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Interpersonal Psychotherapy-Adolescent Skills Training: Anxiety Outcomes and Impact of Comorbidity

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Abstract

Objective—Given the frequent comorbidity of anxiety and depression, it is important to study the effects of depression interventions on anxiety and the impact of comorbid anxiety on depression outcomes.

Method—This paper reports on pooled anxiety and depression data from two randomized trials of Interpersonal Psychotherapy-Adolescent Skills Training (IPT-AST), a depression prevention program. Ninety-eight adolescents were randomized to receive IPT-AST or school counseling (SC). Outcome and predictor analyses were performed utilizing hierarchical linear models.

Results—IPT-AST adolescents had significantly greater reductions in anxiety and depressive symptoms than SC adolescents during the intervention. Baseline anxiety symptoms predicted change in depressive symptoms for adolescents in both intervention conditions, with adolescents low in baseline anxiety demonstrating more rapid change in depressive symptoms than adolescents high in baseline anxiety.

Conclusions—These findings indicate that IPT-AST is effective at decreasing both depressive and anxiety symptoms. For adolescents with comorbid symptoms of anxiety, there may be slower rates of change in depressive symptoms following prevention programs.

Keywords

prevention; depression; anxiety; adolescents; interpersonal psychotherapy

INTRODUCTION

There is growing evidence of the efficacy of preventive interventions for adolescent depression, particularly indicated programs which target individuals with subthreshold depression (for recent reviews, see Horowitz & Garber, 2006; Stice, Shaw, Bohon, Marti, & Rohde, 2009). However, little is known about whether these programs also impact comorbid symptoms, such as anxiety. This is particularly relevant for depression prevention programs,

as reductions in anxiety symptoms may serve as a secondary prevention benefit of an intervention (Flannery-Schroeder, 2006; Garber & Weersing, 2010). In addition, it is important to determine whether adolescents with comorbid symptoms respond as favorably to prevention programs as adolescents who only have elevated depressive symptoms. Given the frequent comorbidity of anxiety and depression (Angold, Costello, & Erkanli, 1999), the shared risk factors for these two disorders (Brozina & Abela, 2006; Hankin, Kassel, & Abela, 2005; Kreuger, 1999), and evidence that anxiety serves as a risk factor for subsequent depression (Pine, Cohen & Brook, 2001; Goodwin, Fergusson & Horwood, 2004), it is important to study the effects of depression interventions on anxiety and the impact of comorbid anxiety on depression outcomes.

Two recent meta-analyses have examined whether treatments for adolescent depression lead to improvements in anxiety symptoms. Weisz, McCarty and Valeri (2006) conducted a meta-analysis of depression treatment studies in children and adolescents. Among the depression treatment studies that examined anxiety outcomes, there was a small to moderate reduction in anxiety symptoms (effect size = 0.39), only marginally lower than the reduction in depressive symptoms. Chu and Harrison (2007) conducted a meta-analysis of cognitive-behavioral therapy (CBT) trials for youth depression and anxiety. Of the 14 depression treatment studies included in the meta-analysis, 5 assessed anxiety outcomes. Within these 5 depression studies, there was a small but significant effect on anxiety symptoms (effect size = 0.28). These meta-analyses suggest that treatments for adolescent depression also impact anxiety symptoms, although the effect sizes for anxiety are smaller than those found in anxiety treatment studies (Chu & Harrison, 2007).

Within the depression prevention literature, most published studies have not examined anxiety outcomes, with the exception of the Penn Resiliency Program (PRP; Jaycox, Reivich, Gillham, & Seligman, 1994) and the FRIENDS program (Barrett, 2005). Roberts, Kane, Thomson, Bishop and Hart (2003) conducted a study utilizing PRP, a group cognitive-behavioral depression prevention program, in Australia. Surprisingly, there was no effect on depressive symptoms but significant effects on anxiety symptoms post-intervention and at 6-month follow-up. Gillham et al. (2006) compared an enhanced version of PRP, which included six 90-minute parent group sessions, to a no intervention control condition and found that adolescents in PRP reported greater reductions in depressive and anxiety symptoms, particularly at 6-month and 12-month follow-up. The FRIENDS program, a universal cognitive-behavioral preventive intervention, has also demonstrated effects on both depressive and anxiety symptoms (Lowry-Webster, Barrett & Dadds, 2001; Lowry-Webster, Barrett & Lock, 2003). However, similar to the findings by Roberts and colleagues (2003), recent research found the FRIENDS program was more effective in reducing anxiety symptoms than depressive symptoms (Barrett, Farrell, Ollendick, & Dadds, 2006; Lock & Barrett, 2003). Findings from these studies suggest that other youth depression prevention programs may also lead to reductions in anxiety symptoms.

In addition to investigating the effects of depression interventions on anxiety symptoms, it is also important to gain a more comprehensive understanding of how anxiety symptoms may attenuate the effects of these interventions. Some studies have found that having a comorbid anxiety diagnosis either led to an improved response to treatment (Rohde, Clarke, Lewinsohn, Seeley, & Kaufman, 2001) or had minimal impact on depression outcomes (Doss & Weisz, 2006; Jayson, Wood, Kroll, Fraser, & Harrington, 1998). However, contrary to these studies, an emerging body of literature suggests that comorbid anxiety may have a negative impact on depression outcomes. Brent et al. (1998) found that having a comorbid anxiety disorder predicted poorer outcomes in all treatment conditions. In a study of interpersonal psychotherapy for depressed adolescents (IPT-A), Young, Mufson and Davies (2006a) found that comorbid anxiety was associated with poorer depression outcomes post-

treatment, particularly for adolescents with probable social anxiety. Recent multi-site studies examining pharmacological, cognitive-behavioral, and combined treatments for depression have also found that adolescents with comorbid anxiety disorders experienced significantly less improvement in depression than adolescents without an anxiety disorder (Curry et al., 2006; Emslie et al., 2010).

Although not entirely consistent, these treatment studies suggest that adolescents with comorbid anxiety and depression may experience worse depression outcomes. This may be due to the fact that individuals with comorbid depression and anxiety experience more associated problems than adolescents with uncomplicated depression (Lewinsohn, Rohde, & Seeley, 1995) and may have a genetically distinct form of depression which is more severe (Kendler, Eaves, Walters, Neale, Heath, & Kessler, 1996). It is unclear whether the same findings would be true in a prevention context, where adolescents are experiencing comorbid symptoms rather than comorbid diagnoses. To date, this question has only been investigated in two studies. In an early study of the FRIENDS program, the prevention program was more effective at reducing depressive symptoms in adolescents with clinical anxiety than in adolescents without anxiety (Lowry-Webster et al., 2001; Lowry-Webster et al., 2003). On the other hand, Pössel and colleagues examined the effects of comorbid anxiety symptoms on the prevention of depressive symptoms following a cognitive-behavioral prevention program and found that comorbid anxiety symptoms did not impact depression outcomes (Pössel, Seemann, & Hautzinger, 2008). Therefore, further research is needed to better understand the impact of comorbidity on the prevention of depressive symptoms.

Interpersonal Psychotherapy-Adolescent Skills Training (IPT-AST) is an indicated group prevention program that is based on Interpersonal Psychotherapy for Depressed Adolescents (IPT-A; Mufson, Dorta, Moreau & Weissman, 2004). In an initial study with predominately female Hispanic youth, adolescents in IPT-AST reported significantly fewer depressive symptoms, better overall functioning, and fewer depression diagnoses than adolescents who received school counseling (SC) post-intervention and at 6-month follow-up (Young, Mufson & Davies, 2006b). In a later study of predominately Hispanic and African-American youth, adolescents in IPT-AST reported significantly greater rates of change in depressive symptoms and overall functioning than SC adolescents from baseline to post-intervention. At post-intervention, IPT-AST adolescents reported significantly fewer depressive symptoms and better overall functioning. During the follow-up phase, rates of change slowed for the IPT-AST adolescents, while the SC adolescents continued to show improvements, perhaps because of regression to the mean or delayed intervention effects. By 12-month follow-up, there were no significant mean differences in depressive symptoms or overall functioning between the two groups (Young, Mufson & Gallop, 2010).

This paper presents pooled anxiety and depression data from these two randomized trials comparing IPT-AST and SC. The first aim of the study was to examine the impact of IPT-AST on anxiety symptoms. We hypothesized there would be significantly different rates of change in overall anxiety symptoms between adolescents in IPT-AST and those in SC, with IPT-AST adolescents experiencing fewer anxiety symptoms post-intervention than SC adolescents. We hypothesized that the rates of change in anxiety symptoms would slow for IPT-AST adolescents during the follow-up phase, mirroring the change seen in depressive symptoms (Young et al., 2010). We also examined rates of change in three anxiety subscales (panic/somatic, generalized anxiety, and social anxiety) to determine whether there were significantly different rates of change in any specific anxiety domains. The second aim of the study was to assess whether baseline anxiety predicted change in depressive symptoms. We hypothesized that adolescents with comorbid anxiety symptoms would have a smaller reduction in depressive symptoms following the intervention than adolescents without

elevated anxiety symptoms. Based on the IPT-A study which found that adolescents with probable social anxiety experienced worse depression outcomes (Young et al., 2006a), we hypothesized that adolescents with comorbid social anxiety symptoms would have more depressive symptoms post-intervention because their avoidance would prevent them from engaging in interpersonal interactions that would improve their relationships and their mood.

METHODS

Case Finding Procedures

In both studies, adolescents with elevated symptoms of depression were identified through a two-stage screening procedure. The first stage consisted of a classroom-based screening using the Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977), a 20-item measure that assesses depressive symptoms over the past week. The adult literature recommends using a score of 16 or higher as indicative of a depressive illness. For adolescent populations, various cut-off scores have been recommended, ranging from 12 to 24 (Garrison, Addy, Jackson, McKeown, & Waller, 1991; Roberts, Andrews, Lewinsohn, & Hops, 1990). We used the adult cutoff of 16 or higher to identify as many adolescents as possible who may be experiencing symptoms of depression. In study 1, adolescents with a CES-D score of 40 or higher were referred out for treatment as a requirement of the Institutional Review Board (IRB). In study 2, adolescents with a CES-D score of 40 or higher were assessed by the principal investigator to determine their appropriateness for the project and were referred out for treatment if they were experiencing a depressive episode.

Adolescents with eligible CES-D scores and their parents were contacted by the research staff to describe the prevention project. Interested families came to the schools to learn about the project and provide informed consent and assent. After families consented to the prevention project, adolescents were administered the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS-PL; Kaufman, Birmaher, Brent, & Rao, 1997) and the Children's Global Assessment Scale (CGAS; Shaffer et al., 1983) to determine eligibility. Adolescents were eligible to participate in the prevention studies if they had at least 2 subthreshold or threshold depressive symptoms on the K-SADS-PL, and had a CGAS score of 61 or higher. Adolescents were excluded from the study if they endorsed current suicidal ideation or self-harm behaviors or if they had a current diagnosis of major depression, dysthymia, bipolar disorder, psychosis, panic disorder, obsessive-compulsive disorder, posttraumatic stress disorder, oppositional defiant disorder, conduct disorder, or untreated attention deficit hyperactivity disorder. The IRB required that we exclude adolescents with panic disorder, obsessive-compulsive disorder, and posttraumatic stress disorder because of the severity of these diagnoses and the fact that IPT-AST was a novel program with limited or no efficacy data at the start of these studies. The IRB allowed us to include adolescents with comorbid social phobia, generalized anxiety disorder, separation anxiety disorder or specific phobia given the decreased severity of these diagnoses, overlap of these disorders with depressive symptoms, and the potential that the prevention programs might have a positive impact on these conditions. The study was approved by the IRBs at the New York State Psychiatric Institute and Rutgers University.

Participants

In study 1, there were 41 participants; 27 were randomized to IPT-AST and 14 were randomized to SC. Participants were aged 11 to 16 years and in the 7th–10th grades at three Catholic schools (two coeducational middle schools and one all-girls high school). The average age was 13.4 ($SD = 1.2$) years and the sample was 85.4% female. The majority of the adolescents were Hispanic (92.7%). Sixty-six percent of the sample lived in a single-parent household. Three adolescents in IPT-AST and 1 adolescent in SC met criteria for

Generalized Anxiety Disorder, 1 in IPT-AST and 3 in SC met criteria for Social Anxiety Disorder, and 1 adolescent in SC met criteria for Separation Anxiety Disorder. Additional details about the sample are available elsewhere (Young et al., 2006b).

In study 2, there were 57 participants; 36 were randomized to IPT-AST and 21 were randomized to SC. Participants were aged 13 to 17 years and in the 9th and 10th grades at three Catholic schools (two all-girls high schools and one all-boys high school). The average age was 14.5 ($SD = 0.8$) years and the sample was 59.7% female. The sample was predominately Hispanic (73.7%) and African American (38.6%) and the majority lived in single-parent homes (70.2%). One adolescent in IPT-AST met criteria for Generalized Anxiety Disorder, 2 adolescents in IPT-AST and 1 in SC met criteria for a specific phobia. See Young et al. (2010) for additional details.

Assessments

This paper presents results from common assessment points across the two studies: baseline, post-intervention, and 6- and 12-months post-intervention. In both studies, adolescents also completed the CES-D mid-intervention to assess clinical status. This assessment is included in the current analyses. The two measures used in the current analyses are the CES-D and the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1999). The CES-D is a 20-item self-report measure that assesses the presence of depressive symptoms over the course of the past week. Scores on the CES-D range from 0 to 60. The CES-D has been well researched and tested as a screening tool for adolescent depression (Garrison et al., 1991; Roberts et al., 1990; Roberts, Lewinsohn, & Seeley, 1991). The Cronbach's alpha for the CES-D at the screening was 0.68. Cronbach's alpha for the remaining assessment points ranged from 0.86 to 0.92.

The SCARED is a 41-item self-report instrument that was developed as a screening tool for childhood anxiety disorders. There is a total score and 5 subscales: panic/somatic, generalized anxiety, separation anxiety, social anxiety and school phobia. We focused on the panic/somatic, generalized anxiety, and social anxiety subscales since we felt these subscales were most relevant for our adolescent participants who were regularly attending school. The recommended clinical cutoff for the total score is 25, 7 for the panic/somatic subscale, 9 for the generalized anxiety subscale, and 8 for the social anxiety subscale. The SCARED demonstrates good internal consistency, test-retest reliability and discriminative validity (Birmaher et al., 1999). The Cronbach's alpha for the SCARED over the different assessment points ranged from 0.86 to 0.91.

Interventions

IPT-AST—IPT-AST (Young & Mufson, 2003) has 2 pre-group sessions (40 minutes each) and 8 weekly group sessions (90 minutes each). The group focuses on psychoeducation and general skill-building that can be applied to different relationships in the adolescents' lives. The psychoeducation component includes defining prevention, educating members about depression, and discussing the relationship between feelings and interpersonal interactions. The interpersonal skill-building component consists of two stages. First, communication and interpersonal strategies are taught through didactics, games, and role-plays. Once group members understand the skills, they are asked to apply the skills to different people in their lives, practicing first in group and then at home. For more information on IPT-AST, please see Young and Mufson (2008).

School Counseling—The adolescents in this condition were referred to the school counselor to be seen at a frequency determined by the adolescent and the counselor. Most adolescents in SC were seen for individual supportive counseling. SC was not intended to be

an equivalent intervention to IPT-AST. It was chosen as the comparison group because it approximates what normally occurs in the schools when an adolescent is identified as having subclinical emotional difficulties. Across the two studies, adolescents in SC attended an average of four sessions (range was 0 to 9 sessions); sessions were typically 30–45 minutes in duration. The most commonly discussed topic during SC sessions was relationships with parents, followed by academic issues, relationships with peers, and feelings of sadness and anxiety.

Statistical Analyses

To determine whether we could pool data from the two studies, we compared baseline depression and anxiety scores in the two samples. There were no significant differences between the two samples on baseline CES-D scores or SCARED scores (total score or any of the subscales). The Institute of Medicine (2001) recommends the use of several approaches, including hierarchical models, to maximize information from small trials and increase statistical power. Based on this recommendation, we used hierarchical linear modeling (HLM) to examine differences between the interventions on rates of change in anxiety and depressive symptoms utilizing pooled data from the two studies. Similar to our prior studies (Young, Gallop, & Mufson, 2009; Young et al., 2010), we conducted a piecewise model examining change in SCARED and CES-D scores from baseline to post-intervention and a second leg of time looking at post-intervention through the 12-month follow-up. The degrees of freedom were estimated with the Kenward-Roger's approximation (Kenward & Roger, 1997) which accommodates small sample inferences, and effect sizes for intervention contrasts (Cohen's *d*) were derived as specified by Verbeke and Molenberghs (2000). To control for potential differences across schools and between the two studies, school and study were included in the models as fixed effects. HLM assumes independent observations between individuals. This assumption may be violated because IPT-AST is a group program. We considered including random effects for group (i.e., Bauer, Sterba, & Hallfors, 2008), but decided against this model because the limited number of groups coupled with the relatively small sample size per intervention arm resulted in statistically unreliable estimates, as evident by a lack of convergence of the statistical algorithms.

To examine whether baseline anxiety scores predicted change in depressive symptoms, we augmented the CES-D outcome model to include baseline anxiety scores predicting change within each portion of the piecewise model. The anxiety scores were rescaled as deviations from the overall mean. This process is referred to as grand mean centering. Centering is used for two purposes: (1) to provide for stability in the estimation of the model and (2) to provide an interpretable or meaningful zero point (Blanton & Jaccard, 2006; Enders & Tofghi, 2007). When baseline anxiety scores significantly predicted the rate of change in CES-D scores, we looked at adolescents who scored above or below the clinical cutoff on the total SCARED score and SCARED subscale scores to better understand this relationship. All analyses were conducted using SAS version 9.2.

RESULTS

Anxiety Symptoms

Descriptive statistics for the SCARED total score and subscale scores are provided in Table 1. Assessment of normality of the total score and subscales indicated no serious deviations in normality per the Shapiro-Wilk (1965) statistics, with the exception of the panic/somatic complaints subscale which was normalized using a square-root transformation. There was no significant difference between interventions on the total score or subscale scores at baseline. At baseline 36.5% of adolescents in IPT-AST and 45.7% of adolescents in SC had

total SCARED scores of 25 or greater. Post-intervention 8.1% of adolescents in IPT-AST had elevated SCARED scores as compared to 23.5% of adolescents in SC. At 6-month follow-up 8.2% of IPT-AST adolescents and 16.7% of SC adolescents had elevated SCARED scores and at 12-month follow-up 3.3% of IPT-AST adolescents and 11.5% of SC adolescents had elevated scores.

Implementing the piecewise HLM showed a differential rate of change per month in total anxiety symptoms, ($t(91) = -2.34, p = 0.02$) during the active phase of the intervention (see Table 2 for details). As depicted in Figure 1, monthly rates of change were -3.26 ($se = 0.40$) points for IPT-AST and -1.70 ($se = 0.54$) points for SC, corresponding to a Cohen's $d = 0.49$. These rates of change mean that the total SCARED scores for IPT-AST adolescents decreased by 3.26 points per month, whereas SC adolescents' total SCARED scores decreased by 1.70 points per month. At the end of the intervention there was a 6.88 ($se = 2.11$) point difference in total SCARED scores between the two interventions, which is statistically significant ($t(91) = -3.26, p < 0.01, d = 0.68$). During the follow-up period, SC showed marginally more rapid improvement compared to IPT-AST ($t(91) = 1.88, p = 0.06, d = 0.39$). On average, there was a 0.14 ($se = 0.11$) point decrease in total anxiety scores per month for IPT-AST and a 0.52 ($se = 0.16$) point decrease per month for SC. Despite the more rapid change for SC during the follow-up phase, the difference in total SCARED scores between IPT-AST and SC at the 6-month follow-up was 4.64 ($se = 1.83$) points in favor of IPT-AST, which is a statistically significant contrast ($t(91) = -2.54, p = 0.01, d = 0.53$). By the 12-month follow-up, the advantage of IPT-AST over SC was no longer significant, ($t(91) = -1.07, p = 0.29, d = 0.22$).

On the panic/somatic complaints subscale, there was a significant difference in the rate of change during the intervention phase for IPT-AST as compared to SC, ($t(91) = -3.46, p < 0.01$). Monthly rates of change on the transformed scale were -0.22 ($se = 0.04$) points for IPT-AST, whereas adolescents in SC showed a minor increase in panic symptoms at the rate of 0.02 ($se = 0.05$) points per month, corresponding to a Cohen's $d = 0.72$. At the end of the intervention there was a 0.80 ($se = 0.20$) point difference in the transformed scale between the two interventions, ($t(91) = 3.95, p < 0.01, d = 0.83$). During the follow-up phase, there was a marginally significant difference in rate of change in favor of SC ($t(91) = 1.72, p = 0.09$). Despite the more rapid change for SC during the follow-up phase, the on-average difference on the transformed panic subscale between IPT-AST and SC at the 6-month follow-up was 0.59 ($se = 0.17$) points in favor of IPT-AST, which is a statistically significant contrast ($t(91) = -3.46, p < 0.01, d = 0.72$). At the 12-month follow-up, the difference was 0.37 ($se = 0.22$) points in favor of IPT-AST, which is marginally significant, ($t(91) = -1.70, p = 0.09, d = 0.36$).

There was a significant difference in rates of change on the GAD subscale during the intervention phase for IPT-AST compared to SC, ($t(91) = -2.78, p < 0.01$). There was a monthly reduction of 1.09 ($se = 0.14$) points on the GAD subscale for IPT-AST compared to a reduction of 0.45 ($se = 0.19$) points for SC (Cohen's $d = 0.58$), resulting in a 2.18 ($se = 0.77$) point difference at endpoint, ($t(91) = -2.84, p < 0.01, d = 0.59$). During the follow-up phase, there was a marginally significant difference in rate of change in favor of SC ($t(91) = 1.76, p = 0.08, d = 0.37$). Despite the more rapid change for SC during the follow-up phase, the on average difference in GAD scores at the 6-month follow-up was 1.49 ($se = 0.68$) points in favor of IPT-AST ($t(91) = -2.18, p = 0.03, d = 0.46$). At the 12-month follow-up, there was no significant difference in GAD scores between the two conditions, ($t(91) = -0.98, p = 0.33, d = 0.21$).

In contrast to the total anxiety score and the panic/somatic complaints and GAD subscales, there were no significant differences in rates of change on the social anxiety subscale during

either the intervention phase ($t(91) = -0.10, p = 0.92$) or follow-up phase ($t(91) = 0.34, p = 0.73$). Adolescents in both groups showed a small, but significant, reduction in social anxiety scores during the course of the intervention (IPT-AST: -0.51 ($se = 0.12$); SC = -0.48 ($se = 0.16$)), with continued significant reductions during the follow-up period (IPT-AST: -0.08 ($se = 0.03$); SC = -0.10 ($se = 0.05$)).

Depressive Symptoms

Descriptive statistics for the CES-D score are provided in Table 1. Assessment of normality of the total score indicated no serious deviations in normality per the Shapiro-Wilk statistics and there was no significant difference between interventions on CES-D scores at baseline. Post-intervention 17.7% of adolescents in IPT-AST had CES-D scores of 16 or greater as compared to 42.9% of adolescents in SC. At 6-month follow-up 21.3% of IPT-AST adolescents and 46.9% of SC adolescents had elevated CES-D scores and at 12-month follow-up 19.7% of IPT-AST adolescents and 35.7% of SC adolescents had elevated scores.

As depicted in Figure 2, there was a differential rate of change per month in depressive symptoms between the two interventions ($t(91) = -3.53, p < 0.01$) during the active phase of the program (see Table 2 for details). Monthly rates of change were -5.41 ($se = 0.37$) points for IPT-AST and -3.23 ($se = 0.49$) points for SC, corresponding to a Cohen's $d = 0.74$. At the end of the intervention there was a 8.21 ($se = 1.43$) point difference in CES-D scores between the two interventions, $t(91) = -5.74, p < 0.01, d = 1.20$. During the follow-up period, SC showed significantly more rapid improvement compared to IPT-AST ($t(91) = 2.38, p = 0.02$). On average, there was a 0.10 ($se = 0.10$) point increase per month for IPT-AST and a 0.33 ($se = 0.15$) point decrease per month for SC, corresponding to a Cohen's $d = 0.50$. Despite the more rapid change for SC during the follow-up phase, the difference in CES-D scores between IPT-AST and SC at the 6-month follow-up was 5.65 ($se = 1.25$) points in favor of IPT-AST, which is a statistically significant contrast ($t(91) = -4.52, p < 0.01, d = 0.95$). At the 12-month follow-up, the difference in CES-D scores between IPT-AST and SC was 3.08 ($se = 1.84$) points in favor of IPT-AST, which is marginally significant ($t(91) = 1.68, p = 0.10, d = 0.35$).

Anxiety as a Predictor of Depressive Symptoms

First, we examined the relationship between baseline anxiety symptoms and baseline depressive symptoms. We found non-significant correlations between baseline depressive symptoms and baseline anxiety symptoms, for the total SCARED score ($r = 0.12, p = 0.22$) and the three subscales (all $r \leq 0.18$, all $p \geq 0.07$). We also examined whether adolescents with low vs. high anxiety symptoms at baseline had different levels of baseline depressive symptoms. There were no significant differences in baseline depressive symptoms between adolescents with low (score ≤ 4) vs. high (score ≥ 5) total SCARED scores ($t(96) = -0.79, p = 0.43$). The same was true when examining each of the three subscale scores (all $t \leq 1.30$, all $p \geq 0.20$).

Next, we examined whether baseline anxiety scores predicted change in CES-D scores during the intervention phase and follow-up phase. There was a significant association between the SCARED total score at baseline and change in CES-D scores during the intervention phase ($t(90) = 2.05, p = 0.04, d = 0.43$) and during the follow-up phase ($t(90) = 2.13, p = 0.04, d = 0.45$). To understand the nature of the significant relationships, we divided the sample by high vs. low total SCARED scores and included the dichotomous variable in the HLM model. During the course of the interventions (IPT-AST and SC), those with low total SCARED scores at baseline showed a decrease in CES-D scores of 5.04 ($se = 0.48$) points per month, whereas those with high anxiety decreased by 4.04 ($se = 0.57$) points per month (see Figure 3). Despite the different rates of change in CES-D scores during the

intervention phase, the high vs. low anxiety groups did not have significantly different CES-D scores at the end of the prevention programs, $t(90) = -1.43$, $p = 0.16$, $d = 0.30$ ¹. During the follow-up phase, those with low total SCARED scores at baseline showed a non-significant increase in CES-D scores of 0.10 ($se = 0.10$) points per month, whereas those with high baseline anxiety continued to demonstrate significant reductions in CES-D scores at the rate of 0.28 ($se = 0.11$) points per month. At the 6-month and 12-month follow-up assessments, the differences in CES-D scores between adolescents with high and low baseline anxiety were not significant.

We conducted the same analyses for the three anxiety subscales to determine whether the results were consistent across the subscales or whether any one subscale was responsible for the effects seen with the total SCARED score. Consistent with the total score, baseline panic/somatic symptoms marginally predicted rates of change in CES-D scores during the intervention phase ($t(90) = 1.89$, $p = 0.06$) and significantly predicted rates of change during the follow-up phase ($t(90) = -2.28$, $p = 0.02$). Using the high vs. low dichotomy for the panic/somatic subscale, adolescents with low baseline symptoms showed more significant reductions in CES-D scores during the intervention phase than adolescents with high baseline symptoms. At the end of the prevention programs, adolescents low in baseline panic/somatic complaints experienced significantly lower CES-D scores than adolescents high in panic/somatic complaints, $t(90) = -2.71$, $p < 0.01$, $d = 0.57$. During the follow-up phase, adolescents with high panic/somatic complaints continued to show significant reductions in CES-D scores, whereas those with low anxiety showed no change in CES-D scores during the follow-up period. At the 6-month follow-up, adolescents low in baseline panic/somatic symptoms reported marginally lower CES-D scores than adolescents high in panic/somatic complaints, $t(90) = -1.66$, $p = 0.10$, $d = 0.35$. At the 12-month follow-up assessment, the difference in CES-D scores between adolescents with high and low baseline panic/somatic symptoms was not significant.

Baseline generalized anxiety symptoms marginally predicted rates of change in CES-D scores during the intervention phase ($t(90) = 1.83$, $p = 0.07$) and significantly predicted rates of change during the follow-up phase ($t(90) = -2.01$, $p < 0.05$). Adolescents with low baseline generalized anxiety symptoms showed greater reductions in CES-D scores during the interventions than those with high anxiety. However, post-intervention, the high vs. low generalized anxiety groups did not have significantly different CES-D scores, $t(90) = -1.20$, $p = 0.23$, $d = 0.25$. During the follow-up phase, adolescents with high generalized anxiety showed significant reductions in CES-D scores, whereas those with low generalized anxiety showed no change in CES-D scores during the follow-up period. At the 6-month and 12-month follow-up assessments, the differences in CES-D scores between adolescents with high and low baseline generalized anxiety symptoms were not significant. Inconsistent with the total SCARED score and contrary to our hypothesis, baseline social anxiety symptoms did not significantly predict change in CES-D scores during the intervention or follow-up phases.

DISCUSSION

The first question we were interested in was whether the indicated depression prevention programs impacted adolescents' anxiety symptoms differentially. While adolescents in both IPT-AST and SC showed a significant reduction in total SCARED scores from baseline to post-intervention, the rates of change were significantly greater for those adolescents in IPT-

¹We also examined whether baseline anxiety moderated, rather than predicted, depression symptoms by including the interaction of baseline anxiety and intervention in our piecewise HLM model. The interaction term was not significant during the intervention phase ($F(1,92) = 0.05$, $p = 0.82$) or follow-up phase ($F(1,92) = 0.87$, $p = 0.36$).

AST. Specifically, at the end of the intervention, adolescents in IPT-AST had significantly fewer anxiety symptoms than SC adolescents. Compared to other research findings, the post-intervention effect sizes for anxiety symptoms were larger than those found for anxiety in past depression treatment studies (Chu & Harrison, 2007; Weisz et al., 2006). Given the frequent comorbidity of depressive and anxiety symptoms, it is very encouraging that IPT-AST effectively reduces both types of symptoms immediately following the intervention.

The current results are consistent with findings from cognitive-behavioral (CB) depression prevention programs that have also found effects on anxiety symptoms (Barrett et al., 2006; Gillham et al., 2006; Lock & Barrett, 2003; Lowry-Webster et al., 2001; Lowry-Webster et al., 2003; Roberts et al., 2003). The anxiety effect sizes from the current study are also higher than those reported in past depression prevention programs. This is not surprising given that some of the mentioned programs are universal prevention interventions and thus tend to have smaller effect sizes (Horowitz & Garber, 2006; Stice et al., 2009). What makes the current findings notable is that IPT-AST, which is adapted from interpersonal psychotherapy for depressed adolescents (IPT-A; Mufson et al., 2004), was specifically designed to target depression. Given that CB interventions for depression and anxiety contain similar elements, such as modifying maladaptive cognitions and addressing negative or avoidant responses to stress (Garber & Weersing, 2010; Weersing, Gonzalez, Campo, & Lucas, 2008), one might anticipate that CB depression prevention program would impact anxiety. IPT-AST, on the other hand, does not contain the active ingredients thought to be effective in treating anxiety, in particular exposure exercises. Nonetheless, the findings from this study suggest that it may be an effective prevention program for both depressive and anxiety symptoms. In particular, improved communication skills and interpersonal problem-solving may lead to reductions in anxiety, perhaps through increased social support. This conclusion is strengthened by findings from an IPT-A study which found that adolescents who showed an improvement in depression also tended to see an improvement in their anxiety symptoms (Young et al., 2006a).

Taken together, these two studies suggest that the effects of depression interventions on both depression and anxiety are not specific to CB programs. Recently, there has been a call for interventions that treat depression and anxiety within a unified treatment protocol (Barlow, Allen, & Choate, 2004). A few recent examples of these transdiagnostic interventions have emerged for adolescents (Chu, Colognori, Weissman, & Bannon, 2009; Ehrenreich, Goldstein, Wright, & Barlow, 2009; Weersing et al., 2008). Within the context of this literature, our findings suggest that IPT-AST may serve as a transdiagnostic preventive intervention for internalizing symptoms. IPT-AST, with its focus on improving communication, is well-suited to address interpersonal problems that are thought to contribute to depression and anxiety (Bosquet & Egeland, 2006; Festa & Ginsburg, 2011; Gazelle & Ladd, 2003; Kingery, Erdley, Marshall, Whitaker, & Reuter, 2010). In addition, IPT-AST targets other interpersonal risk factors of anxiety and depression, such as problematic parent-child relationships (McLeod, Weisz, & Wood, 2007; McLeod, Wood, & Weisz 2007) and insecure attachment (Bosquet & Egeland, 2006; Davila, Ramsay, Stroud, & Steinberg, 2005; Hankin, et al. 2005). Finally, IPT-AST focuses on improving social support, which may be a generalized protective factor for both depression and anxiety (Dozois, Seeds, & Collins, 2009).

When we examined the three anxiety subscales, we found that adolescents in IPT-AST showed significantly greater rates of change in panic/somatic symptoms and generalized anxiety symptoms during the course of the intervention. The findings for generalized anxiety symptoms replicate those found in studies of IPT-A (Young et al., 2006a) and suggest that interventions based on interpersonal psychotherapy may be particularly effective for adolescents with depression and generalized anxiety, whether it be elevated symptoms or

comorbid diagnoses. This is in line with the growing recognition that interpersonal difficulties play an important role in generalized anxiety disorder (Borkovec, Newman, Pincus, & Lytle, 2002), with interpersonal worries being one of the primary concerns reported by people with this diagnosis (Roemer, Molina, & Borkovec, 1997).

The findings for the panic/somatic subscale are more surprising and suggest that, despite the fact that IPT-AST does not focus on physical symptoms, adolescents experience change in this domain. One possible explanation may be that the sample utilized in the present study was predominately Latino. Past research has found that ethnic minorities may be more likely to express somatic symptoms when experiencing depressive symptoms compared to Anglo-American peers (Muñoz et al., 2005). Therefore, the reduction in physical symptom scores may be related to decreases in the adolescents' depressive symptoms. Of note, none of the adolescents in this sample met criteria for Panic Disorder. Future studies should investigate whether these findings would be replicated in a sample that meets criteria for Panic Disorder as opposed to panic symptoms.

Notably, change in rates of social anxiety symptoms did not differ by intervention condition. Adolescents in both conditions showed small reductions in social anxiety symptoms during the intervention, with continued reductions during the follow-up period. These findings suggest that IPT-AST, while effective at addressing anxiety more generally, is less effective at specifically targeting social anxiety symptoms. This is surprising from a theoretical standpoint, since much of IPT-AST is focused on improving interpersonal relationships, through improved communication and interpersonal problem-solving skills. Yet, these findings are consistent with an earlier study that found that adolescents with social anxiety experience poorer depression outcomes in both IPT-A and supportive therapy (Young et al., 2006a). Taken together, these findings suggest that social anxiety may be best targeted with a specific intervention that includes graded exposure to feared social situations, since exposure is an integral component of effective treatments for social anxiety (e.g., Beidel, Turner, & Morris, 1998; Kendall, Kane, Howard, & Siqueland, 1990; Masia et al., 1999; Spence, 1995).

Although the short-term effects of IPT-AST on depressive and anxiety symptoms are promising, the findings suggest that the effects of IPT-AST dissipate over time. SC adolescents continued to show improvements in anxiety and depressive symptoms during the follow-up period, whereas IPT-AST trajectories stabilized during this time. There are several possible explanations for this finding. First, the continued change in symptoms in the SC group may reflect regression to the mean. Second, it is possible that SC contains interventions that impact both depression and anxiety, but the effects of these interventions are delayed. A third explanation is that the intervention strategies taught in IPT-AST are effective, but more needs to be done to support adolescents' continued use of the interpersonal techniques to get longer term benefits for both depressive and anxiety symptoms. Future studies of IPT-AST should include booster sessions with the aim of enhancing the long-term effects of the program.

The second question we were interested in was whether baseline levels of anxiety were associated with greater depressive symptoms at baseline. Adolescents with comorbid anxiety symptoms did not endorse higher depressive symptoms at baseline. This differs from depression treatment studies (e.g., Rohde et al., 2001; Young et al., 2006a) which found that adolescents with comorbid anxiety and depression enter treatment with more severe depression. Our findings suggest that the same is not true for adolescents presenting with comorbid depressive and anxiety symptoms, rather than comorbid disorders. With regards to the question of whether baseline anxiety symptoms predicted change in depressive symptoms, a consistent picture emerged for the total anxiety score, the panic/somatic

symptoms subscale and the generalized anxiety subscale. Adolescents with lower levels of baseline anxiety showed significantly greater rates of change in depressive symptoms during the course of the preventive interventions than adolescents with higher levels of baseline anxiety. This finding is consistent with a growing body of research within the depression treatment literature that has found that adolescents with comorbid anxiety experience worse depression outcomes than adolescents without this comorbidity (Brent et al., 1998; Curry et al., 2006; Emslie et al., 2010; Young et al., 2006a).

However, a closer examination of the change trajectories for adolescents high and low in baseline anxiety reveals that the impact of anxiety symptoms is most apparent in the first several weeks of the interventions, with adolescents low in baseline anxiety experiencing an earlier and more substantial decrease in CES-D scores. By post-intervention, the two anxiety groups have similar levels of depressive symptoms. Thus, although there is an impact of comorbid anxiety on depressive symptoms, the effects are fairly moderate and short-lived. This finding is consistent with results from other prevention programs, in which anxiety did not interfere with the main goal of the depression prevention program (Pössel et al., 2008).

Interestingly, the pattern of reduction in depressive symptoms for adolescents with low and high anxiety changes over time. Adolescents with high baseline anxiety show a continued decrease in depressive symptoms during the follow-up period, whereas adolescents low in anxiety show stabilization of depressive symptoms. This suggests that baseline anxiety symptoms do not necessarily mean worse long-term depressive symptoms, but rather delayed intervention effects. A possible explanation for this delay may be that anxious adolescents are initially more hesitant to use the skills learned from the prevention programs. As a result, they do not experience the same immediate gains from the programs as less anxious adolescents. However, over time these anxious adolescents may gradually begin to implement more of the skills learned from the programs into their lives, and as a result, experience fewer depressive symptoms.

Our findings suggest that the effects of comorbid anxiety on depressive symptoms are moderate, particularly over time. The one exception to this may be adolescents with high panic/somatic symptoms. For these adolescents, the impact of high baseline anxiety may be more substantial. Adolescents with high panic/somatic symptoms experienced smaller reductions in depressive symptoms during the interventions and had significantly higher depression scores post-intervention and marginally higher depression scores at the 6-month follow-up than adolescents low in panic/somatic symptoms. This is despite the fact that adolescents' panic/somatic symptoms improved significantly (during the intervention for IPT-AST and during the follow-up for SC). If this finding is replicated in other prevention studies, we may need to monitor adolescents with comorbid depressive and panic/symptoms during the course of prevention programs and augment programs if the adolescents' depressive symptoms do not improve.

One main limitation of the current study results from our use of a self-report measure of anxiety. As others have noted (e.g., Garber & Weersing, 2010; Stark & Laurent, 2001), there may be substantial overlap in items assessed on depression and anxiety measures. As such, the reduction in anxiety symptoms demonstrated in the current study may reflect a change in negative affect more generally, rather than anxiety specifically. Future research should examine the effects of these programs on anxiety diagnoses, as well as symptoms. A second limitation is that a large number of adolescents with elevated depressive symptoms declined to participate in the two studies, resulting in a selected sample. It is possible that these results would not generalize to other adolescents with elevated symptoms. Third, in both studies, the majority of the adolescents were Hispanic. The inclusion of Hispanic adolescents is an asset of the study since most prevention studies have been with Caucasian

adolescents, and inner city Hispanic adolescents are an underserved population (Kataoka, Zhang, & Wells, 2002). However, it is unclear whether we would see the same anxiety effects in adolescents of other races and ethnicities. Fourth, the participants enrolled in this study were Catholic school students. These adolescents may differ from youth in public education and these differences may account for the depression and anxiety findings. Finally, given that SC involved individual counseling, it is unknown whether the specific benefits of IPT-AST on anxiety symptoms are attributable to general group processes or the specific IPT-AST techniques.

IMPLICATIONS FOR RESEARCH, POLICY, AND PRACTICE

The results from this study have several implications. First, the findings suggest that IPT-AST is effective at decreasing both depressive and anxiety symptoms in a sample of adolescents with elevated depression, although booster sessions may be needed to lengthen the effects of the program. Given the high rates of comorbidity between anxiety and depression and the fact that anxiety and depressive symptoms are both significant risk factors for the development of later depression, these results are very promising. Second, our findings point to the importance of assessing both anxiety and depression before implementing a depression prevention program and to examine both as outcomes. Third, for adolescents with depressive and anxiety symptoms, there may be slower but still significant rates of change in depressive symptoms following depression prevention programs. Future research is needed to confirm these findings in other studies of IPT-AST and in depression prevention programs more generally.

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Figure 1.
CONSORT flow diagram. (Figure appears in color online.)

Figure 2.
Plot of the mean total anxiety score profiles for the two intervention conditions.

Figure 3.
Plot of the mean total depression score profiles for the two intervention conditions.

Figure 4.
Plot of the mean total depression score profiles as a function of high versus low baseline total anxiety.

Table 1

SCARED and CES-D Means and Standard Deviations

	Anxiety		Panic		Generalized		Social		Depression	
	IPT-AST (N = 63)	SC (N = 35)	IPT-AST (N = 63)	SC (N = 35)	IPT-AST (N = 63)	SC (N = 35)	IPT-AST (N = 63)	SC (N = 35)	IPT-AST (N = 63)	SC (N = 35)
Baseline	22.26 (10.56)	24.62 (12.87)	4.03 (3.59)	4.84 (4.85)	6.96 (4.00)	7.26 (3.91)	5.83 (3.10)	5.83 (3.63)	25.51 (6.87)	26.57 (6.12)
Post-intervention	12.52 (8.38)	19.68 (12.97)	2.02 (2.41)	5.03 (4.88)	3.71 (3.31)	5.76 (4.31)	4.35 (2.87)	4.35 (3.56)	8.94 (6.13)	16.69 (9.10)
6-month follow-up	11.78 (7.65)	17.49 (12.03)	2.06 (2.19)	3.80 (4.33)	3.66 (3.55)	5.76 (4.41)	3.77 (2.85)	4.48 (3.35)	9.75 (7.04)	15.22 (9.76)
12-month follow-up	10.78 (7.77)	14.71 (10.79)	1.98 (2.55)	3.85 (4.24)	3.59 (2.74)	4.69 (3.89)	3.33 (2.74)	3.42 (2.58)	9.30 (7.82)	12.96 (8.95)

Note. Numerical values above are Means (Standard Deviation).

IPT-AST = Interpersonal Psychotherapy-Adolescent Skills Training; SC = School counseling. Anxiety = Total SCARED score; Panic = Panic/somatic subscale of the SCARED; Generalized = Generalized anxiety disorder subscale of the SCARED; Social = Social anxiety subscale of the SCARED; Depression = CES-D score.

Table 2

Estimated Slopes for Total Anxiety, Anxiety Subscales and Depression

	IPT-AST (N = 63)	SC (N = 35)	t	p value	Cohen's d (95% CI)
ACTIVE PHASE					
Anxiety	-3.26 (0.40)	-1.70 (0.54)	-2.34	.02	0.49 (0.24-0.82)
Panic	-0.22 (0.04)	0.02 (0.05)	-3.46	< .001	0.72 (0.47-1.05)
Generalized	-1.09 (0.14)	-0.45 (0.19)	-2.78	< .01	0.58 (0.33-0.91)
Social	-0.51 (0.12)	-0.48 (0.16)	-0.10	.92	0.02 (-0.23-0.35)
Depression	-5.41 (0.37)	-3.23 (0.49)	-3.53	< .001	0.74 (0.49-1.07)
FOLLOW-UP PHASE					
Anxiety	-0.14 (0.11)	-0.52 (0.16)	1.88	.06	0.39 (0.14-0.82)
Panic	-0.001 (0.01)	-0.04 (0.02)	1.72	.09	0.36 (0.11-0.69)
Generalized	-0.01 (0.04)	-0.13 (0.05)	1.76	.08	0.37 (0.12-0.70)
Social	-0.08 (0.03)	-0.10 (.05)	0.34	.73	0.07 (-0.18-0.40)
Depression	0.10 (.10)	-0.33 (.15)	2.38	.02	0.50 (0.25-0.83)

Note. Slopes are on-average change per month. Standard errors of the estimates are in parentheses. The panic/somatic subscale is a square-root transformation.

IPT-AST = Interpersonal Psychotherapy-Adolescent Skills Training; SC = School counseling; Anxiety = Total SCARED score; Panic = Panic/somatic subscale of the SCARED; Generalized = Generalized anxiety disorder subscale of the SCARED; Social = Social anxiety subscale of the SCARED; Depression = CES-D score.