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Indicated Prevention for Depression at the Transition to High School: Outcomes for Depression and Anxiety

Heather Makover[1] · Molly Adrian[1] · Chelsey Wilks[1] · Kendra Read[1] · Ann Vander Stoep[1] · Elizabeth McCauley[1,2]

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Abstract
This study examined the impact of a school-based indicated prevention program on depression and anxiety symptoms for youth during the transition from middle to high school. The High School Transition Program (HSTP) was designed to build social and academic problem-solving skills and engagement during this period of particular vulnerability for adolescents. Students (N = 2664) at six middle schools in the Pacific Northwest completed a universal emotional health screening during the second half of the 8th grade year, and those with elevated depression scores and low conduct problem scores were invited to participate in the trial. Eligible students (N = 497) were randomized to either the HSTP (N = 241) or control (N = 256) conditions. Depression and anxiety symptoms were measured at five time points over an 18-month period using validated self-report measures. Hierarchical linear modeling was used to assess prevention effects and moderators such as baseline symptoms, race, and sex. Results suggested that students randomized to the HSTP group had accelerated rate of reduction in depressive symptoms over time (d = .23) relative to the control group. Students randomized to the HSTP group also had significantly faster rates of change of anxiety scores (d = 0.25). Baseline anxiety severity, race, and sex did not differentially impact the trajectories of symptom outcomes between conditions. Implications for prevention efforts during this normative but stressful period of transition for youth are discussed.
ClinicalTrials.gov registration number is NCT00071513.

Keywords Depression prevention · Anxiety prevention · Child and adolescent mental health · School-based intervention · Transition to high school

Depression and Anxiety in Adolescence

Adolescent depression and anxiety constitute significant public health concerns. Anxiety and depression symptoms typically increase during the developmental period of adolescence, resulting in an estimated 20% of adolescents meeting diagnostic criteria for a depressive disorder and an estimated 32% of adolescents meet criteria for anxiety disorders in their lifetime by age 18 (Hankin et al. 1998; Merikangas et al. 2010). There is also high co-occurrence of anxiety and depression (Costello et al. 2003; Garber and Weersing 2010). Depression and anxiety can compromise the course of healthy adolescent development and early adulthood and represent a risk for school dropout, suicide, and substance abuse (Swan and Kendall 2016; Vander Stoep et al. 2000). Due to the prevalence, burden, and consequences of youth depression and anxiety, there is a great need for improved prevention programs to reduce the likelihood of their occurrence. Optimally, prevention programs designed for adolescents should focus on the unique developmental stressors that characterize this period of life (Steinberg et al. 2006). The current study contributes to this effort by examining a school-based prevention program that focuses on building social and academic problem-solving skills during the pivotal developmental time point of the transition to high school.

Limitations of Existing Prevention Programs

Prevention efforts that are universally administered to youth regardless of symptom levels have sometimes demonstrated short-term reduction in symptoms, though their efficacy in

✉ Heather Makover
heathermakover@gmail.com

[1] Department of Psychiatry and Behavioral Sciences, University of Washington, 6200 NE 74th St., Ste. 110, Seattle, WA 98115, USA

[2] Center for Child Health, Behavior, and Development, Seattle Children's Research Institute, Seattle, WA 98101, USA

reducing the onset of a depressive or anxiety disorders and reducing symptoms long-term is less clear (Barrett et al. 2006; Merry 2007; Sheffield et al. 2006). Targeted prevention programs, administered to youth with demonstrated risk, or subclinical symptoms of a disorder have yielded small, short-term effects for depression prevention (e.g., Calear and Christensen 2010; Horowitz and Garber 2006; Merry et al. 2012; Werner-Seidler et al. 2017) and small to moderate short-term effects for anxiety prevention (Lawrence et al. 2017; Neil and Christensen 2009; Werner-Seidler et al. 2017). The modest results to date may reflect methodological shortcomings (Merry et al. 2012; Mychailyszyn et al. 2012) such as lack of integration with educational programming and structure (Fazel et al. 2014), overly general intervention content (Cuijpers et al. 2008), and a lack of longer-term follow-up assessment periods (Horowitz and Garber 2006; Merry et al. 2012). Similarly, preventive intervention research for anxiety is limited by the lack of methodological features such as measurement and reporting of baseline anxiety levels and brief follow-up windows (Lawrence et al. 2017; Neil and Christensen 2009). The current study seeks to address several of these methodological and theoretical limitations.

Rationale for Developmentally Targeted Programs

Depression and anxiety in youth are meaningfully related through shared risk factors at biological, environmental, and individual levels as well as sequential comorbidity where anxiety or depression serves as the risk factor for the other (Cummings et al. 2014). Interventions designed to target depression may have cross-over effects that reduce anxiety symptoms as well; though, there is a need for further research examining this question in prevention programs (Garber et al. 2016; Young et al. 2012). In general, stressful life events are considered a key element in triggering depression and anxiety for youth with vulnerability profiles (e.g., Kendler et al. 1999; McLaughlin and Hatzenbuehler 2009). Targeting stress management around developmental transitions such as the transition to high school (Cuijpers et al. 2008) may increase integration of prevention efforts with both developmental challenges and educational programming and structure (Newman et al. 2000).

Although transitioning from middle school to high school is normative, a number of adverse outcomes have been associated with this transition, including increased depression (Newman et al. 2007), poorer school attendance (Seidman et al. 1996), and declines in achievement (Quiroga et al. 2013) and self-esteem (De Wit et al. 2011). As young people enter high school, they experience a loss of connection with familiar school personnel, disruption in their peer network, loss of seniority and status, and increased academic pressure (Benner and Graham 2009; De Wit et al. 2011; Newman et al. 2007). These changes can tax the coping capabilities of vulnerable adolescents leading to problems in both emotional and academic functioning (De Wit et al. 2011; Weeks et al. 2016). Ultimately, adolescents with mental health problems are significantly less likely to complete high school than peers (Vander Stoep et al. 2000; Vander Stoep et al. 1994). Factors that have been shown to facilitate a positive high school transition include coping and problem-solving skills, teacher as well as peer support, and positive perceptions of the school environment (Dubow et al. 1997). Stable or increasing friend support and a sense of school belonging during the transition period have been linked to reduced socio-emotional disruptions (Benner et al. 2017). Targeting these factors may help prevent the negative outcomes associated with this transition (Benner et al. 2017; Newman et al. 2000).

The Current Study

The High School Transition Program (HSTP) is an indicated intervention program that was developed with the goal of reducing depression, anxiety, and school problems in at-risk youth coping with the transition to high school. HSTP combines components of programs with proven effectiveness in reducing depression and anxiety (Horowitz and Garber 2006; Stice et al. 2009; Werner-Seidler et al. 2017) and those designed to foster successful transition into high school (Dubow et al. 1997). The school-based and school-focused intervention was designed to fit within the environment and developmental timeline of the educational system, and to address factors related to school functioning. The program theory is based in the stress diathesis model of depression, with diathesis reflected in the endorsement of depressive symptoms and stress being the transition to high school.

This study tests the effectiveness of HSTP relative to a control group. First, we hypothesized that youth randomized to the HSTP condition will demonstrate a slower increase in depressive symptoms over the course of the post-intervention follow-up period than the increase in depressive symptoms for those randomized to the control condition. Second, we hypothesized that youth randomized to the HSTP condition will demonstrate a decline in anxiety symptoms over the course of the post-intervention follow-up period, and this decline will be significantly greater than the decline in anxiety symptoms for those randomized to the control condition. Third, we hypothesized that youth with higher baseline levels of anxiety will show less symptom decline over the course of the follow-up period on both depression and anxiety symptom outcomes, consistent with the findings of previous depression prevention programs (e.g., Weersing et al. 2016; Young et al. 2012). The range of baseline depressive symptom

scores was restricted by design because we only included students with elevated symptoms; therefore, we did not evaluate depressive symptoms as a moderator.

Methods

Six middle schools in a Pacific Northwest urban area collaborated in carrying out the indicated preventive intervention (HSTP) trial. The study was approved by the Institutional Review Board; active informed consent and assent were obtained from participants.

Case-Finding Procedures

Participating youth were identified via a universal (8th grade-wide) emotional health screening to assess for depression. Students were eligible to participate in universal screening if they were as follows: (1) determined by school faculty to be able to understand English at a 3rd grade level, (2) not already enrolled in a self-contained class for serious behavioral disturbance, and (3) had written permission from their parent/guardian to complete the screening questionnaire and assented themselves. A total of 2664 youth were screened for depression and conduct problems. This represented 60.3% of those who were eligible. Youth who participated in the screening were given a five dollar coupon for food as a "thank you" for their time. Of non-participants, 476 parents declined (11% of the potential pool), 1222 parents (28%) did not respond, and 42 students (0.09%) declined. Screened students were 52.7% female, and 47.3% male. Figure 1 highlights the participant flow through the study.

Screening Measures

Depressive Symptoms The Mood and Feelings Questionnaire (MFQ; Angold et al. 1995; Angold et al. 2002) was used to assess depressive symptoms. The MFQ comprises both the full range of items that reflect DSM diagnostic criteria for depressive disorders, as well as additional items reflecting common affective, cognitive, and vegetative features of childhood depression. For each item, participants were asked to rate statements (e.g., "I felt miserable or unhappy") as "not true" (0), "sometimes true" (1), or "true" (2). The MFQ has both high content validity and criterion validity (Angold et al. 1995). Internal consistency (Cronbach's alpha) was 0.94 in this study, and prior work demonstrated high correlation with depression diagnoses and the Child Depression Inventory scores (Angold et al. 2002; Kovacs 1992). In the current study, two items were added (i.e., I felt uneasy or anxious, and I felt annoyed or irritated) and three suicide-related items were eliminated due to the impersonal setting in which the questionnaire was administered and the research team's inability to adequately and practically follow up immediately with positive endorsements. Students were identified as eligible for the randomized controlled trial if their 32-item MFQ score was 15 or above.

Aggression The 20-item aggressive behavior syndrome subscale of the Youth Self-Report (YSR; Achenbach and Rescorla 2001) was used to screen for aggressive behavior that may interfere with ability to participate in a group-based intervention. Content, criterion-related, and construct validity of the YSR has been demonstrated in diverse populations through four decades of research (Achenbach and Rescorla 2001). In our sample, internal consistency was strong (Cronbach's alpha = 0.87). To be eligible for the RCT, students had to score below the clinical cutoff for conduct problems on the aggressive behavior subscale.

Demographic Characteristics Student gender, race, and ethnicity were collected based on student report at screening. Additional information about socioeconomic status (education and employment), marital status, and parental age was obtained from parents as part of the initial evaluation.

Randomized Prevention Trial Participants

From an initial screening sample of 2664 youth who were representative of the district population, 697 youth met the criteria for inclusion in the trial. The parents of eligible and interested students were contacted by phone. Of 697 families eligible to participate, 68 students declined; 2 students could not be reached; 61 parents declined, and 69 parents could not be reached within the study recruitment timeframes. Thus, 71.3% of the eligible sample or 497 students/families were randomly assigned, resulting in 241 participants randomized to the HSTP condition and 256 to the control condition. Randomization was done following the baseline assessment, which established that the student met criteria for participation in the study. The project coordinator who provided oversight of all study data collection and had no involvement in the intervention component of the study did randomization via stratified, blind drawing of group assignment using a random number generator, and controlling only for equivalent distribution of gender across the two conditions.

Demographic characteristics including gender, race/ethnicity, and SES for both conditions are presented in Table 1.

Baseline and Follow-up Outcome Assessments

Baseline data were collected from three successive cohorts of students who were in their second semester of 8th grade. Students participating in intervention and

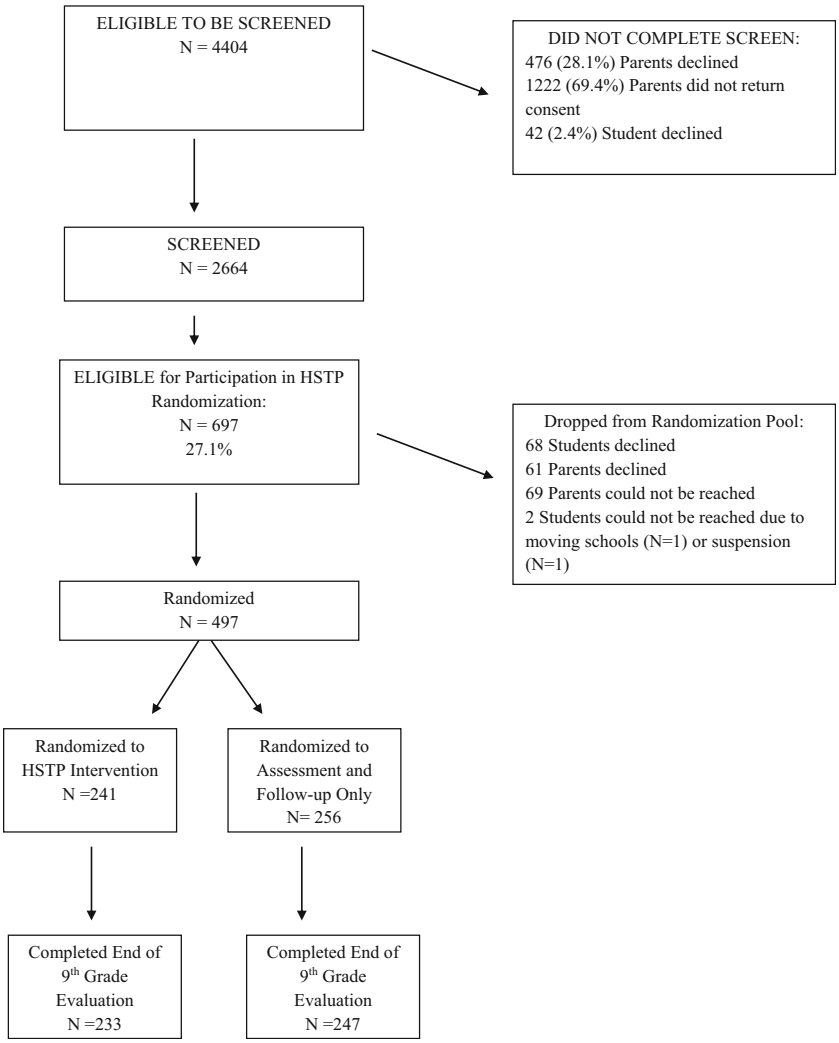

Fig. 1 Consort diagram

control conditions completed a comprehensive questionnaire, the High School Questionnaire (HSQ), developed by the Reconnecting Youth research group (Eggert et al. 1994; Herting et al. 1996), at five time points over a period of 18 months from January of 8th grade through June of 9th grade. Most HSQ items are derivatives of established scales, reduced in length through empirical analyses with samples of both high risk and "typical" youth.

Initial assessments were conducted in the home where the goals and purposes of the study were reviewed, consent/assent obtained, and assessments administered. The assessments were administered 1 month following screening (T_1), after subject selection and prior to random assignment. The first follow-up assessment occurred at the time of the final HSTP session (T_2 3 months post-screening). Additional follow-up assessments were conducted at the beginning of the fall quarter of 9th grade prior to the booster sessions (T_3 9 months post-screening), at the end of the first semester of 9th grade (T_4 12 months post-screening), and at the end of the second semester of 9th grade (T_5 18 months post-screening). Youth and parents were compensated for their time spent on completing questionnaires.

Measures

Depressive Symptoms The HSQ survey included the 13-item Short Mood and Feelings Questionnaire (SMFQ: Angold et al. 1995), which is a 13-item scale designed to measure depressive symptoms in children and adolescents age 8–17 years. SMFQ items are derived from the Diagnostic and Statistical Manual (DSM) criteria for major depression and dysthymia (Angold et al. 1995) and other features of childhood depression. Items are rated on a three-point scale (true, sometimes, not true) for the period of the past 2 weeks. The SMFQ has been shown to have high internal reliability (Cronbach's alpha = 0.90), and results of exploratory factor analysis suggest that it is a unifactorial scale (Angold et al. 1995; Sharp et al. 2006). High correlations have been found between scores from the SMFQ, the Children's Depression

Table 1 Characteristics of participants enrolled in trial

Characteristic	Intervention ($N = 241$) n (%)	Control ($N = 256$) n (%)	p
Female gender	149 (61.8)	165 (64.5)	0.54
Parent highest level of education			0.27
Less than high school	7 (3.1)	16 (6.6)	
High school graduate/GED	37 (16.4)	37 (15.2)	
Some college	71 (31.6)	84 (34.4)	
College graduate or more	110 (48.9)	107 (43.8)	
Race/ethnicity			0.70
Non-Hispanic White	130 (53.9)	144 (56.3)	
Black	32 (13.3)	36 (14.4)	
Asian	38 (15.8)	40 (15.6)	
American Indian	6 (2.5)	9 (3.5)	
Hispanic White	35 (14.5)	27 (10.5)	
Parents married	130 (57.0)	147 (60.0)	0.51
Parents' age at screen	44.69 (7.39)	43.98 (7.34)	0.30
Hollingshead Score at screen	43.83 (17.5)	45.40 (15.1)	0.28
YSR Aggression score at screen	12.12 (5.9)	11.46 (5.8)	0.21
SMFQ score at screen	9.75 (5.0)	9.78 (4.9)	0.94
SMFQ score at T_1	8.67 (5.8)	8.23 (5.6)	0.35
Hopelessness at T_1	1.99 (1.31)	2.13 (1.24)	0.24
Anger at T_1	2.09 (1.24)	2.09 (1.25)	0.99
Anxiety at T_1	2.13 (1.27)	2.01 (1.28)	0.31

Inventory, and the Diagnostic Interview Schedule for Children (DISC) depression scale (Angold et al. 1995; Kuo et al. 2005). Higher scores indicate more depressive symptoms, with a score of 8 or higher indicating symptoms at a clinical level.

Anxiety Symptoms The HSQ included a four-item anxiety subscale: (1) "I feel stressed out," (2) "I feel uneasy and/or anxious," (3) "I have times when I feel physically anxious (jittery, heart pounding, cold sweats, dizzy)," and (4) "I get so anxious, my thoughts get jumbled, and I'm easily confused." Each item was rated on a 7-point Likert-type scale ranging from never (0) to always (6). Internal reliability was adequate ($\alpha = 0.76$). High scores reflect high levels of anxiety.

Intervention Programs

The High School Transition Program The 8th grade in-school intervention was adapted from the 12-session Coping and Support Training (CAST) small-group curriculum developed by the Reconnecting Youth research group at the University of Washington (Eggert et al. 2002). The High School Transition Program focused on reducing development of depressive disorders in at-risk youth as they completed the normative but challenging transition to high school. The overall objectives of the HSTP were the following: (1) to increase the acquisition of coping skills competencies, (2) to increase social support resources by building a supportive peer network, (3) to increase engagement in positive social activities, and (4) to motivate parents to increase their support during the transition period. These objectives were addressed through 12 one-hour skill-based group sessions. The second part of the program was carried out on a 1:1 basis during the 1st semester of 9th grade to provide a bridge for the high school transition via delivery of four one-on-one booster sessions in the high school setting. The booster session curriculum was designed to assist students with bonding to their new school and to reinforce use of the skills taught in the skills group in 8th grade. A parent component was delivered by parent intervention specialists in four home visit sessions, two during 8th grade, and two during 9th grade.

The child group and parent individual and group sessions were led by predominately master's level mental health counselors who were provided with 40 h of training in the HSTP curriculum and 2-hour weekly supervision during the intervention phase. All group sessions, home visit, and booster sessions were videotaped and reviewed weekly as part of supervision and adherence coding.

Control Condition Students assigned in the comparison group completed, after screening, a one-on-one standardized interview and clinical follow-up with a trained clinician. A feedback phone call was made to parents to review concerns and

make recommendations for additional services, as needed. Following each assessment, participants who indicated a risk of clinical depression or self-harm were immediately assessed by clinical specialists who worked with parents and the school counseling department to develop a plan (e.g., connecting student with a tutor, meeting with school counselor, providing mental health referrals). This level of support was modeled on a usual school response to indicators that a student was experiencing depressive symptoms.

Statistical Plan

We used bivariate statistics to compare the baseline demographic characteristics and mental health status of students assigned to the HSTP and control conditions. We evaluated the bivariate correlation between baseline depression and anxiety scores using Pearson's correlation coefficient. To evaluate between-intervention group differences in depression and anxiety outcomes, our primary data analytic tool was hierarchical linear modeling (e.g., HLM; Bryk and Raudenbush 1992) with restricted maximum likelihood estimator (REML). HLM is a flexible approach to modeling longitudinal data in that it treats time as a continuous factor, allowing for the variability of the actual time of assessment for each participant. HLM can accommodate cases with incomplete data under the assumption that the data are missing at random, conditional on the observed data. We included all students who had any data collected at any of the five assessment waves giving us a potential of 2485 observations nested within 497 students. In general, data retention was excellent throughout the study. Specifically, only 3.42% of observations were considered missing for the SMFQ, and 2.66% of observations were missing from the anxiety subscale of the HSQ. We built separate unconditional growth models for both anxiety and depression. We modeled the change in the SMFQ and anxiety subscale of the HSQ from baseline to 18 months. Parameters were systematically added to each model, and deviance statistics were compared analytically (Verbeke and Molenberghs 1997). For both outcomes, the intercept and linear components were set to random. We used the unstructured covariance to allow the covariance between slopes and intercepts to be estimated independently. Model fit was evaluated using likelihood ratio testing, described in detail by Peugh and Enders (2005). Thus, parameters were retained in the model if the chi-square was significant and log likelihood ration was smaller. Given that students were nested within schools, we conducted interclass correlations (ICC), which tests for the variability attributed to students nested in schools. The ICC of school assignment on anxiety scores was 0.07, indicating that school assignment only accounted for 0.7% of the variance in anxiety scores, and the ICC of school on depressive symptoms was 0.07, meaning that 0.07% of the variance of depressive symptom scores were accounted for by school. Therefore, school was not included in the final model. All analyses were conducted using SPSS, version 21.

Once the unconditional growth models were built, we evaluated whether group assignment affected the slopes on each of the two dependent variables. The following group-level predictors were systematically evaluated: condition, sex, and race/ethnicity. Each predictor was evaluated as a main effect and as an interaction term between the predictor (i.e., condition, sex, and race/ethnicity) and time. For the sake of parsimony, ill-fitting parameters were removed (Verbeke and Molenberghs 1997).

For both depression and anxiety, the main effect of sex, condition, and the interaction of time and condition were included. The cross-level effect of sex and time did not improve model fit, therefore was not included, indicating that sex did not affect the rate of change.

We calculated effect sizes using the following formula: $\beta \times \text{time}/SD_{\text{raw}}$, where β is the estimated coefficient of the difference in slope for each condition; SD_{raw} is the pooled standard deviation between conditions at pretreatment, and time is the number of time points. The resulting effect size is interpreted using Cohen's specifications (1988), where 0.20 is a small effect size; 0.50 is a medium effect size, and 0.80 is a large effect size. Confidence intervals (CI) were calculated using the Wald method.

Results

Demographic and Clinical Characteristics

Participants were predominately female (61.5%) and reflected the demographic characteristics of Seattle Public School students, with approximately 14% of the sample African American, 15% Asian American, 3% American Indian, 55% non-Hispanic Caucasian, and 12% Hispanic. At Baseline, mean depression scores for both conditions were 8.42 (SD = 5.71) while mean baseline anxiety scores were 2.07 (SD = 1.28). Participants did not differ significantly by study intervention condition on demographic or clinical characteristics of depressive symptoms, anxiety, hopelessness, and anger at study entry (see Table 1). Additionally, the main effect of sex was significant ($B = 2.90$, CI = 2.14–3.66), suggesting that at baseline, female students, on average, had depression scores that were nearly 2.90 points higher than male students.

Trajectory of Depression and Anxiety from the Transition from Middle to High School

Based on the observed sample means showing an initial decrease in symptoms, which leveled off as time progressed; we tested for both a linear and quadratic effect of time. However, the quadratic effect degraded the model for both dependent

variables, indicating that the effect of time did not significantly decrease as time progressed. Therefore, the final unconditional growth models included the linear effect of time with a random intercept and slope, capturing variation in baseline score and linear change over time for the whole study sample. Before adding any other variables in the model, the effect of time on the dependent variable of depression was significant ($B = -0.42$, $p < .001$), indicating that at each time point, mean depression scores decreased by 0.42 points. For anxiety, the linear component was significant ($B = -0.11$, $p < .001$), suggesting that for each time point, mean anxiety scores decreased by 0.11 points.

Main Effect of HSTP on Depression

As shown in Table 2, for depression, the main effect of condition was not significant indicating that depression scores did not differ at baseline between the two condition groups. There was a significant interaction between condition and time, such that students randomized to the HSTP group had faster rates of change in their depression scores ($B = -0.30$, CI = −0.58, −0.02), albeit with a small effect size ($d = .23$; Fig. 2). We wanted to evaluate the effect of the HSTP as a depression prevention program. Using the cutoff of 8 on the SMFQ at baseline, 119 (46.9%) of students in the control condition were considered above the clinical cutoff, compared to 112 (46.7%) of students in the HSTP condition. By the end of the study, 94 (38.2%) of students in the control condition were considered above the clinical cutoff, compared to 74 (31.8%) of students in the HSTP condition resulting in a marginally significant difference between groups ($X_2(1) = 2.18$, $p = .08$).

Main Effect of HSTP on Anxiety

For anxiety, the main effect of condition was not significant indicating that anxiety scores did not differ at baseline. There was a significant interaction between condition and time, indicating that students randomized to the HSTP group had decreased anxiety scores over time compared to the control condition ($B = -0.07$, CI = −0.13, −0.01), also with a small effect size ($d = .25$; Fig. 2). Additionally, the main effect of sex was significant ($B = 0.34$, CI = 0.16, 0.51), suggesting that at baseline, female students, on average, had anxiety scores that were nearly 0.34 points higher than male students.

Moderation by Baseline Anxiety

We then fit two models that included baseline anxiety on the dependent variables of anxiety and depression, respectively, as well as the two-way interaction of time and baseline severity, and the three-way interaction of time, baseline severity, and condition (Table 2). For the dependent variable of depression, high baseline anxiety accelerated the rate of reduction in depression. In addition, the inclusion of baseline anxiety at the intercept and slope degraded the effect of condition and time. A three-way interaction evaluating the differential effect of condition, time, and baseline symptom severity on each outcome did not yield statistically significant results ($B = 0.001$, CI = −0.17, 0.17), indicating that the effect of baseline anxiety severity on the trajectories of depression was not impacted by treatment condition.

Table 2 Estimated effects of condition, sex, baseline anxiety severity, and time on anxiety and depression

Factor	Anxiety				Depression			
	B	SE	95% CI	*p*	*B*	SE	95% CI	*p*
Effect of time and condition								
Intercept	1.77	0.09	1.58, 1.95	<.001	6.18	0.41	5.36, 6.99	<.001
Time	−0.08	0.02	−0.12, −0.03	.001	−0.27	0.10	−0.47, −0.08	.01
Condition	0.14	0.10	−0.06, 0.34	.18	0.64	0.48	−0.29, 1.58	.18
Sex	0.34	0.09	0.16, 0.51	<.001	2.90	0.39	2.14, 3.66	<.001
Condition × time	−0.07	0.03	−0.13, −0.01	.02	−0.30	0.14	−0.58, −0.02	.04
Effect of time, condition, and baseline Anxiety								
Intercept	1.94	0.07	1.78, 2.10	<.001	6.73	0.35	6.03, 7.44	<.001
Time	−0.08	0.02	−0.12, −0.04	<.001	−0.29	0.10	−0.48, −0.10	.003
Condition	0.07	0.09	−0.10, 0.24	.42	0.36	0.41	−0.44, 1.15	.38
Sex	0.11	0.08	−0.04, 0.27	.16	2.27	0.34	1.60, 2.93	<.001
Baseline severity	0.11	0.01	0.10, 0.13	<.001	2.24	0.16	1.92, 2.55	<.001
Baseline severity × time	−0.01	0.003	−0.12, −0.004	<.001	−0.29	0.07	−0.42, −0.16	<.001
Condition × time	−0.06	0.03	−0.12, −0.004	.034	−0.26	0.14	−0.54, 0.01	.06
Condition × time × baseline severity	−0.001	0.005	−0.01, 0.01	.88	0.001	0.09	−0.17, 0.17	.99

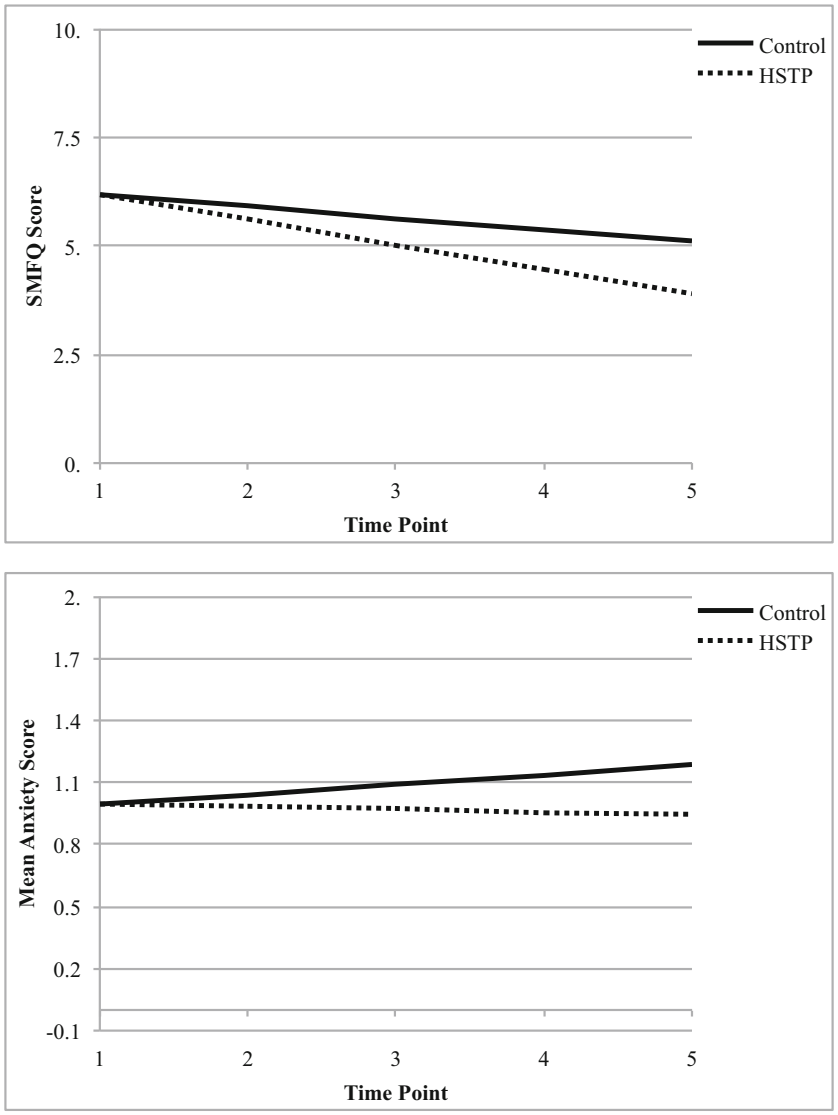

Fig. 2 Plot of the mean depression and anxiety symptoms scores for the two conditions. Control control condition; HSTP High School Transition Program, SMFQ short moods and feelings questionnaire. Trajectories depict the model-implied mean

Discussion

This study examined the prevention effects of a targeted intervention program aimed to reduce the escalation of depression, anxiety, and associated school difficulties in a group of at-risk youth transitioning from middle to high school. Results indicated that in comparison to the control condition, the HSTP intervention evidenced a small to moderate effect for depression symptoms and a small effect size for anxiety symptoms. Estimates of a preventive effect were evaluated, and though fewer youth in the HSTP condition exceeded the clinical cutoff at follow-up than youth in the control condition, this difference was not statistically significant. Given that this normative, yet critical, period of transition from middle school to high school has already been identified as a period of increased rates of stress and depression (e.g., Newman et al. 2007), integrating such programs into regular programming at this transition period may help facilitate a smoother transition for youth.

Results also indicated that depression and anxiety decreased significantly over time regardless of intervention group, and that those randomized to HSTP experienced a faster decline of both anxiety and depression as they transitioned to high school, relative to those assigned to the control condition. These findings suggest that in addition to preventing the onset of depression, HSTP successfully reduced preexisting elevated symptoms of anxiety and depression. Of note, this program was unlike established cognitive behavioral treatment protocols in that its primary components consisted of adaptive coping skills, improved social support and activities, and parental involvement. Given that many youth in the HSTP group experienced reduction in symptoms of anxiety and

depression, a benefit of this program is that it may be more easily integrated into the structure of existing school-based intervention systems as a universal prevention program or tier 2 intervention for indicated youth within a stepped care model. Those with continued, elevated symptom presentations may then benefit from more intensive interventions (e.g., individual outpatient psychotherapy).

Additionally, we found that higher baseline levels of anxiety were associated with faster rates of change for depression and anxiety, respectively. While this finding was not specific to the intervention group, it may indicate regression to the mean or increased readiness for change for youth exhibiting higher levels of psychopathology. Anxiety and depression are highly comorbid and linked risk factors within a developmental psychopathology framework (Cummings et al. 2014), and these results support the importance of early identification and intervention for youth with symptoms of both anxiety and depression prior to the transition to high school. Youth with elevated levels of comorbid anxiety and depression benefited from intervention at this critical transition period, which supports the usefulness of similar unified prevention approaches for emotional disorders (Hersh et al. 2016).

This study was not without limitations, which also serve as important opportunities for future directions. At-risk youth in the study were identified for study enrollment using a screening measure, and outcomes were measured via repeated self-report questionnaire, which may contribute to shared method variance. Future studies may consider including additional measures of clinical diagnoses (e.g., diagnostic interviews) in addition to symptom endorsement (Horowitz and Garber 2006), as targeted prevention programs may not be sufficient in addressing concerns once youth meet criteria for clinical diagnoses of anxiety, depression, or other concerns. Future research may also consider evaluating additional outcomes (e.g., school performance, self-esteem) and mediators of change, particularly at times of significant developmental maturation. The current study was timed to evaluate change during the sensitive transition from middle school to high school, and future research may consider experimentally controlling the timing of prevention programs to identify the most salient time for intervention given developmental context (e.g., earlier intervention vs. transition intervention). It may also be valuable for future research to evaluate later-to-emerge prevention effects as well as the necessary components of the intervention in order to sustain implementation (i.e., parent component and booster sessions).

Additionally, we identified sex differences at baseline (increased endorsement of anxiety for females), which is consistent with epidemiological estimates of depression and anxiety during adolescence (Merikangas et al. 2010). Although we did not find a significant interaction between sex and condition or time in the present study, future research may consider evaluating the role of sex and other demographic differences in longitudinal evaluations of prevention programs. Additionally, identifying specific skills that may bolster effects for subgroups will be important to identify, as additional risk factors and moderators of this intervention effect are explored (Horowitz and Garber 2006). Finally, future studies may consider evaluation of the intervention delivery format. The interventions provided in this study were delivered by master's and doctoral-level child mental health clinicians who were not working in the school setting, rather than school-based special services personnel, which may present a barrier to larger-scale dissemination efforts. Of note, our intervention did not utilize technology, which may aid in dissemination efforts and has been identified as an important future direction for prevention programs (Fazel et al. 2014; Merry et al. 2012). Overall, replication of these effects and further evaluation of the mechanisms of the intervention (Kraemer et al. 2002) and moderators of these effects (Horowitz and Garber 2006) is warranted before considering widespread dissemination (Brunwasser and Garber 2016).

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Compliance with Ethical Standards

Conflicts of Interest The authors declare that they have no conflicts of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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