

# Excessive Reassurance Seeking, Depression, and Interpersonal Rejection: A Meta-Analytic Review

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Coyne's (1976a, 1976b) interactional theory of depression predicts positive associations between excessive reassurance seeking (ERS) and both depression and interpersonal rejection. A growing body of research has supported the ERS model, but this work has yet to be systematically reviewed. A meta-analysis of 38 studies ( $N = 6,973$ ) revealed an aggregate effect size ( $r$ ) of .32 between ERS and concurrent depression. Moderator analyses showed effect sizes were significantly stronger for studies with self-report measures, compared with interviews, and for samples with higher percentages of women and were marginally stronger for studies with community samples, compared with clinical samples. A second meta-analysis of 16 studies yielded a weighted mean effect size of .14 between ERS and concurrent rejection, with studies assessing target-reported rejection showing stronger effect sizes than studies assessing informant-reported rejection and studies examining romantic relationships yielding marginally stronger effect sizes than studies examining nonromantic relationships. Prospective studies are qualitatively reviewed. Results support the ERS model (with several important caveats) but underscore the need for methodological diversity in future research.

*Keywords:* excessive reassurance seeking, meta-analysis, depression, interpersonal rejection

Interpersonal models have guided understanding of the etiology, course, consequences, and treatment of depression (Armsden & Greenberg, 1987; Gotlib & Hammen, 1992; Mufson et al., 2004). Coyne's (1976a, 1976b) interactional theory of depression has emerged as one of the most influential frameworks for studying interpersonal aspects of depression. In this model, mildly depressed people attempt to assuage feelings of guilt and low self-worth by seeking reassurance from others. At first, others provide support, but the depressed person doubts its authenticity and continues to seek reassurance until the other person grows annoyed and rejects them. The rejection exacerbates their symptoms as the cycle continues.

Joiner and colleagues (Joiner, Alfano, & Metalsky, 1992; Joiner, Metalsky, Katz, & Beach, 1999) point to excessive reassurance seeking (ERS) as the active ingredient in this process. They define ERS as the relatively stable tendency to repeatedly request reassurance from others that one is lovable and worthy, despite previous attempts by others to provide such reassurance. ERS has been implicated as a risk factor for the development, maintenance, and worsening of depression (Joiner & Metalsky, 2001; Joiner, Metalsky et al., 1999), a force behind interpersonal rejection (Benazon, 2000; Joiner et al., 1992), and a mediator of depression contagion (Joiner, 1994). The past decade and a half has seen an explosion of research on ERS, investigating the role of related interpersonal constructs (Davila, 2001; Shaver, Schachner, & Mikulincer, 2005), neurological underpinnings (Minnix et al., 2004), and clinical implications (Stellrecht, Joiner, & Rudd, 2006).

Although ERS and its association with depression and rejection have been examined in substantial work, there has yet to be a quantitative, systematic synthesis of the research that clarifies what is and is not known about ERS. In addition, numerous aspects of the model have not been sufficiently developed, tested, or refined. Our meta-analysis was designed to shed light on these issues. First, we quantitatively summarize current knowledge of ERS. Given the prominence of the ERS model within depression research, it is crucial to ensure that it fits with existing data to ensure that the conceptual premises guiding understanding of depression and its treatment are supported. As two other aspects of Coyne's (1976a, 1976b) theory, depression contagion and the depression–rejection link, have previously been supported meta-analytically (Joiner & Katz, 1999; Segrin & Dillard, 1992), a meta-analytic review of the ERS literature would lend convergent support to this model. Second, we use meta-analysis to look for patterns in the data that cannot be easily deciphered by examining individual study reports. For example, the link between ERS and depression has been relatively consistent across studies, which on the surface suggests a well-established finding with little need of replication. However, most of these studies have had very similar samples and methodology (an aspect of the ERS literature that has been appropriately

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criticized; Benazon & Coyne, 1999). Perhaps the homogeneity in methods has yielded homogeneity in results. Meta-analysis can determine the degree to which findings depend on methodological circumstances and can aggregate results across these conditions.

Third, we use our meta-analysis to identify gaps in the literature. For example, what types of samples and methodologies have been underemployed, and how might this limit our knowledge? Are there key aspects of the ERS model that have yet to be tested? Are there alternative hypotheses that may explain existing data? Delineating the limits of the ERS literature is crucial, both for understanding what can and cannot be inferred from existing data and for identifying areas in need of future research.

We examine several specific questions. First, what is the magnitude of the relation between depression and ERS? Second, what is the magnitude of the relation between ERS and interpersonal rejection? Individual studies may be biased by particular sample characteristics. Meta-analysis can powerfully clarify the size of associations across samples and methodologies. For Coyne's (1976a, 1976b) theory to be supported, we would expect ERS to be significantly correlated with both depression and rejection across studies.

Third, are there individual study characteristics that moderate the relation among ERS, depression, and rejection? Identifying methodological circumstances that produce stronger associations may allow for the potential to further refine the ERS model. The literature points to a number of important factors, both conceptual and methodological, which may affect how strongly ERS relates to depression and interpersonal rejection and, consequently, affect our understanding of this important interpersonal phenomenon. For example, one important debate in the literature is whether community samples of convenience, such as college students, are appropriate analogues for studying clinical depression. Although some argued that community samples yield important information about depression (Vredenburg, Flett, & Krames, 1993), others (Coyne, 1994) argued that the point prevalence of depression is too low to find substantial clinical depression in small community samples (Weissman, Bruce, Leaf, Florio, & Holzer, 1991) and that the symptoms reported in such samples often represent transient psychological distress rather than depression *per se*. This criticism, which has been specifically leveled against existing ERS research (Benazon & Coyne, 1999), may be supported if community samples produce a different relation between ERS and depression. If ERS differentially predicts depression in community samples versus clinical samples, it may suggest that the interpersonal context of depression varies depending on its severity. On the other hand, patient samples may not be representative of depressed people in the community (Goodman, Lahey, Fielding, & Dulcan, 1997). Treatment-seeking bias may skew effect sizes (ESs), as high reassurance seekers may be more apt to seek treatment.

A related criticism of the ERS literature is its common reliance on self-report measures of depression. Although cost-effective, self-report instruments' usefulness in assessment of clinical depression has been questioned. For example, the Beck Depression Inventory (BDI; A. T. Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) heavily weighs psychological distress with relative neglect of somatic symptoms (Coyne, 1994). Although most people with clinical depression do score highly on self-report measures, a high percentage of those exceeding severe depression cutoffs on self-report scales do not meet diagnostic criteria for major depression

(Lewinsohn & Teri, 1982), suggesting insufficient specificity. Further, as research has almost always relied on self-report assessment of ERS, shared method variance may inflate the relation between ERS and self-reported depression. Thus, we predict that the ERS–depression relation will be stronger for studies with self-report measures than for studies with interview measures. If this is the case, it would underscore the need to use a more diverse set of assessment methods within research on interpersonal aspects of depression.

An important limitation of the ERS model is its lack of a developmental perspective, leaving it unclear when, how, and over what course ERS emerges. Not only do rates of depression differ by age (Kessler, Avenevoli, & Ries Merikangas, 2001), but interpersonal circumstances change in type and salience over development, a fact that is not addressed in the ERS model. For example, individuals seek support from different sources at different ages. Younger children tend to seek support from their parents; college students are more likely to turn to dating partners and friends (Furman & Buhrmester, 1992). Adults, in contrast, are more likely to be in long-term romantic relationships and, thus, are probably more likely to seek support from their spouses. Even within relationship types, the qualitative nature of relationships differs with age (e.g., romantic relationships differ markedly from early adolescence to adulthood). Reassurance seeking also may have different meanings at different ages. For instance, ERS may be less of a violation of norms in childhood and, thus, may be less likely to lead to rejection at younger ages. Consistent with this, dependency (a construct related to ERS that is perhaps more normative in childhood than in adulthood) is a vulnerability factor for depression and social impairment in adulthood, but not in childhood (Abela & Taylor, 2003; Fichman, Koestner, & Zuroff, 1996; Zuroff et al., 2005). Perhaps, then, the likelihood of rejection and depression following ERS depends on the context in which reassurance is sought, thereby altering the cycle by which depression and ERS hypothetically exacerbate each other.

Most research on ERS has been conducted with college students (e.g., R. Beck, Robbins, Taylor, & Baker, 2001; Joiner et al., 1992; Joiner, Katz, & Lew, 1999; Katz, Beach, & Joiner, 1999) or other, similar age samples (e.g., Air Force cadets; Lerew, Schmidt, & Jackson, 1999), an indicator of the lack of a developmental focus in the literature. However, this is not exclusively true (e.g., Abela, Zuroff, Ho, Adams, & Hankin, 2006; Joiner, Metalsky, Gencoz, & Gencoz, 2001; Prinstein, Borelli, Cheah, Simon, & Aikins, 2005). As such, we examined whether age moderated the relations between ERS, depression, and rejection as one way to begin to address developmentally relevant questions, such as when do people begin to engage in ERS as a response to depressive symptoms and when does ERS begin to incur consequences. Although there is insufficient research to make specific predictions, we expect to see the strongest associations among adult samples, as this seems to be the group on whom the theory was inherently based.

There are other ways in which the context of ERS could affect its outcome. For example, it is unclear how the nature of the relationship between the reassurance seeker and the person rejecting him or her contributes to the association between ERS and rejection. There has been little research exploring how interpersonal aspects of depression differ across relationships, an important shortcoming of the literature. Although depression is associated with interpersonal dysfunction across relationships, romantic

relationships may be a particularly salient context for the depressogenic effects of ERS, as they are typically people's primary adult relationships, and what happens in them has been consistently associated with depression (see Davila, Stroud, & Starr, 2007, 2008). As caregiving is a central component of romantic love, many romantic partners may be hurt that the reassurance seeker would doubt their love and support; this sentiment may lead to resentment (Carnelley, Pietromonaco, & Jaffe, 1996; Swann & Bosson, 1999). This implies that ERS may be especially strongly linked to rejection in romantic couples. On the other hand, high reassurance seekers may select romantic partners who are less apt to reject them in response to ERS, which would deflate the relation between ERS and rejection in romantic relationships. Another variable that may affect the ERS-rejection relation is whether the rejecter lives with the rejectee. Living together may allow for more constant ERS that is more difficult to escape, making it more bothersome and more likely to lead to rejection.

The ERS literature also fails to sufficiently explain whether reassurance seeking and its consequences differ by gender. Although gender differences were not incorporated into the original theory, there is reason to believe that effects may be stronger for women. Women and adolescent girls are more vulnerable to depression (Gotlib & Hammen, 1992; Nolen-Hoeksema & Girgus, 1994). Women also experience more interpersonal stress, are more sensitive to interpersonal stressors, and are more likely to become depressed following interpersonal stressors (Rudolph, 2002; Rudolph & Hammen, 1999). Because women may be more reactive to interpersonal rejection elicited by ERS, we predict that the ERS–depression link will be stronger for women than for men. If this is the case, it may suggest that interpersonal factors contribute to gender differences in depression. On the other hand, as men are less apt to seek support in general (Felsten, 1998), men who break gender norms by engaging in ERS may represent a more severely depressed population. If so, it may contribute to a stronger ERS–depression relation for men, a plausible alternative hypothesis that we will also test. ERS's relation to rejection may also vary by gender. Depressed men are more likely than depressed women to be rejected by their roommates (Joiner, 1996), an effect that ERS could underlie.

Coyne's (1976a, 1976b) theory is an interpersonal model, which assumes that one's behavior creates a social environment that exacerbates and maintains the depression. However, the primary mechanisms of the model may be intrapersonal rather than interpersonal, a possibility that has never been elaborated or tested. Excessive reassurance seekers may simply be more likely to perceive rejection from others, rather than being actually rejected (in fact, this perception may be the driving force behind ERS). If this is the case, the relation between ERS and rejection may be stronger when rejection is assessed by the rejectee rather than the rejecter. Perception of rejection may maintain and exacerbate depression, even in the absence of actual rejection. Indeed, Weinstock and Whisman (2004) found that perceived rejection was 1.5–3 times more strongly related to depression than was partner-reported rejection, perhaps showing that rejection perception is more critical to the maintenance of depression than rejection itself. Notably, if the ERS model is primarily intrapersonal, it raises the question of whether the actual behavior of ERS is a necessary component of the model, or whether ERS is simply a proxy variable for psychological vulnerabilities (self-esteem, rejection sensitivity, pessi-

mism, negativity, etc.) that underlie both depression and perceived rejection, as suggested by Greenberg (1999). Clarifying this question will have significant implications for the model and for treatment strategies.

The ERS literature also is limited by the fact that it has been inconsistent in how it defines rejection, a critical factor in the model. Some assessed the person's willingness to interact with the target in the future. Others asked the person to appraise the target. For example, in several studies, a revised version of the Rosenberg Self-Esteem Inventory was used (Rosenberg, 1965), in which questions were altered to assess others rather than oneself. Other studies have assessed relationship satisfaction, with inventories such as the Quality of Marriage Index (Norton, 1983). Further studies have examined variables such as reduction in social support or social stressors. Although these variables conceptually overlap, they may tap different aspects of rejection and, thus, may have different relations to ERS (likewise, these variables show similar but not identical associations to depression; Weinstock & Whisman, 2004). For example, these constructs may differ on the degree to which they tap attitude versus behavior. People often feel dissatisfied in their relationships but refrain from communicating their dissatisfaction to their partners. As a result, reassurance seekers may be less likely to perceive the rejection, a key facet of the ERS cycle. Thus, the ERS-rejection association may be stronger for measures that are more closely associated with actual behavior, such as willingness to interact scales, than for measures that may more closely tap attitudes, such as relationship satisfaction and appraisal.

In addition to the conceptually driven moderators above, we examined two moderators to test for biases that could potentially compromise the integrity of the ERS literature. First, we tested for publication bias. Research literatures are often contaminated by what is known as the file drawer problem (Rosenthal, 1979), in which studies with significant results are more readily published, whereas studies with nonsignificant findings are never disseminated. The file drawer problem can inflate meta-analytic results. The inclusion of unpublished dissertations in meta-analyses can help alleviate this problem (McLeod & Weisz, 2004). Although dissertations do not undergo the traditional peer review process, they are subject to review by dissertation committees, allowing for some quality control (Slavin, 1995), albeit potentially less rigorous (Vickers & Smith, 2000). Thus, including unpublished dissertations offers control and examination of publication biases without substantially diluting study set quality.

Second, we tested for potential bias introduced by the fact that a substantial proportion of the research on ERS has been conducted by a single research group, T.E. Joiner, Jr. and colleagues. Although Joiner has a superb track record for producing quality research, any time a substantial proportion of a research literature originates in a single laboratory, concerns may be legitimately raised about potential confounding effects of idiosyncratic data collection techniques and possible allegiance effects (Thase, 1999). To rule out the possibility that results from Joiner's laboratory may systematically differ from other laboratories, we examined research group as an additional moderator.

In the current meta-analysis, we compute the mean ES for the relation between ERS and depression and examine six potential moderators (clinical status of sample, depression assessment, mean age, gender composition of sample, publication type, and research

group). We also examine the relation between ERS and rejection, with seven possible moderators (source of rejection assessment, type of rejection assessed, relationship to rejecter, mean age, gender composition, publication type, and research group). We predicted a significant, positive relation between ERS and both depression and rejection. We expected stronger depression–ERS ESs for (a) studies with self-report (rather than interview) depression measures, (b) studies with a greater proportion of female participants, and (c) studies with older samples, and we expected stronger rejection ERS ESs for (a) studies assessing rejection from rejectees rather than rejecters, (b) studies assessing rejection with willingness to interact scales rather than with appraisal or satisfaction scales, (c) studies assessing rejection in romantic relationships rather than in other types of relationships, (d) studies assessing rejection in relationships in which the individuals live together rather than living separately and (e) studies with older samples. For the remaining moderators, the theoretical or empirical basis was too tenuous to make specific a priori hypotheses, and thus, these analyses were exploratory.

Note that the meta-analysis presented here focuses solely on cross-sectional work. The ERS model hinges on predictions about processes unfolding over time, with ERS spurring rejection and, in turn, greater depression. These assumptions about causality have launched theoretical models and have likely guided treatment decisions, so it is doubly important to ensure that they are empirically grounded. Demonstrating temporal antecedence is a critical step in demonstrating causality (Garber & Hollon, 1991), most effectively tested with longitudinal methods. Further, as the model proposes that processes linking ERS, depression, and rejection unfold over time, it may not be effectively captured by cross-sectional research. Thus, although demonstrating a cross-sectional relation between these variables offers some evidence for the ERS model, examining the prospective relation between ERS and later rejection and depression provides a more rigorous test of the model. Although in several studies ERS has been examined longitudinally, inconsistencies in the presentation of ESs (e.g., inclusion of different covariates, differing analytical approaches, etc.) prevent us from meta-analyzing these data. Thus, to supplement our meta-analyses, we also present a qualitative review of studies in which the prospective relation between ERS and later depression and rejection was examined.

Although our inability to meta-analyze longitudinal studies is an important limitation of the meta-analysis, it is perhaps more compellingly a major limitation of the ERS literature, which, despite its prolificacy and influence over the past decade, has too often relied on methods that fail to test the fundamental tenets of the ERS model. Despite this important caveat, this meta-analysis of cross-sectional ESs is poised to make an important contribution to the literature, for several reasons. First, cross-sectional relations among ERS, depression, and interpersonal rejection are assumed by the ERS model. The ERS model suggests not only that ERS would lead to an increase in depressive symptoms, but that depressed people would engage in ERS when depressed (which would translate into a significant cross-sectional relation). Joiner, Metalsky, et al. (1999) list covariance with depression as first among criterion necessary to implicate ERS as a risk factor for depression (and the same would be true for interpersonal rejection). As such, it is important to ensure that their cross-sectional relation is consistent across studies and to identify circumstances

that may inflate or deflate its magnitude. Second, this meta-analysis emphasizes the holes in the existing ERS literature (including its overreliance on cross-sectional designs), which we hope will spur others to conduct more of the badly needed longitudinal research. Thus, although establishing a cross-sectional relations between ERS, depression, and interpersonal rejection does not speak to every aspect of the ERS model, it does ascertain important components of the model while highlighting the literature's limitations.

## Method

Articles were drawn from PsycINFO and PubMed databases through May 2007. PsycINFO also includes all abstracts indexed in *Dissertation Abstracts International*, allowing for the identification of unpublished dissertations in addition to published articles. Search terms included the combination of *reassur\** or *assur\** with *seek\** or *request\**. The asterisks provided a wildcard search, allowing for the inclusion of alternate word endings for each search term (e.g., *reassur\** returned articles including reassurance, reassurance, reassuring, etc.). The exact terms *excessive reassurance*, *interactional theory of depression*, and *interpersonal theory of depression*, were also included. These terms yielded 1,121 articles in PsycINFO and 1,836 articles in PubMed. All titles were read, and potentially eligible article abstracts and full-texts were examined. Reference sections of eligible articles were also searched, and experts in the field were contacted to identify in-press articles.

To be included in the ERS–depression meta-analysis, articles needed to have an assessment of unipolar depression or dysphoria (either through self-report measures, interview-rated scales, structured or semistructured interviews, or diagnoses acquired through chart review) and provide a cross-sectional correlation coefficient between ERS and depression, or enough information to allow for its computation. Articles in which negative affect rather than depression were assessed were excluded. To be included in the ERS–rejection meta-analysis, articles needed to include an assessment of interpersonal rejection, which was broadly defined as any form of negative social response by others, as reported either by the individual or by the person rejecting him or her. This may take the form of willingness to interact with the person (reverse coded), relationship satisfaction (reverse coded), others' appraisal of worth (reverse coded), social stress, or sociometric ratings. All articles also needed to have an assessment of ERS. Because ERS is conceptually distinct from normative support seeking (Joiner, Metalsky, et al., 1999), only studies in which researchers assessed reassurance seeking that is explicitly excessive were included. Reassurance seeking distinctly associated with hypochondriasis or obsessive-compulsive disorder were excluded. Non-English articles were also excluded ( $k = 2$ ). There were no exclusion criteria with regard to age or ethnicity. Studies must have been published in a peer-reviewed journal or, in the case of dissertations, approved by the dissertation committee (unpublished data and book chapters were excluded).

Using these criteria, we identified 39 articles (including 12 unpublished dissertations) containing a total of 46 potentially eligible studies (as some articles contained multiple studies with independent samples) for the depression–ERS meta-analysis. Of these, 3 were eliminated because of common samples, and 2

dissertations could not be obtained. Three more studies were excluded because of insufficient data for ES computation. Excluding these, 24 published articles and 9 unpublished dissertations remained, which contained a total of 38 eligible studies. For the ERS–rejection meta-analysis, we identified 16 eligible studies (3 were dissertations), which were a subset of the studies used in the depression meta-analysis (i.e., there were no studies that assessed ERS and rejection that did not also assess depression).

### Effect Size Coding

Because it was the most widely reported, the ES  $r$  was used for all analyses. In cases in which ESs were reported as group mean differences, they were converted to  $r$ s. Studies occasionally reported multiple ESs, in which case only one could be chosen (Lipsey & Wilson, 2001). To be consistent across studies, if multiple longitudinal time points were reported, only baseline ESs were included (as baseline data are usually the most complete, with no potential attrition effects). In cases in which more than one depression assessment was reported, ESs for the interview data took precedence (except in cases in which self-report data were more complete), as the incorporation of the interviewer's clinical judgment arguably lends greater validity to diagnostic interviews. To be sure that this choice did not substantially affect results, we reconducted all analyses using only self-report data.

Studies often assessed interpersonal rejection in multiple ways. Because only one ES could be used to compute the aggregate ES and test for moderators, in cases in which more than one ES was reported we prioritized ESs according to the following order (based on their appropriateness for the ERS model): (a) willingness to interact by people who know the target well (e.g., roommates, romantic partners, friends); (b) appraisal of worth by others; (c) partner-reported satisfaction; (d) rejection by people who do not necessarily know the target well (e.g., classmates); and (e) general social stressors. Note that these decisions are by necessity subjective, and results should be interpreted with the appropriate caution. However, when we computed mean ESs for each type of rejection, we included all studies that assessed that type of rejection. We also reran relevant analyses using alternative hierarchies to be sure that this decision did not confound results.

Five studies separately reported ESs for two members of a distinguishable dyad (i.e., romantic partners). Because these ESs were not independent, they could not both be included in the meta-analysis. For these studies, we used the female dyad member's ESs. To be sure that this did not bias results, we also reran relevant analyses using the male dyad member's ESs.

### Moderator Coding

For the depression meta-analysis, clinical status of sample was coded as clinical if participants were inpatients or outpatients receiving treatment for psychological symptoms or distress; as community if they were nonpatients; and as other if the patient status could not be ascertained, or if there was a mix.<sup>1</sup> Depression assessment was coded as self-report (Beck Depression Inventory; Children's Depression Inventory, Kovacs, 1992; Center for Epidemiological Studies—Depression scale, Radloff, 1977; etc.), diagnostic interview (Structural Clinical Interview for *DSM-IV*, Spitzer, Williams, Gibbon, & First, 1995; Schedule for Affective

Disorders and Schizophrenia for School Age Children—Present and Lifetime Version, Kaufman, Birmaher, Brent, & Rao, 1997; etc.), other if a different method was used (parent-reported, etc.) or if method was not reported.

For the rejection meta-analysis, the data source was coded as either (a) target (rejectee) reported or (b) other (rejecter) reported. Relationship type was coded in two ways: (a) romantic or non-romantic and (b) rejecters and targets lived together (e.g., married couples and roommates) or did not (e.g., friends, dating couples). Type of rejection assessed was coded as (a) willingness to interact or be friends with target, (b) appraisal of target's worth, (c) relationship satisfaction, (d) support reduction, or (e) social stressors.

For both meta-analyses, age was coded based on reported baseline mean age (or median age, if only that was reported). A few studies did not report age but had undergraduate samples; mean age for those studies was estimated as 20 years. We also coded the percentage of female participants in the sample. For studies reporting dyadic data, percentage female was 100 when the female dyad member was used and was 0 when the male dyad member was used. Finally, we coded research group as one if Thomas Joiner was listed as an author or member of the dissertation committee and as two if he was not. All studies were coded by a second coder, with 100% agreement between coders.

### Data Analysis

All analyses were conducted in SPSS with the macros provided by Lipsey and Wilson (2001). We first computed mean weighted aggregate ESs and inspected distributions for homogeneity. Following the recommendations of Lipsey and Wilson (2001), a fixed effects model was adopted when no significant heterogeneity emerged; otherwise a random-effects model was used. For categorical moderators, the inverse-variance-weighted one-way analogue to analysis of variance (ANOVA) was used to test differences in ESs between categories. Following the recommendations of Lipsey and Wilson (2001), a fixed-effects model was used when within-group heterogeneity was nonsignificant (denoting no remaining unexplained heterogeneity). In cases in which within-group heterogeneity was significant, a mixed-effects model was applied. The analogue to ANOVA yields separate ESs for each group. Dimensional moderator variables were analyzed with the modified weighted least squares regression analysis in which each ES is weighted by the inverse of its variance. Analogous to regression, each analysis yields a standardized regression coefficient representing the degree to which the moderator explains heterogeneity. Fixed models were used in cases in which residual heterogeneity was nonsignificant; otherwise mixed models were adopted (Lipsey & Wilson, 2001).

<sup>1</sup> Notably, the clinical sample designation required that participants be in treatment for psychological distress, not necessarily depression. We made this decision for reasons both conceptual (as we were interested in examining the effects of treatment seeking bias) and practical (because too few studies used samples of participants specifically seeking treatment for depression). However, this does not necessarily address the important question of whether ERS is as strongly linked to clinical depression as it is to subthreshold dysphoria. More research is needed to examine ERS in clinically depressed samples.

## Results

### *ERS and Depression*

The 38 eligible studies included a total  $N$  of 6,973. Eligible studies, including ESs and coded characteristics, are displayed in Table 1. The weighted mean ES ( $r$ ) across all studies for the correlation between ERS and depression was .32 ( $p < .001$ ).<sup>2</sup> Thus, higher reported levels of ERS are associated with more depressive symptoms. According to Cohen's (1988) standards, this constitutes a medium ES. The ES heterogeneity was not significant,  $Q(37) = 46.95$ ,  $p = .127$ ,<sup>3</sup> so a fixed model was adopted for the computation of the aggregate ES. However, we proceeded with moderation analyses because (a) the heterogeneity coefficient neared significance, (b)  $Q$  is a crude, low-powered statistical test often distorted by small numbers of studies (Lipsey & Wilson, 2001), and (c) we had theoretical reasons to do so.

Note that the overall mean ES was computed with the female dyad member's data in the three studies that reported dyadic data. To ensure that this decision did not bias results, we also conducted the same analysis substituting the female dyad members' ESs with the male dyad members' ESs. There were no substantial changes; the mean ES was .31 ( $p < .001$ ), although the heterogeneity became marginally significant,  $Q(1) = 50.31$ ,  $p = .071$  (providing a further argument for testing moderators). We also recomputed mean ES, using only self-report data; results did not change.

*Clinical status of sample.* We first examined whether the clinical status of the sample (patient [ $k = 5$ ] vs. community [ $k = 32$ ])<sup>4</sup> moderated the relation between depression and ERS. One study has a mix of patients and nonpatients; this was excluded from the analysis. We conducted an inverse-variance-weighted one-way analogue to ANOVA and found marginally significant differences between groups,  $Q_{Between}(1) = 3.01$ ,  $p = .08$  ( $Q_B$ ;  $Q_{Within}/Q_W$  was not significant, so a fixed model was applied). Mean ESs were .24 for clinical samples and .32 for community samples ( $ps < .001$ ).

*Method of depression assessment.* We next examined type of depression measure as a moderator, comparing studies in which self-report instruments were used ( $k = 34$ ) with studies in which clinical interviews were conducted ( $k = 3$ ). In one study, parent-reported depression was used; this study was eliminated from the analysis because of insufficient degrees of freedom. An inverse-variance-weighted one-way analogue to ANOVA revealed a significant difference between groups,  $Q(1) = 4.28$ ,  $p < .05$ , with studies with self-report measures yielding higher mean ESs (mean  $r = .32$ ), compared with those with interview data (mean  $r = .21$ ), although both of these ESs were significant ( $ps < .001$ ).  $Q_W$  was not significant, so a fixed model was adopted. Note that only one study used both a clinical sample and interview assessments, so this moderation effect is not redundant to the previously reported moderation of clinical status.

*Age.* To assess the moderating role of age, we conducted an analogue regression, with mean age as a continuous predictor variable. Age was not a significant moderator in this analysis ( $\beta = -.05$ ,  $p > .10$ ).

*Gender.* The percentage of female participants in each study was entered as a predictor variable in a modified weighted least squares regression and emerged as a significant predictor ( $\beta = .43$ ,  $p < .01$ ), with studies with higher percentages of female participants showing stronger associations between ERS and depression.

This finding also held when substituting the male dyad member's ESs from the dyadic studies ( $\beta = .39$ ,  $p < .01$ ). Residual heterogeneity was nonsignificant, so these results reflect a fixed model.

*Publication bias.* Unpublished dissertations ( $k = 8$ ) were compared with published studies ( $k = 30$ ) to identify potential publication bias. There were no significant differences between groups,  $Q(1) = 1.71$ ,  $p > .10$ , suggesting no significant publication bias.

*Research group.* Twenty-one of the 38 studies were published by Joiner's research group. Research group was not a significant moderator, with no significant differences between ESs reported by Joiner and colleagues and ESs reported by other researchers,  $Q(1) = 0.18$ , *ns*.

### *ERS and Interpersonal Rejection*

The 16 eligible studies contained a total of 2,596 participants. Eligible studies and their characteristics are listed in Table 2. Heterogeneity was significant,  $Q(15) = 39.85$ ,  $p < .001$ ,<sup>5</sup> so a random effects model was adopted. The weighted mean ES across all 16 studies was .14 ( $p < .001$ ), with higher ERS predicting more rejection. This effect is significant but weak in magnitude (Cohen, 1988). Results were similar when the male dyad member's data in dyadic studies were used ( $r = .16$ ,  $p < .001$ ) and did not change when ESs from secondary assessments of rejection were used.

*Source of rejection data.* Studies in which rejection was reported by the rejectee ( $k = 3$ ) were compared with studies in which rejection was reported by the rejecter ( $k = 13$ ). An inverse-variance-weighted one-way analogue to ANOVA was conducted.  $Q_W$  was not significant, so a fixed-effects model was used. There were significant differences between groups,  $Q(1) = 16.57$ ,  $p < .01$ , with rejectee-reported ESs (mean  $r = .30$ ) significantly higher than rejecter-reported ESs (mean  $r = .09$ ), although both ESs were significant ( $ps < .001$ ).

*Type of rejection assessed.* Social stressors, reduction in social support, and general feelings of rejection were assessed in one study each. These studies were removed from the analyses because of insufficient degrees of freedom. The remaining studies assessed either willingness to interact (including willingness to be friends or roommates;  $k = 4$ ), appraisal of worth ( $k = 4$ ) or relationship satisfaction ( $k = 5$ ). These included either others' reported rejection

<sup>2</sup> To ensure that the inclusion of dissertation data did not substantially change results, we reran all analyses (for both depression and rejection) excluding these data. Results did not substantially change.

<sup>3</sup> Some have criticized the use of  $Q$ , advocating instead for the use of  $I^2$  with corresponding confidence intervals.  $I^2 = 21\%$ , constituting low heterogeneity, although the upper end of 95% confidence intervals (0% to 48%) were in the range of medium heterogeneity. Note that  $I^2$  has also been criticized for its low power. Results should be interpreted with the appropriate caution (Higgins & Thompson, 2002; Higgins, Thompson, Deeks, & Altman, 2003; Ioannidis, Patsopoulos, & Evangelou, 2007).

<sup>4</sup> Note that some of our moderator analyses include groups with low numbers of studies and/or imbalanced numbers of studies across groups. Although to our knowledge no published literature suggests that this would compromise meta-analysis integrity, analogous concerns in ANOVA may suggest that this would underpower or confound analysis. Thus, results may be understated, and these findings should be interpreted with caution.

<sup>5</sup>  $I^2 = 62\%$  (95% confidence interval 35% to 78%), medium heterogeneity according to Higgins and Thompson (2004).

Table 1  
 Depression Meta-Analysis Eligible Study Effect Sizes and Characteristics

Study	<i>N</i>	<i>r</i>	Depression assessment	<i>M</i> age in years	% Female	Clinical status	Joiner authored	Published
Abela et al. (2005)	140	.27	K-SADS (i)	9.80	50.71	Community		X
Beck et al. (2001)	167	.39	CES-D (s)	18.10	70.00	Community		X
Benazon (2000)	90	.11	SCID (i)	43.00	N/R	Clinical		X
Burns et al. (2006)	220	.24	BDI (s)	18.80	77.00	Community	X	X
Davila (2001), Study 1	220	.37	BDI (s)	20.90	68.00	Community		X
Davila (2001), Study 2	94	.21	SCID (i)	18.05	47.90	Community		X
Dyller (2003)	228	.37	BDI (s)	20.00	52.63	Community		X
Gencoz & Gencoz (2005)	102	.36	BDI (s)	21.50	76.50	Community		X
Gerhardstein (2006), Sample 2	183	.31	BASC (p)	6.01	49.72	Mix	X	
Haefel et al. (2007)	111	.37	BDI (s)	18.65	63.06	Community	X	X
Joiner & Metalsky (1995)	182	.17	BDI (s)	20.00	49.50	Community	X	X
Joiner & Metalsky (2001), Study 5	103	.30	BDI (s)	20.00	55.10	Community	X	X
Joiner & Metalsky (2001), Study 6	119	.38	Composite (s)	20.00	65.50	Community	X	X
Joiner & Rudd (1996), Study 1	336	.30	BDI (s)	20.00	54.46	Community	X	X
Joiner & Rudd (1996), Study 2	337	.36	BDI (s)	20.00	53.11	Community	X	X
Joiner & Schmidt (1998)	1005	.31	BDI (s)	18.01	18.00	Community	X	X
Joiner (1994)	96	.31	BDI (s)	20.00	51.04	Community	X	X
Joiner (1999)	68	.24	CDI (s)	13.34	51.47	Clinical	X	X
Joiner et al. (1992)	353	.31	BDI (s)	20.00	53.26	Community	X	X
Joiner, Katz, & Lew (1999)	177	.24	BDI (s)	20.00	63.30	Community	X	X
Joiner et al. (2001), Study 1	229	.24	BDI (s)	43.87	5.68	Clinical	X	X
Joiner et al. (2001), Study 2	72	.40	CDI (s)	13.18	50.00	Clinical	X	X
Katz & Beach (1997)	196	.46	BDI (s)	20.00	100.00 <sup>a</sup>	Community	X	
Katz et al. (1998)	134	.48	BDI (s)	19.00	100.00	Community	X	X
Katz et al. (1999)	105	.29 <sup>a</sup>	BDI (s)	19.58	100.00 <sup>a</sup>	Community	X	X
Luxton & Wenzlaff (2005)	228	.30	BDI (s)	19.31	66.67	Community		X
Magnum (2004)	47	.19	BDI (s)	22.56	100.00	Community		
Minnix (2006)	83	.42	BDI (s)	19.67	71.00	Community	X	
Minnix et al. (2004)	12	.31	BDI (s)	32.00	50.00	Clinical	X	X
Potthoff et al. (1995)	267	.22	BDI (s)	18.90	61.80	Community	X	X
Prinstein et al. (2005)	520	.25	CDI (s)	12.66	50.00	Community		X
Rizzo (2005)	80	.43	BDI (s)	21.03	100.00 <sup>a</sup>	Community		
Seeger Strauss (2006)	92	.45	BDI (s)	37.84	100.00	Community		
Shahar et al. (2004)	198	.40	BDI (s)	19.90	54.00	Community	X	X
Shaver et al. (2005), Study 1	72	.43 <sup>a</sup>	CES-D (s)	20.00	100.00 <sup>a</sup>	Community		X
Shaver et al. (2005), Study 2	61	.45 <sup>a</sup>	CES-D (s)	20.00	100.00 <sup>a</sup>	Community		X
Siegel (2004)	85	.26	BDI (s)	15.17	64.70	Community		
Varshney (2004) <sup>a</sup>	135	.32	CES-D (s)	33.92	100.00 <sup>a</sup>	Community		

Note. Total *N* = 6,947. s = self-report measure; i = interview measure; p = parent-report measure; N/R = Not reported; CES-D = Center for Epidemiological Studies—Depression scale (Radloff, 1977); K-SADS = Schedule for Affective Disorders and Schizophrenia for School Age Children—Present and Lifetime Version (Kaufman, Birmaher, Brent, & Rao, 1997); SCID = Structural Clinical Interview for *DSM-IV* (Spitzer, Williams, Gibbon, & First, 1995); BDI = Beck Depression Inventory (A. T. Beck et al., 1961); CDI = Children's Depression Inventory (Kovacs, 1992); BASC = Behavior Assessment System for Children (Reynolds & Kamphaus, 1992); Composite = several measures combined.

<sup>a</sup> Study reported dyadic data (e.g., dating couples). Here, only the female dyad data are reported.

tion of targets or target's own perception of others' feelings of rejection. An inverse-variance-weighted one-way analogue to ANOVA was performed, and there were no significant differences between groups,  $Q(2) = 0.01$ , *ns*. The mean aggregate ES (*r*) for all studies that assessed willingness to interact ( $k = 6$ ) was .07; for appraisal ( $k = 8$ ), it was .09; for satisfaction ( $k = 6$ ), it was .13 ( $ps < .05$ ). We reran this analysis using alternative coding hierarchies; moderation effects remained nonsignificant.

**Relationship type.** Studies assessing rejection not specific to one type of relationship were filtered from these analyses. First, studies assessing rejection in romantic relationships ( $k = 8$ ) were compared with studies assessing rejection in nonromantic relationships ( $k = 6$ ). An inverse-variance-weighted one-way analogue to ANOVA was conducted with a mixed model, and differences between groups were marginal,  $Q(1) = 2.64$ ,  $p = .10$ , with

romantic relationships showing stronger ESs (mean  $r = .17$ ,  $p < .05$ ) than nonromantic relationships (mean  $r = .07$ ,  $p < .05$ ). Next, studies in which rejecters lived with targets ( $k = 6$ ) were compared with studies in which rejecters and targets lived apart ( $k = 8$ ). There were no differences between groups,  $Q(1) = 0.01$ , *ns*.

**Mean age.** Participant mean age was entered as a predictor variable in a modified, weighted least-squares-regression equation. Mean age was not a significant predictor of study ERS-rejection ES ( $\beta = .28$ , *ns*).

**Gender.** A modified, weighted least squares regression was conducted in which the percentage of the sample that was female was entered as a predictor variable. It did not emerge as a significant predictor of ERS-rejection ES ( $\beta = -.18$ , *ns*). Gender composition was also not significant as a moderator when male dyad members' data were used ( $\beta = -.08$ , *ns*).

Table 2  
*Interpersonal Rejection Meta-Analysis and Study Characteristics*

Study	<i>N</i>	<i>r</i>	Data source	Rejection type	Relationship type
Benazon (2000)	90	.42	Partner	App., Sat.	Married
Dyller (2003)	114	.10	Partner	Will., App.	Roommates
Haefffel et al. (2007)	111	.15	Target	Social support	N/A
Joiner & Metalsky (1995)	182	.12	Partner	Will., App.	Roommates
Joiner & Metalsky (2001), Study 5	103	-.07	Partner	App.	Roommates
Joiner (1999)	68	.48	Target	Rej. exp.	N/A
Joiner et al. (1992)	353	.05	Partner	Will., App.	Roommates
Katz & Beach (1997)	196	.01	Partner	App., Sat.	Dating
Katz et al. (1998)	134	.12	Partner	App.	Dating
Katz et al. (1999) <sup>a</sup>	105	.04	Partner	Sat.	Dating
Potthoff et al. (1995)	267	.31	Target	Social stress	Dating
Prinstein et al. (2005)	182	.12	Partner	Sat., Soc.	Best friends, peers
Siegel (2004)	85	.03	Partner	Soc.	Peers
Shaver et al. (2005), Study 1 <sup>a</sup>	72	.09	Partner	Sat.	Dating
Shaver et al. (2005), Study 2 <sup>a</sup>	61	.21	Partner	Sat.	Dating
Varshney (2004) <sup>a</sup>	135	.13	Partner	Sat.	Married

*Note.* Consult Table 1 for more study characteristics. Sociometric studies coded as willingness to interact. *Will.* = willingness to interact; *App.* = appraisal; *Sat.* = relationship satisfaction; *Rej. exp.* = rejection experiences; *Soc.* = sociometric; *N/A* = rejection not specific to one type of relationship.

<sup>a</sup> Study reported dyadic data (e.g., dating couples). Here, only the female dyad data are reported.

**Publication bias.** We performed an inverse-variance-weighted one-way analogue to ANOVA, comparing unpublished dissertations ( $k = 3$ ) with published studies ( $k = 13$ ) to identify publication biases. There were no significant differences between groups,  $Q(1) = 0.48, ns$ .

**Research group.** We conducted an inverse-variance-weighted one-way analogue to ANOVA comparing Joiner-authored studies ( $k = 8$ ) with all other studies ( $k = 8$ ). Groups were not significantly different,  $Q(1) = 0.04, ns$ .

**Fail-safe *N* (FSN).** To further ensure that neither meta-analysis was contaminated by the file drawer problem, we computed the FSN following procedures by Orwin (1983), which determines the number of additional, unpublished studies with an ES of zero that would need to be included to lower the aggregate ES to .1 (the lower limits of a small ES according to Cohen, 1988). For the ERS–depression meta-analysis,  $FSN = 84$ . As there are unlikely to be 84 unpublished ERS–depression studies with null findings, this suggests that our effects are relatively robust to the file drawer problem. For the ERS–rejection meta-analysis,  $FSN = 6.4$ , suggesting potential susceptibility to the file drawer problem, although our dissertation analysis, which may be a more precise measure of publication bias, did not suggest bias.

**Correlations among moderators.** We examined correlations between moderators to ensure independence. Joiner's group produced fewer unpublished dissertations ( $r = -.33, p < .05$ ) and used samples with fewer female participants ( $r = -.38, p < .05$ ; dyadic studies were filtered in this analysis). Clinical samples were also likely to be younger ( $r = -.46, p < .05$ ). Because publication type, research group, and mean age were not significant moderators, we do not anticipate that these correlations affected results, but results should be considered with the appropriate caution. Romantic relationships were more likely to have satisfaction or appraisal measures than willingness to interact measures.

### Prospective Studies

**Does ERS predict depression?** In a qualitative review, we examined four related questions. First, does ERS predict depression on its own? Davila (2001) found that it did, and Joiner and Metalsky (2001, Study 4) found that baseline ERS scores of college students who developed depressive symptoms 10 weeks later were higher than students who did not develop symptoms. However, too few studies have directly examined this question (or, at least, reported on it) to draw firm conclusions. Second, does ERS emerge as an independent predictor of depression beyond other covariates? Davila (2001) found that ERS predicted depression even when controlling for attachment-related variables, but other studies failed to find that ERS predicted depression beyond other covariates (e.g., social support, dependency, life stress, self-criticism, friendship quality, etc.; Abela et al., 2006; Haefffel, Voelz, & Joiner, 2007; Prinstein et al., 2005; Shahar, Joiner, Zuroff, & Blatt, 2004). Third, does ERS interact with other variables to predict depression? The answer appears to be yes. For example, ERS is more likely to lead to dysphoria if experienced in conjunction with minor stressors (Abela et al., 2006; Joiner & Metalsky, 2001, Study 6), with rejection or other interpersonal strains (Haefffel et al., 2007; Joiner & Metalsky, 2001, Study 5; Katz, Beach, & Joiner, 1998; Prinstein et al., 2005), or with anxious attachment (Shaver et al., 2005). ERS independently predicted depression in a high-stress sample (Air Force cadets undergoing basic training; Joiner & Schmidt, 1998), further suggesting that ERS may be most depressogenic under circumstances of high stress. Finally, do stressors mediate the prospective relation between ERS and depression? Given that the ERS model makes causal predictions, a mediational model may best support the theory. However, only two studies have tested this, and results are equivocal: in one, data met the conditions for mediation (Potthoff, Holahan, & Joiner, 1995); the other's data did not (Shahar et al., 2004).

Table 3 lists all included published studies reporting longitudinal data, with relevant study characteristics. Note, once again, the methodological homogeneity across studies: Only one study had interview assessments, only two had non-college-aged samples, only three had follow-up periods longer than 10 weeks, and none had clinical samples.

*Does ERS prospectively predict interpersonal rejection?* Less research has examined the longitudinal relation between ERS and rejection. Few studies have reported that ERS independently predicts rejection. Pothoff et al. (1995) did find that ERS predicted minor social stressors, but Shaver et al. (2005) found that daily reassurance seeking had no prospective relation with partner-reported relationship satisfaction, and Prinstein et al. (2005) found that ERS did not predict changes in peer sociometric ratings of adolescents. It does however appear that ERS leads to rejection under certain conditions. For example, among men (but not women), ERS and depression interact to predict increases in roommate rejection over a 5 week interval (Joiner et al., 1992). Joiner and Metalsky (1995) uncovered a four-way interaction in which men (but not women) who were more depressed and high on both ERS and negative feedback seeking were more likely to be rejected by roommates. Conversely, Prinstein et al. (2005) found that ERS predicted a decline in friend-reported positive friendship qualities among adolescent girls but not among boys. Thus, some evidence suggests that ERS leads to greater rejection over time, but perhaps only under certain circumstances. However, it is difficult to draw conclusions because of the limited number of studies (see Table 4 for study characteristics). Note that the relative lack of prospective ERS studies may reflect an underlying file drawer problem, as studies with nonsignificant results may have gone unpublished.

### Discussion

In this meta-analysis, we examined the cross-sectional relation between ERS and both depression and interpersonal rejection. We aimed to summarize existing knowledge, discern new patterns, and identify gaps in the literature. First, we aggregated findings across studies. Results revealed a moderate (Cohen, 1988), positive relation between ERS and concurrent depressive symptoms, support-

ing the ERS model. Associations between ERS and depression varied little across studies, perhaps reflecting an underlying limitation of the research literature—the relative homogeneity of methodologies and sample characteristics. Interpersonal rejection was also significantly related to concurrent ERS across studies, supporting an additional component of the interactional theory—that ERS evokes negative reactions from others. ERS was more weakly related to rejection than to depression. However, it is important to note that in some previous research, researchers have examined the interaction between depression and ERS in predicting rejection, rather than the bivariate relation between rejection and ERS (e.g., Joiner et al., 1992). Thus, rejection may be more strongly linked to ERS when the target is depressed.

ESs varied according to several study characteristics, revealing several important conceptual and methodological caveats to the ERS model. First, method of depression assessment emerged as a significant moderator, with self-report data showing a stronger correlation with concurrent ERS than interview data (as predicted). As argued by Coyne (1994), self-reported data may tap transient psychological distress rather than depression, and this construct may show a stronger relation to ERS than clinical depression. However, there are several alternative, viable explanations for this moderation. The stronger relation between ERS and self-reported depression may be attributable to restricted range for the interview data, as interviews often only yield categorical ratings and self-report measure usually provide continuous data. Moreover, ESs for self-report data may be inflated by shared method variance, as all studies relied on self-report ERS measures. It should also be noted that although studies with interview data reported, on average, weaker correlations, ESs were highly significant for both groups, so there is no debate about the existence of a cross-sectional depression–ERS link across methodologies, but rather a question of differential magnitude. Still, researchers should be aware that self-reported data could potentially bias ESs upwards. Notably, 92% of studies relied solely on self-report data. The low number of studies with interviews is not statistically optimal (and results should be interpreted with that in mind). However, paired with the significant moderation, the scarcity of studies with interviews is actually an important finding in itself, as it suggests that the ERS

Table 3  
*Characteristics of Prospective Studies Examining ERS and Depression*

Study	Follow-up period	Depression assessment	<i>M</i> age	% Female
Abela et al. (2006)	Every 6 weeks for 1 year	CDI (s)	9.80	50.71
Davila (2001), Study 2	6 months	SCID (i)	18.05	47.90
Haefffel et al. (2007)	5 weeks	BDI (s)	18.65	63.06
Joiner & Metalsky (2001), Study 4	10 weeks	BDI (s)	20.00	51.82
Joiner & Metalsky (2001), Study 5	5 weeks	BDI (s)	20.00	55.10
Joiner & Metalsky (2001), Study 6	6 assessments over 3 week period	Composite (s)	20.00	65.50
Joiner & Schmidt (1998)	5 weeks	BDI (s)	18.01	18.00
Katz et al. (1998)	6 weeks	BDI (s)	19.00	100.00
Pothoff et al. (1995)	3 assessments over 5 weeks	BDI (s)	18.90	61.80
Prinstein et al. (2005)	3 assessments over 2 years	CDI (s)	12.66	50.00
Shahar et al. (2004)	5 weeks	BDI (s)	19.90	54.00
Shaver et al. (2005), Study 2	Daily for 14 days	CES–D (s)	20.00	dyadic

*Note.* Time 1 characteristics. All studies used community samples. SCID = Structural Clinical interview for *DSM-IV* (Spitzer et al., 1995); BDI = Beck Depression Inventory (A. T. Beck et al., 1961); CDI = Children's Depression Inventory (Kovacs, 1992); CES–D = Center for Epidemiological Studies—Depression scale (Radloff, 1977); Composite = several measures combined; s = self-report measure; i = interview measure.

Table 4  
*Characteristics of Prospective Studies Examining ERS and Interpersonal Rejection*

Study	Follow-up period	Data source	Rejection type	Relationship type
Joiner & Metalsky (1995)	3 weeks	Partner	Will., App.	Roommates
Joiner et al. (1992)	5 weeks	Partner	Will., App.	Roommates
Potthoff et al. (1995)	3 sessions over 5 weeks	Target	Social stress	Multiple relationships
Prinstein et al. (2005)	3 assessments over 2 years	Partner	Sat., Soc.	Best friends, peers
Shaver et al. (2005), Study 2	Daily for 14 days	Partner	Sat.	Dating

*Note.* Consult Table 1 for more study characteristics. *Will.* = willingness to interact; *App.* = appraisal; *Sat.* = relationship satisfaction; *Soc.* = sociometric.

literature may have been systematically biased by overreliance on self-report assessments.

Studies with patient samples yielded marginally weaker associations between ERS and concurrent depression than did studies with community samples (although both showed significant associations). Although the marginality of this result means we must interpret it with caution, it may have implications for the ERS literature. As patient samples are likely more depressed than community samples, this may mean that the interpersonal causes and consequences of depression change as symptoms grow more severe. For example, the ERS cycle may escalate symptoms at first but then plateau by the time symptoms enter into the range of major depression, as reassurance seekers habituate to rejection or give up on seeking support. However, clinical samples differ from community samples in several other ways that could contribute to a lower association between ERS and depression. For example, the distribution of depressive symptoms is likely to be more uniform in patient samples, potentially introducing problems with restricted range. Similarly, high reassurance seekers may be more apt to seek treatment, leading to greater uniformity in ERS in clinical samples. As this finding is only marginal, it may also be a product of chance and needs replication in future research before conclusions can be drawn. However, coupled with the finding of higher ERSs for self-reported depression, our results highlight the need to replicate findings in clinically depressed samples with clinical interviews to examine whether the ERS cycle is associated with major depression or simply subthreshold dysphoria.

Consistent with predictions, the cross-sectional association between ERS and depression was stronger in samples with a higher percentage of female participants, implying that ERS and depression are particularly strongly linked for girls and women. Although Coyne's original model did not incorporate gender differences, these results suggest that the ERS cycle may have more pronounced effects among women. This could be explained by one (or both) of two possibilities. First, women could be more apt to seek reassurance when upset. Women are more likely to seek support in general (Felsten, 1998), perhaps leading them to be more apt to engage in ERS when depressed. Notably, sample gender composition did not moderate the ERS–rejection association, implying that women may be more likely to seek reassurance when depressed but may not be more likely to be rejected for doing so. Second, women may be more likely to become depressed as a result of ERS. Women are more reactive to interpersonal stress and more likely to become depressed following an interpersonal stressor (Rudolph, 2002; Rudolph & Hammen, 1999), possibly because they place greater importance on harmonious relationships (Rudolph & Conley, 2005). Perhaps the perception of rejection

following ERS is more distressing for women than for men and is more likely to spur the ERS–depression cycle.

Either of these explanations could translate into an increased vulnerability to depression. Women are twice as likely as men to become depressed (Nolen-Hoeksema & Girgus, 1994). Several explanations have been posited for this discrepancy, including different cognitive styles, greater chronic stress, and more frequent childhood sexual abuse (Nolen-Hoeksema & Girgus, 1994; Nolen-Hoeksema, Larson, & Grayson, 1999). However, researchers have only begun to examine how interpersonal factors may play a role in depression sex differences (Eberhart, Shih, Hammen, & Brennan, 2006; Rose, 2002). Future research should consider whether ERS plays a role in women's heightened vulnerability to depression.

The cross-sectional ERS–rejection relation was substantially weaker in studies assessing rejection directly from the person rejecting the excessive reassurance seeker, compared with studies in which perceptions of rejection were assessed. This may suggest that the mechanisms of the ERS model are primarily intrapersonal rather than interpersonal. Excessive reassurance seekers may simply be much more apt to perceive rejection (perhaps an impetus for the reassurance seeking in the first place), while only being slightly more likely to actually be rejected. In other words, ERS may lead to depression not because of an actual rejection or loss in support but because the reassurance seeker feels rejected or unsupported. Of course, perceptions of rejection are related to actual rejection, but not perfectly so (Weinstock & Whisman, 2004). Future research should empirically evaluate this idea, as it constitutes a major rethinking of the ERS model. It is, however, also possible that the relation between ERS and self-reported rejection is inflated by shared method variance, an issue that may have introduced some bias into the literature.

The strength of the concurrent association between ERS and perceptions of rejection may suggest an underlying relation with a related construct—rejection sensitivity. Defined as the tendency to anxiously anticipate, readily perceive, and overact to rejection (Downey & Feldman, 1996), rejection sensitivity (like ERS) has been linked to actual interpersonal rejection and depression (Ayduk, Downey, & Kim, 2001; Downey, Freitas, Michaelis, & Khouri, 1998) and often unfolds a self-fulfilling prophecy, in which the expectation of being rejected leads the person to act in a manner that elicits rejection. Perhaps ERS is the behavioral manifestation of rejection sensitivity. Rejection sensitive individuals are probably more likely to seek reassurance, feel unsatisfied with others' attempts to provide reassurance, perceive rejection in others (whether real or imagined), and become depressed as a result of this perceived rejection, all of which suggests that rejec-

tion sensitivity could play a role in ERS and its consequences. There is a clear need to integrate the literatures on ERS and rejection sensitivity, something no published work to our knowledge has attempted.

We also found evidence that the impact of ERS depends on the interpersonal context in which it takes place. Studies that assessed ERS and concurrent rejection in romantic relationships yielded slightly higher ESs than did studies assessing ERS in nonromantic relationships, although this effect was marginal and could be a product of chance (and thus, should be interpreted with substantial caution and replicated in future research). Should this result be replicated in future research, it may help explain why romantic dysfunction is so strongly and consistently linked to depression (Davila et al., 2008). In interpreting this finding, consider the partner's perspective. Having a roommate or acquaintance engage in ERS may be a nuisance, but having a romantic partner constantly invalidate attempts at reassurance may be a more heart-breaking and embittering experience (as argued by Swann & Bosson, 1999). Categorical coding of relationship types, however, does not necessarily capture all aspects of relationships that may be relevant to the ERS–rejection association. Future research should further examine qualities of relationships that moderate the likelihood of rejection following ERS. For example, individuals in more committed relationships may be less apt to reject their partners following ERS.

In an attempt to capture aspects of the developmental course of ERS, we examined whether sample mean age moderated the cross-sectional relation between ERS and depression or rejection. Age was not a significant moderator in either case, but this may be the result of skewed data, underscoring an important limitation of the ERS literature. Over two-thirds of studies ( $k = 26$ ) used college-aged samples (between the ages of 18 years and 22 years). In contrast, only seven studies looked at ERS in children, and only five looked at post-college-aged adults. This is a major shortcoming, given that both the nature of interpersonal relationships and the social acceptability of reassurance seeking change substantially with age. Although college samples are convenient and cost-effective, more research should investigate ERS in other age groups.

In particular, the relative lack of research on ERS in children leaves us with little understanding of the developmental course of ERS. For example, when and why does ERS develop? Attachment theory holds that when caregivers provide consistent validation, children eventually learn to self-reassure, but when caregiver validation is inconsistent, they develop a negative view of the self, fail to learn to self-reassure, and thus need to seek validation from others (Bowlby, 1980). ERS may develop in a similar manner, but research is needed to explore when and how. In addition, reassurance seekers may, as children, develop the tendency to internalize others' disapproval (a trait linked to depression in children) while failing to internalize others' approval (which has been shown to protect against depression; Rudolph, Caldwell, & Conley, 2005). Similarly, at what point does ERS begin to incur consequences, such as depression and rejection? Prinstein et al. (2005) found that among early adolescent girls, ERS predicted friend-reported decreases in friendship quality but did not predict self-reported decreases (at odds with our finding that ERS is more strongly associated with self-perceived rejection than informant-reported rejection). It may be that children at this age have not yet developed the ability to perceive subtle social cues of rejection, a

necessary component of the ERS model. Finally, given our finding that ERS is particularly linked to depression among girls, could ERS play a role in the emergence of depression gender differences in adolescence (Gotlib & Hammen, 1992; Nolen-Hoeksema & Girgus, 1994)? One study (Prinstein et al., 2005) supported this hypothesis, but more work is needed. These are questions that are critical to the developmental conceptualization of ERS and that the current literature cannot decisively answer.

All of the above findings are severely limited by the fact that they reflect purely cross-sectional work. In contrast, the ERS model is predicated on the idea that processes unfold over time—in other words, that ERS would predict increases in depression and interpersonal rejection. The cross-sectional relation between ERS and depression may also be confounded by the impact of mood state on ERS reports (as evidenced by the rapidly declining relation between baseline ERS and later depression over time; see Joiner & Metalsky, 2001, Study 6). To examine the extent to which our findings may be replicated in longitudinal designs, we conducted a qualitative review of prospective studies. This review both revealed interesting patterns and raised several questions. First, there were very few prospective studies to begin with (especially examining rejection). This issue, potentially a manifestation of the file drawer problem, limits our ability to draw firm conclusions about the ERS model. Second, with a few exceptions, most studies found that ERS only predicted later depression under certain circumstances, especially stress and rejection. Why would this be the case? It fits with the ERS model that ERS would only lead to depression when it produces stress in the person's relationship and evokes rejection. However, this does not sufficiently explain why ERS also interacts with noninterpersonal stressors (such as failing a midterm or undergoing basic training) to predict depression. Alternatively, excessive reassurance seekers may be more likely to actually engage in ERS when under stress (thereby provoking rejection and in turn depression). If so, this idea should be incorporated in the model, as the ERS model was not originally devised as a diathesis-stress model. Or, in perhaps a more parsimonious explanation (as proposed by Greenberg, 1999), ERS may act as a proxy variable for other vulnerability factors, such as poor self-esteem and rejection sensitivity, which are activated by stress to produce depression. The available data cannot distinguish between these explanations. Similarly, why does ERS only predict rejection when the person is depressed (implying that others react differently to ERS depending on the reassurance seeker's mood)? Perhaps the qualitative nature of the reassurance seeking is different when the person is depressed. Additionally, other variables associated with depression (such as negativity, complaining, etc.) may play a role in eliciting rejection of excessive reassurance seekers. Whatever the case, the ERS model needs to be modified to fit with these findings. Further, to the extent that longitudinal evidence is inconsistent with cross-sectional findings, the common practice of using cross-sectional research to test the ERS model should be questioned. Overall, although there is some prospective evidence for the model, more research is needed to assess alternative hypotheses and refine the model's details.

Additional longitudinal research would also help ensure that ERS' association with depression is not inflated by a common link to a third variable. For example, research extensively links childhood family and peer dysfunction to depression (Davila et al., 2008; Garber & Flynn, 2001), and it is possible that ERS also

emerges as a result of early family and peer experiences, such as emotional invalidation, rejection, and insecure attachment. Thus, ERS and depression may be linked partially because of their common link with early interpersonal dysfunction, a hypothesis best evaluated with longitudinal designs.

The follow-up intervals in these prospective studies may not have been appropriate to test the core tenets of the ERS model. The majority of longitudinal studies used follow-up periods of around 5 or 6 weeks, a choice that seems somewhat arbitrary. Some aspects of the hypothetical processes in the ERS model are likely to occur over days rather than months. For example, the model suggests that excessive reassurance seekers engage in ERS on days when they feel depressed, provoking rejection and withdrawal of support from others on subsequent days, which then exacerbates depressed mood over following days. Thus, daily diary methodologies may best capture them in their natural, spontaneous context (Bolger, Davis, & Rafaeli, 2003). One study has already used a diary methodology to examine the relation between ERS and other interpersonal constructs (Shaver et al., 2005), finding that the consequences of daily ERS differ by the person's attachment style. More work should further test the basic premises of the ERS model with similar methods. On the other hand, in addition to the use of shorter follow-up periods to capture the day-to-day sequence of the ERS cycle, longer follow-up periods are needed to explore ERS' developmental course and long-term aftermath. Because clinical depression does not typically develop overnight, short follow-up periods may capture more transient distress rather than major depression.

Overall, these meta-analytic results offer some support to two key aspects of the interactional theory of depression: the cross-sectional link between ERS and both depression and rejection. This adds to evidence from other meta-analyses for other components of the interactional theory, namely the depression-interpersonal rejection link (Segrin & Dillard, 1992) and depression contagion (Joiner & Katz, 1999). However, this meta-analysis also reveals important limitations of the existing ERS literature. We do not know whether the other individual tenets of the ERS model—that depression leads to self-doubt, which leads to reassurance seeking, which is in turn doubted, and so on—occur as hypothesized or whether there may be other factors at play (such as rejection sensitivity) that account for the relations between ERS, depression, and rejection. As most research is cross-sectional, we have only tenuous evidence for how the ERS cycle unfolds over time. We do not know what the time frame is over which these processes occur or how, when, and over what course they develop. These questions are fundamental to our understanding of ERS and must be addressed to provide a solid foundation for the ERS literature.

Perhaps the most striking finding of this meta-analysis is the near complete lack of methodological diversity across studies. ERS researchers have been creative and prolific in exploring a wide array of research ideas but have been less imaginative methodologically. Research has virtually always relied on a single, four-item, self-report measure of ERS (Depressive Interpersonal Relationships Inventory-Reassurance Seeking; Joiner et al., 1992). Although this scale has shown strong psychometric properties (Joiner & Metalsky, 2001), the exclusivity of its use makes it impossible to explore whether other methods of assessing ERS yield similar results. Moreover, individuals may not have insight into their ERS behavior; thus, informant report or interview measures may be more appropriate. Further, the substantial majority of

studies used community samples, college-aged participants, and self-report assessments of depression. Our results show that these decisions may systematically bias results. Research on ERS has mushroomed in recent years, expanding in many exciting directions, but several aspects of the ERS model are conceptually underdeveloped or empirically undertested. It will be important to refine the underlying model with a more diverse range of methods, as this literature continues to burgeon.

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