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Attachment and Internalizing Behavior in Early Childhood: A Meta-Analysis

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Empirical research supporting the contention that insecure attachment is related to internalizing behaviors has been inconsistent. Across 60 studies including 5,236 families, we found a significant, small to medium effect size linking insecure attachment and internalizing behavior (observed $d = .37$, 95% CI [0.27, 0.46]; adjusted $d = .19$, 95% CI [0.09, 0.29]). Several moderator variables were associated with differences in effect size, including concurrent externalizing behavior, gender, how the disorganized category was treated, observation versus questionnaire measures of internalizing behavior, age of attachment assessment, time elapsed between attachment and internalizing measure, and year of publication. The association between avoidant attachment and internalizing behavior was also significant and small to moderate ($d = .29$, 95% CI [0.12, 0.45]). The effect sizes comparing resistant to secure attachment and resistant to avoidant attachment were not significant. In 20 studies with 2,679 families, we found a small effect size linking disorganized attachment and internalizing behavior (observed $d = .20$, 95% CI [0.09, 0.31]); however, the effect size was not significant when adjusted for probable publication bias ($d = .12$, 95% CI [−0.02, 0.23]). The existing literature supports the general notion that insecure attachment relationships in early life, particularly avoidant attachment, are associated with subsequent internalizing behaviors, although effect sizes are not strong.

Keywords: attachment, internalizing behavior, meta-analysis

A central focus of research in developmental psychopathology involves risk and protective factors associated with internalizing problems in childhood and beyond. Internalizing problems involve behaviors that are inner-directed and overcontrolled (Achenbach & Rescorla, 2000). Internalizing behaviors encompass symptoms related to depression and anxiety, as well as social isolation and withdrawal. There is consensus among developmentalists that pathways to internalizing disorders are multifactorial, but once established, internalizing symptoms tend to be stable over time, placing the child at risk for various forms of adversity (Keiley, Bates, Dodge, & Pettit, 2000). One potential early contributor to internalizing behavior, beyond temperament and genetics (Ono et al., 2002), involves insecure attachment relationships. While some studies have shown significant associations between insecure attachment and internalizing behavior (e.g., Bohlin, Hagekull, & Rydell. 2000; Brumariu & Kerns, 2010; Cicchetti, Rogosch, & Toth, 1998; Manassis, Bradley, Goldberg, Hood, & Swinson, 1995), others have failed to document this association (e.g., DeMulder, Denham, Schmidt, & Mitchell, 2000; Stams, Juffer, & van IJzendoorn, 2002). The seemingly inconsistent literature serves as impetus to attain a summary account of the association between insecurity and internalizing behaviors and to explore the underlying causes for variation in this association. The current meta-analysis is a necessary prerequisite to conceptualizing and testing more compelling models that move beyond single factor risk variables in the development of behavior problems. The purpose of this meta-analysis is to resolve two fundamental questions regarding the data amassed to date: (1) How strongly is insecure attachment associated with internalizing behaviors? and (2) what factors moderate the magnitude of this association?

The attachment relationship is said to reflect children's expectation regarding their caregiver's response to attachment-related needs and cues (Ainsworth, Blehar, Waters, & Wall, 1978; Lyons-Ruth, Bronfman, & Parsons, 1999; Main & Hesse, 1990). Know-

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ing they can count on their caregiver when distressed, children in secure attachment relationships use the attachment figure as a secure base for exploration, regulating emotion as appropriate. In contrast, children with anxious–insecure attachment adopt one of two strategies to deal with rejecting or inconsistent caregiving: restrained (avoidant attachment) or exaggerated (resistant attachment) expression of need for comfort and safety. Main and Solomon (1990) introduced insecure–disorganized attachment to characterize children who showed a mixture of anxious–insecure strategies or who demonstrated a breakdown of their preferred strategy under duress. The Strange Situation Paradigm (SSP; Ainsworth et al., 1978) was developed to assess the quality of the attachment relationship in infancy. Methods for assessing behavioral patterns of attachment in early childhood (e.g., Cassidy & Marvin, 1992; Crittenden, 1992; Main & Cassidy, 1988) and outside of the laboratory (Attachment Q-Sort [AQS]; Waters, 1987) have also been developed.

Conceptual Links Between Attachment and Internalizing Problems

Attachment theory's original formulation was driven by John Bowlby's (1969/1982) quest for a meaningful model of the development of psychopathology. Once Bowlby (1969/1982) provided an appealing paradigm for understanding attachment relationships and Ainsworth (Ainsworth et al., 1978) developed the means to verify it, the hypothesized association between insecure attachment and later psychopathology received concerted empirical attention. At the heart of Bowlby's (1973) theory was the idea that early loss, separation, or psychological unavailability of an attachment figure would have enduring effects, setting in motion processes in children and their relationships that are carried forward in development, influencing later psychosocial functioning (Bowlby, 1973). Children who are insecurely attached, due to inconsistent or inadequate caregiving, are likely to take these maladaptive models of interpersonal relations into the broader social environment; "they respond either by shrinking from it or doing battle with it" (Bowlby, 1973, p. 208). The presence of an insecure attachment simultaneously decreases children's ability to cope with stress while increasing their probability of behaving in ways that bring about more adverse experiences. Support for these contentions was initially provided by the Minnesota Longitudinal Study of Parents and Children (Erickson, Sroufe, & Egeland, 1985). However, research emerging over the past 25 years has been inconsistent; several studies have verified the link between insecure attachment and internalizing behavior, others have contradicted it (e.g., Howes, Matheson, & Hamilton, 1994), and still others have provided partial support (e.g., insecure attachment is related to internalizing problems, but only in males; Lewis, Feiring, McGuffog, & Jaskir, 1984).

The underpinnings of Bowlby's (1973) developmental framework implicating early disruptions in the attachment relationship as central to psychopathology served as building blocks for the emergence of additional theorizing on behavioral maladaptation in normative development. Contemporary theorizing has attempted to explain the pathways leading from specific forms of insecure attachments to internalizing behavior. Although children with avoidant and resistant attachment are both considered *anxiously attached,* resistant attachment has been most consistently linked, at least theoretically, with internalizing problems (E. A. Carlson & Sroufe, 1995; DeKlyen & Greenberg, 2008; Finnegan, Hodges, & Perry, 1996; Manassis, 2011). Attachment theory proposes that manifestations of anxiety or depression originate in children's uncertainty about their caregiver's likely response to attachment-related needs. Children in resistant relationships, typically with overinvolved or inconsistent caregivers, may develop chronic anxiety and an overly dependent attitude toward their caregiver. Their preoccupation with maintaining the attachment figure's attention may come at the expense of exploring the larger world (Bowlby, 1973). Functional dependence on a caregiver in turn engenders anxiety about whether one's needs can be met in the outside world and/or when undertaking new endeavors, leading to a relational style that may be characterized by emotional dependence, regressed behavior, and social isolation (Moss, Parent, Gosselin, Rousseau, & St-Laurent, 1996).

It has been argued that children in avoidant attachment relationships are more prone to externalizing problems such as aggression and hostility (e.g., Cassidy & Kobak, 1988; Renken, Egeland, Marvinney, Mangelsdorf, & Sroufe, 1989; Sroufe, 1983). Having experienced consistently unresponsive or rejecting caregiving, these children come to expect such treatment and react to others in an antagonistic manner. However, in line with Bowlby's (1973) observation that internalizing symptoms are associated with caregiver unavailability, internalizing behavior could also be embedded in patterns of avoidant attachment. As a means of coping with rejection when demonstrating negative affect, children with an avoidant attachment may learn to inhibit emotional arousal, thereby detaching themselves from potential interpersonal threat (Goldberg, 1997; Manassis, 2011). This formulation is consonant with evidence that avoidance involves the inhibition of negative emotion (Cassidy, 1994) and is also associated with physiological recordings indicating that children in avoidant relationships are aroused and distressed by their mothers' departures during the Strange Situation (Hertsgaard, Gunnar, Erickson, & Nachmias, 1995; Spangler & Grossmann, 1993), even though they show no behavioral signs of distress.

A third type of insecure attachment, disorganized attachment, has more recently been identified, initially in high-risk populations with known parenting problems such as maltreatment (V. Carlson, Cicchetti, Barnett, & Braunwald, 1989) and parental depression (Radke-Yarrow et al., 1995). The disorganized classification has been associated with broad psychological disturbances; however, limited theorizing is available to explicate how disorganized attachment influences the development of internalizing problems per se. Disorganized attachment is said to develop when children find themselves emotionally and physically dependent on someone who is also a source of fear, due to parental maltreatment, mental illness, and/or disruptive forms of parental behavior (Lyons-Ruth et al., 1999; Madigan, Bakermans-Kranenburg, et al., 2006; Main & Hesse, 1990). Caregivers' repeated failure to protect children and/or satisfy attachment needs when aroused may subject children to an extreme state of fear and an inability to self-regulate (Solomon & George, 1999). Children may be faced with the frightening realization that, when in need of protection, their caregiver is unlikely to be a haven of safety, in turn preventing the children from developing appropriate attentional and behavioral strategies to cope with distress, which may ultimately result in a vulnerability to internalizing psychopathology.

It has also been suggested that hallmark indicators of disorganized attachment (e.g., stilling, freezing, and stereotyped movements) parallel features of dissociation and establish a potential pathway to dissociative disorders (Liotti, 1995); however, this theoretical proposition does not elucidate the link between disorganized attachment and anxiety and depression. In children's preschool and early school years, disorganized attachment manifests in controlling patterns of behavior during reunion (Cassidy & Marvin, 1992; Main & Cassidy, 1988). Operationally, this means that the children greet their caregiver in a punitive or hostile manner or alternatively that the children are excessively concerned with their caregiver's physical and psychological well-being, both of which require considerable attentional, emotional, and cognitive resources. The energy necessary to maintain this pattern of disorganized behavior may leave little room for exploring and learning outside of the caregiving relationship and may place these children on a pathway leading to internalizing problems (Moss et al., 1996).

Empirical Links Between Attachment and Internalizing Problems

As mentioned, studies examining the association between insecure forms of attachment and internalizing behavior have produced mixed results. Even studies with similar indices of risk have reported inconsistent effects. For example, associations between insecure attachment and internalizing behavior were reported by Bates, Maslin, and Frankel (1985) and Rothbaum, Rosen, Pott, and Beatty (1995) in samples with low risk. However, studies with similar sample and measurement characteristics have also reported nonsignificant associations (e.g., Howes et al., 1994). The inconsistent findings may partly be due to methodological challenges associated with the distribution of attachment (e.g., small cell sizes of resistant, avoidant, and/or disorganized classifications), the use of different methods and instruments to assess attachment and internalizing behavior, sample and study design variability, or chance variation. We seek to overcome these challenges by providing a quantitative synthesis of the literature.

Potential Moderators of Effect

With an intensive approach to the study of insecure attachment and internalizing behavior comes an increasing focus on factors that may alter the association between these constructs.

Substantive Factors

First, internalizing and externalizing behaviors are often comorbid, although the distinction between them has been conceptually supported (Achenbach, 1992). Achenbach (1992) reported average correlations of .70 and .76 between the two broadband dimensions of problematic behavior on the Child Behavior Checklist (CBCL; Achenbach, Edelbrock, & Howell, 1987) in referred and nonreferred samples, respectively. Similarly, the National Institute of Child Health & Human Development (NICHD) Study of Early Child Care reported strong correlations between internalizing and externalizing scores on the CBCL ($r = .71$) and Teacher Report Form (TRF; $r = .65$; Achenbach, 1992) during early childhood (McCartney, Owen, Booth, Clarke-Stewart, & Vandell, 2004). Despite their shared variance, internalizing and externalizing behaviors are typically examined as independent outcomes of insecure attachment, either in studies that assess one outcome but not the other (Graham & Easterbrooks, 2000) or in studies that include both but in independent analyses (e.g., Goldberg, Gotowiec, & Simmons, 1995; Lewis et al., 1984). Alternatively, studies examine both internalizing and externalizing behaviors within the same analysis, but as a combined and undifferentiated total behavior problems score (Pauli-Pott, Haverkock, Pott, & Beckmann, 2007; Vando, Rhule-Louie, McMahon, & Spieker, 2008). Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, and Roisman (2010) recently examined the association between insecure attachment in childhood and externalizing problems in 69 samples involving 5,947 participants and reported that the strength of the association was small to moderate (observed $d = .31$; adjusted for publication bias $d = .27$). Unfortunately, all aforementioned strategies preclude insight into the interactional relations among attachment, internalizing behavior, and externalizing behavior. Given this state of affairs, it is difficult to advance an empirically based hypothesis, but in the present study, we examine the degree to which externalizing behaviors moderate the relation between attachment classification and internalizing behaviors. To our knowledge, this is the first study to do so.

Second, gender differences in the association between attachment and psychopathology have received selected attention. Some studies have reported higher scores on internalizing behavior for boys with insecure attachment compared with girls with insecure attachment (e.g., Bar-Haim, Dan, Eshel, & Sagi-Schwartz, 2007; Lewis et al., 1984), but most studies do not address the issue of gender differences. The meta-analysis by Fearon et al. (2010) revealed that insecure attachment is more strongly associated with externalizing problems in samples of boys versus girls.

Third, sufficient data have now accumulated to formally assess for differential effect sizes by risk status of sample. The link between insecure attachment and behavior problems appears to be strong in samples with known risks (e.g., adolescent parents) but has also been reported in samples with low risk (e.g., Bates et al., 1985). Risk is also a precursor of insecure attachment. Goldberg (1997) showed across 10 samples that as risk increased, so too did the percentage of infants with insecure attachment. In addition, the accumulation of socioeconomic risk predisposes children to disorganized attachment (Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010) and may place them at further risk for associated psychopathology (DeKlyen & Greenberg, 2008; Lyons-Ruth, 1996).

Fourth, there has also been a considerable range of clinically oriented studies examining associations between attachment and behavioral problems, including samples of children (e.g., Speltz, Greenberg, & DeKlyen, 1990) and parents (e.g., Manassis et al., 1995; Radke-Yarrow et al., 1995) with clinical diagnoses. Insecure (van IJzendoorn & Kroonenberg, 1988) and disorganized (Atkinson et al., 2000; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999) attachments are more prevalent in samples with psychiatrically diagnosed parents than in samples with nonclinical parents. Again, however, no overall conclusions regarding differential strength of association have been drawn.

In sum, based on extant literature, we test several hypotheses regarding the quality of the attachment relationship and internal-

izing behavior, expecting that stronger associations would be found in (1) boys than girls, (2) those with risk versus those without, (3) low versus middle socioeconomic status (SES; we found no relevant studies of high-SES families), and (4) clinical compared with nonclinical groups (whether the disorder was the parent's or the child's). We also test for difference in association strength as a function of externalizing problems.

Methodological Factors

First, children behave differently depending on context. Meta-analytic findings indicate a correlation of only .28 between different types of informants (e.g., parent/teacher) in the judgment of behavior problems (Achenbach, McConaughy, & Howell, 1987). Second, there is also variability in types of measures utilized to examine attachment behavior (e.g., SSP, AQS). In a large sample of 997 mother–child dyads, McCartney et al. (2004) examined the associations between attachment and internalizing behaviors across three age points in early childhood—15, 24, and 36 months—using the SSP, the AQS, and a preschool attachment measure, respectively. Insecure attachment was associated with internalizing behavior, but only when examined using the AQS and preschool attachment measures. Thus, we examine the method of assessment of attachment and of behavioral problem as moderators. Finally, we examine age of the children at assessment of both the attachment relationship and internalizing behavior to ascertain if the strength of the effect is influenced by these variables.

Study Characteristics

First, due to the tendency for only statistically significant results to be published, publication status (publications vs. dissertations) was included as a moderator. Second, based on research demonstrating that effect size can be affected by the chosen research design (e.g., Vierhaus, Lohaus, & Shah, 2010), we test for difference in association strength as a function of whether a study design was cross-sectional or longitudinal. Third, year of publication is examined to account for changes in methodology across the three decades of research included in this meta-analysis. During this time, changes in methodology have occurred for both the measurement of internalizing behavior (e.g., test norms) and the assessment of attachment (e.g., the disorganized category was developed over a decade after the development of the three primary classifications of secure, avoidant, and resistant; Ainsworth et al., 1978; Main & Solomon, 1990). Finally, the appraisal of internalizing difficulty can be influenced by cultural factors. For example, the manifestation of depressive symptomatology has been shown to vary across cultures (Harkness & Super, 2000), suggesting a need to account for cross-cultural variation (Rescorla et al., 2007). Cross-cultural differences in patterns of attachment relationships have also been established among Westernized cultures (van IJzendoorn & Kroonenberg, 1988). Compared with their American counterparts, children in northern Germany and Israel have shown a greater prevalence of avoidant attachment (Grossmann, Grossmann, Spangler, Suess, & Unzer, 1985) and resistant attachment, respectively (Sagi et al., 1985). To account for cross-cultural diversity between the Westernized countries represented in the current study, geographical origin of study participants is examined as a moderator.

Method

Search Strategy

Published and unpublished studies were located in three ways, as detailed in the PRISMA statement (Moher, Liberati, Tetzlaff, & Altman, 2009) detailed in Figure 1. The stems of the following identifiers or keywords in the title or abstract were used in the separate or combined searches: *attachment,* in conjunction with *internal*, behavior problem*, withdraw*, anx*, shy*, depress*, and psychopathology*. Our search included studies available in the academic literature on or before January 2010. A study was included if it fulfilled the following criteria:

1. The study involved children whose attachment relationship was assessed in infancy or early childhood using a behavioral coding measure of the attachment relationship, including the Strange Situation Paradigm (SSP; Ainsworth et al., 1978), the Preschool Attachment Coding System (Cassidy & Marvin, 1992), the Main–Cassidy attachment classification system (Main & Cassidy, 1988), the Attachment Q-Sort (Waters, 1987), or the Preschool Attachment Assessment (Crittenden, 1992). Consistent with Fearon et al. (2010), in cases where multiple assessments of attachment were available, we used the earliest measure provided. Representational measures (e.g., Story Attachment Completion Task; Bretherton, Ridgeway, & Cassidy, 1990) and questionnaire measures of attachment (e.g., the Security Scale; Kerns, Aspelmeier, Gentzler, & Grabill, 2001) were excluded. Observational measures for infants and children have been extensively validated, and behavioral assessments during preschool and school age have relative good reliability, stability, and validity (Fraley, 2002). However, information on the validity and stability of representational and questionnaire measures of attachment is currently sparse, as is data pertaining to the longitudinal relations between these measures (Brumariu & Kerns, 2010; Kerns & Seibert, in press). Thus, the current study focused exclusively on behavioral measures of attachment because of their psychometric adequacy.

2. The study examined the association between child–mother attachment and internalizing behavior. Only three studies reported on child–father attachment in early childhood and internalizing problems; therefore we did not include them.

3. The study assessed manifestations of internalizing behavior at any point through childhood using parent report, teacher report, self-report, or direct observation. A number of studies involved more than one measure of behavioral difficulty, resulting in multiple effect sizes per sample. In such cases, we used the earliest report of internalizing behavior. When reports were provided by multiple informants at the same time point (e.g., parent and teacher), we defaulted to maternal reports, as these data typically involved the largest sample size and the fewest missing values. If multiple measures of internalizing behavior were provided by a single informant at the same time point, we incorporated the most consistently used measure of internalizing problems in early childhood (i.e., internalizing subscale on the CBCL or TRF).

4. Study data included statistics that could be transformed into an effect size (e.g., means and standard deviations, correlations, t value).

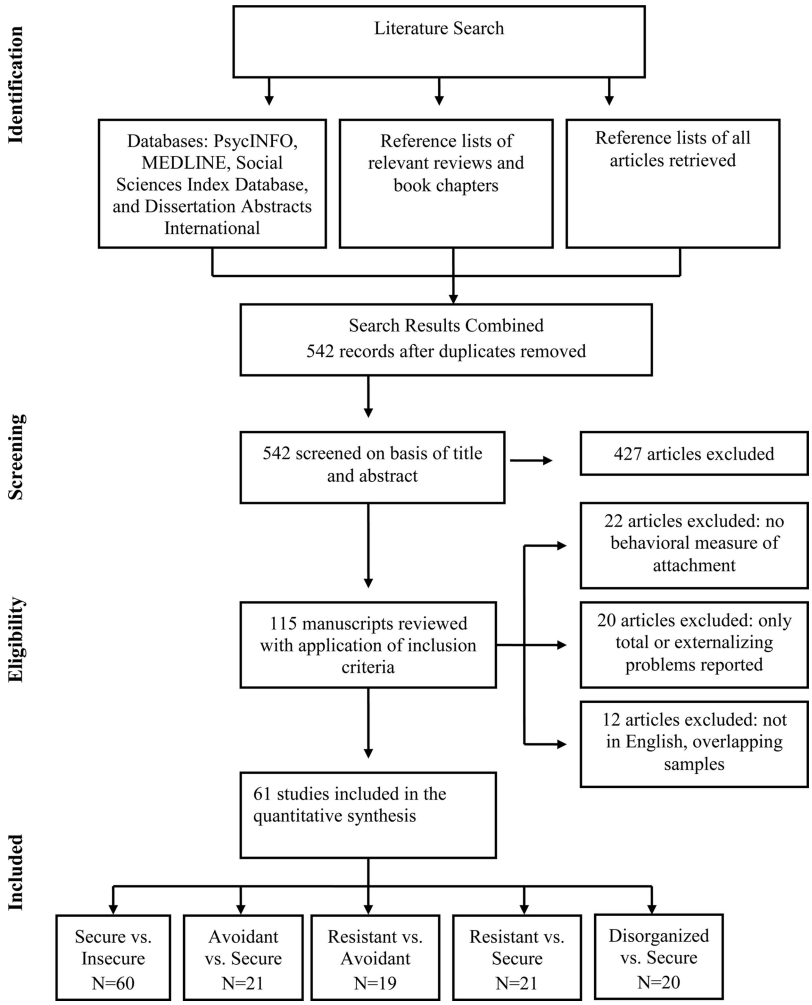

Figure 1. PRISMA flow chart used to identify studies for detailed analysis of attachment and internalizing problems.

5. The article was available in English.

Several studies were based on overlapping samples of participants. In such cases, we selected the study with the largest sample size. Peer-reviewed publications were favored over book chapters and/or dissertations. Where investigations involved separate reports for boys and girls (e.g., Lewis et al., 1984) or separate results for various groups within a study (e.g., health status; Goldberg et al., 1995), effect sizes were calculated for each group and entered into the meta-analysis separately. A total of 60 samples (N = 5,236) met inclusion criteria for the secure versus insecure contrast (see Table 1), and one additional study (E. A. Carlson, 1998) was available for the disorganized versus organized contrast. The number of samples providing analyses involving subclassifications[1] of attachment included resistant (N = 21), avoidant (N = 21), and disorganized (N = 20).

Coding of Study Variables

A standard coding form was used to rate each study on sample, measure, moderator, and outcome characteristics. The following features were included in the coding system: (1) externalizing behavior score or rating, (2) percent of males in sample, (3) socioeconomic status, (4) clinical status of parent and child, (5) risk (e.g., adolescent parent), (6) attachment measure, (7) problematic behavior informant, (8) age of child at attachment assessment, (9) age of child at behavior problems assessment, (10) dissemination medium (i.e., peer-reviewed journal article, book chapter, or dissertation), (11) study design (cross-sectional vs. longitudinal), (12) year of publication, and (13) geographical location of participants.

Initially, two graduate students coded five studies in collaboration with the lead author to ensure coding accuracy and reliability. Following this procedure, the graduate students coded all remaining studies. Reliability between the two coders was conducted on

[1] Because the AQS is a continuous measure that examines secure base behavior and does not yield subclassifications, studies using the AQS were included in only the primary analyses on secure/insecure attachment and internalizing behavior.

Table 1
Independent Samples Included in the Meta-Analysis of Attachment and Internalizing Problems and Effect Size Calculations for the Secure Versus Insecure Contrast

Study	*N*	*d*	Attachment measure	Age at attachment assessment[a]	Internalizing measure	Age at internalizing assessment[a]
Anan & Barnett (1999)	56	0.38	CM	54	CBCL	54
Bar-Haim et al. (2007)	136	–0.09	SSP	12	SCARED	132
Bates et al. (1985)	52	1.11	SSP	13	PBQ	36
Birkenfield-Adams (2000)						
Boys only	44	0.10	CM	69	CBCL	69
Bohlin et al. (2000)	87	0.93	SSP	15	OBS	96
Booth et al. (1994)			CM	48	CBCL	96
Boys	24	0.68				
Girls	34	0.61				
Bosquet & Egeland (2006)	155	0.24	SSP	15	CBCL/TRF	64
Burgess et al. (2003)	174	–0.04	SSP	14	CBCL	48
Call (1999)						
Boys only	52	1.08	AQS	56		56
E. A. Carlson (1998)	143		SSP	15	TRF	78
Chisholm (1998)	43	0.53	PAA	55	CBCL	54.5
Cicchetti et al. (1998)	126	0.81	AQS	20	CBCL	20
Cohn (1990)			MC	74	OBS	75
Boys	46	0.65				
Girls	34	0.54				
Dayton (2009)	177	0.06	SSP	13	CBCL	48
DeMulder et al. (2000)			AQS	46	SCBE	46
Boys	51	–0.04				
Girls	43	0.04				
Edwards et al. (2006)	176	0.43	SSP	12	CBCL	24
Fagot & Pears (1996)	96	0.60	PAA	30	CBCL	84
Frosch (1998)	90	0.67	AQS	36	CBCL	36
Goldberg et al. (1995)			SSP	12	CBCL	30
Healthy controls	51	0.41				
Cystic fibrosis	40	0.27				
Coronary heart disease	54	0.37				
Graham & Easterbrooks (2000)	79	0.45	MC	96	CES-D	96
Houtmeyers (2002)	31	0.99	AQS	51	SCBE	51
Howes et al. (1994)	84	0.15	SSP/CM	30	CCQ-Set	48
Huang (2005)	179	0.47	AQS	17	CBCL	35
Hubbs-Tait et al. (1994)	44	0.57	SSP	13	CBCL	54
Lafrenière et al. (1992)	81	0.62	AQS	45	PBQ	45
Lewis et al. (1984)			SSP	12	CBCL	72
Boys	56	0.98				
Girls	57	–0.24				
Lieberman et al. (1991)	52	0.23	SSP	12	OBS	24
Lyons-Ruth et al. (1997)	45	0.16	SSP	18	CBCL	60
Madigan et al. (2007)	62	0.14	SSP	12	CBCL	24
Manassis et al. (1995)	20	1.05	SSP/CM	36	CBCL	36
Marchand et al. (1998)	46	0.71	AQS	48	CBCL	48
Mavis (2001)	39	0.04	SSP	60	CBCL	60
McCartney et al. (2004)	1,069	0.02	SSP	15	CBCL	47
Moss et al. (2009)	80	0.25	MC	75	SBQ	103
Moss et al. (1998)	121	0.22	CM/MC	75	PSP	75
Murray et al. (2010)	166	0.33	SSP	18	TRF	90
Pierrehumbert et al. (2000)	40	0.54	SSP	18	CBCL	60
Radke-Yarrow et al. (1995)	90	0.00	SSP/CM	32	CBCL	67
Rothbaum et al. (1995)			SSP	18	CBCL	84
Boys	18	1.82				
Girls	18	0.33				
Schmidt et al. (2002)	49	0.10	AQS	46	CBCL	46
Shamir-Essakow (2005)			CM	46	Clinical interview	46
Controls	32	0.16				
Behaviorally inhibited	72	0.47				
Shaw et al. (1997)	67	0.02	SSP	15	CBCL	36
Smeekens et al. (2009)	111	0.10	AQS	15	CBCL/TRF	63
Speltz et al. (1999)	62	–0.42	CM	57	TRF	57

(*table continues*)

Table 1 (*continued*)

Study	*N*	*d*	Attachment measure	Age at attachment assessment[a]	Internalizing measure	Age at internalizing assessment[a]
Speltz et al. (1990)	50	0.87	CM/MC	54	CBCL	54
Stams et al. (2002)	145	–0.12	SSP	12	CBCL/TRF	84
Suess et al. (1992)	35	0.59	SSP	15	CCQ-set	60
Trapani (2007)	40	0.74	SSP	15	CBCL	84
Turner (1991)			CM	54	OBS	48
Boys	18	1.56				
Girls	22	0.49				
Vondra et al. (2001)	68	0.17	SSP	15	CBCL	42
Weiss et al. (2002)	110	0.74	AQS	12	CBCL	24
Wood et al. (2004)	37	1.01	AQS	42	CABI	57

Note. CM = Cassidy and Marvin; CBCL = Child Behavior Checklist; SSP = Strange Situation Paradigm; SCARED = Screen for Child Anxiety Related Emotional Disorders; PBQ = Preschool Behavior Questionnaire; OBS = Observation; TRF = Teacher Report Form; AQS = Attachment Q-Sort; PAA = Preschool Attachment Assessment; MC = Main and Cassidy; SCBE = Social Competence and Behavior Evaluation; CES-D = Center for Epidemiologic Studies Depression Scale; CCQ-Set = California Child Q-Set; PSP = Preschool Socio-affective Profile; CABI = Child Adaptive Behavior Inventory.
[a] Age in months.

12 (20%) randomly selected articles. Intraclass correlations across all coded variables ranged from .82 to 1.00 (median .94). Disagreements were discussed, and the final coding reflected the consensus of the coders.

Data Analysis

Calculation of effect sizes. Effect sizes were calculated and analyzed using Comprehensive Meta-Analysis (Version 2.0) software (Borenstein, Rothstein, & Cohen, 2005). Effect sizes were weighted according to the inverse of their variance to ensure that more precise estimates influenced overall effect size most heavily and to attenuate the upwardly biased estimates of smaller studies (Hedges & Olkin, 1985). When nonsignificant findings were reported ($N = 4$) without accompanying statistical information, a p value of .50 was entered (Rosenthal, 1995).

We based calculations on a random effects model, as opposed to a fixed effects model. Fixed effects models are based on the assumption that all studies included in the meta-analysis have a common effect size and that between-study effect size differences are due to error (Rosenthal, 1995). In random effects models, this assumption is not made (Hedges & Olkin, 1985) and the possibility that each separate study has its own population parameters is considered (Rosenthal, 1995). Random effects models more adequately mirror the heterogeneity in behavioral studies and derive noninflated alpha levels when the assumption of homogeneity has not been met (Cooper & Hedges, 1994). We assessed for heterogeneity of effect size and for significance of categorical moderators using Q statistics (Borenstein, Hedges, Higgins, & Rothstein, 2009; Rosenthal, 1995). The significance of dimensional moderators was assessed using metaregression (Thompson & Higgins, 2002).

Publication bias. Due to the bias toward publication of studies with a large sample size and/or significant findings, meta-analyses typically overestimate mean effect size (Borenstein et al., 2005; Lipsey & Wilson, 2001). To test and correct for publication bias, Duval and Tweedie's (2000) trim-and-fill procedure was used. In this procedure, a funnel plot is derived to show the association between sample size and effect size. When no publication bias is present, the plot is shaped like an inverted funnel, with effect sizes distributed symmetrically around the combined effect size. Large samples with smaller variations in effect sizes, located toward the top of the funnel, should estimate effect sizes most precisely, and smaller studies with higher error should increase symmetrically toward the bottom of the plot. In cases where the expected effect size is positive and publication bias is present (see Figure 2), fewer studies than expected are found on the bottom left-hand side of the mean effect size (Borenstein et al., 2009). If more small studies are located to the right-hand compared with the left-hand side of the mean, the funnel plot is considered to be symmetrically unmatched, and the trim-and-fill procedure imputes symmetrical extreme values to balance the plot. All these effect sizes, observed and computed, are used to compute an adjusted effect size (with confidence intervals), reflecting the combined effect size when no publication bias would have been present. This estimate represents the major advantage of trim-and-fill, compared with more traditional methods for assessing bias (Duval & Tweedie, 2000).

An additional statistic, the *Fail-safe N,* was developed by Rosenthal (1991) to estimate the number of unpublished studies with null results required to reduce the effect size into a nonsignificant outcome. Results are considered robust against the file-drawer effect if the Fail-safe N is greater than or equal to five times the number of studies in the analysis plus 10 (Rosenthal, 1991). We included this statistic because it is widely used and easily understood.

Results

Summary of Study Variables

Sixty studies reported on the secure/insecure contrast, and one additional study (E. A. Carlson, 1998) reported on the disorganized/organized contrast. The median sample size was 52, with a range of 18–1,069 participants (excluding the NICHD study, range = 18–223). Ten samples (16%) were characterized as having low SES, nine (15%) were clinical (five parent; four child), and 12 studies (20%) contained at least one index of risk. Twenty-eight (46%) studies used the SSP exclusively, nine (15%) used the

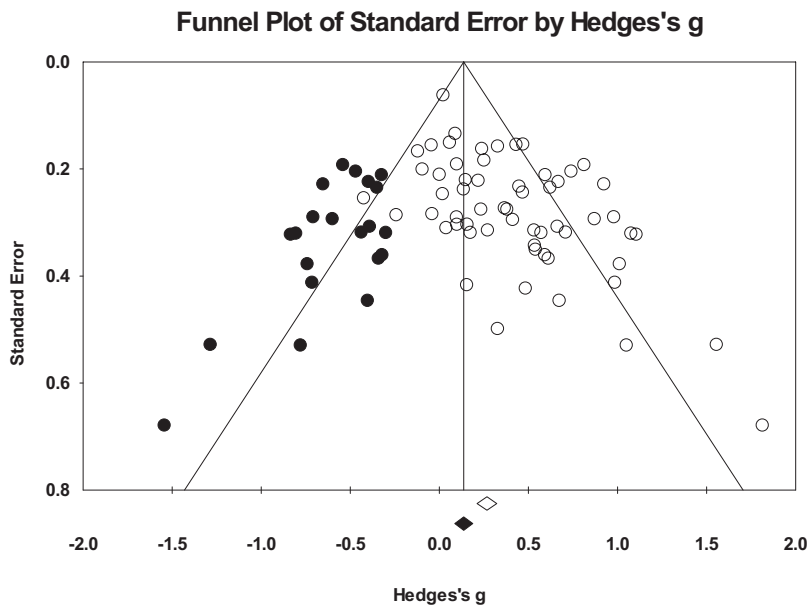

Figure 2. Trim-and-fill funnel plot for the meta-analysis of insecure attachment and internalizing problems. "Filled" studies are imputed in bold.

Preschool Attachment Coding System, four (7%) used the Main–Cassidy Attachment Classification system, 13 (21%) used the Attachment Q-Sort, two (3%) used the Preschool Attachment Assessment, and five (8%) used a mixture of the above-mentioned methodologies. Thirty-six (59%) studies used the CBCL and/or TRF, six (10%) studies used observational measures, and the remaining studies (21%) used other questionnaires (e.g., Preschool Behavior Questionnaire). The average age of the children at the time of the assessments of attachment and internalizing behavior was 32.84 months (SD = 22.21, range = 12–96 months) and 57.11 months (SD = 22.89; range = 18–120 months), respectively. Year of publication ranged from 1984 to 2010. Fifty-three (87%) studies were published in peer-reviewed journals, and eight (13%) were dissertations. The majority of studies were based on samples from the United States (N = 39, 63%), and the remaining samples were from Canada (N = 11, 18%) Europe (N = 9, 15%), and Australia (N = 2, 3%).

Insecure Attachment and Internalizing Behavior

Weighted mean effect size. In this analysis, children classified as secure were compared with children classified as insecure on all measures of internalizing behavior. We included children who had avoidant and resistant attachment in the insecure category and, if coded, those who were classified as disorganized. In 60 studies, having a combined total of 5,236 participants, the combined effect size was significant and small to moderate (d = .37, 95% CI [0.27, 0.46]). However, the funnel plot demonstrated the presence of publication bias (see Figure 2). Using the trim-and-fill procedure, 19 studies were trimmed and replaced, resulting in a significant adjusted effect of d = .19 (95% CI [0.09, 0.29]). The Fail-safe N was 1,979; that is, 1,979 studies with null results would be needed to negate the combined significance. The Q statistic (Q = 136.42, $p < .001$) indicated heterogeneity among the effect sizes and the need to examine moderators of the association between insecure attachment and internalizing behavior. Results of all categorical and continuous moderator analyses are presented in Tables 2 and 3, respectively.

Substantive moderators. We examined the degree to which externalizing behaviors moderated the relation between insecure attachment and internalizing behaviors. We examined the influence of externalizing behavior in two ways. First, we used the mean externalizing T score in studies that utilized the CBCL or TRF. We used these measures because they are the most commonly used behavior measures in our data set and because they have nonoverlapping lists of externalizing and internalizing behaviors (Achenbach, 1992). Of 35 studies using the CBCL or TRF, 26 (72%) provided sufficient information to calculate a mean score of externalizing behavior. We examined this mean score as a moderator and found that the association between insecure attachment and internalizing behavior strengthened as the mean score of externalizing difficulty increased (k = 28, b = .03, $p < .02$). Second, where studies included the available data (i.e., in 49 of 60 studies with a comparable externalizing measure), we computed effect sizes linking attachment to externalizing problems and assessed this effect size as a moderator of the relation between attachment and internalizing behavior. The effect size linking attachment insecurity to internalizing behaviors was greater in samples where the relation between insecure attachment and externalizing behaviors was also relatively high (k = 49, b = .635, $p < .0001$).

Effect size also varied as a function of gender. A metaregression indicated that percentage of males in the study was a significant moderator (k = 48, b = .012, $p < .01$). Effect sizes increased linearly from a nonsignificant d = .26, based on samples consisting entirely of females (k = 6), to a significant d = .71, based on samples consisting entirely of males (k = 8). Effect size did not

Table 2
Results of Categorical Moderators for the Associations Between Insecure Attachment and Internalizing Problems

Moderator	*k*	Total *N*	*d*	95% CI	*Q*	*p*
Total set						
Observed	60	5,236	.37***	[0.30, 0.51]	136.42	.001
Adjusted[a]	60	5,236	.19**	[0.09, 0.30]	242.85	
Gender					2.88	.09
Girls	6	208	.26	[–0.06, 0.60]		
Boys	8	309	.71***	[0.31, 1.15]		
Socioeconomic status					1.60	.20
Low	9	645	.28***	[0.12, 0.43]		
Middle	51	4,591	.40***	[0.29, 0.51]		
Clinical					0.02	.89
Nonclinical	51	4,517	.36***	[0.26, 0.48]		
Clinical	9	719	.38***	[0.11, 0.66]		
Risk status					0.89	.35
No risk	49	4,476	.39***	[0.28, 0.51]		
Risk	11	760	.31***	[0.16, 0.45]		
Attachment measure					4.81	.19
SSP	27	3,123	.28***	[0.15, 0.41]		
AQS	13	1,006	.54***	[0.34, 0.73]		
CM	9	364	.36*	[0.04, 0.68]		
MC	4	239	.42***	[0.16, 0.68]		
Disorganized category					6.24	.01
Treated as insecure	20	2,408	.21***	[0.10, 0.32]		
Force classified into primary attachment	24	1,427	.49***	[0.30, 0.68]		
Internalizing measure					3.95	.05
Questionnaire	52	4,873	.34***	[0.24, 0.43]		
Observation	6	259	.67***	[0.37, 0.98]		
Dissemination medium					0.57	.45
Publication	52	4,588	.36***	[0.26, 0.46]		
Dissertation	8	648	.47***	[0.20, 0.74]		
Research design					2.31	.13
Cross-sectional	25	1,482	.46***	[0.31, 0.61]		
Longitudinal	35	3,754	.32***	[0.20, 0.43]		
Geographical origin					0.05	.97
Canada	11	640	.36***	[0.20, 0.52]		
Europe	9	760	.37***	[0.08, 0.66]		
United States	38	3,732	.38***	[0.26, 0.51]		

Note. *k* = number of studies; CI = confidence interval; *Q* = heterogeneity across studies; SSP = Strange Situation Paradigm; AQS = Attachment Q-Sort; CM = Cassidy and Marvin Preschool Attachment Coding System; MC = Main and Cassidy attachment classification system. Contrasts were only tested for subgroups with more than three studies.
[a] Adjusted for publication bias.
* $p < .05$. ** $p < .01$. *** $p < .001$.

vary as a function of socioeconomic status, clinical status, or risk status.

Methodological factors. Effect sizes did not vary according to the type of attachment assessment used.[2] However, the treatment of the disorganized category was a significant moderator.[3] The effect size was significantly larger ($N = 24$; $d = .49$) in studies where children with disorganized attachment were force-classified into their best fitting secure, avoidant, or resistant attachment, compared with studies that treated disorganized attachment as an insecure category ($N = 20$; $d = .21$). The method of assessing internalizing behavior was also a significant moderator.[4] Observations of internalizing behavior yielded a significantly larger effect size ($d = .67$) compared with questionnaire measures ($d = .34$). Effect size varied as a function of children's age at the time of the assessment of attachment ($k = 59$, $b = .004$, $p < .01$). This finding suggests that the prediction of internalizing behavior from attachment insecurity strengthened when attachment was assessed at a later age of children's development. Follow-up analyses were conducted to determine whether the variability of age within each attachment assessment served as a moderator. There was no effect of age when it was examined within the SSP, AQS, or Cassidy and Marvin assessment, suggesting that age and attachment measure were confounded. Time lapse between the assess-

[2] When there were fewer than four studies available at each level of moderator variable, they were excluded from analysis. Thus, this analysis did not include the Preschool Attachment Assessment ($N = 2$). Studies that used a mix of assessment methods were also excluded ($N = 5$).

[3] This analysis excludes studies ($N = 4$) that did not explicitly indicate how the disorganized category was treated (i.e., insecure vs. force-classified). In addition, studies using the AQS ($N = 12$) were excluded, as this measure does not assess for disorganized attachment.

[4] This analysis excludes the study by Shamir-Essakow, Ungerer, and Rapee (2002), as it did not explicitly examine internalizing behavior using a questionnaire or observational measure.

Table 3
Metaregression Results for the Associations Between Insecure Attachment and Internalizing Problems

Moderator	*k*	Total *N*	Slope	*SE*	*z*	*p*
Mean CBCL Externalizing Score	26	3,057	.034	.01	2.53	.02
Effect size for externalizing and insecure attachment	49	4,348	.634	.088	7.23	.0001
Percentage of males in sample	49	5,236	.012	.005	2.34	.02
Age at attachment assessment	60	5,236	.003	.002	2.41	.02
Age at outcome assessment	60	5,236	–.002	.001	–1.58	.11
Time between assessments	60	5,236	–.004	.006	–3.02	.01
Year of publication	60	5,236	–.012	.002	–5.06	.0001

Note. CBCL = Child Behavior Checklist.

ments of attachment and internalizing behavior (time of behavior problems minus time of attachment assessment) was also a significant moderator ($k = 59$, $b = –.004$, $p < .001$), indicating that the association between insecurity and internalizing behaviors weakens the greater the distance between the assessments of attachment and internalizing difficulty.

Study characteristics. Effect size was not moderated by dissemination medium (peer-reviewed vs. chapter vs. dissertation) or by research design (cross-sectional vs. longitudinal). However, there was a statistically significant negative relationship between year of publication and effect size ($k = 60$, $b = –.012$, $p < .0001$). These results indicate that the association between insecure attachment and internalizing behavior diminished over time. Finally, geographical origin[5] did not influence the effect of insecure attachment and internalizing behavior.

Resistant Attachment and Internalizing Behavior

Weighted mean effect size: Resistant versus secure. In this analysis, children classified as resistant were compared with children classified as secure. In 21 studies with $N = 1,823$ participants, the combined effect size for internalizing problems was not significant ($d = .10$, 95% CI [–0.12, 0.32]). The Q statistic, 48.35 ($p < .01$), revealed heterogeneity among effect sizes; however, none of the aforementioned moderators emerged as significant.[6]

Weighted mean effect size: Resistant versus avoidant. In this analysis, children classified as resistant were compared with children classified as avoidant. In 19 studies with $N = 664$ participants, the combined effect size linking attachment to internalizing behaviors was not significant ($d = –.17$, 95% CI [–0.41, 0.06]). The Q statistic, 30.11 ($p < .05$), revealed heterogeneity among effect sizes; however, none of the aforementioned moderators proved significant.

Avoidant Attachment and Internalizing Behavior

Weighted mean effect size: Avoidant versus secure. In this analysis, children classified as avoidant were compared with children classified as secure. In 21 studies with $N = 1,852$ participants, the combined internalizing problem effect size was significant ($d = .29$, 95% CI [0.12, 0.45]). The funnel plot was symmetrical, showing no evidence of publication bias. However, the Fail-safe N for this combined effect size was 79, which falls below Rosenthal's (1991) criterion ($5k + 10$). The Q statistic (33.78, $p < .05$) revealed heterogeneity among effect sizes; however, none of the moderators proved significant.

Disorganized Attachment and Internalizing Behavior

Weighted mean effect size: Disorganized versus organized. In this analysis, children classified as disorganized were compared with children classified as organized (secure, avoidant, or resistant), as the sample size for individual contrasts (e.g., disorganized vs. secure) was small and therefore lacked power. In 20 studies with a total of 2,679 participants, the combined internalizing problem effect size was significant and homogeneous ($d = .20$, 95% CI [0.09, 0.31]). The Fail-safe N of studies needed to bring the effect down below significance was 74 and therefore did not meet Rosenthal's (1991) criterion. The funnel plot showed that there was publication bias. Using the trim-and-fill procedure, six studies were trimmed and replaced, resulting in a nonsignificant adjusted effect of $d = .09$ (95% CI [–0.02, 0.23]). Although effect sizes were not significantly heterogeneous ($Q = 20.36$, $p = .31$), we assessed for moderators (see Tables 4 and 5) because small sample size undermined power, a common problem in meta-analysis (Borenstein et al., 2009). None of the moderators were significant.

Discussion

The notion that early maladaptive attachment relationships play a fundamental role in the development of behavioral problems is central to developmental theorizing. The empirical research examining this association has yielded mixed results. In the current meta-analysis we found a small to medium effect size for the association between insecure attachment and internalizing behavior ($N = 60$, 5,236 families; observed $d = .37$, 95% CI [0.27, 0.46]; adjusted for publication bias $d = .19$, 95% CI [0.09, 0.29]). A sense of the magnitude of this association can be obtained by considering that the combined effect size of $d = .37$ generates an odds ratio of 2.00 (95% CI [1.67, 2.36]), suggesting that a child with insecure attachment is twice as likely to develop internalizing behavior as is a child with secure attachment. Moderator analyses showed that concurrent externalizing behavior—as well as gender, whether disorganization was explicitly recognized or subsumed

[5] This analysis did not include samples from Australia ($N = 2$) as the k was insufficient for testing of moderator variables.

[6] In some cases, the number of studies available for testing for potential moderators was small. Moderator analyses for the individual contrasts involving avoidant, resistant, and disorganized attachment were not performed when there were fewer than four studies at each level of moderator variable.

Table 4
Results of Categorical Moderators for the Associations Between Disorganized Attachment and Internalizing Problems

Moderator	*k*	Total *N*	*d*	95% CI	*Q*	*p*
Total set						
Observed	20	2,679	.19*	[0.09, 0.31]	20.36	.31
Adjusted[a]	20	2,679	.09	[–0.02, 0.23]	32.55	
SES					0.81	.78
Low	6	371	.23**	[0.05, 0.41]		
Middle	14	2,308	.19**	[0.04, 0.34]		
Clinical					0.07	.79
Nonclinical	16	2,394	.19**	[0.08, 0.30]		
Clinical	4	285	.13	[–0.29, 0.56]		
Risk status					0.49	.48
No risk	12	2,157	.17*	[0.02, 0.32]		
Risk	8	522	.24**	[0.09, 0.39]		
Geographical origin					0.14	.71
Canada	7	498	.28*	[0.06, 0.49]		
United States	10	1,882	.22*	[0.03, 0.41]		

Note. Moderator analyses were not performed when there were fewer than four studies at each level of moderator variable. *k* = number of studies; CI = confidence interval; *Q* = heterogeneity across studies; SES = socioeconomic status.
[a] Adjusted for publication bias.
* $p < .05$. ** $p < .01$.

under alternate classifications, method of assessment of internalizing problems, age at attachment assessment, time elapsed between assessment of attachment and assessment of internalizing problems, and year of publication—explained some of the heterogeneity of the effects linking insecure attachment to internalizing behavior.

An important aspect of the current synthesis involved exploring externalizing behavior as a moderator. Internalizing and externalizing problems often co-occur in early childhood (Achenbach, Edelbrock, & Howell, 1987; Gilliom & Shaw, 2004; McCartney et al., 2004), but research rarely addresses both simultaneously. We found that higher ratings of concurrent externalizing behavior strengthen the association between insecure attachment and internalizing behavior. Although internalizing and externalizing problems commonly co-occur, an understanding of the risks and mechanisms underlying comorbidity remains unclear (Rutter & Sroufe, 2000). One proposition is that the co-occurrence arises because risk factors associated with internalizing behavior may be the same as the risk factors associated with externalizing behavior (Rutter & Sroufe, 2000). The current study suggests that insecure attachment may be one such risk factor for comorbidity. However, further elucidation of how the antecedents of insecure attachment are implicated in co-occurring internalizing and externalizing problems is needed. Parenting quality—for example, insensitive, hostile, or rejecting parental behavior—has been associated with the development of insecure attachment (e.g., Madigan, Moran, & Pederson, 2006; Pederson, Gleason, Moran, & Bento, 1998), and changes in the quality of parenting behavior can effectively amplify or mitigate children's expression of behavioral difficulty (NICHD Early Child Care Research Network, 2006). Thus, an examination of whether the genesis of co-occurring internalizing and externalizing behaviors lies in a history of insecure attachment and/or in the parenting quality that precedes it constitutes one possible line of future investigation.

The association between insecurity and internalizing behaviors strengthened as the percentage of boys in the sample increased, with variation between a nonsignificant association ($d = .26$) in samples consisting of girls only to a significant association ($d = .71$) in all-boys samples. This finding does not contest that a marked preponderance of girls exhibit depression and anxious behaviors; it suggests, rather, that the effect of insecure attachment on such behaviors is greater in boys than in girls. From an early age, boys show greater difficulty with regulating and controlling negative emotions than do girls (Zahn-Waxler, Shirtcliff, & Marceau, 2008). It is possible that the impact of insecure mother–child relationships affects boys' development of emotion regulation more so than girls', whereas risk factors outside the attachment relationship may be more influential in girls' development of

Table 5
Metaregression Results for the Associations Between Disorganized Attachment and Internalizing Problems

Moderator	*k*	Total *N*	Slope	*SE*	*z*	*p*
Mean CBCL Externalizing Score	12	2,034	.04	.02	1.67	.09
Effect size for externalizing and insecure attachment	16	2,426	–.09	.15	–0.55	.57
Age at attachment assessment	20	2,679	.001	.001	1.10	.23
Age at outcome assessment	20	2,679	.001	.002	0.53	.60
Time between assessments	20	2,679	–.001	.002	–0.15	.87
Year of publication	20	2,679	–.001	.001	–0.94	.34

Note. CBCL = Child Behavior Checklist.

internalizing problems. In a longitudinal study of at-risk youth from infancy to adolescence, Duggal, Carlson, Sroufe, and Egeland (2001) found that insecure attachment in infancy was a stronger risk factor for later depressive symptomatology for adolescent males, whereas maternal depressive symptomatology predicted depression in females. This research, together with our finding that insecure attachment in boys is more strongly associated with internalizing behavior and Fearon et al.'s (2010) similar finding with respect to externalizing behavior, suggests that insecurity in boys serves as a risk factor for later adverse outcomes.

Studies using direct observations of internalizing difficulty showed higher effect sizes ($d = .67$) than did studies with questionnaire-based measures of internalizing behavior ($d = .34$; e.g., CBCL, PBQ). This finding is consistent with other meta-analyses examining the role of both attachment (Fearon et al., 2010) and parenting factors (e.g., McLeod, Wood, & Weisz, 2007; Rothbaum & Weisz, 1994) as they predict internalizing and externalizing problems. It is plausible that observers trained to recognize the manifestations of internalizing behavior may be more sensitive than are individuals who base their judgment on broader and potentially biased perceptions.

Although the type of attachment assessment did not emerge as a significant moderator, the effect size did vary as a function of children's age at the time of attachment; effect size strengthened as children's age increased. An important caution here is that when similar analyses of the effect of age of attachment were conducted within each behavioral assessment of attachment (e.g., SSP, AQS), age of attachment was not a significant moderator. Although the latter analyses had comparatively less power than did analyses based on all studies, it is also possible that age and attachment measure may be confounded. Thus, we cannot ascertain whether the effect of age is a result of methodological factors or of developmental changes in children's expression of internalizing behavior later in childhood.

We found a significantly larger effect size among studies that (knowingly or unknowingly) placed children with disorganized attachment into their best fitting alternative classification ($d = .49$) of secure, avoidant, or resistant, compared with studies that treated disorganized attachment as an insecure category ($d = .21$) in and of itself. It appears that inclusion of disorganization as a stand-alone classification attenuates effect size. It is possible, however, that disorganization, in combination with the best fitting alternative classification, strongly predicts behavioral maladjustment (Bernier & Meins, 2008; Lyons-Ruth, 1996; Morley & Moran, 2011; Wartner, Grossmann, Fremmer-Bombik, & Suess, 1994). Disorganized attachment is not considered an attachment strategy; children who are disorganized are also assigned a secondary "best fit" classification to reflect their underlying strategy of secure, avoidant, or resistant. Children's disorganized attachment behavior, such as freezing or repeated incomplete approaches to their parent when distressed, represents a breakdown or collapse of their organized strategy for dealing with distress during interactions with their caregiver (Main & Hesse, 1990; Main & Solomon, 1990). That is, an underlying pattern of avoidant, secure, or resistant attachment still dominates children's behavior outside the ephemeral expressions of disorganization. Thus, it is possible that it is not avoidant or disorganized attachment in isolation that predicts behavioral difficulties; it is both in combination. Lyons-Ruth (1996) maintained that the combination of disorganized attachment and children's best fitting classifications tends to be context-specific; children classified as disorganized in low-risk samples often have secondary classifications of secure (i.e., disorganized/secure), whereas those with high social risk who are classified as disorganized have best fitting classifications of avoidant (i.e., disorganized/avoidant). It is the latter form of disorganization, associated as it is with more severe maternal psychosocial difficulties and more harmful mother–child interactional styles, which may be more predictive of behavioral problems (Lyons-Ruth, Repacholi, McLeod, & Silva, 1991). A hurdle to testing this hypothesis meta-analytically is that few studies report the individual contrast of disorganized/avoidant, disorganized/resistant, and disorganized/secure attachment and internalizing or externalizing problems.

The current meta-analysis spans three decades of research. Accordingly, we examined whether the effect size linking insecure attachment and internalizing behavior is moderated by year of publication. Earlier studies showed stronger associations between attachment and internalizing behavior than did more recent studies. This decrement might reflect changing sociological circumstances, which alter the association between attachment and internalizing behavior. For example, the increasing propensity for women, particularly married women with young children, to join the labor force (Cohen & Bianchi, 1999) may weaken the relation between maternal behavior (and its correlates) and child outcome. More optimistically, it is possible that as attachment theory becomes more broadly accessible to the public (e.g., Leach, 1977), the distribution of attachment classifications change, such that range restrictions in attachment classification and/or correlated behavioral difficulties attenuate effect sizes. We mention these possibilities only to suggest that the decreasing association between attachment and internalizing behaviors may involve sociological factors. Alternatively, the decreasing effect sizes may be due to measurement, methodology, and/or statistical artifact. For instance, increasingly sophisticated research designs and statistical methodology, which serve to remove confounds (e.g., environmental influences shared by both attachment relationships and internalizing behavior) and sharpen estimates of association, may reveal that effect sizes are weaker than were previously expected. This consideration is particularly pertinent given Lyons-Ruth's (1996) observation that the forced alternate classification of children classified as disorganized may depend on contextual factors. While the current meta-analytic data do not permit us to test these or other explanations of the decrement in association between attachment and internalizing behavior, identification of the phenomenon opens a potentially important line of research.

Specific Forms of Insecure Attachment and Internalizing Behavior

Following examination of the general hypothesis that insecure attachment is associated with internalizing difficulty, we conducted more specific analyses. In these analyses, the Fail-safe N, that is, the number of studies averaging null results required to reduce the obtained alpha level to nonsignificance, fell short of Rosenthal's (1991) critical value. With this caution in mind, the association between internalizing behavior and avoidant, resistant, and disorganized attachment is discussed in turn.

Our findings indicated that children with avoidant attachment demonstrated more internalizing behavior than did children with secure attachment ($N = 21$ studies, 1,852 families; $d = .29$, 95%

CI [0.12, 0.45]). This finding is consistent with findings from the NICHD Early Child Care Research Network (2006) that avoidant attachment is the classification most consistently associated with problematic behavioral outcomes, as well as problematic parenting and demographic risk. Children in avoidant relationships are prone to externalizing problems (e.g., Burgess, Marshall, Rubin, & Fox, 2003; Cassidy & Kobak, 1988; Fearon et al., 2010; Goldberg et al., 1995; Munson, McMahon, & Spieker, 2001). It is hypothesized that having experienced consistently unresponsive or rejecting caregiving, these children come to expect such treatment and as a result react to others in an antagonistic manner. However, two lines of argument suggest that one might expect concurrent internalizing difficulties as well. First, from a theoretical standpoint, it has been proposed that children with avoidant attachment histories may learn to expect rejection and therefore come to perceive others as hostile and unsupportive, leading to passive withdrawal and internalization of negative affect (Goldberg, 1997; Moss, Rousseau, Parent, St-Laurent, & Saintong, 1998). Fear of rejection and the associated need to withdraw from social contact and/or dismiss and displace negative emotions may in turn lead children with avoidant attachment to develop feelings of depression, alienation, and hopelessness (Brumariu & Kerns, 2010; Goldberg, 1997; Manassis, 2011). Second, from an empirical perspective, despite appearing unperturbed by their mothers' departures and returns during the SSP, children with avoidant attachment show heightened physiological arousal (Hertsgaard et al., 1995; Spangler & Grossmann, 1993). This finding is consonant with evidence that avoidance involves the need to disavow negative affect (Cassidy, 1994; Manassis, 2011).

Resistant attachment has been theoretically linked to internalizing behavior (e.g., E. A. Carlson & Sroufe, 1995; DeKlyen & Greenberg, 2008; Manassis, 2011); however, this notion is not supported by the current meta-analysis. The effect size for the associations between resistant versus secure attachment ($N = 21$, 1,823 families; observed $d = .10$, 95% CI [–0.12, 0.32]) and resistant versus avoidant attachment ($N = 19$, 664 families; observed $d = –.17$, 95% CI [–0.41, 0.06]) and internalizing behavior were not significant. There are several points to consider with respect to this finding. First, it is possible that small sample size precluded the detection of significant differences. Second, some theorists have disputed the theoretical link between resistant attachment and internalizing behavior in early childhood (Goldberg, 1997, 2000; Manassis, 2011). Encompassed within the prediction that resistant attachment leads to internalizing behavior is the seeming discordance between theory and behavioral observation during the SSP. Goldberg (1997) proposed that children with resistant attachment express their displeasure with their caregiver with exaggerated emotional expression, a style of affect regulation that is not consistent with internalizing behavior. Third, children with resistant attachment have an internal working model of a caregiver who is available, but only consequent to overt and prolonged cues of needing assistance. That is, with significant effort exerted by the children, their caregiver will respond. While this dyadic pattern is not ideal, it may minimize the risk of behavioral maladaptation in children with resistant attachment, at least in early childhood, as they are indeed likely to approach the caregiver for assistance with a difficult situation. This pattern of parent–child dyadic behavior is very different from that of the avoidant dyad, where children avoid their caregiver for fear of rebuff. That is, with up-regulated signals, resistant children do, in fact, solicit attention from their mother, while avoidant children have no such recourse.

In early childhood, measures of internalizing behavior typically denote manifestations of both anxiety and depression. It is possible that the nonsignificant association between resistant attachment and internalizing behavior are obscured by this generalized approach to internalizing behavior. Currently, there is a paucity of research in the early childhood period examining distinctive developmental trajectories of anxiety and depression in individuals with different early attachment histories. The small set of prospective studies has revealed that resistant attachment in early childhood is most strongly associated with diagnoses or manifestations of anxiety in early and late adolescence (Bar-Haim et al., 2007; Warren, Huston, Egeland, Sroufe, 1997). In contrast, the broader construct of insecure attachment has been linked to depression in late childhood and adolescence (Duggal et al., 2001; Graham & Easterbrooks, 2000; Murray et al., 2011). In order to advance understanding in this area, additional research should differentiate the role of early attachment in anxiety, depression, and their comorbid expression. Further, resistant attachment may be more strongly associated with internalizing behavior when measured at later developmental periods than those investigated here (Brumariu & Kerns, 2010), when the necessity of independent function becomes more marked. Investigations with detailed and repeated longitudinal observations of anxious and depressive behaviors over childhood and adolescence would be particularly welcome to disentangle the discrepant findings of no association between resistant attachment and internalizing behavior in early childhood shown here, and the significant associations demonstrated in early and late adolescence (Bar-Haim et al., 2007; Brumariu & Kerns, 2010; Warren et al., 1997).

With the development of the disorganized classification, investigators came to see disorganized attachment as the major attachment-related risk factor for behavior problems (e.g., DeKlyen & Greenberg, 2008; Lyons-Ruth, 1996; van IJzendoorn et al., 1999). A recent meta-analysis of 34 studies with 3,778 participants found a small but significant effect size (observed $d = .34$; adjusted for publication bias $d = .18$) for the association between disorganized attachment and externalizing problems (Fearon et al., 2010). In the current meta-analysis, the contrast for disorganized versus organized attachment ($N = 20$, 2,679 families) showed that disorganized children evince more internalizing behavior, but this relation became nonsignificant once publication bias was taken into account (observed $d = .20$, 95% CI [0.09, 0.31]; adjusted $d = .09$, 95% CI [–0.02, 0.23]). Thus, these data do not provide support for a link between disorganized attachment and internalizing behaviors.

Limitations, Implications, and Conclusions

The current meta-analysis is limited to conclusions regarding attachment and internalizing behavior in regard to behavioral assessments of attachment in early childhood only. We used the circumscribed set of behavioral attachment assessments to maintain homogeneity among our measures (see Brumariu & Kerns, 2010, for a narrative review of behavioral, representational, and questionnaire measures). Also, it was not possible to determine the contributing role of infant–father attachment in the development of

the children's internalizing behavior. This is in large part due to a lack of empirical studies ($N = 3$) and associated lack of power in analyses for examining this association. Finally, studies used in the current meta-analysis focused on the direct relations between attachment and behavioral difficulties, neglecting the influence of mediating variables. There is a need for more sophisticated modeling to explain this transmission gap and identify the processes that mediate between insecure attachment and behavioral difficulty. Compelling theoretical models have been proposed to understand pathways to internalizing problems (see Brumariu & Kerns, 2010; DeKlyen & Greenberg, 2008; Morley & Moran, 2011), but few have been tested.

The pathways to internalizing disorders are complex, and it is unlikely that a single risk factor is sufficient to cause psychopathology (Rutter & Sroufe, 2000). The effect sizes derived here demonstrate that not all children with insecure attachment show internalizing problems and not all children with secure attachment are problem-free. Thus, attachment is one factor among many in the context of psychopathology. Risk factors for internalizing problems occur at multiple levels and contexts, including caregiver-specific factors (e.g., parent employment, support, childhood history, and psychopathology), child-specific factors (e.g., genetics, temperament, and negative emotionality), family-level factors (e.g., differential parenting, marital conflict), and macrolevel contexts such as culture, neighborhoods, and socioeconomic opportunities (Brumariu & Kerns, 2010; Caspi, Taylor, Moffitt, & Plomin, 2000; Costello, Compton, Keeler, & Angold, 2003; DeKlyen & Greenberg, 2008; Jenkins, Simpson, Dunn, Rasbash, & O'Connor, 2005). Despite the importance of these factors, it was not possible to assess their influence here, due to the limited information provided in individual studies. Meta-analysis rarely permits the examination of more than two variables simultaneously, allowing only a limited representation of children's context.

Findings from the current study have methodological implications. It appears the specificity of hypotheses predicting distinct outcomes for insecure-avoidant and insecure-resistant attachment in infancy may have been ill founded. The significant effect sizes relating avoidant attachment and internalizing and externalizing behaviors on the one hand, and the nonsignificant associations between resistant attachment and internalizing and externalizing behaviors on the other (see Fearon et al., 2010, for externalizing findings), suggest that collapsing avoidant and resistant attachment classifications into a single group may attenuate the association between insecure attachment and behavior problems. In the case where there are few children with resistant attachment in a sample, the wisest recourse may be to exclude them from analysis. Even here, though, it is advisable to report means and standard deviations for the resistant group for the sake of future meta-analyses.

The findings from the current meta-analysis also have important implications for interventions with young children and their families. This point is underscored by our finding that children with insecure attachment who had high levels of externalizing problems exhibited increased internalizing behavior as well. Fortunately, the impact of early attachment insecurity can be mollified by changes in parenting (NICHD Early Child Care Research Network, 2006). Attachment-based interventions can increase caregiver warmth, responsiveness, and sensitivity, as well as promote the development of secure attachment relationships, all of which serve as protective factors in the context of internalizing and externalizing problems (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; Rothbaum & Weisz, 1994). Using attachment theory as a theoretical framework, there have also been more direct attempts to develop interventions that prevent or mitigate the development of externalizing behavioral problems (e.g., Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2008; Moss et al., 2011). However, there is an urgent need for more research to examine the efficacy of attachment-based interventions in diminishing internalizing problems.

While theoretical considerations suggest that attachment influences behavioral outcome, the current study cannot speak to the issue of causation. However, the data synthesized here do examine some of the basic premises concerning the link between insecure attachment and behavioral difficulty. Children with insecure attachment, particularly avoidant attachment, evince more internalizing behavioral difficulties than do their secure counterparts; however, the relation is not robust. Thus, there is a need to go beyond the attachment relationship to understand the complex interplay between individuals and their contexts in the development and maintenance of internalizing problems.

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