The Happy Heels Study: Testing Whether Positive Exercises Improve Mental Health, Happiness and Academics in First-Year Students

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Abstract

College students face increasing amounts of stress related to navigating and thriving at universities. With increasing levels of anxiety, depressive symptoms and the strain placed on college counseling and psychological services, new creative ways are needed to assist students with their mental health and well-being. Three Good Things and a variant that focuses on social connection, are two exercises shown to improve mental and physical well-being, as well as reduce loneliness. 160 UNC first-year and transfer students participated in a two-week intervention where they performed Three Good Things (3GT) or an adapted Positivity Resonance exercise (3GT-Social). Results showed that while no significant changes in academic performance or visits to counseling services emerged, students did report significant improvements in loneliness, positivity resonance with strangers and acquaintances, and depressive symptoms, with between-group differences approaching significance at one follow-up time point. The two exercises offer a novel approach to addressing the mental health of many college students while also at little costs to university resources.
The Happy Heels Study: Testing Whether Positive Exercises Improve Mental Health, Happiness and Academics in First-year University Students

Undergraduate college students are facing higher levels of stress and anxiety than ever before. From adjusting to college life, classes, exams, making friends, and pressures to succeed, more students are finding it difficult to thrive in the college environment. In 2013, the American College Health Association National College Health Assessment found that 61% of students, in a sample of over 63,000, had experienced overwhelming anxiety in the previous year. Fifty-three percent of students reported academics being “very difficult or even traumatic” to handle (American College Health Association, 2013). Since 2013, all measures of mental health for students on the assessment have worsened. In the spring of 2018, 55% of students felt hopeless, 88.1% felt overwhelmed by what they had to do, 84.6% felt exhausted, 64.4% felt lonely, 69.9% felt very sad, 42.9% felt so depressed it was difficult to function, 64.3% felt overwhelming anxiety, 13% seriously considered suicide, 8.5% committed self-harm, and 1.9% attempted suicide (American College Health Association, 2018).

Rates of depression in undergraduates have risen concurrently with anxiety (American College Health Association, 2013). Over time, more students have begun to seek out mental health and psychological services. There has been a 30% increase in the number of students going to counseling and psychological services between 2009 and 2015 (Center for Collegiate Mental Health, 2016). This trend may point to society becoming more aware of the necessity for mental health resources and reduced stigma behind psychological services. However, the increase in students has overwhelmed university counseling services across the country. Already with limited resources, universities have resorted to a plethora of methods to accommodate the
growing number of students. Many have hired additional staff, partnered with private clinics and therapists, resorted to triage-like methods to reduce appointment wait-times, and assigned clinicians for same-day care (Reilly, 2018). Despite these efforts, the volume of students is still staggering, which results in longer wait-times for appointments and the inevitability that these services will not get to every student in a timely manner. The students missed may end up developing serious mental health complications, needing to withdraw from school or even hospitalized from self-harm or suicide attempts.

**Mental Health at UNC-Chapel Hill**

The University of North Carolina at Chapel Hill has exhibited similar trends in mental health compared to the rest of the nation. An increasing number of students face mental health challenges during their undergraduate career and more students are seeking out and utilizing Counseling and Psychological Services (CAPS) on campus. Since 2012, the number of students going to CAPS, for all appointment types (medical evaluation, medical check, telephone/web appointments, academic interventions, triage, brief therapy, and urgent crisis) has increased (Counseling and Psychological Services Appointment Statistics, 2018). The exhaustive reports from CAPS are provided in Appendix A. Notably, the rise in the number of academic interventions, urgent crises, and triage appointments have more than doubled between the 2012-2013 and 2016-2017 academic year (+113%, +104%, +101% increase respectively) (Counseling and Psychological Services Appointment Statistics, 2018). Between July 1st, 2017 and June 30th, 2018, CAPS had 18,805 attended appointments and saw a total of 4,097 clients (Counseling and Psychological Services Appointment Statistics, 2018) or roughly equivalent to an entire undergraduate first-year class seeking mental health services over the course of a year.
Personal conversations with Carolina Counseling and Psychological Services (CAPS), academic advisors, and admissions staff have corroborated the increases in symptoms of anxiety and depression in students. Staff members at CAPS have noted that making friends on campus, adjusting to college life, imposter syndrome, homesickness, and social anxiety are among common concerns of students. One academic advisor noted that students have anxiety due to familial pressure to perform at the perceived standard of what is considered academically “normal” at UNC (D. Robinson, personal communication, September 2018). There is sufficient evidence to suggest that more students are facing challenges while on campus and though more are seeking help, university resources struggle to assist such a high volume of students.

Improving Mental Health in Healthcare Workers (HCW)

Students are not the only group to face increasing levels of stress, anxiety, depressive symptoms, and difficulties balancing their lives. In the field of medicine, healthcare workers are facing longer hours, increased patient volume, and increased regulation. The rise in demands and expectations have contributed to the increased prevalence of burnout in physicians (Bakker and Demerouti, 2017). Burnout is a combination of emotional exhaustion, lower productivity at work and over-depersonalization (Perlman and Hartman, 1982). As of 2014, 55% of US physicians had one or more symptoms of burnout (Shanafelt, T. D., Hasan, O., Dyrbye, L. N., Sinsky, C., Satele, D., Sloan, J., and West, C. P., 2015). This is a concerning increase given that burnout and depression, among other stress-related symptoms, are linked to increased medical errors and as a result, put patients at risk (Shanafelt et al., 2010) (Welp, A., Meier, L. L., and Manser, T. 2015). There has also been a need in medicine to provide cost-effective ways of reducing stress in HCW.
A particular psychological exercise has had documented success in alleviating burnout, depression, improving happiness and work-life balance in HCW. The Three Good Things (3GT) exercise is a short intervention that has been shown to reduce depressive symptoms, burnout, and increase happiness for six months (Seligman et al., 2005). 3GT is a short exercise in which participants write three things that went well during their day. They are typically prompted with the question “What went well today?” or slight variations of it. A recent study done at the Duke Patient Safety Center in Duke Hospital found that healthcare workers who performed 3GT for 15 days had significant improvements in burnout, depressive symptoms, happiness and work-life balance six months to a year following the intervention (Sexton & Adair, 2017). The success of this exercise in healthcare demonstrates that small interventions can have long-lasting impacts on the mental health of participants. Additional cohorts of healthcare workers have partaken in 3GT with similar results, and the Patient Safety Office continues its research into 3GT’s efficacy. Multiple units at Duke Hospital have seen improvements in their staff after partaking in the intervention.

Because 3GT has been shown to have marked success as a cognitive exercise and as part of a concrete intervention for hospital personnel, the present research proposes that 3GT can have similar effects for undergraduate students. Both populations, healthcare workers and undergraduate students, have experienced increases in anxiety, depressive symptoms, burnout and difficulties balancing work and home in recent years. Both universities and hospitals are currently ill-equipped to handle the increase in those who may be seeking mental health services. Consequently, 3GT may be a useful tool for undergraduate students to use, in the same way the healthcare workers have utilized it in the hospital.
Positivity Resonance Improves Mental Health

Research has shown that positive emotions affect a person’s mental and physical health. In particular, shared positive emotions are integral for general well-being, social interaction and health (Fredrickson, 2016). Based on this research, Dr. Barbara Fredrickson proposed positivity resonance theory, which states that these shared positive interactions can result in increases in psychological well-being, mental flourishing, and lower levels of loneliness (Major, Lundberg, & Fredrickson 2019). Positivity resonance is a brief experience that occurs when two or more individuals share an interpersonal connection with: shared positive affect, mutual care and concern, and behavioral or biological synchrony (Major et al., 2019). A recent study by Major and colleagues revealed these findings in a cohort of 81 undergraduate students at UNC-Chapel Hill. Students in the treatment condition underwent a two-week social intervention, where they were encouraged to create more positive interpersonal connections with others (Major et al., 2019). Because the study demonstrated that behaviors promoting positivity resonance can improve well-being in students, it is hypothesized that first-year students who experience more positivity resonance during their first semester will have higher levels of happiness, flourishing and general well-being.

Current Study

Recent data and research show that both universities and hospitals are currently ill-equipped to handle the increase in individuals seeking mental health services. Both healthcare workers and undergraduate students have experienced increases in anxiety, depressive symptoms, burnout and difficulties balancing work and home. However, two simple, free interventions have provided measurable improvements to many mental health issues in individuals. 3GT displays impressive success as a cognitive reappraisal exercise and as part of a
concrete intervention for healthcare workers. As a result, it may be a useful tool for undergraduate students to use, in the same way the healthcare workers have utilized it in the hospital. In addition, in Fredrickson, Major and Lundberg’s study with undergraduates, those students who cultivated more positivity resonance not only showed lower levels of loneliness following the two-week intervention, but also displayed higher levels of flourishing mental health and psychological well-being. This positivity resonance exercise follows the same two-week duration as 3GT. As a result, in the present study, the exercise was adapted to mimic the daily reminders of 3GT, while also encouraging students to focus specifically on cultivating moments of positivity resonance with others. In maintaining the format of 3GT, participants were asked “What social interactions went well today?” While slightly different from the original positivity resonance exercise, this offers a more direct comparison between 3GT and positivity resonance. The new condition is termed 3GT-Social throughout the study.

The present study aimed to investigate if 3GT and 3GT-Social would have positive effects on first-year students embarking on their first year of college. It tested whether either of the exercises would improve the overall mental health of first-years and also affect academic performance. Improvements in students within the 3GT group stood to increase the generalizability of the 3GT exercise to populations outside of healthcare. Improvements in students within the 3GT-Social group would further test whether increases in positivity resonance lead to better health and well-being.

Both exercises were tested to examine their effects on a variety of mental states observed within the realm of a college campus. They included: burnout, depressive symptoms, anxiety, school-life balance, subjective happiness, gratitude, satisfaction with life, loneliness, positive empathy, social curiosity, sense of belonging and perceived positivity resonance.
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It was hypothesized that students in the 3GT and 3GT-Social conditions, in comparison to an active control group, would show improved scores on a core set of measures representing mental health: burnout, depressive symptoms, school-life balance, subjective happiness and anxiety, at the conclusion of the semester. It was also hypothesized that these improvements would have observable effects on students’ academic performance as well—manifesting in a higher cumulative GPA for the fall semester. Thus, students in the treatment conditions would have a higher cumulative GPA than students in the active control group. Finally, it was hypothesized that the two treatment groups would also have significantly fewer visits to CAPS than those in the active control condition.

These exercises may provide incoming first-year undergraduate students with a new way to cope with the stress of adjusting to college life in the same way that healthcare professionals have used 3GT in the hospital. Given that the exercises are free and require minimal time to complete, they stand to serve as an additional tool for university counseling services to use with students who require mental health support. They have the potential to be used as large-scale interventions by on-campus counseling services.

Methods

Participants

Participants were recruited via email through the Office of New Student and Family Programs listserv at The University of North Carolina at Chapel Hill. Eligible participants were 18 and older and classified as first-year or transfer students. Those providing consent (N = 206) were directed to complete a pre-survey of mental health measures, as well as to provide their email (and optional phone number) in order to be contacted during the study. Participants were
excluded if they were not 18 years of age, were not a first-year or transfer student, did not consent, or did not complete the pre-survey in its entirety (see CONSORT diagram in Figure 1). Following these exclusion criteria, the remaining participants ($N = 160$) were randomized into an active control ($n = 53$) or one of two treatment groups: Three Good things (3GT; $n = 54$) or Positivity Resonance (3GT-Social; $n = 53$). The average age of participants was ($M = 18.5; SD = 2.31$). The final sample contained 150 first-year students and 10 transfer students (see Table 1). 130 out of 160 students in the final sample consented to allow their fall cumulative GPA to be accessed by the researchers in the spring. Participants were incentivized to complete the daily surveys by having the option to receive a customized study-specific stress ball, free of charge, at the beginning of the study, as well as be entered into a random drawing for 1 of 20 $50 Visa gift cards. Drawings for gift cards were done at random among participants who consented and provided an email to receive daily reminders throughout the study. Drawings occurred following the last follow-up survey in January. Stress balls were delivered to students via the on-campus packaging centers. Students living off campus were able to pick up their stress ball from Davie Hall at their earliest convenience.

**Measures**

Measures of burnout, depressive symptoms, anxiety, school-life balance, subjective happiness, gratitude, satisfaction with life, loneliness, positive empathy, social curiosity, sense of belonging, and positivity resonance were administered to participants before, during, and after completing the intervention period. The intervention period was for two weeks (15 days) during the fall semester in November of 2018. Fall semester GPA’s of consenting participants ($n = 130$) were collected from the university registrar’s office in January 2019.
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**Anxiety & Depressive symptoms:** To assess anxiety and depressive symptoms in students, short forms of the Patient-Reported Outcomes and Measurement System (PROMIS®) items for anxiety and depression were used (Pilkonis et al., 2011). Participants responded to eight and seven items respectively for depressive symptoms and anxiety, indicating the frequency that they experienced each item on a 5-level ordinal scale (*never, rarely, sometimes, often, always*). Example items included: “I felt worthless” (depressive symptoms) or “I felt worried” (anxiety). Cronbach’s alpha for anxiety and depressive symptoms at the pre-survey survey for the current sample were .892 and .930 respectively.

**Burnout:** The Maslach Burnout Inventory is the most widely used instrument to assess burnout. A 5-item variant of the 9-item scale was used to measure emotional exhaustion in participants (Schaufeli, Bakker, Hoogduin, Schap, & Kladler, 2001). Participants responded on a scale of 1-5 (1 = strongly disagree; 5 = strongly agree) to items such as “I feel burned out from my work”. Cronbach’s alpha at pre-survey for the current sample was .802

**Gratitude:** Gratitude/grateful disposition was assessed using the Gratitude Questionnaire—6 (McCullough, Emmons, and Tsang, 2002). Participants responded to six items on a seven-point scale (*1 = strongly disagree to 7 = strongly agree*). Example items included: “I have so much in my life to be thankful for” and “I am grateful to a wide variety of people”. Cronbach’s alpha at pre-survey for the current sample was .770.

**Loneliness:** Loneliness was assessed with the UCLA Loneliness Scale (version 3) (Russell, 1996). Participants responded on a five-point scale (*1 = never to 5 = always*) to 20 items regarding their sentiments over the previous week. Example items included: “How often do you feel left out?” and “How often do you feel outgoing and friendly?” Cronbach’s alpha at pre-survey for the current sample was .927.
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School-life balance: Students were assessed on how well they balanced various aspects of college life using the College Activities and Behaviors Questionnaire (CABQ) (Pennebaker, 2013). Students indicated the number of times they had experienced each item over the past week. Example items include: “Number of times had difficulty falling asleep___” and “Number of times exercised strenuously__”. Raw scores were aggregated into four larger categories: unhealthy behaviors, unhealthy consumption, self-care and social. Final scores were computed by subtracting the sum of the unhealthy habits (consumption and behaviors) from the positive ones (self-care and social).

Sense of belonging: Students’ sense of belonging while on campus was measured using the 12-item General Belongingness Scale (GBS) (Malone et al., 2012). Participants responded on a seven-point Likert scale to items such as: “When I am with other people, I feel included” and “I feel accepted by others”. Cronbach’s alpha at pre-survey for the current sample was .926

Subjective Happiness: Measures of participants’ subjective happiness were done using the Lyubomirsky and Lepper’s subjective happiness scale (SHS) (Lin J-D, Lin P-Y and Wu C-L., 2010; Sexton and Adair, 2017; Lyubomirsky and Lepper, 1999). Participants responded to items such as “In general I consider myself…” (1 = not a very happy person to 7 = a very happy person). Cronbach’s alpha at pre-survey for the current sample was .866

Perceived Positivity Resonance: Positivity resonance was measured using a 7-item scale developed by Major et al., 2018. Participants were asked: “Considering the single longest interaction you had with one or more strangers or acquaintances this week. For what proportion of time during this episode (from 0 to 100 percent)…” to measure positivity resonance with strangers and acquaintances and “Considering the single longest interaction you had with one or more close friends or romantic partner this week. For what proportion of time during this episode
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(from 0 to 100 percent)...” for positivity resonance with close friends or romantic partners. Participants indicated how much they experienced each item as a percentage ranging from 0-100 percent. Responses from each item were averaged to make an individual score. Positivity Resonance for romantic partners and close friends was denoted as PosRes_RC. Positivity Resonance for strangers/acquaintances was denoted as PosRes_SA. Cronbach’s alpha at the pre-survey for the current sample were .962 for PosRes_SA and .978 for PosRes_RC.

**Social Curiosity:** Social curiosity was measured using the 10-item Social Curiosity Scale (SCS) (Renner, 2006). Participants responded to items such as “I like to learn about the habits of others” and “When people quarrel, I like to know what’s going on” on a 5-point Likert scale (1= Does not describe me to 5= Describes me extremely well). Cronbach’s alpha at pre-survey for the current sample was .760.

**Positive Empathy:** Positive empathy was measured using the Positive Empathy Scale (Morelli, Lieberman, & Zaki, 2015). Participants responded on a 5-point Likert scale to items such as “When someone is else is enthusiastic, I can’t help but be enthusiastic too”. Cronbach’s alpha at pre-survey for the current sample was .853.

**Satisfaction with Life:** Satisfaction with life was measured using the Riverside Satisfaction with Life Scale (Margolis, Schwitzgebel, Ozer, & Lyubomirsky, 2018). Participants responded on a 7-point Likert scale (1= Strongly Disagree to 7= Strongly Agree) to items such as “I like how my life is going” and “I am content with my life.” Cronbach’s alpha at pre-survey for the current sample was .836.

**Design**

All study procedures were approved by the University of North Carolina at Chapel Hill’s Institutional Review Board. Potential participants were recruited through email and directed to a
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Qualtrics survey containing the consent form, option to receive a stress ball as incentive, and the pre-survey. In the consent form, students could choose to: consent to the study and share their fall semester GPA at the end of the study; consent to the study and **NOT** share their fall semester GPA at the end of the study; or not consent to be in the study. Students who were not 18 or did not classify as first-years or transfer students, were screened out, while those meeting the requirements continued to the pre-survey. Participants received all correspondences through email and text and all data was collected via Qualtrics.

Consenting participants completed the pre-survey in Qualtrics assessing initial levels of anxiety, burnout, depressive symptoms, school-life balance, gratitude, loneliness, sense of belonging, subjective happiness, positivity resonance, and positive empathy. Following the pre-survey, they were randomly assigned into an active control or one of two treatment conditions: Three Good Things (3GT) or Positivity Resonance (3GT-Social). All groups began their respective intervention on November 1st, during which they received an email and text message (if participants opted in to provide a phone number) each evening, asking them to complete their daily exercise. Messages were sent at 7pm daily.

Participants in the active control condition were asked “What did you do today?”, those in the Three Good Things (3GT) condition were asked “What went well today?”, and those in the positivity resonance condition (3GT-Social) were asked “What social interactions went well today?”. In each condition, participants were encouraged to provide a minimum of three responses but could list up to six. The intervention period lasted 15 days—concluding on November 15th. An error in the survey distribution also resulted in participants in the active control condition not receiving the loneliness scale for Day 15.
Within the intervention period, all participants were presented with repeat assessments of anxiety, burnout, depressive symptoms, school-life balance, gratitude, loneliness, sense of belonging, subjective happiness, positivity resonance, and positive empathy on days 7 and 15. After the intervention period, follow up measures of all mental health measures were collected two (Follow-up 1), four (Follow-up 2) and eight (Follow-up 3) weeks after the intervention. Participants were also asked if they had visited Counseling and Psychological Services (CAPS) throughout the semester. In January, fall 2018 cumulative GPAs of consenting participants \( (n = 130) \) were obtained through the UNC Registrar’s Office. All students were sent a debriefing email and offered to attend an additional debriefing session to learn the results of the study.

Results

Statistical Analysis

Data were analyzed using SPSS Statistics Software v. 25. Chi-squares assessed whether attrition during the intervention differentially affected the three conditions. Scores for all mental health measures were calculated at each time point based on published scoring procedures and used for analysis. Scores for positivity resonance were averaged across all responses, while all other scores, excluding school-life-balance, were summed. Between-group differences for mental health measures were assessed with One-way ANCOVAs. These were also used to control for pre-survey results when analyzing post-intervention measures. Post-hoc tests further analyzed differences between conditions. A One-way ANOVA was used to test differences in GPA for academic performance, as well as test for differences in GPA between those who were retained and dropped out of the study.
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Attrition

Collapsing across conditions over the intervention period, attrition rates through the intervention period were 69.1% compared to Sexton and Adair’s, 2017 3GT study, which had attrition rates averaging 53% following their intervention. Table 2 shows the sample size of each condition as the study progressed. A Chi Square analysis determined that attrition rates at each time point were not significantly different across conditions. However, because there was a large amount of participant drop-out, additional analysis of pre-survey results examined whether students who dropped out of the study had markedly different scores on pre-survey mental health measures. A one-way ANOVA tested all pre-survey measures against whether or not participants dropped out at Day 15. Results determined that students who dropped out had higher levels of anxiety than those who completed the intervention period ($F = 5.892 \ p < .05$). For all other measures, there was no difference in pre-survey scores between those who dropped out and those who remained in the study. Thus, the group of students who did not complete the intervention were more anxious prior to its start ($M = 18.13$) compared to those who were retained ($M = 16.03$), but did not differ in other measures assessing mental health.

Student Mental Health Pre-Intervention

Participants did not show significant between-group differences in any mental health measures before the intervention period. However, all students were assessed for concerning levels of key measures. Students passing a certain threshold for each measure were considered to meet a “percent concerning” criteria. Table 3 notes the number of students (collapsed across conditions) meeting a percent concerning score at the pre-survey. Percent concerning scores for key measures, excluding school-life balance, were determined using published precedents. To calculate percent concerning for burnout, scores were converted from a 50-point scale to a 100-
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point scale. A threshold of 50 was used to mark moderate levels of burnout and considered percent concerning (Schaufeli et al., 2001). Raw scores for depressive symptoms were converted to t-scores and scores beyond 1 standard deviation (60+) were considered moderate levels of depressive symptoms and marked as percent concerning (Choi, Schalet, Cook & Cella, 2014).

Percent concerning for sense of belonging was determined by comparing the scores for inclusion and rejection questions within the scale; inclusion scores were summed separately from rejection. A difference score was calculated by subtracting inclusion scores from rejection scores, with a positive difference score indicating higher feelings of rejection and isolation. A difference score of 10 or higher was considered a percent concerning level of isolation.

Individual items for happiness were averaged across all responses. A score below 5 marked percent concerning in line with data on various populations (Lyubomirsky, 1999). A score of 50 or higher for loneliness was considered a moderate level of loneliness by Perry and was used as the threshold of percent concerning for students (Perry, 1990). A score below -2 for school-life balance was marked as percent concerning and indicated that students were engaging in greater proportion of negative habits than positive ones on campus.

More than half of participants met the percent concerning criteria for happiness and loneliness (64.4% and 62.5%) and 31.1% of students had difficulties with school-life balance. Overall, this shows that as new students begin the second half of the semester in November, more than one in two students feels at least moderately unhappy and lonely, and that nearly a third are having difficulties balancing the various aspects of college life.

Mental Health Measures Post Intervention

Table 4 displays significant mental health measures differences at timepoints following the intervention period. Repeated measures ANCOVA with a Greenhouse-Geisser correction to
account for sphericity were used to determine between-group differences while controlling for pre-survey results. As shown, significant differences were observed in burnout, depressive symptoms, loneliness, anxiety, positive empathy, and positivity resonance for strangers/acquaintances at various timepoints post-intervention. All unlisted measures were not significantly different at all post-intervention timepoints. Graphs depicting the change in scores over time for both significant and nonsignificant measures are displayed in Figure 4 of Appendix B.

Students in all conditions improved their scores in depressive symptoms throughout the exercise. Within-subject effects showed a main effect of time from the pre-survey to Day 15 \((F = 7.00, p < .05)\).

Repeated measures showed a significant main effect for time \((F = 14.51, p < .05)\) and moderating effect by condition \((F = 3.734, p < .05)\) for loneliness from the pre-survey to Day 15. Post hoc tests showed that at Day 15, students in the 3GT-Social condition \((M = 35, SD = 13.4)\) were significantly different in their improvement from the active control and 3GT conditions \((M = 55.35, SD = 13.4)\) \((M = 52.64, SD = 19.6)\) respectively.

Repeated measures showed a significant main effect for time \((F = 8.24, p < .05)\) and time x condition \((F = 4.24, p < .05)\) for positivity resonance with strangers/acquaintances at Day 15. Post hoc tests revealed that self-reported scores for positivity resonance with strangers/acquaintances in the 3GT-Social condition \((M = 77.8, SD = 20.4)\) were significantly higher than the active control group \((M = 57.7, SD = 22.6)\). Additionally, from the beginning of the exercise to the final 8-week follow-up, students in the 3GT-Social condition showed the largest improvement from a mean score of 53.37 (out of 100) at the pre-survey, to a mean score
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of 74.89 at Day 15. This improvement was maintained at the 8-week follow-up, with students in this condition reporting a mean score of 74.36.

**Academic performance**

During the spring semester, fall cumulative GPA was obtained from the registrar for consenting participants ($n = 130$). A one-way ANOVA determined that there was no significant difference between each condition’s average GPA at the end of the fall semester ($F = 1.92, p = .151$). Due to attrition throughout the intervention period, a second ANOVA tested if students who dropped out differed significantly in their GPA from those who remained in the study. Results showed that those who dropped out of the study were not significantly different in the fall cumulative GPA than those who were retained in the study ($F = .039, p > .05$). The average cumulative GPA for all students was a 3.40 with a standard deviation of .628, 95% CI [3.22, 3.45].

**CAPS Visits**

After the intervention, participants were asked whether or not they had visited Counseling and Psychological Services (CAPS) during the semester. Of the 41 students that responded, two students went one time and six more than once. There was no difference between groups in the number of visits.

**Discussion**

The main goals of this study were to test if two brief, self-administered exercises, Three Good Things (3GT) and a variant of it that focused on social interactions (3GT-Social), could improve the mental health and academic performance of first-year and transfer students at UNC-Chapel Hill. Students participated in the exercise(s) or served in an active control condition for 15 days, replicating the time length used in exercises for 3GT with healthcare workers. Scattered
findings suggest that students improved over the semester in certain measures and not others. In particular, loneliness and positivity resonance with strangers and acquaintances showed significant improvements by virtue of the 3GT-Social exercise. Not only did students improve on these measures, but a number of these differential improvements were maintained after the intervention period into the start of the spring semester. Students continued to feel significantly less lonely and had warmer social connections with individuals that were not already close friends or romantic partners in the spring. In addition to loneliness and positivity resonance with strangers and acquaintances, students in the 3GT-Social condition also had significant improvements in anxiety between the start and 8-week follow up from the study. They also saw improvements in depressive symptoms following the intervention, with between-group differences that approached significance at the 2-week follow-up. It should be noted that attrition of research participants throughout the study was high and resulted in fewer students completing the follow-up measures as time progressed. Studies done by the Duke Patient Safety Center with 3GT report attrition rates of 50% to be typical of such study designs (Sexton and Adair, 2017). The incentives provided in this study served to encourage the completion of the daily surveys, though did not guarantee 100% participation by all students.

These results partially support the hypothesis that the exercises improve students’ mental health, given that only some measures such as perceived positivity resonance, and depressive symptoms—one key measure, improved. There were no significant differences in CAPS visits or cumulative GPA, which represents academic performance over the semester. Thus, students in all groups tended to perform at about the same academic level, whether they performed an exercise or not. These findings fail to reject the null hypotheses for CAPS visits and academic performance.
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Students in the 3GT-Social condition improved from the pre-survey to the end of the exercise in loneliness and positivity resonance with strangers and acquaintances. Then after the intervention period, they had larger decreases in anxiety than the control or 3GT condition at the 8-week follow up. Thus, students who were encouraged to reflect on, and implicitly create, positive social interactions with strangers or acquaintances in the fall semester, came back in January with lower anxiety levels than those who did not. And though the college environment does provide a space to meet new people, it was students in this condition who saw significant improvements in loneliness. Fredrickson’s (2016) theory on positivity resonance is supported by studies indicating that positivity resonance is correlated with improvements in flourishing mental health, decreases in depressive symptoms, and loneliness. Additionally, in Fredrickson, Major, and Lundberg’s (2019) study, students in the experimental (positivity resonance) condition had increased positivity resonance, which predicted lower levels of loneliness after the two-week intervention (Major et al., 2019). Taken into consideration, the results of the present study further support that social interventions can increase positivity resonance and decrease loneliness. This is pertinent considering that UNC students who initially met percent concerning levels for loneliness (62.5%) is comparable to the spring 2018 national average of 64.4%. There may be broader applications for such interventions beyond UNC-Chapel Hill: levels of loneliness are high in colleges across the country. Other schools could adopt similar interventions for students to address high levels of loneliness on their respective campuses.

The findings presented above replicate, on a shorter timeline, those of the Duke Patient Safety Center, where healthcare workers that underwent the 3GT exercise showed significant improvements in mental health one month, six months, and twelve months, after the intervention period. This further strengthens the research showing that brief interventions encouraging
个体反思生活中的积极方面（和/或互动）可以对心理健康和幸福感产生长期影响（Sexton and Adair, 2017）。

这项研究也为100多名学生提供了一个连续两周的时间段，同时跟踪他们的心理健康状况。这项研究的开展没有要求学生支付费用，研究人员的费用也相对较低。参加研究的学生每天都能收到电子邮件的链接，他们也可以选择接收通过短信发送的额外提醒。鉴于学生确实通过干预措施得到了显著改善，这种框架可以被作为一种对学生的健康干预，也可以为希望评估学生在学期期间的幸福感的大学机构提供质量指标。对于咨询和心理服务，这种类型的活动可以用来帮助一大群学生在大学校园中感到不那么孤独，通过鼓励他们反思他们每天与他人交往的社交互动。（Sandstorm and Dunn, 2014）。在UNC大学，教职员工和学生都意识到结识新朋友是适应大学环境的一个挑战。不仅会建立亲密的友谊，也会有频繁的愉快互动，与校园内其他个人交往，将会带来更大的心理益处。积极的共鸣也可能有助于提高身体健康（Major et al., 2019）。因此，可能有初步的证据表明，一种可以让学生反思并与他们不太熟悉的个体建立积极的社会联系的方法是值得的。在大学层面实施这样的练习可能有助于丰富新老学生在校园的生活体验。
Some limitations of this study include the attrition of research participants throughout the study. Maintaining a larger sample size for each condition would likely increase the reliability of significant findings. Allowing students to complete the daily exercises via mobile devices, as opposed to only receiving reminders via their phones, could allow for more consistent participation. Additionally, students may require more reminders to complete the follow-up surveys. Students may also be more inclined to continue participating if each completed daily survey accrued a reward. For example: completing seven days meant a participant would receive a stress ball and completing 15 days entered them into the drawing for a visa gift card. An error in the survey distribution also resulted in participants in the control condition not receiving the loneliness scale for Day 15. Thus, changes from the pre-survey to Day 15 were not able to be obtained. More transfer students in the population would allow for stronger analysis of possible differences between first-year and transfer students’ mental health and academic performance.

The Happy Heels Study sought to test if Three Good Things and a new positivity resonance exercise—3GT-Social, would improve the mental health and academic performance of first-year and transfer students. Results showed improvements in loneliness and positivity resonance with strangers and acquaintances, and had changes approaching significance for depressive symptoms. A number of students were able to receive an exercise improving some aspects of their mental health without visiting a CAPS office on campus. This method of intervention could possibly serve as an additional resource for counseling services to better serve students as they come to college and adjust to the campus environment.
References


THE HAPPY HEELS STUDY


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THE HAPPY HEELS STUDY


THE HAPPY HEELS STUDY


doi:10.3389/fpsyg.2014.01573
THE HAPPY HEELS STUDY

Appendix A.

Table 1.

<table>
<thead>
<tr>
<th></th>
<th>3GT (N=54)</th>
<th>Control (N=53)</th>
<th>3GT-Social (N=53)</th>
<th>Chi Square</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.6</td>
<td>.231</td>
<td>18.2</td>
<td>.233</td>
<td></td>
</tr>
<tr>
<td>Class Year</td>
<td>First Year</td>
<td>First Year</td>
<td>First Year</td>
<td>Transfer</td>
<td></td>
</tr>
<tr>
<td>(# of students)</td>
<td>51</td>
<td>3</td>
<td>50</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>49</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X² 9.379</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p .639</td>
</tr>
</tbody>
</table>

Table 2. Participant Attrition by Condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pre-survey</th>
<th>Day 15</th>
<th>Follow-up 1</th>
<th>Follow-up 2</th>
<th>Follow-up 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>3GT</td>
<td>54</td>
<td>16</td>
<td>12</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Control</td>
<td>53</td>
<td>29</td>
<td>22</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>3GT-Social</td>
<td>53</td>
<td>16</td>
<td>15</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Total (N)</td>
<td>160</td>
<td>61</td>
<td>49</td>
<td>48</td>
<td>43</td>
</tr>
<tr>
<td>Chi Square (X²)</td>
<td>3.00</td>
<td>3.00</td>
<td>6.00</td>
<td>6.00</td>
<td>6.00</td>
</tr>
</tbody>
</table>

Note: * p < .05

Table 3.

Students with Percent Concerning Scores at Pre-Survey

<table>
<thead>
<tr>
<th>Measure</th>
<th>Students with % Concerning at Pre-survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>8.8% (14 of 160)</td>
</tr>
<tr>
<td>Burnout</td>
<td>16.9% (27 of 160)</td>
</tr>
<tr>
<td>Belonging</td>
<td>7.5% (12 of 160)</td>
</tr>
<tr>
<td>Depression</td>
<td>18.8% (30 of 160)</td>
</tr>
<tr>
<td>Happiness</td>
<td>64.4% (103 of 160)</td>
</tr>
<tr>
<td>Loneliness</td>
<td>62.5% (100 of 160)</td>
</tr>
<tr>
<td>School-life balance</td>
<td>31.3% (50 of 160)</td>
</tr>
</tbody>
</table>
Table 4. Summary of Significant Mental Health Changes from Pre-Survey to After Intervention Period

<table>
<thead>
<tr>
<th>Measure</th>
<th>Day 15</th>
<th>Follow-up 1</th>
<th>Follow-up 2</th>
<th>Follow-up 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time</td>
<td>Condition</td>
<td>Time</td>
<td>Condition</td>
</tr>
<tr>
<td>Burnout</td>
<td>1.31</td>
<td>.340</td>
<td>.488</td>
<td>5.57*</td>
</tr>
<tr>
<td>Depression</td>
<td>7.00*</td>
<td>1.701</td>
<td>1.53</td>
<td>14.49*</td>
</tr>
<tr>
<td>Loneliness</td>
<td></td>
<td></td>
<td></td>
<td>9.71*</td>
</tr>
<tr>
<td>PES</td>
<td>.168</td>
<td>.102</td>
<td>.805</td>
<td>4.89*</td>
</tr>
<tr>
<td>PosRes_SA</td>
<td>8.24*</td>
<td>2.86+</td>
<td>4.24*</td>
<td>11.02*</td>
</tr>
<tr>
<td>Anxiety</td>
<td>1.35</td>
<td>.987</td>
<td>.257</td>
<td>1.76</td>
</tr>
</tbody>
</table>

Note: PosRes_SA Positivity Resonance with strangers and/or acquaintances. PES Positive empathy. Repeated measures ANCOVA with a Greenhouse-Geiser correction. Follow-ups are at two, four, and eight weeks after the intervention. Loneliness data not collected on Day 15 due to error in Qualtrics survey. † approaching significance; * p < .05; ++p = .050
Figure 1.
Consort Diagram

Enrollment

Assessed for eligibility (n=299)

Excluded in consent survey (n=136)
- Underage and/or not first-year/transfer student (n=5)
- Declined to participate (n=89)
- Did not complete first survey in entirety (n=45)

Randomized (n=160)

Allocation

Allocated to Three Good Things 3GT (n=54)
- Received allocated intervention (n=54)

Allocated to Control (n=53)
- Received allocated intervention (n=53)

Allocated to 3GT-Social (n=53)
- Received allocated intervention (n=53)

Day 15

Completed Intervention (n=16)

Completed Intervention (n=29)

Completed Intervention (n=26)

2-Week Follow-up

Completed (n=12)

Completed (n=22)

Completed (n=15)

4-Week Follow-up

Completed (n=11)

Completed (n=22)

Completed (n=15)

8-Week Follow-up

Completed (n=15)

Completed (n=17)

Completed (n=11)
Figure 2.

UNC-Chapel Hill CAPS Appointment Trends from 2012-2017

**CAPS ANNUAL VISIT COUNTS BY APPOINTMENT TYPE**

<table>
<thead>
<tr>
<th>Med Eval</th>
<th>Med Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>2013-14</td>
</tr>
<tr>
<td>2014-15</td>
<td>2015-16</td>
</tr>
<tr>
<td>2016-17</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tele/Web</th>
<th>Academic Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>2013-14</td>
</tr>
<tr>
<td>2014-15</td>
<td>2015-16</td>
</tr>
<tr>
<td>2016-17</td>
<td>2017-18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Triage</th>
<th>Brief Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>2013-14</td>
</tr>
<tr>
<td>2014-15</td>
<td>2015-16</td>
</tr>
<tr>
<td>2016-17</td>
<td>2017-18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Urgent Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
</tr>
<tr>
<td>2013-14</td>
</tr>
<tr>
<td>2014-15</td>
</tr>
<tr>
<td>2015-16</td>
</tr>
<tr>
<td>2016-17</td>
</tr>
</tbody>
</table>

**Percentages of Change: 2012-13 v 2016-17**

- Med Eval: +24.4%
- Med Check: +68.9%
- Tele/Web Encounters: +43.2%
- Academic Intervention: +113%
- Brief Therapy: +28.3%
- Triage: +101%
- Urgent Crisis: +104%
### Figure 3. UNC-Chapel Hill CAPS Appointment Statistics for 2018

**Counseling & Psychological Services (CAPS) - University of North Carolina**

Appointment Statistics

From 07/01/2017 to 06/30/2018 and Clients and All Appointments and All Schedules and Client Attendance = Attended

<table>
<thead>
<tr>
<th>Attendance</th>
<th>No. of Appts</th>
<th>% of Appts</th>
<th>Length in Hours</th>
<th>No. of Clients</th>
<th>% of Clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended</td>
<td>18805</td>
<td>84.7%</td>
<td>13760.77</td>
<td>4097</td>
<td>99.6%</td>
</tr>
<tr>
<td>Center Closed</td>
<td>18</td>
<td>0.1%</td>
<td>16.50</td>
<td>16</td>
<td>0.4%</td>
</tr>
<tr>
<td>Client Canceled</td>
<td>1175</td>
<td>5.3%</td>
<td>1184.25</td>
<td>891</td>
<td>21.7%</td>
</tr>
<tr>
<td>Client Canceled Late</td>
<td>131</td>
<td>0.6%</td>
<td>121.00</td>
<td>120</td>
<td>2.9%</td>
</tr>
<tr>
<td>Client No Show</td>
<td>770</td>
<td>3.5%</td>
<td>702.50</td>
<td>583</td>
<td>14.2%</td>
</tr>
<tr>
<td>Client Rescheduled</td>
<td>666</td>
<td>3.0%</td>
<td>613.25</td>
<td>512</td>
<td>12.4%</td>
</tr>
<tr>
<td>Counselor Canceled</td>
<td>503</td>
<td>2.3%</td>
<td>538.25</td>
<td>395</td>
<td>9.6%</td>
</tr>
<tr>
<td>Counselor Rescheduled</td>
<td>90</td>
<td>0.4%</td>
<td>81.00</td>
<td>84</td>
<td>2.0%</td>
</tr>
<tr>
<td>Scheduled</td>
<td>1</td>
<td>0.0%</td>
<td>0.25</td>
<td>1</td>
<td>0.0%</td>
</tr>
<tr>
<td>&lt;No Associated Clients (Group)&gt;</td>
<td>53</td>
<td>0.2%</td>
<td>61.50</td>
<td>1</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

**Subtotal for: Attendance**

| 22212 | 17079.27 |  |

This Attendance section ignores the attendance filter. Even if you specified that you only wanted to run this report for 'Attended' appointments this section will show statistics for all the appointments regardless of the attendance filter you specified. The 'Attended' row totals are the most important information in this section. The total number of appointments counts each person in a Group/Couple appointment as a separate appointment (e.g. 10 clients in a single group session will be counted as 10 appointments). Since you ran the report combining individual and group appointments then the total number of clients on the 'Attended' row is the total number of unique clients that attended an appointment at your center.

The subtotal for the number of clients would be misleading and is not shown (e.g. The same client could be counted in more than one row because one client can have both an attended and a canceled appointment).

The subtotal for the number of appointments can be misleading because multiple clients can be on a single appointment, and can be 'Attended' for one client and a 'No Show' for another. Both will be counted here.
Appendix B.

Figure 4. Mean Change in Mental Health Measures Over the Course of the Study.

*Note:* Error bars denote standard deviations
THE HAPPY HEELS STUDY

### Social Curiosity

- **3GT**
- **Control**
- **3GT-Social**

### Positive Empathy

- **3GT**
- **Control**
- **3GT-Social**

### Positivity Resonance Stranger/Acquaintance

- **3GT**
- **Control**
- **3GT-Social**
THE HAPPY HEELS STUDY

Positivity Resonance Romantic Partner/Close Friend

School-life Balance