International Journal of Cognitive Therapy, 3(3), 228–244, 2010

Family Functioning and Anxiety in School Age Children: The Mediating Role of Control Cognitions

Lata K. McGinn and Yael Jerome
Yeshiva University

Kate B. Nooner
Montclair State University

As a test of the cognitive vulnerability model proposed by Chorpita and Barlow, the present study examined the mediating role of control beliefs on the relationship between family functioning and childhood anxiety. The sample was composed of 147 children aged 7-14 years old. Participant's anxiety levels, family functioning, and perceived control over events was hypothesized to mediate over outcomes in the environment and over their feelings of anxiety, were assessed. Partial support was obtained for Chorpita and Barlow's cognitive vulnerability model of anxiety. As predicted, findings demonstrated that an external locus of control and low perceived control over potentially threatening events was related to higher levels of anxiety. Findings also demonstrated that dysfunctional parenting was related to higher anxiety in children. Further, children from dysfunctional families exhibited a lower external locus of control and having an external locus of control mediated the relationship between dysfunctional family experiences and anxiety symptoms. This study is consistent with the existing literature that suggests that the relationship between family functioning and anxiety is mediated by a child's control beliefs.

There has been an increased interest in the research and understanding of anxiety disorders in children over the last 20-25 years (Barrett, 2000; Schnierring, Hudson, & Rapee, 2000). Previously, anxiety was considered to be relatively rare in children in comparison to externalizing disorders, which appeared to be far more prevalent. Consequently, minimal research was done on anxiety disorders in children. Up until the mid 1970s, the research on anxiety in children consisted of only a small amount of case studies that examined specific fears (Dadds et al., 1997 as cited in Barrett,

~~Address correspondence~~ to Lata K. McGinn, PhD, Ferkauf Graduate School of Psychology, Yeshiva University, Albert Einstein College of Medicine, 1300 Morris Park Avenue, Rousso Building, Room 126, Bronx, NY 10461. E-mail: Lata.McGinn@einstein.yu.edu

2000). More recently however, and contrary to prior conceptions, there is increasing evidence from epidemiological studies that Anxiety Disorders are in fact the most common disorders experienced by children and adolescents (Fergusson & Verhulst as cited in Schnierring et al., 2000). Overall, the literature suggests that anxiety disorders are fairly prevalent, ranging from 25–31.4% (Kessler et al., 2009) and have a widespread impact on children's short- and long-term functioning (Bolton et al., 2006; Egger, Costello, & Angold, 2003; Grover, Ginsburg, Golda & Ialongo, 2007; Grover, Ginsburg, & Ialongo, 2005; Mellon & Moutavelis, 2007; Schnierring et al., 2000; Stevenson-Hinde et al., 2007).

AU: Please add circled cites to ref. list.

Cognitive models of anxiety have implicated the role of environmental factors such as maternal anxiety, parental over-control and rejection, and attachment style and suggest that the mechanism through which they lead to anxietty is through the consequent development of beliefs characterized by a lowered sense of control over the environment (Beck, 1967; Beck, Rush, Shaw, & Emery, 1979; Chorpita & Barlow, 1998). In some of the earliest studies examining cognitive models of psychopathology, Rotter (1966) examined an individual's sense of mastery or control over the environment and proposed that an individual's perception of an event is mediated by the way in which they attribute the cause of this event. Specifically, his theory states that locus of control exists on a continuum, with individuals who perceive that they have control over the outcomes of an event (internal locus of control) on one end of the spectrum and individuals who believe they do not (external locus of control) on the other. Rotter's (1966) theory also hypothesized that individuals who exhibit an external locus of control may be more vulnerable to emotional disturbances such as anxiety and depression.

A related concept is that of perceived control, defined as "the ability to personally influence events and outcomes in one's environment" (Chorpita & Barlow, 1998, p. 5). According to this theory, individuals lacking in the belief that they have control over the outcomes of events may be more likely to experience feelings of anxiety. In fact, a prolonged lack of control over the environment is posited to be the etiological foundation for the development of anxiety disorders. A child's relationship with their family and ways that parents foster a sense of control (or lack of) in their child may have a direct impact on the development of anxiety. According to Chorpita and Barlow (1998), " . . . early experience with uncontrollable events may be thought of as a primary pathway to the development of anxiety in that such experiences may foster an increased likelihood to process events as not within one's control" (p. 5). Some theorists believe that a sense of control over the environment may be the key to understanding the development of both anxiety and depression in children. That is, the more children experience themselves as having control over the outcomes in their environment, the less likely they are to develop psychopathology, particularly depression and anxiety. Conversely, "early experience with reduced control can foster a psychological diathesis that may eventually give rise to anxiety" (Chorpita & Barlow, 1998, p. 3).

Prior research has examined and found support for the impact of a range of environmental factors such as maternal anxiety, attachment style, parental over-control, and rejection in the development of anxiety and depressive disorders (Abramson, Metalsky, & Alloy, 1989; Bayer, Sanson, & Hemphill, 2006; Chorpita, Brown, & Barlow, 1998; Creswell & O'Connor, 2006; Field, Ball, Kawycz, & Moore, 2007; Ginsberg, Siqueland, Masia-Warner, & Hedtke, 2004; Manassis & Hood, 1998; McGinn, Cukor, & Sanderson, 2005; Moulding & Kyrios, 2006; Ollendick & Horsch, 2007; Parker, 1983; Rapee, Craske, Brown, & Barlow, 1996; Roelofs, Meesters, Ter Huurne, Bam-

AU: Add to refs

elis, & Muris, 2006; Spokas, Rodebaugh, & Heimberg 2008; van Brakel, Muris, Bogels, & Thomassen, 2006; Weems, Berman, Silverman, & Saavedra, 2001; Weems, Silverman, Rapee, & Pina, 2003; Yahav, 2007). For example, research has shown that adults with anxiety and depressive disorders recall having an early family environment that gave them limited experiences where they felt they had control over events (Chambers, Power, Loucks, & Swanson, 2000; McGinn et al., 2005; McLeod, Weisz, & Wood, 2007; Parker, 1983; Seibel & Johnson, 2001; Spokas et al., 2008).

In fact, the bulk of research in this area has examined adult populations who are asked to recall their family environment and relatively few studies have examined these relationships using children. The major criticism of retrospective research on parenting is that people's memories are not always accurate (Bernstein, Fink, Handelsman, & Foote, 1994; Brewin, Andrews, & Gottlieb, 1993; Watkins, 2002). Furthermore, individuals may be likely to remember negative aspects of their childhood simply because they are suffering from a negative mood (Watkins, 2002). The mood congruent bias asserts that individuals are likely to confirm and recall events congruent with the present mood state. Therefore, according to the mood congruent bias, it is possible that adults with an anxiety disorder may remember their parents negatively simply because they are suffering from a negative emotional condition. Retrospective reports of childhood experiences may be further biased by present psychopathology. Individuals may have feelings of bitterness about having a disorder and in accounting for why they do, may be likely to develop explanations that lay blame on their parents (Watkins, 2002). In other words, in order to explain why they have an anxiety disorder, individuals may recall their parents as being controlling and rejecting even if they were not.

Although there is a relative dearth of studies examining the impact of family environment using child populations, overall there is fairly consistent evidence to support the notion that, similar to adults, children with anxiety report greater family instability and experience parents as rejecting and controlling (i.e., Ginsburg, Siqueland, Masia-Warner, & Hedtke, 2004; Muris, Meesters, Merckelbach, & Hulsenbeck, 2000; McClure, Brennan, Hammen, & Le Brocque, 2001; Muris, Bogels, Van der Kamp, & van Ooste, 1996; Muris, Bosma, Meesters, & Schouten, 1998; Kashani et al., 1999; Muris, Meesters, Schouten, & Hoge, 2004; van Brakel, Muris, Bogels, & Thomassen, 2006; Van der Bruggen, Stams, & Bögels, 2008). A recent finding also suggests a stronger relationship between parental over-control and anxiety than with parental rejection (McLeod, Woods, & Weisz, 2007).

Recent studies also provide preliminary support for the relationship between control cognitions and anxiety (Frala, Leen-Feldner, Blumenthal, & Barreto, 2010) and suggest that experiencing low control cognitions (an external locus of control and/or low perceived control over control over potentially threatening internal and external events) may mediate the relationship between family stability and both anxiety and depression in adults (Sokolowski & Israel, 2008). In one of the first studies to examine the mediating impact of control cognitions in the development of childhood anxiety, Chorpita, Brown, and Barlow (1998) examined the impact of parental over-control on a child's beliefs of control over the environment and the mediating impact of these beliefs on the development of anxiety. Ninety-three clinical and nonclinical samples of children and their families were studied in order to evaluate the different models which propose that locus of control may be a mediating factor in the relationship between family environment and negative affect. Chorpita and colleagues (1998) administered a variety of measures such as the Family Environment Scale control scale and the Revised Children's Manifest Anxiety Scale to children and parents in order to evaluate

elements of control and anxiety. Several statistical analyses were performed in order to assess the "goodness of fit" of several models. All of the models included locus of control, parental control, negative affect, and clinical symptoms. Several models also included attribution style as a variable, which was also believed to mediate anxiety. However, upon statistical evaluation, attribution style was not found to play a significant role in anxiety outcomes in children. The best model was one, which asserted that the level of parental control impacts a child's locus of control, which in turn, plays a mediating influence on negative affect and can lead to clinical symptoms. Overall results suggested that parental control was related to negative affect when mediated by control cognitions.

STUDY OBJECTIVES

Building on findings from Chorpita, Brown, and Barlow (1998), the present study attempted to directly assess the relationship between maladaptive family functioning and anxiety as mediated by control beliefs. The study administered a general measure of locus of control and a specific measure of perceived control over potentially threatening internal (physical and cognitive aspects of the feelings of anxiety) and external events (anxiety-producing events). In order to minimize the potential effects of a mood congruent bias among clinical samples, the present study used a sample of nonclinical participants in a school setting. By using children instead of adults, the present study also minimized the potential for inaccuracies among subjects' memories of their family environment.

To test this meditational model, we made the following hypotheses. First, the present study examined the relationship between dysfunctional parenting styles and anxiety. Specifically, we hypothesized that general dysfunctional family experiences, and specifically those characterized by high levels of control, would be related to high levels of anxiety in children. Secondly, we examined the relationship between family dysfunction and control cognitions. It was hypothesized that high levels of dysfunction, and specifically a greater degree of parental control would be correlated with low perceived control over potentially threatening internal and external events and an external locus of control. Third, the relationship between these control cognitions and anxiety was examined. It was hypothesized that children with low perceived control over events and an external locus of control would be more anxious. Finally, the present study examined the mechanism through which general family dysfunction and specifically high levels of parental impacts on the development of anxiety. We predicted that dysfunctional families, and particularly highly controlling parents, would impact the severity of anxiety symptoms in children through the mediating role of control cognitions.

METHOD

Participants

One hundred and forty-seven participants from three schools in the New York metropolitan area were recruited for this study. Twenty-three (15%) of the participants

were from a private school in Bayridge, Brooklyn, 22 (15%) participants were from a private school in Greenwich, Connecticut, and 102 (69%) participants were students from a public school in Greenwich, Connecticut. It should be noted that all three schools were located in relatively affluent upper-middle class areas.

The sample consisted of sixty-four males (43.5%) and 83 females (56.5%) with an age range of 7–14 years old (M = 11.5, SD = 1.22). The breakdown by grade was as follows: 3rd grade had 10 participants (6.8%), 4th grade had 5 participants (3.4%), 5th grade had 3 participants (2%), 6th grade had 102 participants (74%), 7th grade had 12 participants (8.2%), and 8th grade had 8 participants (5.4%).

MEASURES

Measures of Anxiety

The Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds and Richmond, 1978). The RCMAS was used to measure the children's anxiety. The RCMAS is a self-report scale of children's anxiety that contains 37 dichotomous (yes/no) items. The RCMAS measures both the level and type of anxiety in children between the ages of 6–19 years old and can be administered both individually or in groups to children aged 9½ or older. The reliability and validity of the RCMAS has been strongly established in the literature.

Measures of Family Functioning

Family Environment Scale (Moos & Moos, 1986). The original FES contains 90 true-false items (Moos & Moos, 1986). The FES has ten subscales and can be completed by any member of the family. Six of the subscales represent internal family functioning and four of the subscales represent linkages between the family and the external social context. Four subscales (i.e., Intellectual-Cultural Orientation, Active-Recreational Orientation, Moral-Religious Emphasis, and Achievement Orientation) were excluded because they target linkages between the family and the larger social context. For example, the Moral-Religious Emphasis focuses on ethical and religious values with organizations outside of the family and does not directly tap constructs related to morality. The instructions and a few words in some questions were modified to make the scale more age appropriate for younger children.

The subscales that were included (i.e., Cohesion, Expressiveness, Conflict, Independence, Organization, and Control Scales) were selected based on their purported ability to test the hypothesized relationships between family environment and anxiety such as parental over-control, expressed emotion, and conflict. The Cohesion subscale strives to measure the degree of help and support family members give to one another. The Expressiveness subscale attempts to measure the amount that family members are encouraged to express their feelings freely and openly. The Conflict subscale examines the amount of fighting and conflict in the family. The Independence subscale looks at the amount that family members are encouraged to be assertive. The Organization subscale measures the degree of emphasis placed on clear organization and structure when it comes to planning family activities and responsibilities. Finally, the Control subscale looks at how much set rules and procedures are used to run family life. The

subscales have low to moderate inter-correlations with the average of all correlations being 0.25, indicating that each subscale is measuring a distinct characteristic of a family (Moos, 1990).

The ranges for internal consistency estimates for the subscales (in the original version of the FES) are .64–.78 (Moos & Moos, 1986). Moreover, a significant degree of correspondence exists across family member reports. Correlations between single rater and composite family scores (mom and dad and child looked at together) are high, ranging in magnitude from .66–.91 (Jacob & Windle, 1999).

The FES also has acceptable test-retest reliability. Families were re-administered the FES after two ($N = 47$) and four month ($N = 35$) periods. The two-month test-retest reliabilities were in an acceptable range varying from .68 for Independence to .86 for Cohesion. Test-retest reliabilities were also fairly high for the four-month period (Moos, Finney, & Cronkite, 1990). Research further indicates that the FES subscales have both good content and construct validity (Moos, Nichol, & Moos, 2002).

Measures of Control Cognitions

Nowicki-Strickland Locus of Control Scale (NSLOC; Nowicki & Strickland, 1973). The NSLOC is a self-report measure composed of 40 questions to which respondents must answer yes or no (items are scored 0 or 1, and higher scores indicate a greater external locus of control). The NSLOC has been used in children between the ages of 8–18 years old. The NSLOC measures the degree of experienced control over contingent stimuli in the environment (success or failure). It attempts to examine how much a child believes they are able to control outcomes in the environment. It has been found that children with greater internal locus of control tend to get better grades in school (Nowicki & Strickland, 1973). On the other hand, children with greater external locus of control see environmental factors as being the driving force behind what happens to them.

The NSLOC is an adequate but distinctive measure of locus of control and has good construct validity with internal consistency ranging from .63–.81, test re-test reliabilities were found to be adequate as well (Nowicki & Strickland, 1973). Finally, research supports the relation of external locus of control to negative affect such as anxiety (Finch & Nelson, 1974; Nunn, 1988, as cited in Chorpita, Brown, & Barlow, 1998).

AU: Add to refs. →

ACQ for Children (ACQ-C; Weems, Silverman, Alfano, & Tarolla, 1999). In addition to the NSLOC, the ACQ-C was administered to garner further information about the children's perceived control over potentially threatening internal (physical and cognitive aspects of the feelings of anxiety) and external events (anxiety producing events). Specifically, the ACQ-C looks at how much control a child believes they have over these events. The ACQ-C is a self-report measure that contains 30 items with two subscales. Respondents are asked to rate on a scale of 0-4 how much they agree or disagree with various statements (0 = none and 4 = very much). The first subscale measures lack of control over external events that produce fear in the individual. The second subscale measures control over negative internal emotional and physical reactions to anxiety such as heart palpitations and trembling. The ACQ-C has also been found to possess discriminant, convergent, and incremental validity (Weems, Silverman, Alfano, & Tarolla, 1999).

Procedure

Inclusion criteria for this research were as follows: participants had to be in the third through twelfth grades and English speaking. Participants also received parental consent and gave assent to participate in this study.

The children were then sent home with a packet that contained a letter explaining the study, a parental consent form, and a child assent form. The older children (11–13 years old) were given the questionnaires in two 25-minute sessions in the classroom. Only the directions were read out loud to the older children. The younger children (8–10 years old) were all taken from class in groups of three and all directions and questions were read out loud to them. Administration was divided into two 25-minute sessions as well. Those children that chose not to participate were given packets with materials such as crossword puzzles to do while the other children were answering the questionnaires, in order to keep them occupied and from feeling self-conscious. In certain instances, when only a few in the class chose to participate, children were taken out to an empty classroom to respond to the questionnaire.

To maintain anonymity, no names appeared on the questionnaires; instead each child was given an id number to insure that they would receive their own packet for the second administration. Upon completion of the questionnaire, the list linking names to id numbers was destroyed. The only identifying factors that remained on the packets were age, grade, school, and gender.

Test of Mediation

We tested the mediational model as proposed by Chorpita and colleagues (1998) using the Sobel test (Preacher & Hayes, 2004). The meditational model posited that negative experience (i.e., a dysfunctional family and/or highly controlling parents) was related to increased anxious symptomatology when mediated by negative cognitions (i.e., external locus of control, low perceived control over potentially threatening internal and external events). In the present study, we prospectively tested if the relationship between family functioning (FES) and anxiety symptoms (RCMAS) was mediated by these control cognitions (NOSLOC and ACQ) in school age children. Although Baron and Kenny's (1986) method for testing mediation is a commonly used approach, this method often suffers from low statistical power (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The Sobel test of mediation represented a promising alternative in that it uses joint significant tests for confirming the components of mediation, which have greater statistical power than the Barron & Kenny approach (MacKinnon et al., 2002).

type: close space/new para.

We used the Sobel test to confirm the following hypotheses:

Hypothesis 1. We first established the relationship between dysfunctional parenting styles and (FES) and measures of child anxiety (RCMAS). We hypothesized that greater family dysfunction in general and specifically high levels of parental control would be related to high levels of anxious symptomatology in children.

Hypothesis 2. The relationship between general dysfunctional family functioning (FES) and control cognitions (NSLOC, ACQ) was then examined. We hypothesized that general dysfunction in the family, and particularly high levels of parental con-

TABLE 1. Descriptive Statistics of Total Scores for Measures: FES, RCMAS, NSLOC, and ACQ

Measure	*N*	Mean	*SD*
FES	147	4.32	0.65
RCMAS	147	46.67	10.80
NSLOC	147	20.11	3.83
ACQ	147	76.33	20.87

AU: Some numbers were ital originally - should ital be kept? If so, pls add note to table to explain significance.

type: wrong table head font.

ital - x 4

trol would correlate with low perceived control over threatening internal and external events and high external locus of control

Hypothesis 3. The relationship of control cognitions and anxiety were explored. It was predicted that low control cognitions (NSLOC, ACQ) would be correlated with higher scores of anxiety in the child (RCMAS).

Hypothesis 4. We tested the meditational model. Specifically, we tested the effect of control cognitions on the relationship between a dysfunctional family environment and anxiety. We predicted that general dysfunction in the family, and specifically a greater degree of parental control would impact the severity of anxiety symptoms through the mediating role of control cognitions.

RESULTS

Descriptive Statistics

There were no statistically significant differences by gender or age on any of the outcome measures. As expected in a nonclinical sample, average scores on all measures were in the normal range. The mean scores on the FES ($M = 4.32$, $SD = .65$) placed the sample in the moderately adaptive range of family functioning, suggesting that respondents were truthful in their responses. The mean scores on the measure of anxiety (RCMAS) ($M = 46.67$, $SD = 10.8$) indicated that the overall sample had slightly lower anxiety than average based on normative samples. On the ACQ-C, a measure of perceived control over potentially threatening internal and external events, the mean scores ($M = 76.33$, $SD = 20.87$) indicate that this sample had a stronger sense of control over their anxiety. Finally, measures of locus of control (NSLOC) ($M = 20.11$, $SD = 3.83$) indicate that the sample, on average, had an internal locus of control or a relatively high sense of control over outcomes in their environment. In short, this particular sample had slightly lower than average scores on all outcome measures. These results are consistent with what should be expected in a nonclinical sample. A summary of all self-report scores is found in Table 1.

Measure Reliability

Reliability scales were calculated on all measures in order to establish internal consistency, specifically, the degree to which items in the measure are internally consistent and positively correlated with each other. The ACQ-C was found to have excellent reliability (.91); the RCMAS had good reliability (.84), and NSLOC had acceptable reli-

TABLE 2. Correlations of Central Measures Used to Test Mediation (N = 147). Each Cell Contains the Correlation (r) and Significance

	FES	RCMAS	ACQ	NSLOC
FES	–	–	–	–
RCMAS	.36*	–	–	–
ACQ	-.21*	-.44*	–	–
NSLOC	.41**	.54**	-.56**	–

*p < .05, **p < .01

type: wrong table head font.

ability (.70). The FES control scale in this sample was found not to be reliable (.297). However the six subscales of the FES administered to participants had acceptable reliability (.73). Overall, all measures used in this study, aside from the single control scale on the FES, were found to have acceptable or better than acceptable reliability. Given that the six scales FES demonstrated adequate reliability, the FES was used to assess general family dysfunction. However, given that the control scale of the FES was found to have poor reliability, we were unable to test the specific relationships between parental over-control and anxiety for this subscale. Each of the other five scales individually and all six of the scales together had good reliability and were used to test specific study hypotheses.

Moreover, several correlations between measures were calculated in order to determine that each measure used examined separate and distinct constructs. For example, a correlation was calculated between the measure for anxiety (RCMAS) and the measure for perceived control over threatening internal and external events (ACQ-C). As expected, the RCMAS and the ACQ-C were inversely and significantly correlated, although only moderately so (r = -.44). This indicates that while both measures look at the variable of anxiety they each examine different aspects of anxiety.

In addition, a correlation between the variable anxiety (RCMAS) and locus of control (NSLOC) was also calculated. Again, as expected, the RCMAS and NSLOC were positively and significantly correlated (r = .54). This suggests that although the two measures are moderately correlated, they still measure separate and distinct constructs. Finally, a correlation between the variable of locus of control (NSLOC) and perceived control over threatening events (ACQ-C) was also examined. Both the NSLOC and ACQ-C were found to be moderately correlated (-.56) indicating that although these measures both examine control they each measure different aspects of control. A summary of central correlations is found in Table 2.

ital. r

Testing Mediation

The meditational models in this study (i.e., locus of control and perceived control over threatening events) were tested using macros for SPSS that provide a test of the indirect effect using the Sobel Test as well as a version that relies on a nonparametric bootstrapping procedure (Preacher & Hayes, 2004). Results for the Sobel Test were indistinguishable from the bootstrapping results; therefore, only the Sobel Test results and related statistics will be presented (Appendix A).

Locus of Control. The Sobel Test (1982) was used to determine the extent that locus of control (NSLOC) accounts for the relation between the family functioning

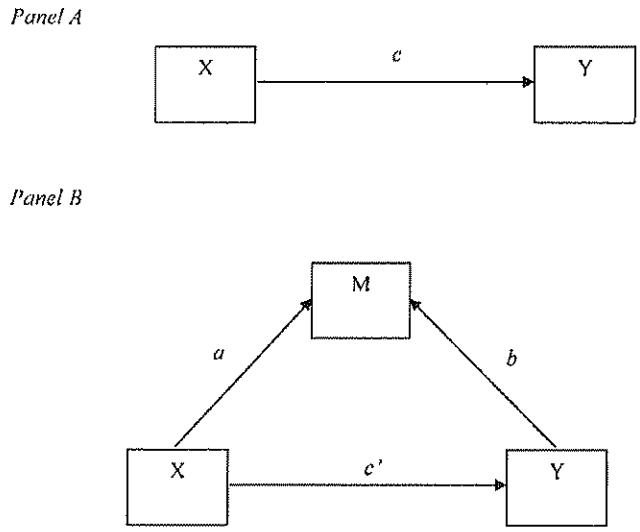

FIGURE 1. Panel A: Illustration of the direct effect of family functioning on anxiety in children. The independent variable, family functioning, (X) affects the dependent variable, anxiety in children, (Y). Panel B: Illustration of mediation design with mediator (M). Each of the mediators was tested in its own model (M1 = locus of control, M2 = perceived control). X affects Y indirectly through M1 in the first meditational model and M2 in the second.

(FES) and anxiety (RCMAS) in a sample of 147 children (N = 147). Total scores were used to test the meditational model with the following measures: FES with six subscales, RCMAS, and NSLOC. The rows of output, found in Appendix A, are interpreted as follows: b(YX) is the total effect of the independent variable X, FES, on the dependent variable Y, RCMAS (c in Figure 1). This effect is statistically significant (p = .003); as stated in hypothesis one, lower levels of adaptive parenting (i.e., more maladaptive parenting) was related to higher anxiety in children.

As stated in hypothesis two, the second row of output, b(M1X) is the effect of the independent variable, FES, on the proposed mediator M1, NSLOC, (a in Figure 1). This effect is also significant (p < .0001); less adaptive parenting was associated with a more external locus of control. As stated in hypothesis three, the third row of output, b(YM1.X), is the effect of the mediator, NSLOC, on the dependent variable, RCMAS, controlling for the independent variable, FES total score (b in Figure 1). This effect is significant (p < .0001); locus of control cognitions mediate the relationship between family functioning and anxiety in children.

Last, as stated in hypothesis four, b(YX.M1) is the direct effect of the independent variable, FES, on the dependent variable, RCMAS, controlling for the mediator, NSLOC (c' in Figure 1). This effect is not significant (p = .2722), indicating no relationship between family functioning and anxiety in children after controlling for locus of control. Therefore, according to the Sobel test, criteria for mediation are established, demonstrating that locus of control (NSLOC) completely mediates the relationship of family functioning on anxiety in children.

In further exploration of hypothesis four, this output also contains the estimate of the indirect effect of X on Y through M1 (i.e., family functioning on anxiety in

children as mediated by locus of control). The direct effect is 0.4494, which is both *ab* in Figure 1, or b(M1X) b(YM1.X) from the output, as well as $c - c'$ in Figure 1, or b(M1X) - b(YM1.X) from the output. A formal two-tailed test of the significance of this indirect (i.e., mediated) effect follows; it is based on the assumption that the ratio of the indirect effect to its standard error is normal as established by Sobel (1982). The Sobel test further supports mediation ($z = 3.56, p = .0004$); indicating that locus of control (NSLOC) perfectly mediates the relationship between family functioning and anxiety in children. Locus of control accounts for 45% (95% CI = 20% to 70%) of the relationship between family functioning and anxiety in children.

Perceived Control over Threatening Events. The Sobel Test (1982) was again used to determine the extent that perceived control over potentially threatening events (ACQ) accounts for the relation between the family functioning (FES) and anxiety (RCMAS) in a sample of 144 children ($N = 144$). Total scores were used to test the meditational model with the following measures: FES, RCMAS, and ACQ. The rows of output are interpreted as follows: b(YX) is the total effect of the independent variable X, FES, on the dependent variable Y, RCMAS (*c* in Figure 1). This effect is statistically significant ($p = .002$); as stated in hypothesis one, lower levels of adaptive parenting was related to higher anxiety in children.

As stated in hypothesis two, the second row of output, b(M2X) is the effect of the independent variable, FES, on the proposed mediator M, ACQ, (*a* in Figure 1). This effect is not significant ($p = .1264$); perceived control over threatening events, as measured by the ACQ, was not significantly related to family functioning. The third row of output, b(YM2.X), is the effect of the mediator, ACQ, on the dependent variable, RCMAS, controlling for the independent variable, FES (*b* in Figure 1). This effect is significant ($p < .0001$); as stated in hypothesis three, low perceived control over threatening events in children were associated with higher anxiety.

Last is the test of hypothesis four with the mediator perceived control over threatening events. The model illustrated that b(YX.M2) is the direct effect of the independent variable, FES, on the dependent variable, RCMAS, controlling for the mediator, ACQ (*c'* in Figure 1). This effect is significant ($p = .0001$), indicating that a direct relationship remains between family functioning and anxiety in children after controlling for perceived control. Therefore, according to the Sobel Test, criteria for mediation were not established for perceived control over threatening events (ACQ).

DISCUSSION

Cognitive models of anxiety have emphasized the significance of the family environment on the lives of children, such as the role of uncontrollable events, and the mediating impact of cognitive styles such as low control cognitions in the development of anxiety disorders. As a test of the cognitive vulnerability model of anxiety disorders, the present study examined the mediating impact of control cognitions on the relationship between a negative early environment, specifically a familial style characterized by over-control, and the level of anxiety. Building on prior research, the present study examined the effects of control cognitions (locus of control and perceived control over threatening events; Weems et al., 1999; Weems et al., 2003).

In support of the cognitive vulnerability model of anxiety proposed by Chorpita and Barlow (1998), the present study demonstrated that children with an external

locus of control and those who felt that they had little or no control over their own anxious feelings or anxiety producing events reported significantly more anxiety than children who reported an internal locus of control and a higher degree of perceived control over threatening events.

Although the inadequate reliability of the control scale of the FES prevented us from parceling out the specific effects of parental over-control, the study found support for the general cognitive model linking effects of negative early environmental events such as over-control, cognitive styles, and anxiety (Beck, 1967; Beck et al., 1979). Consistent with previous research (Ballash, Leyfer, Buckley, & Woodruff-Borden, 2006; Chambers et al., 2000; McGinn et al., 2005; Sheehan & Noller, 2002; Van ~~Breald~~ Brakel et al., 2006; Weems et al., 2003), the present study found a significant relationship between general dysfunction in the family (including parental over-control) and increased anxiety in children, suggesting that an array of negative family experiences may possibly create a vulnerability to anxiety. Additionally, in keeping with the cognitive vulnerability model of anxiety, the study also found that children who reported a greater degree of dysfunction in the family also reported experiencing less control over their lives as compared to children with healthier family environments. Although children with greater dysfunction in the family reported a greater external locus of control in general, they did not report having less perceived control over threatening events.

Providing further support for the cognitive model, the present study also found that the mechanism through which poor family functioning influences the severity of a child's feelings of anxiety is through the mediating role of the child's control cognitions. Specifically, an external locus of control mediated the relationship between family dysfunction and anxiety. These findings are in concordance with the findings of Chorpita, Brown, and Barlow (1998) linking the effects of family functioning to locus of control beliefs, and anxiety in a clinical population. However, given the central role of locus of control as the cognitive mechanism through which anxiety develops and gets maintained, there has been relatively little research on the specific concept of locus of control (Weems et al., 2003). Our study extends Chorpita et al.'s (1998), findings and provides preliminary support for the specific model proposed by Chorpita and colleagues (1998) regarding the effects of locus of control over symptoms of anxiety in a nonclinical sample.

Limitations

Overall, our results appear to be consistent with previous findings in the cognitive literature (Ballash et al., 2006; Chambers et al., 2000; McGinn et al., 2005; Sheehan & Noller, 2002; Weems et al., 2003; Van Brakel et al., 2006;). However, several limitations must be noted. Inferences about causality cannot be made regarding the significant relationships found between family functioning, feelings of anxiety, and control cognitions. Rather, these associations can only shed light on possible ways to understand how anxiety may be maintained. In addition, participants were primarily from high socioeconomic Caucasian backgrounds and represented the older side of the age distribution. Therefore, further research is warranted to see if results generalize to younger children and children from other socioeconomic and racial/ethnic backgrounds. Although the self-report measures that were chosen for this study are reliable and valid assessments of family functioning, anxiety, and control beliefs, future research may benefit from obtaining parent's responses. Finally, this study may

have been limited by the use of six of the ten scales of the FES rather than the entire measure, which may have limited our ability to detect an effect. Additionally, future studies utilizing more reliable measures of parental control may be needed to assess the specific effects of control on the development of anxiety given the poor reliability of the control scale in the FES.

Future Research

This study is in concordance with the existing literature suggesting that the relationship between family functioning and anxiety is mediated by a child's control beliefs (Weems et al., 1999; Weems et al., 2003). The present study suggests that family factors other than parental overcontrol may be linked to the development of low control cognitions and anxiety. Further research is needed to identify the range of environmental factors, including parenting styles, which may play a role in the development of control cognitions and anxiety.

Though family measures exist for adults (i.e., Parker, 1986), better measures are needed for children that are grounded in current cognitive research findings. Currently, a measure originally developed in Holland, the Egna Minnen Betraffende Uppfostran for Children (EMBU-C; Muris, Meesters, & van Brakel, 2003), is designed to be administered to children and examines different aspects of family functioning including parental control. However, at the time of this research, normative data had been obtained for children in Holland, but not for children in the United States. It would be useful to obtain normative data in the United States in order to determine whether this would be a good measure to look at family functioning with North American children. In addition, future research should administer measures of family functioning to parents in order to obtain a different vantage point. Finally, prospective research studies are also needed to study children and their family environment over a period of time in order to examine possible causal mechanisms in the development and maintenance of anxiety.

Summary

In summary, these findings provide support for the role of control beliefs in mediating the relationship between dysfunctional family environments and anxiety. Family dysfunction was associated with greater anxiety in 7–14-year-old children. Both an external locus of control and a low perceived control over anxiety were also associated with higher levels of anxiety in children. Additionally, an association was found between family functioning and control cognitions. That is, children who reported more maladaptive family functioning also had a more external locus of control. Finally, an external locus of control was found to mediate the relationship between family functioning and anxiety. These findings offer preliminary support for cognitive vulnerability models of anxiety (Chorpita & Barlow, 1998; Weems et al., 1999; McGinn et al., 2005) and suggest that cognitive styles characterized by low internal control play an important role in anxiety. Further studies using measures of familial over-control are still needed to corroborate these findings and to clarify the specific aspects of a family's functioning that may play a role in the development of an anxious child's control

AU: Do you mean Weems et al., 1998? If not, add to refs.

y = z

cognitions. Future prospective research studies may help establish causal factors in the family environment that contribute to the development of anxiety in children.

APPENDIX A.

Output from Sobel Test of mediation in the relationship of family functioning (FES) and anxiety in children (NSLOC) (N = 147). Part A: Model with locus of control (RCMAS) as mediator. Part B: Model with perceived control as mediator (ACQ).

type: fix formatting - smaller font?

Mediator	Sobel Value	Z-Score	P-Value
RCMAS	.4494	3.5622	.004
ACQ	-.1390	-1.4517	.1466

REFERENCES

Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review, 96*, 358-372.

Ballash, N., Leyfer, O., Buckley, A. E., & Woodruff-Borden, J. (2006). Parental control in the etiology of anxiety. *Clinical Child and Family Psychology Review, 9*, 113-133.

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.

Barrett, P. M. (2000). Treatment of childhood anxiety. *Clinical Psychology Review, 20*, 479-494.

Bayer, J. K., Sanson, A. V., & Hemphill, S. A. (2006). Parent influences on early childhood internalizing difficulties. *Journal of Applied Developmental Psychology, 27*(6), 542-559.

Beck, A. T. (1967). *Depression: Causes and treatment.* Philadelphia: University of Pennsylvania Press.

Beck, A. T, Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression.* New York: Guilford.

Bernstein, D., Fink, L., Handelsman, L., & Foote, J. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *The American Journal of Psychiatry, 151*, 1132-1136.

Bolton, D., Eley, T. C., O'Connor, T. G., Perrin, S., Rabe-Hesketh, S., Rijsdijk, F. et al. (2006). Prevalence and genetic and environmental influences on anxiety disorders in 6-year-old twins. *Psychological Medicine, 36*, 335-344.

Brewin, C. R., Andrews, B., & Gotlib, I. H. (1993). Psychopathology and early experience: A reappraisal of retrospective reports. *Psychological Bulletin, 113*, 82-98.

Chambers, J. A., Power, K. G., Loucks, N., & Swanson, V. (2000) The quality of perceived parenting and its association with peer relationships and psychological distress in a group of incarcerated young offenders. *International Journal of Offender Therapy and Comparative Criminology, 44*, 350-368.

Chorpita, B. F., & Barlow, D. H. (1998). The development of anxiety: The role of control in the early environment. *Psychological Bulletin, 124*, 3-21.

Chorpita, B. F., Brown, T. A., & Barlow, D. H. (1998). Perceived control as a mediator of family environment in etiological models of childhood anxiety. *Behavior Therapy, 29*, 457-476.

Compton, S. N., Nelson, A. H., March, J. S. (2000). Social phobia and separation anxiety symptoms in community and clinical samples of children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 39*, 1040-1046.

Creswell, C., & O'Connor, T. G. (2006). Anxious cognitions' in children: An exploration of associations and mediators. *British Journal of Developmental Psychology, 24*, 761-766.

Dweck, C., & Wortman, C. (1982). Learned helplessness, anxiety and achievement. In H. Kron & L. Laux (Eds.), *Achievement, stress, and anxiety* (pp. 93-125). Washington, DC: Hemisphere Publishing Group.

Egger, H. L., Costello, E. J., & Angold, A. (2003). School refusal and psychiatric disorders: A community study. *Journal of the American Academy of Child & Adolescent Psychiatry, 42*, 797-807.

Essau, C., Conradt, J., & Petermann, F. (2000). Frequency, comorbidity, and psychosocial impairment of anxiety disorders in German adolescents. *Journal of Anxiety Disorders, 14*, 263-279.

Field, A. P., Ball, J. E., Kawycz, N. J., & Moore, H. (2007). Parent-child relationships and the verbal information pathway to fear in children: Two preliminary experiments. *Behavioural and Cognitive Psychotherapy, 35*, 473-486.

Frala, J., Leen-Feldner, E., Blumenthal, H., & Barreto, C. (2010). Relations among perceived control over anxiety-related events, worry, and generalized anxiety disorder in a sample of adolescents. *Journal of Abnormal Child Psychology, 38*, 237-247

Ginsburg, G. S., Silverman, W. K., & Kurtines, W. K. (1995). Family involvement in treating children with phobic and anxiety disorders: A look ahead. *Clinical Psychology Review, 15*, 457-473.

Ginsburg, G., Siqueland, L., Masia-Warner, C., & Hedtke, K. (2004). Anxiety disorders in children: Family matters. *Cognitive and Behavioral Practice, 11*, 28-43.

Grover, R. L., Ginsburg, G. S., ~~Gotlad~~ & Ialongo, N. (2005). Childhood predictors of anxiety symptoms: A longitudinal study. *Child Psychiatry & Human Development, 36*, 133-153.

Grover, R., Ginsburg, G., & Ialongo, N. (2007). Psychosocial outcomes of anxious first graders: A seven-year follow-up. *Depression and Anxiety, 24*, 410-420.

Jacob, T., & Windle, M. (1999). Family assessment: Instrument dimensionality and correspondence across family reporters. *Journal of Family Psychology, 13*, 339-354.

Kasen, S., Cohen, P., Brook, J., & Hartmark, C. (1996). A multiple-risk interaction model: Effects of temperament and divorce on psychiatric disorders in children. *Journal of Abnormal Child Psychology, 24*, 121-150.

Kashani, J. H., Suarez, L., Jones, M. R., & Reid, J. C. (1999). Perceived family characteristic differences between depressed and anxious children and adolescents. *Journal of Affective Disorders, 52*, 269-274.

Keller, M. B., Lavori, P. W., Wunder, J., & Beardslee, W. R (1992). Chronic course of anxiety disorders in children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 31*, 595-599.

Kessler, R., Avenevoli, S., Green, J., Gruber, M., Guyer, M., He, Y. (2009). National Comorbidity Survey replication adolescent supplement (NCS-A): III. Concordance of DSM-IV/CIDI diagnoses with clinical reassessments. *Journal of the American Academy of Child & Adolescent Psychiatry, 48*, 386-399.

Kwon, J., Delaney-Black, V., Covington, C., Abell, S. C., Nordstrom-Bailey, B., Sokol, R. J., & Ager, J. (2006). The relations between maternal expressed emotion and children's perceived self-competence, behavior and intelligence in African-American families. *Early Child Development and Care, 176*, 195-206.

Last, C., Perrin, S., Hersen, M., & Kazdin, A. (1996). A prospective study of childhood anxiety disorders. *Journal of the American Academy of Child & Adolescent Psychiatry, 35*, 1502-1510.

MacKinnon, D., Lockwood, C., Hoffman, J., West, S., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*, 83-104.

Manassis, K., & Hood, J. (1998). Individual and familial predictors in childhood anxiety disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 428-434.

McClure, E. B., Brennan, P. A., Hammen, C., & Le Brocque, R. M. (2001). Parental anxiety disorders, child anxiety disorders, and the perceived parent-child relationship in an Australian high-risk sample. *Journal of Abnormal Child Psychology, 29*(1), 1-10.

McGinn, L. K., Cukor, D., & Sanderson, W. C. (2005). The relationship between parenting style, cognitive style, and anxiety and depression: Does increased early adversity influence symptom severity through the mediating role of cognitive style? *Cognitive Therapy and Research, 29*, 219-242.

McLeod, B. D., Weisz, J. R., & Wood, J. J. (2007). Examining the association between parenting and childhood depression: A meta-analysis. *Clinical Psychology Review, 27*, 986-1003.

Mellon, R. C., & Moutavelis, A. G. (2007). Structure, developmental course, and correlates of children's anxiety disorder-related behavior in a Hellenic community sample. *Journal of Anxiety Disorders, 21*, 1-21.

Moos, R. H. (1990). Conceptual and empirical approaches to developing family-based assessment procedures: Resolving the case of the family environment scale. *Family Process, 29*, 199-208.

Moos, R. H., Finney, J.W., & Cronkite, R. C. (1990). *Alcoholism treatment: Context, process, and outcome*. New York: Oxford University Press.

Moos, R., & Moos, B. (1986). *Family environment scale manual* (2nd ed.). Palo Alto, CA: Consulting Psychological Press.

Moos, R., Nichol, A., & Moos, B. (2002). Global assessment of functioning ratings and the allocation and outcomes of mental health services. *Psychiatric Services, 53*, 730-737.

Muris, P., Bogels, S., Meesters, C., van der Kamp, N., & van Oosten, A. (1996). Parental rearing practices, fearfulness, and problem behaviour in clinically referred children. *Personality and Individual Differences, 21*, 813-818.

Muris, P., Meesters, C., Merckelbach, H., & Hulsenbeck, P. (2000). Worry in children is related to perceived parental rearing and attachment. *Behaviour Research and Therapy, 38*, 487-497.

Muris, P., Bosma, H., Meesters, C., & Schouten, E. (1998). Perceived parental rearing behaviors: A confirmatory factor analytic study of the Dutch EMBU for children. *Personality and Individual Differences, 24*, 439-442.

Muris, P., Meesters, C., Schouten, E., & Hoge, E. (2004). Effects of perceived control on the relationship between perceived parental rearing behaviors and symptoms of anxiety and depression in nonclinical preadolescents. *Journal of Youth and Adolescence, 33*, 51-58.

Muris, P., Meesters, C. M. G., Van Brakel, A. (2003). Assessment of anxious rearing behaviors with a modified version of "Egna Minnen Beträffende Uppfostran" Questionnaire for Children. *Journal of Psychopathology and Behavioral Assessment, 25*, 229-237.

Nowicki, S., & Strickland, B.R. (1973). A locus of control scale for children. *Journal of Consulting and Clinical Psychology, 40*, 148-154.

Ollendick, T. H., & Horsch, L. M. (2007). Fears in clinic-referred children: Relations with child anxiety sensitivity, maternal overcontrol, and maternal phobic anxiety. *Behavior Therapy, 38*, 402-411.

Parker, G. (1983). Parental Affectionless control as an antecedent to adult depression—A risk factor delineated. *Archives of General Psychiatry, 40*, 956-960.

Parker, G. (1986). Validating an experiential measure of parental style: The use of a twin sample. *Acta Psychiatrica Scandinavica, 73*, 22-27.

Preacher, K. P., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*, 717-731.

Rapee, R. M., Craske, M. G., Brown, T. A., & Barlow, D. H. (1996). Measurement of perceived control over anxiety-related events. *Behavior Therapy, 27*(2), 279-293.

Reynolds, C. R. (1998). Need we measure anxiety differently for males and females? *Journal of Personality Assessment*, 70, 212-221.

Reynolds, C. R., & Richmond, B. O. (1978). What I think and feel: A revised measure of children's manifest anxiety. *Journal of Abnormal Child Psychology, 6*, 271-280.

Roelofs, J., Meesters, C., Ter Huurne, M., Bamelis, L., & Muris, P. (2006). On the links between attachment style, parental rearing behaviors, and internalizing and externalizing problems in nonclinical children. *Journal of Child and Family Studies, 15*, 331-344.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General & Applied, 80*, 1-28.

Seibel, F. L., & Johnson, W. B. (2001). Parental control, trait anxiety, and satisfaction with life in college students. *Psychological Reports, 88*, 473-480.

Sheehan, G., & Noller, P. (2002). Adolescent's perceptions of differential parenting: Links with attachment style and adolescent adjustment. *Personal Relationships, 9*, 173-190.

Siqueland, L., Kendall, P. C., & Steinberg, L. (1996). Anxiety in children: Perceived family environments and observed family interaction. *Journal of Clinical Child Psychology, 25*, 225-237.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhart (Ed.), *Sociological methodology 1982* (pp. 290-312). San Francisco: Jossey-Bass.

Sokolowski, K., & Israel, A. (2008). Perceived anxiety control as a mediator of the relationship between family stability and adjustment. *Journal of Anxiety Disorders, 22*, 1454-1461.

Spokas, M., Rodebaugh, T., & Heimberg, R. (2008). *Treatment research. Handbook of clinical psychology, Vol. 1: Adults* (pp. 300-338). Hoboken, NJ: Wiley.

van Brakel, A. M. L., Muris, P., Bogels, S. M., & Thomassen, C. (2006). A multifactorial model for the etiology of anxiety in nonclinical adolescents: Main and interactive effects of behavioral inhibition, attachment and parental rearing. *Journal of Child and Family Studies, 15*, 569-579.

van der Bruggen, C., Stams, G., & Bögels, S. (2008). Research review: The relation between child and parent anxiety and parental control: A meta-analytic review. *Journal of Child Psychology and Psychiatry, 49*,1257-1269.

Van Roy, B., Kristensen, H., Groholt, B., & Clench-Aas, J. (2009). Prevalence and characteristics of significant social anxiety in children aged 8–13 years: A Norwegian cross-sectional population study. *Social Psychiatry and Psychiatric Epidemiology, 44*, 407-415.

Watkins, P. C. (2002). Implicit memory bias in depression. *Cognition & Emotion, 16*, 381-402.

Weems, C. F., Silverman, W. K., Alfano, C., & Tarolla, S. (1999). Control and anxiety disor-

ders in children. Presented at the Biennial Meeting of the Society for Research on Child Development, Albuquerque, NM.

Weems, C. F., Silverman, W. K., Rapee, R. M., & Pina, A. A. (2003). The role of control in childhood anxiety disorders. *Cognitive Therapy and Research*, *27*, 557-568.

Yahav, R. (2007). The relationship between children's and adolescents' perceptions of parenting style and internal and external symptoms. *Child: Care, Health and Development*, *33*, 460-471.