constituted a mood or empathy manipulation and would examine our proposal that it is relatedness and its association with connectedness (i.e., feeling a strong bond and identifying with others), rather than mood or empathetic concern, that is driving the effects. Note that in Experiments 1 and 2 we did not use an objective prosocial behavior measure but relied instead on participants' self-reports of their motivation. Thus, we felt it important to examine the effect of the relatedness prime on an objective behavior measure (donations to charity). We predicted that participants given the relatedness prime would donate to charity more of the money they earned for their participation in the study than would those in the neutral prime condition, even after controlling for mood and empathetic concern. Because there were no significant effects of competence and autonomy on prosocial tendencies in Experiments 1 and 2, we abstained from priming these needs in Experiment 3. Note also that because measuring a proposed mediator may affect a behavioral outcome (see Spencer, Zanna, & Fong, 2005), we abstained from assessing feelings of connectedness.

Method

Design. An independent measures design was employed in which participants were randomly allocated to either the relatedness manipulation or neutral condition and completed questionnaire measures presented online.

Participants. Participants were recruited from a university participant pool ($N = 55$; 37 females and 18 males) and were paid £3 (approximately $5) for their participation. Ages ranged from 18 to 34 ($M = 23.29$, $SD = 4.31$).

Materials

Relatedness manipulation. The relatedness and neutral tasks and instructions were the same as those used in Experiment 1.

Word completion task. The manipulation check was the same as that used in Experiment 1.

Positive mood. The five positive emotion items from the 10-item Positive and Negative Affect Scale (PANAS; Thompson, 2007) were used to assess positive affect. This scale was found to be a reliable shortened version of the original 20-item scale (Watson, Clark, & Tellegen, 1988). Participants were asked to rate the extent to which they felt the following at the current moment: inspired, alert, determined, active, and attentive (rated on a scale from 1 = *not at all like this* to 7 = *a lot like this*; $\alpha = .71$).

Empathy. The measure used to assess empathy was taken from Cialdini, Brown, Lewis, Luce, and Neuberg (1997). Participants were asked to think about a friend they regularly met up with in their spare time. They were asked to first briefly describe this individual's physical characteristics, personality traits, interests, values, and attitudes, to focus their attention on the friend. They were then asked to imagine that the person had been evicted from his or her apartment and were asked to indicate the extent to which they felt: sympathetic, tender, soft-hearted, compassionate, and warm toward the person (rated on a scale from 1 = *not at all like this* to 7 = *a lot like this*). This measure was designed to assess situational empathetic concern for an individual in need. The five items showed good internal reliability ($\alpha = .86$) and were combined to provide a measure of empathy.

Charity donation behavior. Participants were told that the research was being conducted in association with the British Red Cross. Participants then read the following information about the charity:

> The British Red Cross helps people in crisis, whoever and wherever they are. We are part of a global voluntary network, responding to conflicts, natural disasters and individual emergencies. We enable vulnerable people in the UK and abroad to prepare for and withstand emergencies in their own communities. And when the crisis is over, we help them to recover and move on with their lives.

Participants were then told that they had the opportunity to donate some of the money they had earned for participating

Table 3. Experiment 3: Descriptive Statistics

	Relatedness prime (n = 28)		Neutral prime (n = 27)	
	M	*SD*	*M*	*SD*
Positive mood	3.28	0.72	3.07	0.80
Empathy	6.41	0.80	6.19	0.88
Accessibility of relatedness words	2.14	1.01	1.19	0.62
Charity donation	0.70	0.98	0.22	0.63

in the study to this charity and were asked to write down how much they would like to donate to this charity (between £0 and £3). They were assured that the amount donated would be anonymous to the researcher conducting the study.

Procedure

Participants were recruited to the study titled "Language and Social Interaction" and were informed that the study was about the relations between sentence formation and social behaviors. As participants entered the lab, they completed a participation form and were immediately paid £3 in small change for their participation. Participants then sat at individual PCs, and clicked on a link displayed on the screen that randomly assigned them to one of the two experimental conditions. Participants completed the subsequent measures in the order described above. After completing the study, participants were given an envelope in which to place their donation. After the participant had left the room, the researcher checked that the participant had donated the amount he or she had committed to giving.

Results

Independent sample t tests were conducted to determine differences in relatedness words, positive mood, empathy, and charity donation between the relatedness and neutral prime conditions (for means and standard deviations, see Table 3). Those in the relatedness prime condition completed a greater number of words associated with relatedness (M = 2.14, SD = 0.16) than did those in the neutral prime condition (M = 1.19, SD = 0.16), $t(53) = -4.22$, $p < .001$; we were therefore satisfied that the relatedness manipulation had been successful. The results showed that there was no effect of prime condition on participants' empathy, $t(53) = -1.01$, $p = .32$, or mood, $t(53) = -1.03$, $p = .316$. However, the results showed that those in the relatedness prime condition donated more money to charity (M = £0.70, SD = 0.98) than did those in the neutral condition (M = £0.22, SD = 0.63), $t(53) = -2.12$, $p = .038$. When empathy and mood were added as covariates, this effect remained significant. Examining charity donation as a binary variable revealed that more participants in the relatedness condition (46.4%) donated money than did participants in the neutral condition (18.5%), $\chi^2(1) = 4.86$, $p = .027$.

Discussion

In Experiment 3, we showed that the relatedness prime had a significant effect on an objective prosocial behavior measure, namely, charity donations. These findings are consistent with those reported in Experiments 1 and 2, and provide causal evidence for the impact of relatedness on prosocial tendencies by showing that participants whose feelings of relatedness were increased donated significantly more money to charity than did those in a neutral condition. It is encouraging to find that increasing relatedness had a direct effect on participants' observable behavior, suggesting that the effect of the manipulation was not restricted to self-reports of prosocial intentions. This finding strengthens the evidence suggesting that incorporating relatedness primes within charity campaign materials may increase donation behavior.

The effect of the relatedness manipulation on prosocial behavior remained significant even after mood and empathy were accounted for. Previous research (Dovidio, Allen, & Schroeder, 1990) has shown that empathy associated with a specific problem leads only to helping with respect to that problem but does not generalize to helping toward a different problem. However, other research (Greitemeyer, 2009; Twenge, Baumeister, et al., 2007) has revealed that empathy can evoke helping across different needs and persons. Future research in which the effects of relatedness on empathy and helping toward the same target are examined would usefully complement our studies.

Although empathy could be considered a similar construct to connectedness, we believe that the differences in our mediation findings for empathy and for connectedness suggest that relatedness manipulations highlight the bond and identification that people feel with others rather than their encouraging empathetic emotional reactions toward a person in need. We suggest that the increased relatedness need satisfaction felt by participants after highlighting feelings of relatedness motivated the person to engage in further relatedness need-satisfying experiences.

Meta-Analysis of the Three Experiments

Although there was a significant difference between relatedness and the combination of other conditions for each of our dependent variables in both Experiments 1 and 2, post hoc tests revealed no significant mean differences between the relatedness condition and neutral condition in these experiments (see Tables 1 and 2). Inspection of the means for these two experiments reveals that our findings could be partly driven by reduced prosocial tendencies in the autonomy (compared to neutral) condition in addition to increased

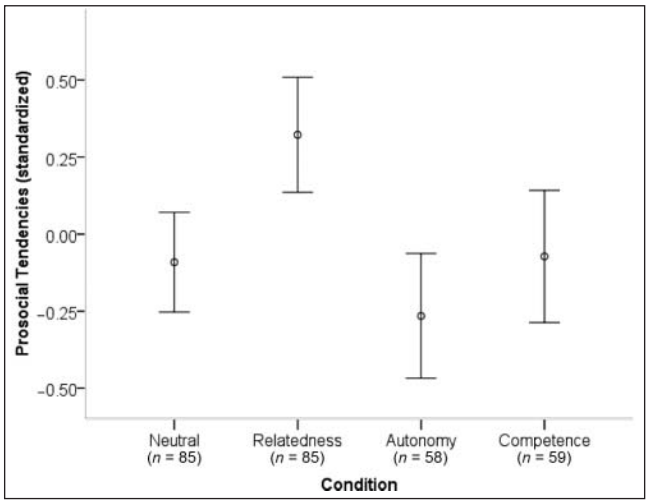

Figure 1. Meta-analysis of the three studies (N = 287): Mean standardized prosocial tendency scores for each condition
Note: Error bars indicate +/− 2 *SE*.

prosocial tendencies in the relatedness (compared to neutral) condition. Therefore, to provide a clear indication of the overall effect of highlighting relatedness (compared to the neutral condition) on prosocial tendencies, a meta-analysis of the three experiments was conducted. The mean *z*-standardized dependent measures from each study (mean interest in volunteering and intentions to volunteer from Experiment 1, mean connectedness and prosocial intentions from Experiment 2, and charity donation from Experiment 3) were compiled in one data set with the condition variable coded 1 = *neutral*, 2 = *relatedness*, 3 = *autonomy*, 4 = *competence* (N = 287). A one-way ANOVA indicated a significant main effect of condition, $F(3, 283) = 7.21$, $p < .001$, $\eta_p^2 = .07$. Planned contrasts showed that participants in the relatedness conditions displayed greater prosocial tendencies than did participants in each of the neutral, autonomy, and competence conditions, all ps < .01. The prosocial tendencies of those in the autonomy and competence conditions were no different from those in the neutral condition, ps > .10. Means and standard errors for participants in each condition are displayed in Figure 1.

General Discussion

The three experiments reported here provide evidence to suggest that highlighting feelings of relatedness satisfaction increases prosocial motivation and behavior. In Experiment 1, the relatedness manipulation led to greater intentions to volunteer and interest in volunteering, relative to the other conditions. Experiment 2 showed that highlighting relatedness experiences increased feelings of connectedness toward others, which in turn increased participants' general prosocial intentions. Finally, Experiment 3 showed that participants in the relatedness manipulation condition donated significantly more money to charity than did those given a neutral task. A meta-analysis of the three studies indicated that overall, those in the relatedness manipulation condition displayed greater prosocial tendencies than did those in each of the neutral, autonomy, and competence conditions.

The experiments are the first to investigate the causal effect of autonomy, competence, and relatedness needs on prosocial motivation and behavior. The findings support the general tenets of SDT (Ryan & Deci, 2000a), which suggest that satisfaction of basic human needs lead to greater orientation toward growth and positive social functioning. According to SDT, relatedness, competence, and autonomy are the most important psychological needs, which either in concert or on their own affect human thoughts, feelings, and behavior. Further to this, it has been suggested that relatedness, affiliation, and relationship-enhancing traits are often found to be most closely associated with subjective well-being (Ryan & Deci, 2001). As indicated in the Introduction, evidence is emerging to suggest that autonomy and competence may be more important to maintain positive aspects of the self-concept (e.g., self-esteem; Patrick, Knee, Canevello, & Lonsbary, 2007), whereas relatedness may be more important in promoting secure attachments (La Guardia et al., 2000), relationship quality (Patrick et al., 2007), and, as shown in the current studies, prosocial motivation and behavior.

It is also possible that autonomy and competence need satisfaction, in concert with relatedness need satisfaction, is required to promote prosocial tendencies (as suggested by research examining the importance of autonomy-supportive relationships). This may account for the results of the current studies being dissimilar to the correlation findings of Gagné (2003). Although self-reported satisfaction of the three needs are often correlated, and were each found by Gagné to be positively correlated with prosocial behavior, activating the needs of autonomy and competence may not be independently predictive of prosocial behaviors. Further research examining methods of activating the three needs in unison would therefore complement our studies.

We suggest that the manipulations we used present a broader conceptualization of relatedness experiences than the manipulations used in previous research to prime secure attachments (Mikulencer & Shaver, 2005). For example, relatedness experiences are likely to be present in a wide variety of relational experiences that are not solely those that arise in response to safety and security anxieties during development (Ryan et al., 2007). Nonetheless, we acknowledge the overlap between these constructs and the difficulty of activating feelings of security of attachment without activating broader feelings of relatedness satisfaction. This may partly be because of the likelihood that conditions conducive to satisfying the need for relatedness are also those conducive to the formation of secure attachments during development.

Our research also increases understanding of the mechanisms by which relatedness has an influence on prosocial tendencies. Experiment 2 showed that feelings of connectedness

significantly mediated the effect of the relatedness manipulation on prosocial motivation. This suggests that relatedness may be important in determining people's prosocial tendencies, as it concerns the extent to which people feel that they are connected and close to other people around them. This supports the research of Twenge and colleagues (Twenge et al., 2001; Twenge, Baumeister, et al., 2007; Twenge, Zhang, et al., 2007), who found that increasing social connectedness reduced aggression and that social exclusion increased aggression and reduced prosocial behaviors. In contrast, although empathy and mood are strong predictors of prosocial behaviors (Batson, 1991; Cunningham, 1979), in the current research relatedness had its effect on prosocial behaviors independent of any effect on empathy or mood (Experiment 3). This indicates that the construct of relatedness was unique in our studies in the predictive impact it exerted on prosocial tendencies, and it was not a result of the manipulation eliciting more positive mood or empathy (at least, as measured here). Other potential mediators should be examined in further research. For example, relationship well-being, security of attachment, a shared social identity, or a sense of oneness (Cialdini et al., 1997; Maner et al., 2002) may be other potential mediators of our effects. The concept of connectedness examined in Experiment 2 is likely to be a proximal mediator of the relatedness manipulation. Examining mediators of the effect that are more distal to our core construct of relatedness would further enhance our understanding of why highlighting relatedness results in greater prosocial behavior. We also suggest that it is likely highlighting the three needs may lead to qualitatively different types of prosocial behavior, for example, those that are autonomously motivated as oppose to those that are motivated from feelings of pressure or duty (Gebauer et al., 2008; Weinstein & Ryan, 2010). Examining the type of prosocial motivation that the manipulations promote would also further the understanding of our findings.

The results support the research of Levesque and Pellietier (2003), Hodgins et al. (2006), and Sheldon and Filak (2008), and show that autonomy, competence, and relatedness can all be successfully manipulated using a combination of implicit sentence unscrambling tasks and tailored instructions, as evidenced by respective increases in the accessibility of words related to each need in Experiment 1 and respective increases in feelings of each need in Experiment 2. This useful methodological development could be used in the application of SDT to other research areas. By highlighting autonomy, competence, and relatedness, other benefits of greater need satisfaction, such as greater happiness, greater vitality, less defensiveness, and a greater orientation toward growth and positive social functioning could, at least temporarily, be realized. These manipulations, when coupled with behavior change interventions such as those that aim to increase intentions toward, for example, healthier lifestyles or engagement with community, may increase intervention effectiveness. The finding that such relatedness manipulations influenced prosocial tendencies supports the recent literature that has highlighted the importance of using experimental methods in the investigation of SDT effects (Levesque at al., 2008). It is important to acknowledge the potential process differences that could occur from consciously or nonconsciously activating feelings of relatedness (or of combinations of the two as used in the current experiments). Unpacking the independent effects of the sentence scrambling tasks (relatively implicit) and instructions for the task (relatively explicit), and their potentially different mediating effects, deserves further exploration.

Despite the promising findings from the current series of studies, potential limitations of this research should be acknowledged. Participants were all university students, well educated, and mostly between the ages of 18 and 21. This particular population may have less time to volunteer and money to donate to charity than many other members of the community. In addition, the participants were mostly female (because of the uneven distribution of males and females studying psychology); as previous research has shown females to be more highly motivated to engage in prosocial behavior (e.g., Carlo, Okun, Knight, & de Guzman, 2005), it would be worthwhile to assess whether the effects of a relatedness manipulation would occur to the same extent using a larger sample of males. Finally, the current experiments only examine the effects of need satisfaction on prosocial tendencies. Further research should examine whether such manipulations increase specific motives for acting prosocially (e.g., whether the manipulations increase participants' intrinsic reasons for prosocial action), as would be suggested from the recent developments on this topic (Weinstein & Ryan, 2010).

Our findings illustrate the beneficial effects of priming relatedness in terms of prosocial behaviors and should be considered in relation to broader ramifications for theory and practice. For example, effects similar to those we found may be achievable both by using different methods and by making relatedness salient in other ways. Demonstration of such effects would strengthen speculations about broader social processes that promote or weaken the social relationships that might involve and encourage greater engagement in the welfare of others. Indeed, the effects of promoting prosocial behaviors on the quality of social relationships also merit further investigation. We know that the quality of social relationships has an impact on people's health and well-being (Wilkinson & Pickett, 2009), that social support has a similar positive effects (Stansfeld, 1999), that social isolation has comparable detrimental consequences (House, Landis, & Umberson, 2003), and that we may lose something fundamental by ignoring community relationships (Cushman, 1990; Putnam, 2000). The empirical links between relatedness, prosocial behaviors, and the quality of social relationships therefore warrant more detailed research attention. Such research could promote simultaneously individual welfare and the welfare of others in a way that would challenge the assumption that there is some kind of conflict between

the two. This research direction offers some optimism that individual and social flourishing might be enhanced through attention to people's engagement with others.

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Note

1. Before conducting this study, the target words were piloted to ensure that they were representative of, and associated with, relatedness, autonomy, and competence, and their definitions as stated by self-determination theory (SDT). Ten social psychology experts were given a definition of each of the needs as stated by SDT and were asked to rate the extent to which the relatedness words were associated with the definition of relatedness (1 = *not at all associated with relatedness* to 7 = *very much associated with relatedness*), the autonomy words were associated with the definition of autonomy (1 = *not at all associated with autonomy* to 7 = *very much associated with autonomy*), and the competence words were associated with the definition of competence (1 = *not at all associated with competence* to 7 = *very much associated with competence*). The relevant target words were all rated as highly associated with the definitions of relatedness (M = 5.07, SD = 0.51), autonomy (M = 5.44, SD= 0.49), and competence (M = 5.60, SD = 0.57).

References

Aderman, D., & Berkowitz, L. (1970). Observational set, empathy, and helping. *Journal of Personality and Social Psychology, 14*, 141-148.

Batson, C. D. (1991). *The altruism question: Towards a social social-psychological answer*. Hillsdale, NJ: Erlbaum.

Batson, C. D., Dyck, J. L., Brandt, J. R., Batson, J. G., Powell, A. L., McMaster, M. R., & Griffitt, C. (1988). Five studies testing two new egoistic alternatives to the empathy-altruism hypothesis. *Journal of Personality and Social Psychology, 55*, 52-77.

Batson, C. D., Sager, K., Garst, E., Kang, M., Rubchinsky, K., & Dawson, K. (1997). Is empathy-induced helping due to self-other merging? *Journal of Personality and Social Psychology, 73*, 495-509.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529.

Carlo, G., Okun, M. A., Knight, G. P., & de Guzman, M. R. T. (2005). The interplay of traits and motives on volunteering: Agreeableness, extraversion and prosocial value motivation. *Personality and Individual Differences, 38*, 1293-1305.

Cialdini, R. B., Brown, S. L., Lewis, B. P, Luce, C., & Neuberg, S. L. (1997). Reinterpreting the empathy-altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology, 73*, 481-494.

Cunningham, M. R. (1979). Weather, mood, and helping behavior: Quasi experiments with the sunshine Samaritan. *Journal of Personality and Social Psychology, 37*, 1947-1956.

Cushman, P. (1990). Why the self is empty: Toward a historically situated psychology. *American Psychologist, 45*, 599-611.

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology, 44*, 113-126.

Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology, 31*, 169-193.

Deci, E. L. (1980). *The psychology of self-determination*. Lexington, MA: Heath.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.

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*, 227-268.

Dovidio, J. F., Allen, J. L., & Schroeder, D. A. (1990). Specificity of empathy-induced helping: Evidence for altruistic motivation. *Journal of Personality and Social Psychology, 59*, 249-260.

Finkelstein, M. A., Penner, L. A., & Brannick, M. T. (2005). Motive, role identity, and prosocial personality as predictors of volunteer activity. *Social Behavior and Personality, 33*, 403-418.

Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and Emotion, 27*, 199-223.

Gebauer, J. E., Riketta, M., Broemer, P., & Maio, G. R. (2008). Pleasure and pressure based prosocial motivation: Divergent relationships to subjective well-being. *Journal of Research in Personality, 42*, 399-420.

Grant, A. M. (2008). Does intrinsic motivation fuel the prosocial fire? Motivational synergy in predicting persistence, performance, and productivity. *Journal of Applied Psychology, 93*, 48-58.

Graumann, C. F. (1988). Introduction to a history of social psychology. In M. Hewstone, W. Stroebe, J-P Codol, & G. M. Stephenson (Eds.), *Introduction to social psychology* (pp. 3-19). Oxford, England: Blackwell.

Greitemeyer, T. (2009). Effects of songs with prosocial lyrics on prosocial behavior: Further evidence and a mediating mechanism. *Personality and Social Psychology Bulletin, 35*, 1500-1511.

Hodgins, H. S., Brown, A. B., & Carver, B. (2007). Autonomy and control motivation and self-esteem. *Self and Identity, 6*, 189-208.

Hodgins, H. S., & Knee, C. R. (2002). The integrating self and conscious experience. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 87-100). Rochester, NY: University of Rochester Press.

Hodgins, H. S., Yacko, H. A., & Gottlieb, E. (2006). Autonomy and nondefensiveness. *Motivation and Emotion, 30*, 283-293.

Hoffman, M. L. (1981). Is altruism part of human nature? *Journal of Personality and Social Psychology, 40*, 121-137.

House, J. S., Landis, K. R., & Umberson, D. (2003). Social relationships and health. In P. Salovey & A. J. Rothman (Eds.), *Social psychology of health*. (pp. 218-226). New York, NY: Psychology Press.

La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*, 367-384.

Levesque, C., Copeland, K. J., & Sutcliffe, R. A. (2008). Conscious and nonconscious processes: Implications for self-determination theory. *Canadian Psychology, 49*, 218-224.

Levesque, C. S., & Pellitier, L. G. (2003). On the investigation of primed and chronic autonomous and heteronomous motivational orientations. *Personality and Social Psychology Bulletin, 29*, 1570-1584.

Maner, J. K., Luce, C. L., Neuberg, S. L., Cialdini, R. B., Brown, S., & Sagarin, B. J. (2002). The effects of perspective taking on motivations for helping: Still no evidence for altruism. *Personality and Social Psychology Bulletin, 28*, 1601-1610.

Mansbridge, J. J. (Ed.). (1990). *Beyond self-interest*. Chicago, IL: University of Chicago Press.

Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioral system in adulthood: Activation, psychodynamics, and interpersonal processes. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 35, pp. 53-152). New York, NY: Academic Press.

Mikulincer, M., & Shaver, P. R. (2005). Attachment security, compassion, and altruism. *Current Directions in Psychological Science, 14*, 34-38.

Moller, A. C., Deci, E. L., & Elliot, A. J. (2010). Person-level relatedness and the incremental value of relating. *Personality and Social Psychology Bulletin, 36*, 754-767.

Nix, G. A., Ryan, R. M., Manly, J. B., & Deci, E. L. (1999). Revitalization through self-regulation: The effects of autonomous and controlled motivation on happiness and vitality. *Journal of Experimental Social Psychology, 35*, 266-284.

Patrick, H., Knee, C. R., Canevello, A., & Lonsbary, C. (2007). The role of need fulfillment in relationship functioning and well-being: A self-determination theory perspective. *Journal of Personality and Social Psychology, 92*, 434-457.

Pavey, L. J., & Sparks, P. (in press). Autonomy and defensiveness: Experimentally increasing adaptive responses to health-risk information via priming and self-affirmation. *Psychology and Health*.

Penner, L. A., Dovidio, J. F., Piliavin, J. A., & Schroeder, D. A. (2005). Prosocial behavior: A multilevel approach. *Annual Review of Psychology, 56*, 365-392.

Pomazal, R. P., & Jaccard, J. J. (1976). An informational approach to altruistic behavior. *Journal of Personality and Social Psychology, 33*, 317-326.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers, 36*, 717-731.

Putnam, R.D. (2000). *Bowling alone: The collapse and revival of American community*. New York, NY: Simon & Schuster.

Reed, M. B., & Aspinwall, L. G. (1998). Self-affirmation reduces biased processing of health-risk information. *Motivation and Emotion, 22*, 99-132.

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*, 419-435.

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality, 63*, 397-427.

Ryan, R. M., & Brown, K. W. (2003). Why we don't need self-esteem: On fundamental needs, contingent love, and mindfulness. *Psychological Inquiry, 14*, 71-76.

Ryan, R. M., Brown, K. W., & Creswell, J. D. (2007). How integrative is attachment theory? Unpacking the meaning and significance of felt security. *Psychological Inquiry, 18*, 177-182.

Ryan, R. M., & Deci, E. L. (2000a). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78.

Ryan, R. M., & Deci, E. L. (2000b). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*, 319-338.

Ryan R. M., & Deci E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*, 141-166

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*, 1557-1586.

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need-satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology, 76*, 482-497.

Sheldon, K. M., Elliot, A. J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Journal of Personality and Social Psychology, 89*, 325-339.

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*, 267-283.

Sheldon, K. M., Ryan, R. M., & Reis, H. T. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin, 22*, 1270-1279.

Smith, A. (1993). *An inquiry into the nature and causes of the wealth of nations*. Oxford, England: Oxford University Press.

Sparks, P., Hinds, J., & Curnock, S. (2010). *Connectedness, caring, and their consequences: A study of relationships with the natural environment*. Manuscript in preparation.

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*, 845-851.

Stansfeld, S. A. (1999). Social support and social cohesion. In M. Marmot & R. G. Wilkinson (Eds.), *Social determinants of health*. (pp. 155-178). Oxford, England: Oxford University Press.

Thoits, P. A., & Hewitt, L. N. (2001). Volunteer work and well-being. *Journal of Health and Social Behavior, 42*, 115-131.

Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule. *Journal of Cross-Cultural Psychology, 38*, 227-242.

Twenge, J. M., Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Bartels, J. M. (2007). Social exclusion decreases prosocial behavior. *Journal of Personality and Social Psychology, 92*, 56-66.

Twenge, J. M., Baumeister, R. F., Tice, D. M., & Stucke, T. S. (2001). If you can't join them, beat them: Effects of social exclusion on aggressive behavior. *Journal of Personality and Social Psychology, 81*, 1058-1069.

Twenge, J. M., Zhang, L., Catanese, K. R., Dolan-Pascoe, B., Lyche, L. F., & Baumeister, R. F. (2007). Replenishing connectedness: Reminders of social activity reduce aggression after social exclusion. *British Journal of Social Psychology, 46*, 205-224.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of Positive and Negative Affect: The PANAS Scales. *Journal of Personality and Social Psychology, 54*, 1063-1070.

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*, 222-244.

Wilkinson, R. G. & Pickett, K. (2009). *The spirit level: Why more equal societies almost always do better*. London, England: Penguin.