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UNIVERSITY OF CALIFORNIA
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Enhancing the Effects of Happiness-Boosting Activities:
The Role of Autonomy Support in an Experimental Longitudinal Intervention

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Psychology

by

Matthew David Della Porta

June 2012

Dissertation Committee:

Dr. Sonja Lyubomirsky, Chairperson
Dr. David Funder
Dr. Kate Sweeny

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The Dissertation of Matthew David Della Porta is approved:

Committee Chairperson

University of California, Riverside

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DEDICATION

I dedicate this dissertation and my Ph.D. to my father, Dr. David Della Porta. For my entire life he has demonstrated an incomparable example of hard work, sacrifice, and determination. As a medical doctor he was a true inspiration, going far above and beyond the normal call of duty. His early mornings, late nights, and committed time studying taught me that a good education is a responsibility to help others. In my father's footsteps, I hope to use my education to affect just a fraction of the number of people that he has helped. He is an outstanding role model and loving father and I am proud to show him yet another fruit of his labor.

ABSTRACT OF THE DISSERTATION

Enhancing the Effects of Happiness-Boosting Activities:
The Role of Autonomy Support in an Experimental Longitudinal Investigation

by

Matthew David Della Porta

Doctor of Philosophy, Graduate Program in Psychology
University of California, Riverside, June 2012
Dr. Sonja Lyubomirsky, Chairperson

Previous studies have demonstrated the effectiveness of positive activities to enhance well-being (see Sin & Lyubomirsky, 2009, for a meta-analysis), but an inexpensive, standardized approach to optimizing the success of such activities has yet to be developed. A 6-week randomized experimental longitudinal study tested the effect of supporting the basic human need of autonomy (Deci & Ryan, 2000) on the efficacy of practicing a happiness-boosting activity (doing acts of kindness). A novel autonomy support manipulation involving weekly electronic messages was developed for this purpose. As predicted, performing acts of kindness while receiving autonomy support was more effective than performing this strategy without autonomy support or focusing on one's academic work (with or without autonomy support). Also, intrinsic motivation was found to underlie the success of autonomously supported acts of kindness. The benefits of providing autonomy-supportive environments when administering positive interventions in applied settings are discussed.

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Chapter 1: Introduction

The pursuit of long-term happiness is an important goal, shared by people world-wide (Diener, 2000; Diener, Suh, Smith, & Shao, 1995). To be sure, numerous studies reveal good reasons for people to try to become happier. A meta-analysis examining 225 cross-sectional, longitudinal, and experimental investigations found that subjective well-being is related to success in multiple life domains, including positive self-perceptions, productivity, and physical well-being (Lyubomirsky, King, & Diener, 2005). Fortunately, recent studies reveal that people are capable of intentionally raising their happiness levels by engaging in positive activities. This area of research incorporates randomized controlled experiments that test which activities lead to sustained increases in subjective well-being, as well as the conditions under which such activities produce maximal success.

The construct of happiness is generally defined by researchers as consisting of two components – an affective component, indicated by experiences of frequent positive emotions and relatively infrequent negative emotions, and a cognitive component, characterized by an overall assessment of one’s quality of life (Diener et al., 1999). Together, these two components tap an individual’s happiness level, also known as subjective well-being. Both terms are used interchangeably throughout this paper.

Much positive intervention research is guided by the sustainable happiness model, which posits that individual differences in long-term happiness are influenced by three factors: the genetically-determined “set point” for happiness, life circumstances, and purposeful cognitive, behavioral, and goal-based activities. Relative to changing one’s set

point or life circumstances, intentional happiness-boosting activities are the most practical and promising way for people to take charge¹ of increasing their subjective well-being for a sustained period of time (Lyubomirsky, Sheldon, & Schkade, 2005).

If being happy is beneficial and positive activities can increase subjective well-being, assessing the extent of such activities' effectiveness is instructive. The results of a meta-analysis of 51 interventions with over 4,000 individuals indicate that happiness-enhancing strategies significantly increase subjective well-being (mean $r = .29$) and reduce depressive symptoms (mean $r = .31$; Sin & Lyubomirsky, 2009). In addition to demonstrating that happiness-promoting practices are beneficial, this line of research also addresses how and why such activities increase happiness.

The mechanisms underlying the success of happiness-enhancing strategies have been investigated by testing a number of potentially important moderators and mediators of the process of well-being change. For example, one study found that participants benefited more (i.e., experienced bigger increases in happiness) from positive activities when they chose to be in a study advertised as a happiness intervention (and thus presumably were motivated to improve their happiness) than when they chose to be in a study advertised to be unrelated to increasing happiness (Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011). In another investigation, continued and effortful practice of positive activities helped explain why such activities boosted well-being (Seligman, Steen, Park, & Peterson, 2005). Testing the efficacy of positive interventions, as well as their underlying mechanisms, was and still is an important component of this literature.

Indeed, understanding the circumstances under which these activities can be optimally performed is essential in the real-world application of happiness-enhancing strategies in clinical and non-clinical settings.

New Directions for Positive Intervention Research

Fortunately, previous research testing the particular moderators that underlie the effectiveness of happiness-promoting strategies can elucidate the optimal ways to perform them. For example, if the motivation or “will” to become happier impacts the efficacy of positive interventions (Lyubomirsky et al., 2011), efforts could be made to ensure that participants are adequately motivated before initiating a happiness-boosting activity. In addition, targeting and testing factors that are expected to contribute to optimal activity practice – for example, the frequency or variety with which such activities are performed – is very important. Research in this area can be of great use in clinical settings (e.g., those involving mental health professionals, physicians, and coaches), as well as non-clinical ones (e.g., schools, workplaces, and athletic fields). Practitioners wishing to use positive interventions in virtually any applied setting will want to know that they are executing them in the most effective, empirically-supported way possible.

A number of practical concerns, however, must be addressed for positive interventions to be implemented successfully in applied settings. Indeed, happiness-boosting activities need to meet strict criteria to be useful outside the laboratory. First, efforts toward improving the effectiveness of positive interventions should ideally be applicable to as many different strategies as possible. Depending on the context or setting

(e.g., athletic training vs. coping with a chronic illness), one activity might be more appropriate to use than another (e.g., meditation vs. gratitude), so studying a factor that is applicable to only one activity will be less useful than studying one that is applicable to many. For example, investigating whether writing letters of gratitude to one's mother is more beneficial than writing letters of gratitude to one's father would further clarify the best way to practice this particular strategy, but this information would have virtually no relevance to other strategies.

Second, optimization of happiness-boosting practices must be relatively easy to implement. Activity improvements that are expensive (e.g., involving travel), time-intensive (e.g., requiring daily sessions), or complicated to incorporate into happiness practices (e.g., necessitating hired experts) would be of little use. For example, although factors targeted by previous studies (e.g., variety, motivation to be happier, person-activity fit) hold great theoretical importance and critically inform researchers about how positive activities may be best performed, such factors may not be as useful in establishing the most practical ways to optimize the effects of such activities in applied settings. For example, ensuring that all participants are adequately motivated to become happier before beginning an intervention may require money and time that organizations cannot afford.

Finally, a standardized approach to optimizing the effectiveness of happiness-boosting strategies will allow investigators to test a variety of positive interventions in a consistent manner. For example, a researcher may wish to amplify the effects of two different positive activities (e.g., counting one's blessings and visualizing one's best

possible future self). Rather than first identifying specific ways to strengthen the effects of each of these particular happiness-enhancing strategies, a uniform method of enhancing these exercises would enable her to test both activities right away in the same study.

Autonomy support, defined as communication conducive toward the satisfaction of the basic human need of autonomy (Deci & Ryan, 2000), fits each of the above criteria and is a promising approach toward optimizing the effects of positive interventions. In a variety of domains, including job performance (e.g., Baard, Deci, & Ryan, 2004; Deci, Connell, & Ryan, 1989) and health behavior (e.g., Williams et al., 2006), studies have demonstrated the importance of an autonomy-supportive environment in facilitating positive behavior change or enhanced performance. For example, feeling respected and understood by one's instructor has been found to predict greater academic achievement in students (e.g., Black & Deci, 2000; see Ryan & Brown, 2005, for a review). However, due to the broad range of contexts in which it has been provided, a standardized protocol of autonomy support has yet to be developed. The systematic integration of autonomy support into positive interventions is likely to be useful for those wishing to administer happiness-promoting strategies in the real world more effectively.

The present study had three primary aims. The first was to develop a novel autonomy support manipulation. The second was to test whether performing acts of kindness while receiving autonomy support is the most effective way to boost well-being. Lastly, I investigated the mediating role of intrinsic motivation underlying my effects.

Previous research testifies to the efficacy of numerous happiness-promoting strategies and has already investigated a number of mechanisms underlying their success. This study aims to explore the optimal ways to carry out these positive interventions by exploring a mechanism (autonomy support) that is applicable to virtually all activities, brief, and inexpensive, and can be standardized across a variety of applied settings.

Happiness-Promoting Intervention Activity: Acts of Kindness

Correlational evidence demonstrates a clear relationship between performing acts of kindness and subjective well-being. For example, daily diary and “beeper” studies reveal that those who spend more time helping other people (relative to those who spend less time helping) are higher than average in dispositional well-being (Lucas, 2000). In addition, individuals who have a greater interest in helping others, a tendency to behave in a prosocial manner, and intentions to act courteously toward coworkers are more likely to rate themselves as happier people (Williams & Shiaw, 1999). Interestingly, a relationship between prosocial behavior and increased well-being has been found not just among psychologically healthy individuals (Thoits & Hewitt, 2001), but also among those who had experienced a recent traumatic event (Frazier et al., 2012).

In addition to such correlational evidence, performing acts of kindness has been shown to be effective in boosting well-being in randomized controlled studies lasting from one day (Dunn, Aknin, & Norton, 2008) to 10 weeks (Sheldon, Boehm, & Lyubomirsky, in press). For example, in a one-day study, those prompted to spend \$5 or \$20 on others were happier at the end of the day than those prompted to spend the same money on themselves (Dunn et al., 2008), and, in a one-week study, participants who

merely kept track of and recorded their daily number of acts of kindness also reported greater increases in happiness compared to a control group (Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006).

Furthermore, studies that explicitly instruct participants to perform acts of kindness have not only yielded promising results (e.g., Buchanan & Bardi, 2010), but have shed light on the factors that bolster their effects. A 6-week experimental study showed that performing five acts of kindness all in one day was more effective than spreading those five acts out over the course of a whole week (Lyubomirsky, Sheldon et al., 2005). Thus, the "dosage" of the activity clearly mattered. Another longitudinal experimental intervention revealed that participants who performed acts of kindness in a variety of ways obtained a greater benefit than participants who performed the acts in similar ways (Sheldon et al., in press). Overall, both cross-sectional and randomized controlled intervention studies suggest that this positive activity is highly effective in improving well-being.

Autonomy Support

According to self-determination theory (SDT; Deci & Ryan, 2000), needs are evolved experiential requirements that all people must have in order to grow to their fullest potential (Sheldon & Niemiec, 2006). SDT posits three basic human needs – competence, relatedness, and autonomy. Competence is characterized by feelings of effectiveness, efficiency, and mastery over one's environment (White, 1959). Relatedness is indicated by feeling understood, connected with, and appreciated by close others (Baumeister & Leary, 1995). Finally, when the need of autonomy has been met, one feels

a sense of choice and personal endorsement regarding his or her daily behavior (Deci & Ryan, 1980). The present study will focus on this particular need because SDT research supporting the three basic human needs has identified autonomy as the most promising one for facilitating positive behavior change (Ryan & Deci, 2000).

Autonomy support provides people with the critical opportunity to perceive and experience their behavior as self-determined, valuable, and personally endorsed (Ryan, Williams, Patrick, & Deci, 2009). In other words, the successful provision of autonomy support leads people to believe that their behavior is voluntary and worthwhile, thus increasing the likelihood that their need for autonomy will be satisfied. Take, for example, an individual who wishes to exercise more frequently. If he is encouraged to find a physical activity that he finds enjoyable, he will presumably perform the activity often just for its inherent pleasure, thereby fostering the feeling that he is in charge of his exercise routine. To this end, autonomy (relative to competence and relatedness) is considered the most important need to support because of its close association with an internally perceived locus of causality, indicating that a particular behavior stems from the individual's own choice (Deci & Ryan, 2000).

As noted above, autonomy support involves providing a social environment conducive toward the satisfaction of the need for autonomy. An autonomy-supportive environment encourages behavior characterized by a sense of volition and a lack of external control (Deci & Ryan, 2000). For example, an educator offering autonomy support to his students would provide meaningful learning goals, engage students with challenging and interesting class activities, and acknowledge the feelings students may

experience when they encounter academic difficulties (Jang, Reeve, & Deci, 2010).

Pressuring students to perform well through the use of external rewards or punishments (e.g., awarding extra points for perfect attendance records) is inconsistent with the provision of autonomy support. Indeed, a meta-analysis examining 128 studies revealed that offering rewards contingent on the completion or adequate performance of a task undermines the desire to perform a behavior for its own sake (Deci, Koestner, & Ryan, 1999).

Numerous experimental studies conducted in a variety of applied settings suggest that autonomy support is an essential component of facilitating positive health behavior change and optimal work performance. For example, in health care settings, support for autonomy leads to sustainable health behavior change (Ryan, Patrick, Deci, & Williams, 2008), including quitting smoking (Niemic, Ryan, Patrick, Deci, & Williams, 2010), adhering to diabetes medication (Williams et al., 2009), and avoiding adolescent health-risk behaviors (Williams, Cox, Hedberg, & Deci, 2000). In a study conducted in the workplace, autonomy support (i.e., encouraging self-initiated performance of job duties while minimizing explicit pressure to comply) predicted later trust in the work organization, positive affect at work, and work satisfaction (Deci et al., 1989). In sum, these studies suggest that providing autonomy support is instrumental in enabling beneficial behavior change and heightened task performance. Therefore, I expect that autonomy support can be successfully incorporated into happiness-enhancing interventions and will contribute toward improving their effectiveness.

How precisely can the need for autonomy be supported in positive interventions? Depending on the context in which they were conducted, previous studies have employed a variety of autonomy support strategies. However, the need of autonomy is typically satisfied in three ways (Deci, Eghrari, Patrick, & Leone, 1994). First, support for autonomy involves providing relevant information and meaningful rationales for why a particular behavior – whether it involves doing acts of kindness or meditating daily – is important. For example, a person may be informed that mindfulness meditation is an effective coping strategy that has been practiced for thousands of years (see Brown, Ryan, & Creswell, for a review). Second, autonomy support involves giving individuals a sense of choice in the behavior they have been instructed to perform. Although an employee may have little choice in completing a workplace project, she may be able to decide precisely how to carry out the project or how to present it to her colleagues and superiors. Third, autonomy support is provided by acknowledging the perspectives of those instructed to do a particular activity (e.g., individuals striving to improve their marital relationships would be assured that feelings of frustration or confusion during this process are common; Deci et al., 1994).

A novel contribution of the present study was to provide autonomy support via pre-scripted electronic messages. To my knowledge, autonomy support has been offered to date only in face-to-face interactions. However, as discussed above, the most useful techniques to optimize the effects of happiness-increasing activities in non-laboratory settings are likely to be inexpensive, relatively brief, and standardized. Autonomy support administered electronically meets all of these criteria and, notably, provides researchers

and practitioners in applied settings with a systematic approach to test this construct in positive interventions. To be sure, the role of autonomy support in optimizing the effects of happiness-boosting activities can only be established if it is implemented in a consistent manner.

Underlying Mechanism: Intrinsic Motivation

The present study also aims to examine a mediating mechanism underlying the overall efficacy of performing acts of kindness and its effectiveness when it is practiced with autonomy support. Previous research suggests that successful autonomy support facilitates intrinsic motivation toward a particular behavior (Deci & Ryan, 2000). When behavior is intrinsically motivated, it is done for its own sake, generally because the behavior is enjoyable and valued. In general, intrinsically motivated behaviors are characterized by feeling a lack of tension or pressure, a sense of enjoyment, and a sense of choice.

Intrinsic motivation is theorized as an inherent human desire; its emergence depends primarily on the degree to which favorable environmental conditions (e.g., the presence or absence of autonomy support) exist (Ryan & Deci, 2000). Due to the strong theoretical link between autonomy support and intrinsic motivation, I expected that happiness boosts from an autonomously supported positive activity (performing acts of kindness) would be at least partially dependent on prior increases in intrinsic motivation. Consistent with this notion, previous research shows that autonomously motivated prosocial behavior is more closely related to well-being boosts (for the helper and

recipient) than prosocial behavior done for non-autonomous (i.e., controlled or pressured) reasons (Weinstein & Ryan, 2010).

The Present Study

The role of autonomy support in the efficacy of performing acts of kindness was investigated in a 6-week randomized controlled intervention study. Measures of the primary outcome (well-being) were assessed immediately before, midway through, and immediately after the intervention; the mediating variable of intrinsic motivation was measured once a week throughout the 6-week intervention period.

My first and primary hypothesis concerned whether participants who performed acts of kindness with autonomy support would benefit the most, relative to the other groups. Specifically, those who did acts of kindness with autonomy support were expected to show larger increases in well-being than those who performed acts of kindness without autonomy support or those in the control groups.

My second hypothesis concerned one mechanism by which performing acts of kindness with autonomy support is the most beneficial activity. Participants who performed acts of kindness with autonomy support were expected to experience greater intrinsic motivation, and, in turn, greater increases in well-being by the end of the study, relative to those who practiced this activity without autonomy support and those who performed the control activity, with or without autonomy support. Three indicators of intrinsic motivation were tested as mediators: tension/pressure (Hypothesis 2a), perceived choice (Hypothesis 2b), and interest/enjoyment (Hypothesis 2c).

Chapter 2: Method

Participants

Two samples of undergraduate students enrolled in a psychology course participated in this study. The first group comprised undergraduates attending the University of California, Riverside (UCR; $n = 124$), who completed the study in exchange for course credit. In this group, 20 participants were removed from the sample because they failed to complete measures for at least 5 of the 7 intervention time points or at least 1 of the 3 time points in which measurements of subjective happiness and affect were taken, leaving a total of 104 participants. The second group comprised undergraduates attending Seoul National University in South Korea (SNU; $n = 153$), who were paid approximately \$20. In this group, 39 participants were removed for the same reasons noted above, leaving a total of 114 participants.

When testing my hypotheses, no significant differences between these two cultural samples were found. To determine whether the samples could be pooled together without artificially inflating any significant findings, the effect sizes within each sample were compared to effect sizes within a larger group in which both samples were pooled together. The pooled effect sizes did not exceed the effect sizes within either the UCR or SNU sample. Accordingly, the two samples were pooled together, with a total sample size of 218 (115 female, 103 male). Participants comprised 72% Asians, 15% Latino(a)s, 5% Caucasians, 3% more than one ethnicity, 2% African American, 2% “other,” and 1% Hawaiian. The age of participants ranged from 17 to 27 years ($M = 19.97$ years, $SD = 1.79$ years).

Design

A 2 (Autonomy support vs. No autonomy support) X 2 (Intervention activity: Acts of kindness vs. Control) design was used in this study. Participants were randomly assigned to receive or not receive autonomy support and randomly assigned to perform one of the two activities.

Procedure

The present study took place entirely over the Internet, using a website available only to registered participants. The study website was identical for both samples, except that the website for the UCR sample was in English and the website for the SNU sample was in Korean. The total length of the intervention was 6 weeks.

Baseline assessment. The first week of the intervention period included a consent form, demographic questions, and baseline measures of students' well-being (i.e., affect and happiness). Participants also reported their baseline autonomous need satisfaction.

At the beginning of the study, participants were assigned to one of the four study conditions and received the relevant instructions and materials (see detailed descriptions below).

Weekly assessments. Assessments of autonomous need satisfaction and intrinsic motivation were taken each week of the intervention period. Measurements of affect and happiness were taken at the beginning, middle, and end of the intervention period.

Autonomy Support Manipulation

At the beginning of the study, participants in the autonomy support conditions were told the following cover story:

The purpose of this study is to observe and track the experiences of students who have previously completed this study. These students have volunteered to assist 10 current study participants. You will be assigned to one such previous participant. Beginning this week, you will receive weekly messages from this individual throughout the study.

In reality, these weekly autonomy support messages were pre-scripted and written to look as if they were from fellow students. Autonomy support was provided every week of the intervention. Each week, support messages focused on one of the three ways to satisfy the need for autonomy – namely, providing a rationale, giving a sense of choice, and acknowledging the perspective of participants. Two variations of each of these three autonomy support techniques were used, for a total of six messages. All participants receiving autonomy support (regardless of whether they performed acts of kindness or the control activity) received autonomy support messages in the following randomly determined 6-week sequence: Rationale₁, Choice₁, Choice₂, Rationale₂, Acknowledge₁, Acknowledge₂. The specific content of these weekly messages for those who performed acts of kindness is provided in Appendix A. The content of weekly messages for those who completed the control activity is provided in Appendix B.

Participants in the no autonomy support conditions completed their assigned intervention activities and measures in exactly the same way as participants in the support conditions, except without weekly support messages.

Positive Activity Manipulation

Performing acts of kindness. In this condition, students were instructed to perform five acts of kindness all in one day, once a week, for 6 weeks (following Lyubomirsky, Sheldon et al., 2005). At the start of the study, participants received initial

instructions about how to begin performing acts of kindness the first week of the intervention so that they could be reported the following week. During each of the remaining 5 weeks of the intervention period, participants continued to complete their assigned activity. Their instructions each week were as follows:

In our daily lives, we all perform acts of kindness for others. These acts may be large or small and the person for whom the act is performed may or may not be aware of the act. Examples include helping your parents cook dinner, doing a chore for your sister or brother, helping a friend with homework, or visiting an elderly relative.

On any day this week, before next Monday, please perform five acts of kindness – all five in one day. The acts do not need to be for the same person, the person may or may not be aware of the act, and the act may or may not be similar to the acts listed above. Next week you will be asked to report what acts of kindness you chose to perform. Please do not perform any acts that may place yourself or others in danger.

Control activity. In this condition, students completed their regularly assigned academic coursework. This particular activity was chosen because it was relatively more conducive toward the provision of autonomy support (e.g., Black & Deci, 2000). Indeed, giving autonomy support for the type of neutral control activity used in previous studies (e.g., asking participants to list the things they did during the past week) would be awkward and inappropriate, relative to giving support for the more challenging task of completing academic coursework.

Materials

Happiness. Participants' overall happiness was evaluated with the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999). This scale consists of four items that are rated on a 7-point Likert-type scale. The first two items ask participants how generally happy they are (1 = *not a very happy person*, 7 = *a very happy person*) and how

happy they are relative to their peers (1 = *less happy*, 7 = *more happy*). The remaining two questions require participants to indicate the extent to which a description of a “very happy” and a “very unhappy” person, respectively, characterizes them (1 = *not at all*, 7 = *a great deal*). After reverse scoring the fourth item, higher scores on this measure indicate greater subjective happiness. Analyses revealed that including this fourth item produced a reliability of $\alpha = .62$ at baseline and $.64$ immediately post-intervention. However, when this fourth item was removed, reliability of this measure increased to $\alpha = .86$ at baseline and to $\alpha = .90$ at post-intervention. Therefore, all analyses using subjective happiness as an outcome used only the first three items of this measure.

Emotions. The Modified Differential Emotions Scale (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008) requires participants to recall and rate their strongest experience of 19 different emotions over a specific period of time (i.e., the past week) on a 4-point scale (0 = *not at all*, 4 = *extremely*). The scale includes a subscale for positive emotions (e.g., amusement, compassion, confidence) and a subscale for negative emotions (e.g., anger, sadness, contempt). Across measurements in this study, α s for positive emotions ranged from $.90$ to $.92$, while α s for negative emotions ranged from $.80$ to $.88$.

Autonomous need satisfaction. Individual autonomous need satisfaction was assessed with three items (Sheldon, Elliot, Kim, & Kasser, 2001). An example item is, “I was free to do things my own way.” Participants rated their level of agreement with each item on 7-point Likert-type scales (1 = *not at all*, 4 = *somewhat*, 7 = *very much*). From immediately pre-intervention to post-intervention, α s ranged from $.78$ to $.85$.

Intrinsic motivation. Three subscales from the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989) were administered. All items were rated on 7-point Likert-type scales (1 = *not at all true*, 4 = *somewhat true*, 7 = *very true*). The first subscale (interest/enjoyment) has seven items and measures the desire to perform the assigned activity for its own sake. A sample item is “I found the activity very interesting.” The second subscale (perceived choice) taps the extent to which participants perceive their positive activity performance as voluntary. This is measured with five items (e.g., “I felt that it was my choice to do the task”). The third and final subscale contains five items and measures the degree to which engagement in the happiness-boosting strategies feels tense (e.g., “I felt pressured while doing the task”). For the purpose of mediation analyses, measures of intrinsic motivation collected from the 2nd week to the 6th week of the intervention period were used. During these time periods, internal reliabilities ranged from .91 to .92 for the interest/enjoyment subscale, from .92 to .92 for the perceived choice subscale, and from .85 to .80 for the tension/pressure subscale.

Suspensions. To establish whether participants believed that support messages were provided by a peer (rather than the experimenter), one open-ended question (“Did you have any suspicions about this study?”) was administered at the end of the study.

Chapter 3: Results

Baseline Analyses

To determine whether baseline condition differences existed prior to the manipulation, a one-way analysis of variance was performed. As expected, the three

groups did not differ in subjective happiness, negative affect, or positive affect at the beginning of the study (all F s < 2.3, *ns*).

Manipulation Check Contrast Analyses

To determine whether groups that received autonomy support increased in autonomy more than groups that did not receive autonomy support, a planned contrast was performed (see Table 1 for contrast weights).

A linear increase theory (-3, -2, -1, 0, +1, +2, +3) was tested for all seven measurements of autonomy. Surprisingly, the two groups that received autonomy support did not increase in autonomy more than the two groups that did not receive autonomy support, $t(145) = .80$, *ns*, $r = .07$. However, another planned contrast revealed that only participants who received autonomy support *and* did acts of kindness marginally significantly increased in autonomy, $t(145) = 1.57$, $p = .06$, $r = .13$, relative to the other groups. In other words, although autonomy support was expected to increase autonomy regardless of the assigned activity, autonomy support in this study was effective in increasing self-reported autonomy only among those who performed acts of kindness (see Figure 1).

In addition, responses to the open-ended question did not reveal any suspicions, indicating no skepticism by participants that anyone else but a fellow student wrote the weekly support messages.

Well-Being Contrast Analyses

Subjective happiness, negative affect, and positive affect were assessed immediately before, halfway through, and immediately after the intervention period. A

linear increase theory (-1, 0, +1) was tested for each of these three measurements.

Means and standard deviations for changes in subjective happiness, negative affect, and positive affect from baseline to post-intervention are presented in Table 2, which compares the kindness/support, kindness/no-support, and the two control conditions.

Planned contrasts were performed on all three measurements (pre-, mid-, and post-intervention) of subjective happiness, negative affect, and positive affect (Rosenthal, Rosnow, & Rubin, 2000). These contrasts compared the kindness/support group to the kindness/no-support group and the control groups (Hypothesis 1; see Table 2 for contrast weights). This analysis was significant for subjective happiness, $t(99) = 1.97$, $p = .03$, $r = .14$ (see Figure 2), and for negative affect, $t(178) = 1.88$, $p = .03$, $r = .14$ (see Figure 3), but not for positive affect, $t(178) = -0.60$, ns , $r = .04$ (see Figure 4). These results indicate that those who performed acts of kindness with autonomy support experienced linear increases in subjective happiness and linear decreases in negative affect, relative to the kindness/no support group and the control groups.

The Role of Intrinsic Motivation

I used a regression framework to explore whether the effect of the kindness/support condition vs. the other three groups on subjective happiness, negative affect, and positive affect was mediated by changes in intrinsic motivation (Hypothesis 2). Three indicators of intrinsic motivation were tested as mediators – tension/pressure (Hypothesis 2a), perceived choice (Hypothesis 2b), and interest/enjoyment (Hypothesis 2c).

In Step 1 of the mediation analyses, the effect of condition on the dependent variable (measured at post-intervention and controlling for the same variable at baseline) must be established (Baron & Kenny, 1986). The results showed that practicing acts of kindness with autonomy support marginally predicted increased subjective happiness, followed by practicing acts of kindness with no autonomy support and completing regularly assigned academic work, with or without autonomy support, $\beta = .08$, $t(183) = 1.73$, $p = .085$. In addition, a significant effect was found for negative affect, $\beta = .18$, $t(182) = 2.93$, $p < .01$, but not for positive affect, $\beta = -.04$, $t(182) = -0.62$, *ns*. Therefore, further mediation analyses were conducted using only negative affect and happiness as outcomes.

Step 2 revealed that condition predicted the extent to which participants experienced the three indicators of intrinsic motivation while performing their assigned activity: The degree to which participants felt tension or pressure while performing their assigned activity, $\beta = -.23$, $t(215) = -3.42$, $p < .01$; the degree to which participants felt a sense of choice while performing their assigned activity, $\beta = .34$, $t(215) = 5.23$, $p < .01$; and the degree to which participants enjoyed performing their assigned activity, $\beta = .24$, $t(215) = 3.57$, $p < .01$.

In Step 3, changes in intrinsic motivation were associated with post-intervention happiness when controlling for condition and baseline happiness. This was indicated by the degree to which participants felt tension or pressure, $\beta = -.12$, $t(181) = -2.51$, $p = .01$, but not by whether they felt a sense of choice, $\beta = .03$, $t(181) = 0.52$, *ns*, or whether they felt a sense of enjoyment, $\beta = .07$, $t(181) = 1.46$, *ns*.

Changes in intrinsic motivation were also associated with post-intervention reductions in negative affect. This was indicated by the degree to which participants felt tension or pressure, $\beta = .12$, $t(181) = 1.86$, $p = .06$, and by whether they felt a sense of choice, $\beta = -.11$, $t(181) = -1.69$, $p = .09$, but not whether they felt a sense of enjoyment, $\beta = -.09$, $t(181) = -1.44$, *ns*.

In support of Hypothesis 2a, a Sobel test revealed a significant reduction in the variance of subjective happiness, $Z = 2.19$, $p = .01$, and negative affect, $Z = -1.87$, $p = .03$, explained by condition when tension or pressure was added to the equation. In support of Hypothesis 2b, this effect was also found for negative affect (but not subjective happiness) when perceived choice was added to the equation, $Z = 2.06$, $p = .02$. However, the results did not support Hypothesis 2c, as no significant reductions in the variances of subjective happiness or negative affect were found when enjoyment was added to the equation. These findings suggest that a lack of tension/pressure and a sense of choice while performing acts of kindness with autonomy support partially mediated the relationship between group assignment and post-intervention well-being.

Chapter 4: Discussion

The present study was conducted with both U.S. and South Korean students to investigate the degree to which autonomy support enhances the benefits experienced by people performing acts of kindness. Below I discuss the meaning and implications of my findings with respect to increases in autonomy and well-being among my four experimental conditions, as well as the mediating role of intrinsic motivation.

Increases in Autonomy

To begin, only those who received autonomy support for performing acts of kindness significantly increased in autonomy, compared to those who did not receive autonomy support for kindness or those who did or did not receive autonomy support for completing academic coursework (see Figure 1). Although previous research suggests that perceived autonomy support from an instructor benefits students engaged in academic coursework (e.g., Black & Deci, 2000; Jang et al., 2010), support delivered via pre-scripted electronic messages may not have been enough to increase autonomy in this experiment. Prior studies, however, have provided autonomy support via in-person interactions (e.g., Edmunds, Ntoumanis, & Duda, 2008), and this approach may be more beneficial for students engaged in challenging work than simply receiving brief electronic autonomy-supportive messages. By contrast, my results showed that autonomy support delivered via pre-scripted electronic messages was sufficient to increase autonomy in students engaged in the relatively undemanding and stress-free activity of carrying out acts of kindness.

The Benefits of Performing Acts of Kindness with Autonomy Support

My first hypothesis was that students performing acts of kindness with autonomy support would experience greater increases in well-being than those performing acts of kindness without autonomy support or those completing their regularly assigned academic work (with or without autonomy support). This notion is consistent with work showing that people who engage in happiness-boosting activities with a high degree of self-concordance (which taps autonomous motivation) benefit more than those with low

self-concordance (Sheldon & Lyubomirsky, 2006). Analyses using subjective happiness and negative affect as outcome variables supported this hypothesis (see Figures 2 and 3, respectively), but analyses using positive affect as an outcome were not significant (see Figure 4). This mixed pattern of results is not surprising, as positive and negative affect represent two independent components of subjective well-being (Russell & Carroll, 1999). Indeed, previous research shows that, rather than operating as opposing constructs, positive and negative affect correlate with other variables differently (e.g., Watson & Pennebaker, 1989). Accordingly, it makes sense that my intervention, which commenced several weeks into the academic quarter and ended close to finals, led students to experience reductions in negative affect amidst the quarter's stress and challenges. Confronted with a mountain of homework, midterms, and imminent finals, students may have been disposed to feel aversive mood states (e.g., anxiety, guilt, disappointment) as they began my study and, as a result, experienced subjective reductions in negative affect as they completed acts of kindness for others and received autonomy support.

Increases in positive affect, however, would have been relatively unexpected during this stressful period because students were likely not experiencing excitement or enthusiasm in the first place. Accordingly, as shown in Table 2 and Figure 4, participants in all four conditions experienced decreases in positive affect throughout the study. By contrast, students performing acts of kindness with autonomy support showed increases in subjective happiness, a global assessment of well-being (Lyubomirsky & Lepper, 1999). To be sure, if participants in the kindness/support group experienced reductions in negative affect compared to other students, they are likely to have reported feeling

happier than their peers, which was one of the three items on the measure I used to assess happiness. In addition, relative to participants' activities prior to beginning the study, the novel combination of doing acts of kindness for others and receiving autonomy support may have fostered experiences of overall subjective happiness (i.e., feeling good about being generous while being optimally motivated to do so). Thus, although students did not report increased day-to-day positive affect (a bottom-up judgment), they did report an overall improvement in their sense of being a happy person (a top-down judgment). In sum, the present study demonstrates how positive interventions can result in improvements in some, but not all, components of well-being, especially with regard to global versus moment-to-moment subjective experiences.

Although I expected the kindness/support group to benefit more than the control groups, the kindness/no support group's relative lack of improvement in this study requires further explanation. A previous randomized controlled longitudinal intervention, conducted during the relatively leisurely pace of summer, found that doing five acts of kindness in one day is beneficial (Lyubomirsky, Sheldon et al., 2005). Consistent with these prior results, students performing acts of kindness (without autonomy support) did show increased subjective happiness and reduced negative affect during the first half of the intervention period (see Table 2 and Figures 2 and 3). The decline in these outcomes during the second half of my study may be explained by the increasing strain and challenge the students were confronting as the academic quarter intensified. Indeed, students assigned to complete acts of kindness were confronted with both their academic work and the obligation of doing the kind acts, which may have augmented their stress.

By contrast, during this challenging period, autonomy support appears to have had a synergistic effect on the practice of kindness, by emphasizing the choice students had in carrying out the activity, pointing out the benefits they could expect, and acknowledging the feelings they were most likely experiencing.

The Mediating Role of Intrinsic Motivation

My second hypothesis explored why those performing acts of kindness experienced the biggest increases in happiness and the biggest reductions in negative emotions – that is, why they benefited the most. My results suggest that they benefited in part because the activity triggered increases in intrinsic motivation. Specifically, if while doing kind acts while receiving autonomy support, participants felt a lack of tension or pressure or a sense of choice in performing the activity, they were more likely to experience greater happiness, less negative affect, or both. These mediational results are buttressed by the strong theoretical link between autonomy and intrinsic motivation (Deci & Ryan, 2000).

Interestingly, a sense of interest or enjoyment (a hallmark indicator of intrinsic motivation) did not significantly mediate the relationship between doing a positive activity with autonomous support and subsequent gains in well-being. Although analyses suggest that the acts of kindness activity was beneficial, participants may not have found this activity to be interesting or enjoyable. However, it appears that participants did experience a sense of choice and lack of tension or pressure while performing acts of kindness and receiving autonomy support messages, and these experiences were associated with post-intervention benefits for well-being. In future studies, a sense of

interest or enjoyment may be more likely to play a significant mediating role if participants are asked to enact a positive activity that fits their personality, preferences, or goals (Lyubomirsky, Sheldon et al., 2005).

Another puzzle is why a perceived sense of choice was found to mediate the relationship between performing acts of kindness with autonomy support and post-intervention reductions in negative affect but not for gains in subjective happiness. One possibility is that a sense of choice in performing acts of kindness may impact feelings of state negative affect more than global happiness assessments. Given that participants were asked whether they felt a sense of choice regarding only the assigned experimental activity, subsequent decreases in state negative affect may reflect their subjective experiences during the intervention period only. My results for the happiness variable may have been stronger if participants had been asked the degree to which they have felt an overall sense of choice in their happiness-boosting activities over a longer period of time.

Caveats and Limitations

The present study had several limitations. First, although autonomy support is expected to be applicable to virtually any positive activity, only one (performing acts of kindness) was examined here. Future research should continue to explore the role of autonomy support in a variety of happiness-boosting practices. Ideally, participants should have a high degree of person-activity fit with the activity so that they personally endorse it from the beginning of the intervention (Lyubomirsky, Sheldon et al., 2005). If some participants start out with a weak fit, autonomy support is essentially left to do the

“heavy lifting” of gradually changing their attitudes and perceptions toward completing the happiness-boosting strategy.

Additionally, the success of autonomy support may have been contingent on whether participants believed that the weekly messages were coming from peers. This method of providing autonomy support (sending pre-scripted electronic messages) should be tested using messages ostensibly sent by the experimenter or a comparable authority figure. Indeed, previous research shows that autonomy support (offered in-person) is effective when given by teachers (e.g., Jang et al., 2010), workplace supervisors (e.g., Deci, et al., 1989, 2001), and athletic coaches (Adie, Duda, & Ntoumanis, 2008). If similar results are found when autonomy support is tendered via electronic messages, they will provide an empirical foundation on which professionals in applied settings can use this technique without the impractical concern of whether or not participants believe the source of the messages.

Lastly, some of the mediation analyses (at Steps 1 and 3) were marginally significant. Although effects above .05 may be considered by some researchers to be too small and unworthy of serious attention, such results in positive intervention research should be assessed based on the trade-off between their trivial costs versus their potential benefits for helping people. Performing acts of kindness and other positive activities have essentially no drawbacks for individual happiness-seekers. Thus, even small effect sizes suggesting that a positive activity may be beneficial, or positing a mechanism explaining why the activity is effective, should be noted and further explored (Frattaroli, 2006).

Study Implications and Conclusions

The results of this study elucidate the importance of autonomy support when administering positive interventions in basic and applied research settings. A large number of SDT-based intervention studies have spotlighted the effectiveness of autonomy support in fostering positive behavior change and enhancing work performance (e.g., Fortier, Sweet, O'Sullivan, & Williams, 2007; Ryan et al., 2009). Aside from the moderating role of self-concordant motivation (Sheldon & Lyubomirsky, 2006), little has been done to draw on the conclusions drawn from this area when designing and testing optimal ways to perform happiness-boosting activities. To this end, the present study was the first to test whether autonomy support plays a role in the optimal performance of happiness-enhancing strategies. Future studies building on these findings will help bridge together these two research areas and begin to build a theoretical framework describing the optimal practice of positive activities, which may lead to other fruitful research directions.

Furthermore, my results indicate that autonomy support, delivered via pre-scripted, electronic messages, can be administered in an easy, inexpensive, brief, and uniform manner, applicable to virtually any positive activity. The novel autonomy support manipulation developed for the present study can be used by researchers to refine autonomy support techniques and further explore the effects of these techniques on different types of happiness-increasing practices. Indeed, as discussed above, autonomy support may be even more beneficial for other positive activities, which may be a better fit for happiness seekers. Future investigations in this area will offer positive

interventionists additional evidence regarding how these activities are most optimally practiced.

Notably, the results suggest that my novel autonomy support manipulation can be implemented successfully in more than one culture. As mentioned above, no differences were found between the UCR and SNU samples – namely, autonomously supported acts of kindness led to boosts in well-being in both the U.S. and South Korea. Consistent with this finding, previous research has demonstrated the effectiveness of perceived autonomy support in facilitating desirable behavior change among students in a variety of cultures (see Chirkov, 2009, for a review). Furthermore, my results are directly supported by a previous study that showed that self-concordant goals, which largely tap autonomous motivation, were reported as frequently by Asian participants (including South Koreans) as they were by U.S. participants (Sheldon et al., 2004). Thus, the provision of autonomy support appears to be a good fit for members of both Eastern and Western cultures, perhaps because the drive to autonomously pursue goals is universal. Accordingly, the effectiveness of autonomously supported positive activities should be tested in a variety of cultures to further explore the cross-cultural generalizability of these findings.

Finally, results from the present study and future research in this area will benefit not only positive intervention research, but also individuals wishing to administer these activities in clinical (e.g., mental health) and non-clinical (e.g., business, educational, government, athletic) settings. As the popularity of positive interventions continues to grow, researchers need to accommodate interested practitioners and laypeople by offering a variety of empirically supported recommendations for the optimal implementation of

these happiness-enhancing strategies. Although research reveals the benefits of many happiness-boosting activities (Sin & Lyubomirsky, 2009), the extent and mechanisms of these benefits remain unknown. The inclusion of autonomy support into positive activity practices will serve as an example of how to assist individuals more effectively in their journeys toward self-improvement and sustainable well-being.

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Table 1

Means (SDs) for Changes in Autonomy by Condition

	Kindness/ Support		Kindness/ No- support		Academic/ Support		Academic/ No- support	
Contrast Weight (λ) Testing Manipulation Check 1	(+1)		(-1)		(+1)		(-1)	
Contrast Weight (λ) Testing Manipulation Check 2	(+.75)		(-.25)		(-.25)		(-.25)	
	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>N</i>
Assessment 1(Immediately Pre-Intervention)	4.88 (1.17)	51	4.89 (1.06)	50	4.95 (1.23)	58	4.62 (1.31)	59
Assessment 2	4.86 (1.06)	50	5.06 (1.01)	47	4.92 (1.32)	54	4.97 (1.33)	55
Assessment 3	4.97 (1.12)	49	4.79 (1.13)	49	4.85 (1.25)	55	4.65 (1.26)	56
Assessment 4 (Mid-Intervention)	4.92 (1.11)	46	4.91 (1.01)	47	4.84 (1.27)	53	4.68 (1.06)	54
Assessment 5	5.16 (1.12)	43	4.95 (1.17)	42	4.77 (1.25)	51	4.57 (1.12)	51
Assessment 6	5.24 (1.17)	42	4.84 (1.48)	43	4.59 (1.41)	50	4.65 (1.11)	51
Assessment 7 (Immediately Post-Intervention)	5.17 (1.01)	42	5.03 (1.32)	44	4.92 (1.26)	53	4.68 (.97)	52

Table 2

Means (SDs) for Changes in Subjective Happiness, Negative Affect and Positive Affect by Condition

	Kindness/ Support		Kindness/ No-support		Academic/ Support		Academic/ No-support	
Contrast Weight (λ) Testing Hypothesis 1	(+.75)		(-.25)		(-.25)		(-.25)	
Outcome	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>
Subjective Happiness								
Immediately Pre- Intervention	5.10 (1.18)	51	5.01 (0.97)	50	5.23 (1.09)	51	5.01 (1.18)	59
Mid- Intervention	5.18 (1.29)	46	5.20 (1.01)	47	5.29 (1.14)	46	5.02 (1.22)	54
Immediately Post- Intervention	5.28 (1.27)	42	4.96 (1.02)	41	5.10 (1.24)	42	4.94 (1.35)	51
Negative Affect (reverse-coded)								
Immediately Pre- Intervention	2.90 (0.48)	51	2.71 (0.63)	50	2.72 (0.58)	57	2.62 (0.63)	58
Mid- Intervention	3.09 (0.49)	46	2.84 (0.71)	47	2.74 (0.61)	52	2.80 (0.62)	54
Immediately Post- Intervention	3.16 (0.64)	42	2.62 (0.78)	40	2.75 (0.64)	52	2.71 (0.70)	50
Positive Affect								
Immediately Pre- Intervention	2.51 (0.58)	51	2.50 (0.55)	50	2.63 (0.66)	57	2.38 (0.78)	58
Mid- Intervention	2.36 (0.70)	46	2.39 (0.59)	47	2.36 (0.77)	52	2.32 (0.71)	54
Immediately Post- Intervention	2.27 (0.78)	42	2.36 (0.66)	40	2.44 (0.73)	52	2.18 (0.77)	50

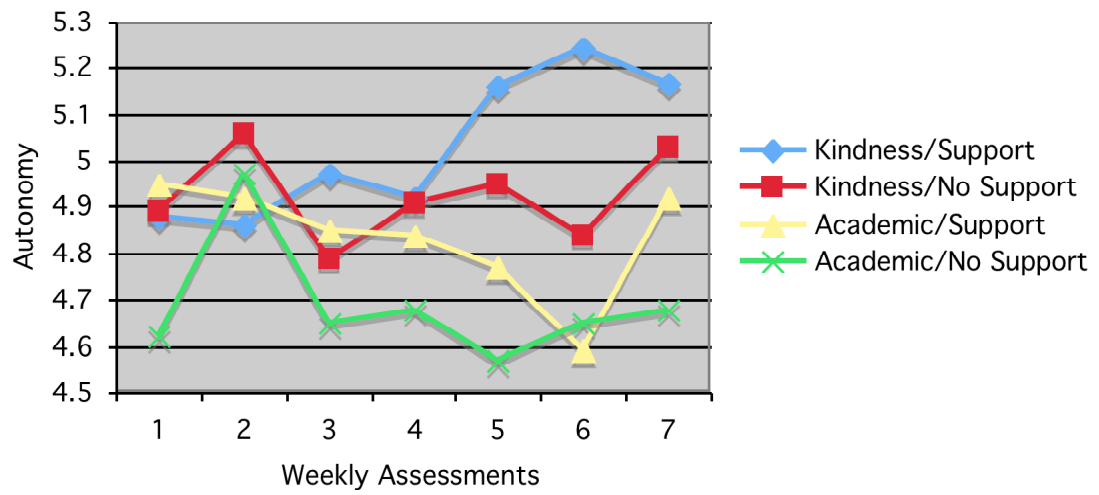


Figure 1. Changes in autonomy over the 6 weeks of the intervention for each condition.

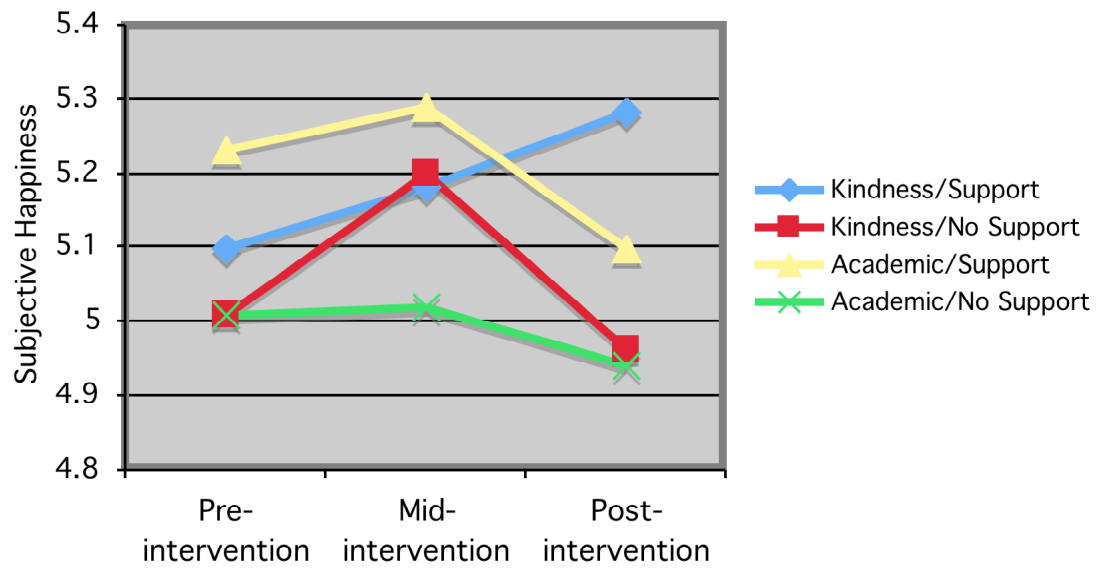


Figure 2. Changes in subjective happiness over the 6 weeks of the intervention for each condition.

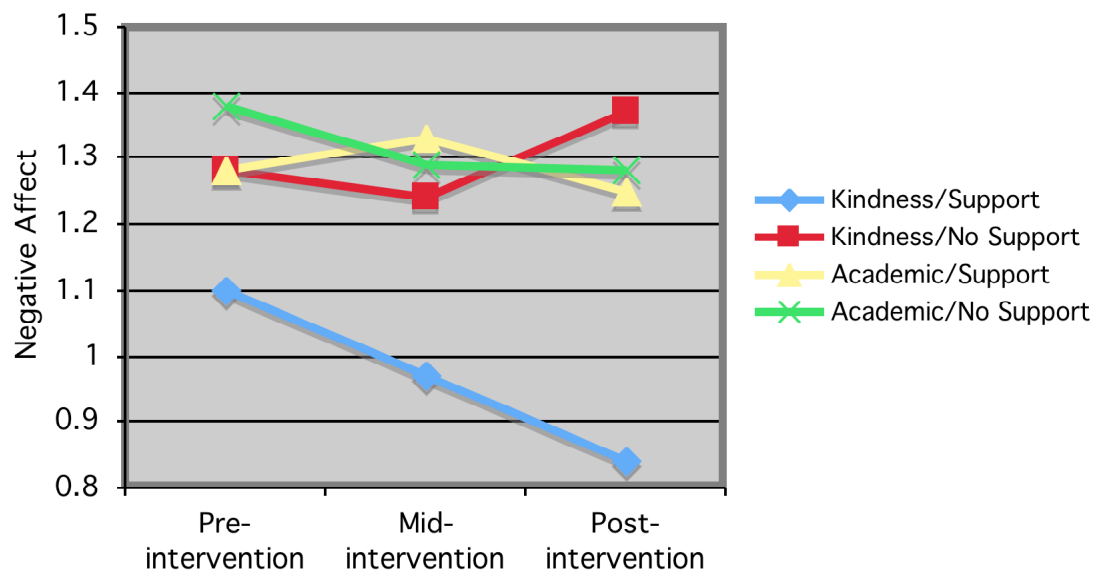


Figure 3. Changes in negative affect over the 6 weeks of the intervention for each condition.

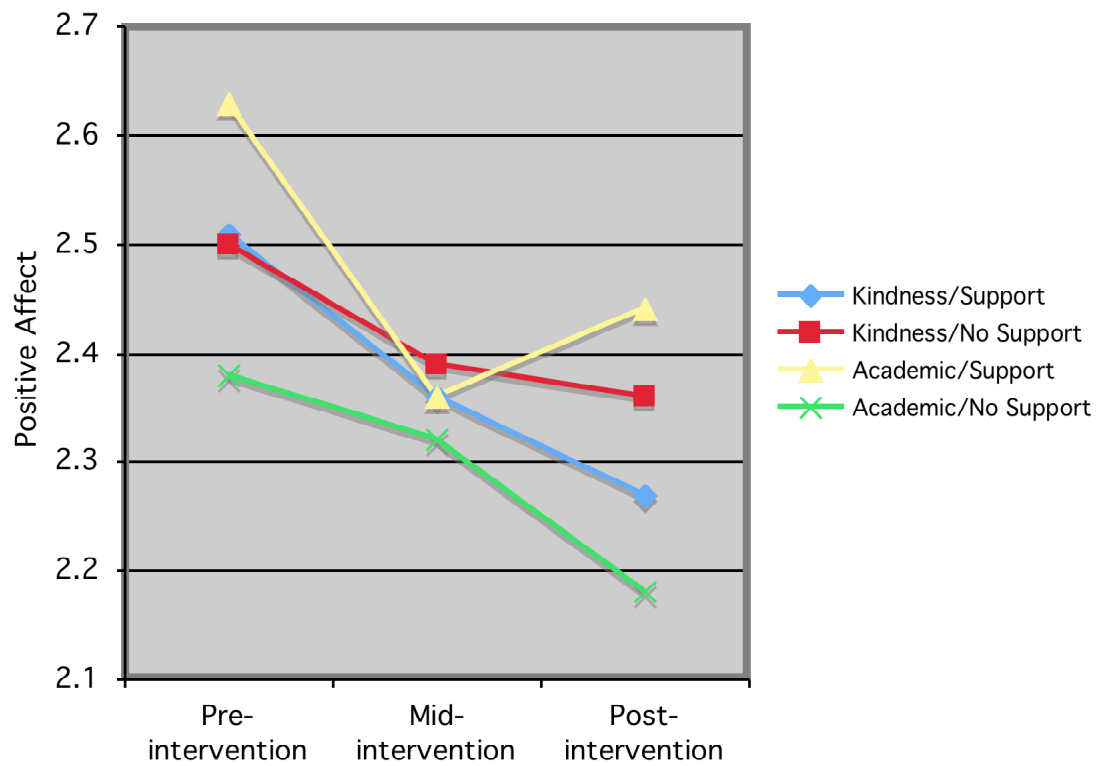


Figure 4. Changes in positive affect over the 6 weeks of the intervention for each condition.

Appendix A

Weekly Autonomy Support Messages for Performing Acts of Kindness

Providing a Rationale

Hey, [participant name]! Did u know that doing acts of kindness helps u become happier?! A bunch of studies show that people who do five acts of kindness for other people all in one day are happier than people who don't! :)

Hey, [participant name]! Did u know that performing acts of kindness is kinda like the domino effect? Legit studies have been done to show that if people see or hear bout an act of kindness they are more likely to do one themselves! Who knows what impact u might have :)

Giving a Sense of Choice

Hey, [participant name]! I hope ur excited to do five acts of kindness all in one day :) Just wanted to let ya know that where u do these acts and who u do them for is totally up to u. Feel free to do this however u want! :)

Hey [participant name]! There's a bunch of places to do the five acts of kindness all in one day. You might wanna do them at home or at school or somewhere else. Either way, do whatever u want! :)

Acknowledging the Perspective of Participants

Hey, [participant name]! I know u might think that doing five acts of kindness all in one day may seem kinda difficult or awkward lol. Just do the best u can and u will start to feel more comfortable as time goes on! :)

Hey [participant name]! So u might be thinking that doing these five acts of kindness in one day is kinda random or forced, but just keep trying to do them and in time u will feel more comfortable and that ppl appreciate them. Plus u will feel really good about urself lol :)

Appendix B

Weekly Autonomy Support Messages for Completing Academic Coursework

Providing a Rationale

Hey (participant name)! Did u know that taking notes while doing reading for class totally helps u out during the test? Studies show that ppl who take notes while reading do way better than ppl who don't!

Hey, (participant name)! Did u know that A students spend 2 hrs studying for every hour they are in class? Legit studies have been done to show that students that fail only study 1/3 as much as A students. Putting in the time to study really helps a lot :)

Giving a Sense of Choice

Hey (participant name)! I hope ur excited to study! :) Just wanted to let ya know that where u study and how u do it is totally up to u. Do this however u want! :)

Hey (participant name)! There's a bunch of places u can study. You might wanna study at the library or at home or somewhere else. Either way, do whatever u want! :)

Acknowledging the Perspective of Participants

Hey (participant name)! I know u might think that doing school stuff is kinda lame or boring lol. Just do the best u can and it will get better as time goes on! :)

Hey (participant name)! So u might be thinking that doing homework or studying is kinda annoying or stressful, but just hang in there and after a while it won't be so bad. Plus u might learn something cool lol.