COPING AS A MEDIATOR IN A PREVENTIVE INTERVENTION FOR CHILDREN AND ADOLESCENTS OF PARENTS WITH DEPRESSION

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CHAPTER I

INTRODUCTION

The development of evidence-based preventive interventions is slowly emerging with respect to the prevention of depression in children and adolescents. The Institute of Medicine (IOM) defined prevention as interventions conducted prior to the initial onset of a disorder in order to reduce the incidence of new cases (Munoz, Mrazek, & Haggerty, 1996). The definition of prevention research was recently expanded to also include pre-intervention risk research in basic processes (biological, psychological, and sociocultural risk factors) and research targeting the prevention of relapse or recurrence of a disorder (NIMH, 2001). The continued importance of prevention is further reflected in a current IOM project to update the status of evidence-based preventive interventions for mental disorders and substance abuse (IOM, 2008). As evidence for the effects of preventive interventions has accumulated, the focus has now begun to shift onto potential mediators of these effects.

Depression is a particularly important target for preventive interventions. Depression is a significant mental health problem that affects 1 in 6 adults and is associated with severe impairment, including loss of productivity at work and disruptions in interpersonal relationships (Kessler et al., 2005). Research examining depression in children and adolescents suggests that rates of depression increase significantly from childhood to adolescence (e.g., 3% of children 13 or younger reported an episode of depression, compared to 5.6% of adolescents by age 15, and 20% of adolescents by age

18; Hankin et al., 1998), and implicate late adolescence as the "peak time" of risk for experiencing the first occurrence or initial onset of depression. In particular, offspring of depressed parents have been shown to be three to four times more likely than offspring of non-depressed parents to experience an episode of MDD by the time they reach 25 years of age, implicating this population as one potential target for preventive interventions (e.g., Beardslee et al., 1993; Hammen et al., 1987).

Furthermore, the onset of depression in childhood or adolescence is associated with an increased risk for experiencing major depressive disorder in adulthood (Fombonne et al., 2001; Weissman et al., 1999). Experiencing depression early in life is also linked to increased risk for attempted suicide, and is associated with more functional impairment in work and social activities compared to individuals without a history of early-onset depression (Weissman et al.). Thus, the significant impairment and increased risk for a wide range of functioning and psychological problems suggests the need for interventions designed to prevent both initial onset and recurrence of depression in youth, and children of parents with a history of depression represent a particularly high risk group.

Translational research has begun to bridge the gap between research on risk and protective factors and the development of preventive interventions, with a growing body of evidence suggesting that depressive symptoms in children and adolescents can be prevented through psychosocial intervention (e.g., Horowitz & Garber, 2006). Programs to prevent depression in youth target a range of mechanisms to prevent symptoms, including components to enhance effective parenting skills, teacher-based curriculum programs, and components designed to teach adaptive coping skills to implement in

response to stress (e.g., Beardslee et al., 2003; Lamb et al., 1998). Recommendations in this area continue to emphasize the need to examine putative mediators of program effects on depression outcomes in children and adolescents (e.g., Horowitz & Garber, 2006). Mediation analyses are potentially significant in that they permit a greater understanding of how interventions work, in order to focus future prevention efforts toward enhancing these mechanisms (Sutton, 2007).

Of the wide range of mechanisms targeted in prevention programs, teaching effective coping strategies is one component often included within programs designed to prevent depression in youth (e.g., Clarke et al., 2001; Sandler et al. 2003). Research in the broader stress and coping field has found that children and adolescents' use of adaptive coping skills may account for a significant portion of the effects of stress on emotional and behavioral symptoms (e.g., Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). Consequently, coping has been implicated as a protective factor for many populations of children and adolescents, and has been targeted for prevention work. However, in spite of the fact that most interventions to prevent depression in children and adolescents target increasing coping skills, very little research in this area has evaluated the overall effectiveness of programs in increasing adaptive coping skills in children and adolescents at risk for depression. The current study evaluated whether changes in coping skills accounted for changes in depressive symptoms in children and adolescents of depressed parents who participated in a family cognitive behavioral preventive intervention.

Depression Prevention

A number of interventions have been tested as a means to address and reduce the incidence and prevalence of the significant mental health problem of depression in children and adolescents. Preventive interventions for children and adolescents at-risk for depression vary in terms of timing and characteristics of the target population (Horowitz & Garber, 2006; Weisz et al., 2005). Universal preventive interventions target all individuals in a community regardless of risk for psychopathology (e.g., school-based interventions for all children), whereas selective preventive interventions are aimed at individuals at high risk for psychopathology (e.g., children of depressed parents), and indicated preventive interventions are targeted at individuals with symptoms (e.g., children with elevated symptoms of depression) or signs (e.g., biological markers) indicative of future mental disorder (Munoz, Mrazek, & Haggerty, 1996). In addition, preventive interventions for a variety of populations of children and adolescents have varied with regard to inclusion of children alone, or inclusion of children and parents.

Several recent reviews of the literature have yielded promising results suggesting that depression can be prevented in youth through psychosocial intervention (Horowitz & Garber, 2006; Sutton, 2007). Specifically, one meta-analysis found weighted mean effect sizes of $d = .21$ and $d = .19$, for prevention programs targeting children (up to 14 years old) and adolescents (15 to 18 years old), respectively (Jane-Llopis et al., 2003). In a more recent meta-analysis, Horowitz and Garber (2006) evaluated outcome effects for 30 prevention programs specifically targeted at children and adolescents (up to age 20). Results indicated that at post-intervention, selective preventive interventions had a significantly higher weighted mean effect size (mean effect size $d = .30$) than universal

preventive interventions (mean effect size *d* = .12), although the effect for selective preventive interventions was marginal when the two prevention studies with college students included in the review were removed from the analyses. Furthermore, analyses examining intervention outcomes at follow-up time points (ranging from 2 month to 48 month follow-ups) revealed that both selective and indicated interventions (mean effect sizes were *d* = .34 and *d* = .31, respectively) had significantly larger effect sizes than universal preventive interventions (mean effect size *d* = .02), and this effect remained after the removal of the two interventions targeting college students (mean effect sizes at follow-up without college samples: Selective prevention programs *d* = .56, indicated prevention programs *d* = .25, and universal prevention programs *d* = .02). Thus, the results from the Horowitz and Garber review suggest that both selective and indicated prevention programs have demonstrated small to moderate effects in terms of decreasing symptoms of depression in children and adolescents and produced significantly larger effects than universal prevention programs.

Furthermore, effect sizes for selective interventions targeted at children and adolescents of depressed parents have typically been small to medium in magnitude. Specifically, Beardslee et al. (2007) reported an effect size of .32 for decreases in total internalizing scores for all children in their two intervention conditions (a clinician-facilitated intervention and a lecture-based intervention). This suggests a small effect for all children and adolescents to report fewer symptoms, regardless of intervention condition. In addition, in a preventive intervention study for children of depressed parents with elevated symptoms of depression, Clarke et al. found a significant decrease in reports of depressive symptoms in the intervention group relative to the control group,

with an effect that was medium in magnitude (d = .54).

Horowitz and Garber (2006) note that these effects can be more accurately termed a treatment effect than a prevention effect, since most studies reviewed showed decreases in depressive symptoms in intervention groups (treatment effect) rather than increases in depressive symptoms in control groups (prevention effect). Further, recommendations from the findings of this meta-analysis and other reviews included measuring changes in potential mediators (e.g., coping) and testing whether changes in the mediator account for the effects of the program in order to better understand effects of the program (Horowitz & Garber; Sutton, 2007). In order to advance research in this area, this study focused on evaluating the effects of children and adolescents' coping behaviors as a mediator of the association between a family cognitive-behavioral preventive intervention and children and adolescents' depressive symptoms.

Child and Adolescent Coping

A broad literature examines children and adolescent's coping responses, but research in this area is limited by confusion and inconsistency in the conceptualization and measurement of coping (Compas, in press; Compas et al., 2001; Skinner & Zimmer-Gembeck, 2007, in press). In particular, models of coping differ in terms of the definition used and the organization and structure of coping.

Conceptualization of Coping

An overarching definition of coping is important to clarify the specific cognitions and behaviors that fall within the confines of this construct, and subsequently to inform

the model and factor structure within which this construct is conceptualized and measured. At the broadest level, some researchers have defined coping as all responses to stress, regardless of the degree of control the individual has over their responses (e.g., Skinner, 1995). Other definitions of coping have included only those behaviors under conscious, volitional control (e.g., Compas et al., 2001). In their seminal work on stress and coping, Lazarus and Folkman (1984) define coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p.141). In this way, they define coping as those behaviors purposefully enacted in response to person-environment interactions that are appraised by the individual as threatening in some way. In contrast, Skinner and Wellborn (1994) include all responses to stress within their conceptualization, and consequently define coping as "how people regulate their behavior, emotion, and orientation under conditions of psychological stress" (p. 112).

Inconsistencies in proposed definitions of coping are further compounded by differences in the organization and structure of coping. In a comprehensive review, Skinner et al. (2003) suggested that models of coping differ on whether they conceptualize coping based on the function of coping (e.g., problem-focused vs. emotion-focused), based on features that describe ways of coping (e.g., active, passive, approach, avoidance), or based on type of action (e.g., primary vs. secondary control).

Lazarus and Folkman's (1984) model of emotion-focused coping (i.e., changing something about one's emotions) and problem-focused coping (i.e., changing an aspect of the stressful situation) is conceptualized based on the function or focus of the coping efforts. This two-dimensional model of coping has been widely used in research

examining children and adolescents' coping behaviors (e.g., Compas, Worsham et al., 1996; Hart, 1991); However, the emotion-focused and problem-focused distinction has been widely criticized, particularly because some coping attempts can fall into both categories of coping (Compas, Connor-Smith et al., 2001; Skinner et al., 2003). For instance, one may both regulate emotions and engage in problem-solving behaviors as a result of walking away from conflict with a peer (Compas, Connor-Smith et al.). Thus these categories are not mutually exclusive and provide relatively little information about helpful ways of coping (Skinner et al.).

Another common broad-dimension category distinguishes between responses that are oriented toward or away from the threat or one's emotions and thoughts (e.g., Compas et al., 2001; Ebata & Moos, 1991). Models of coping that utilize this distinction have been commonly referred to as approach vs. avoidance coping or engagement vs. disengagement coping. Specifically, engagement or approach coping behaviors refer to strategies that bring the individual closer to the source of threat, and include such techniques as cognitive reappraisal of the problem and dealing with the problem directly. On the other hand, disengagement or avoidance strategies allow the individual to escape from the threat, and include denial, minimization of the threat, and behavioral attempts to avoid the threat (Ebata & Moos). A significant limitation of this approach is the heterogeneous sets of coping responses included within the two broad categories proposed.

Coping has also been conceptualized in terms of the type of action (e.g., efforts to control or change the situation, control or change one's emotions, or adapt to the circumstances of the situation) used when faced with a specific stressor as reflected in the

categories of primary control vs. secondary control and assimilative vs. accommodative coping. Assimilative coping is defined as strategies wherein the individual changes the stressful situation to fit their goals and desires, whereas accommodative coping refers to adjusting one's goals and desires to fit within the confines of the situation (Walker et al., 1997). Similar to assimilative and accommodative coping, primary and secondary control coping distinguish between attempts to do something to act on the stressful event or change one's emotions (primary control coping) and attempts to adjust one's fit to the stressful condition (secondary control coping). Weisz and colleagues were the first to introduce the distinction between primary and secondary control coping in their model of coping responses (e.g., Rudolph et al., 1995), and Compas and colleagues recently built on this foundation by proposing a model that also emphasizes the distinction between primary and secondary control coping (Connor-Smith et al., 2000). However, it is noteworthy that the primary vs. secondary distinction utilized in Compas et al.'s model is embedded within a broader categorization of engagement vs. disengagement coping.

Dual Process Model of Coping

The current study was based on a dual-process model of coping that distinguishes between two dimensions of responses to stress (Compas et al., 2001). First, responses to stress can be either automatic, involuntary responses to stress (e.g., physiological arousal, intrusive thoughts) or controlled, volitional coping responses (i.e., conscious attempts to regulate emotion, behavior, thoughts, or physiology). Both involuntary and voluntary processes are further divided into engagement coping responses (i.e., orienting toward the source of stress or one's related thoughts and emotions) and disengagement responses

(i.e., orienting away from the source of stress). In this model, coping responses are specifically divided into three factors: Primary control coping, secondary control coping, and disengagement coping. Primary control coping is an individual's attempt to directly change the stressful situation, and includes such techniques as problem solving, emotional expression, and emotional regulation. Secondary control coping involves an individual's attempts to adapt to a stressful situation through cognitive restructuring, positive thinking, acceptance, and distraction. On the other hand, disengagement coping includes techniques such as wishful thinking, avoidance, and denial, which are all attempts to distance oneself from the stressor. Confirmatory factor analytic studies have supported this three factor model of coping responses in samples of adolescents and adults from several different cultural backgrounds coping with a wide variety of stressors (e.g., Compas et al., 2006a, 2006b; Connor-Smith et al., 2000; Connor-Smith & Calvete, 2004; Wadsworth et al., 2004).

Coping in Children and Adolescents at Risk for Depression: Implications for Preventive Interventions

Basic research on risk and protective factors serves as the empirical foundation for the development of interventions to prevent depression by teaching coping skills. In a series of reviews, Grant and colleagues have shown that acute and chronic stress is associated with externalizing and internalizing symptoms, including depression, in children and adolescents (e.g., Grant et al., 2003, 2004, 2006; McMahon, Grant et al., 2003). Furthermore, how children cope with the effects of exposure to significant sources of stress which place them at increased risk for depression (e.g., children coping with the stress of parental divorce, children coping with the stress associated with a

depressed parent) has been shown to be related to depressive symptoms (see Compas, Jaser, & Benson, in press).

Within the context of the broad literature of stress and coping, several studies in particular have examined coping responses in children and adolescents faced with the stress of parental depression (e.g., Jaser et al., 2005, 2007, in press; Langrock et al., 2002). The earliest research examined children's descriptions of their coping behavior in a sample of children whose families were characterized by a high degree of stress in addition to both parents suffering from psychopathology (mothers were classified as severely depressed; fathers diagnosed with either depression, anxiety, or substance abuse; Radke-Yarrow & Brown, 1993). Results indicated no differences in coping behavior between children classified as resilient and as vulnerable. However, this study was exploratory in nature and was limited by problems in the conceptualization and measurement of children's coping.

Klimes-Dougan, and Bolger (1998) examined children's coping responses to maternal negative affect in children whose parents had depression or bipolar disorder compared to children of well parents. Coping was operationalized in this study in terms of Lazarus and Folkman's (1984) model, which emphasizes a distinction between emotion-focused coping and problem-focused coping. Results yielded few differences between general coping patterns of children of depressed and well parents; rather, all children (regardless of risk status as defined by parental illness) tended to use problem-focused and support-seeking strategies more than other strategies. Klimes-Dougan and Bolger therefore concluded that parental depression in general, as opposed to children's coping behaviors relative to parental depression, may be a more important predictor of

children's subsequent psychological well-being.

Recently, research has examined children's stress responses specific to coping with stressors related to parental depression, and the association of coping with children's internalizing and externalizing symptoms (Jaser et al., 2005, 2007, in press; Langrock et al., 2002). Stress associated with parental depression was quantified in terms of intrusive (e.g., My mom is upset, tense, grouchy, angry, and easily frustrated) and withdrawn (e.g., I wish my mom would spend more time with me) behavior patterns of parents with a history of depression, and these studies were based on the empirically supported, dual-process model of coping described above (Compas et al., 2001; Connor-Smith et al., 2000). Results from these studies indicated a consistent association between children's coping responses and their concurrent level of anxious/depressed and aggressive symptoms (Jaser et al.; Langrock et al.). Specifically, secondary control coping (attempts to adapt to a stressful situation through acceptance, distraction, cognitive restructuring, activities) was significantly negatively correlated with adolescent anxious/depressed symptoms, such that greater use of this form of coping was associated with fewer symptoms of psychopathology (Jaser et al.). In parent reports of adolescents' coping and behavior symptoms, primary control coping (attempts to directly change the stressful situation, through use of such techniques as problem solving, emotional expression, and emotional regulation) was also modestly negatively related to anxious/depressed symptoms, but not as strongly as secondary control engagement coping (Langrock et al.). Furthermore, adolescent reports of both their secondary control coping strategies and levels of stress reactivity (e.g., emotional and physiological arousal) accounted for a portion of the relationship between adolescents' reports of parental intrusiveness and

parents' reports of anxious/depressed symptoms in children (Jaser et al.). These cross-informant findings provide strong support for the role of children's coping and stress responses as factors which can account for the effects of parental stress related to depression on children's internalizing symptoms, and specifically implicate secondary control coping strategies as a potentially beneficial form of coping for this population of children.

Implications of stressor controllability. Children and adolescents' coping behavior may serve as a protective factor for many populations of children at risk for depression, but research in this area suggests that the *controllability* of the stressful situation has an impact on the effects of coping strategies children and adolescents use. For instance, research has shown that secondary control coping strategies are more beneficial when children are faced with *uncontrollable* sources of stress, such as homesickness or the types of stress associated with parental depression (e.g., Jaser et al., 2005; Thurber & Weisz, 1997). Still other research has found that adolescents who used active coping strategies when faced with interpersonal stress that was *uncontrollable* displayed more symptoms than children who used active coping in response to *controllable* interpersonal stressors (Clarke, 2006).

In addition, a recent study compared the effect of adolescents' use of coping strategies on symptoms across two different stressful situations (family stress and peer stress) (Jaser et al., 2007). Results from this study demonstrated that greater use of secondary control coping predicted fewer symptoms of anxiety/depression in adolescents regardless of type of stress (family stress or peer stress). In contrast, a differential effect for adolescents' use of primary control coping across stressors was found, such that

greater use of this form of coping predicted fewer symptoms of anxiety/depression in response to peer stress, but predicted more symptoms of anxiety/depression when enacted in response to family stress (Jaser et al.). Thus, different coping strategies were demonstrated to be effective when adolescents' were faced with different types of stress, one that may be considered relatively controllable (peer stress) and one that may be considered relatively uncontrollable (family stress), providing further evidence that different coping strategies are adaptive in different contexts. Research therefore suggests that adaptive coping responses appear to vary with type of stressor, but evidence supports the notion that secondary control coping skills are important for children and adolescents dealing with family stress, in particular the sources of stress associated with parental depression.

Summary

Taken together, research in this area indicates that coping is an important factor to target in preventive interventions for depression. Generally, findings from research examining the effects of various types of coping strategies for children faced with uncontrollable sources of stress, such as parental depression, suggest that secondary control coping is a potentially beneficial form of coping (e.g., Jaser et al., 2005). Empirical evidence further suggests that children who have the ability to select and match coping strategies based on the controllability of the stressor may benefit more from learning new coping skills. Therefore, a strong empirical foundation exists to inform preventive interventions that teach children and adolescents adaptive coping skills to implement when faced with significant stress.

Coping as a Component of Previous Depression Prevention Programs

I now review published studies of the prevention of depression in children and adolescents. Studies were included for review if a targeted aim was preventing depression in children/adolescents and if a component of the intervention directly involved teaching coping skills to children/adolescents. Consequently, preventive interventions that targeted parents only were not included. Studies were evaluated based on the degree to which they conceptualized coping as including responses that involve purposeful attempts to regulate emotion, behavior, cognition, or physiology in response to stress. Therefore, all studies that defined coping in this way were included in this review, regardless of whether the researchers used the term "coping" to explicitly describe the components of their intervention. Dissertations were not included because they have not been subjected to peer-review. In addition, because adolescents between the ages of 15 and 18 years old are at greatest risk for experiencing the first occurrence or initial onset of depression (Hankin et al., 1998), prevention programs targeting college students or older were not included. Finally, it's noteworthy that coping may be related to other behavioral and cognitive processes, such as attributional or explanatory style, automatic thoughts, and other broad ways that children and adolescents respond to stress. However, the focus of this study was specific to coping skills, and the following review pertains explicitly to coping and does not include related constructs.

Teaching Coping Skills in Interventions to Prevent Depression

As previously stated, many interventions to prevent depression in children and adolescents teach coping skills. Because there has been inconsistency with regard to the

conceptualizations and models of coping used across studies evaluating prevention programs, it is important to examine the specific coping skills taught to children and adolescents. In particular, prevention programs have differed in terms of their inclusion of problem-solving skills, social support-seeking skills, distraction, cognitive restructuring skills, and other types of coping skills.

Problem-Solving skills. Problem solving coping skills typically include strategies such as planning and thinking about the problem, as well as direct actions to change the problem. Specifically, 26 of the 33 studies evaluating the prevention of depression included a component targeted at increasing adolescents' problem-solving skills when faced with stress (Butler et al. 1980; studies 1 and 2 from Cardemil et al. 2002; Gillham et al. 1995; 2006a; 2006b; 2007; Gwynn & Brantley, 1987; Hains & Ellmann, 1994; Hannan et al. 2000; Horowitz et al. 2007; Jaycox et al. 1994; Lamb et al. 1998; Merry et al. 2004; Pattison & Lynd-Stevenson, 2001; Puskar et al. 2003; Riley et al., 2008; Roberts et al. 2003; Roosa et al. 1989; Sandler et al. 1992; Sandler et al. 2003; Shochet et al. 2001; Spence et al., 2003; Wolchik et al. 2000; Yu & Seligman, 2002; Zubernis et al. 1999). For instance, the Family Bereavement Program (Sandler et al., 2003) targets improving children and adolescents' use of effective problem solving skills by teaching them fours steps of effective problem solving: Stop, Think, Brainstorm, and Choose. Similarly, the Penn Resiliency Program also teaches problem-solving skills by having children and adolescents identify goals, generate alternative solutions, implement the chosen solution, and then evaluate the efficacy of the solution chosen (Gillham et al. 2006a). In the Problem Solving for Life Program adolescents are taught how to approach a difficult problem in a more positive manner, in addition to more basic problem solving

skills (Spence et al.). This approach focuses on utilizing cognitive restructuring techniques to create a more positive approach to problem solving, therefore linking both cognitive and problem-solving skills. Still other programs teach children and adolescents a problem-solving approach by teaching them to generate multiple potential solutions when faced with a stressor (e.g., Butler et al., 1980).

Seeking Social Support/ Interpersonal Skills Training. Some programs attempted to improve adolescents' ability to obtain support and guidance from others when confronted with a stressor. In particular, 7 studies included a component designed either to specifically enhance adolescents' social-support seeking skills, or teach interpersonal skills which may be considered coping when enacted in response to stress (Horowitz et al. 2007; Jaycox et al. 1994; Pössel et al. 2004; Puskar et al. 1997; Roosa et al. 1989; Shochet et al. 2001; Young et al. 2006). For example, one program emphasized specific ways adolescents could seek out and utilize social support when faced with uncontrollable stress such as parental drinking or interparental conflict (e.g., Roosa et al. 1989).

On the other hand, some prevention programs include specific skills to teach adolescents strategies to improve interpersonal relationships and social networks (e.g., Horowitz et al., 2007; Young et al., 2006). This type of training results in improved coping strategies when adolescents utilize more support-seeking coping strategies in response to stress as a consequence of the intervention training. In particular, one intervention tested by Horowitz et al. included a three-phase interpersonal skill-building component. Adolescents were educated on the ways interpersonal relationships affect their mood, were taught strategies to improve their interpersonal relationships (which

included practice applying these skills), and were helped to organize, plan for the future, and recognize how this skill-set can generalize. These skills may be generalized in ways that implicates coping in that they may help adolescents learn ways to seek support in response to a stressor. Furthermore, another intervention provided social competence training, defined as enhancing adolescents' ways to create, improve, and maintain social contacts and networks (Pössel et al., 2004). Again, by developing a larger and more accessible group of social contacts, adolescents gain a bigger network from which to seek support when needed.

Using Pleasant Activities and Distraction as Coping Strategies. Distraction coping strategies include techniques to give oneself a break from the stressful situation. They sometimes involve engagement in pleasant activities, and thus these two coping skills as a part of preventive interventions were examined together. In contrast to the large number of interventions that focus on improving problem-solving skills, cognitive restructuring, and to a lesser extent social support-seeking skills, only five preventive interventions report teaching distraction or engagement in pleasant activities to children and adolescents (Clarke et al. 1993; Jaycox et al. 1994; Pattison & Lynd-Stevenson, 2001; Roberts et al. 2003; Zubernis et al. 1999). In particular, several studies evaluating the Penn Prevention Program mentioned teaching distraction skills to children and adolescents dealing with family conflict and other stressors (Jaycox et al., Pattison & Lynd-Stevenson, Roberts et al., Zubernis et al.). In addition, early work by Clarke et al. (1993) focused on behavioral skills training by increasing the frequency with which children and adolescents engaged in pleasant activities. It is important to note that the work by Clarke et al. focused on increasing the number of fun activities in adolescents'

daily lives, but did not emphasize using these strategies when faced with stress, which would be considered a form of distraction.

Cognitive Restructuring. The majority of interventions to prevent depression in children and adolescents included cognitive skills training, typically referred to as cognitive restructuring, cognitive reframing, cognitive reappraisal, or positive cognitive restructuring (identifying and challenging negative thoughts was also included, as this is coping when enacted in response to stress). Specifically, 26 of the 33 original studies (excluding follow-up studies that evaluated the same program) included a cognitive component (Butler et al. 1980; studies 1 and 2 from Cardemil et al. 2002; Clarke et al. 1995; 2001; Gillham et al. 1995; 2006a; 2006b; 2007; Hains & Ellman, 1994; Hannan et al. 2000; Horowitze et al. 2007; Jaycox et al. 1994; Merry et al., 2004; Pattison & Lynd-Stevenson, 2001; Pössel et al. 2004; Puskar et al., 2003; Quayle et al. 2001; Roberts et al. 2003; Riley et al. 2008; Sandler et al. 2003; Shochet et al., 2001; Spence et al. 2003; Wolchik et al. 2000; Yu & Seligman, 2002; Zubernis et al. 1999). Interventions which targeted improving children and adolescents' cognitive restructuring skills typically first educated children and adolescents regarding the link between their thoughts, feelings, and behaviors. Adolescents were then taught to identify their automatic thoughts, and challenge any thoughts they had which were irrational or negative (e.g., examine the evidence that their thought or belief was actually true) in order to replace them with more realistic or positive thoughts. For example, in Clarke et al.'s (1995, 2001) Coping with Stress Course, adolescents were taught cognitive restructuring skills through the C-A-B technique: Recognize the Consequence, identify the Activating event that triggered the consequence, and identify the Beliefs that link the activating event and the consequence.

Adolescents were then taught to challenge these negative or irrational beliefs and to create a positive counter-thought in these situations.

Additional Coping Skills Taught. Several intervention programs reference additional components to improve other types of coping skills. Specifically, 10 interventions included a component teaching relaxation or self-calming techniques (Gillham et al. 1995; Hains & Ellman, 1994; Jaycox et al., 1994; Merry et al., 2004; Pattison & Lynd-Stevenson, 2001; Puskar et al., 2003; Roberts et al. 2003; Shochet et al., 2001; Wolchik et al. 2000; Zubernis et al. 1999). For example, Hains and Ellman taught children and adolescents to implement any of a range of relaxation techniques (e.g., progressive muscle relaxation) in response to heightened arousal due to stressful situations. Furthermore, 9 preventive interventions included a component of assertiveness training in their intervention (Gillham et al. 1995; 2006a; 2006b; Hannan et al. 2000; Pössel et al., 2004; Puskar et al. 2003; Quayle et al. 2001; Yu & Seligman, 2002; Zubernis et al. 1999), and three interventions reported teaching negotiation skills in addition to assertiveness skills (Hannan et al.; Quayle et al.; Zubernis et al.). For instance, the Penn Resiliency Program focused on asserting oneself in response to conflict, and a specific multistep approach to this skill was taught (e.g., Gillham et al., 2006a). Again, when these strategies are used as a means of dealing with stress, they are considered coping strategies.

Measurement of Coping in Prevention of Depression Trials. In spite of the availability of measures of coping that are sufficiently reliable and well-validated to measure changes in coping in the context of prevention trials and the emphasis in many of these programs on improving children and adolescents' coping skills, relatively few

studies examining prevention programs have included a measure of coping in their assessment battery. Specifically, only 9 of 33 studies reviewed, which targeted improving children and adolescents' coping skills, actually included a measure of coping. Furthermore, a diverse set of coping questionnaires were utilized across those interventions which did include a measure of coping, leading to further confusion and inconsistency. Measures have also varied in terms of their specificity, ranging from a focus on one specific type of coping (e.g, The Social-Problem-Solving Inventory; D'Zurilla & Maydeu-Olivares, 1995) to a wide range of possible coping behaviors (e.g., The Coping Response Inventory-Youth Form; Moos, 1993). The inconsistency in measurement across studies examining coping as part of a preventive intervention therefore underscores the importance of future research utilizing measures that are specific to the coping skills being taught in the intervention, in order to accurately evaluate the effects of the program.

Evidence for Changes in Coping in Preventive Interventions

The limited number of depression prevention studies that included a measure of coping consequently restricted the number of studies that were able to examine whether children and adolescents' use of targeted coping strategies changed from pre-intervention to post-intervention and follow-up. Despite these methodological limitations, a growing body of literature provides evidence that children and adolescents are learning and using different coping strategies as a result of preventive intervention programs. In particular, of the 33 studies of preventive interventions for depression (excluding papers providing follow-up analyses of the same intervention), only nine studies assessed coping with a

measure designed to explicitly measure this construct. Eight of these nine studies found evidence for changes in coping in their intervention group from pre-intervention to post-intervention and/or follow-up time points (Horowitz et al., 2007; Lamb et al., 1998; Pössel et al., 2004; Puskar et al., 2003; Roosa et al., 1989; Sandler et al., 2003; Spence et al., 2003; Wolchik et al., 2000). These studies are now reviewed with regard to the types of coping that were assessed.

Evidence for changes in problem-solving skills. Outcome analyses from three preventive intervention studies (Puskar et al., 2003; Roosa et al., 1989; Spence et al., 2003) have provided evidence for improvements in adolescents' problem solving skills, which is a type of primary control coping. For instance, one preventive intervention (Spence et al., 2003) demonstrated changes in coping out to one year post-intervention such that adolescents in an intervention group classified as high risk (i.e., a BDI score of 13 or higher, suicidal ideation, or endorsement of certain questions on a measure assessing dysthymia) displayed greater changes in problem-solving scores than a control group. Spence et al. found reductions in negative problem-solving orientation (i.e., pessimistic beliefs regarding one's ability to solve problems, and tendency to become upset when faced with problems) and avoidant problem solving strategies (i.e., procrastination, passivity, inaction, or dependency). Similarly, adolescents in the low-risk group (i.e., BDI score was less than 13) for this same intervention also showed more improvement (seen through less use of negative problem orientation, impulsive problem-solving strategies, and avoidant problem solving strategies) in problem-solving skills than the control condition (Spence et al.). Further, at 12 month follow-up, the high risk adolescent intervention group still showed greater decreases in their use of negative

problem solving and avoidant problem solving compared to the control group (Spence et al.). In contrast, the low risk intervention and control adolescent group both showed declines in problem-solving scores at 12 month follow-up. However, long-term outcome analyses (conducted at 2 year, 3 year, and 4 year follow-up time points) indicated that the short-term changes in coping for the high-risk group were not sustained beyond the 12 month follow-up (Spence et al. 2005).

Outcome analyses from an indicated preventive intervention showed that adolescents in the intervention condition displayed better scores on problem-solving than adolescents in the control condition (Puskar et al. 2003). In addition, further evidence for the ability to change problem-solving skills in interventions was reported in a study using a selected sample of children of alcoholic parents (Roosa, 1989). Compared to the control condition, children in the intervention group demonstrated greater change in problem-focused coping strategies (e.g., identify the problem, generate alternatives) at post-intervention (follow-up analyses were not reported) (Roosa et al.). Thus, three different studies demonstrated good evidence that psychosocial intervention does promote changes in children and adolescents' use of problem-solving coping skills.

Evidence for changes in support-seeking coping. There is evidence from four studies demonstrating significant changes in children and adolescents' use of support-seeking coping strategies as a result of preventive interventions (Lamb et al., 1998; Puskar et al., 2003; Roosa et al., 1989; Wolchik et al., 2000). In particular, one indicated preventive intervention showed that adolescents in an intervention group reported significantly greater use of seeking guidance and support at post-intervention and at 12 month follow-up compared to adolescents in a control condition (Puskar et al. 2003).

Similarly, another indicated prevention program (Lamb et al., 1998) showed increases in adolescents' supportant coping (i.e., adolescents' use of personal, professional, or spiritual support systems). A preventive intervention for children of divorce (Wolchik et al., 2000) found evidence at post-intervention for increased use of support coping based on answers to open-ended questions pertaining to coping with divorce-related stress, but found no evidence for changes in coping behaviors measured by a well-validated coping measure (Children's Coping Strategies Checklist; Ayers et al., 1996). In addition, a study using a selected sample of children of alcoholic parents found a trend that suggested that children in an intervention group showed greater change in support seeking behavior (Roosa, et al., 1989). Thus, several studies examining preventive interventions for children and adolescents provide evidence for improvement in adolescents' use of support-seeking coping strategies at post-intervention relative to control groups.

Furthermore, one universal intervention examined characteristics of adolescents' social support networks in general, rather than their reports of seeking support in response to stress (Pössel et al., 2004). Increases in social support in general could indicate the availability of more resources when faced with stress. At post-intervention, Pössel et al. found no effect for social support. In contrast, at 3-month follow-up, results indicated that adolescents in the intervention group had significantly larger network sizes. Furthermore, at 3-month follow-up adolescents who were high in self-efficacy (i.e., based on a median split of scores from a measure of general self-efficacy) increased the frequency of use of their social networks. This study provides more evidence to suggest that children and adolescents' size and use of their social networks can be changed through intervention. Changes in specific aspects of adolescents' social networks may

indirectly affect adolescents' coping skills in this area by increasing the resources and support they have available to them when they are faced with stress.

Evidence for changes in avoidant coping. Avoidant coping typically encompasses the use of strategies such as cognitive avoidance and behavioral avoidance or avoidant actions. Although none of the interventions reviewed reported teaching adolescents to use less avoidant coping strategies, by increasing their use of cognitive restructuring skills, effective problem-solving skills, and support-seeking strategies, it is plausible that this may result in a subsequent decrease in the use of avoidant coping strategies. Three depression prevention studies measured and provide evidence for changes in children and adolescents' use of avoidant coping strategies at post-intervention (Lamb et al., 1998; Puskar et al., 2003; Wolchik et al., 2000). In particular, adolescents in one study with elevated depressive symptoms who received an intervention plus an additional booster session reported a greater decline in their use of cognitive avoidance coping strategies compared to adolescents who received the intervention but not the additional booster session, and adolescents in the control condition (Puskar et al.). Another indicated preventive intervention found a trend approaching significance for adolescents in the intervention condition to use less avoidance coping at post-intervention relative to a control group (Lamb et al.). Finally, a prevention program targeting children of divorce found evidence at post-intervention for decreased use of avoidant coping for children in the intervention condition (Wolchik et al.). Thus, these three prevention studies provide evidence that children and adolescents are reporting less avoidant coping strategies at post-intervention.

Evidence for changes in emotional expression/emotion-focused coping strategies.

Four prevention studies examined emotional expression in outcome analyses with mixed results for producing changes in this form of coping (Horowitz et al., 2007; Lamb et al., 1998; Roosa et al., 1989; Sandler et al., 2003). Results from an indicated preventive intervention showed that adolescents in the intervention group tended to report less use of emotive coping (i.e., emotional expression, letting out anger, or engaging in impulsive, risky behaviors) at post-intervention compared to controls, but this was not a statistically significant difference (Lamb et al., 1998). In analyses of a high-risk subgroup (those who scored in the top 25th percentile on a composite variable of scores on the CDI and CESD measures), Horowitz et al. found no effects for changes in coping at post-intervention, but at follow-up the high-risk subgroup in the interpersonal psychotherapy adolescent skills training (IPT-AST) condition engaged in less emotions-based coping than adolescents in the cognitive behavioral intervention condition or control condition. Furthermore, in addition to the changes in problem-focused coping reported earlier, a selective prevention program for children of alcoholics also showed that children in the intervention group displayed significantly improved use of emotion-focused coping strategies (e.g., play a game, listen to music; Roosa et al.). Furthermore, in a selective intervention for children who have lost a parent, Sandler et al. found a trend at 11-month follow-up with children and adolescents in the intervention condition showing greater improvements on a measure assessing inhibition of emotional expression than children and adolescents in the comparison condition.

Evidence for changes in active coping. Active coping is a category which is often defined in different ways. Typically, active coping encompasses cognitive decision making, direct problem solving, seeking understanding, and cognitive restructuring. This

category therefore combines both the cognitive and problem-solving skills often targeted for change in preventive interventions. It is therefore difficult to discern whether changes in active coping are due to changes in cognitive restructuring, problem solving, or both. Consequently, evidence for changes in active coping (as a complete construct) are examined independent of changes in cognitive restructuring and problem solving skills.

Three depression prevention studies examined coping outcomes in terms of active coping (Horowitz et al., 2007; Sandler et al., 2003; Wolchik et al. 2000). One prevention study compared two active interventions (a cognitive-behavioral intervention and an interpersonal psychotherapy skills training) to a control condition (Horowitz et al.). Results indicated that at post-intervention there was no change in coping, but at six month follow-up the group which had received a cognitive behavioral intervention showed a trend for higher levels of active coping. Furthermore, at follow up, a high-risk subgroup (those who scored in the top 25th percentile on a composite variable of scores on the CDI and CESD measures) followed a similar pattern, such that there were no effects for coping at post-intervention, but at follow-up this high-risk subgroup in the interpersonal psychotherapy skills training condition engaged in significantly less active coping than adolescents in the cognitive behavioral intervention condition or control condition (Horowitz et al.). Interestingly, the latter finding is counter-intuitive, in that adolescents who received the cognitive behavioral skills training and the no-training controls both had scores on these variables that were higher than the adolescents in the interpersonal skills training group. Thus, this does not suggest that there was evidence for changes in coping in the cognitive behavioral group specific to the intervention, since the control condition did not differ from this group on their reports of these skills.

Therefore, evidence for changes in coping from this study is mixed.

A prevention program targeting children of divorce found evidence at post-intervention for increased use of active coping for children in the intervention condition (based on open-ended questions about coping with divorce; Wolchik et al., 2000). However, at 6 month follow-up for this intervention, children whose mothers were in the mother-only condition (so the children themselves were not taught skills) showed greater changes in active coping (Wolchik et al.). Thus, similar to the intervention implemented by Horowitz et al., this intervention has also demonstrated some counter-intuitive findings and therefore provides mixed support for interventions producing changes in children and adolescents' use of active coping skills.

In another selective intervention program (targeting parentally bereaved children) Sandler et al. (2003) combined the active subscale of the Children's Coping Strategies Checklist (Ayers et al., 1996) and a seven item questionnaire on coping efficacy (Sandler et al., 2000) to create a measure of positive coping. Results at post-intervention indicated greater change in positive coping in children and adolescents in the intervention condition compared to those in a comparison (self-study) condition (Sandler et al., 2003). However, this effect was not found at 11 month follow-up, and due to the composition of the coping scale used in their work, it is difficult to ascertain to what extent changes on this variable are a reflection of improvements in children and adolescents' cognitive restructuring and/or problem-solving coping skills, as opposed to changes in their beliefs about their abilities to cope (coping efficacy). Consequently, evidence for the ability of interventions to successfully enhance children and adolescents' use of active coping skills is inconsistent.

Evidence for changes in cognitive restructuring. Although cognitive restructuring (or a variant of this skill-set) is the most common coping skill included across various prevention programs, relatively few studies have measured changes in cognitive restructuring as a function of preventive interventions. For instance, many studies do not measure or do not report measuring changes in this skill-set (e.g., Gillham et al., 2006b), or do not make a clear enough distinction between a measure of this skill-set and other types of coping skills (e.g., outcome analyses examining active coping captures cognitive restructuring combined with a range of other skills; Sandler et al., 2003) and is consequently not a pure measure of cognitive restructuring. The exclusion of a measure assessing for changes in this skill is a significant limitation of programs which target improving any variant of cognitive restructuring skills in children and adolescents. It is noteworthy that several studies have included a measure of attributional style or automatic thoughts, with mixed results (e.g., Jaycox et al., 1994; Roberts et al., 2003).

Summary

In summary, although over half of the prevention studies reviewed for this paper did not include a measure of coping, those that do include such a measure provide evidence for the ability of psychosocial interventions to change how children and adolescents cope with stress. In particular, results from three studies examining preventive interventions provide evidence that children and adolescents report improvements on measures assessing problem-solving coping skills (Puskar et al., 2003; Roosa et al., 1989; Spence et al., 2003). Outcome analyses from four interventions provide evidence to suggest that children and adolescents use more support-seeking

coping strategies after psychosocial interventions (Lamb et al., 1998; Puskar et al.; Roosa et al.; Wolchik et al., 2000). Additionally, results from three preventive interventions suggest that children and adolescents report engaging less frequently in avoidant coping strategies at post-intervention (Lamb et al.; Puskar et al.; Wolchik et al.). There is also evidence from three interventions to suggest children's emotional expression and emotion-focused coping strategies change through psychosocial intervention (Horowitz et al., 2007; Lamb et al.; Sandler et al., 2003). In contrast, evidence demonstrating changes in active coping skills are mixed, which is likely due to the way this category has been measured (e.g., Sandler et al. 2003, combined children and adolescents' scores on an active coping subscale and a coping efficacy subscale to yield a composite positive coping variable). Finally, although many interventions teach cognitive restructuring skills, few include a coping measure to assess for changes in this skill-set. Further, it is a noteworthy limitation that although a significant number of interventions reported teaching relaxation skills and distraction skills, these coping strategies were not evaluated in outcome analyses for these studies and therefore are unable to be assessed regarding potential changes in children and adolescents' use of these skills.

Coping as a Mediator of Changes in Depressive Symptoms

Unfortunately, of the studies that found evidence for changes in coping skills either at post-intervention, follow-up, or both, only a small portion ran mediation analyses to determine whether changes in coping accounted for effects of the intervention on children and adolescents' symptoms (Pössel et al., 2005; Spence et al., 2003; Tein et al., 2006). Although three studies found some evidence for changes in problem-solving

coping skills at post-intervention, only one study tested this form of coping as a mediator (Spence et al., 2003). Specifically, change from pre-intervention to post-intervention on children and adolescents' reports of problem-solving skills was tested as a mediator of program effects on depressive symptoms (Spence et al.). Results from hierarchical linear regression analyses indicated that in both high and low-risk groups, changes in adolescents' problem-solving skills significantly predicted adolescents' changes from pre-intervention to post-intervention in depressive symptoms scores (Spence et al.). Consequently, in the only study to test changes in problem-solving skills as a mediator, results provide support to suggest that adolescents' improvements in this skill account for a portion of the effects of the program on reducing depressive symptoms.

Although four studies found evidence that their prevention program improved children and adolescents' use of support-seeking coping strategies (Lamb et al., 1998; Puskar et al. 2003; Roosa et al. 1989; Wolchik et al., 2000), none tested changes in this coping strategy as a mediator for effects of the program on changes in symptoms. However, Pössel et al. (2004), reported evidence that adolescents' size and frequency of use of their social networks was significantly improved (in those that received the intervention program), and did conduct mediation analyses (Pössel et al., 2005). Results from these analyses indicated that neither of the two social support components tested (network size or frequency of use) was a significant mediator of the effects of the program on changes in depressive symptoms from pre-intervention to 3 month follow-up. It is therefore a significant limitation that four studies which demonstrated evidence in changes in adolescents' support-seeking coping strategies did not conduct mediation analyses (Lamb et al.; Puskar et al.; Roosa et al.; Wolchik et al.). In addition, it is

difficult to draw conclusions from the findings of Pössel et al. because the constructs measured in this study (social support size and frequency of use) may be indirectly related to support-seeking coping strategies, but are not specific to adolescents' controlled responses when confronted with stress.

In spite of the evidence in support of interventions decreasing children and adolescents' use of avoidance coping strategies (Lamb et al., 1998; Puskar et al., 2003; Wolchik et al, 2000), change in the use of this coping strategy has not been examined as a mediator. Although studies yielding support for this have been conducted fairly recently, none reported tests of mediation for changes in these forms of coping. This is a significant limitation in the current literature examining outcome effects of programs to prevent depression in children and adolescents.

On the other hand, of the three studies examining evidence for changes in emotional expression/emotion-focused coping, one intervention (Sandler et al., 2003) tested this coping skill as a mediator (follow-up analyses were also reported by Tein et al., 2006) and the other two did not (Horowitz et al., 2007; Lamb et al., 1998). Results from the one study conducting mediational analyses found that active inhibition of emotional expression emerged as a significant mediator between the program effect and girls' externalizing behaviors, but not internalizing behaviors (Tein et al.).

Two of the three studies examining changes in active coping as a result of preventive interventions tested active coping as a mediator (Tein et al., 2006; Wolchik et al., 2000). Positive coping (a composite variable including both active coping and coping efficacy) was examined as a potential mediator between intervention program effects and adolescent girls' depressive symptoms in a two-wave longitudinal design (Tein et al.).

Results indicated that positive coping mediated the association between the preventive intervention and girls' reports of *both* their internalizing and externalizing symptoms. In contrast, the other two interventions which directly measured active coping (Horowitz et al.; Wolchik et al.) did not conduct mediation analyses with this variable.

Summary

Taken together, prevention research is limited in its ability to draw conclusions regarding components which account for program efficacy, due to the scarcity of mediation analyses that examine this. However, some research does support the role of changes in problem solving skills, emotional expression, and active coping as mediators of the effects of several prevention programs on changes in children and adolescents' depressive symptoms. The paucity of research in the area suggests the need for an intervention based on pre-intervention risk research to measure and evaluate the specific types of coping skills being taught as a mediator of intervention effects on symptoms.

Methodological Issues in Testing Mediation

Although few preventive intervention studies have tested for mediation thus far, there is promising evidence to suggest coping may mediate the effects of some intervention programs. As previously stated, several recent reviews have strongly recommended the need for mediational analyses in prevention research, suggesting that mediation analyses of intervention effects are a critical step to advance research in this area. However, there are several ways to test for the effects of a putative mediator on program efficacy and symptoms, and there is a lack of consensus in the field with regard

to the best approach for defining mediation (e.g., Baron & Kenny, 1986; DeRubeis, 2008; Hollon, 2008; Kraemer et al. 2002; 2008; MacKinnon, Fairchild, & Fritz, 2007). In particular, inconsistency has emerged in terms of the criteria used to define mediation, and the timing of the measurement of the mediator.

Criteria for Defining Mediation

There are at least two different approaches which posit different criteria must be met in order to indicate evidence for mediation. The most commonly used method is Baron and Kenny's (1986) classic criteria. Criteria for this approach involves establishing a relationship between involve a 4 step approach in which they establish a relationship (1) between the intervention and the outcome, (2) between the intervention and the mediator, (3) between the mediator and the outcome, and (4) test whether the association between the intervention and the outcome is significantly changed (decreased) after accounting for the effects of the mediator (Baron & Kenny, 1986). Partial mediation occurs if the first three steps are met and full mediation occurs if all four criteria are established. The Sobel test is the most common way to assess step 4, but is considered to be a very conservative test (MacKinnon, Warsi, & Dwyer, 1995). Consequently, MacKinnon, Fairchild, & Fritz (2007) recently argued that steps 1 through 3 of Baron and Kenny's criteria sufficiently establish mediation because step 4 is mathematically equivalent to steps 1 through 3 but is more stringent, and most studies are insufficiently powered to meet the criteria for this final step. This suggests that even without the final step initially proposed by Baron and Kenny (testing whether the association between the intervention and the outcome is changed after accounting for the

effects of the mediator), evidence for mediation may exist.

In contrast, the approach outlined by Kraemer and colleagues is a more recent approach to testing for mediation (Kraemer et al., 2002; 2008). This approach builds on the foundation of Baron and Kenny's criteria, but Kraemer et al. suggest that their approach addresses limitations in the method proposed by Baron and Kenny. In particular, their method places a stronger emphasis on establishing temporal precedence of the mediator (i.e., the program causes change in the mediator, and the changes in the mediator then cause change in the outcome measured at a later point) (Kraemer et al., 2002). This approach also suggests that a significant interaction between the mediator and treatment in predicting the outcome is a necessary inclusion in the model testing for mediation, whereas Baron and Kenny's approach assumes that the interaction is zero and therefore leaves this out of their model. Finding a significant interaction between the condition (i.e., intervention vs. control) and change in the mediator would mean that the mediator is changing differently across time between the two groups. Using this interaction term to then predict changes in outcome is important because if found to be significant, this would establish that the different rates of change in the mediator across the different groups was predicting differences in change on the outcome variable for the two groups. Consequently, this approach proposes that evidence for mediation exists if the following criteria are met: 1) There is a significant association between condition and change in the mediator, and either 2a) there is a main effect of changes in the mediator that affects the outcome or 2b) there is an interaction between treatment and change in the mediator that affects the outcome. Mediation occurs when step 1 is established, and either step 2a is established, step 2b is established, or both 2a and 2b are established.

Finally, as suggested by the Kraemer et al. (2002) approach, in order to establish true mediation one must assess for changes in the mediator prior to, and independent of changes in outcome (DeRubeis, 2008; Kraemer et al. 2002; 2008). In prevention research, it is common to test for mediation by measuring the mediator mid-way through the intervention program, calculating a change score from baseline for this mediator variable, and measuring the outcome at the end of the intervention and creating a change score from baseline for this outcome variable. It is noteworthy that recent research suggests that this approach does not fully take into account the possibility that change in the mediator and outcome up to the mid-treatment point still may be occurring simultaneously (DeRubeis, 2008; Hollon, 2008). If change in the mediator is assessed at the same time as change in the outcome, the direction of the relationship between these two changes cannot be established. That is, it would be equally plausible that change in the outcome could lead to change in the proposed mediator, as it is the change in the mediator leads to change in the outcome (e.g., one could not determine whether changes in depressive symptoms may be causing changes in coping or changes in coping may be causing changes in depressive symptoms). This implicates the importance of covarying for scores in the outcome from pre to mid-treatment when measuring the mediator at mid-treatment. Again, final consensus has not been reached with regard to the best method for testing mediation. Comparison of these two approaches with a single data set could be helpful in evaluating the relative merits of both the Baron and Kenny approach and the approach proposed by Kraemer et al.

Timing of the Measurement of the Mediator

The timing of the measurement of a potential mediator is also a significant methodological concern when testing for mediation. For instance, if one measures the mediator *after* the most significant changes in the outcome have occurred, there is no longer enough residual change in the outcome remaining for change in the mediator to have an effect (Cole & Maxwell, 2003). For example, if an intervention is conducted over a period of 6 months, changes in the mediator could be assessed at the mid-point in the intervention (3 months). However, the most significant changes in the outcome could occur during the first 1 to 3 months of the intervention, with only maintenance in these changes being sustained during the 3rd through 6th months. In this example, testing for mediation at three months, after the most significant change in the outcome has occurred, may result in failure to detect mediational effects. Consequently, for this example one would want to measure the mediator much earlier than the mid-way point, in order to capture early changes in the proposed mediator that may be accounting for the rapid change in the outcome. Therefore, it is important to measure the mediator at a time point after which substantial change in the outcome continues to occur, as this maximizes the ability of changes in the proposed mediator to predict changes in the outcome.

A Family Cognitive-Behavioral Preventive Intervention

The current study was embedded within an empirically-supported, family-based preventive intervention for children and adolescents with at least one parent who has a history of depression (Compas, Forehand, & Keller, in press; Compas et al., 2002, 2008). In particular, this preventive intervention targeted reducing stressful parent-child

interactions, improving parenting skills, and enhancing children's coping in response to the stress associated with parental depression. Although there are several potential mechanisms through which this intervention could have an effect, the focus of this paper is on the ability of the intervention to enhance children's coping skills and evaluating whether changes in these coping skills as a result of the preventive intervention accounted for changes in children and adolescents' symptoms. Specifically, children and adolescents were taught to enact secondary control coping skills (acceptance, distraction, activities, positive thinking/cognitive restructuring) when faced with an uncontrollable stressor (e.g., the stress associated with their parents' depression). Previous research has provided evidence that these types of coping strategies are associated with fewer symptoms of anxiety/depression and aggression in children and adolescents faced with the uncontrollable stress of parental depression. This intervention was therefore predicated on those pre-intervention risk research studies (e.g., Jaser et al. 2005; Langrock et al. 2002).

Analyses of the effects of the intervention at 12-month follow-up have been reported in a sample of 80 adolescent children from 56 families randomized to the intervention condition as compared with 75 adolescent children from 55 families randomized to an information only comparison condition (Compas et al., 2009). Results indicated that children and adolescents in the intervention condition reported significantly fewer symptoms of anxiety/depression and fewer total internalizing symptoms (based on reports from the youth self-report). Effect sizes for these results were medium in magnitude (d= .50 and d= .52 for reports on the YSR internalizing and anxiety/depression scales, respectively). Further, a small to medium effect was found for children and

adolescents in the intervention condition reporting fewer depressive symptoms at 12-month follow-up compared to children and adolescents in the information comparison condition (d= .38 for children and adolescents' self-reports on the CES-D). These results suggest that small to medium effects for this sample exists in favor of decreased symptoms in adolescents in the intervention condition relative to the comparison condition, from which coping can then be tested as a potential mediator of the effect of the intervention on reducing symptoms.

Significance of the Current Study

Several recent reviews have provided evidence that symptoms of depression in youth can be reduced through psychosocial intervention (Horowitz & Garber, 2006; Sutton, 2007). Building on the foundation of this work, the current study addressed limitations in previous research on preventive interventions for children and adolescents by evaluating changes in coping skills as a mediator of the association between a preventive intervention and changes in symptoms for children and adolescents whose parent has a history of depression. In particular, this study builds on and improves prior research by directly assessing the coping skills targeted as part of the intervention. Previous interventions did not always measure the coping skills they were intending to change. This study was specific about the types of coping strategies being taught to children (the secondary control coping skills of acceptance, distraction, positive thinking/cognitive restructuring), and utilized a measure of coping which explicitly captures changes in these particular skills. Furthermore, the current study controlled for temporal precedence in analyses by measuring the mediator and the outcome at

independent time points, and by assessing for covariation of outcome at the point at which the mediator was measured. The following specific hypotheses were tested:

Hypothesis 1: Children and adolescents in the intervention condition will increase their use of secondary control coping skills significantly more than children and adolescents in the information only comparison condition.

Hypothesis 2: The effect of the intervention on reducing depressive symptoms in children and adolescents will be mediated by changes in children and adolescents' use of secondary control coping skills.

CHAPTER II

METHOD

Participants

The proposed study was a two-site randomized intervention trial being conducted at Vanderbilt University and the University of Vermont (R01 MH069940-02, PI: Bruce Compas; R01MH69928-03, PI: Rex Forehand). Extensive efforts were made to assure that all randomization procedures and intervention sessions were matched across sites.

111 families were recruited and enrolled in the intervention. The sample for the current study consisted of 107 youth drawn from these 111 families, with one child randomly selected from families with multiple children (n=44 families with multiple children) due to concerns of clustered data with the inclusion of these additional children (i.e., a lack of independence). In addition, 4 families were excluded from this sample due to missing data at the initial baseline assessment. The resulting sample of 107 youth (62 males and 45 females; mean age = 11.36) were 79% Caucasian, 8% African American, 3% Asian, 1% Hispanic, and 9% Mixed and included 52 youth randomized to the self-study comparison condition (32 males and 20 females; mean age = 11.25) and 55 youth randomized to the intervention condition (30 males and 25 females; mean age = 11.45). Parents (both parents when available; the custodial parent in single-parent families) were screened to determine that at least one parent meets criteria for at least one episode of major depressive disorder during the lifetime of their children (including a current major depressive episode). Participants were excluded if they had no current or past history of

depression, or if they met criteria for lifetime Bipolar Disorder Type I (BP-I) or lifetime Schizophrenia. In addition, families where one child within the age range met criteria for current Conduct Disorder or current Substance Abuse were permanently excluded, as were children with mental retardation or a history of an autism spectrum disorder. Furthermore, if any family member was acutely suicidal they were temporarily placed on-hold, as were families where any participating child was currently depressed. If any parent is currently depressed, the family was permitted to participate as long as extreme functional impairment (i.e., GAF<50, or unable to attend work and take care of children) or active suicidal ideation was not present.

Procedure

Families were primarily recruited via psychological and mental health clinics/practices. Brochures were placed in appropriate waiting rooms, and mental health specialists were educated about the intervention and provided referrals accordingly. Other methods of recruitment that were also implemented included advertising through the media and mass email mailing lists. Potential participants contacted the research staff and participated in a 30-45 minute phone screening interview. Upon completion of this initial screening, families placed on-hold were re-contacted in two months, while families who did not meet any exclusionary criteria (i.e., no history of BP-I or Schizophrenia, no history of autism or current Conduct Disorder, Substance, or Major Depression in participating children) were eligible to come in for further interviews.

Potential participants who came into the laboratory for further interviews participated in an extensive battery of assessments. The identified target parent (i.e., the

parent with the history of depression) was interviewed using the Structured Clinical Interview for DSM-IV (SCID; First et al., 2001) about their history of psychopathology, and was then interviewed with the Family History Research Diagnostic Criteria interview (Andreasen et al., 1977) to assess for other psychopathology in their spouse or family (the participating child's grandparents). Both children/adolescents and parents were interviewed with the Schedule for Affective Disorders and Schizophrenia for School-Aged Children – Present and Lifetime Version (KSADS-PL, Kaufman et al., 1997). Upon completion of these tasks, the parent and child/adolescent completed questionnaires.

All eligible participants were then randomized to either the family group condition or the information-only comparison condition using a randomized number system. Randomized families then participated in structured interviews again at 6 and 12 months, and completed survey questionnaires at 2, 6, and 12 months.

Measures

Parental Psychopathology

The Structured Clinical Interview for DSM-IV-*TR* (SCID; First et al., 2001) is a semi-structured psychiatric interview that was used to assess for both current and lifetime psychopathology in the identified target parent. SCID modules for affective disorders, psychosis, and alcohol and substance abuse were administered. SCID interviews were used to screen for eligibility but were not included in the current analyses. Inter-rater reliability for diagnosis of Major Depressive Disorder using this interview was adequate

in the current sample (κ = .78; 96% agreement and κ = .63; 93% agreement, respectively).

Child/Adolescent Psychopathology

The Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977) is a self-report questionnaire which was used to assess for current depressive symptoms in children and adolescents. The CES-D measures the frequency of 20 depressive symptoms in children and adolescents over the past week using a 5 point Likert scale. Reliability and validity of this self-report measure has been established with adolescents (Fendrich et al., 1990; Lewinsohn et al., 1991). Internal consistency for this sample at baseline was α=.90.

The Youth Self-Report (YSR; Achenbach & Rescorla, 2001) was used to assess internalizing symptoms in adolescents. The YSR is a 112-item checklist of problem behaviors which adolescents rate as not true (0), somewhat or sometimes true (1), or very true or often true (2) about themselves in the past six months. Building on outcome data from Compas et al. (2008), the analyses for this proposal will focus on the total internalizing and anxious/depressed scales from the YSR. These scales represent salient forms of internalizing and depressive symptoms in adolescents and have been reported in outcome studies from prior interventions for children of depressed parents (e.g., Beardslee et al., 2008). The Achenbach System of Empirically Based Assessment has strong test-retest reliability (.79-.95), and criterion-related validity has been established. In this sample, the internal consistency at baseline was α=.83 for anxious/depressed symptoms and α=.90 for total internalizing symptoms.

Child/Adolescent Coping

The parental depression version of the Responses to Stress Questionnaire (Connor-Smith et al., 2000; Langrock et al., 2002) was given to children and adolescents to assess coping style in response to stressors associated with parental depression that occurred within the past six months. The RSQ has been shown to have good reliability and validity, including internal consistency (alphas from .73 to .85), test-retest reliability over 2-weeks (from .69 to .81), convergent validity in reports of parents and children, and construct validity as reflected in results of confirmatory factor analyses (Connor-Smith et al., 2000). Factor analyses of the RSQ have identified five primary factors (Connor-Smith et al., 2000): primary control engagement coping (problem solving, emotional expression, emotional modulation), secondary control engagement coping (cognitive restructuring, positive thinking, acceptance, distraction), disengagement coping (avoidance, denial, wishful thinking), involuntary engagement (e.g., emotional arousal, intrusive thoughts), and involuntary disengagement (e.g., cognitive interference, escape). The first three factors reflect voluntary coping processes, and the latter two factors reflect involuntary stress responses. In particular, this paper focuses on secondary control coping strategies, and this factor was utilized in analyses. The internal consistency at baseline for this sample was $\alpha = .82$. Coping change variables were created for each time point by subtracting children and adolescents' scores on secondary control coping at 2-months from their baseline score (referred to in the text as changes in coping at 2-months), and by subtracting their scores on secondary control coping at 6-months from their baseline score (referred to in the text as changes in coping at 6-months). These variables were used in all regression analyses.

Condition Descriptions

Family Cognitive-Behavioral Intervention Condition

The 12-session manualized intervention program was designed for participation by both parents and children. Goals were to educate families about depressive disorders, increase family awareness of the impact of stress and depression on functioning, help families recognize and monitor stress, facilitate the development of adaptive coping responses to stress, and improve parenting skills. Information was presented to group members during sessions, practice and discussion of skills were facilitated during the sessions, and all members were given weekly home practice exercises.

The first three sessions (sessions 1-3) provided an introduction to the nature of depression, the effects of parental depression on children, and an introduction to skills which were proven to help children effectively cope with both family stress specific to depression and general, everyday stress. During these first three sessions both parents and children of all families met together as a group, and an emphasis was placed on increasing family activities. During the next five sessions (sessions 4-8), parents and children met separately for the majority of the time, only coming together during the last few minutes as a family to share what they had learned. During these sessions, children and adolescents were taught such secondary control coping skills as acceptance, distraction, fun activities, and positive thinking. Each coping skill was the focus of a separate session for the children and adolescents, to insure adequate time for them to learn and understand how to use each skill independently. Once children and adolescents understood each skill, the possibility of using more than one skill when faced with a

stressor was explored (e.g., first accept that the situation is uncontrollable, then use distraction or positive thinking). Parents learned basic parenting skills, with an emphasis on areas that are likely to be impacted by depression such as consistency, structure, parental responsiveness, parent-child communication, and involvement in family activities. Finally, four monthly follow-up booster sessions (sessions 9-12) were included to provide additional practice and support in the continued development and refinement of the skills learned in the initial eight sessions.

Information-Only Comparison Condition

The comparison condition was modeled after a self-study program used successfully by Wolchick et al. (2000) in their preventive intervention trial for families coping with parental divorce. Families were provided with written materials which were carefully selected by a team of clinicians within the project. Parents and children were each provided with three separate reading booklets over the course of eight weeks, which educated them about the nature of depression, the effects of parental depression on families, and signs of depression in children/adolescents and loved ones. During the consenting process, participants agreed (if they were assigned to the self-study condition) to spend approximately one hour per week for eight weeks reading these materials.

Statistical Power

For this study, power calculations were based on the table of empirical estimates of sample sizes needed for .8 power to detect mediation (Fritz & MacKinnon, 2007). Assuming partial mediation, when both the path from the treatment to the mediator and

the mediator to the outcome are small in size, a sample size of 158 participants is needed to detect an effect for mediation. When the path from the treatment and the mediator and the mediator to the outcome are medium in size (again assuming partial mediation), the sample size needed to detect the effect is 75 participants. This suggests that the current sample size of 107 children is sufficient to detect mediation in these three pathways if the effects are medium in size, but may be limited in its ability to detect smaller effects.

Data Preparation and Analyses

Data was analyzed for all participants in this sample, using an intention-to-treat approach (e.g., all participants' data was included, regardless of whether or not they satisfied the requirements of the condition to which they were assigned). In order to analyze complete data for all participants, missing data was handled by imputing the score of the most adjacent time point forward, as a conservative estimate of the level of use of that particular symptom/skill.

To test hypothesis 1, analysis of covariance was conducted to test whether there were differences in reports of secondary control coping covarying for initial level of use of these coping skills. Data analyses to test hypothesis 2 were conducted in several different ways to address the question of whether evidence for mediation differs by 1) type of data analytic approach (Baron and Kenny's causal steps method vs. the method proposed by Kraemer et al. (2002); 2) timing of measurement of the mediator (2 month vs. 6 month) and 3) whether or not evidence for mediation differs based on covarying for level of outcome symptoms at the point at which the mediator is measured (e.g., if coping change at 2-month is in the equation, anxious/depressed or internalizing symptoms at 2-

month, rather than baseline, were included as the covariate). The details of the analytic procedure used for each hypothesis are described below.

CHAPTER III

RESULTS

Descriptive Statistics

Means and standard deviations for children and adolescents' reports of anxious/depressed symptoms, internalizing symptoms, and secondary control coping are reported in Table 1. For purposes of comparison to national norms, normalized *T* scores are reported for symptoms of anxiety/depression and internalizing symptoms based on the Youth Self Report (YSR). As expected, this sample of children and adolescents of depressed parents was elevated in both anxious/depressed symptoms (mean $T = 56.07$ for youth in the intervention condition, and mean $T = 57.30$ for youth in the comparison condition) and internalizing symptoms (mean $T = 54.96$ for youth in the intervention condition, and mean $T = 53.56$ for youth in the comparison condition) at baseline assessment. At the 12-month time point, mean *T*-scores for anxious/depressed symptoms had decreased to $T = 51.55$ for youth in the intervention condition and $T = 55.58$ for youth in the comparison condition. For internalizing symptoms, scores at 12-months were $T = 44.63$ for youth in the intervention condition and $T = 50.27$ for youth in the comparison condition.

In addition, children and adolescents in this sample reported engaging in moderate levels of secondary control coping (scores on this scale could range from 12 to 48). For youth in the intervention condition, mean secondary control coping scores were 26.90 at baseline, 27.00 at 2-months, and 27.40 at 6-months. In contrast, mean secondary control

coping scores for youth in the comparison condition were 28.43 at baseline, 25.58 at 2-months, and 25.97 at 6-months.

Table 1. Descriptive Statistics

Measure	**Intervention Condition**	**Comparison Condition**
Anxiety/Depression	*T*-Scores (SD)	*T*-Scores (SD)
YSR Baseline	56.07 (7.80)	57.30 (8.04)
YSR 2-Month	53.47 (5.20)	55.68 (7.39)
YSR 6-Month	51.72 (2.69)	54.17 (6.73)
YSR 12-Month	51.55 (3.13)	55.58 (8.47)
Internalizing	*T*-Scores (SD)	*T*-Scores (SD)
YSR Baseline	54.96 (10.63)	53.56 (11.73)
YSR 2-Month	50.24 (10.83)	51.20 (12.13)
YSR 6-Month	46.69 (9.41)	47.11 (12.43)
YSR 12-Month	44.63 (8.59)	50.27 (12.64)
Secondary Control Coping	Raw Scores (SD)	Raw Scores (SD)
Baseline	26.90 (6.61)	28.43 (6.34)
2-Month	27.00 (6.78)	25.58 (6.94)
6-Month	27.40 (5.79)	25.97 (6.69)

Preliminary Analyses

Analyses of the effects of the intervention at 12-months were conducted using the CES-D, YSR anxious/depressed, and YSR internalizing variables[1]. Univariate ANCOVA's were conducted to test for group differences on reports of symptoms at 12-months covarying for initial symptoms between the children and adolescents in the intervention condition and those in the comparison condition. Significant group

[1] When outcome analyses were conducted using Full Information Maximum Likelihood (FIML) to estimate missing data (rather than the imputation process used in the present study), outcome findings were significant for all three measures (YSR anxious/depressed, YSR internalizing, and CES-D); see Compas et al. (2009).

differences were found for YSR internalizing symptoms, such that children and adolescents in the intervention condition reported significantly fewer symptoms on the YSR internalizing scale compared to children and adolescents in the comparison condition, $F(1, 106) = 4.71$, $p < .05$. Further, group differences approaching significance were found for YSR anxious/depressed symptoms, $F(1,106) = 3.59$, $p = .061$[2], with youth in the intervention reporting fewer symptoms relative to those in the comparison condition. In contrast, no group differences emerged for youth reports of depressive symptoms on the CES-D, and this measure was therefore not used in further mediation analyses in the current study (as there was no effect of the intervention to test for mediation).

Effect sizes for the difference in scores at 12-months for both anxious/depressed and internalizing symptoms were calculated for Cohen's *d* by subtracting the mean raw score for the comparison condition from the mean raw score for the intervention condition, and dividing by the standard deviation of the comparison condition[3]. The calculated effect size was $d = .30$ for the difference in reported anxious/depressed scores between conditions, and $d = .20$ for the difference in reported internalizing symptoms between conditions. These preliminary analyses therefore indicate that the intervention had significant effects on child/adolescent symptoms at 12-months that were small in magnitude in favor of decreased symptoms in children and adolescents in the intervention condition relative to the comparison condition. These effects were a sufficient basis to

[2] For the purposes of this dissertation, this p-value of .061 will be treated as a sufficiently robust effect to complete the mediation analyses and will henceforward be referred to as significant (see Cohen 1994).

[3] When calculating effect sizes, it is often recommended to divide by the standard deviation of the comparison condition rather than using the pooled standard deviation, as the treatment/intervention can change the variance (e.g., Horowitz & Garber, 2006; Weisz et al., 1995).

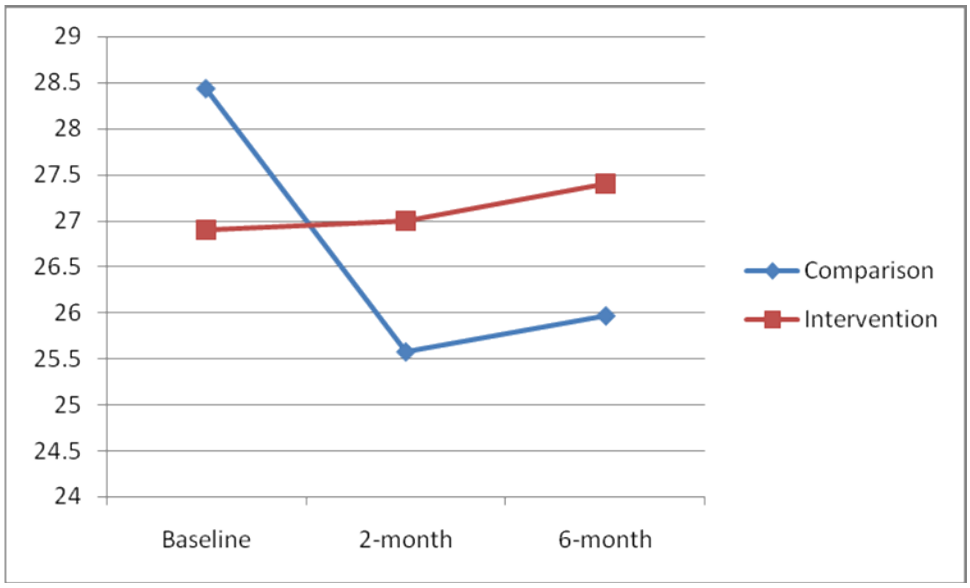
proceed with testing for possible effects of child/adolescent coping as a mediator of the effects of the intervention on reducing both anxious/depressed and internalizing symptoms.

Hypothesis 1: Use of Secondary Control Coping Skills

To test the first hypothesis that children and adolescents in the intervention condition will increase their use of secondary control coping skills significantly more than children and adolescents in the comparison condition, univariate ANCOVAs were conducted at the 2-month time point to assess changes in coping after the acute phase of the intervention (i.e., after 8 weekly sessions and before the 4 monthly sessions) and then separately for the 6-month time point to examine changes in coping post-intervention between the 2 groups. Results at both the 2-month and 6-month time-points yielded a non-significant trend for the effect of Condition, $F(1,106) = 3.41$, $p = .068$, for coping at 2-months, and $F(1,106) = 2.82$, $p = .096$ for coping at 6-months, on children and adolescents' reports of secondary control coping at 2-month covarying for their level of secondary control coping at baseline. Effect sizes for the non-significant trends in reported use of secondary control coping between youth in the intervention condition and those in the comparison condition were small in magnitude ($d = .20$ for mean differences in coping reported at both 2-months and 6-months). Results therefore indicate an emerging group difference on secondary control coping at both time points with children and adolescents in the intervention condition reporting greater coping relative to children and adolescents in the comparison condition. The pattern of coping scores across the 3 assessments suggests that children in the comparison condition decreased in their use of

secondary control coping whereas children in the intervention remained stable in their use of these coping strategies (see figure 1 below).

Figure 1. *Children and Adolescents' Secondary Control Coping Skills*



Hypothesis 2: Coping as a Mediator

Evidence for changes in coping as a mediator of the effects of the intervention on reducing symptoms was examined by comparing two different approaches to testing mediation: The causal steps approach proposed by Baron and Kenny (1986), and a more recent approach to testing mediation proposed by Kraemer et al. (2002). As previously noted, the timing of the measurement of the mediator is also important for establishing significant findings for mediation. If the mediator is measured after the majority of changes in the outcome have already taken place, then the proposed mediator will have very little residual change left to predict in the outcome, resulting in non-significant findings for the mediator. If the mediator is measured prior to the majority of change in

the mediator itself occurring (e.g., before children had increased their use of coping skills), then there would not be enough change in the mediator to predict outcome change, again likely resulting in non-significant findings for the mediator. For this reason (and because it is unknown whether the majority of change in coping would be captured quickly or at a later time-point), all mediation analyses were conducted separately using coping scores reflecting changes from baseline to both the 2-month time-point (i.e., immediately after 8 weekly intervention sessions) and the 6-month time-point (i.e., immediately following 8 weekly plus 4 monthly follow-up sessions which resulted in the completion of the intervention). It is also important to establish temporal precedence between the mediator and the outcome, indicating that change in the mediator (coping) occurred prior to change in the outcome (anxious/depressed and internalizing symptoms). Consequently, all of the above analyses were conducted in two ways: First in a model that included the baseline level of symptoms as a covariate, and second in a model that included the corresponding symptom measure at the time of measurement of coping (e.g., if coping change at 2-month is in the equation, anxious/depressed or internalizing symptoms at 2-month, rather than baseline, were included as the covariate).

Baron and Kenny Approach

The effect for coping as a mediator was first tested using the most common approach to testing for mediation (Baron & Kenny, 1986). As previously stated, their criteria involve a 4 step approach in which they establish a relationship (1) between the intervention and the outcome, (2) between the intervention and the mediator, (3) between

the mediator and the outcome, and (4) test whether the association between the intervention and the outcome is significantly changed (decreased) after accounting for the effects of the mediator. Partial mediation occurs if the first three steps are met and full mediation occurs if all four criteria are established. In order to outline which of Baron and Kenny's 4 criteria have been met by which predictors and for which outcomes, analyses are organized by each step listed above.

Step 1 was tested by examining separate regression equations predicting 12-month anxious/depressed and 12-month internalizing symptoms from condition (coded ½ for intervention condition and -½ for the comparison condition in all regression analyses). Six regression equations were examined, three for anxiety/depression and three for internalizing symptoms, differing only on the timing of the symptom covariate (i.e., symptoms at baseline, 2-months, 6-months). See Table 2 for regressions controlling for symptoms at baseline. Controlling for baseline symptoms, condition emerged as a significant predictor of both 12-month anxious/depressed symptoms, $F(2,106) = 32.76$, $p < .001$, $R^2 = .38$, $\beta = -.15$, $p = .06$, and 12-month internalizing symptoms, $F(2,106) = 37.23$, $p < .001$, $R^2 = .41$, $\beta = -.16$, $p < .05$.

Table 2.
Regression Equations Predicting Anxious/Depressed (Equation 1) and Internalizing (Equation 2) Symptoms from Condition, controlling for Baseline Symptoms

Equation 1 – YSR Anxious/Depressed		Final $R^2 = .38$	$F(2,106) = 32.76$, $p < .001$
	β	sr^2	
Baseline Anx/Dep	.60***	.36	
Condition	-.15†*	.02	
Equation 2 – YSR Internalizing		**Final $R^2 = .41$**	**$F(2,106) = 37.23$, $p < .001$**
	β	sr^2	
Baseline Internalizing	.64***	.40	
Condition	-.16*	.03	

Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†* $p = .06$ *$p<.05$; **$p < .01$; ***$p < .001$.

When controlling for 2-month symptoms, a non-significant trend for condition as a predictor of 12-month internalizing symptoms emerged ($F(2,106)=34.00$, $p<.001$, $R^2 = .38$, $\beta=-.13$, $p< .10$, but condition was not a significant predictor of 12-month anxiety/depression symptoms. See Table 3 for regression equations controlling for symptoms at 2-months.

Table 3.
Regression Equations Predicting Anxious/Depressed (Equation 1) and Internalizing (Equation 2) Symptoms from Condition, Controlling for 2-month Symptoms

Equation 1 – YSR Anxious/Depressed		Final $R^2 = .40$ $F(2,106) = 35.62$, $p < .001$
	β	sr^2
2-month Anx/Dep	.62***	.38
Condition	-.11	.01
Equation 2 – YSR Internalizing		**Final $R^2 = .38$ $F(2,106) = 34.00$, $p < .001$**
	β	sr^2
2-month Internalizing	.62***	.38
Condition	-.13†	.02

Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†* $p = .06$ *$p<.05$; **$p < .01$; ***$p < .001$.

Similarly, a non-significant trend emerged for condition as a significant predictor of 12-month internalizing symptoms controlling for 6-month internalizing symptoms, $F(2,106) = 181.23$, $p < .001$, $R^2 = .77$, $\beta = -.08$, $p < .10$, but condition did not emerge as a significant predictor of 12-month anxiety/depression symptoms controlling for 6-month anxiety/depression symptoms. See Table 4 for regression equations controlling for symptoms at 6-months. Thus, the first criteria in Baron and Kenny's causal steps approach to testing mediation was met for condition as a predictor of 12-month anxious/depressed and internalizing symptoms controlling for baseline symptoms, but not when 2-month or 6-month symptoms were included in the equation.

Table 4.

Regression Equations Predicting Anxious/Depressed (Equation 1) and Internalizing (Equation 2) Symptoms from Condition, Controlling for 6-month Symptoms

Equation 1 – YSR Anxious/Depressed		Final R^2 = .71	F (2,106) = 130.85, p < .001
	β	sr^2	
6-month Anx/Dep	.84***	.69	
Condition	-.05	.00	
Equation 2 – YSR Internalizing		Final R^2 = .77	F (2,106) = 181.23, p < .001
	β	sr^2	
6-month Internalizing	.87***	.76	
Condition	-.08†	.01	

Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†* p= .06 *p<.05; **p < .01; ***p < .001.

To analyze whether step 2 was met (i.e., condition predicts the proposed mediator), regression equations were tested wherein condition was entered as a predictor of changes in coping. Two separate regression equations were examined, differing on whether changes in coping were calculated at 2 months or 6 months (see Table 5), and both equations were significant. Specifically, condition emerged as a significant predictor of change in coping from baseline to 2-months, $F(1,106) = 4.95$, $p < .05$, $R^2 = .04$, $\beta = .21$, $p < .05$, and change in coping from baseline to 6-months, $F(1,106) = 4.38$, $p < .05$, $R^2 = .03$, $\beta = .20$, $p < .05$, indicating that at both time points condition differentially predicted children and adolescents' change in their use of secondary control coping skills. Therefore, condition was significantly associated with change in coping from baseline to both 2-months and 6-months, and both potential mediators (change in coping at 2-months and change in coping at 6-months) met Baron and Kenny's second criteria in the process of establishing mediation.

Table 5.

Regression Equations Predicting Change in Coping from Baseline to 2-months (Equation 1) and Change in Coping from Baseline to 6-months (Equation 2) from Condition

Equation 1 – Changes in Coping at 2-Months	Final R^2 = .04	F (1,106) = 4.95, p < .05
	β	sr^2
Condition	.21*	.04
Equation 2 – Changes in Coping at 6-Months	**Final R^2 = .03**	**F (1,106) = 4.38, p < .05**
	β	sr^2
Condition	.20*	.04

Note: β = standardized beta; sr^2 = semi-partial correlation squared;
* p<.05

A series of hierarchical regression analyses were conducted to examine step 3 (i.e., the mediator affects the outcome) in Baron and Kenny's approach to testing for mediation. Regression models were examined using condition and changes in coping (separate regression models were tested for changes in coping at 2-months compared to changes in coping at 6-month) as predictors of 12-month symptom variables (anxious/depressed and internalizing symptoms separately) controlling for baseline symptoms, yielding a total of 4 regressions.

Changes in coping at 2-months as a mediator. Two hierarchical regressions predicting 12-month symptoms from changes in coping at 2-months were examined (see Table 5 and Figures 2 and 3). A hierarchical regression model predicting 12-month anxious/depressed symptoms from changes in coping at 2-months was examined. Baseline anxiety/depression symptoms and family assigned condition (intervention vs. comparison) were entered first in the equation, and this step was significant, F (2, 106) = 32.76, p < .001, R^2 = .38, indicating that condition and baseline symptoms are significant, independent predictors (β=-.15 and β=.60, for condition and baseline symptoms, respectively) of children and adolescents' anxious/depressed scores at 12-months. In the second step, change in coping at 2-months was added and the regression equations

remained significant, F (3, 106) = 23.88, p < .001, R^2 = .39, with children and adolescents' baseline symptoms remaining a significant predictor (β = .61, p < .001). The effect for condition became non-significant, and changes in coping at 2-months emerged as a significant predictor (β = -.16, *p* < .05), indicating that changes in children's use of secondary control coping at 2-months (relative to baseline levels of coping) accounted for symptoms of anxiety/depression at 12-months controlling for initial anxious/depressed symptoms.

A hierarchical regression model predicting 12-month internalizing symptoms from change in coping at 2-months was examined next. Baseline internalizing symptoms and family assigned condition (intervention vs. self-study) were entered first in the equation, and this step was again significant, F (2, 106) = 37.23, *p* < .001, R^2 = .41, again indicating that both condition (β=-.16) and baseline symptoms (β=.64) are significant, independent predictors of children and adolescents' internalizing scores at 12-months. In the second step, change in coping at 2-months was added and the regression equations remained significant, F (3, 106) = 26.31, p < .001, R^2 = .42, with children and adolescents' baseline symptoms remaining a significant predictor (β = .64, p < .001). The effect for condition became marginally significant (β = -.14, p < .10, a non-significant trend), and a non-significant trend for the effect of change in coping at 2-months emerged (β = -.13, *p* < .10).

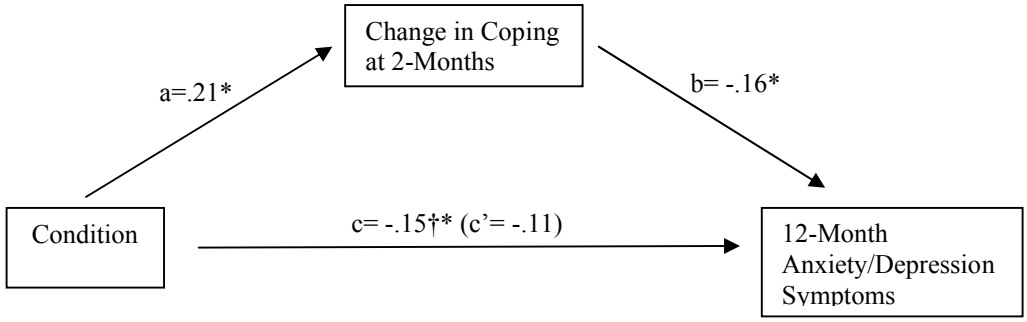
Table 6.

Regression Equations Predicting Anxious/Depressed Symptoms (Equation 1) and Internalizing Symptoms (Equation 2) from Condition and Changes in Coping at 2-months, Controlling for Baseline Symptoms

Equation 1 –YSR Anxious/Depressed from Coping Change at 2-months		
	Final R^2 = .39	F (3,106) = 23.88, p < .001
Step 1: R^2 change = .39***	β	sr^2
Baseline Anx/Dep	.60***	.36
Condition	-.15†*	.02
Step 2: R^2 change = .02*		
Baseline Anx/Dep	.61***	.37
Condition	-.11	.01
Coping Change at 2-months	-.16*	.02
Equation 2 – YSR Internalizing from Coping Change at 2-months		
	Final R^2 = .42	F (3,106) = 26.31, p < .001
Step 1: R^2 change = .42***	β	sr^2
Baseline Internalizing	.64***	.40
Condition	-.16*	.03
Step 2: R^2 change = .02†		
Baseline Internalizing	.64***	.41
Condition	-.14†	.02
Coping Change at 2-months	-.13†	.02

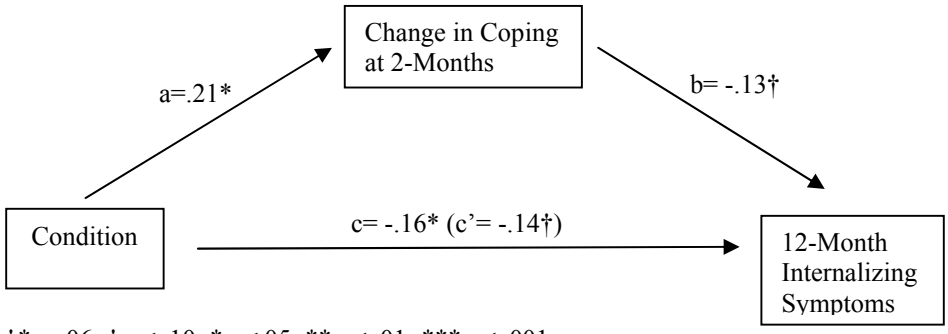
Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†*p=.06; †p < .10; * p<.05; **p < .01; ***p < .001.

Figure 2. *Change in Coping at 2-months as a Mediator of the Effects of Condition on 12-month Anxiety/Depression Symptoms*



Note: †*p=.06; †p < .10; * p<.05; **p < .01; ***p < .001.

Figure 3. *Change in Coping at 2-months as a Mediator of the Effects of Condition on 12-month Internalizing Symptoms*



Note: †**p*=.06; †*p* < .10; * *p*<.05; ***p* < .01; ****p* < .001.

Based on these analyses using the first three steps of the Baron and Kenny model, change in coping at 2-months meets criteria as a partial mediator between the effects of condition on 12-month anxious/depressed symptoms. To ascertain whether the criteria for full mediation was met (step 4 of Baron and Kenny's causal steps model), the Sobel test (1982) was conducted to determine whether the change in the effect for condition predicting symptoms was significantly attenuated when changes in coping at 2-months was included in the regression equation. The Sobel test was non-significant, indicating that change in coping at 2-months was a partial mediator but did not fully mediate the effects of condition on reducing anxious/depressed symptoms. Because changes in coping at 2 months did not emerge as a significant predictor of internalizing symptoms, it was not found to mediate the effects of the intervention on symptoms at 12-months based on Baron and Kenny's criteria.

Changes in coping at 6-months as a mediator. Two hierarchical regressions predicting 12-month symptoms from changes in coping at 6-months were examined next (see Table 7 and Figures 4 and 5). Specifically, a hierarchical regression model predicting

12-month anxious/depressed symptoms from change in coping at 6-month was examined. Baseline anxiety/depression symptoms and family assigned condition (intervention vs. self-study) were entered first in the equation, and this step was significant, F (2, 106) = 32.76, $p < .001$, $R^2 = .38$, indicating that both condition (β=-.15) and baseline symptoms (β=.60) are significant, independent predictors of children and adolescents' anxious/depressed scores at 12-months. In the second step, change in coping at 6-months was added and the regression equations remained significant, F (3, 106) = 26.36, $p < .001$, $R^2 = .42$, with children and adolescents' baseline symptoms remaining a significant predictor (β= .62, p < .001). The effect for condition became non-significant, and change in coping at 6-months emerged as a significant predictor (β = -.22, $p < .01$), indicating that changes in children's use of secondary control coping at 6-months accounted for symptoms of anxiety/depression at 12-months controlling for initial anxious/depressed symptoms.

A hierarchical regression model predicting 12-month internalizing symptoms from change in coping at 6-months was examined next. Again, baseline symptoms (internalizing) and family assigned condition (intervention vs. comparison) were entered first in the equation, and this step was again significant, F (2, 106) = 37.23, $p < .001$, $R^2 = .41$, such that both condition (β=-.16) and baseline symptoms (β=.64) differentially predicted children and adolescents' internalizing scores at 12-months. In the second step, change in coping at 6-months was added and the regression equations remained significant, F (3, 106) = 26.78, $p < .001$, $R^2 = .42$, with children and adolescents' baseline symptoms remaining a significant predictor (β = .65, $p < .001$). The effect for condition became marginal ((β = -.14, p < .10, a non-significant trend), whereas changes in coping

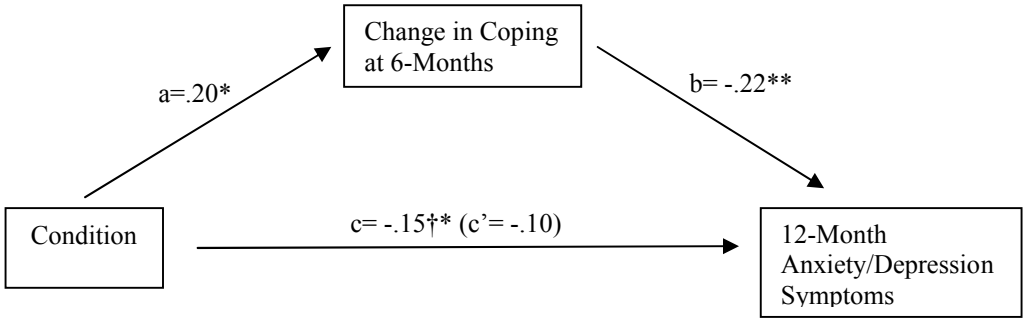
at 6-months emerged as a significant predictor (β = -.15, p = .05), again suggesting that changes in children and adolescents' use of secondary control coping skills accounted for their self-reports of internalizing symptoms at 12-months controlling for the effects of initial baseline symptoms and condition.

Table 7.
Regression Equations Predicting Anxious/Depressed Symptoms (Equation 1) and Internalizing Symptoms (Equation 2) from Condition and Changes in Coping at 6-months, Controlling for Baseline Symptoms

Equation 1 – YSR Anxious/Depressed from Coping Change at 6-months		Final R^2 = .42 F (3,106) = 26.36, p < .001
Step 1: R^2 change = .39***	β	sr^2
Baseline Anx/Dep	.60***	.36
Condition	-.15†*	.02
Step 2: R^2 change = .05**		
Baseline Anx/Dep	.62***	.38
Condition	-.10	.01
Coping Change at 6-months	-.22**	.05
Equation 2 – YSR Internalizing from Coping Change at 6-months		Final R^2 = .42 F (3,106) = 26.78, p < .001
Step 1: R^2 change = .42***	β	sr^2
Baseline Internalizing	.64***	.40
Condition	-.16*	.03
Step 2: R^2 change = .02*		
Baseline Internalizing	.65***	.42
Condition	-.13†	.02
Coping Change at 6-months	-.15*	.02

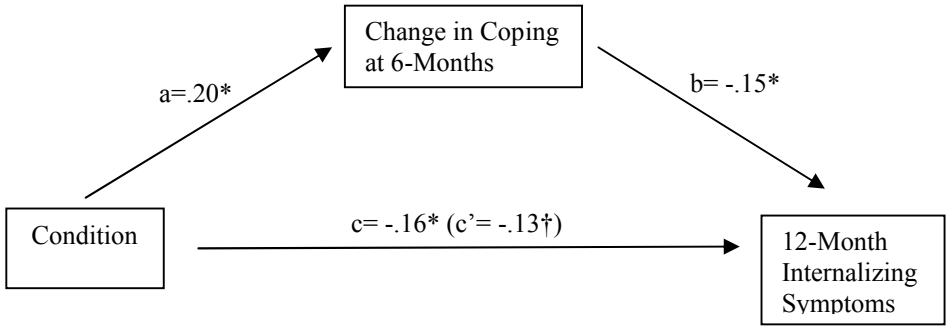
Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†*p=.06; †p < .10; * p<.05; **p < .01; ***p < .001.

Figure 4. *Change in Coping at 6-months as a Mediator of the Effects of Condition on 12-month Anxiety/Depression Symptoms*



Note: †**p*=.06; †*p* < .10; * *p*<.05; ***p* < .01; ****p* < .001.

Figure 5. *Change in Coping at 6-months as a Mediator of the Effects of Condition on 12-month Internalizing Symptoms*



Note: †**p*=.06; †*p* < .10; * *p*<.05; ***p* < .01; ****p* < .001.

Based on these analyses, changes in coping at 6-months predicting both anxiety/depression and internalizing symptoms at 12-months met criteria for the first three steps proposed by Baron and Kenny for partial mediation. To ascertain whether the criteria for full mediation was met (step 4 in the causal steps approach), the Sobel test was conducted to determine whether the change in the effect for condition predicting symptoms was significantly reduced when changes in coping at 6-months was included in the regression equation. The Sobel test for changes in coping at 6-months predicting 12-

month anxious/depressed symptoms emerged as a non-significant trend ($z = -1.71$, $p < .10$), and was non-significant for changes in coping at 6-month predicting 12-month internalizing symptoms. This indicates that children and adolescents' changes in their use of secondary control coping skills at 6 months partially mediated the effect of the intervention on reducing anxiety/depression and internalizing symptoms at 12 months, but did not meet criteria for full mediation.

Summary. Thus, based on Baron and Kenny's (1986) causal steps approach to establishing mediation, changes in children and adolescents' use of secondary control coping from baseline to 6-months meets the first three criteria and therefore partially mediates the effects of the intervention on reducing scores on symptom measures at 12-months. Evidence for changes in coping as a partial mediator also emerged for changes in coping at 2-months in predicting 12-month anxious/depressed symptoms.

Covariation within the Baron and Kenny Approach

All of the above regression equations were tested again controlling for the measure of symptoms at the point at which change in coping was measured (e.g., if the equation was predicting 12-month anxiety/depression symptoms using 2-month reports of coping, then symptoms of anxiety/depression at 2-months were also included), in an attempt to control for simultaneous change of coping and symptoms when predicting the outcome.

Changes in coping at 2-months controlling for 2-month symptoms. Two hierarchical regressions predicting 12-month symptoms from changes in coping at 2-months were examined, controlling for symptoms at 2-months (see Table 8 and Figures 6

and 7). A hierarchical regression model predicting 12-month anxious/depressed symptoms from change in coping at 2-months was examined, controlling for anxious/depressed symptoms at 2-months. Two-month symptoms and family assigned condition (intervention vs. self-study) were entered in the first step, and this step was significant, $F (2, 106) = 35.62$, $p < .001$, $R^2 = .40$, with the effect for 2-month symptoms emerging as a significant predictor of 12-month symptoms ($\beta = .62$, $p < .001$) whereas the effect for condition was non-significant. In the second step, change in coping at 2-months was added and the regression equation remained significant, $F (3, 106) = 28.21$, $p < .001$, $R^2 = .44$, with children and adolescents' 2-month symptoms remaining a significant predictor ($\beta = .65$, $p < .001$) and the effect for condition remaining non-significant. Further, change in coping at 2-months emerged as a significant predictor ($\beta = -.22$, $p < .01$), indicating that changes in children's use of secondary control coping at 2-months accounted for internalizing symptoms at 12-months above and beyond the effects of condition and internalizing symptoms at 2-months.

A hierarchical regression model predicting 12-month internalizing symptoms from change in coping at 2-months was examined controlling for internalizing symptoms at 2-months. Internalizing symptoms at 2-months and family assigned condition (intervention vs. comparison) were entered in the first step, and this step was significant, $F (2, 106) = 34.00$, $p < .001$, $R^2 = .38$, with the effect for 2-month symptoms emerging as a significant predictor of 12-month symptoms ($\beta = .62$, $p < .001$) and the effect for condition approaching significance ($\beta = -.13$, $p < .10$). In the second step, change in coping at 2-months was added and the regression equations remained significant, $F (3, 106) = 27.11$, $p < .001$, $R^2 = .43$, with children and adolescents' 2-month symptoms

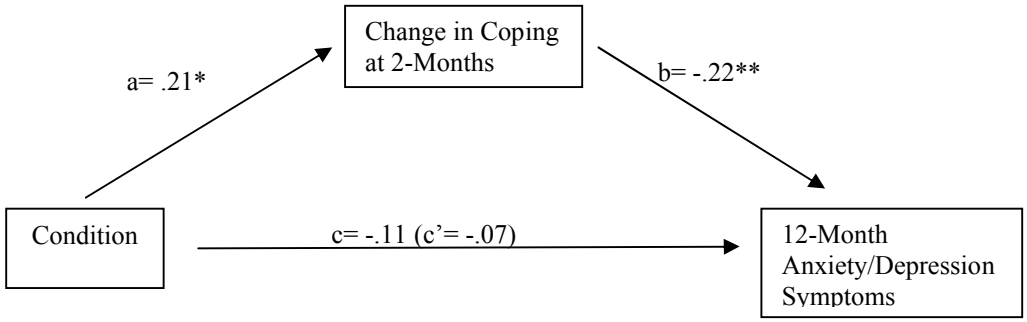
remaining a significant predictor (β = .66, p < .001). The effect for condition became non-significant, and change in coping at 2-months emerged as a significant predictor (β = -.22, $p < .01$), indicating that changes in children's use of secondary control coping at 2-months accounted for internalizing symptoms at 12-months above and beyond the effects of symptoms at 2-months.

Table 8.
Regression Equations Predicting Anxious/Depressed Symptoms (Equation 1) and Internalizing Symptoms (Equation 2) from Condition and Changes in Coping at 2-months, Controlling for 2-month Symptoms

Equation 1- YSR Anxious/Depressed from Coping Change at 2-months		
Covarying for 2-month Anx/Dep	Final R^2 = .44	F (3,106) = 28.21, p < .001
Step 1: R^2 change = .41***	β	sr^2
2-Month Anx/Dep	.62***	.38
Condition	-.11	.01
Step 2: R^2 change = .04**		
2-Month Anx/Dep	.65***	.41
Condition	-.07	.00
Coping Change at 2-months	-.22**	.04
Equation 2 – YSR Internalizing from Coping Change at 2-months		
Covarying for 2-month Internalizing	Final R^2 = .43	F (3,106) = 27.11, p < .001
Step 1: R^2 change = .40***	β	sr^2
2-Month Internalizing	.62***	.38
Condition	-.13†	.02
Step 2: R^2 change = .05**		
2-Month Internalizing	.66***	.42
Condition	-.08	.01
Coping Change at 2-months	-.22**	.05

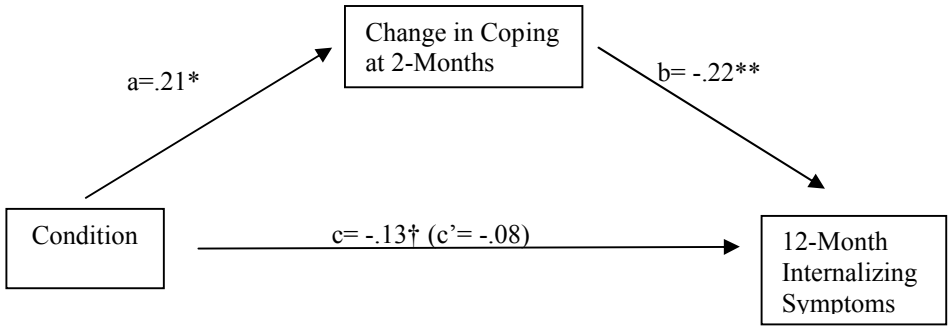
Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†*p=.06; †$p < .10$; * $p<.05$; **$p < .01$; ***$p < .001$.

Figure 6. *Change in Coping at 2-months as a Mediator of the Effects of Condition on 12-month Anxiety/Depression Symptoms, Covarying for 2-month Anxiety/Depression Symptoms*



Note: †**p*=.06; †*p* < .10; * *p*<.05; ***p* < .01; ****p* < .001.

Figure 7. *Change in Coping at 2-months as a Mediator of the Effects of Condition on 12-month Internalizing Symptoms, Covarying for 2-month Internalizing Symptoms*



Note: †**p*=.06; †*p* < .10; * *p*<.05; ***p* < .01; ****p* < .001.

Changes in coping at 6-months controlling for 6-month symptoms. Next, two regression models were tested examining changes in coping at 6-months as a predictor of 12-month symptoms covarying for symptoms at 6-months (see Table 9 and Figures 8 and 9). Specifically, a hierarchical regression model predicting 12-month anxious/depressed symptoms from changes in coping at 6-months was examined, controlling for anxious/depressed symptoms at 6-months. In this model, 6-month symptoms and family assigned condition (intervention vs. comparison) were entered in the first step, and this

step was significant, F (2, 106) = 130.85, $p < .001$, $R^2 = .71$, with the effect for 6-month symptoms emerging as a significant predictor of 12-month symptoms ($\beta = .84$, $p < .001$) whereas the effect for condition was non-significant. In the second step, change in coping at 6-months was added and the regression equations remained significant, F(3, 106) = 96.83, $p < .001$, $R^2 = .73$, with children and adolescents' 6-month symptoms remaining a significant predictor ($\beta = .84$, $p < .001$) and the effect for condition remaining non-significant. Further, change in coping at 6-months emerged as a significant predictor ($\beta = -.15$, $p < .01$), with greater increase in use of secondary control coping associated with fewer symptoms of anxiety/depression at 12-months, controlling for 6-month symptoms and condition.

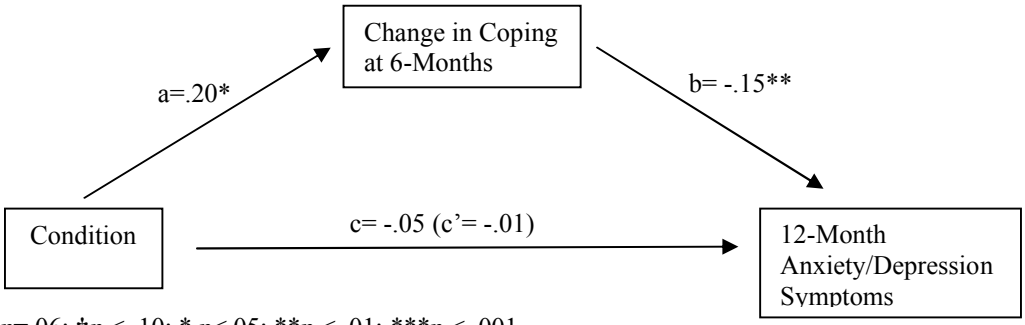
A hierarchical regression model predicting 12-month internalizing symptoms from change in coping at 6-months controlling for internalizing symptoms at 6-months was examined next. In the first step, 6-month symptoms and condition were entered, and this step was significant, F (2, 106) = 181.23, $p < .001$, $R^2 = .71$, with the effect for 6-month symptoms emerging as a significant predictor of 12-month symptoms ($\beta = .87$, $p < .001$) and the effect for condition approaching significance ($\beta = -.08$, $p < .10$). In the second step, change in coping at 6-months was added and the regression equations remained significant, F (3, 106) = 129.22, $p < .001$, $R^2 = .78$, with children and adolescents' 6-months symptoms remaining a significant predictor ($\beta = .88$, $p <. 001$). In addition, the effect for condition became non-significant, and change in coping at 6-months emerged as a significant predictor ($\beta = -.12$, $p < .05$), indicating again that greater increases in secondary control coping predicted fewer internalizing symptoms at 12-months, controlling for condition and symptoms at 6-months.

Table 9.
Regression Equations Predicting Anxious/Depressed Symptoms (Equation 1) and Internalizing Symptoms (Equation 2) from Condition and Changes in Coping at 6-months, Controlling for 6-month Symptoms

Equation 1 – YSR Anxious/Depressed from Coping Change at 6-months, Controlling for Anxious/Depressed Symptoms at 6-months	Final R^2 = .73	F (3,106) = 96.83, p < .001
Step 1: R^2 change = .72***	β	sr^2
6-month Anx/Dep	.84***	.69
Condition	-.05	.00
Step 2: R^2 change = .02**		
6-month Anx/Dep	.84***	.69
Condition	-.01	.00
Coping Change at 6-months	-.15**	.02
Equation 2 – YSR Internalizing from Coping Change at 6-months, Controlling for Internalizing Symptoms at 6-months	Final R^2 = .78	F (3,106) = 129.22, p < .001
Step 1: R^2 change = .78***	β	sr^2
6-month Internalizing	.88***	.76
Condition	-.08†	.01
Step 2: R^2 change = .01*		
6-month Internalizing	.88***	.77
Condition	-.06	.00
Coping Change at 6-months	-.12*	.01

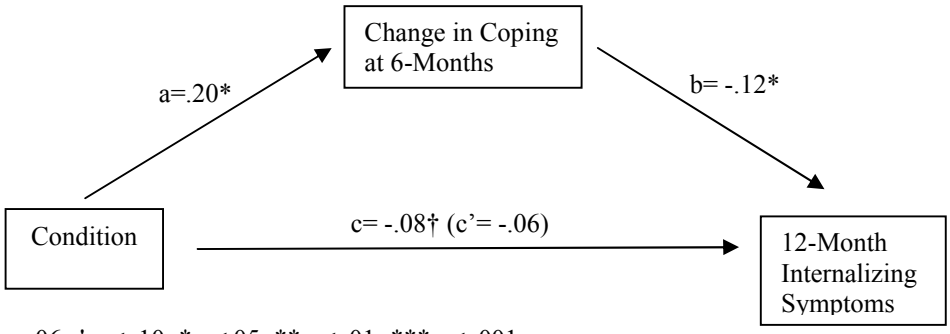
Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†*p=.06; †p < .10; * p<.05; **p < .01; ***p < .001.

Figure 8. *Change in Coping at 6-months as a Mediator of the Effects of Condition on 12-month Anxiety/Depression Symptoms, Covarying for 6-Month Anxiety/Depression Symptoms*



Note: †*p=.06; †p < .10; * p<.05; **p < .01; ***p < .001.

Figure 9. *Change in Coping at 6-months as a Mediator of the Effects of Condition on 12-month Internalizing Symptoms, Covarying for 6-Month Internalizing Symptoms*



Note: †**p*=.06; †*p* < .10; * *p*<.05; ***p* < .01; ****p* < .001.

Summary. Thus, the pattern of results in terms of the effect that changes in coping has on changes in symptoms, controlling for condition and covarying for symptoms at time of measurement of coping stayed the same or strengthened compared to results of regressions that did not control for corresponding symptom measurements. It is noteworthy, however, that step 1 based on Baron and Kenny's causal steps model (which requires a significant association between the condition and the outcome) was no longer significant with the inclusion of 2 or 6-month symptoms. Therefore, it is difficult to draw firm conclusions from these analyses based on Baron and Kenny's method that include symptoms at 2 and 6-months as covariates. Without full criteria being met for the first 3 steps, the Sobel test was not conducted because there was not a significant path between condition and outcome symptoms to attenuate. Thus, conclusions based on these analyses suggests that there is evidence for an effect of the proposed mediator (changes in coping) at both time-points on outcome symptoms when covarying for symptoms at time of measurement of coping; however, the non-significance of the first step in Baron and Kenny's approach excludes conclusions of mediation within any of the covariation analyses.

Kraemer et al. (2002) Approach

The effect for coping as a mediator was then tested using the approach Kraemer and colleagues (2002) outlined for testing mediation within the context of randomized clinical trials. They propose that evidence for mediation exists if the following criteria are met: 1) There is a significant association between condition and change in the mediator, and either 2a) there is a main effect of changes in the mediator that affects the outcome or 2b) there is an interaction between treatment and change in the mediator that affects the outcome. Mediation occurs when criteria 1 is established, and either criteria 2a is established, criteria 2b is established, or both 2a and 2b are established. Analyses are organized below corresponding to these two criteria.

In order to establish a significant association between condition and change in coping, correlations were conducted separately as a function of whether change in coping was calculated at the 2-month or 6-month time point, and results indicated significant, positive correlations. Specifically, condition (coded as a positive ½, whereas the comparison condition was coded as negative ½) was significantly and positively associated with changes in coping at 2-month ($r = .21$, $p < .05$) and with changes in coping at 6-month ($r = .20$, $p < .05$), suggesting that the intervention condition is associated with greater increases in coping. The significant, positive correlations between condition and change in coping at both 2-months and 6-months therefore meet Kraemer et al.'s (2002) first criterion as possible mediators, and indicate that greater change in coping was associated with youth in the intervention condition.

To examine whether Kraemer et al.'s (2002) second criteria was met, regression analyses were conducted. For these analyses, intervention condition was coded +1/2, the

comparison condition was coded -1/2, and changes in coping at 2-months and 6-months were centered by subtracting the corresponding mean (Kraemer & Blasey, 2004). The interaction term was created by multiplying condition by the centered changes in coping variable. This resulted in a total of four regression equations, wherein condition, changes in coping, and the interaction of condition by changes in coping was entered into an equation predicting 12-month symptoms, controlling for baseline symptoms.

Changes in coping at 2-months. Two regression equations were examined testing changes in coping at 2-months as a potential mediator based on the criteria proposed by Kraemer et al. (2002) (See Table 10). Specifically, a regression model predicting 12-month anxious/depressed symptoms from condition, changes in coping at 2-months, and the interaction of condition by changes in coping at 2-months was examined, controlling for anxious/depressed symptoms at baseline. The overall regression equation was significant, $F(4, 106) = 20.14$, $p < .001$, $R^2 = .42$, and baseline symptoms emerged as a significant predictor ($\beta = .60$, $p < .001$) of 12-month symptoms. Further, the interaction of condition by change in coping was also found to be a significant predictor of 12-month anxious/depressed symptoms ($\beta = .18$, $p < .05$). Specifically, changes in children and adolescents' coping were unrelated to changes in anxious/depressed symptoms for those in the intervention condition, whereas symptoms were highest for those in the comparison condition who decreased their use of secondary control coping (see Figure 10). In addition, the main effect for changes in coping at 2-months approached significance ($\beta = -.13$, $p < .10$). This satisfies Kraemer et al.'s second criteria, implicating changes in children's reports of coping at 2-months as a significant mediator of the effect for condition on 12-month anxiety/depression symptoms.

A regression model predicting 12-month internalizing symptoms from condition, changes in coping at 2-months, and the interaction of condition by changes in coping at 2-months controlling for baseline internalizing symptoms was examined next. Again, the overall regression equation was significant, $F(4, 106) = 23.79$, $p < .001$, $R^2 = .46$, and baseline symptoms was a significant predictor ($\beta = .64$, $p < .001$) of 12-month internalizing symptoms with the effect for condition emerging as marginal ($\beta = -.14$, $p < .10$). The main effect of changes in coping at 2-months was non-significant, but the interaction of condition by change in coping at 2-months emerged as a significant predictor of 12-month internalizing symptoms ($\beta = .22$, $p < .01$). Specifically, changes in children and adolescents' coping were unrelated to changes in internalizing symptoms for those in the intervention condition, whereas symptoms were highest for those in the comparison condition who decreased their use of secondary control coping (see Figure 11). This satisfies Kraemer et al.'s second criteria, therefore indicating changes in coping at 2-months is a mediator of the intervention's effects on reducing internalizing symptoms.

Table 10.

Regression Equations Predicting Anxious/Depressed Symptoms(Equation 1) and Internalizing Symptoms (Equation 2) from Condition, Changes in Coping at 2-months, and the Interaction of Condition by Changes in Coping at 2-months, Controlling for Baseline Symptoms

Equation 1 –YSR Anxious/Depressed from Coping Change at 2-months		
	Final R^2 = .42	F (4,106) = 20.14, p < .001
	β	sr^2
Baseline Anx/Dep	.60***	.35
Condition	-.12	.01
Coping Change at 2-months	-.13†	.02
Condition X coping at 2-months	.18*	.03
Equation 1 – YSR Internalizing from Coping Change at 2-months		
	Final R^2 = .46	F (4,106) = 23.79, p < .001
	β	sr^2
Baseline Internalizing	.64***	.40
Condition	-.14†*	.02
Coping Change at 2-months	-.10	.01
Condition X Coping at 2-months	.22**	.05

Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†*p=.06; †p < .10; * p<.05; **p < .01; ***p < .001.

Figure 10. *Interaction of Condition and Changes in Coping Predicting Anxious/Depressed Symptoms at 12-Months Controlling for Baseline Symptoms*

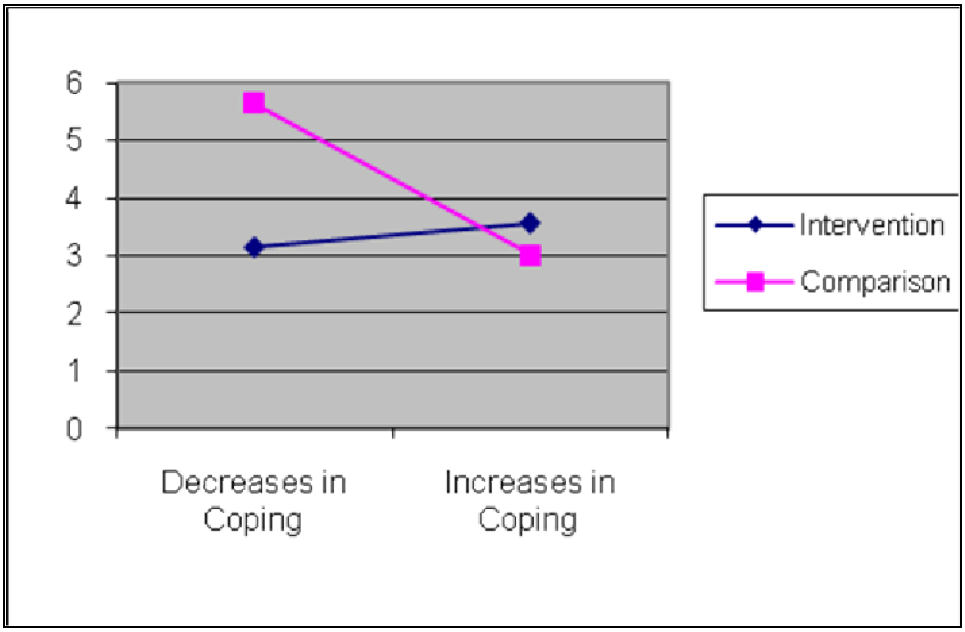
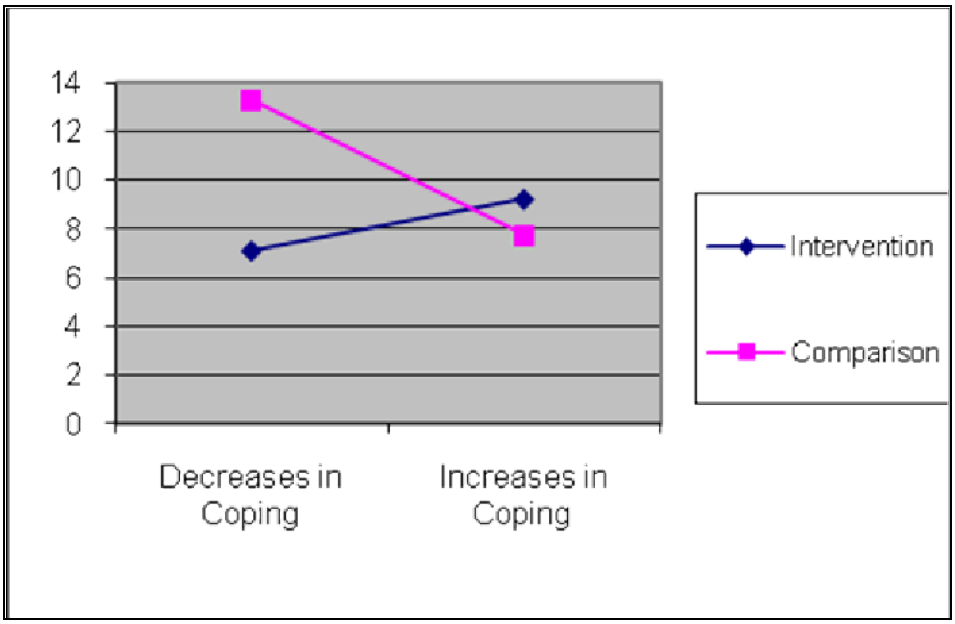


Figure 11. *Interaction of Condition and Changes in Coping Predicting Internalizing Symptoms at 12-Months Controlling for Baseline Symptoms*



Changes in coping at 6-months. Two regression equations were also examined testing changes in coping at 6-months as a mediator of the effect of condition on outcome symptoms (see Table 11). The models were identical to the models above except that they included changes in coping at 6-months rather than 2-months. In particular, a regression model predicting 12-month anxious/depressed symptoms from condition, changes in coping at 6-months, and the interaction of condition by changes in coping at 6-months was examined, controlling for anxious/depressed symptoms at baseline. The overall regression equation was significant, $F(4, 106) = 19.60$, $p < .001$, $R^2 = .41$. Baseline symptoms again emerged as a significant predictor ($\beta = .62$, $p < .001$) of 12-month anxious/depressed symptoms, and changes in coping at 6-months ($\beta = -.22$, $p < .10$) also emerged as a significant predictor of symptoms. In contrast, the interaction of condition by changes in coping at 6-months was non-significant. The significant main

effect of changes in coping at 6-months satisfies Kraemer et al.'s second criteria, implicating changes in coping at 6-months as a significant mediator of the effect for condition on 12-month anxiety/depression symptoms.

A regression model predicting 12-month internalizing symptoms from condition, changes in coping at 6-months, and the interaction of condition by changes in coping at 6-months controlling for baseline internalizing symptoms was also tested. Again, the overall regression equation was significant, $F(4, 106) = 20.29$, $p < .001$, $R^2 = .42$, with baseline symptoms again emerging as a significant predictor ($\beta = .65$, $p < .001$) of 12-month internalizing symptoms. In contrast to prior models tested using the Kraemer approach, both changes in coping at 6-months and the interaction of condition by changes in coping at 6-months were non-significant, whereas a non-significant trend emerged for condition as a significant predictor ($\beta = -.14$, $p < .10$) of 12-month symptoms. Due to the non-significant effects found for both the main effect of changes in coping at 6-months and the interaction of condition by changes in coping at 6-months, changes in coping at 6-months did not meet Kraemer et al.'s second criteria for mediation. Therefore, based on this approach, change in coping at 6-months was not found to mediate the effect of condition on 12-month internalizing symptoms.

Table 11.

Regression Equations Predicting Anxious/Depressed Symptoms(Equation 1) and Internalizing Symptoms (Equation 2) from Condition, Changes in Coping at 6-months, and the Interaction of Condition by Changes in Coping at 6-months, Controlling for Baseline Symptoms

Equation 1 – YSR Anxious/Depressed from Coping Change at 6-months		
	Final R^2 = .41	F (4,106) = 19.60, p < .001
	β	sr^2
Baseline Anx/Dep	.62***	.38
Condition	-.10	.01
Coping Change at 6-months	-.22**	.04
Condition X Coping at 6-months	.02	.00
Equation 2 – YSR Internalizing from Coping Change at 6-months		
	Final R^2 = .42	F (4,106) = 20.29, p < .001
	β	sr^2
Baseline Internalizing	.65***	.42
Condition	-.14†	.02
Coping Change at 6-months	-.12	.01
Condition X Coping at 6-months	.08	.00

Note: β = standardized beta; sr^2 = semi-partial correlation squared;
$^{\dagger *}p$=.06; $^{\dagger}p$ < .10; * p<.05; **p < .01; ***p < .001.

Summary. Based on Kraemer et al.'s two step criteria to establishing mediation, changes in coping at 2-months emerged as a significant mediator of the association between condition and both 12-month anxious/depressed and internalizing symptoms. In contrast, results indicated that changes in coping at 6-months met criteria as a mediator only for the association between condition and 12-month anxious/depressed symptoms.

Covariation within the Kraemer Approach

All of the above regression equations testing for mediation using Kraemer et al.'s (2002) criteria were conducted again, controlling for the measure of symptoms at the point at which change in coping was measured (e.g., if the equation was predicting 12-month anxiety/depression symptoms using 2-month reports of coping, then symptoms of anxiety/depression at 2-month were also included). As previously noted, this was an

attempt to control for simultaneous change of coping and symptoms when predicting the outcome, in order to more clearly delineate temporal precedence of changes in the mediator occurring prior to changes in the outcome.

Changes in coping at 2-months controlling for 2-month symptoms. Two regression equations were examined, predicting 12-month outcome symptoms (anxious/depressed or internalizing) from condition, changes in coping at 2-months, and the interaction of condition by changes in coping at 2-months, controlling for 2-month symptoms (see Table 12). The pattern of results for changes in coping at 2-months predicting both anxiety/depression and internalizing symptoms with the inclusion of the corresponding symptom measure was similar to the pattern of results without the inclusion of this covariate. Specifically, the overall regression equation predicting 12-month anxiety/depression was significant $F(4,106) = 23.80$, $p < .001$, $R^2 = .46$, with symptoms of anxiety/depression at 2-months emerging as a significant predictor ($\beta = .64$, $p < .001$) of 12-month symptoms. Further, as in the model without the 2-month symptom covariate, the interaction of condition by change in coping was a significant predictor of 12-month anxious/depressed symptoms ($\beta = .18$, $p < .05$). Specifically, changes in children and adolescents' coping were unrelated to changes in anxious/depressed symptoms for those in the intervention condition, whereas symptoms were highest for those in the comparison condition who decreased their use of secondary control coping (see Figure 12). In contrast to the model without the 2-month symptom covariate, the main effect for changes in coping at 2-months in this model (which previously only approached significance) was significant ($\beta = -.19$, $p < .05$). Thus, as in the model without the corresponding symptom covariate at time of measurement of coping, changes

in coping at 2-months, controlling for 2-month anxious/depressed symptoms, is a mediator of the effect for condition on 12-month anxiety/depression symptoms based on Kraemer et al.'s (2002) criteria.

The regression model predicting 12-month internalizing symptoms from condition, changes in coping at 2-months, and the interaction of condition by changes in coping at 2-months controlling for 2-month internalizing symptoms was examined next. Again, the overall regression equation was significant, $F(4, 106) = 23.43$, $p < .001$, $R^2 = .46$, and internalizing symptoms at 2-months was a significant predictor ($\beta = .64$, $p < .001$) of 12-month internalizing symptoms. Further, as in the model without the 2-month symptom covariate, the interaction of condition by change in coping at 2-months significantly predicted 12-month internalizing symptoms ($\beta = .20$, $p < .01$). Specifically, changes in children and adolescents' coping were unrelated to changes in internalizing symptoms for those in the intervention condition, whereas symptoms were highest for those in the comparison condition who decreased their use of secondary control coping (see Figure 13). In contrast to the non-significant effect found in the model without the 2-month symptom covariate, the main effect of changes in coping at 2-months was a significant predictor ($\beta = -.19$, $p < .05$) of 12-month internalizing symptoms in this regression model. Therefore, conclusions based on this model with the 2-month symptom covariate is identical to the model without this covariate, and suggests that changes in coping at 2-months is a mediator of the intervention's effects on reducing internalizing symptoms.

Table 12.

Regression Equations Predicting Anxious/Depressed Symptoms(Equation 1) and Internalizing Symptoms (Equation 2) from Condition, Changes in Coping at 2-months, and the Interaction of Condition by Changes in Coping at 2-months, Controlling for 2-month Symptoms

Equation 1 –YSR Anxious/Depressed from Coping Change at 2-months		
Covarying for 2-month Anx/Dep	Final R^2 = .46	F (4,106) = 23.80, p < .001
	β	sr^2
2-Month Anx/Dep	.64***	.39
Condition	-.07	.00
Coping Change at 2-months	-.19*	.03
Condition X coping at 2-months	.18*	.03
Equation 2 – YSR Internalizing from Coping Change at 2-months		
Covarying for 2-month Internalizing	Final R^2 = .46	F (4,106) = 23.43, p < .001
	β	sr^2
2-Month Internalizing	.64***	.40
Condition	-.09	.01
Coping Change at 2-months	-.19*	.03
Condition X Coping at 2-months	.20**	.04

Note: β = standardized beta; sr^2 = semi-partial correlation squared;
$^{\dagger *}p$=.06; $^{\dagger}p < .10$; * p<.05; **$p < .01$; ***$p < .001$.

Figure 12. *Interaction of Condition and Changes in Coping Predicting Anxious/Depressed Symptoms at 12-Months Controlling for 2-Month Symptoms*

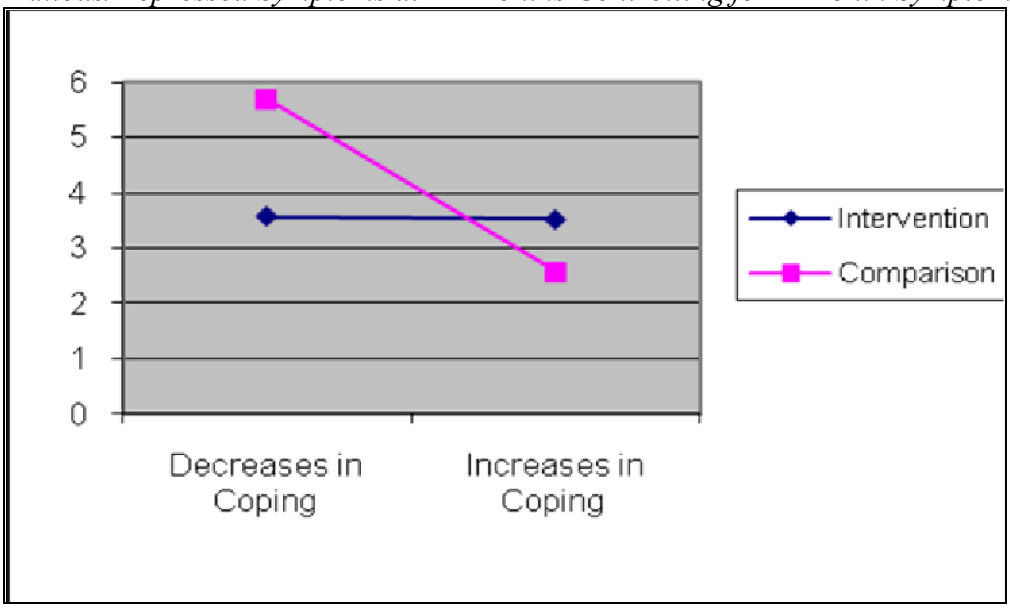
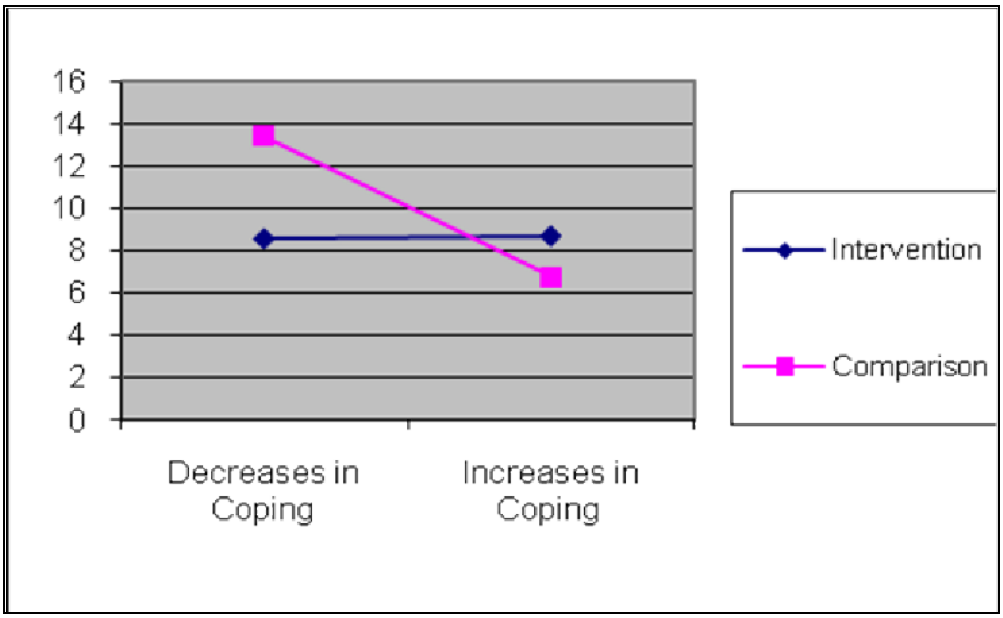


Figure 13. *Interaction of Condition and Changes in Coping Predicting Internalizing Symptoms at 12-Months Controlling for 2-Month Symptoms*



Changes in coping at 6-months controlling for 6-month symptoms. Two regression equations were examined next, predicting 12-month outcome symptoms (anxious/depressed or internalizing) from condition, changes in coping at 6-months, the interaction of condition by changes in coping at 6-months, controlling for 6-month symptoms (see Table 13). The pattern of results for changes in coping at 6-months predicting both anxiety/depression and internalizing symptoms with the inclusion of the corresponding symptom measure was again very similar to the pattern of results without the inclusion of this covariate. Specifically, the overall regression equation predicting 12-month anxiety/depression was significant $F(4,106) = 72.63$, $p < .001$, $R^2 = .73$, with symptoms of anxiety/depression at 6-months emerging as a significant predictor ($\beta = .84$, $p < .001$) of 12-month symptoms. Further, as in the model without the 6-month symptom covariate, changes in coping at 6-months was a significant predictor of 12-month

anxious/depressed symptoms (β = .14, $p < .05$), and the interaction of condition by changes in coping at 6-months was non-significant. Due to the identical pattern of results found for the models predicting 12-month anxious/depressed symptoms with and without the corresponding symptom covariate at time of measurement of coping, results from this model also indicate that changes in coping at 6-months is a significant mediator of the effect for condition on 12-month anxiety/depression symptoms based on Kraemer et al.'s (2002) criteria.

The regression model predicting 12-month internalizing symptoms from condition, changes in coping at 6-months, and the interaction of condition by changes in coping at 6-months controlling for 6-month internalizing symptoms was examined next. Again, the overall regression equation was significant, $F(4, 106) = 98.07$, $p < .001$, $R^2 = .79$, and internalizing symptoms at 6-months was a significant predictor (β = .88, $p < .001$) of 12-month internalizing symptoms. In contrast to the non-significant effect found in the regression model without the 6-month symptom covariate, there was a non-significant trend found for changes in coping at 6-months (β = -.09, $p < .10$) as a significant predictor of 12-month symptoms in the current model (with the inclusion of 6-month symptoms). The interaction of condition by change in coping at 6-months was non-significant. Therefore, conclusions based on this model with the inclusion of the 6-month symptom covariates are identical to the model without the corresponding covariate, and indicate that changes in coping at 6-months is not a mediator of the intervention's effects on reducing internalizing symptoms.

Table 13.

Regression Equations Predicting Anxious/Depressed Symptoms(Equation 1) and Internalizing Symptoms (Equation 2) from Condition, Changes in Coping at 6-months, and the Interaction of Condition by Changes in Coping at 6-months, Controlling for 6-month Symptoms

Equation 1 – YSR Anxious/Depressed from Coping Change at 6-months		
Covarying for 6-month Anx/Dep	Final R^2 = .73	F (4,106) = 72.63, p < .001
	β	sr^2
6-Month Anx/Dep	.84***	.68
Condition	-.02	.00
Coping Change at 6-months	-.14*	.02
Condition X Coping at 6-months	.05	.00
Equation 2 – YSR Internalizing from Coping Change at 6-months		
Covarying for 6-month Internalizing	Final R^2 = .79	F (4,106) = 98.07, p < .001
	β	sr^2
6-Month Internalizing	.88***	.77
Condition	-.06	.00
Coping Change at 6-months	-.09†*	.01
Condition X Coping at 6-months	.06	.00

Note: β = standardized beta; sr^2 = semi-partial correlation squared;
†**p*=.06; †*p* < .10; * *p*<.05; ***p* < .01; ****p* < .001.

Summary. Conclusions for the regression models using the Kraemer et al. (2002) approach to testing for mediation while controlling for the measure of symptoms at the point at which change in coping was measured were identical to conclusions reached without this symptom covariate. Thus, these results suggest that changes in coping at 2-months is a mediator of the effect for condition on both 12-month anxiety/depression and 12-month internalizing symptoms, but changes in coping at 6-months is only a mediator for the effect of condition on 12-month anxious/depressed symptoms.

CHAPTER IV

DISCUSSION

Significant progress has been made toward the goal of preventing depression in youth, with a recent review indicating small to moderate effects of preventive interventions reducing symptoms in children and adolescents at high risk for depression (Horowitz & Garber, 2006). Despite this promising work, very little research has examined the mechanisms (mediators) that account for the positive effects of these interventions. The present study examined changes in coping as a mediator of the efficacy of a preventive intervention program for children and adolescents of parents with a history of depression. This study was based on a theory-driven intervention informed by pre-intervention risk research, which implicated secondary control coping skills as a potentially beneficial form of coping for children and adolescents faced with the stress of a parent with a history of depression (Compas, Keller, & Forehand, in press). This study therefore improves on prior interventions by teaching a type of coping informed by prior research, and by using a measure that explicitly captures changes in secondary control coping skills. The most important finding from this study was that changes in children and adolescents' use of secondary control coping mediated program effects on children and adolescents' symptoms 12-months later. Thus, the present study provides evidence that changing how children and adolescents cope with stress decreases their reports of symptoms of psychopathology. Results from this study therefore have potentially important implications for prevention research and implicate secondary control coping as

a core component to include in future interventions designed to prevent depression in high-risk youth.

Evidence for Changes in Coping

Non-significant trends were found in partial support of the first hypothesis that children and adolescents in the intervention condition would increase their use of secondary control coping compared to those youth in the comparison condition. In particular, there was some evidence at both 2-months and 6-months that children and adolescents in the intervention condition were reporting greater use of secondary control coping skills compared to children and adolescents in the comparison condition. Small effects were demonstrated for the differences between reports of coping for youth in the intervention condition relative to the self-study comparison condition. It is likely that the sample size in the current study limits the ability to detect small differences between the groups. Should the small effect size remain stable with a larger sample of youth, it would likely reach statistical significance.

Upon examination of the pattern of change in coping between the intervention and comparison condition, it appears that a prevention effect rather than a treatment effect was found with respect to youth's use of coping, which was an unexpected finding. Specifically, children and adolescents in the comparison condition decreased their use of secondary control coping, whereas those in the intervention condition maintained a relatively stable level of coping. Previous research has found a negative association between secondary control coping and stress among children of depressed parents, suggesting that children and adolescents use less secondary control coping as stress levels

increase (e.g., Jaser et al., 2005; Langrock et al., 2002). Findings from this study therefore may be a result of increased stress levels for families in the comparison condition (e.g., the intervention condition decreased the amount of stress in families), or that the *longer* children and adolescents are exposed to chronic stress, the less they use secondary control coping. Thus, the intervention appears to have prevented the reduction in secondary control coping seen in those youth in the comparison condition, and future research should examine other variables such as levels of stress in families of depressed parents an attempt to ascertain why coping decreased in controls. In addition, future research should consider measuring coping more frequently to better ascertain the patterns of change in the two groups over time.

Changes in Coping as a Mediator of Intervention Effects

Support was found for the second hypothesis, suggesting that changes in children and adolescents' use of secondary control coping skills is a mediator of the effect of a family cognitive behavior intervention on reducing symptoms in children and adolescents (see Tables 14 and 15 for a summary of results). In particular, results from this study provide consistent support across two statistical methods of testing for mediation that changes in coping reflected from both baseline to the end of the acute phase (i.e., 8 weekly sessions or the 2-month time point) of the intervention and change in coping upon completion of the acute and follow-up phase (4 monthly sessions or the 6-month time point) account for the effects of the intervention on reducing anxiety/depression symptoms, controlling for baseline levels of symptoms. This suggests that changing (or sustaining) children and adolescents' use of secondary control coping skills (i.e.,

acceptance, distraction, cognitive restructuring) resulted in fewer reported symptoms of anxiety/depression.

In addition, results from this study provided evidence in support of changes in coping at both time points as a mediator of the effects of the intervention on reducing total internalizing symptoms; however, evidence for mediation with respect to reduced internalizing symptoms varied based on the approach taken to testing for mediation (i.e., using the Baron and Kenny approach only, changes in coping at 6-months was a significant mediator, and using the Kraemer et al. approach only, changes in coping at 2-months was a significant mediator). The somewhat different results found across data analytic approaches for changes in coping as a mediator of internalizing symptoms is in contrast to the consistent results across the two data analytic approaches found for changes in coping at both time points as a mediator of anxious/depressed symptoms. The difference in the results may be due to the composition of the dependent variables. The measure of internalizing symptoms on the YSR includes anxious/depressed symptoms as well as somatic and withdrawn symptoms, and therefore may include symptoms that are less likely to change as a result of increased use of secondary control coping. However, even if internalizing symptoms are a less sensitive indicator of symptoms targeted by the intervention, results from this study still suggest that changes in children and adolescents' use of secondary control coping following the acute phase of treatment and upon completion of 4 monthly follow-up sessions functioned as a mediator of the effects of the intervention on reducing internalizing symptoms.

Table 14. *Summary of Findings for Changes in Coping as a Mediator of 12-month Anxiety/Depression Symptoms*

	Coping Change at 2-month		**Coping Change at 6-month**	
	Coping Change at 2-month	Coping Change Covarying for Symptoms at 2-month	Coping Change at 6-month	Coping Change Covarying for Symptoms at 6-month
Baron and Kenny Causal Steps				
Step 1. Significant relationship between condition and outcome symptoms	**Yes**	No	**Yes**	No
Step 2. Significant relationship between condition and changes in coping	**Yes**	**Yes**	**Yes**	**Yes**
Step 3. Changes in coping significantly affects the outcome	**Yes**	**Yes**	**Yes**	**Yes**
Step 4. Association between intervention and outcome significantly reduced by changes in coping	No	N/A	No	N/A
Kraemer Approach				
Step 1. Significant association between condition and change in coping	**Yes**	**Yes**	**Yes**	**Yes**
Step 2a. Significant main effect of change in coping predicting outcome symptoms	No	**Yes**	**Yes**	**Yes**
OR				
Step 2b. Significant interaction between condition and change in mediator that affects outcome symptoms	**Yes**	**Yes**	No	No
Baron and Kenny Conclusions	**Partial Mediation**	Non-significant	**Partial Mediation**	Non-significant
Kraemer Conclusions	**Mediation**	**Mediation**	**Mediation**	**Mediation**

Table 15. Summary of Findings for Changes in Coping as a Mediator of 12-month Internalizing Symptoms

	Coping Change at 2-month		**Coping Change at 6-month**	
	Coping Change at 2-month	Coping Change Covarying for Symptoms at 2-month	Coping Change at 6-month	Coping Change Covarying for Symptoms at 6-month
Baron and Kenny Causal Steps				
Step 1. Significant relationship between condition and outcome symptoms	**Yes**	No	**Yes**	No
Step 2. Significant relationship between condition and changes in coping	**Yes**	**Yes**	**Yes**	**Yes**
Step 3. Changes in coping significantly affects the outcome	No	**Yes**	**Yes**	**Yes**
Step 4. Association between intervention and outcome significantly reduced by changes in coping	N/A	N/A	No	N/A
Kraemer Approach				
Step 1. Significant association between condition and change in coping	**Yes**	**Yes**	**Yes**	**Yes**
Step 2a. Significant main effect of change in coping predicting outcome symptoms	No	**Yes**	No	No
OR				
Step 2b. Significant interaction between condition and change in mediator that affects outcome symptoms	**Yes**	**Yes**	No	No
Baron and Kenny Conclusions	Non-significant	Non-significant	**Partial Mediation**	Non-significant
Kraemer Conclusions	**Mediation**	**Mediation**	Non-significant	Non-significant

Thus, taken together the results from this study indicate that changes in coping functioned as a mediator of the effects of the intervention both when measuring coping after the acute phase of the intervention and upon completion of 4 monthly follow-up sessions. This suggests that meaningful changes in coping are occurring rapidly during the first 2 months of the intervention, and may either remain consistent during the next four months or strengthen with repeated practice and the support provided in the follow-up sessions. Without directly assessing for changes in coping from 2-months to 6-months, it is difficult to ascertain whether meaningful changes continue to occur during the monthly follow-up sessions. More frequent measures of coping may be useful in future research in order to capture the point at which the greatest change occurs.

The current study contributes to the growing body of research on interventions designed to enhance coping skills in children and adolescents. Only a small portion of previous studies that found evidence for changes in coping skills in preventive interventions conducted mediation analyses (Pössel et al., 2005; Spence et al., 2003; Tein et al., 2006). Findings from these studies provide some support for various types of coping (e.g., problem-solving, active inhibition of emotion, active coping) as mediators of the effects of interventions. Compared with these previous studies, the intervention in the current study was specific about the types of coping strategies being taught to children (acceptance, distraction, positive thinking/cognitive restructuring), and utilized a measure of coping that explicitly captures these particular skills. Thus, results from the current study indicated that changes in secondary control coping was a mechanism through which the present intervention reduced symptoms in children and adolescents at risk for depression based on parental history of depression.

Methodological Issues in Testing Mediation

This study also examined important methodological issues in testing for mediation within intervention trials. Specifically, results from Baron and Kenny's (1986) causal steps approach to testing for mediation were compared with results from Kraemer et al.'s (2002) method which was designed in part for use within intervention trials (see Tables 14 and 15 for summaries of the findings from these two approaches). Mediation conclusions were consistent across both approaches for only two analyses. Specifically, results from both Baron and Kenny's causal steps approach and Kraemer et al.'s method indicated that changes in coping at 2-months (controlling for baseline symptoms) and changes in coping at 6-months (controlling for baseline symptoms) were both significant mediators of the effects of the intervention on reducing anxious/depressed symptoms. The significant results for changes in coping at 2-months and changes in coping at 6-months as mediators of the effect of the intervention on reducing anxious/depressed symptoms is therefore the most reliable finding of this study, as it was replicated across two data analytic methods.

In contrast, several differences emerged (in terms of conclusions for whether changes in coping was a mediator) across use of these two methods, such that a greater number of significant mediation analyses resulted from using the method proposed by Kraemer et al. (2002). In particular, when including symptom covariates (e.g., controlling for changes in symptoms at 2-months or 6-months rather than symptoms at baseline), findings from the Kraemer method indicated in 3 out of 4 analyses that changes in coping was a significant mediator, whereas findings from the Baron and Kenny approach did not find evidence for mediation across any of the 4 analyses. In particular,

changes in coping at 2-months controlling for 2-month symptoms, and changes in coping at 6-months controlling for 6-month symptoms both emerged as significant mediators of 12-month anxious/depressed symptoms based on the Kraemer method, but were non-significant based on Baron and Kenny's criteria. These two variables did not meet criteria for mediation (based on Baron and Kenny's criteria) because of the non-significant association between condition and 12-month symptoms when controlling for symptoms at 2-month or 6-month (step 1 in Baron and Kenny's causal steps approach); whereas when controlling for baseline anxious/depressed symptoms, condition accounted for changes in the outcome predictor.

The fact that condition failed to account for symptoms at 12-months when corresponding symptoms at 2-months or 6-months were included in the equations suggests that the majority of the change on this dependent variable was occurring rapidly (i.e., prior to the 2-month time point). The failure of the Baron and Kenny approach to take this into account is a significant limitation, and some critics argue that step 1 is not necessary for mediation to occur (e.g., MacKinnon, Fairchild, & Fritz, 2007). Had the first step been significant for both of these models, a conclusion of mediation would have been reached for both of these variables (since steps 2 and 3 were met), which would have resulted in consistent conclusions across both approaches in the test of these variables as mediators of the association of condition and changes in anxious/depressed symptoms. This finding therefore provides support for the Kraemer approach to testing for mediation over the Baron and Kenny approach.

With respect to 12-month internalizing symptoms, results utilizing the two methods were inconsistent, with changes in coping at 2-months controlling for either

baseline or 2-month symptoms emerging as a significant mediator based on Kraemer et al.'s approach, and changes in coping at 6-months controlling for baseline symptoms emerging as a significant mediator based on Baron and Kenny's causal steps method. Again, changes in coping at 2-month controlling for 2-month symptoms was not a significant mediator based on Baron and Kenny's approach due to the non-significant first step (condition did not significantly predict 12-month internalizing symptoms when controlling for 2-month internalizing symptoms). Further, changes in coping at 2-months controlling for *baseline* symptoms was considered a significant mediator based on Kraemer et al.'s approach, an effect not found using Baron and Kenny's approach. Changes in coping at 2-months was considered a mediator based on Kraemer et al.'s approach because there was a significant association between intervention condition and change in coping (criteria 1), and the interaction between condition and change in coping significantly predicted 12-month symptoms (criteria 2), controlling for the main effect of condition and changes in coping.

The inclusion of the interaction of the intervention and the mediator is a unique element in the criteria outlined by Kraemer et al., which they include to address concerns that the effect of the mediator (changes in coping) on the outcome (internalizing) may vary depending on the condition to which youth are assigned. If the interaction of intervention and changes in the mediator has a significant effect on the outcome symptoms, Kraemer and colleagues argue this is sufficient for establishing mediation (coupled with their first criteria). Therefore, by not including the interaction term, they argue that this mediation effect may be missed. Results from this study provide support for this argument, suggesting that if the classic approach to testing for mediation alone

had been used (Baron & Kenny), then no evidence for changes in coping at 2-month as a mediator of the effect of condition on changes in internalizing symptoms would have been found. Thus, the interaction of intervention by changes in coping in the current analyses was more sensitive to capturing the complex pattern of change occurring differently across the two groups, whereas the Baron and Kenny method for mediation was insensitive to the way that changes in coping functioned differently across the two groups. As a result, the inclusion of an interaction term when testing for mediation within the context of intervention trials may be a significant improvement on prior statistical methods (which assume the interaction is zero and therefore do not include this term), and should be considered in future studies.

Another major difference apparent in the two approaches was the specification of partial vs. full mediation in the Baron and Kenny approach. In order to meet criteria for partial mediation in Baron and Kenny's method, steps 1 through 3 must be significant. Full mediation occurs when step 4 is also significant, in which the effect of condition on the outcome is significantly decreased by inclusion of the potential mediator. The Sobel (1982) test is the most commonly used test conducted for this last step, and it has been criticized as too stringent and requiring large samples to achieve significance. As a result, several researchers (e.g., MacKinnon, Fairchild, & Fritz, 2007) have recently suggested that evidence for full mediation is met once significant results are found for the first three criterion steps within their model. No significant results for full mediation using the Sobel test were found in the present study (likely due at least in part to the sample size), suggesting effects for partial mediation of changes in coping but never full mediation based on the classic criteria outlined by Baron and Kenny.

In contrast, Kraemer and colleagues do not specify criteria for partial vs. full mediation, and simply refer to mediation. For the purposes of this study, results were considered comparable in terms of significance for mediation when the Baron and Kenny approach yielded *partial* mediation conclusions and Kraemer yielded *mediation* conclusions. The necessity and importance of testing for partial vs. full mediation is therefore called into question with results from this study, suggesting that using a broader term (e.g., simply using "mediation") with a more specific means of testing for magnitude of the mediation effect may be a more appropriate alternative approach in future research. Thus, based on results of the two approaches to testing for mediation within a single dataset, the more recent method proposed by Kraemer et al. (2002) may be more appropriate for use within the context of intervention trials. The inclusion of the interaction of condition and putative mediator in the model permits greater ability to discern complex patterns of change between the two groups, and captures the fact that the mediator may be functioning differently in the two groups. Future research should therefore consider utilizing Kraemer et al.'s method when testing for mediators of intervention effects.

Covarying for Symptoms at the Time of Measurement of Coping

In addition, it's important to establish that changes in the mediator occurred prior to, and independent of changes in the outcome. In order to attempt to study whether changes in coping and symptoms were occurring simultaneously, all analyses were run both with and without including the corresponding symptom covariate at the time of measurement of the potential mediator. When analyses were run in this way, effects for

changes in coping as a mediator remained significant only when testing for mediation using Kraemer's method. In particular, the effect for changes in coping at both time points as a mediator of 12-month anxious/depressed symptoms remained, as did the effect for changes in coping at 2-month as a significant mediator of 12-month internalizing symptoms, when controlling for corresponding symptoms. This suggests that even with the inclusion of the symptom covariate, there was still enough residual change left in the outcome measures to predict changes in the outcome from changes in coping. This also provides support for the temporal precedence of changes in coping occurring before changes in the outcome, a particular emphasis in the Kraemer et al. approach.

As previously noted, when examining the corresponding 2-month or 6-month symptom covariate, changes in coping was no longer considered a mediator due to a non-significant first step in Baron and Kenny's causal steps approach. It is noteworthy, however, that changes in coping would have remained a significant mediator of anxiety/depression symptoms with the inclusion of the corresponding symptom covariate had the first step (establishing a significant association between condition and outcome symptoms) remained significant (i.e., changes in coping was still a significant predictor of 12-month anxious/depressed symptoms, but there was not a significant effect of condition on outcome). Similarly, changes in coping at both time points would have been a significant mediator of 12-month internalizing symptoms had the first step of Baron and Kenny's criteria been met. Again, results from this study therefore suggest that Kraemer et al's approach to testing for mediation is more appropriate within the context of

intervention trials, as Baron and Kenny's approach appears too stringent and less sensitive to complex patterns of change.

Limitations

This study had several limitations. First, results from this study were based solely on questionnaire data from children and adolescents' self-reports. This lends itself to the problem of common or shared method variance, and future research would benefit from assessing symptoms and coping using multiple methods (e.g., semi-structured interviews, parent reports). In addition, the sample size in the present study likely limited the power to detect small effects. The Sobel test, which emerged non-significant in all analyses, typically requires a large sample size to detect even small effects. Future research should therefore re-evaluate mediation analyses for the current study when more participants have reached the 12-month time-point, to ascertain whether a similar pattern of results remains. Another limitation of the present study was the measurement of coping at only two time intervals within a 6-month period. More frequent measurements of the putative mediator (i.e., changes in coping) may permit a greater ability to understand patterns of change, as well as capture change in the mediator prior to change in the outcome.

Implications for Future Research

Results from this study have important implications for research on the construct of coping, as well as for future interventions. This study targeted increasing secondary control coping skills because prior research had identified this set of coping skills as pertinent for children and adolescents of depressed parents. Findings from this study

suggest that teaching coping skills is one mechanism through which preventive interventions may have their effect on reducing depressive symptoms. It will be important to replicate results from this study by conducting another randomized intervention trial utilizing the same foundation of teaching secondary control coping skills. Future research should also attempt to enhance the coping skills component of this intervention, in an effort to further increase effects of this mediator on reducing symptoms of depression in youth.

Furthermore, the positive findings from this study suggest that future interventions should consider basing their work on a specific theory, engaging in pre-intervention research to test their theory, and then design the intervention such that the techniques taught are informed from the earlier research. In addition, it is important for future studies that teach coping skills to include a measure of coping that explicitly captures the skills they are teaching. Previous intervention research often did not match the measure of coping to the skills they taught, which decreases the sensitivity of the measure to capturing expected changes.

In addition, it is also important for future research to continue to try to disentangle the direction of effects between coping and symptoms. Although this study's mediation analyses typically held up under the Kraemer approach with the inclusion of the symptom covariate, it is important to continue taking into account issues of temporal precedence. As noted above, future interventions should find a way to increase their frequency of measurement of coping, in order to maximize the likelihood that the data capture change in the mediator prior to change in the outcome. It is important to capture change in the mediator at its greatest point prior to changes in the outcome, and more frequent

measurements of this construct would help establish this and increase understanding of the pattern of change in coping over the course of the intervention. It will also be important to include a similar measurement of coping at identical time intervals for youth in the comparison condition.

Further, this study has important methodological implications. Findings from this study suggest that the approach outlined by Kraemer and colleagues (2002) for testing mediation may be more sensitive to significant mediators, due to the fewer criteria necessary to achieve status as a mediator, as well as the inclusion of the interaction term in the equation (which suggests that the effect of changes in the mediator on the outcome depends on the condition to which youth were assigned). Based on findings from this study, the Kraemer approach appears to be more appropriate for testing mediation within the context of intervention trials and should be utilized in future research.

In conclusion, the results from this study indicate that changes in children and adolescents' use of secondary control coping skills accounted for the effects of a family based, cognitive-behavioral intervention on reducing symptoms in children and adolescents of depressed parents. Changes in coping skills is therefore a mechanism through which the intervention outlined in this paper was having a significant effect, and is a component which should be included and enhanced in future preventive interventions targeting samples of children and adolescents at risk for depression.

REFERENCES

Achenbach, T.M. & Rescorla, L.A. (2001). Manual for ASEBA School-Age Forms & Profiles. Burlington, VT: University of Vermont, Research Center for Children, Youth, and Families.

Andreasen, N.C., Endicott, J., Spitzer, R.L., & Winokur, G. (1977). The family history method using diagnostic criteria: Reliability and validity. *Archives of General Psychiatry 34,* 1229-1235.

Ayers, T.S., Sandler, I.N., West, S.G., & Roosa, M.W. (1996). A dispositional and situational assessment of children's coping: Testing alternative models of coping. *Journal of Personality, 64,* 923-958.

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Beardslee, W.R., Gladstone, T.R.G., Wright, E.J., & Cooper, A.B. (2003). A family-based approach to the prevention of depressive symptoms in children at risk: Evidence of parental and child change. *Pediatrics, 112,* 119-131.

Beardslee, W.R., Keller, M.B., Lavori, P.W., Staley, J., & Sacks, N. (1993). The impact of parental affective disorder on depression in offspring: A longitudinal follow-up in a nonreferred sample. *Journal of the American Academy of Child and Adolescent Psychiatry, 32,* 723-730.

Beardslee, W.R., Wright, E.J., Gladstone, T.R.G., & Forbes, P. (2007). Long-term effects from a randomized trial of two public health preventive interventions for parental depression. *Journal of Family Psychology, 21,* 703-713.

Butler, L, Miezitis, S., Friedman, R., & Cole, E. (1980). The effects of two school-based intervention programs on depressive symptoms in preadolescents. *American Educational Research Journal, 17,* 111-119.

Cardemil, E.V., Reivich, K.J., & Seligman, M.E.P. (2002). The prevention of depressive symptoms in low-income minority middle school students. *Prevention and Treatment, 5,* 1-31.

Cardemil, E.V., Reivich, K.J., Beevers, C.G., Seligman, M.E.P., & James, J. (2007). The prevention of depressive symptoms in low-income minority children: Two-year follow up. *Behaviour Research, 45,* 313-327.

Clarke, A.T. (2006). Coping with interpersonal stress and psychosocial health among children and adolescents: A meta-analysis. *Journal of Youth and Adolescence, 35,* 11-24.

Clarke, G.N., Hawkins, W., Murphy, M., Sheeber, L. (1993). School-based primary prevention of depressive symptomatology in adolescents: Findings from two studies. *Journal of Adolescent Research, 8,* 183-204.

Clarke, G.N., Hawkins, W., Murphy, M., Sheeber, L.B., Lewinsohn, P.M., & Seeley, J.R. (1995). Targeted prevention of unipolar depressive disorder in an at-risk sample of high school adolescents: A randomized trial of a group cognitive intervention. *Journal of the American Academy of Child and Adolescent Psychiatry, 34,* 312-321.

Clarke, G.N., Hornbrook, M., Lynch, F., Polen, M., Gale, J., Beardslee, W., O'Connor, E., & Seeley, J. (2001). A randomized trial of a group cognitive intervention for preventing depression in adolescent offspring of depressed parents. *Archives of General Psychiatry, 58,* 1127-1134.

Cohen, J. (1994).The Earth is round ($p < .05$). *American Psychologist, 49,* 997-1003.

Cole, D.A., & Maxwell, S.E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112,* 558-577.

Compas, B.E. (in press). Coping, regulation and development during childhood and adolescence. E. Skinner & M. J. Zimmer-Gembeck (Eds.). *Coping and the Development of Regulation*. A volume for the series, R. W. Larson & L. A. Jensen (Eds.-in-Chief), *New Directions in Child and Adolescent Development*, San Francisco: Jossey-Bass.

Compas, B.E., Beckjord, E., Agocha, B., Sherman, M.L., Langrock, A., Grossman, C., Dausch, B., Glinder, J., Kaiser, C., Anderson-Hanley, C., & Luecken, L. (2006a). Measurement of coping and stress responses in women with breast cancer. *Psycho-Oncology, 15,* 1038-1054.

Compas, B.E., Boyer, M.C., Stanger, C., Colletti, R.B., Thomsen, A.H., Dufton,, L.M., & Cole, D.A. (2006b). Latent variable analysis of coping, anxiety/depression, and somatic symptoms in adolescents with chronic pain. *Journal of Consulting and Clinical Psychology, 74,* 1132-1142.

Compas, B.E., Connor-Smith, J.K., Saltzman, H., Thomsen, A.H., & Wadsworth, M.E. (2001). Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin, 127,* 87-127.

Compas, B.E., Forehand, R., & Keller, G. (in press). Preventive intervention in families of depressed parents: A family cognitive-behavioral intervention. In T.J. Strauman, P.R. Costanzo, J. Garber, and L.Y. Abramson (Eds.), *Preventing depression in adolescent girls: A multidisciplinary approach*. New York: Guilford Press.

Compas, B.E., Forehand, R., Keller, G., Champion, J.E., Rakow, A., Reeslund, K., McKee, L., Fear, J., Colletti, C., Hardcastle, E., Merchant, M.J., Roberts, L., Potts, J., & Cole, D.A. (2009). Randomized Trial of a Family Cognitive-Behavioral Preventive Intervention with Families of Depressed Parents. Manuscript in preparation.

Compas, B.E., Jaser, S.S., & Benson, M. (in press). Coping and emotion regulation: Implications for understanding depression during adolescence. In S. Nolen-Hoeksema & L. Hilt (eds.), *Handbook of Adolescent Depression*.

Compas, B.E., Worsham, N., Ey, S., & Howell, D.C. (1996). When mom or dad has cancer: II. Coping, cognitive appraisals, and psychological distress in children of cancer patients. *Health Psychology, 15,* 167-175.

Connor-Smith, J.K., & Calvete, E. (2004). Cross-cultural equivalence of coping and involuntary responses to stress in Spain and the United States. *Anxiety, Stress, and Coping: An International Journal, 17,* 163-185.

Connor-Smith, J.K., Compas, B.E., Wadsworth, M.E., Thomsen, A.H., & Saltzman, H. (2000). Responses to stress in adolescence: Measurement of coping and involuntary stress responses. *Journal of Consulting and Clinical Psychology, 68,* 976-992.

D'Zurilla, T.J. & Maydeu-Olivares, A. (1995). Conceptual and methodological issues in social problem-solving assessment. *Behavior Therapy, 26,* 409-432.

DeRubeis, R.J. (2008). *Testing mediation in randomized comparative trials: Not as simple as it may seem.* Conference Presentation.

Ebata, A., & Moos, R. (1991). Coping and adjustment in distressed and healthy adolescents. *Journal of Applied Developmental Psychology, 12,* 33-54.

Ebata, A.T., & Moos, R.H. (1991). Coping and adjustment in distressed and healthy adolescents. *Journal of Applied Developmental Psychology, 12,* 33-54.

Fendrich, M., Weissman, M. M., Warner, V., & Mufson, L. (1990). Two-year recall of lifetime diagnoses in offspring at high and low risk for major depression: The stability of offspring reports. *Archives of General Psychiatry, 47*, 1121-1127.

First, M.B., Spitzer, R.L., Gibbon, M., & Williams, J.B.W. (2001). *Structured Clinical*

Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition (SCID-I/P). New York: Biometrics Research, New York State Psychiatric Institute.

Fombonne, E., Wostear, G., Cooper, V., Harrington, R., & Rutter, M. (2001). The Maudsley long-term follow-up of child and adolescent depression: 1. Psychiatric outcomes in adulthood. *British Journal of Psychiatry, 179,* 210-217.

Fritz, M.S., & MacKinnon, D.P. (2007). Required sample size to detect the mediated effect. *Psychological Science, 18,* 233-239.

Gillham, J.E., Hamilton, J., Freres, D.R., Patton, K., & Gallop, R. (2006b). Preventing depression among early adolescents in the primary care setting: A randomized controlled study of the Penn Resiliency Program. *Journal of Abnormal Child Psychology, 34,* 203-219.

Gillham, J.E., Reivich, K.J., Freres, D.R., Chaplin, T.M., Shatte, A.J., Samuels, B., Elkon, A.G.L., Litzinger, S., Lascher, M., Gallop, R., & Seligman, M.E.P. (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,* 9-19.

Gillham, J.E., Reivich, K.J., Freres, D.R., Lascher, M., Litzinger, S., Shatte, A., & Seligman, M.E.P. (2006a). School-based prevention of depression and anxiety symptoms in early adolescence: A pilot of a parent intervention component. *School Psychology Quarterly, 21,* 323-348.

Gillham, J.E., Reivich, K.J., Jaycox, L.H., & Seligman, M.E.P. (1995). Prevention of depressive symptoms in schoolchildren: Two-year follow-up. *Psychological Science, 6,* 343-351.

Grant, K.E., Compas, B.E., Stuhlmacher, A.F., Thurm, A.E., & McMahon, S.D. (2003). Stress and child/adolescent psychopathology: Moving from markers to mechanisms of risk. *Psychological Bulletin, 129*, 447-466.

Grant, K.E., Compas, B.E., Thurm, A.E., McMahon, S.D., & Gipson, P.Y. (2004). Stressors and child/adolescent psychopathology: Measurement issues and prospective effects. *Journal of Clinical Child and Adolescent Psychology, 33*, 412-425.

Grant, K.E., Compas, B.E., Thurm, A.E., McMahon, S.D., Gipson, P.Y., Campbell, A.J., Krochock, K., & Westerholm, R.I. (2006). Stressors and child and adolescent psychopathology: Evidence of moderating and mediating effects. *Clinical Psychology Review, 26,* 257-283.

Gwynn, C.A., & Brantley, H.T. (1987). Effects of a divorce group intervention for elementary school children. *Psychology in the Schools, 24,* 161-164.

Hains, A.A., & Ellmann, S.W. (1994). Stress inoculation training as a preventative intervention for high school youths. *Journal of Cognitive Psychotherapy, 8,* 219-232.

Hammen, C., Gordon, D., Burge, D., Adrian, C., Jaenicke, C., & Hiroto, D. (1987). Maternal affective disorders, illness and stress: Risk for adolescents' psychopathology. *American Journal of Psychiatry, 144,* 736-741.

Hankin, B.L., Abramson, L.Y., Silva, P.A., McGee, R., Moffitt, T.E., & Angell, K.E. (1998). Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology, 107,* 128-140.

Hannan, A.P., Rapee, R.M., & Hudson, J.L. (2000). The prevention of depression in children: A pilot study. *Behaviour Change, 17,* 78-83.

Hart, K.E. (1991). Coping with anger-provoking situations. *Journal of Adolescent Research, 6,* 357-370.

Hollon, S.D. (2008). *Mediation and moderation in the treatment and prevention of depression.* Conference Presentation.

Horowitz, J.L., & Garber, J. (2006). The prevention of depressive symptoms in children and adolescents: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 74,* 401-415.

Horowitz, J.L., Garber, J., Ciesla, J.A., Young, J.F., & Mufson, L. (2007). Prevention of depressive symptoms in adolescents: A randomized trial of cognitive-behavioral and interpersonal prevention programs. *Journal of Consulting and Clinical Psychology, 75,* 693-706.

Institute of Medicine (2008). Project Title: *Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions.* Retrieved from: http://www8.nationalacademies.org/cp/projectview.aspx?key=BCYF-I-06-02-A.

Jane-Llopis, E., Hosman, C., Jenkins, R., & Anderson, P. (2003). Predictors of efficacy in depression prevention programmes. *British Journal of Psychiatry, 183,* 384-397.

Jaser, S.S., Champion, J.E., Reeslund, K.L., Keller, G., Merchant, M.J., Benson, M., & Compas, B.E. (2007). Cross-situational coping with peer and family stressors in adolescent offspring of depressed parents. *Journal of Adolescence, 30,* 917-932.

Jaser, S.S., Fear, J.M., Reeslund, K.L., Champion, J.E. Reising, M.M., & Compas, B.E. (in press). Maternal sadness and adolescents' responses to stress in offspring of mothers with and without a history of depression. *Journal of Clinical Child and Adolescent Psychology*.

Jaser, S.S., Langrock, A.M., Keller, G., Merchant, M.J., Benson, M.A., Reeslund, K., Champion, J.E., & Compas, B.E. (2005). Coping with the stress of parental depression II: Adolescent and parent reports of coping and adjustment. *Journal of Clinical Child and Adolescent Psychology, 34,* 193-205.

Jaycox, L.H., Reivich, K.J., Gillham, J., & Seligman, M.E.P. (1994). Prevention of depressive symptoms in school children. *Behavior Research and Therapy, 32,* 801-816.

Kaufman, J., Birmaher, B., Brent, D., Rao, U. et al. (1997). Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime version (K-SADS-PL): Initial reliability and validity data. *Journal of American Academy of Child and Adolescent Psychiatry 36*, 980-988.

Kessler, R., Chiu, W., Demler, O., & Walters, E. (2005). Prevalence, severity, and comorbidity of 12 month DSM-IV disorders in the national comorbidity survey-replication. *Archives of General Psychiatry*, 62, 617-709.

Kraemer, H.C., & Blasey, C.M. (2004). Centring in regression analyses: A strategy to prevent errors in statistical inference. *International Journal of Methods in Psychiatric Research, 13,* 141-151.

Kraemer, H.C., Kiernan, M., Essex, M., & Kupfer, D.J. (2008). How and why criteria defining moderators and mediators differ between the Baron and Kenny and MacArthur Approaches. *Health Psychology, 27,* S101-S108.

Kraemer, H.C., Wilson, G.T., Fairburn, C.G., & Agras, W.S. (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry, 59,* 877-883.

Klimes-Dougan, B., & Bolger, A.K. (1998). Coping with maternal depressed affect and depression: Adolescent children of depressed and well mothers. *Journal of Youth and Adolescence, 27,* 1-15.

Lamb, J.M., Puskar, K.R., Sereika, S.M., Corcoran, M. (1998). School-based intervention to promote coping in rural teens. *The American Journal of Maternal/Child Health, 23,* 187-194.

Langrock, A.M., Compas, B.E., Keller, G., Merchant, M.J., & Copeland, M.E. (2002). Coping with the stress of parental depression: Parents' reports of children's

coping, emotional, and behavioral problems. *Journal of Clinical Child and Adolescent Psychology, 31,* 312-324.

Lazarus, R.S., & Folkman, S., (1984). *Stress, appraisal, and coping.* New York: Springer.

Lewinsohn, P.M., Rohde, P., Seeley, J. R., & Hops, H. (1991). Comorbidity of unipolar depression: I. Major depression with dysthymia. *Journal of Abnormal Psychology, 100*, 205-213.

Lowry-Webster, H.M., Barrett, P.M., & Dadds, M.R. (2001). A universal prevention trial of anxiety and depressive symptomatology in childhood: Preliminary data from an Australian study. *Behaviour Change, 18,* 36-50.

MacKinnon, D.P., Fairchild, A.J., & Fritz, M.S. (2007). Mediation Analysis. *Annual Review of Psychology, 58,* 593-614.

MacKinnon, D.P., Warsi, G., & Dwyer, J.H. (1995). A simulation study of mediated effect measures. *Multivariate Behavioral Research, 30,* 41-62.

McMahon, S.D., Grant, K.E., Compas, B.E., Thurm, A.E., & Ey, S. (2003). Stress and psychopathology in children and adolescents: Is there evidence of specificity? *Journal of Child Psychology and Psychiatry, 44*, 1-27.

Merry, S., McDowell, H., Wild, C.J., Bir, J., & Cunliffe, R. (2004). A randomized placebo-controlled trial of a school-based depression prevention program. *Journal of the American Academy for Child and Adolescent Psychiatry, 43,* 538-547.

Moos, R. (1993). *Coping Response Inventory.* Odessa, FL: Psychological Assessment Resources.

Munoz, R.F., Mrazek, P.J., & Haggerty, R.J. (1996). Institute of Medicine report on prevention of mental disorders. *American Psychologist, 51,* 1116-1122.

National Institute of Mental Health (NIMH), National Advisory Council Workgroup on Mental Disorders Prevention Research (2001). Priorities for prevention research at NIMH. *Prevention and Treatment, 4,* 1-37.

Pattison, C., & Lynd-Stevenson, R.M. (2001). The prevention of depressive symptoms in children: The immediate and long-term outcomes of a school-based program. *Behaviour Change, 18,* 92-102.

Pössel, P., Baldus, C., Horn, A.B., Groen, G., & Hautzinger, M. (2005). Influence of general self-efficacy on the effects of a school-based universal primary prevention

program of depressive symptoms in adolescents: A randomized and controlled follow-up study. *Journal of Child Psychology and Psychiatry, 46,* 982-994.

Pössel, P., Horn, A.B., Groen, G., & Hautzinger, M. (2004). School-based prevention of depressive symptoms in adolescents: A 6-month follow-up. *Journal of the American Academy for Child and Adolescent Psychiatry, 43,* 1003-1010.

Puskar, K.R., Lamb, J., & Tusaie-Mumford, K. (1997). Teaching kids to cope: A preventive mental health nursing strategy for adolescents. *Journal of Child and Adolescent Psychiatric Nursing, 10,* 18-28.

Puskar, K., Sereika, S., & Tusaie-Mumford, K. (2003). Effect of the Teaching Kids to Cope Program on outcomes of depression and coping among rural adolescents. *Journal of Child and Adolescent Psychiatric Nursing, 16,* 71-80.

Quayle, D., Dziurawiec, S., Roberts, C., Kane, R., & Ebsworthy, G. (2001). The effect of an optimism and lifeskills program on depressive symptoms in preadolescence. *Behaviour Change, 18,* 194-203.

Radke-Yarrow, M., & Brown, E. (1993). Resilience and vulnerability in children of multiple-risk families. *Development and Psychopathology, 5,* 581-592.

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.

Riley, A.W., Valdez, C.R., Barrueco, S., Mills, C., Beardslee, W., Sandler, I., & Rawal, P. (2008). Development of a family-based program to reduce risk and promote resilience among families affected by maternal depression: Theoretical basis and program description. *Clinical Child and Family Psychology Review,* 1-33.

Roberts, C., Kane, R., Thomson, H., Bishop, B, & Hart, B. (2003). The prevention of depressive symptoms in rural school children: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 71,* 622-628.

Roosa, M.W., Gensheimer, L.K., Short, J.L., Ayers, T.S., & Shell, R. (1989). A preventive intervention for children in alcoholic families: Results of a pilot study. *Family Relations, 38,* 295-300.

Rudolph, K.D., Dennig, M.D., & Weisz, J.R. (1995). Determinants and consequences of children's coping in the medical setting: Conceptualization, review, and critique. *Psychological Bulletin, 118,* 328-357.

Sandler, I.N., Ayers, T.S., Wolchik, S.A., Tein, J.Y., Kwok, O.M., Haine, R.A., Twohey-Jacobs, J., Suter, J., Lin, K., Padgett-Jones, S., Weyer, J.L., Cole, E., Kriege, G., & Griffin, W.A. (2003). The Family Bereavement Program: Efficacy evaluation of a theory-based prevention program for parentally bereaved children and

adolescents. (2003). *Journal of Consulting and Clinical Psychology, 71,* 587-600.

Sandler, I.N., Tein, J.Y., Mehta, P., Wolchik, S., & Ayers, T. (2000). Coping efficacy and psychological problems of children of divorce. *Child Development, 71,* 1099-1118.

Sandler, I.N., Tein, J.Y., Mehta, P., Wolchik, S., & Ayers, T. (2000). Coping efficacy and psychological problems of children of divorce. *Child Development, 71,* 1099-1118.

Sandler, I.N., West, S.G., Baca, L., Pillow, D.R., Gersten, J.C., Rogosch, F., Virdin, L., Beals, J., Reynolds, K.D., Kallgren, C., Tein, J.Y., Kriege, G., Cole, E., & Ramirez, R. (1992). Linking empirically based theory and evaluation: The Family Bereavement Program. *American Journal of Community Psychology, 20,* 491-521.

Shochet, I.M., Dadds, M.R., Holland, D., Whitefield, K., Harnett, P.H., & Osgarby, S.M. (2001). The efficacy of a universal school-based program to prevent adolescent depression. *Journal of Clinical Child Psychology, 30,* 303-315.

Skinner, E.A. & Wellborn, J.G. (1994). Coping during childhood and adolescence: A motivational perspective. In D. Featherman, R. Lerner, & M. Perlmutter (Eds.), *Life-span development and behavior* (pp. 91-133). Hillsdale, NJ: Erlbaum.

Skinner, E.A. & Zimmer-Gembeck, M.J. (2007). The development of coping. *Annual Review of Psychology, 58,* 119-144.

Skinner, E.A. & Zimmer-Gembeck, M.J. (in press). Introduction: Challenges to the developmental study of coping. In E. Skinner & M.J. Zimmer-Gembeck (Eds.), *Coping and the Development of Regulation,* a volume for the series R.W. Larson & L.A. Jenson (Eds.), *New Directions in Child and Adolescent Development.* San Francisco: Jossey-Bass.

Skinner, E.A. (1995). *Perceived control, motivation, and coping.* Thousand Oaks, CA: Sage.

Skinner, E.A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin, 129,* 216-269.

Spence, S.H., Sheffield, J.K., & Donovan, C.L. (2003). Preventing adolescent depression: An evaluation of the problem solving for life program. *Journal of Consulting and Clinical Psychology, 71,* 3-13.

Spence, S.H., Sheffield, J.K., & Donovan, C.L. (2005). Long-term outcome of a school-based, universal approach to prevention of depression in adolescents. *Journal of Consulting and Clinical Psychology, 73,* 160-167.

Sutton, J.M. (2007). Prevention of depression in youth: A qualitative review and future suggestions. *Clinical Psychology Review, 27,* 552-571.

Tein, J.Y., Sandler, I.N., Ayers, T.S., & Wolchik, S.A. (2006). Mediation of the effects of the Family Bereavement Program on mental health problems of bereaved children and adolescents. (2006). *Prevention Science, 7,* 179-195.

Thurber, C.A. & Weisz, J.R. (1997). "You can try or you can just give up": The impact of perceived control and coping style on childhood homesickness. *Developmental Psychology, 33,* 508-517.

Wadsworth, M.E., Rieckmann, T., Benson, M.A., & Compas, B.E. (2004). Coping and responses to stress in Navajo adolescents: Psychometric properties of the Responses to Stress Questionnaire. *Journal of Community Psychology, 32,* 391-411.

Walker, L.S., Smith, C.A., Garber, J., & Van Slyke, D.A. (1997). Development and validation of the Pain Response Inventory for Children. *Psychological Assessment, 9,* 392-405.

Weissman, M.M., Wolk, S., Goldstein, R.B., Moreau, D., Adams, P., Greenwald, S., Klier, C.M., Ryan, N.D., Dahl, R.E., & Wickramaratne, P. (1999). Depressed adolescents grown up. *Journal of the American Medical Association, 281,* 1707-1713.

Weisz, J.R., Sandler, I.N., Durlak, J.A., & Anton, B.S. (2005). Promoting and protecting youth mental health through evidence-based prevention and treatment. *American Psychologist, 60,* 628-648.

Weisz, J.R., Weiss, B., Han, S.S., Granger, D.A., & Morton, T. (1995). Effects of psychotherapy with children and adolescents revisited: A meta-analysis of treatment outcome studies. *Psychological Bulletin, 117,* 450-468.

Wolchik, S.A., Sandler, I.N., Millsap, R.E., Plummer, B.A., Greene, S.M., Anderson, E.R., Dawson-McClure, S.R., Hipke, K., & Haine, R.A. (2002). Six-year follow-up of preventive interventions for children of divorce. *Journal of the American Medical Association, 288,* 1874-1881.

Wolchik, S.A., West, S.G., Sandler, I.N., Tein, J.Y., Coatsworth, D., Lengua, L., Weiss, L., Anderson, E.R., Greene, S.M., & Griffin, W.A. (2000). An experimental evaluation of theory-based mother and mother-child programs for children of divorce. *Journal of Consulting and Clinical Psychology, 68,* 843-856.

Young, J.F., Mufson, L., & Davies, M. (2006). Efficacy of interpersonal psychotherapy-adolescent skills training: An indicated prevention for depression. *Journal of Child Psychology and Psychiatry, 47,* 1254-1262.

Yu, D.L., & Seligman, M.E.P. (2002). Preventing depressive symptoms in Chinese children. *Prevention and Treatment, 5,* 1-39.

Zubernis, L.S., Cassidy, K.W., Gillham, J.E., Reivich, K.J., & Jaycox, L.H. (1999). Prevention of depressive symptoms in preadolescent children of divorce. *Journal of divorce and remarriage, 30,* 11-36.