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

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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. 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. 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.

KEYWORDS: Behavioral and Social Sciences; Sociology and Social Psychology; Well-Being; Kindness; Gratitude.

## Introduction

The U.S. Department of Education and the public have become increasingly concerned about the social disconnection and the well-being of youth since the COVID-19 pandemic.[1] Additionally, Santini *et al.* reported in their 2021 study,[2] "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." Furthermore, prosocial behaviors reduce loneliness and enhance positive mood, as well as subjective well-being, according to Lanser and Eisenberger in 2022.[3] Post suggests that self-reported subjective well-being,[4] 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.[5] 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 subjective well-being, according to Curry *et al.* in 2018.[6] The meta-analysis by Hui *et al.* in 2020 confirms these causal relationships in adults.[7] Experimental studies, such as those conducted by Buchanan and Bardi,[8] Nelson *et al.*,[9] and Rowland and Curry,[10] 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.

Subjective well-being is an inclusive term that describes "the levels of well-being people experience according to their subjective evaluations of their lives. These evaluations…include judgments and feelings about life satisfaction, interest and engagement, affective reactions such as joy and sadness to life events, and satisfaction with work, relationships, health, recreation, meaning and purpose, and other important domains," according to Diener and Ryan.[11] "Individuals' subjective well-being is based on self-reports of happiness and life satisfaction," summarized by Schwarz and Strack.[12] Subjective happiness, a measure of subjective well-being, is a "subjective assessment of whether one is happy or an unhappy person," indicated by Lyubomirsky and Lepper.[13] Self-reported subjective life satisfaction is a component of subjective well-being.[14] "Gratitude is the appreciation of what is valuable and meaningful to oneself; it is a general state of thankfulness and appreciation," noted by Sansone and Sansone.[15] It can exist as "an affective trait, a mood, or an emotion," stated by McCullough *et al.* in 2002.[16] Importantly, subjective gratitude favorably impacts subjective well-being.[17]

## Literature Review

### *Meta-Analytic 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,



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authored by Curry *et al*. in 2018, comprises 27 experimental studies focusing on age groups of 1.9 to 10.6 years and 18.55 to 72 years.[6] The second, conducted by Hui *et al*. in 2020, includes 55 experimental studies focusing on adult participants aged 18 years or above.[7] Although these two meta-analyses do not include studies involving high school students,[6,7] they provide valuable insights into the experimental design of this current study.


Source: This flow chart is adapted from Page *et al*.[18]

**Figure 1:** The selection process for meta-analysis articles of kindness-based experiments. Two relevant meta-analysis articles are identified.

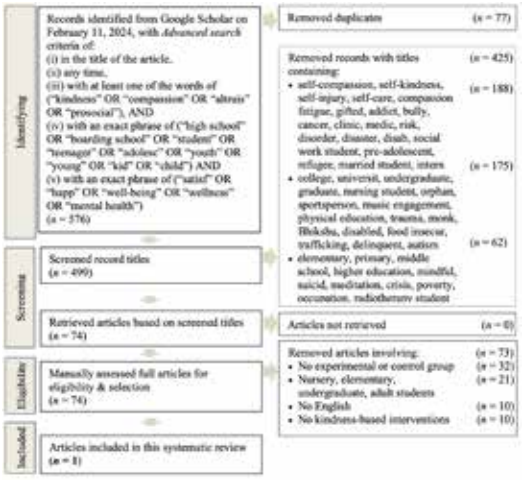
The meta-analysis by Curry *et al*. reveals a small-to-medium weighted average effect size,[6] with a Cohen's *d*-value of 0.28, across all 27 included experimental studies. Among these 27 studies,[6] 25 measured dependent variables through self-reported metrics such as positive affect, negative affect, subjective happiness, and life satisfaction. The other two studies, conducted by Aknin *et al*. in 2012,[19] and Aknin *et al*. in 2015,[20] focus 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,[6] it includes one study conducted by Aknin *et al.* (2015) with a large effect size.[20] They 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.[20] In their study, adult participants in a small and isolated village on Tanna Island made a large prosocial purchase for others, equivalent to one day's wage, in an intervention group, compared to purchases for themselves in a control group.[20] The dependent variable was positive affect, measured by the Positive and Negative Affect Schedule.[20] Their 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).[20]

The meta-analysis by Hui *et al*. reports a weighted average effect size[7], Cohen's $d = 0.32$, with a 95% confidence interval ranging from 0.24 to 0.39, an effect size similar to that found in the meta-analysis by Curry *et al*.[6] Hui *et al*. draw three critical conclusions regarding the effectiveness of kindness-based interventions.[7] 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.[7] Second, younger individuals performing/giving acts of kindness show more pronounced improvements in subjective well-being than older individuals.[7] Third, acts of kindness directed toward recipients with whom the givers/performers have strong social ties are associated with larger positive effects on the givers'/performers' subjective well-being than those directed toward recipients with weaker social ties.[7]

***Narrative Literature Review:***

An experimental study by Tashjian *et al*. in 2021,[21] 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.[21] 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 ($n = 30$).[21] The active control group participants performed acts of kindness for themselves for the same duration and frequency.[21] The passive control group participants were not prompted to perform/give any acts.[21] Tashjian *et al*. 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.[21] However, this improvement was not statistically significant when the intervention group was compared to the passive control group.[21] Tashjian *et al*. speculate that altruism plays a role—the more altruistic adolescents benefit more from positive peer reinforcement. In contrast, less altruistic adolescents might find the acts less personally meaningful, limiting the intervention's effects.[21]




Source: This flow chart is adapted from Page *et al*.[18]

**Figure 2:** The selection process for kindness-based experiments involving high school students. One relevant article is identified.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***Three 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:

***Gap 1: 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. Unlike day school students, boarding school students stay on campus after classes. The boarders have three meals together at the same times on campus seven days a week, sharing common rooms, bathrooms, and study rooms. They are required to join regular evening group activities seven days a week. The results of the study by Aknin *et al*. (2015) suggest that givers/performers of acts of kindness within a small community with strong social ties show a large effect on enhancements to their subjective well-being.[20] The meta-analysis conducted by Hui *et al*.,[7] 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.[7] Students in a boarding high school environment live and study in a close-knit community, confining most of their activities to campus. This situation is similar to the adult participants living in a small and isolated village on Tanna Island, as described by Aknin *et al*. (2015).[20] Consequently, boarding school students tend to have stronger social ties than both adults and day school students. Therefore, this study investigates whether kindness-based interventions in a boarding high school environment may significantly enhance participants' subjective well-being and have a significant effect.

***Gap 2: 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, respectively. Implementing adolescent-and-peer-led interventions could help reduce response bias, which McGrath *et al*. define as "a consistent tendency to respond inaccurately to a substantive indicator, resulting in systematic error in prediction."[22] Furthermore, the study by Bartholomay and Sifers 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.[23]

In contrast, this adolescent-and-peer-led research study promotes the voluntary involvement of adolescent participants, thereby reducing perceived pressures and the likelihood of inauthentic prosocial responses. Its absence of adult authority may give adolescent participants a sense of autonomy. The design of this current study aligns with the self-determination theory by Deci and Ryan,[24] and research by Weinstein and Ryan,[25] 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 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 I, a non-adult, led and administered the study.

***Gap 3: Administration Outside Classrooms/Laboratories:***

Although some kindness-based adult experiments 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*. for this current study,[21] 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*.[21] 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*.[21] This modification streamlined the experiment's administration. Given the same 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*.,[21] 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,[10] 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.

***Hypotheses:***

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.

The above main hypothesis (H) consists of three individual hypotheses regarding three self-reported measures of subjective well-being: self-reported subjective happiness (H1), subjective gratitude (H2), and life satisfaction (H3), with the same intervention and participants in the same setting during the same period—all conducted simultaneously.

If any of the three individual hypotheses (H1, H2, and H3) is supported by results, the main hypothesis (H) is supported.

***Null Hypotheses:***

The following null hypotheses correspond to the research hypotheses and represent the assumptions to be tested statistically:

Null Hypothesis for H:

The intervention would not result in a significant change in self-reported subjective well-being.

Null Hypothesis for H1:

The intervention would not result in a significant change in self-reported subjective happiness.

Null Hypothesis for H2:

The intervention would not result in a significant change in self-reported subjective gratitude.

Null Hypothesis for H3:

The intervention would not result in a significant change in self-reported life satisfaction.

## 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 to all students via the Boarding High School's email system in the late afternoon of 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 with their school email addresses. The dedicated webpage 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 not informed of the presence of two groups: the intervention and the control groups. The blinding helped reduce the likelihood of participants discussing the differences between their assigned intervention and control activities. 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.

After the study was completed, participants were debriefed. They were informed about the study's purpose, hypothesis, methodology, results, discussion, and conclusions. Additionally, a poster summarizing these details was displayed in the Boarding High School's hallway as part of the Academic Showcase Spring 2024 to ensure broader dissemination of the study's information. This poster remained on display for over a month, allowing the wider school community to learn about the research.

***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.


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***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 webpage 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.

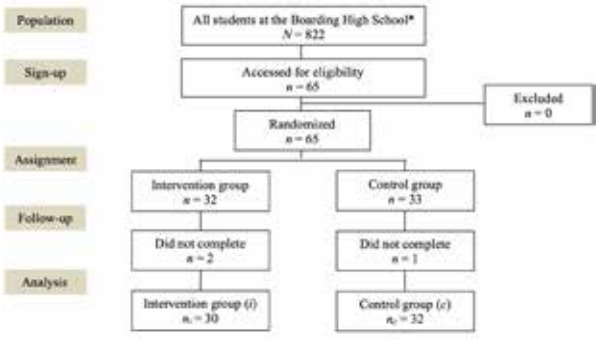
***No Logging of Daily Activities:***

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.

***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 because all participants were required to sign up with school email addresses, which were also used for authentication. 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. All students were invited to participate in the study; 65 participated, and 62 completed it.




* The Boarding High School is a boarding high school located on 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. At the end of the experiment, 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 by Lyubomirsky and Lepper, published in 1999,[13] which measures participants' self-reported subjective happiness, referred to as "Happiness" in this paper.

***Subjective Gratitude:***

The tenth to 15th questions were from the Gratitude Questionnaire by McCullough *et al.*, published in 2002,[16] which measures participants' self-reported subjective gratitude, referred to as "Gratitude" in this paper.

***Subjective Life Satisfaction:***

The fifth to ninth questions originated from the Satisfaction with Life Scale by Diener *et al.*, published in 1985,[14] which measures participants' self-reported subjective life satisfaction, termed "Life Satisfaction" 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 independent samples 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 errors. 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 1 and Table 2), 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

***Participants:***

Among the 32 participants in the Control Group who completed the study, 7, 10, 8, and 7 are grade-12, grade-11, grade-10, and grade-9 students, accounting for 21.9%, 31.3%, 25.0%, and 21.9% of the group, respectively. Among the 30 participants in the Intervention Group who have completed the study, 8, 6, 8, and 8 are grade-12, grade-11, grade-10, and grade-9 students, accounting for 26.7%, 20.0%, 26.7%, and 26.7% of the group, respectively. The participants' grade levels are inferred from the participants' school email addresses, with no personal information used to ensure privacy.

***Pre-Test Results:***

The differences in means of pre-test scores between the intervention and control groups were not statistically significant

(see Table 1). 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 1:** Independent samples *t*-test results for pre-test scores between the intervention and control groups. At the beginning of the experiment, no statistically significant differences existed between the intervention and control groups.

| | Happiness[a] | Gratitude[b] | Life Satisfaction[c] |
|---|---|---|---|
| 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 ($n_c$) | 32 | 32 | 32 |
| Means of pre-test scores ($M_c$) | 4.6093 | 5.9218 | 4.6437 |
| Standard deviations of pre-test scores ($SD_c$) | 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 | | | |
| $t(60)$, | 0.0301, | 0.8245, | 0.5932, |
| *p*-value | 0.9761 | 0.4129 | 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 |

[a] The participants' Happiness was measured by the Subjective Happiness Scale.[13]
[b] The participants' Gratitude was measured by the Gratitude Questionnaire.[15]
[c] The participants' Life Satisfaction was measured by the Satisfaction with Life Scale.[14]

***Post-Test Results:***

Table 2 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. The intervention significantly enhanced the subjective happiness of student participants in the intervention group compared to those in an active control condition.

***Gratitude:***

The results suggested no statistically significant difference between the intervention and the control groups, and the null hypothesis for Gratitude cannot be rejected. The intervention did not significantly enhance the subjective gratitude of student participants in the intervention group compared to those in an active control condition.

***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. The intervention did not significantly enhance the subjective life satisfaction of student participants in the intervention group compared to those in an active control condition.

***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 2).

**Table 2:** *t*-test results for mean score changes from the pre-test to the post-test of the intervention and control groups. Happiness was statistically significantly enhanced, but Gratitude and Life Satisfaction showed no statistically significant improvement.

| | Happiness[a] | Gratitude[b] | Life Satisfaction[c] |
|---|---|---|---|
| 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 ($SD_c$) | 1.2525 | 0.7666 | 1.4791 |
| Pooling of intervention and control groups | | | |
| Differences of mean of score changes ($M - M_c$) | 0.9640 | 0.3163 | 0.2583 |
| Total degrees of freedom, $n_i + n_c - 2$ | 60 | 60 | 60 |
| Pooled standard deviation ($SD_{pooled}$) | 1.1710 | 0.7106 | 1.4614 |
| The standard deviation of the 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 | [0.0955, 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 |

[a] The participants' Happiness was measured by the Subjective Happiness Scale.[13]
[b] The participants' Gratitude was measured by the Gratitude Questionnaire.[15]
[c] The participants' Life Satisfaction was measured by the Satisfaction with Life Scale.[14]

## 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 3.2392 and Cohen's *d*-value of 0.8232 (see Table 2). 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 1.7513 and a medium Cohen's *d*-value of 0.4450 (see Table 2). Additionally, the PIF RAK intervention's impact on the participants' subjective life satisfaction was statistically non-significant and likely of small magnitude, evidenced by a low *t*-score of 0.6956 and a small Cohen's *d*-value of 0.1767 (see Table 2).

***Possible Contributors to the Large Effect Size:***

The large effect size of the subjective happiness measure in this current study, Cohen's $d = 0.8232$ (see Table 2), exceeds the small-to-medium weighted averages reported by the meta-analyses—0.28 by Curry *et al.* and 0.32 by Hui *et al.*—as well as the medium effect size of 0.54 found in the study by Tashjian *et al.*[6,7,21] 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 by Deci and Ryan,[24] along with subsequent research by Weinstein and Ryan and Wray-Lake *et al.*,[25,26] suggests that autonomous acts of kindness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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 Deci and Ryan's self-determination theory, which posits that autonomy in choosing how and when to perform/give kindness can significantly enhance intrinsic motivation.[24] This study allowed participants 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,[24] Weinstein and Ryan,[25] and Wray-Lake *et al*.[26], this study effectively fostered a sense of autonomy among participants, resulting in a large effect size on their subjective happiness. However, this sense of autonomy was insufficient to compensate for the short intervention of 7 days to increase participants' gratitude and life satisfaction significantly.

The participant demographics of this study offer a unique comparison to previous research. While this study focused exclusively on high school students, the meta-analyses by Curry *et al*. and Hui *et al*. primarily examined studies with college student samples.[6,7] This distinction is noteworthy because college students often participate in psychology experiments to fulfill course requirements or earn college credits. However, this college practice can create a sense of "coercion" among experiment participants, as noted by Bartholomay and Sifers,[23] potentially limiting participants' autonomy. In contrast, this study did not subject the high school student participants to such course or credit requirements, offering them autonomy in their participation.

Additionally, the study by Tashjian *et al*. employed a more structured methodology that allowed less autonomy for high school student participants in the acts of kindness intervention group.[21] Before experimenting, 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.[21] Restrictive instructions and a controlled environment may have reduced the participants' sense of autonomy, potentially mitigating the positive effects on their subjective well-being.

Furthermore, Tashjian *et al*. 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.[21] This compensation likely served as an extrinsic motivator, which Finkelstein *et al*. find significantly negatively associated with individuals' satisfaction.[27] Moreover, Kunda and Schwartz report that monetary compensation may weaken the altruistic nature of subsequent engagement in acts of kindness.[28] In contrast, the current study's offer of $10 Amazon gift cards has a much smaller monetary amount per card and a lucky-draw basis, unlikely to pose the same intensity of extrinsic motivation as that in Tashjian *et al*.'s study.

***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, "[29] suggesting that the well-being of givers/performers of acts of kindness is amplified when they have stronger social connections with the recipients. The researchers compared the differences in positive affect,[29] 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. They report a statistically significant difference at a 95% confidence level, $t(76) = 2.09$, $p < 0.05.29$ Another study by Aknin *et al*. (2015),[20] 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*.,[21] and (ii) the adult participants in the diverse settings examined in the meta-analyses conducted by Curry *et al*. and Hui *et al*.[6,7] 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*.[21], Curry *et al*.,[6] and Hui *et al*.[7]

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*. reveals an association wherein "younger [kindness] givers exhibited higher levels of well-being."[7] This finding may account for the large effect 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 $d = 0.8232$, on their enhanced subjective happiness. In contrast, the smaller

weighted average effect size on subjective well-being enhancement reported by Hui *et al.*[7], 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.

***Intensive Intervention:***

The current study used a more intensive intervention—at least three acts of kindness per day—than those in the 27 experimental studies disclosed by the meta-analysis authored by Curry *et al*. in 2018,[6] the experimental studies conducted by Rowland and Curry in 2019,[10] and Tashjian *et al*. in 2021.[21] The Hui *et al*. 2020 meta-analysis does not disclose the intervention intensities of its 55 included experimental studies.[7] Based on the comparison with the 29 experimental studies disclosed, the more intensive intervention of this current study may have contributed to its large effect size on the subjective happiness measure. Future studies may systematically compare varying intensities of interventions on subjective well-being. Before the results of such studies are published, researchers may opt for interventions of higher intensities if situations allow.

***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,[13] is more sensitive to the seven-day PIF RAK interventions compared to their subjective gratitude and life satisfaction, measured by the Gratitude Questionnaire and the Satisfaction with Life Scale,[16,14] 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 research results.[30] Pavot and Diener state that measures of life satisfaction are "more than momentary mood states" and represent "a relatively stable component of subjective experience over time."[30] 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.[30]

Contextually, Fujita and Diener argue that subjective life satisfaction measures are more malleable than static metrics such as body weight,[31] suggesting potential for improvement through extended interventions. Their suggestion is supported by a meta-analysis by Curry *et al*.,[6] which includes four studies that report statistically significant enhancements in individuals' subjective life satisfaction following kindness-based interventions. These four studies were conducted by Buchanan and Bardi in 2010,[8] Aknin *et al*. in 2013,[32] and Nelson *et al.* in 2015,[9] and Chancellor *et al*. in 2018,[33] respectively. They 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. Moreover, the durations of these interventions align with those stated by Pavot and Diener in 1993.[30] In short, if the durations of kindness-based interventions are lengthened to two weeks or more, participants' subjective life satisfaction is possibly enhanced with statistical significance.

On the gratitude outcome, I have not found any published studies using experimental designs to investigate the effects of kindness-based interventions on participants' subjective gratitude, despite extensive literature searches. Therefore, I decided to pioneer this study using an experimental approach. The findings from my seven-day intervention study are novel, revealing a trend toward enhanced subjective gratitude ($t(60) = 1.7513$ and $p = 0.0850$). Although these results do not reach conventional levels of statistical significance, they suggest a positive trend (see Table 2). These 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*. underscores the importance of these cumulative effects,[34] a concept further explored by Funder and Ozer.[35] 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.

The limited student population at the Boarding High School, just over 800, presents a challenge for achieving ade


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quate sample sizes to obtain statistically significant results for well-being outcomes with small effect sizes. To address this limitation, future research could extend studies across multiple schools, enhancing statistical robustness and improving the generalizability of results in this field.

## 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 conduct additional post-test surveys to assess the long-term effects of the kindness intervention on participants' well-being. This longitudinal approach would help understand the sustainability of the intervention's impact over time. For context, Armenta *et al*. (2022) conducted a longitudinal study on a gratitude intervention in a high school setting,[36] providing valuable feasibility insights for future researchers on kindness intervention.

## 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.

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