



The Impact of a Universal Mental Health Intervention on Youth with Elevated Negative Affectivity: Building Resilience for Healthy Kids

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Abstract

Objective In response to the rise in mental health needs among youth, a school-based resilience intervention was implemented for sixth graders at an urban middle school. The goal of this analysis is to examine improvements in key mental health parameters among students who endorsed negative affectivity at baseline.

Method A total of 285 11–12-year-olds (72% white, 18% Hispanic, 55% female) participated in a single-arm, non-randomized 6-week 1:1 school-based coaching intervention, Healthy Kids. Youth completed validated surveys at baseline and 6-week follow-up assessing depression/anxiety symptoms, bullying, self-efficacy, academic pressure, grit, and resilience. Participants were determined to have elevated negative affectivity if they reported mild-to-severe symptoms for both depression and anxiety symptoms. General linear models examined differences between groups for each mental health parameter, as well as change in outcomes from baseline to follow-up.

Results A third of participants (38%) at baseline endorsed negative affectivity. Youth who endorsed negative affectivity were more often female (71% vs 29%; $p < 0.001$) and identified as victims of cyberbullying (25% vs 8%; $p < 0.001$). Youth with baseline negative affectivity scored lower for self-efficacy (total 70.5 vs 86.8; $p < 0.0001$). Baseline negative affectivity was a significant moderator for change in mental health parameters. Post-intervention, those who endorsed baseline negative affectivity, medium effect sizes were observed for self-efficacy ($g = 0.6$; 95%CI 0.3, 0.9; $p < 0.001$) and anxiety symptoms ($g = -0.70$; 95%CI $-1.0, -0.4$; $p < 0.001$). Among all youth, there were significant medium intervention effects in resilience ($g = 0.5$; 95%CI 0.3, 0.7; $p < 0.001$) and self-efficacy ($g = 0.7$; 95%CI 0.4, 0.9; $p < 0.001$).

Conclusions A universal resiliency program may improve self-efficacy and symptoms of anxiety among youth experiencing negative affectivity, while improving resilience and self-efficacy among all youth. Our findings suggest a universal school-based coaching program benefits all youth, while also specifically targeting the needs of youth with negative affectivity who are most at risk for mental health concerns.

Keywords Youth · Mental health · Primary prevention · School-based

Introduction

Rates of death by suicide among youth aged 10–24 years increased by 56% from 2007 to 2017 (Curtin, 2020; Curtin & Hedegaard, 2019; Lee & Wong, 2020; Oh et al., 2019). In parallel to the increasing prevalence of youth suicide, there has been a rapid increase in youth diagnosed with depression (Zhang et al., 2019). The onset of depressive disorders typically occurs in early-to-middle adolescence (ages 11–15 years) and, if untreated, tracks into adulthood (Feiss et al., 2019; Fergus & Zimmerman, 2005; Luthar et al., 2000; Mongelli et al., 2020). Elevated anxiety symptoms during the early adolescent period (11–12 years) are a predictor of

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later depression and suicide among youth (Lee et al., 2020; Zhang et al., 2019). Therefore, efforts to decrease anxiety and depression symptoms, collectively referred to as “negative affectivity,” in early adolescent youth are integral for early suicide prevention efforts.

Universal prevention efforts targeting schools have the potential for widespread reach, including students from underserved communities, as well as students who may be classified as “just under the clinical radar” for diagnostic criteria. These programs, however, should be non-stigmatizing in order to get buy-in from schools, parents, and youth (Feiss et al., 2019). Schools are attractive platforms for prevention programs because they can alter the environment and education of a large number of youth simultaneously and, when implemented successfully into the school’s structure, have the potential to be integrated and sustained long-term (Ashworth et al., 2018).

Despite these advantages, few school-based efforts focused on improving protective factors, such as resilience, to reduce symptoms of anxiety and depression have been conducted (Dray et al., 2017; Feiss et al., 2019; Gillham et al., 2007). One notable exception is the Penn Resiliency Program (PRP), a group-based intervention that involves 12 90-min lessons or 18–24 60-min lessons delivered by a trained interventionist to interested students during after-school hours. Students that opted to participate were randomized to the PRP (i.e., focus on teaching coping and problem-solving skills) or control group (i.e., focus on group cohesion, social support, sharing feelings and thoughts with peers) (Gillham et al., 2007). At the 12-month follow-up, students in the PRP group tended to have lower depression symptoms compared to the control students; with both groups showing reduced depression symptoms at follow-up.

The PRP findings demonstrate the strong potential value of intervening in this age group for decreasing anxiety and depression in the short and long-term using school-based universal delivery. However, due to a low response rate (15–22%), the reach of such a program was limited due to the “opt-in” approach to enrollment. With the continued increases in population-wide mental health distress, there is a need for the development of additional programs that have the potential to reach more kids—and potentially offer a more notable public health impact. Pragmatic approaches are needed to increase individual youth’s contacts with a trusted adult which allows for work on personalized resilience goals.

The Building Resilience for Healthy Kids program has previously reported evidence for the utility of a universal, 1:1 health coaching framework to improve youth resilience in schools and support youth mental health (Lee et al., 2020). Health coaching offers a pragmatic approach that can be highly personalized, is widely accepted by students, teachers, principals, and administrators. Due to health coaching being an individualized and customized intervention, it

allows for flexibility to accommodate school needs and to minimize missed instructional time. Healthy Kids invited all sixth-grade students to participate in the 1:1 health coaching program and, to ensure buy-in from youth, parents, and the school community, the sessions are incorporated into the existing school curriculum. However, it is unclear to what extent adolescents with initial elevated negative affectivity benefited from the program, given that they were not specifically targeted in this universally designed intervention. We hypothesized that baseline negative affectivity would moderate the effectiveness of Healthy Kids in decreasing symptoms of anxiety and depression, such that youth with elevated baseline negative affectivity would show the strongest benefits compared to those with lower negative affectivity.

Methods

Study Design

Building Resilience for Healthy Kids (Healthy Kids) is a single group, school-based intervention (Lee et al., 2020, 2021). Healthy Kids was delivered within an urban middle school from January–March 2020. The middle school demographics included 71% non-Hispanic White students and 15% students with Hispanic ethnicity. A total of 16% of students were eligible for free or reduced lunch programs. All students enrolled in sixth grade at the time of intervention were invited to participate. Both parents (via a letter) and students were given the opportunity to “opt out” of the study at any time. The Colorado Multiple Institutional Review Board approved the study and the program is registered at clinicaltrials.gov (NCT04202913).

Intervention

Healthy Kids is a 6-week, 1:1 universal health coaching intervention focused on improving resiliency and mental health in early adolescent students. Full program details have been previously published by Lee et al., (2020). In brief, each student was allocated a set time to meet with their Health Coach once a week for 15 min during the school day for six consecutive weeks. During the sessions, health coaches worked with each student to recognize their strengths and assisted the students with setting goals to improve resilience in areas of the student’s choice. Areas included facilitating supportive adult–child relationships, building a sense of self-efficacy, and strengthening adaptive and/or coping skills. The health coaching sessions and goal-setting activities were guided by Social Determination Theory and Goal Theory. Social Determination Theory provided the framework necessary to focus on developing autonomy,

competence, and relatedness towards a behavior to promote self-determination, internal value, and skills necessary to facilitate motivation for initiating and maintaining behaviors over time (Pearson, 2011; Ryan et al., 2008). Goal Theory helped to inform how coaches worked with students to set weekly and overall goals. The application of Goal Theory was intended to optimize youth's potential for reaching their goal by guiding them to identify and select their own unique goal that is relevant, important, and feasible to attain, while also incorporating a feedback mechanism (i.e., check-ins and discussions between youth and health coaches) (Latham & Locke, 1991). In addition, discussions and goal-setting activities were framed within the social-ecological model, which theorizes that behaviors are inherently influenced by and across multiple levels of one's social environment (i.e., intrapersonal, interpersonal, organizational, community, and public policy) (Stokols, 1996). By acknowledging the uniqueness of individual circumstances, this framework allowed Health Coaches to assist youth in setting weekly goals that were feasible and meaningful to them.

Program Health Coaches had either a health coaching certification from an accredited program or a Master's degree in Health Promotion that included a health coaching class within the degree curriculum and participation in a training curriculum focused on facilitating youth resiliency through health coaching. Additional details about the health coach training protocol are provided in Lee et al., (2020).

Measures

The following surveys were completed by the student using the electronic RedCap survey tool at baseline (January 12, 2020) and again at a post-intervention follow-up (March 13, 2020). Survey delivery was carried out during the school day, under the supervision of classroom teachers.

Demographics

Information regarding youth age, sex, race, and ethnicity was collected from school records.

Mental Health Parameters

Negative Affectivity

The PROMIS Emotional Distress Anxiety and PROMIS Emotional Distress Depressive Symptoms scales (Irwin et al., 2010) were used to assess negative affectivity. Each 8-item short form elicits responses from the student on a 5-point Likert scale from "never" to "always" over the past 7-day period. The items are summed for a score ranging from 8 to 40 with higher scores indicating more elevated

negative affectivity. Scores are then translated to *T* scores, with *T* scores below 55 classified as "normal," *T* scores between 55 and 60 classified as "mild," *T* scores between 60 and 70 classified as "moderate," and *T* scores above 70 classified as "severe." The measure demonstrated satisfactory goodness of fit and adequate internal reliability ($\alpha = 0.85$) in children and adolescents aged 8–17 years (Irwin et al., 2010). Elevated negative affectivity was endorsed in cases when students scored mild or higher for symptoms of both depression and anxiety on each of the PROMIS scales.

Self-Efficacy

The Self-Efficacy Questionnaire for Children (SEQ-C) validated among adolescents aged 12–19 years was used to assess self-efficacy (Muris, 2001). This 24-item survey assesses three key domains of self-efficacy: (1) social self-efficacy, defined as perceived capability for peer relationships and assertiveness; (2) academic self-efficacy, which is the perceived capability to manage one's own learning behavior, to master academic subjects, and to fulfill academic expectations; and (3) emotional self-efficacy, which is the perceived capability of coping with negative emotions. Each item is scored on a 5-point Likert scale ranging from "not at all" to "very well." Subscale scores and an overall or total self-efficacy score are obtained by summing respective items, with higher scores indicating greater self-efficacy.

Resilience

Social-ecological resilience was measured using the 17-item Child and Youth Resilience Measure (CYRM-R) (Jefferies et al., 2018). Students completed the CYRM-R by hand in the first session with the assistance of their Health Coach, and for the follow-up assessment, the CYRM-R was included in the online electronic RedCap assessment and completed independently due to the coronavirus pandemic. The CYRM-R tool has been validated among youth aged 11–19 years. Items are rated on a 5-point Likert scale ranging from "not at all" to "a lot." The items are summed to calculate a total resilience score, with higher scores indicating greater resilience.

Academic Pressure

The Educational Stress Scale for Adolescents (ESSA) (Sun et al., 2011) was used to assess academic pressure. The ESSA has been validated in youth aged 12–18 years. The 16-item ESSA utilizes a 5-point Likert scale from "strongly disagree" to "strongly agree." The responses are summed for a total score, with higher scores indicating higher academic stress or pressure.

Grit

A 12-item Grit Scale validated in youth 7–15 years old (Duckworth & Quinn, 2009) was used to assess grit. This tool measures the non-cognitive trait of grit, defined as perseverance and passion for long-term goals. Items are rated on a 5-point Likert scale ranging from “very much like me” to “not like me at all.” The total score is the average of all items, with higher total scores indicating more grit.

Statistical Analysis

All analyses were conducted using SAS version 9.4 (SAS institute, Inc., Cary NC). Negative affectivity status was first examined as a potential effect modifier using an interaction term for each mental health parameter. As all interaction terms were significant, the analysis was stratified by negative affectivity status. Descriptive analyses compared negative affectivity status using *t* tests for continuous variables and chi-square tests for categorical variables. General linear models (i.e., PROC GLM) were used to analyze differences between groups (i.e., negative affectivity status) by each mental health parameter at baseline and follow-up. Change in mental health parameter was examined similarly while controlling for baseline value of the given parameter. Hedges’ *g* effect sizes and 95% confidence intervals (95% CI) for the effect sizes were calculated to identify the impact of the change in each of the mental health parameters by negative affectivity status. Hedges’ *g* corrects for overestimations of the true population effect present in Cohen’s *d* (Cohen, 1988). Interpretations of the size of the effect are consistent with those for Cohen’s *d* (small=0.2; medium=0.5, and large=0.8). Alpha for the present study was set at 0.05.

Results

A total of 330 students were enrolled in the sixth-grade class at the time of the baseline survey, of which 285 (86%) completed baseline measures and participated in the Healthy Kids program. No data was collected from students who chose not to participate. Follow-up data was collected for 252 students (88% of initial sample); the students who did not complete the follow-up survey were absent on the day of data collection ($n=33$). As this analysis was focused on change of mental health parameters, only data for the 252 participants with both baseline and follow-up data were used. There was no statistical difference (i.e., sex, age, race, negative affectivity status) between students that completed the baseline survey versus those that completed the follow-up survey (data not shown).

Demographics and Baseline Mental Health Risk

Seventy percent of students ($n=252$) reported mild-severe symptoms of depression and 42% reported mild-severe symptoms of anxiety, and 38% of sixth graders in our study reported experiencing elevated negative affectivity, defined as elevated symptoms of both depression and anxiety (Table 1). Of the students who had elevated negative affectivity, there were significantly more females (71% vs 29%, $p<0.001$). Students who endorsed elevated negative affectivity also reported being cyberbullied (25% vs 8%; $p<0.001$) and bullied in-person (37% vs 22%; $p=0.01$) more often than students who reported no or low negative affectivity.

At baseline, students who endorsed negative affectivity had lower grit (2.6 vs 2.9; $p<0.001$), and less self-efficacy in all domains (total self-efficacy 70.5 vs 86.8; $p<0.0001$).

Table 1 Demographic and baseline mental health risk of cohort stratified by negative affectivity status

	All	Elevated negative affectivity	No negative affectivity endorsed	<i>p</i> value
<i>N</i>	252	96 (38%)	156 (62%)	
Sex				
Males	114 (45%)	28 (29%)	86 (55%)	<0.0001
Females	138 (55%)	68 (71%)	70 (45%)	
Age (years)	11.4±0.5	11.4±0.6	11.4±0.5	0.82
Race/ethnicity				
White	172 (68%)	63 (66%)	109 (70%)	0.90
Black	9 (4%)	4 (4%)	5 (3%)	
Hispanic	45 (18%)	19 (20%)	26 (17%)	
Asian	11 (4%)	5 (5%)	6 (4%)	
Other	15 (6%)	5 (5%)	10 (6%)	
Bullied				
Cyberbullying	36 (%)	24 (25%)	12 (8%)	<0.001
In-person	70 (%)	36 (38%)	34 (22%)	0.01
Depression				
None to slight	78 (30%)	0	78 (50%)	<0.0001
Mild	62 (25%)	10 (10%)	52 (33%)	
Moderate	62 (25%)	43 (45%)	19 (12%)	
Severe	50 (20%)	43 (45%)	7 (5%)	
Anxiety				
None to slight	146 (58%)	0	146 (94%)	<0.0001
Mild	45 (18%)	39 (41%)	6 (4%)	
Moderate	44 (17%)	40 (42%)	4 (3%)	
Severe	17 (7%)	17 (18%)	0	

Elevated negative affectivity = scored mild or higher for symptoms of depression and anxiety on the PROMIS Emotional Distress Scales for Anxiety and Depressive Symptoms

Students with elevated negative affectivity at baseline also reported higher academic pressure (49.2 vs 36.6; $p < 0.0001$; Table 2).

Change Baseline—Post-Intervention

Students who reported no negative affectivity at baseline significantly improved their total resilience (3.0 vs 1.5; $p = 0.03$) compared to students who endorsed negative affectivity. All students reported a large increase in total self-efficacy in addition to an increase in each domain of self-efficacy (social, emotional, and academic) with improvements found to be insignificant by those that endorsed or did not endorse negative affectivity. Lastly, students who reported negative affectivity at baseline significantly improved both their symptoms of depression [0 (– 5.0, 0) vs 0 (– 3.0, 5.0); $p = 0.01$] and anxiety [– 2.0 (– 5.0, 0) vs 0 (– 1.0, 4.0); $p = 0.01$] upon completion of our 6-week intervention compared to those students who did not endorse negative affectivity.

Hedges' g effect sizes were calculated for students who endorsed negative affectivity and those who did not to examine improvements in mental health parameters in our universal program (Fig. 1). Among our students who endorsed negative affectivity at baseline, improvements were noted for total self-efficacy ($g = 0.6$; 95%CI 0.3, 0.9; $p < 0.001$), and each domain, including social ($g = 0.4$; 95%CI 0.1, 0.7; $p < 0.001$), emotional ($g = 0.5$; 95%CI 0.2, 0.8; $p < 0.001$), and academic ($g = 0.3$; 95%CI 0.1, 0.6; $p = 0.02$). Symptoms of both anxiety ($g = -0.70$; 95%CI – 1.0, – 0.4; $p < 0.001$) and depression ($g = -0.3$; 95%CI – 0.5, 0.0; $p = 0.08$) also greatly improved. Among students that did not report negative affectivity at baseline, medium effect size improvements were noted in resilience ($g = 0.5$; 95%CI 0.3, 0.7; $p < 0.001$), including both domains: personal ($g = 0.5$; 95%CI 0.3, 0.7; $p < 0.001$) and relationship ($g = 0.4$; 95%CI 0.2, 0.7; $p < 0.001$) resilience. Total self-efficacy ($g = 0.7$; 95%CI 0.4, 0.9; $p < 0.001$) and all domains of self-efficacy were also noted with medium and higher effect sizes; social ($g = 0.4$; 95%CI 0.2, 0.7; $p < 0.001$), emotional ($g = 0.5$; 95%CI 0.2, 0.7; $p < 0.001$), and academic ($g = 0.6$; 95%CI 0.3, 0.8; $p < 0.001$).

Discussion

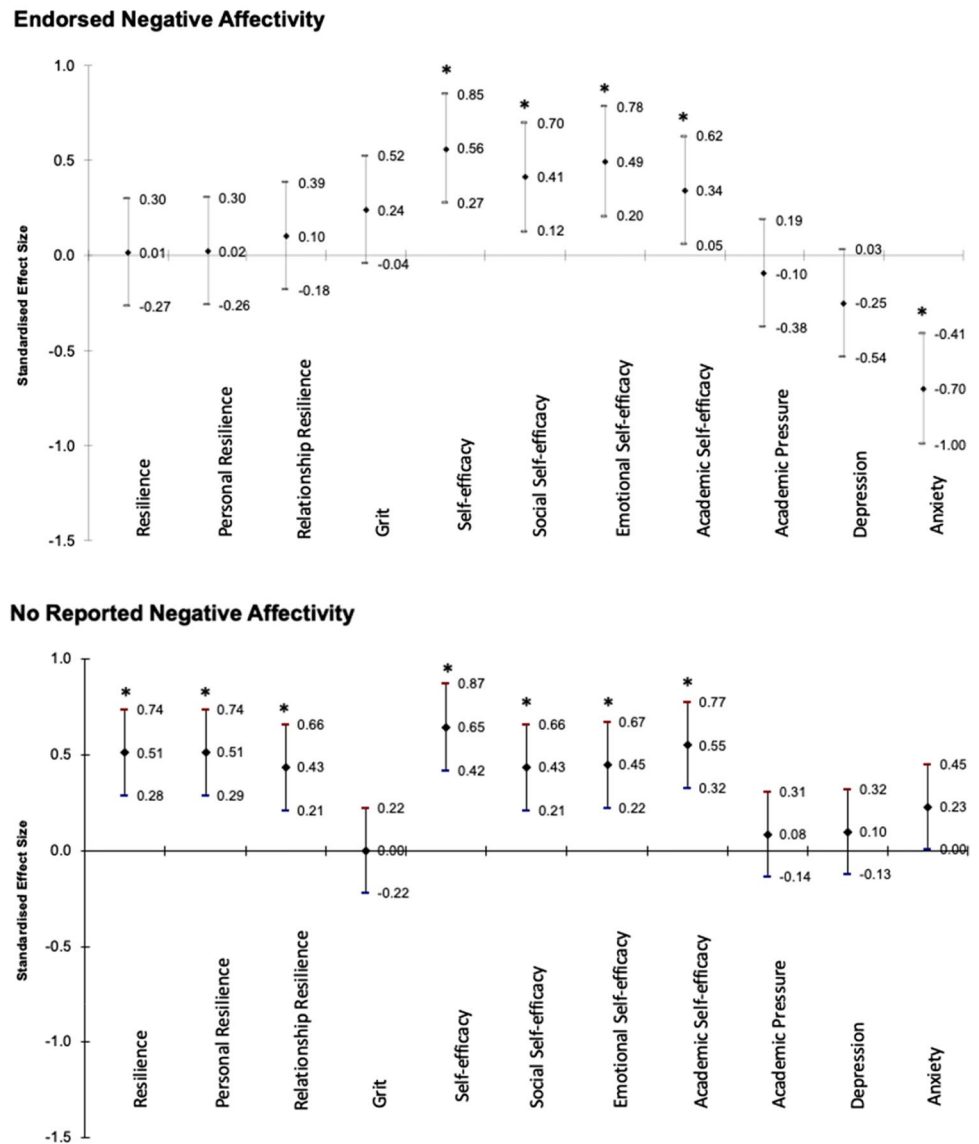
Healthy Kids, a school-based, universal resilience program for sixth-grade students, significantly improved symptoms of anxiety and self-efficacy among youth who endorsed negative affectivity at baseline. Furthermore, Healthy Kids was successful in increasing resilience and self-efficacy among all students, indicating the possibility that a universal intervention focused on improving resilience in youth may offer a

Table 2 Baseline, follow-up, and changes from baseline to follow-up in early adolescents, stratified by baseline negative affectivity status

	Elevated negative affectivity	No negative affectivity endorsed	p value [^]
<i>Baseline</i>			
Resilience			
Total	75.1 ± 7.6	76.1 ± 6.4	0.29
Personal	43.3 ± 4.9	43.8 ± 4.2	0.46
Relationships	31.4 ± 4.0	32.3 ± 2.4	0.06
Grit	2.6 ± 0.4	2.9 ± 0.4	< 0.001
Self-efficacy			
Total	70.5 ± 12.1	86.8 ± 13.4	< 0.0001
Social	25.2 ± 5.7	29.1 ± 5.6	< 0.0001
Emotional	21.0 ± 4.9	27.6 ± 5.0	< 0.0001
Academic	24.6 ± 5.3	29.6 ± 5.6	< 0.0001
Academic pressure	49.2 ± 12.9	36.6 ± 11.7	< 0.0001
Mood symptoms			
Depression	23.1 ± 7.4	10.8 ± 5.1	< 0.0001
Anxiety	26.2 ± 5.8	13.3 ± 4.4	< 0.0001
<i>Follow-up (post-intervention)</i>			
Resilience			
Total	75.2 ± 7.7	79.2 ± 5.7	< 0.0001
Personal	43.4 ± 4.9	45.9 ± 4.0	< 0.0001
Relationships	31.8 ± 3.8	33.3 ± 2.2	< 0.001
Grit	2.7 ± 0.4	3.0 ± 0.5	< 0.0001
Self-efficacy			
Total	79.4 ± 18.8	95.9 ± 15.3	< 0.0001
Social	27.7 ± 6.4	31.6 ± 5.9	< 0.0001
Emotional	23.8 ± 6.7	30.1 ± 6.1	< 0.0001
Academic	26.6 ± 6.9	32.6 ± 5.3	< 0.0001
Academic pressure	47.9 ± 14.2	37.6 ± 11.8	< 0.0001
Mood symptoms			
Depression	21.1 ± 8.4	11.3 ± 5.2	< 0.001
Anxiety	23.4 ± 7.4	14.5 ± 6.1	< 0.001
<i>Change baseline—post-intervention*</i>			
Resilience			
Total	1.5 (– 6.0, 6.5)	3.0 (– 3.0, 8.0)	0.03
Personal	0 (– 5.0, 4.0)	2.0 (– 1.0, 6.0)	0.006
Relationships	0 (– 2.0, 2.0)	1.0 (– 1.0, 3.0)	0.03
Grit	0 (– 0.1, 0.3)	0 (– 0.2, 0.2)	0.10
Self-efficacy			
Total	6.0 (0, 19.0)	9.0 (2, 16)	0.66
Social	1.0 (0, 5.0)	2.0 (0, 5.0)	0.49
Emotional	1.0 (0, 6.0)	2.0 (0, 6.0)	0.64
Academic	2.0 (– 1.0, 6.0)	2.0 (– 1.0, 5.0)	0.61
Academic pressure	0 (– 5.0, 3.0)	0 (– 3.0, 5.0)	0.03
Mood symptoms			
Depression	0 (– 5.0, 0)	0 (– 2.0, 1.0)	0.01
Anxiety	– 2.0 (– 5.0, 0)	0 (– 1.0, 4.0)	< 0.001

Elevated negative affectivity = scored mild or higher for symptoms of depression and anxiety on the PROMIS Emotional Distress scales for Anxiety and Depressive Symptoms; [^] p values examined differences between negative affectivity status; *Change scores included adjustment for baseline value of each variable

Fig. 1 Intervention effect sizes for baseline to follow-up changes among early adolescents, by negative affectivity status



beneficial and non-stigmatizing approach for the prevention of mental health difficulties.

Our findings of improvements to symptoms of anxiety and depression among youth were similar to the findings from Penn Resilience Program described previously. However, by using an “opt-out” recruitment approach, Healthy Kids was able to reach almost 90% of sixth-grade students, compared to only 15–20% in the Penn Resilience Program. With the continued increases in population-wide mental health distress in youth, there is a need for the development of additional programs that have the potential to reach more adolescents—and potentially offer a more notable public health impact. The transition into adolescence and from elementary to middle school is a stressful period marked by dramatic changes in biopsychosocial development and often coinciding with increased anxiety and depression, making it an optimal window for prevention and intervention efforts

(Evans et al., 2018; Hoffman et al., 1992; Romeo, 2013). Thus, a universal intervention focused on improving self-efficacy, self-regulation, and resilience during this time may be effective in reducing and preventing symptoms of anxiety and depression in early adolescent youth.

Pragmatic approaches, such as Healthy Kids, are needed to increase individual youth’s contacts with a trusted adult, allowing for work on personalized resilience goals. Health coaching offers one such pragmatic approach that can be highly personalized within the structure of the Healthy Kids program. Not only is this program highly acceptable to students, teachers, principals, and administrators, it also offers delivery flexibility in terms of the weekly, 15-min sessions to accommodate student/school schedules while minimizing missed instructional time. Healthy Kids was designed with the intention that all sixth-grade students participate in the 1:1 health coaching program, and to ensure buy-in from

youth, parents, and the school community, the sessions are incorporated into the existing school curriculum.

By structuring the program as universal and prioritizing implementation flexibility, the Healthy Kids program can accommodate varying school district policies and budget needs with the potential to be disseminated in all communities, including underserved schools with limited resources. To date, school-based interventions have mostly been targeted programs, with “at-risk” students attending group sessions with clinical mental health professionals. While there are benefits to targeted approaches, downsides include that this model can be expensive, potentially stigmatizing, and often difficult for schools to sustain long-term (Feiss et al., 2019; Langley et al., 2010). Programs such as Healthy Kids may combat these issues with a universal, 1:1 health coaching program, delivered by health promotion professionals rather than mental health experts and reaching all students independent of the degree of mental health concerns. This approach may be more acceptable and feasible for schools. Likewise, this strategy enables the intervention to achieve dual goals as follows: (1) increase protective factors such as resilience, self-efficacy, and grit in all students that can prevent the development of worsening negative affectivity and (2) decrease negative affectivity in youth with current elevated symptoms, preventing further clinical deterioration.

Although these early results from Healthy Kids show signals of mental health benefits in youth after six weeks of intervention, more work is needed. The data for this analysis was part of a pilot phase of Healthy Kids, designed to be a proof of concept, single-group trial design with no control group. Although we relied on validated assessment measures, all assessments were self-reported, which may have resulted in socially desirable responses or other reporting biases. Our participants came from diverse background; however, this school district has a low prevalence of low-income families. This participating school district was identified due to the high incidence of youth suicide rates in the area and the district willingness and commitment to promoting mental wellbeing to its students.

In conclusion, a universal resiliency program may improve self-efficacy and symptoms of anxiety among youth experiencing negative affectivity, while improving resilience and self-efficacy among all youth. Our findings suggest a universal school-based coaching program that benefits all youth, while specifically targeting the needs of youth with negative affectivity who are most at risk for mental health concerns. Although more work is needed, including testing the efficacy of Healthy Kids compared to a control group, our initial results are promising. Building Resilience for Healthy Kids has strong potential for widespread dissemination and could, thus, contribute to reduction in anxiety and depression symptoms among early adolescent youth.

Declarations

Ethics Approval The study protocol was approved by institutional and school site review boards. Assent was obtained from all participating youth prior to participation in the study. Ethics Committee: Colorado Multiple Institution Review Board. Protocol # 19–2602. Effective Date 13th November 2019.

Competing Interests The authors declare no competing interests.

References

- Ashworth, E., Demkowicz, O., Lendrum, A., & Frearson, K. (2018). Coaching models of school-based prevention and promotion programmes: A qualitative exploration of UK teachers' perceptions. *School Mental Health, 10*(3), 287–300. <https://doi.org/10.1007/s12310-018-9282-3>
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Routledge Academic
- Curtin, S. C. (2020). *State suicide rates among adolescents and young adults aged 10–24: United States, 2000–2018*. National Vital Statistics Reports
- Curtin, S. C., & Hedegaard, H. (2019). *Suicide rates for females and males by race and ethnicity: United States, 1999 and 2017*. NCHS Health E-Stat
- Dray, J., Bowman, J., Campbell, E., Freund, M., Wolfenden, L., Hodder, R. K., McElwaine, K., Tremain, D., Bartlem, K., Bailey, J., Small, T., Palazzi, K., Oldmeadow, C., & Wiggers, J. (2017). Systematic review of universal resilience-focused interventions targeting child and adolescent mental health in the school setting. *Journal of the American Academy of Child & Adolescent Psychiatry, 56*(10), 813–824. <https://doi.org/10.1016/j.jaac.2017.07.780>
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (grit-s). *Journal of Personality Assessment, 91*(2), 166–174. <https://doi.org/10.1080/00223890802634290>
- Evans, D., Borriello, G. A., & Field, A. P. (2018). A Review of the academic and psychological impact of the transition to secondary education. *Frontiers in Psychology, 9*, 1482–1482. <https://doi.org/10.3389/fpsyg.2018.01482>
- Feiss, R., Dolinger, S. B., Merritt, M., Reiche, E., Martin, K., Yanes, J. A., Thomas, C. M., & Pangelinan, M. (2019). A systematic review and meta-analysis of school-based stress, anxiety, and depression prevention programs for adolescents. *Journal of Youth and Adolescence, 48*(9), 1668–1685. <https://doi.org/10.1007/s10964-019-01085-0>
- Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annual Review of Public Health, 26*, 399–419. <https://doi.org/10.1146/annurev.publhealth.26.021304.144357>
- Gillham, J. E., Reivich, K. J., Freres, D. R., Chaplin, T. M., Shatté, A. J., Samuels, B., Elkon, A. G., Litzinger, S., Lascher, M., Gallop, R., & Seligman, M. E. (2007). School-based prevention of depressive symptoms: A randomized controlled study of the effectiveness and specificity of the Penn Resiliency Program. *Journal of Consulting and Clinical Psychology, 75*(1), 9–19. <https://doi.org/10.1037/0022-006x.75.1.9>
- Hoffman, M. A., Levy-Shiff, R., Sohlberg, S. C., & Zarizki, J. (1992). The impact of stress and coping: Developmental changes in the transition to adolescence. *Journal of Youth and Adolescence, 21*(4), 451–469. <https://doi.org/10.1007/bf01537897>
- Irwin, D. E., Stucky, B., Langer, M. M., Thissen, D., DeWitt, E. M., Lai, J.-S., Varni, J. W., Yeatts, K., & DeWalt, D. A. (2010). An item response analysis of the pediatric PROMIS anxiety and

- depressive symptoms scales. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, 19(4), 595–607. <https://doi.org/10.1007/s11136-010-9619-3>
- Jefferies, P., McGarrigle, L., Ungar, M. (2018). The CYRM-R: A Rasch-validated revision of the child and youth resilience measure. *Journal of Evidence-Informed Social Work*, 1–23. <https://doi.org/10.1080/23761407.2018.1548403>
- Langley, A. K., Nadeem, E., Kataoka, S. H., Stein, B. D., & Jaycox, L. H. (2010). Evidence-based mental health programs in schools: Barriers and facilitators of successful implementation. *School Mental Health*, 2(3), 105–113.
- Latham, G. P., & Locke, E. A. (1991). Self-regulation through goal setting. *Organizational Behavior and Human Decision Processes*, 50(2), 212–247. [https://doi.org/10.1016/0749-5978\(91\)90021-K](https://doi.org/10.1016/0749-5978(91)90021-K)
- Lee, C. S., & Wong, Y. J. (2020). Racial/ethnic and gender differences in the antecedents of youth suicide. *Cultural Diversity & Ethnic Minority Psychology*, 26(4), 532–543. <https://doi.org/10.1037/cdp0000326>
- Lee, J. A., Heberlein, E., Pyle, E., Caughlan, T., Rahaman, D., Sabin, M., Kaar, J. L. (2020). Evaluation of a resiliency focused health coaching intervention for middle school students: Building resilience for Healthy Kids program. *American Journal of Health Promotion*, 890117120959152. <https://doi.org/10.1177/0890117120959152>
- Lee, J. A., Heberlein, E., Pyle, E., Caughlan, T., Rahaman, D., Sabin, M., & Kaar, J. L. (2021). Study protocol for a school-based single group pragmatic trial to promote resilience in youth: Building resilience for Healthy Kids. *Contemporary Clinical Trials Communications*, 21, 100721. <https://doi.org/10.1016/j.conctc.2021.100721>
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562. <https://doi.org/10.1111/1467-8624.00164>
- Mongelli, F., Georgakopoulos, P., & Pato, M. T. (2020). Challenges and opportunities to meet the mental health needs of underserved and disenfranchised populations in the United States. *Focus (American Psychiatric Publishing)*, 18(1), 16–24. <https://doi.org/10.1176/appi.focus.20190028>
- Muris, P. (2001). A brief questionnaire for measuring self-efficacy in youths. *Journal of Psychopathology and Behavioral Assessment*, 23(3), 145–149.
- Oh, H., Stickley, A., Koyanagi, A., Yau, R., & DeVylder, J. E. (2019). Discrimination and suicidality among racial and ethnic minorities in the United States. *Journal of Affective Disorders*, 245, 517–523. <https://doi.org/10.1016/j.jad.2018.11.059>
- Pearson, E. S. (2011). The ‘how-to’ of health behaviour change brought to life: a theoretical analysis of the Co-Active coaching model and its underpinnings in self-determination theory. *Coaching: An International Journal of Theory, Research and Practice*, 4(2), 89–103. <https://doi.org/10.1080/17521882.2011.598461>
- Romeo, R. D. (2013). The teenage brain: The stress response and the adolescent brain. *Current Directions in Psychological Science*, 22(2), 140–145. <https://doi.org/10.1177/0963721413475445>
- Ryan, R. M., Patrick, H., Deci, E. L., & Williams, G. C. (2008). Facilitating health behaviour change and its maintenance: Interventions based on Self-Determination Theory
- Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, 10(4), 282–298. <https://doi.org/10.4278/0890-1171-10.4.282>
- Sun, J., Dunne, M. P., Hou, X.-Y., & Xu, A.-Q. (2011). Educational stress scale for adolescents: Development, validity, and reliability with chinese students. *Journal of Psychoeducational Assessment*, 29(6), 534–546. <https://doi.org/10.1177/0734282910394976>
- Zhang, S., Cain, D. S., & Liao, M. (2019). Racial/ethnic disparities in the decision points of mental health service use and psychotropic medication receipt among depressed youth. *Youth & Society*. <https://doi.org/10.1177/0044118x19871853>

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