HIGH SCHOOL EDITION
Journal of Student Research
Volume 13 Issue 3 (2024)

Student-Led Kindness Intervention Boosts High School Students' Well-Being

Nathan Hu[1] and Leah Domb[#]

[1]The Lawrenceville School, USA
[#]Advisor

ABSTRACT

Despite growing public concerns about high school students' mental health, research into how kindness-based interventions affect their subjective well-being remains scant. This study addresses three research gaps in kindness-based interventions: adolescent-peer leadership throughout the experiment, administration outside laboratory or classroom settings, and applicability to boarding high school students. These gaps exist because kindness-based interventions for adolescents are a relatively new topic. Addressing these gaps may help improve the interventions' effectiveness and their costs. I hypothesized that a seven-day pay-it-forward random acts of kindness intervention would boost the subjective well-being of boarding high school students. Volunteer participants from a boarding high school were randomly assigned to an intervention group (random acts of kindness) or an active control group (tree observations). Thirty and thirty-two participants completed the study, respectively. I administered the experiment online via emails and a dedicated website. Results indicated a statistically significant enhancement in participants' happiness and a large effect size as measured by the Subjective Happiness Scale. Although improvements in gratitude and life satisfaction, as assessed by the Gratitude Questionnaire and the Satisfaction With Life Scale, respectively, were not statistically significant, their positive trends suggest that a broader impact on the school community's subjective gratitude and life satisfaction might be achievable with a larger sample size or an extended intervention duration. This peer-led, simple, and cost-effective kindness-based intervention can be readily replicated by student leaders in day and boarding high schools on a sustainable and scalable basis, bolstering subjective well-being at both individual and school community levels.

Introduction

The government and the public have become increasingly concerned about the social disconnection and the well-being of youth since the COVID-19 pandemic (U.S. Department of Education, 2021, pp. 3-9, 11, 15). Santini et al. (2021) report, "Social disconnectedness was positively associated with mental health problems, such as depression symptoms, anxiety symptoms, stress, sleep problems, suicidal ideation, non-suicidal self-injury, eating disorders, body dissatisfaction, and low self-esteem, and negatively associated with subjective well-being" (p. 1). Furthermore, prosocial behaviors reduce loneliness and enhance positive mood, and subjective well-being (Lanser & Eisenberger, 2022). Post (2005) suggests that self-reported subjective well-being, including feelings of hope, happiness, life satisfaction, energy, social connectedness, and positive mood and emotions, is associated with the mental health of adults.

Acts of kindness are primary prosocial behaviors that enhance the mental well-being of pre-adolescents who perform/give them (Layous et al., 2012). Specifically, toddlers and adults performing/giving pay-it-forward random acts of kindness (PIF RAK)—spontaneous actions aimed at benefiting others without expectation of reciprocation—significantly improve their own subjective well-being, according to Curry et al. (2018). The meta-analysis by Hui et al. (2020) confirms these causal relationships in adults. Experimental studies, such

as those conducted by Buchanan and Bardi (2010), Nelson et al. (2016), and Rowland and Curry (2019), also suggest that PIF RAK interventions can significantly bolster the subjective well-being of adult givers/performers of acts of kindness. These causal-relational studies, covering toddlers, pre-adolescents, and adults, indicate a high likelihood that PIF RAK interventions can significantly improve the subjective well-being of high school students who perform/give acts of kindness.

Literature Review

Two prior meta-analyses, identified through a systematic literature review depicted in Figure 1, focus on the causal effects of acts of kindness interventions on the subjective well-being of individuals who perform/give them. The first meta-analysis, authored by Curry et al. (2018), comprises 27 experimental studies, and the second, conducted by Hui et al. (2020), includes 55 experimental studies. Although these two meta-analyses do not include studies involving high school students (Curry et al., 2018, pp. 324-325; Hui et al., 2020, p. 1090), they provide valuable insights into the experimental design of this current study.

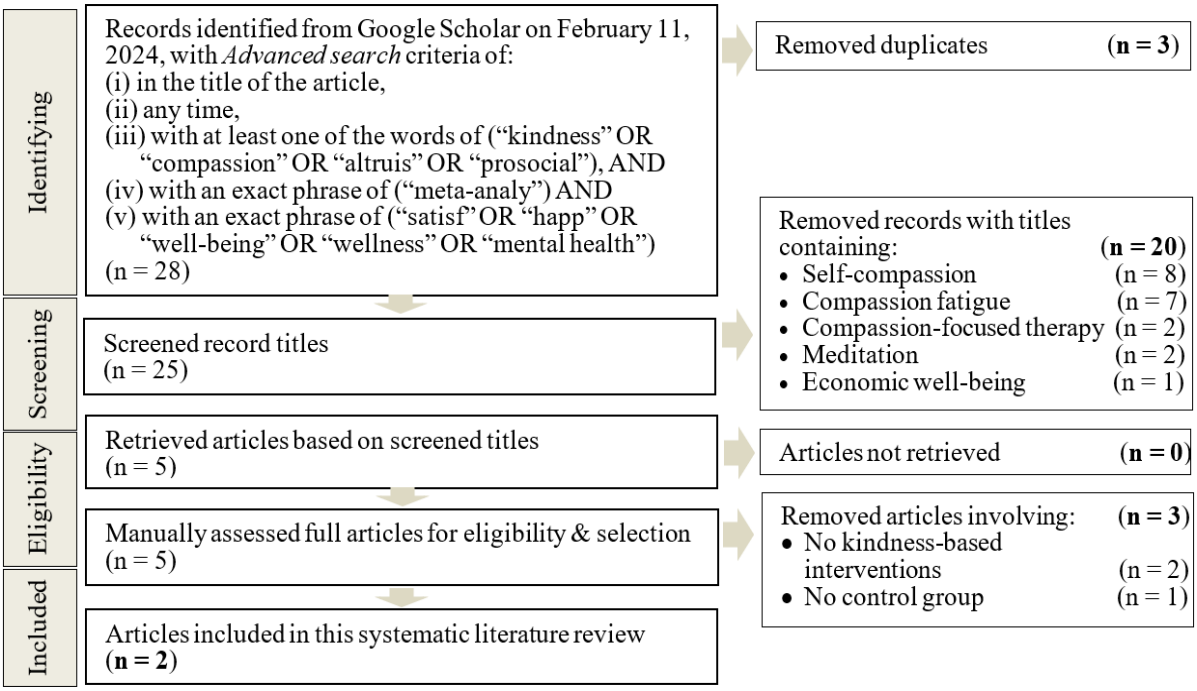

Figure 1. Selection Process for Meta-Analysis Articles of Kindness-Based Experiments. Source: This flow chart is adapted from Page et al. (2021).

The meta-analysis by Curry et al. (2018, p. 325) reveals a small-to-medium weighted average effect size, with a Cohen's *d*-value of 0.28, across all its included 27 experimental studies. Among these, 25 studies measured dependent variables through self-reported metrics such as positive affect, negative affect, subjective happiness, and life satisfaction. The remaining two studies, conducted by Aknin et al. (2012) and Aknin et al. (2015, Study 2), focused on the smiling behaviors of toddlers and young children, with average ages of 1.9 and 3 years, respectively.

Despite a small-to-medium weighted average effect size reported by Curry et al.'s meta-analysis (2018), it includes one study conducted by Aknin et al. (2015, Study 1, p. 790) with a large effect size. Aknin et al. report Cohen's $d = 0.93$ and $t(24) = 2.383$, $p < 0.03$, two-tailed, to support their hypothesis that pay-it-

forward kindness interventions in a small and close-knit environment significantly bolstered the subjective well-being of givers/performers of acts of kindness with a large effect (2015, Study 1, p. 790). In Aknin et al. (2015, Study 1), adult participants in a small and isolated village on Tanna Island made a large prosocial purchase equivalent to one day's wage for others in an intervention group, compared to purchases for themselves in a control group (Study 1, p.790). The dependent variable was positive affect, measured by the Positive and Negative Affect Schedule (pp. 789-790). The Aknin et al. (2015) study's focus on close social ties between givers/performers of acts of kindness and recipients inspired me to conduct my current study in a boarding high school, where students study and live on campus for most of the year, tending to have close social ties. The close social ties in a boarding high school are akin to those living on a small and isolated island in the study by Aknin et al. (2015).

The meta-analysis by Hui et al. (2020) reports a weighted average effect size, Cohen's $d = 0.32$, with a 95% confidence interval ranging from 0.24 to 0.39 (p. 1094), an effect size similar to that found in the meta-analysis by Curry et al. (2018). Hui et al. (2020) draw three critical conclusions regarding the effectiveness of kindness-based interventions. First, spontaneous and unplanned acts of kindness provide more substantial well-being benefits for the individuals performing/giving them than formal and planned acts of kindness (Hui et al., 2020, p. 1103). Second, younger individuals performing/giving acts of kindness show more pronounced improvements in subjective well-being than older individuals (Hui et al., 2020, p. 1084). Third, acts of kindness directed toward recipients with whom the givers/performers have strong social ties are associated with large positive effects on the givers'/performers' subjective well-being than those directed toward recipients with weaker social ties (Hui et al., 2020, p. 1085).

An experimental study by Tashjian et al. (2021), identified through the second systematic literature review depicted in Figure 2, is the only kindness-based intervention study involving high school students. The researchers recruited high school students from day schools near the local area of their university's laboratory because there were no boarding high schools nearby. Their experimental design consisted of an intervention group (n = 33), which performed/gave one act of kindness per day for three days a week over four weeks, and two control groups: an active control (n = 34) and a passive control (n = 30). The active control group participants performed acts of kindness for themselves for the same duration and frequency. The passive control group participants were not prompted to perform/give any acts. The researchers found that participants in the intervention group showed a statistically significant improvement in subjective well-being with a medium effect size, Cohen's $d = 0.54$, compared to their counterparts in the active control group. However, this improvement was not statistically significant when the intervention group was compared to the passive control group (Tashjian et al., 2021).

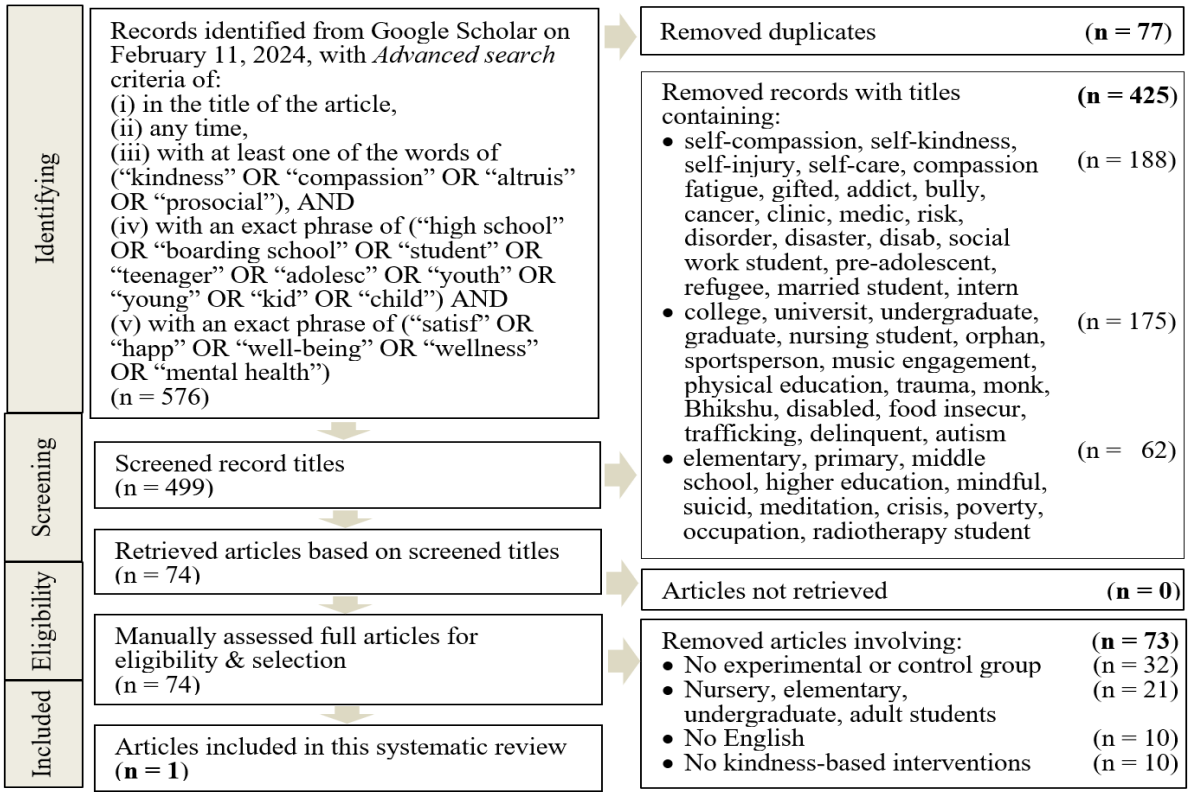

Figure 2. Selection Process for Kindness-Based Experiments Involving High School Students. Source: This flow chart is adapted from Page et al. (2021).

Gaps to Be Addressed

After analyzing the two systematic literature reviews, their included studies and cited sources, and the experiment conducted by Tashjian et al. (2021), I identified three gaps within the domain of kindness-based research that this current study aims to address:

Boarding High School Environment

No kindness-based experiments have been conducted in a boarding high school environment. The boarding school environment presents unique social dynamics and opportunities for community building that differ from those in day school settings. The results of the study by Aknin et al. (2015, p. 790) suggest that givers/performers of acts of kindness within a small community with strong social ties show a large effect in enhancements to their subjective well-being. The meta-analysis conducted by Hui et al. (2020), which focuses on adults, also indicates a trend that givers/performers of acts of kindness tend to show large positive effects on their subjective well-being when they are young and have strong social ties with the recipients of their acts of kindness (p. 1085). Because students in a boarding high school environment live and study in a close-knit community, they tend to have stronger social ties than adults and day school students. Therefore, this current study investigates whether kindness-based interventions in a boarding high school environment may significantly enhance participants' subjective well-being with a large effect.

Adolescent-and-Peer-Led Research

No prior kindness-based experiments led by adolescent researchers have been conducted, according to the first and second systematic literature reviews depicted in Figure 1 and Figure 2. Implementing adolescent-and-peer-led interventions could help reduce response bias, which McGrath et al. (2010, p. 451) define as "a consistent tendency to respond inaccurately to a substantive indicator, resulting in systematic error in prediction." Furthermore, the study by Bartholomay and Sifers (2016, p. 305) reveals that college students, in the face of faculty authority, "reported moderate levels of perceived pressure to participate in faculty-led research," including those participation opportunities that are ostensibly voluntary. An adolescent-and-peer-led research study promotes the voluntary involvement of adolescent participants, thereby reducing perceived pressures and the likelihood of inauthentic prosocial responses. The absence of adult authority may give adolescent participants a sense of autonomy. These insights align with self-determination theory (Deci & Ryan, 2000) and research by Weinstein and Ryan (2010), which report significant associations between autonomous acts of kindness and enhancements in the subjective well-being of the givers/performers of acts of kindness.

In this current study, I, an adolescent peer, used broadcast emails to recruit volunteer student participants and dispatched daily prompt emails for their acts of kindness and control activities. The adolescent participants knew that I, not an adult, led and administered the study.

Administration Outside Classrooms/Laboratories

Although some kindness-based experiments for adults have been conducted in natural environments, no such experiments for adolescents have been administered entirely outside of classroom or laboratory settings, according to the two systematic literature reviews depicted in Figure 1 and Figure 2. Administering experiments in natural settings could give adolescent participants a sense of autonomy, inspiring their autonomous acts of kindness. Therefore, this current study's administration of kindness-based interventions outside traditional classroom or laboratory settings may help boost the adolescent participants' subjective well-being to a large effect size.

Building on a Successful Precedent Experiment

I adopted the successful web-based methodology from Tashjian et al. (2021) for this current study, administering an online intervention featuring pay-it-forward random acts of kindness for high school students attending a boarding school. In addition, I made three major adjustments to their experimental design:

Shortened Post-Intervention Assessment Period

I shortened the time gap between the end of the intervention and the subsequent post-test survey to one day, as opposed to the one-week gap used in Tashjian et al. (2021). This adjustment was designed to capture measures of participants' subjective well-being more immediately, potentially reducing recall bias.

Consolidated Control Groups

I consolidated the control group structure by incorporating only one control group instead of the two control groups used in Tashjian et al. (2021). This modification streamlined the experiment's administration. Given the same total number of participants, having one less control group meant larger sample sizes in both the intervention and control groups, thereby increasing the statistical power of this current study.

Intensified Intervention

I intensified the intervention by having participants perform/give three or more random acts of kindness daily for seven consecutive days, unlike Tashjian et al. (2021), where participants performed/gave one act per day

for three days each week over four weeks. This condensed seven-day protocol aligns with the methodology used in the random acts of kindness experiment by Rowland and Curry (2019), which involved performing/giving one act of kindness daily for one week. This modification was designed to lower the dropout rate of volunteer participants due to the long intervention duration and to amplify the intervention's impact.

Hypothesis

I proposed the following hypothesis: A seven-day web-based intervention featuring pay-it-forward random acts of kindness (PIF RAK)—defined as spontaneous or unplanned actions intended to benefit others without expecting reciprocation—led and administered by a peer student outside of classroom and laboratory settings would enhance the self-reported measures of subjective well-being of student participants in the intervention group compared to those in an active control condition at a boarding high school.

Methods

The administration authority of an East Coast boarding high school ("the Boarding High School") approved the proposed experiment for this current study in February 2024. This approval confirms that the experiment complies with the school's policies and ethical guidelines.

Volunteer student participants were recruited through a broadcast email sent via the Boarding High School's email system. This email was sent to all students late afternoon on Friday, February 16, 2024. The broadcast recruitment email invited all students to participate in this current study and provided an internet link to a dedicated website where they could sign up. The dedicated website required volunteer students to input their school email addresses for authentication and registration. After signing up online, students were automatically directed to an online initial survey. The website was instrumental in streamlining the study, making it convenient for participants to report their responses. Its algorithm required participants to answer all questions before submitting their responses, effectively avoiding missing data in the collection process.

Participants who completed the experiment were automatically entered into a random draw for one of twenty-five $10 Amazon gift cards.

The registration period ended at 10:00 p.m. on Sunday, February 18, 2024. Because every student at the Boarding High School received the volunteer recruitment invitation simultaneously, they all had an equal opportunity to participate in this study. In total, 65 volunteer student participants signed up for the study.

Randomized Group Assignment

Immediately following the end of the registration period, I used a randomization program to assign the 65 registered student participants to the control and intervention groups. On a randomized basis, 33 participants were assigned to the control group, and 32 were assigned to the intervention group. These group assignments were then coded into the database of the dedicated website for separate daily prompts and response collections for the participants in the intervention and control groups.

Participant Blinding

All participants were uninformed about this current study's purpose or hypothesis. Furthermore, they were blinded to the presence of two groups: the intervention group and the control group. The blinding helped reduce the likelihood of participants discussing the differences between their assigned intervention and control activi-

ties. Additionally, the broadcast email informed students that the school had approved the study. This information helped assure the participants of the study's safety and alleviate any concerns they might have had, thereby reducing the need for them to discuss their assigned activities.

Intervention

I emailed intervention group participants twice daily, at 8 AM and 6 PM, for seven days, from February 19 to 25, 2024 (Monday to Sunday), prompting them to perform/give three or more PIF RAKs each day. The exact wording of the prompt was:" Today, please perform at least three random acts of kindness outside of your usual routine on a pay-it-forward basis—spontaneous or unplanned actions intended to benefit others without expecting reciprocation. Your acts of kindness—large or small—could create a huge ripple of kindness felt across the school." The daily prompt emails included an Internet link for participants to log in to the dedicated website to confirm whether they had completed their acts of kindness.

The dedicated website facilitated this process with a convenient daily online Yes-or-No question for intervention group participants to click on to confirm whether they had completed their three acts of kindness. Daily confirmation served as a tracking mechanism and a tool to foster a habit of kindness integrated into their daily lives.

Active Control

I emailed control group participants twice daily, at 8 AM and 6 PM, for seven days, from February 19 to 25, 2024 (Monday to Sunday), prompting them to observe trees at least three times a day. I selected observing trees as an active non-social task because it was engaging enough to demand participants' effort yet unlikely to influence their emotions. This activity served as an active control for this current study, ensuring a fair comparison. The daily prompt emails included an Internet link for participants to log in to the dedicated website. The dedicated website facilitated this process with a convenient daily online Yes-or-No question for control group participants to click on to confirm whether they had completed their observations of trees.

No Logging of Daily Activities

The intervention group participants were not required to record their daily pay-it-forward acts of kindness. I designed this current study to avoid burdening the participants with recording activities. Unlike some college students who participate in studies to fulfill course credit or graduation requirements, the high-school student participants in this study were volunteers with no such obligations. Imposing the recording task could have reduced the study's participation and completion rates.

Population and Participants

The population of this current study comprised 822 students at the Boarding High School. In total, 65 students signed up for the study. None of these 65 student participants was excluded, thanks to the dedicated website's authentication check against their school email addresses. However, three participants—two from the intervention group and one from the control group—did not complete the experiment. As a result, 30 participants from the intervention group and 32 from the control group completed the study (see Figure 3).

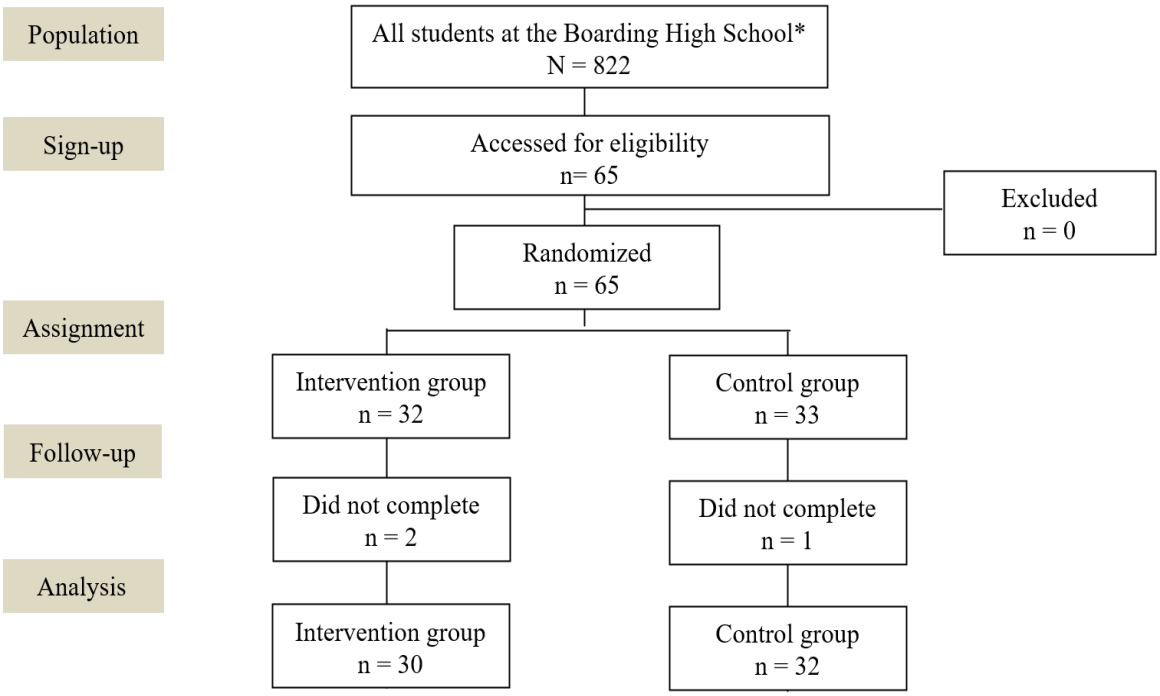

Figure 3. Flowchart of Participants

* The Boarding High School is a boarding high school located in the East Coast.

Measures: Pre-Test and Post-Test Surveys

All participants who signed up for this current study via the dedicated website were automatically prompted to take the online pre-test survey before their intervention or control activities. Those who completed the 7-day intervention or control activities were then prompted to take the post-test survey via the same dedicated website. The pre-test and post-test surveys consisted of 15 questions, using a 7-point Likert scale to measure participants' self-reported subjective happiness, gratitude, and life satisfaction.

Subjective Happiness

The survey's first to fourth questions came from the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999), which measures participants' self-reported subjective happiness, referred to as "Happiness" in this paper.

Subjective Life Satisfaction

The fifth to ninth questions originated from the Satisfaction With Life Scale (Diener et al., 1985), which measures participants' self-reported subjective life satisfaction, termed "Life Satisfaction" in this paper.

Subjective Gratitude

The tenth to fifteenth questions were from the Gratitude Questionnaire (McCullough et al., 2002), which measures participants' self-reported subjective gratitude, referred to as "Gratitude" in this paper.

The scores of these three scales—Happiness, Life Satisfaction, and Gratitude—were calculated as the simple averages of their respective questions.

Statistical Methods and Tools

This current study utilized six *t*-tests—three for the pre-tests and three for the changes in mean scores from pre-test to post-test between the intervention and control groups, all at a 95% confidence level and two-tailed. The Bonferroni correction was applied to account for the multiple *t*-tests, making the critical *t*-values more conservative to control for Type I error. Consequently, the original critical *p*-value of 0.05 was divided by 6, resulting in an adjusted critical *p*-value of 0.0083.

The adjusted critical *p*-value of 0.0083 corresponds to a critical *t*-value of 2.730 (see Table 4 and Table 5), based on 60 degrees of freedom (the sum of the sample sizes of the intervention and control groups minus two). I used an online calculator provided by Dotmatics (https://www.graphpad.com/quickcalcs/statRatio1/) for this conversion. I calculated the *t*-test scores and Cohen's *d*-values using spreadsheet software and formulas from textbooks. I used the same calculator by Dotmatics *(https://www.graphpad.com/quickcalcs/pValue1/)* to convert *t*-scores to *p*-values based on the same 60 degrees of freedom.

Results

Pre-Test Results

The differences in means of pre-test scores between the intervention and control groups were not statistically significant (see Table 4). In short, at the experiment's inception, before any intervention, there were no statistically significant differences between the intervention and control groups regarding Happiness, Life Satisfaction, and Gratitude.

Table 4. Independent Samples *t*-Test Results for Pre-Test Scores between the Intervention and Control Groups

	Happiness[1]	Gratitude[2]	Life Satisfaction[3]
Intervention group (i)			
Sample sizes (n_i)	30	30	30
Means of pre-test scores (M_i)	4.6000	5.7611	4.4333
Standard deviations of pre-test scores SD_i)	1.2293	0.7614	1.4346
Control group (c)			
Sample sizes of c (n_c)	32	32	32
Means of pre-test scores (M_c)	4.6093	5.9218	4.6437
Standard deviations of pre-test scores (SDc)	1.2163	0.7724	1.3581
Pooling of intervention and control groups			
Pre-test score differences ($M_c - M_i$)	0.0094	0.2104	0.1607
Total degrees of freedom, $n_{i+}n_{c-2}$	60	60	60
Pooled standard deviation (SD_{pooled})	1.2226	0.7671	1.3956
Standard deviations of distribution of differences between means ($SD_{difference}$)	0.3107	0.1949	0.3546
t and null tests			
t(60), p-value	0.0301, 0.9761	0.8245, 0.4129	0.5932, 0.5553
Critical *t*(60),	2.730,	2.730,	2.730,

Critical *p*-value, at a 95% confidence level with a Bonferroni-correction for six *t*-tests	0.0083	0.0083	0.0083
Statistically significant?	No	No	No
Null hypothesis test for mean pre-test scores between intervention and control groups	Not Rejected	Not Rejected	Not Rejected

[1] The participants' Happiness was measured by the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999)
[2] The participants' Gratitude was measured by the Gratitude Questionnaire (McCullough et al., 2002)
[3] The participants' Life Satisfaction was measured by the Satisfaction With Life Scale (Diener et al., 1985)

Post-Test Results

Table 5 presents the statistics regarding the mean score changes from pre-test to post-test between the intervention and control groups following the intervention and active control activities.

Happiness

The results suggested a statistically significant difference between the intervention and the control groups, leading to rejecting the null hypothesis for Happiness.

Gratitude

The results suggested no statistically significant difference between the intervention and the control groups, and the null hypothesis for Gratitude cannot be rejected.

Life Satisfaction

The results suggested no statistically significant difference between the intervention and the control groups, and the null hypothesis for Life Satisfaction cannot be rejected.

Effect Sizes

Cohen's *d*-values for Happiness, Gratitude, and Life Satisfaction were 0.8232, 0.4450, and 0.1767, respectively, corresponding to large, medium, and small effect sizes (see Table 5).

Table 5. *t*-Test Results for Mean Score Changes from Pre-Test to Post-Test of the Intervention and Control Groups

	Happiness[1]	Gratitude[2]	Life Satisfaction[3]
Intervention group (i)			
Sample sizes (n_i)	30	30	30
Mean score changes from pre-test to post-test (M_i)	0.9250	0.2277	0.2333
Standard deviations of score changes (SD_i)	1.0770	0.6454	1.4423
Control group (c)			
Sample sizes (n_c)	32	32	32
Mean score changes from pre-test to post-test (M_c)	-0.0390	-0.0885	-0.0250
Standard deviations of score changes (SDc)	1.2525	0.7666	1.4791
Pooling of intervention and control groups			
Differences of mean of score changes ($M_i - M_c$)	0.9640	0.3163	0.2583
Total degrees of freedom, $n_{i+}n_{c-2}$	60	60	60

	Happiness[1]	Gratitude[2]	Life Satisfaction[3]
Intervention group (i)			
Sample sizes (n_i)	30	30	30
Mean score changes from pre-test to post-test (M_i)	0.9250	0.2277	0.2333
Standard deviations of score changes (SD_i)	1.0770	0.6454	1.4423
Control group (c)			
Sample sizes (n_c)	32	32	32
Mean score changes from pre-test to post-test (M_c)	-0.0390	-0.0885	-0.0250
Standard deviations of score changes (SDc)	1.2525	0.7666	1.4791
Pooling of intervention and control groups			
Differences of mean of score changes ($M_i - M_c$)	0.9640	0.3163	0.2583
Pooled standard deviation (SD_{pooled})	1.1710	0.7106	1.4614
Standard deviation of distribution of differences between means ($SD_{difference}$)	0.2976	0.1806	0.3713
t and null tests			
t(60),	3.2392,	1.7513,	0.6956,
p-value	0.0020	0.0850	0.4894
Critical *t*(60),	2.730,	2.730,	2.730,
Critical *p*-value, at a 95% confidence level with a Bonferroni-correction for six *t*-tests	0.0083	0.0083	0.0083
95% confidence interval	[0.0965, 1.8315]	[-0.2101, 0.8427]	[-0.8242, 1.3409]
Statistically significant (two-tailed)?	Yes	No	No
Null hypothesis test for mean score changes between intervention and control groups	Rejected	Not Rejected	Not Rejected
Cohen's *d*	0.8232	0.4450	0.1767

[1] The participants' Happiness was measured by the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999)
[2] The participants' Gratitude was measured by the Gratitude Questionnaire (McCullough et al., 2002)
[3] The participants' Life Satisfaction was measured by the Satisfaction With Life Scale (Diener et al., 1985)

Discussion

In this current study, I investigated whether a seven-day web-based intervention featuring the PIF RAK, led and administered by a peer student outside of classroom and laboratory environments, would enhance the self-reported measures of subjective well-being of student participants in the intervention group compared to those in an active control condition at the Boarding High School.

The experimental results indicate that the PIF RAK intervention significantly enhanced the participants' subjective happiness with a large effect, as evidenced by a *t*-score of 3.23 and Cohen's *d*-value of 0.82 (see Table 5). These findings support the effectiveness of the PIF RAK intervention in bolstering participants' subjective happiness.

However, the PIF RAK intervention's impact on the participants' subjective gratitude was statistically inconclusive, with a medium magnitude, evidenced by a moderate *t*-score of 1.75 and a medium Cohen's *d*-value of 0.44 (see Table 5). Additionally, the PIF RAK intervention's impact on the participants' subjective life satisfaction was statistically nonsignificant and likely of small magnitude, evidenced by a low *t-sc*ore of 0.69 and a small Cohen's *d*-value of 0.17 (see Table 5).

Possible Contributors to the Large Effect Size

The large effect size of the subjective happiness measure in this current study, Cohen's $d = 0.82$ (see Table 5), exceeds the small-to-medium weighted averages reported by the meta-analyses—0.28 by Curry et al. (2018, p. 325) and 0.32 by Hui et al. (2020, p. 1094)—as well as the medium effect size of 0.54 found in the study by Tashjian et al. (2021, p. 39). The larger effect size observed in this study may be attributed to its distinctive hypothesis and experimental design in three ways, as outlined below:

Autonomous Acts of Kindness

The self-determination theory (Deci & Ryan, 2000), along with subsequent research by Weinstein and Ryan (2010) and Wray-Lake et al. (2019), suggests that autonomous acts of kindness predict greater subjective well-being for both primary school students and adults who perform/give acts of kindness compared to non-autonomous acts. In this current study, the experiment was entirely peer-led and administered outside of classroom or laboratory environments, without adult authority figures in front of the student participants. Additionally, participants were reminded daily that their involvement was voluntary and that they could withdraw at any time. Furthermore, daily prompts directed to participants in the intervention group underscored the "random," "spontaneous," and "unplanned" aspects of acts of kindness. This focus on spontaneity aligns with self-determination theory, which posits that autonomy in choosing how and when to act of kindness can significantly enhance intrinsic motivation (Deci & Ryan, 2000). This study gave participants the freedom to choose the timing, locations, methods of performing/giving acts of kindness, and the recipients of these acts. In line with the findings of Deci and Ryan (2000) and Weinstein and Ryan (2010), this study effectively fostered a sense of autonomy among participants, resulting in a large effect size on their subjective happiness.

In contrast, the meta-analyses by Curry (2018) and Hui et al. (2020) include experiments in which college students typically participate. College students commonly participate in such experiments to fulfill course requirements in exchange for college credits; some experience coercion (Bartholomay & Sifers, 2016, pp. 305-306). These imposed requirements mean less autonomy for those participants, contrasting with the conditions of this current study, which provided greater autonomy to the Boarding High School's student participants.

The study by Tashjian et al. (2021) employed a more structured methodology that allowed less autonomy for high school student participants in the acts of kindness intervention group. Before conducting the experiment, the researchers recruited 62 adults and requested that they provide three examples of acts of kindness. Tashjian et al. then included these examples in a list of specific acts of kindness to guide the participants in the training sessions, which took place in a laboratory setting at the researchers' university (2021, p. 31). Restrictive instructions and a controlled environment may have reduced the participants' sense of autonomy, potentially mitigating the positive effects on their subjective well-being.

Also, Tashjian et al. (2021) required their high school student participants to visit a university laboratory twice for training sessions on acts of kindness, compensating them with $90 for their participation (p. 31). This compensation likely served as an extrinsic motivator, which Finkelstein et al. (2005) find to be significantly negatively associated with individuals' satisfaction. Additionally, Kunda and Schwartz (1983) report that heavy monetary compensation may weaken the altruistic nature of subsequent engagement in acts of kindness.

Close Social Ties Between Givers/Performers and Recipients of Acts of Kindness

Aknin et al. (2011) highlight "positive feelings arising from sharing one's resources with strong social ties" (p. 3), suggesting that the well-being of givers/performers of acts of kindness is amplified when they have stronger social connections with the recipients. Aknin et al. compared the differences in positive affect, as measured by the Positive and Negative Affect Schedule, between an intervention group—prosocial purchases for recipients

with strong social ties—and an active control group—prosocial purchases for recipients with weak social ties (2011). Aknin et al. (2011) reports a statistically significant difference at a 95% confidence level, $t(76) = 2.09$, $p < 0.05$. Another study by Aknin et al. (2015, Study 1), as discussed in the Literature Review section, reports a large effect size (Cohen's $d = 0.93$) with statistical significance: $t(24) = 2.383$, $p < 0.03$, two-tailed.

In this current study, the Boarding High School constitutes a tight-knit community of 822 students, nurturing close interactions and relationships due to the communal living arrangements. The students attend classes and sports/extracurricular sessions six days a week. They live on campus, often in the same dormitory buildings. This environment likely cultivates stronger social connections than those experienced by students in day schools or adults in more dispersed communities. Hence, it is probable that the student participants in this study share closer social ties with the recipients of their acts of kindness compared to (i) the student participants from various day schools in the study by Tashjian et al. (2021) and (ii) the adult participants in the diverse settings examined in the meta-analyses conducted by Curry et al. (2018) and Hui et al. (2020). The closer social ties at the Boarding High School may contribute to the larger effect size in subjective well-being improvement observed in this study relative to the outcomes reported by Tashjian et al. (2021), Curry et al. (2018), and Hui et al. (2020).

A potential counterargument may point out that the close social ties within the Boarding High School could have compromised the experiment's internal validity, as participants from both the intervention and control groups might have discussed the experiment. However, this risk is minimal. The 65 participants in this current study represented only 7.9% of the total student population of 822, making it unlikely that the study would become a widespread topic of conversation. Additionally, this study's activities required only small amounts of the participants' time daily and did not constitute major events likely to arouse significant discussion interest.

Adolescent Givers/Performers of Acts of Kindness

The meta-analysis by Hui et al. (2020) reveals an association wherein "younger [kindness] givers exhibited higher levels of well-being" (p. 1084). This finding may account for the large effect size on subjective well-being observed in this current study. Because this study focuses on an adolescent population, their youth likely contributes to the large effect, Cohen's $d = 0.82$, on their enhanced subjective happiness. In contrast, the smaller weighted average effect size on subjective well-being enhancement reported by Hui et al. (2020), Cohen's $d = 0.32$, amalgamates results from studies focusing on adult participants; their older ages may account for the outcome differences compared to this study's teenage cohort.

Sensitivities of Happiness, Gratitude, and Life Satisfaction

The results of this current study suggest that participants' subjective happiness, as measured by the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999), is more sensitive to the seven-day PIF RAK interventions compared to their subjective gratitude and life satisfaction, measured by the Gratitude Questionnaire (McCullough et al., 2002) and the Satisfaction With Life Scale (Diener et al., 1985), respectively. This finding implies that happiness may respond more readily to short-duration interventions.

This current study's finding that PIF RAK interventions of short duration—seven days in this case—were insufficient to enhance participants' subjective life satisfaction significantly aligns with Pavot and Diener's (1993) research results. Pavot and Diener (1993) state that measures of life satisfaction are "more than momentary mood states" and represent "a relatively stable component of subjective experience over time" (p. 165). They underscore that the Satisfaction With Life Scale has "moderate temporal stability" and requires two weeks to four years of interventions to generate statistically significant enhancements in participants' life satisfaction measured by the same scale (p. 167).

Contextually, Fujita and Diener (2005) argue that subjective life satisfaction measures are more malleable than static metrics such as body weight, suggesting potential for improvement through extended interventions (p. 158). Their suggestion is supported by a meta-analysis by Curry et al. (2018), which includes four studies that report statistically significant enhancements in individuals' subjective life satisfaction following kindness-based interventions (pp. 324-325). These studies feature interventions of longer durations—ranging from 10 days to six weeks—or greater intensity, such as prosocial purchasing, compared to that employed in this current study (Aknin et al., 2013, Study 3; Buchanan & Bardi, 2010; Chancellor et al., 2018; Nelson et al., 2015). Moreover, the durations of these interventions align with those stated by Pavot and Diener (1993). In short, if the durations of kindness-based interventions are extended to two weeks or more, participants' subjective life satisfaction is possibly enhanced with statistical significance.

On gratitude, I have not found any published articles that examine the causal impacts of kindness-based interventions on participants' subjective gratitude despite extensive searches. Therefore, I decided to pioneer research into this causal relationship. The findings from my seven-day intervention study are novel. I observe a trend toward enhanced subjective gratitude with $t(60) = 1.7513$ and $p = 0.0850$. Although the results do not reach conventional levels of statistical significance, they suggest a positive effect (see Table 5). The findings highlight the potential for future research to explore whether more extended or intense kindness-based interventions could yield statistically significant enhancements in subjective gratitude.

Overall, additional research is needed to explore the correlations among subjective happiness, gratitude, and life satisfaction among high school students. Understanding these relationships is crucial for informing educational policies and interventions to enhance student well-being. Future studies could employ longitudinal designs to track changes over time and experimental methods to test the sensitivities and longevities of different aspects of individuals' well-being enhancements.

From Individuals' Well-being to School Community's Well-being

Although the improvements in individuals' subjective gratitude and life satisfaction from PIF RAK interventions did not reach statistical significance, the small-to-medium positive effect sizes may hold meaningful implications at the school community level. This potential is particularly pronounced when such effects are experienced repeatedly by multiple individuals over time. Research by Greenwald et al. (2015) underscores the importance of these cumulative effects, a concept further explored by Funder and Ozer (2019). The key lies in the cumulative impact of these interventions over time at the school community level on a sustainable basis.

Beyond psychological experiments, in transitioning to a long-term practice or even a culture at a high school, the school can encourage the establishment of a positive psychology club to train student leaders and successors to perpetuate the promotion of acts of kindness on campus.

Limitations of the Current Study

The volunteer nature of this current study incurs a trade-off between the intervention duration and the completion rate. A lengthier intervention might have yielded statistical significance and large effect sizes for subjective gratitude and life satisfaction. However, extending the intervention duration could have led to a higher dropout rate, thereby reducing the sample sizes and potentially skewing the results. Moreover, an extended intervention duration may deter volunteers, directly affecting participation. Additionally, experimental blindness prevents advertising or promotional campaigns for this study's recruitment, limiting its participation rate.

Recommendations for Future Studies

Researchers who plan to roll out similar studies can easily add three enhancements:

Extending Enrolment Period

Researchers can give participants more time to sign up for their studies and complete the pre-test survey. This current study's experiment allowed only two days for these tasks. Extending the sign-up period could increase participation rates.

Scheduling Considerations

Better schedule planning can achieve higher participation and completion rates by avoiding conflicts with final exam week.

Lingering Effects

Researchers can add additional post-test surveys to gauge the long-term effects of the intervention on participants' well-being. This longitudinal approach will help us better understand the sustainability of the intervention's impact over time.

Conclusion

The findings of this current study support the hypothesis that a seven-day web-based intervention featuring pay-it-forward random acts of kindness (PIF RAK)—defined as spontaneous or unplanned actions intended to benefit others without expecting reciprocation—led and administered by a peer student outside of classroom and laboratory environments will enhance the self-reported measures of subjective well-being of student participants in the intervention group compared to those in an active control condition at a boarding high school.

Specifically, the PIF RAK intervention significantly enhanced the subjective happiness of students with a large practical effect in this current study. Although the impacts of the PIF RAK intervention on participants' subjective gratitude and life satisfaction were not statistically significant in the study, their positive trends suggest that interventions of longer duration may reach statistical significance.

For Future High School Student Leaders

I designed this current study with three fundamental principles: simplicity, affordability, and student autonomy. These principles aim to assist future student leaders in readily reusing or improving my experimental protocols to perpetuate PIF RAK interventions at minimal cost. Educational institutions, including day and boarding schools, are welcome to adopt or adapt this framework to nurture students' well-being and foster positive campus community dynamics.

Acknowledgments

I am deeply grateful to Dr. Alexander Kocar, my Head of House, and Mr. Johnny Clore, my Biology Teacher, for encouraging the novel concept of this student-led experiment and my independent study in positive psychology. I cannot thank Dr. Leah Domb enough for her patient guidance throughout this experiment. Her support has motivated me to work to my best potential. Importantly, I greatly appreciate Mr. Blake Eldridge, the Dean of Students, for approving this schoolwide experiment and trusting in student autonomy in independent research.

References

Aknin, L. B., Barrington-Leigh, C. P., Dunn, E. W., Helliwell, J. F., Burns, J., Biswas-Diener, R., Kemeza, I., Nyende, P., Ashton-James, C. E., & Norton, M. I. (2013). Prosocial spending and well-being: Cross-cultural evidence for a psychological universal. *Journal of Personality and Social Psychology*, 104(4), 635–652. http://dx.doi.org/10.1037/a0031578

Aknin, L. B., Broesch, T., Hamlin, J. K., & Van de Vondervoort, J. W. (2015). Prosocial behavior leads to happiness in a small-scale rural society. *Journal of Experimental Psychology*: General, 144(4), 788-795. http://dx.doi.org/10.1037/xge0000082

Aknin, L. B., Hamlin, J. K., & Dunn, E. W. (2012). Giving leads to happiness in young children. *PLOS ONE*, 7(6), e39211, 1-4. http://dx.doi:10.1371/journal.pone.0039211

Aknin, L. B., Sandstrom, G. M., Dunn, E. W., & Norton, M. I. (2011). It's the recipient that counts: Spending money on strong social ties leads to greater happiness than spending on weak social ties. *PLOS ONE*, *6*(2), e17018. http://dx.doi.org/10.1371/journal.pone.0017018

Bartholomay, E. M., & Sifers, S. K. (2016). Student perception of pressure in faculty-led research. *Learning and Individual Differences*, 50, 302-307. http://dx.doi.org/10.1016/j.lindif.2016.08.025

Buchanan, K. E., & Bardi, A. (2010). Acts of kindness and acts of novelty affect life satisfaction. *Journal of Social Psychology*, *150*(3), 235–237. https://doi.org/10.1080/00224540903365554

Chancellor, J., Margolis, S., Jacobs Bao, K., & Lyubomirsky, S. (2018). Everyday prosociality in the workplace: The reinforcing benefits of giving, getting, and glimpsing. *Emotion*, 18(4), 507-517. https://doi.org/10.1037/emo0000321

Curry, O. S., Rowland, L. A., Van Lissa, C. J., Zlotowitz, S., McAlaney, J., & Whitehouse, H. (2018). Happy to help? A systematic review and meta-analysis of the effects of performing acts of kindness on the well-being of the actor. *Journal of Experimental Social Psychology*, *76*, 320-329. https://doi.org/10.1016/j.jesp.2018.02.014

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. http://dx.doi.org/10.1207/S15327965PLI1104_01

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, *49*, 71-75. https://doi.org/10.1207/s15327752jpa4901_13

Finkelstein, M. A., Penner, L. A., & Brannick, M. T. (2005). An examination of role identity and motives among hospice volunteers. *Social Behavior and Personality*, 33, 403-418. https://doi.org/10.2224/sbp.2005.33.4.403

Fujita, Frank, and Ed Diener. (2005) Life satisfaction set point: stability and change. *Journal of Personality and Social Psychology* 88, no. 1: 158-164. https://doi.org/10.1037/0022-3514.88.1.158

Funder, D. C., & Ozer, D. J. (2019). Evaluating effect size in psychological research: Sense and nonsense. *Advances in Methods and Practices in Psychological Science*, *2*(2), 156-168. https://doi.org/10.1177/2515245919847202

Greenwald, A. G., Banaji, M. R., & Nosek, B. A. (2015). Statistically small effects of the Implicit Association Test can have societally large effects. *Journal of Personality and Social Psychology*, *108*, 553–561. https://doi.org/10.1037/pspa0000016

Hui, B. P., Ng, J. C., Berzaghi, E., Cunningham-Amos, L. A., & Kogan, A. (2020). Rewards of kindness? A meta-analysis of the link between prosociality and well-being. *Psychological Bulletin*, *146*(12), 1084-1116. http://dx.doi.org/10.1037/bul0000298

Kunda, Z., & Schwartz, S. H. (1983). Undermining intrinsic moral motivation: External reward and self-presentation. *Journal of Personality and Social Psychology*, 45, 763–771. https://doi.org/10.1037/0022-3514.45.4.763

Lanser, I., & Eisenberger, N. I. (2023). Prosocial behavior reliably reduces loneliness: An investigation across two studies. *Emotion*, *23*(6), 1781-1790. https://doi.org/10.1037/emo0001179

Layous, K., Nelson, S. K., Oberle, E., Schonert-Reichl, K. A., & Lyubomirsky, S. (2012). Kindness counts: Prompting prosocial behavior in preadolescents boosts peer acceptance and well-being. *PLOS ONE*, 7(12), e51380. https://doi.org/10.1371/journal.pone.0051380

Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research*, *46*, 137-155. https://doi.org/10.1023/A:1006824100041

McCullough, M. E., Emmons, R. A., & Tsang, J. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, *82*, 112-127. https://doi.org/10.1037//0022-3514.82.1.112

McGrath, R. E., Mitchell, M., Kim, B. H., & Hough, L. (2010). Evidence for response bias as a source of error variance in applied assessment. *Psychological Bulletin*, 136(3), 450-470. https://doi.org/10.1037/a0019216

Nelson, S. K., Della Porta, M. D., Jacobs Bao, K., Lee, H. C., Choi, I., & Lyubomirsky, S. (2015). 'It's up to you': Experimentally manipulated autonomy support for prosocial behavior improves well-being in two

cultures over six weeks. *The Journal of Positive Psychology*, 10(5), 463-476. https://doi.org/10.1080/17439760.2014.983959

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., & Mulrow, C. D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *PLOS Medicine*, 18(3), e1003583. https://doi: https://doi.org/10.1136/bmj.n71

Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment*, 5(2), 164-172. https://doi.org/10.1037/1040-3590.5.2.164

Post, S. G. (2005). Altruism, happiness, and health: It's good to be good. *International Journal of Behavioral Medicine*, *12*, 66–77. http://dx.doi.org/10.1207/s15327558ijbm1202_4

Rowland, L., & Curry, O. S. (2019). A range of kindness activities boosts happiness. *The Journal of Social Psychology*, *159*(3), 340-343. https://doi.org/10.1080/00224545.2018.1469461

Santini, Z. I., Pisinger, V. S., Nielsen, L., Madsen, K. R., Nelausen, M. K., Koyanagi, A., Kosher, V., Roffey, S., Thygesen, L. C., & Meilstrup, C. (2021). Social disconnectedness, loneliness, and mental health among adolescents in Danish high schools: A nationwide cross-sectional study. *Frontiers in Behavioral Neuroscience*, 15, 632906. https://doi.org/10.3389/fnbeh.2021.632906

Tashjian, S. M., Rahal, D., Karan, M., Eisenberger, N., Galván, A., Cole, S. W., & Fuligni, A. J. (2021). Evidence from a randomized controlled trial that altruism moderates the effect of prosocial acts on adolescent well-being. *Journal of Youth and Adolescence*, *50*, 29-43. https://doi.org/10.1007/s10964-020-01362-3

U.S. Department of Education. (2021). *Supporting child and student social, emotional, behavioral, and mental health needs*. U.S. Department of Education. https://www2.ed.gov/documents/students/supporting-child-student-social-emotional-behavioral-mental-health.pdf

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. http://dx.doi.org/10.1037/a0016984

Wray-Lake, L., DeHaan, C. R., Shubert, J., & Ryan, R. M. (2019). Examining links from civic engagement to daily well-being from a self-determination theory perspective. *The Journal of Positive Psychology*, 14(2), 166-177. https://doi.org/10.1080/17439760.2017.1388432