

Examining the association between parenting and childhood anxiety: A meta-analysis

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Abstract

Theoretical models emphasize the role of parenting in the development and maintenance of child anxiety, but reviews of the empirical literature have provided mixed support for existing theories. To help clarify the role parenting plays in childhood anxiety, we conducted a meta-analysis of 47 studies testing the association between parenting and child anxiety. Across these studies, parenting accounted for only 4% of the variance in child anxiety. Moderator tests indicated that methodological factors (i.e., how child anxiety and parenting were conceptualized and assessed) may be a source of inconsistent findings within the literature. In addition, our analyses revealed that parental control was more strongly associated with child anxiety than was parental rejection. Specific subdimensions within parental rejection and control differed in their association with child anxiety (e.g., autonomy-granting accounted for 18% of the variance, but warmth < 1%), indicating that efforts to disaggregate parenting dimensions may inform theory development and future research. Overall, however, the modest association between parenting and child anxiety suggests that understanding the origins of children's anxiety will require identifying factors other than parenting that account for the bulk of the variance.

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1. Introduction

Anxiety disorders are among the most common psychiatric problems experienced by children and they appear to remain stable and problematic for many youths throughout childhood and adolescence (Benjamin, Costello, & Warren, 1990; Boyd, Gullone, Kostanski, Ollendick, & Shek, 2000; Last, Perrin, Hersen, & Kazdin, 1996). Theoretical models of anxiety disorders have emphasized the influence of parenting on the development, maintenance, and amelioration of childhood anxiety (e.g., Chorpita & Barlow, 1998; Craske, 1999; Dadds & Roth, 2001; Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Krohne, 1990; Manassis & Bradley, 1994; Rapee, 2001; Vasey & Dadds, 2001). However, four reviews of the empirical evidence linking parenting to childhood anxiety have provided mixed support for existing theories (see Gerlsma, Emmelkamp, & Arrindell, 1990; Masia & Morris, 1998; Rapee, 1997; Wood, McLeod, Sigman, Hwang, & Chu, 2003) and have failed to resolve a fundamental question: Are parenting practices substantially associated with childhood anxiety?

Traditional models of childhood anxiety sought to explain the development of anxiety in terms of single main effects and focused primarily on the broad parenting dimensions of acceptance versus rejection and psychological granting of autonomy versus psychological control (see Gerlsma et al., 1990; Masia & Morris, 1998; Rapee, 1997; Wood et al., 2003). Both represent bipolar parenting dimensions, with positive parenting practices (e.g., acceptance) at one end of the continuum and negative parenting practices (e.g., rejection) at the other end of the continuum. For simplicity, we will use the terms rejection and control throughout the rest of this paper. Parental rejection connotes low levels of parental warmth, approval, and responsiveness (i.e., coldness, disapproval, and unresponsiveness) (e.g., Clark & Ladd, 2000; Maccoby, 1992). Parental rejection is hypothesized to undermine children's emotion regulation by increasing sensitivity to anxiety (e.g., Gottman, Katz, & Hooven, 1997). Hence, parental rejection is hypothesized to put children at an increased risk for developing anxiety problems. Parental control involves excessive parental regulation of children's activities and routines, encouragement of children's dependence on parents, and instruction to children on how to think or feel (e.g., Barber, 1996; Steinberg, Elmer, & Mounds, 1989). Some theoretical models (see, e.g., Chorpita & Barlow, 1998; Krohne, 1990; Manassis & Bradley, 1994; Rapee, 2001; Rubin & Mills, 1991) hypothesize that when parents are highly controlling in contexts when it is developmentally appropriate for children to act independently (e.g., attending elementary school), children may experience decreased self-efficacy, and thus, increased anxiety (Wood, 2006) — e.g., about their ability to function on their own within their environments. Conversely, some models (see, e.g., Chorpita & Barlow, 1998; Wood et al., 2003) have hypothesized that parental encouragement of children's autonomy and independence (e.g., in novel contexts) may augment children's perceptions of mastery over the environment, leading to anxiety reduction.

In keeping with the dominant theoretical models, most empirical studies have focused on the linkage between childhood anxiety and the broad parenting dimensions of rejection and control. Early empirical efforts primarily relied on adult retrospective reports. Papers reviewing this group of studies concluded that anxious adults generally remember their parents as being rejecting and controlling (see Gerlsma et al., 1990; Masia & Morris, 1998; Rapee, 1997). These findings are consistent with existing theories, but may not generalize to the association between parenting and anxiety during childhood. Retrospective reports have strengths, but they have been criticized because they may not provide a

reliable measure of actual parenting (see [Holden & Edwards, 1989](#)). For instance, evidence suggests that adults with mood disorders give biased accounts of parenting that do not reflect their actual childhood experiences ([Lewinsohn & Rosenbaum, 1987](#)). A recent review excluded retrospective reports and focused exclusively on studies that employed concurrent measures of parenting and anxiety in childhood or adolescence ([Wood et al., 2003](#)). But this review drew no clear conclusions regarding the parenting and childhood anxiety association, partially because a narrative review does not allow for an examination of the magnitude of effects across studies or potential moderating variables.

None of these four reviews used quantitative methods for synthesizing findings across studies. As a result, these reviews are limited in their ability to characterize the parenting–childhood anxiety association and cannot accurately assess the extent to which variations in parenting are actually associated with child anxiety. Methodologists (e.g., [Rosenthal, 1991](#); [Schmidt, 1992](#)) caution that statistical tests from individual studies can be misleading, given the dependence of such metrics on sample size and other sample characteristics, and that a better way to assess associations is to rely on effect size (ES) values examined within meta-analyses that synthesize those values across multiple studies. Like any statistical tool, meta-analyses are most informative when applied to the most representative data possible (e.g., the complete collection of studies carried out) and when used with safeguards against distortion (e.g., small sample bias). In the present paper, we present such a meta-analysis, relying on a highly representative set of studies and using stringent procedures to assess the strength of association.

Such an approach is useful in assessing the extent to which variations in parenting are actually associated with child psychological problems. Recent controversy over the long-accepted premise that parental childrearing practices are associated with child psychological problems raises questions about the extent to which parental behavior impacts children's psychological well-being ([Harris, 2002](#); [Kagan, 2003](#); [Maccoby, 2002](#); [Rutter, 2002](#)). The need to examine this broad question is highlighted by findings of [Rothbaum and Weisz's \(1994\)](#) meta-analysis testing the association between parenting and child externalizing problems. These authors found that, in contrast to the theoretical literature which strongly emphasized parenting as a determinant, parenting actually accounted for less than 6% of the variance in child externalizing problems. This rather surprising finding raises the question of whether or not internalizing problems such as child anxiety are strongly associated with parenting.

The theoretical literature cited earlier certainly asserts that a strong association between parenting and childhood anxiety exists, but other lines of evidence point to non-parenting factors that might be considerably more powerful in their impact. For example, twin studies (see e.g., [Eley et al., 2003](#); [Rice, Harold, & Thapar, 2002](#); [van Beijsterveldt, Verhulst, Molenaar, & Boomsma, 2004](#)) have suggested that additive genetic effects may account for 30–80% of the variance in children's trait anxiety, and that the non-shared environment (i.e., biological and social environmental influences that affect one sibling but not another) might account for a substantial proportion of additional variance. Nonetheless, most behavioral genetic studies suggest that there is at least some role of the “shared environment” in children's anxiety, which can include parenting influences. Meta-analytic methods permitted us to address the extent to which parenting behavior may be linked with child anxiety, to further evaluate this possibility.

Meta-analytic methods also allow the examination of variables that may moderate the association between parenting and childhood anxiety. Moderator variables can be the source of inconsistent findings across studies and can serve to mask the effects of other variables. Narrative reviews cannot identify modest but reliable effects associated with moderator variables, and thus are limited in their ability to identify potential sources of inconsistent findings. Elucidating possible sources of inconsistent findings can help inform theory development and provide direction for future research. Thus, a major goal of the present study was to examine whether a set of methodological and theoretical variables moderated the association between parenting and childhood anxiety.

Our examination of potential moderator variables begins with methodological variables. It is important to examine whether the way in which the target constructs (i.e., parenting and childhood anxiety) are measured moderates the strength of association, because variation in measurement is often the source of inconsistent findings. For example, [Rothbaum and Weisz \(1994\)](#) found that the association between parenting and childhood externalizing behavior was significantly reduced when parenting was measured using questionnaire measures as opposed to observational measures. We therefore examined whether methodological factors moderate the parenting–childhood anxiety association.

In addition, we assessed whether findings might be moderated by the manner in which parenting is construed and operationalized. The parenting dimensions of “rejection” and “control” emphasized in traditional theoretical models may lack specificity ([Wood, 2006](#)). Discontent with these models has led some to hypothesize that subdimensions of parental rejection (e.g., aversiveness, withdrawal, and a lack of warmth) and control (e.g., overinvolvement and a lack of autonomy-granting) may be differentially associated with childhood anxiety. For instance, [Rapee \(2001\)](#) emphasized

the importance of parental overinvolvement, whereas [Chorpita and Barlow \(1998\)](#) stressed the importance of parental autonomy-granting. If specific parenting subdimensions are differentially associated with childhood anxiety, then the use of the broad parenting categories may produce uneven effects due to heterogeneity among the subdimensions. At present, though, limited empirical evidence can be brought to bear on this issue since past reviews have not examined these parenting subdimensions. Thus, an aim of this paper was to assess whether subdimensions of the traditional parenting categories were differentially associated with childhood anxiety.

We also assessed whether the strength of the parenting-anxiety association might depend in part on child age or gender, or parent gender. One hypothesis we addressed was that the association between parenting and childhood anxiety is strongest in early childhood. Some models posit that parenting is particularly influential early in a child's life when the parents represent the main socializing agent — for example, early experiences with limited control are hypothesized to contribute to the development of anxiety ([Chorpita, 2001](#)). But it is also plausible that associations are stronger in later childhood as a result of the cumulative influences that child–parent interactions have on the development of anxiety over time (cf. [Maccoby, 1992](#); [Patterson, 1982](#); [Rothbaum & Weisz, 1994](#)). With regard to child gender, more girls than boys suffer from anxiety disorders and symptoms (see [Weiss & Last, 2001](#)) suggesting that higher levels of anxiety exhibited by some girls may ensnare parents in an overprotective or aversive cycle of behavior. To our knowledge, the role of parent's gender has not been the focus of theory nor has it been addressed in any reviews. On the one hand, women are more likely to suffer from anxiety symptoms than are men (see [Craske, 1999](#)) and may thus be more likely to model anxious behavior to their children ([Whaley, Pinto, & Sigman, 1999](#)). On the other hand, studies have suggested that fathers' affect may have a greater influence than mothers' on the mood of family members, including children (e.g., [Larson & Richards, 1994](#)). In sum, an aim of the present study was to examine whether child age and gender, and parent gender, moderate the parenting–childhood anxiety association.

Finally, we examined whether the magnitude of the parenting–childhood anxiety association varied as a function of several study design factors that are often examined in meta-analyses related to child and adult psychopathology. These factors included: (a) diagnostic status (i.e., whether the participants were diagnosed with an anxiety disorder), (b) type of anxiety (i.e., social anxiety symptoms versus other anxiety symptoms), (c) anxiety assessment strategy (continuous variable approach vs. categorical group comparison), (d) measurement technology of anxiety measure (i.e., the type of measure used to characterize anxiety), (e) child anxiety informant (i.e., who provided the report on children's anxiety), (f) measurement technology of parenting measure (i.e., the type of measure used to characterize parenting), (g) parenting informant (i.e., who provided the information on parenting), and (h) the subdimensions of parental rejection and control (i.e., withdrawal, aversiveness, warmth, overinvolvement, autonomy-granting).

To summarize, in the present study, we conducted a meta-analysis of studies examining the linkage between parenting and childhood anxiety to provide a more definitive statement about the overall strength of this association and to assess the impact of potential moderators. This is a particularly appropriate time for a meta-analysis because new theoretical frameworks for understanding the role that parenting plays in the development, maintenance, and amelioration of childhood anxiety are emerging, yet the strength of the parenting–childhood anxiety association has not yet been established (see [Chorpita & Barlow, 1998](#); [Craske, 1999](#); [Dadds & Roth, 2001](#); [Rapee, 2001](#); [Wood, 2006](#)). Our goal was to contribute to the development of these new frameworks by examining the overall degree of covariation of parenting and childhood anxiety. We sought to avoid some of the limitations of previous reviews by excluding adult retrospective reports and by using the quantitative approach of meta-analysis to synthesize the entire body of research in this area. We considered including longitudinal and experimental studies in the study set, but our search found no experimental studies and too few longitudinal studies to warrant a meta-analysis. Thus, only studies examining the concurrent association between parenting and childhood anxiety were included in this meta-analysis, but we did include a brief overview of the longitudinal studies to date.

2. Method

2.1. Selection of studies

We conducted a literature search for studies presenting quantitative data on the association between parenting and childhood anxiety involving mothers and/or fathers, and children from infancy through adolescence. A computer based information search was conducted on the PsychInfo computer database, which indexes (with key terms) and abstracts articles. The search covered from January 1887 up to April 2004, and we used the following 12 anxiety-related key

Table 1
Reviewed studies, sample characteristics, methods of assessment, and study ES

| Study | n | Age (years) | Parent | Parenting measure | | Dx. | Anxiety measure | | Mean r |
|--|------|----------------|--------|----------------------|---------|-----|--------------------|--------|-----------|
| | | | | Tech | Inform | | Tech | Inform | |
| Barrera & Garrison-Jones (1992) | 94 | 14.60 | M, F | Q | C | N | S | C | .00 |
| Barrett, Shortt, & Healy (2002) | 40 | 10.56 | M, F | O | O | Y | O | P | .62 |
| | 44 | 9.14 | M, F | O | O | Y | O | P | .38 |
| Berg & McGuire (1971) | 110 | 13.50 | M | Q | P | N | O | O | .22 |
| Biggam & Power (1998) | 125 | 18.80 | M, F | Q | C | N | S | C | .15 |
| Biller & Zung (1972) | 42 | 10.67 | M | Q | C | N | S | C | .08 |
| Booth, Rose-Krasnor, McKinnon, & Rubin (1994) | 74 | 4.00 | M | O | O | N | C | O | .04 |
| Bray (1992) | 24 | 9.10 | M, F | O | O | N | C | O | .40 |
| Brody & Forehand (1990) | 60 | 13.33 | F | Q | C | N | O | O | .16 |
| Broome & Endsley (1989) | 83 | 5.10 | M | O | O | N | O, C | P, O | .12 |
| Caster, Inderbitzen, & Hope (1999) | 1756 | 13.50 | M, F | Q | C | N | S | C | .22 |
| Dumas, LaFreniere, & Serketich (1995) | 84 | 4.08 | M | O | O | N | O | O | .52 |
| Eastburg & Johnson (1990) | 56 | 18.30 | M, F | Q | C | N | S | C | .16 |
| Fletcher, Steinberg, & Sellers (1999) | 1117 | 16.50 | M, F | Q | C | N | S | C | .02 |
| Greco & Morris (2002) | 48 | 11.00 | F | O | O | N | S | C | .12 |
| Gruner, Muris, & Merckelbach (1999) | 117 | 10.40 | M, F | Q | C | N | S | C | .23 |
| Harold, Fincham, Osborne, & Conger (1997) | 146 | 12.83 | M, F | Q | C | N | S | C | .44 |
| | 380 | 13.00 | M, F | Q | C | N | S | C | .31 |
| Hernandez-Guzman & Sanchez-Sosa (1996) | 3432 | 16.5 | M, F | Q | C | N | S | C | .21 |
| Hersov (1960) | 100 | 11.50 | M | Q | O | N | O | O | .25 |
| Hibbs, Hamburger, Kruesi, & Lenane (1993) | 101 | 13.50 | M, F | I | P | Y | O | P | .00 |
| Hirshfeld, Biederman, Brody, Faraone, & Rosenbaum (1997) | 71 | 9.59 | M | I | P | N | O, C | O | .06 |
| Hodges, Buchsbaum, & Tierney (1983) | 30 | 4.40 | M | Q | P | N | O | P, O | .06 |
| | 60 | 4.40 | M | Q | P | N | O | P, O | .16 |
| Hudson & Rapee (2001) | 29 | 8 | M | O | O | Y | S | C | .39 |
| | 25 | 10.50 | M | O | O | Y | S | C | .42 |
| | 21 | 13.50 | M | O | O | Y | S | C | .35 |
| Hudson & Rapee (2002) | 57 | 11.00 | M, F | O | O | Y | S | P | .25 |
| Hummel & Gross (2001) | 30 | 11.85 | M, F | O | O | N | S | C | .19 |
| Kochanska (1995) | 103 | 2.75 | M | Q, O | P, O | N | O | P | .19 |
| Kohlmann, Schumacher, & Streit (1988) | 329 | 13.00 | M, F | Q | C | N | S | C | .24 |
| LaFreniere & Dumas (1992) | 84 | 3.92 | M | O | O | N | O | O | .00 |
| MacEwen & Barling (1991) | 147 | 8.20 | M | Q | P | N | O | P | .30 |
| Mills & Rubin (1998) | 35 | 7.00 | M | O | O | N | O | O | .11 |
| Muris, Bogels, Meesters, van der Kamp, & van Oosten (1996) | 49 | 12.00 | M, F | Q | C, P | N | S | C | -.06 |
| Muris, Meesters, Merckelback, & Hulsenbeck (2000) | 159 | 10.82 | M, F | Q | C | N | S | C | .20 |
| Muris (2002) | 220 | 14.20 | M, F | Q | C | N | S | C | .13 |
| Rubin, Nelson, Hastings, & Asendorpf (1999) | 60 | 2.00 | M, F | Q | P | N | O, C | P, O | .10 |
| Schultz, Firetto, & Walker (1969) | 683 | 16.50 | M, F | Q | C | N | S | C | .25 |
| Shek (1989) | 2150 | 16.00 | M | Q | C | N | S | C | .24 |
| Siqueland, Kendall, & Steinberg (1996) | 44 | 11.00 | M, F | Q, O | C, P, O | Y | O | C | .13 |
| Stevenson-Hinde (1996) | 126 | 4.25 | M | O | O | N | O | P | .00 |
| Tesser & Forehand (1991) | 147 | 13.00 | M, F | Q | C | N | O | O | .09 |
| Travillion & Snyder (1993) | 61 | 4.42 | M | I | C | N | C | O | .33 |
| Weinstein (1968) | 40 | 10.00 | M | I | C | N | S | C | .19 |
| | 50 | 9.00 | M | I | C | N | S | C | .24 |
| Whaley et al. (1999) | 36 | 10.25 | M | O | O | N | S | O | .50 |

Note. Age is reported in mean years. For Parent, M = mother, F = father. For Parenting measure, Tech. = measurement technology, Q = questionnaire, I = interview, O = observation, Inform = informant, C = child, P = parent, O = observer. Dx. = diagnostic status, Y = Yes, N = No. For Anxiety measure, Tech = measurement technology, S = self-report, O = other-report, C = Counts/Behavioral observation, Inform = informant, C = child, P = parent, O = other.

terms: *internaliz-*, *anxi-*, *fear-*, *obsessive*, *compulsive*, *OCD*, *panic*, *phobi-*, *worr-*, *inhibit-*, *shy-*, and *somat-*. These key terms were crossed with the following parenting-related key terms: *father-*, *maternal*, *mother-*, *parent-*, *paternal*, *rearing*, and *socializ-*. Relevant literature reviews (e.g., Masia & Morris, 1998; Rapee, 1997) were used to initiate reference trails, and issues of journals (e.g., *Child Development*) dated 1990 and later which reported relevant studies

were hand-searched to locate studies not yet incorporated into PsychInfo. These steps produced a pool of 47 studies (reported in 41 articles) that met inclusion criteria. Table 1 lists the sample characteristics, methods of assessment, and study ESs for each of the 47 studies.

2.1.1. Inclusion/exclusion criteria

To be included, a study had to meet the following criteria: First, the study had to include a measure of the parenting of one parent in relation to a target child, or separate measures of both parents' in relation to the target child; second, the study either had to include a measure of anxiety (e.g., self-report) or the child participants had to be diagnosed with an anxiety disorder (e.g., Separation Anxiety Disorder); third, the association between parenting and childhood anxiety had to be tested statistically (e.g., correlation); finally, the reported mean age of the child participants had to be below 19 years.

We required that studies include a direct measure of parenting (e.g., positive parental involvement with one target child), so we excluded studies that did not, including studies that employed measures of "attachment" and the "family environment". Although attachment status may arguably reflect an aspect of the parent–child relationship, traditional attachment measures are based on observations of a child's behavior with a parent, rather than a parent's behavior with a child. Similarly, studies of the family environment have examined childhood anxiety as an outcome of interest (e.g., Green, Loeber, & Lehey, 1991); however, the family environment (e.g., family cohesiveness and adaptability) involves a complex interactive process among all family members and is not a direct measure of parenting.

2.1.2. Study sample

Our search was designed to identify three sets of studies: (a) cross-sectional; (b) longitudinal; and (c) experimental. However, our literature search only identified four longitudinal studies (i.e., Papini & Roggman, 1992; Pedersen, 1994; Rubin, Burgess, & Hastings, 2002; Rubin et al., 1999) and no experimental studies. The findings reported in the Results were derived from 47 cross-sectional studies published from 1960 to 2002, encompassing children ranging in age from 2 to 18.8 years ($M=10.46$, $SD=4.28$), totaling 12,879 participants, producing 236 correlations and 75 group-comparisons. Less than half of the studies reported on the ethnic composition of their sample; 16 studies were comprised mostly of Caucasian youth, whereas three studies were comprised of non-Caucasian youth — i.e., Asian, African American, and Latino. On average, families were comprised of 2.65 members ($SD=1.09$; based upon four studies), 72% of the families were intact ($SD=.38$; based upon 19 studies), and the parents reported an average of 14.24 years of education ($SD=.96$; based upon six studies). Finally, three studies reported that their samples were classified as "low" SES and six reported that their samples were classified as "middle" SES. Studies included in the meta-analysis are denoted with asterisks in the References section.

2.2. Coding of the studies

Information extracted from the studies was coded by the first and second authors. To assess intercoder agreement they independently coded a randomly selected sample of 14 studies. Coders were trained to an acceptable level of reliability, weekly meetings were held to prevent rater drift, and differences between coders were resolved through discussion. Following Fleiss (1981), kappas below .40 reflect "poor" agreement, kappas between .40 and .74 reflect "fair to good" agreement, and kappas .75 and higher reflect "excellent" agreement. Inter-coder agreement ranged from .62 to .98, with one of our codes in the fair to good range and the rest in the excellent range.

2.2.1. Information extracted

Information about the following variables was extracted from each study: (a) design features including SES, ethnicity, family size, intactness of families, study location (i.e., United States versus international), study setting (i.e., urban versus suburban/rural), and setting in which study was conducted (i.e., laboratory, home, other); (b) child age; (c) gender of the child; (d) gender of the parent;¹ (e) type of parenting behavior; (f) measurement technology of parenting

¹ An anonymous reviewer noted that parental psychopathology may moderate the association between parenting and childhood anxiety (see Connell & Goodman, 2002, for a review). To examine our ability to test this hypothesis, we reviewed the studies and found six studies that assessed the relation between parental psychopathology and childhood anxiety. Because only six studies tested the association we were unable to assess whether parental psychopathology moderated the association, but we concur that this issue is important and merits consideration in future meta-analyses when more research findings have accrued.

measure (i.e., questionnaire, interview, observation); (g) parenting informant (i.e., child, parent, observer); (h) type of childhood anxiety (i.e., social anxiety symptoms versus unspecified anxiety symptoms); (i) measurement technology of anxiety measure [i.e., self-report (i.e., rating of own anxiety), other-report (i.e., rating of someone else's anxiety), counts/behavioral observation (i.e., objective ratings of subject's anxiety)]; (j) anxiety informant (i.e., child, parent, other); (k) anxiety assessment strategy (i.e., continuous versus categorical); and (l) whether the participants were diagnosed with an anxiety disorder (i.e., yes, no).

2.2.2. *Childhood anxiety*

The definition of the term “anxiety” varies from study to study and across disciplines. For the purposes of this study we adopted Craske's (1999) definitions of and distinctions between trait anxiety and anxiety disorders (e.g., social phobia, separation anxiety disorder). Trait anxiety (also referred to as negative affect or neuroticism, comprising nonspecific symptoms of fear, worry, and other negative mood states not unique to a single disorder) is a continuous characteristic that, when elevated, represents a generalized vulnerability to mood disorders. In contrast, anxiety disorders represent specific clusters of anxiety symptoms that cause marked distress or impairment. We classified studies based upon the way in which childhood anxiety was assessed, namely, whether a trait (called “continuous”; $n=28$) or a diagnostic/extreme-groups approach (termed “group comparison”; $n=19$) was used. Examples of measures that were used to measure anxiety in a study classified as continuous are the Fear Survey Schedule and the State-Trait Anxiety Inventory for Children. Studies were classified as group comparison designs if “normal” children (non-anxiety disordered youth) were compared to a sample of children that (a) were diagnosed with anxiety disorder(s) (e.g., Hudson & Rapee, 2001), (b) had clinically elevated anxiety (i.e., above a clinical cutoff on a questionnaire measure of anxiety; e.g., Greco & Morris, 2002), or (c) were at-risk for developing an anxiety disorder (i.e., highly shy children; e.g., Rubin et al., 1999).

Originally, we planned to categorize anxiety measures according to the type of symptoms assessed (e.g., social anxiety, separation anxiety); however, many studies utilized measures that assessed unspecified types of anxiety symptoms (e.g., State-Trait Anxiety Inventory for Children; Spielberg, 1973). Nonetheless, numerous studies focused on shyness and social anxiety specifically. We therefore decided to classify measures of childhood anxiety into either (a) symptoms of social anxiety ($n=16$), or (b) unspecified anxiety symptoms ($n=34$).

Childhood anxiety was assessed using the following methods within the current study set. Regarding the measurement technology of the anxiety measures, 25 studies relied exclusively upon self-report measures, 16 studies relied solely upon an other-report (e.g., parent-report, teacher-report), and three studies relied upon behavioral counts/observations. Only three studies used multiple methods to assess anxiety and each one relied upon an other-report and a behavioral counts/observation measure. Regarding the anxiety informant, 24 studies relied solely upon child-report, seven exclusively upon parent-report, and 12 studies relied upon other reporters (e.g., teachers). Four studies collected information from the parent and other reporters.

2.2.3. *Parenting*

Parenting was defined as behavior towards children (e.g., “overprotection”), reported by children, parents, or observers. We did not include attributes of parents (e.g., parental psychopathology), the success of parenting (e.g., effectiveness of discipline), parents' roles or relationships (i.e. responsibility for financial matters), or parents' values and attitudes (e.g., belief in strict discipline for children). Guided by theory (e.g., Maccoby, 1992), factor-analytic findings (e.g., Schwarz, Barton-Henry, & Pruzinsky, 1985), and other reviews and meta-analyses of parenting (Rapee, 1997; Rothbaum & Weisz, 1994), we divided parenting into two broad dimensions: rejection and control.

In addition to classifying each parenting measure into rejection or control we classified each measure into a subdimension of rejection or control. The subdimensions of parental rejection were: (a) withdrawal, defined as the lack of involvement between parent and child, lack of interest in the activities of the child, or lack of emotional support/reciprocity (see Forehand & Nousiainen, 1993; Rapee, 1997); (b) aversiveness, defined as parental hostility towards children (e.g., criticism, punishment, and conflict) hypothesized to reflect a lack of parental acceptance (see Rapee, 1997; Tesser & Forehand, 1991); and (c) warmth, defined as a sense of positive regard expressed by the parent toward the child, pleasant interactions shared between parent and child, or parenting involvement in children's activities (of course, parental rejection is marked by a lack of warmth) (see Clark & Ladd, 2000; Gottman et al., 1997). The subdimensions of parental control were: (a) overinvolvement, defined as parental interference with children's age-normative autonomy and emotional independence, boundary problems (e.g., parent-child role reversal), excessive

restrictiveness, and encouragement of excessive dependence on the parent (see Barber, 1996; Wood et al., 2003); and (b) autonomy-granting, defined as parental encouragement of children's opinions and choices, acknowledgement of children's independent perspectives on issues, and solicitation of children's input on decisions and solutions of problems (parental control is marked by low autonomy-granting) (see Clark & Ladd, 2000; Steinberg et al., 1989; Whaley et al., 1999). Parenting measures were classified into one of these subdimensions except when a measure could be classified into more than one subdimension, in which case it was only coded as parental rejection or control.

Regarding the measurement technology of the parenting measures, 24 studies relied exclusively upon questionnaire measures, five relied solely upon interview measures, and 16 utilized only observational measures. Only two studies used multiple methods to assess parenting, with both relying upon questionnaires and observational measures. Regarding the parenting informant, 20 studies relied exclusively upon child-report, seven upon parent-report, and 17 solely upon observers. Three studies relied upon multiple informants, with one study relying upon child and parent report, one upon parent and observers, and one relying upon child, parent, and observers. Regarding parent gender, 25 studies examined the parenting–childhood anxiety relation for fathers and 45 studies examined the association for mothers. Regarding child gender, 10 studies examined the parenting–childhood association for boys, nine studies examined the relation for girls, and 36 studies did not specify child gender.

2.3. Meta-analytic method

Studies expressed the parenting–childhood anxiety association both in terms of Pearson's product-moment correlation (r) and mean difference between-groups. Following Rosenthal (1994), we used the ES r to express the association between parenting and childhood anxiety because it is more familiar and thus easier to interpret for most readers compared to d -type ES indices. We calculated ES values for each association of interest within each study — i.e., separate ES values were calculated within each study for all pairings between a parenting category and an anxiety measure. When investigators reported nonsignificant effects, there was sometimes insufficient information to compute an ES. In such cases, we contacted the authors in an attempt to gain access to the pertinent data. But when such efforts failed we used the common, conservative strategy of assigning a correlation of 0 (Pigott, 1994). This approach resulted in 15.8% of the parenting–childhood associations being assigned a 0.

Once ES values were calculated within each study we analyzed data across studies. In these analyses we first analyzed data at the study-level and then at the construct-level. The goal of these analyses was to obtain an unbiased ES estimate and to examine the homogeneity of the ES estimates. We weighted each ES by the inverse of its variance (Shadish & Haddock, 1994) and thus adjusted for heterogeneity of variance across individual observations. The resulting ESs were interpreted following Cohen's (1988) guidelines: r is a “small” effect when at least .10, r is a “medium” effect when at least .24, and r is a “large” effect when at least .37. In addition, so that ES estimates for negative parenting dimensions (i.e., rejection, withdrawal, aversiveness, overinvolvement, and control) could be compared to ES estimates for positive parenting dimensions (i.e., warmth, autonomy-granting) we multiplied the latter by -1 . Thus, for comparisons involving warmth and autonomy-granting, positive correlations mean that more of the parental behavior was associated with less childhood anxiety (e.g., more warmth is associated with less childhood anxiety).

The first goal of the study-level analysis was to produce an estimate of the population ES for the parenting–childhood anxiety association. To ensure independence of observations, each study contributed only one ES to the analysis by averaging across all parenting and childhood anxiety comparisons contained within each study. The second goal was to assess the homogeneity of the ESs. At the study-level, the homogeneity estimate (Q) approximates a chi-square distribution with $k-1$ degrees of freedom (Hedges, 1994). A significant effect indicates that the variation may not be due to sampling error (i.e., that the variation across weighted mean ESs is greater than chance) and that moderators may explain the variability. The final goal was to assess whether any sample characteristics accounted for variations in ESs across studies.

The goal of the construct-level analyses was to examine potential moderators of the association between parenting and childhood anxiety. To ensure independence of observations, each study was allowed to contribute only one ES to each moderator level by averaging across all parenting and childhood anxiety comparisons up to the level of analysis. For example, measures of different parenting dimensions were averaged except when the moderating effects of parental rejection and parental control were assessed. For these analyses, we first examined whether any methodological variables associated with the way in which parenting and childhood anxiety were measured moderated the parenting–

childhood anxiety association. Then, we examined whether a series of theoretical variables moderated the parenting–childhood anxiety association. Because these variables were categorical we used procedures analogous to analysis of variance (ANOVA) for the analyses — i.e., ES values were grouped according to each moderator to test for differences between the levels (Hedges, 1994). At the construct-level, two homogeneity estimates were produced (Hedges, 1994); a between-groups Q (termed Q_b) was calculated to test for significant variability across groups (e.g., parental rejection vs. parental control), and a within-group Q (termed Q_w) was calculated to test for significant variability within each group (e.g., variation within the parental rejection category). For follow-up contrasts, standardized contrasts (g) were calculated from the difference in ES values (Hedges, 1994). The significance of each contrast was determined by first dividing the contrast value by the pooled variance, which produces a critical value equivalent to the chi-square distribution with one degree of freedom. The critical value for the contrasts was set at $p < .05$.

3. Results

3.1. Study-level analysis

Our study-level analysis focused upon the association between parenting and childhood anxiety. For the parenting–childhood anxiety association the weighted mean ES was .21, reflecting a relation in which more negative parenting was associated with more child anxiety, and the 95% confidence interval did not include zero. This ES meets criteria for a small effect and suggests that parenting was associated with approximately 4% of the variance in childhood anxiety. The homogeneity analysis was significant indicating that moderating variables likely exist ($Q = 140.56, p < .01$). Before proceeding with the construct-level analyses we conducted analyses examining whether ESs varied according to SES, ethnicity, family size, intactness of families, study location (i.e., United States vs. international), study location (i.e., urban versus suburban/rural), and setting in which the study was conducted (i.e., laboratory, home, other). All of these analyses were nonsignificant, so ESs produced by studies utilizing different design features were not treated separately in subsequent analyses.²

3.2. Construct-level analyses — methodological moderators

We first examined whether methodological factors moderate the association between parenting and childhood anxiety.

3.2.1. Childhood anxiety

Results for the construct-level analyses examining the moderating effects of type of anxiety symptoms, measurement technology, informant, diagnostic status, and anxiety assessment strategy indicated that diagnostic status was a moderator (see Table 2). The weighted mean ES for diagnosed samples ($ES = .35$) was significantly higher than the weighted mean ES for non-diagnosed samples ($ES = .20$) ($Q_b = 14.48, p < .01$). This finding suggests that the way in which anxiety was modeled affected the magnitude of the parenting–childhood anxiety association.

3.2.2. Parenting

Results for the construct-level analyses examining the moderating effects of measurement technology and informant of the parenting measures indicated that both were significant (see Table 2). The between-groups homogeneity statistic was significant for measurement technology ($Q_b = 7.38, p < .05$), indicating that the weighted mean ES varied according to whether questionnaire ($ES = .20$), interview ($ES = .15$), or observational ($ES = .28$) measures were used. Follow-up contrasts indicated that observational measures were significantly higher than questionnaire ($g = .07, p < .01$) and interview ($g = .12, p < .01$) parenting measures. The between-groups homogeneity statistic was also significant for parenting informant ($Q_b = 9.71, p < .01$), indicating that the weighted mean ES differed according to whether children ($ES = .21$), parents ($ES = .14$), or observers ($ES = .28$) reported on parenting. Follow-up contrasts indicated that observer-report was significantly higher than child ($g = .07, p < .01$) or parent ($g = .14, p < .01$). Overall, these findings

² We should also add that over half of the studies did not provide information on certain sample characteristics (e.g. SES, ethnicity, family size, intactness of families), which limited our ability to determine whether the magnitude of the parenting–childhood anxiety association varied according to these variables.

Table 2
Moderator analyses for parenting and childhood anxiety

| Moderator | Weighted | | | |
|---|----------|-----|------------------------|----------|
| | Q_b | K | mean ES | Q_w |
| Methodological moderators for childhood anxiety | | | | |
| Anxiety diagnostic status | 14.48** | | | |
| Yes | | 10 | .35 | 29.63** |
| No | | 38 | .20 | 97.56** |
| Methodological moderators for parenting | | | | |
| Measurement technology | 7.38* | | | |
| Questionnaire parenting measures | | 27 | .20 _a | 81.82** |
| Interview parenting measures | | 5 | .15 _b | 5.60* |
| Observational parenting measures | | 18 | .28 _{a,b} | 52.49** |
| Informant | 9.71** | | | |
| Child | | 22 | .21 _a | 72.99** |
| Parent | | 10 | .14 _b | 12.09 |
| Observer | | 18 | .28 _{a,b} | 52.49** |
| Theoretical moderators | | | | |
| Parenting dimension | 9.88** | | | |
| Rejection | | 41 | .20 _a | 132.13** |
| Control | | 26 | .25 _a | 68.84** |
| Parenting subdimension | 82.02** | | | |
| Warmth | | 16 | .06 _{a,b,c,d} | 27.10* |
| Withdrawal | | 7 | .22 _{a,c} | 12.59 |
| Aversiveness | | 14 | .23 _{b,f} | 43.31** |
| Overinvolvement | | 11 | .23 _{c,g} | 14.79 |
| Autonomy-granting | | 7 | .42 _{d,e,f,g} | 54.31** |

Note. Categories with the same subscript denote significant differences. Q_b = homogeneity for test of variation across groups; K = number of correlations; Weighted mean ES = average corrected (i.e., weighted) correlation; Q_w = test of variation within group of individual effects.

* $p < 0.05$ ** $p < 0.01$.

indicate that the way in which parenting was assessed impacted the magnitude of the parenting–childhood anxiety association.

3.3. Construct-level analyses: theoretical moderators

We next examined whether theoretical factors moderate the association between parenting and childhood anxiety.

3.3.1. Parenting dimensions

Results of the construct-level analyses examining the moderating effects of the parenting dimensions and subdimensions are shown in Table 2. We first examined the association between childhood anxiety and the dimensions of rejection and control. This analysis identified significant between-groups homogeneity ($Q_b = 9.88$, $p < .01$), indicating that the rejection and control dimensions differed significantly. For rejection, the weighted mean ES was .20, which meets criteria for a small effect and indicates that parental rejection accounts for approximately 4% of the variance in childhood anxiety. For control, the weighted mean ES was .25, which meets criteria for a medium effect and suggests that parental control accounts for almost 6% of the variance in childhood anxiety. Altogether, these findings indicate that higher levels of parental rejection and control were associated with more childhood anxiety, but parental control was associated with a greater proportion of the variance in childhood anxiety than rejection.

Because the rejection and control categories were heterogeneous we next examined whether the five parenting subdimensions—warmth, withdrawal, aversiveness, overinvolvement, and autonomy-granting—were differentially associated with childhood anxiety. These analyses produced a significant between-groups homogeneity estimate ($Q_b = 82.02$, $p < .01$), indicating significant differences across parenting subdimensions. Weighted mean ESs for the parenting subdimensions ranged from .06 (warmth), a small effect, to .42 (autonomy-granting), a large effect. Accordingly, the percentage of variance explained varied substantially, ranging from <1% to 18%. All of the associations between parenting and childhood anxiety were in the hypothesized direction. That is, higher levels of

parental warmth and autonomy-granting were associated with less child anxiety, and higher levels of parental withdrawal, aversiveness, and overinvolvement were associated with more child anxiety. Follow-up contrasts revealed that the weighted mean ES for autonomy-granting was significantly higher than the weighted mean ESs for warmth ($g = .36, p < .01$), withdrawal ($g = .20, p < .01$), aversiveness ($g = .19, p < .01$), and overinvolvement ($g = .19, p < .01$). Also, the weighted mean ES for warmth was significantly lower than the weighted mean ESs for withdrawal ($g = .16, p < .01$), aversiveness ($g = .17, p < .01$), and overinvolvement ($g = .17, p < .01$). The parenting subdimensions were therefore differentially associated with childhood anxiety, with autonomy-granting and overinvolvement explaining the greatest proportion of the variance in childhood anxiety.

3.3.2. *Child age and gender, and parent gender*

Results of the analyses examining the moderating effects of child age, child gender, and parent gender produced no significant findings.

3.4. *Do methodological factors explain the findings for parental rejection and control?*

Next, we examined whether the average ESs for parental rejection and control remained statistically different from each other when the effects of the methodological variables identified as significant moderators were controlled. Simultaneous weighted least squares (WLS) regression was used for this analysis. The WLS regression analysis yielded a significant multiple $R^2 = .27, F(5, 72) = 4.98, p < .001$. Diagnostic status remained significant ($\beta = -.43, p = .01$), but parenting type did not remain significant ($\beta = .16, ns$), when controlling for the methodological variables identified above.

To explore the suppressive effect of diagnostic status on parenting type identified in the regression analysis, we then examined the two-way interaction between parenting type and diagnostic status. Our analyses revealed that the interaction was significant, ($Q_b = 4.13, p < .05$). In diagnosed samples, the association for parental control was significantly higher than parental rejection (ESs = .45 vs. .30, $p < .05$), but parental control was not significantly higher than parental rejection in non-diagnosed samples (ESs = .22 vs. .19, ns). Overall, these findings indicate that the differential ESs for parental control versus rejection only emerge in studies comparing children with anxiety disorders and children without diagnoses.

3.5. *Longitudinal studies*

Longitudinal studies can help clarify the direction of effects linking parenting and child outcomes, and four longitudinal studies meeting our inclusion/exclusion criteria were identified. Three of these longitudinal studies provided prospective analyses (e.g., a time 1 measure predicting a time 2 outcome), but only one study controlled for initial levels of symptomatology (i.e., inhibition) when predicting later anxiety. Rubin et al. (1999) found that early shyness in two-year olds predicted subsequent parental control at age four, but that initial parental control at age two was not significantly associated with shyness at age four. In contrast, Pedersen (1994) found that normal adolescents' ratings of greater parental rejection predicted more anxiety symptoms six months later. Interestingly, Rubin et al. (2002) found that maternal parenting behaviors (i.e., overprotection and warmth) moderated the relation between two-year-olds' inhibition with peers and their social anxiety at age four. These studies provide illustrations of two possible pathways — child behavior eliciting parental behavior, and parental behavior eliciting child behavior. The final study (Papini & Roggman, 1992) reveals little about the direction of effects because even though parenting and anxiety data were collected at three different time points, longitudinal associations among the variables were not examined.

4. Discussion

The primary goal of the present study was to identify the nature and strength of associations between parenting and childhood anxiety. Influential theories in the field have stressed the role of parenting, but reviews of the empirical literature have suggested that the association is inconsistent from study to study (see e.g., Masia & Morris, 1998; Rapee, 1997). The meta-analytic data synthesized here indicate that the connection between parenting and child anxiety was small in magnitude, with parenting statistically accounting for about 4% of the variance in childhood anxiety. As a point of comparison, a meta-analysis by Rothbaum and Weisz (1994) found that parenting explained less

than 6% of the variance in childhood externalizing behavior. Together, these findings raise the important possibility that parenting may actually play a considerably more minor role in children's psychological problems (both externalizing and internalizing) than a number of influential theories imply.

If parenting explains only a small portion of the variance in childhood anxiety symptoms and disorders, what factors may play a larger role? Studies of monozygotic and dizygotic twins suggest two possible sources of variation in anxiety distinct from parenting influences. Two recent studies using large twin registry samples ($n=4564$ and 7600) report narrow heritability (additive genetic effects) estimates around 50% for anxiety symptoms in children (Eley et al., 2003; van Beijsterveldt et al., 2004), with some variability in heritability depending on the type of anxiety in question. Second, the nonshared environment may play a substantial role in childhood anxiety. Nonshared environmental influences include both biological factors (e.g., perinatal complications) and nonbiological factors (e.g., peer relationships, traumatic events). Both of the recent large twin studies cited above found that about a third of the variance in anxiety was attributable to the nonshared environment (Eley et al., 2003; van Beijsterveldt et al., 2004). Emerging research has found linkages between aspects of the nonshared environment and childhood anxiety; for instance, peer victimization experiences (which are often unique to one sibling) are linked with children's anxiety (Graham & Juvonen, 2002). Evidently, a substantial proportion of the variance in childhood anxiety—perhaps the lion's share of the variance—may be attributed to additive genetic effects and nonshared environmental influences.

Beyond assessing the overall association between parenting and child anxiety, our meta-analysis was designed to test whether sample design characteristics or methodological factors (e.g., measurement technology) accounted for inconsistent findings in the literature. Moderator analyses suggested that three methodological factors explained some heterogeneity of the effects in the literature, with somewhat stronger effects emerging for studies comparing diagnosed and non-diagnosed youth, for studies using observers to report upon parenting, and for studies with higher quality measurement of parenting practices. We also tested whether theoretical factors (e.g., parenting dimensions, child age) accounted for the heterogeneity of the effects in the literature. Somewhat stronger effects emerged for parental control than parental rejection, and subdimensions of these parenting categories varied significantly as well. Overall, our findings provide modest support to theoretical models of childhood anxiety that emphasize the role of parenting (Chorpita & Barlow, 1998; Craske, 1999; Dadds & Roth, 2001; Fox et al., 2005; Krohne, 1990; Manassis & Bradley, 1994; Rapee, 2001; Wood et al., 2003), and identify several sources of inconsistent findings in the literature.

With regard to the goal of identifying possible sources of inconsistent findings, our results help identify the presence of moderators of the parenting–childhood anxiety association. Evidently, the extant literature does not represent a single “population” of studies, but rather, a heterogeneous group whose effects vary according to both methodological and theoretical factors. We first examined whether methodological factors associated with the measurement of childhood anxiety moderated the association between parenting and childhood anxiety. Diagnostic status was a significant moderator of this association. This factor relates to the way in which anxiety is modeled, and suggests that samples of children diagnosed with anxiety disorders generate larger effects than non-diagnosed samples. Traditionally, individuals with anxiety disorders have been viewed as categorically different from individuals who do not meet the criteria (e.g., Craske, 1999). If anxiety is better modeled as a categorical rather than a continuous variable, then perhaps the studies that used diagnosed samples in this meta-analysis produced a more accurate (and sizeable) estimate of the parenting–childhood anxiety association by minimizing error variance in the measurement model. Our findings provide evidence of concurrent validity for this approach that has been increasingly employed in the childhood anxiety field. However, this pattern of findings could also be explained by the tendency for “extreme-groups” designs to yield larger statistical effects than full-range correlational designs (Preacher, Rucker, MacCallum, & Nicewander, 2005).

Next, we examined whether parenting measurement strategy moderated the parenting–childhood anxiety association. Stronger effects were found for observer ratings than for child- or parent-report. Both interview and questionnaire measures of parenting were found to underestimate the magnitude of the association between parenting and childhood anxiety when compared to observational measures. These results are consistent with past meta-analytic research examining the association between parenting and childhood externalizing behavior that also found weaker ES estimates associated with questionnaires than with observational methods (Rothbaum & Weisz, 1994). In fact, when we focused exclusively upon observational measures of parenting, we found a parenting–anxiety ES ($r=.28$) that is identical to the parenting–externalizing ES reported by Rothbaum and Weisz (1994; $r=.28$). Thus, with observational methods, almost 8% of the variance in both childhood anxiety and externalizing behavior is associated with variance in parenting. These findings highlight the limitations of questionnaire measures of parenting. Traditional paper-and-pencil parenting measures have been criticized for their lack of convergent validity (Holden & Edwards, 1989); of course, the

lack of validity of such measures would significantly restrict the validity of any hypothesis-testing conducted with such measures. Investigators in the field would be well advised to carefully select parenting measures with good convergent validity, as well as other positive psychometric properties, in future research on parenting and childhood anxiety (cf. Wood, 2006).

Given that methodological factors were found to moderate the association between parenting and childhood anxiety, it may be worthwhile for researchers to consider steps that could be taken to minimize the impact of these factors in future studies. One important step is the use of multiple informants to assess both parenting and child anxiety. Most studies in the present study set relied exclusively on questionnaire measures and used a single informant to report on both constructs (i.e., on both child anxiety symptoms as well as parenting). Studies that examine the association between two questionnaire measures from the same source are at risk of obtaining inflated correlations (Campbell & Fiske, 1959), due to response bias (e.g., desire to present the child as “well” or “ill”) and response sets (e.g., a tendency to make generally high ratings on Likert-type scales). Using multiple informants to assess the multi-faceted constructs of parenting and anxiety may help provide a more accurate estimate of the parenting–childhood anxiety association that is not subject to method variance.

Turning to factors identified in the theoretical literature on parenting, only one turned out to be a significant moderator of the parenting–anxiety relationship, namely, parenting dimensions. Our results indicate that the two broad parenting dimensions of rejection and control were differentially associated with childhood anxiety, with control (a medium effect) demonstrating a stronger association than rejection (a small effect) — a finding that appeared to be primarily characteristic of studies comparing diagnosed and non-diagnosed youth. These findings suggest that excessive parental control may play a particularly important role in children’s anxiety disorders, either as a cause of anxiety, as a response by parents to the child’s anxiety, or as an expression of the parents’ own anxiety (Fox et al., 2005; Rapee, 2001; Wood et al., 2003). Human and animal models of anxiety emphasize the role of control and self-efficacy as determinants of anxiety (e.g., Bandura, 1988; Chorpita & Barlow, 1998). When parents fail to provide children with the opportunity to experience control in age-appropriate contexts, it is possible that children may not develop a strong sense of self-efficacy, thereby increasing their sense of vulnerability to threat and heightening anxiety (Chorpita & Barlow, 1998; Wood, 2006). Conversely, when children exhibit elevated anxiety, parents may respond by making more decisions for the child, which may resemble overcontrolling parenting behavior. Our results lend support to theoretical models that emphasize the importance of parental control in the development, maintenance, and/or amelioration of anxiety disorders, but the results do not clarify the direction of effects or the specific process involved. These remain as important questions for future research.

We also assessed whether five subdimensions of our two main parenting categories—warmth, aversiveness, withdrawal, overinvolvement, and autonomy-granting—were differentially associated with childhood anxiety. To date, categorizing parenting into rejection and control has been based on the implicit assumption that these constructs capture most of the relevant parenting behavior. But this assumption has recently been questioned (Silk, Morris, Tomoe, & Steinberg, 2003), and our findings suggest that the use of broad parenting measures may have led researchers to underestimate the strength of the parenting–childhood anxiety association. Some parenting subdimensions (e.g., autonomy-granting, 18% of the variance) demonstrated a significantly stronger association with childhood anxiety than others (e.g., warmth, <1% of the variance). And it is notable that lower levels of autonomy-granting, and to a lesser degree excessive overinvolvement, were more strongly associated with childhood anxiety than the subdimensions of rejection. This pattern is consistent with the theoretical literature that emphasizes the role of parental control in the development and maintenance of childhood anxiety. Moreover, this pattern reinforces the findings regarding differential effects for the rejection and control dimensions, suggesting that parental autonomy-granting and support for independence, as well as less parental overinvolvement, could facilitate children’s confidence and buffer against excessive anxiety; or, conversely, that very anxious children tend to elicit parental overinvolvement and less autonomy-support.

It is equally notable that parental warmth, a sub-dimension of parenting that theory and conventional wisdom posit to be crucial for children’s development and well-being (see Kagan, 2003, for discussion), appeared to play a very small role, explaining less than 1% of the variance in childhood anxiety. In comparison, the subdimensions of aversiveness and withdrawal, which may be conceptualized as the opposites of warmth on a single continuum, had effects comparable to the subdimension of overinvolvement. This pattern suggests that the presence of aversiveness and/or withdrawal may have a greater impact on anxiety (or, conversely, may be more strongly elicited by anxiety) than the absence of “positive” parenting (i.e., warmth). This finding reinforces the need to disaggregate the traditional

parenting dimensions, such as “rejection,” into more specific components of parenting behavior that may represent unique correlates of childhood anxiety.

It is important to note that our overall findings of a small ES is most likely a conservative estimate of the parenting–childhood anxiety association, given the significant moderating effects of both methodological and theoretical factors. For example, although based on a small subsample of studies, the percent of variance in anxiety linked with parenting was as high as 18% when the parenting subcategory of autonomy-granting was singled out. Future research may help clarify the magnitude of the association by more precisely measuring parenting behavior, using observational measures of parenting, and perhaps by relying more consistently upon categorical models of childhood anxiety. It is also possible that dimensions of parenting not yet identified in the theoretical and empirical literature may be more closely linked to child anxiety than dimensions examined in research to date.

Another factor that qualified the news regarding the parenting–childhood anxiety association is that the literature is very limited in what it can tell us about the direction of effects linking parenting and childhood anxiety. There are very few prospective studies and no experimental studies in the literature. The three prospective studies that made use of the longitudinal aspect of their datasets yielded evidence consistent with both causal directions — parenting predicting child anxiety, and anxiety predicting parenting (Pedersen, 1994; Rubin et al., 1999, 2002). Clearly, given the limitations of longitudinal designs—which are correlational and nonexperimental in nature—these findings are not conclusive (see Cowan & Cowan, 2002). And the more numerous cross-sectional studies summarized herein cannot clarify whether negative parenting behaviors precede the development of childhood anxiety, are elicited by anxious child behavior, or are subject to a “third variable” explanation, as in the case of genetic factors affecting both parenting and childhood anxiety. To clarify the direction of effects, the field needs to move from correlational designs to experimental methodology. We offer two suggestions for advancing the field by employing experimental designs.

Short-term experimental designs may be used to test hypotheses about the role of child anxiety in eliciting specific types of parenting behavior. One possible model for such a design comes from research in the area of childhood externalizing behavior. For instance, Pelham and colleagues (1998) have investigated whether exposure to a compliant versus noncompliant child confederate in a laboratory interaction task leads to differential short-term patterns of alcohol consumption in parents of children with externalizing problems. A similar approach could examine the effects of anxious child behaviors on parenting. For instance, parents might be randomly assigned to teach an “anxious” or “normal” child confederate a skill. The child confederate could be assigned to either act in a shy manner, or in a sociable and confident manner. Group differences between the parents in their interactional styles with the child confederates could provide useful experimental evidence on the role of child anxious behavior in eliciting specific adult behaviors such as autonomy-granting and intrusiveness.

Intervention designs can also help clarify the direction of effects between family interaction patterns and childhood anxiety. Such research designs seek to alter parenting patterns to assess the resulting impact on children’s developmental outcomes (Cowan & Cowan, 2002). Although intervention designs cannot provide information regarding the initial causes of childhood anxiety, such designs can test whether altering current parenting practices affects subsequent childhood anxiety, and this may have implications for the role that parents play in maintaining or ameliorating child anxiety symptoms. In such a design, participants would be randomly assigned to either a condition that alters parenting patterns, or a control condition that does not. Children’s behavior and parenting practices would be measured before and after the intervention. Parenting practices could be said to play a mediating role in children’s anxiety if (a) the parenting intervention improves children’s anxiety more than does the control group, (b) the parenting intervention improves parenting practices more than the control group, and (c) improvements in the child anxiety measure are associated with improvements in parenting practices. Of course, even results that meet these criteria would not “prove” that parenting practices causally affect child anxiety symptoms. However, such results would provide more convincing evidence of the potential for parenting to play a role in the maintenance and alleviation of child anxiety symptoms than do correlational results.

A few interpretive issues warrant attention. Although we coded and assessed for a wide range of variables, it is possible that we failed to identify some variables that exert a systematic influence upon the parenting–childhood anxiety association. The study set was characterized by uneven reporting practices, which potentially limited our ability to identify moderators. As one example, less than half of the reviewed studies provided a thorough description of sample characteristics (SES, ethnicity, family size, intactness of families), which impeded our efforts to determine whether one or more of these factors moderated the relation between parenting and childhood anxiety. Consequently, the generalizability of our findings was limited by the fact that we could not adequately assess consistency of the

parenting–childhood anxiety association across variations in a broad range of sample characteristics. As another example, the number of analyses that focused upon maternal parenting ($n=45$) was almost twice as many as the number focused upon paternal parenting ($n=25$), which restricted our ability to examine the influence of parent gender upon the parenting–childhood anxiety association. To aid future efforts to synthesize the literature it would be helpful for researchers to provide a more thorough description of sample characteristics and design features so that the impact of these factors upon the parenting–childhood anxiety association can be more fully assessed.

We now return to a primary question with which this meta-analysis began — what role does parenting play in childhood anxiety? In one respect, our findings are encouraging because they establish a reliable association between parenting and childhood anxiety. However, this news is qualified by the fact that the association is modest. Moreover, the causal mechanisms that produce this linkage have not been established. Given that current theoretical models posit that parenting plays a role in the development, maintenance, and amelioration of childhood anxiety, the field would be advanced by research clarifying what role, if any, parenting behaviors play in causing, sustaining, or reducing childhood anxiety. In the next generation of research, experimental designs will be needed that can begin clarifying the direction of effects.

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