

The Experiences in Close Relationship Scale (ECR)-Short Form: Reliability, Validity, and Factor Structure

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We developed a 12-item, short form of the Experiences in Close Relationship Scale (ECR; Brennan, Clark, & Shaver, 1998) across 6 studies. In Study 1, we examined the reliability and factor structure of the measure. In Studies 2 and 3, we cross-validated the reliability, factor structure, and validity of the short form measure; whereas in Study 4, we examined test-retest reliability over a 1-month period. In Studies 5 and 6, we further assessed the reliability, factor structure, and validity of the short version of the ECR when administered as a stand-alone instrument. Confirmatory factor analyses indicated that 2 factors, labeled *Anxiety* and *Avoidance*, provided a good fit to the data after removing the influence of response sets. We found validity to be equivalent for the short and the original versions of the ECR across studies. Finally, the results were comparable when we embedded the short form within the original version of the ECR and when we administered it as a stand-alone measure.

In 1987, Hazan and Shaver developed a self-report adult attachment questionnaire based on the three types of infant caregiver attachment (i.e., secure, anxious, and avoidant) identified by Ainsworth, Blehar, Waters, and Wall (1978) from observational research. Subsequently, adult attachment has become a major focus of research in personality, social, clinical, counseling, and developmental psychology. Given the strong and growing empirical interest in adult attachment, researchers have made efforts to develop a psychometrically sound measure of the construct. The original adult attachment measure consisted of three paragraphs, each describing one type of adult attachment, and one question asking respondents to choose a type that best represents their adult attach-

ment style (Hazan & Shaver, 1987). Of course, a single-item measure is fraught with psychometric problems. As a result, researchers in subsequent attachment studies created multi-item inventories to assess adult attachment (e.g., Collins & Read, 1990; Feeney, Noller, & Hanrahan, 1994; Simpson, 1990). The proliferation of self-report inventories appears to have largely come to a halt with Brennan, Clark, and Shaver's (1998) seminal factor analysis. In Brennan et al.'s (1998) study, they included items from all of the available self-report measures of adult attachment as well as items from some instruments that appeared only in conference presentations (14 measures, 60 subscales, 323 items). Brennan et al. (1998) presented these items to nearly 1,100 undergraduate

students. The subsequent factor analysis identified two relatively orthogonal dimensions that were labeled *Anxiety* and *Avoidance* by Brennan et al. (1998). The 18 items among the 323 that loaded highest on each of these two factors were retained. The resulting 36-item adult attachment measure was called the Experiences in Close Relationship Scale (ECR).

There now appears to be a consensus that adult attachment consists of these two dimensions: Anxiety and Avoidance (Mikulincer, Shaver, & Pereg, 2003). *Attachment anxiety* is defined as involving a fear of interpersonal rejection or abandonment, an excessive need for approval from others, and distress when one's partner is unavailable or unresponsive. *Attachment avoidance* is defined as involving fear of dependence and interpersonal intimacy, an excessive need for self-reliance, and reluctance to self-disclose. People who score high on either or both of these dimensions are assumed to have an insecure adult attachment orientation. By contrast, people with low levels of attachment anxiety and avoidance can be viewed as having a secure adult attachment orientation (Brennan et al., 1998; Lopez & Brennan, 2000; Mallinckrodt, 2000). The ECR instructions state, in part, "We are interested in how you generally experience relationships, not just in what is happening in a current relationship" (Brennan et al., 1998, p. 65). Thus, the scale is designed to assess a general pattern of adult attachment as independently as possible from idiosyncratic influences of respondents' current circumstances. These instructions also allow respondents who are not currently in a close romantic relationship to provide valid responses.

Brennan et al. (1998) reported that the ECR had a high level of internal consistency in a sample of undergraduates, with coefficient alphas of .91 and .94 for the Anxiety and Avoidance subscales, respectively. Results from other studies of undergraduates (e.g., Lopez & Gormley, 2002; Lopez, Mauricio, Gormley, Simko, & Berger, 2001; Lopez, Mitchell, & Gormley, 2002; Vogel & Wei, 2005; Wei, Mallinckrodt, Russell, & Abraham, 2004) also indicated a high level of internal consistency for the Anxiety subscale (α ranges from .89 to .92) and the Avoidance subscale (α ranges from .91 to .95). Two studies have administered the ECR to samples of college students and reported test-retest reliability. One was conducted by Brennan, Shaver, and Clark (2000), and they reported that test-retest reliabilities over a 3-week interval were .70 for both the Anxiety and Avoidance subscales. The other study by Lopez and Gormley (2002) indicated that the test-retest reliabilities over a 6-month period were .68 and .71 for the Anxiety and Avoidance subscales, respectively. In terms of validity, Brennan et al. (2000) expected the ECR subscales to correlate with touch aversion, and indeed, their results were consistent with the expectation. Other studies using the ECR have also provided support for its validity. For example, attachment anxiety and avoidance have been found to be positively associated with self-concealment and personal problems (Lopez et al., 2002), ineffective coping (Wei, Heppner,

Mallinckrodt, 2003; Wei, Heppner, Russell, & Young, 2006), maladaptive perfectionism (Wei, Mallinckrodt, et al., 2004; Wei et al., 2006), negative mood (Wei, Russell, Mallinckrodt, & Zakalik, 2004), and depression (Zakalik & Wei, 2006) but negatively associated with social self-efficacy and emotional self-awareness (Mallinckrodt & Wei, 2005) and basic psychological need satisfaction (Wei, Shaffer, Young, & Zakalik, 2005) in college student samples. One group of researchers (Fraley, Waller, & Brennan, 2000) suggested additional items that may improve the sensitivity of the ECR across a wider range of adult attachment, but we could not find a single published study that developed a shorter measure based on the ECR.

Although the ECR appears to be a highly reliable and valid measure that has been widely used to assess adult attachment, the length of the ECR (36 items) can be problematic in some research applications. For example, if the ECR is administered to populations other than college students (e.g., older adults), it may be difficult for research participants to remain focused for the length of time required to complete the large number of items contained within it. Similarly, if the ECR is employed in survey research (e.g., mail survey, internet survey, or telephone interview), the large number of items in the measure may decrease the research compliance rate and participants' motivation in responding to the questionnaire. Therefore, it appeared worthwhile to develop a short version of the scale based on the original ECR. We conducted six studies for developing a short version of the ECR and comparing this new short version with the original version of the scale in terms of reliability, validity, and factor structure.¹

STUDY 1

The purpose of Study 1 was to (a) select the best items to include in a short version of the ECR, (b) evaluate the internal reliability of the Anxiety and Avoidance subscales from the short version of the ECR for a college student sample, and (c) compare the factor structure of the original and short versions of the scale through a confirmatory factor analysis.

¹Note that data we used in Studies 2 and 3 were also used in previous publications (Wei, Mallinckrodt, Larson, & Zakalik, 2005; Wei, Vogel, Ku, & Zakalik, 2005). The purposes of those two articles were to examine whether excessive reassurance seeking (Wei, Mallinckrodt, et al., 2005) and emotional reactivity and emotional cutoff (Wei, Vogel, et al., 2005) mediated the relations between attachment and psychological outcomes. The purpose of Studies 2 and 3 in this article was to examine the reliability, validity, and factor structure of the new short version of ECR and compare those results to findings based on the original version the ECR. As such, the findings we report in this article are unique and have not been published previously. We collected all other data sets included in Studies 1, 4, 5, and 6 for the purposes of this research.

Method

Participants and Procedure

Undergraduate students ($N = 851$) enrolled in psychology classes at a large public university completed the ECR. The sample included 442 (52%) women, 407 (48%) men, and 2 participants who did not indicate their sex. Over half of the participants were 1st-year students (58%), followed by sophomores (24%), juniors (11%), and seniors (7%). Their ages ranged from 18 to 45 years ($M = 20.36$ years; $SD = 2.04$). Participants' ethnic self-identification was predominantly White (90.6%), followed by African American (2.1%), Asian American (2.4%), Hispanic American (1.5%), non-U.S. citizen (1.2%), Native American (0.1%), and Multiracial American (0.7%). In terms of current relationship status, most of the participants (94%) were single. Participants received extra course credit for their participation.

Instrument

Adult attachment was measured with the ECR (Brennan et al., 1998). The ECR is a 36-item self-report measure. Respondents use a 7-point, partly anchored, Likert-type scale ranging from 1 (*disagree strongly*) to 7 (*agree strongly*) to respond to the items. Point 4 on the scale is anchored by *neu-*

tral/mixed. Of the 36 items, 9 are reverse keyed (8 items from the Avoidance subscale and 1 item from the Anxiety subscale). Participants rate how well each statement describes their typical feelings in romantic relationships. As mentioned previously, the results of a factor analysis by Brennan et al. (1998) identified two relatively orthogonal continuous attachment dimensions labeled Anxiety (18 items) and Avoidance (18 items). Higher scores on the Anxiety and Avoidant subscales indicate higher levels of attachment anxiety and attachment avoidance, respectively.

Results and Discussion

Item Selection

We used a combination of rational (the conceptualization perspective) and empirical (the statistical perspective) methods to select which of the 36 original ECR items should be included in the short form of the scale, which is called the ECR Scale-Short Form (ECR-S). We began by examining published descriptions of the adult attachment anxiety and avoidance constructs (cf. Brennan et al., 1998; Mikulincer et al., 2003). We then conducted exploratory factor analyses separately for each set of 18 subscale items to identify possible item domains within the two subscales. We conducted a principal axis factor extraction with a promax (oblique)

TABLE 1
Corrected Item-Total Correlations and Factor Loadings for the Avoidance Subscale of the Experiences in Close Relationship Scale

Item	Item Total Correlation	Avoidance	
		Factor 1	Factor 2
1. I prefer not to show a partner how I feel deep down.	.57	.38	.28
3 R. I am very comfortable being close to romantic partners.	.47	.32	.21
5. Just when my partner starts to get close to me I find myself pulling away.	.66	.81	-.05
7. I get uncomfortable when a romantic partner wants to be very close.	.65	.78	-.04
9. I don't feel comfortable opening up to romantic partners.	.64	.65	.09
11. I want to get close to my partner, but I keep pulling back.	.68 (.68)	.86	-.07
13. I am nervous when partners get too close to me.	.66 (.66)	.86	-.09
15R. I feel comfortable sharing my private thoughts and feelings with my partner.	.49	.06	.50
17. I try to avoid getting too close to my partner.	.68 (.67)	.77	.02
19R. I find it relatively easy to get close to my partner.	.61	.28	.43
21. I find it difficult to allow myself to depend on romantic partners.	.55	.56	.08
23. I prefer not to be too close to romantic partners.	.73	.69	.15
25R. I tell my partner just about everything.	.68	.10	.71
27R. I usually discuss my problems and concerns with my partner.	.67 (.67)	.02	.79
29R. I feel comfortable depending on romantic partners.	.57	.07	.60
31R. I don't mind asking romantic partners for comfort, advice, or help.	.64	-.04	.81
33R. It helps to turn to my romantic partner in times of need.	.62 (.60)	-.09	.86
35R. I turn to my partner for many things, including comfort and reassurance.	.65 (.63)	-.07	.87
Eigenvalue (after rotation)		4.90	4.25
Proportion of variance (after rotation)		27.24	23.59

Note. $N = 851$. Boldfaced items and factor loadings mean that these items were selected for the short version. Numbers outside of parentheses are the item total correlation with a total score for the full subscale (18 items). Numbers within parentheses are the item total correlation with a total score for a subset of items (12 items) that are on the full subscale (18 items) but omitted from the short form (6 items). Note. The Experiences in Close Relationship Scale is from *Attachment Theory and Close Relationships* (p. 65), by J. A. Simpson and W. S. Rholes (Eds.), 1998, New York: Guilford. Copyright 1998 by The Guilford Press. Reprinted with permission. R = reversed item.

rotation (see discussion by Russell, 2002). Based on the result of the scree plot, two factors with eigenvalues > 1.0 emerged from the factor analysis of the 18 avoidance items (see Table 1). The first factor accounted for 46% of the variance in the items, whereas the second factor accounted for an additional 12% of the variance prior to rotation. Factors 1 and 2 were found to correlate .59 with one another after rotation. The items with the five highest factor loadings on the first factor (i.e., Items 5, 7, 11, 13, and 17) were positively worded, contained the word *close*, and expressed variations on the theme of discomfort with becoming too close to one's partner. As shown in Table 1, we judged Items 5 (loading = .81) and 11 (loading = .86) to have had very similar wording (pulling away from his or her partner) and had high inter-item correlations ($r = .71$). Of these two, we dropped Item 5, and we retained Item 11, which had the higher loading. Similarly, Items 7 (loading = .78) and 13 (loading = .86) shared similar wording (feel uncomfortable or nervous with closeness) and high inter-item correlations ($r = .66$). From this pair, we dropped Item 7, and we retained Item 13 because of its higher loading. Thus, we retained Items 11, 13, and 17 to represent the first factor/domain.

The second factor extracted from the Avoidance items consisted exclusively of items that were negatively worded. The items loading highest on the second factor (Items 25

[loading = .71] and 27 [loading = .79]) shared similar wording (reluctance to self-disclose). Also, Items 31 (loading = .81), 33 (loading = .86), and 35 (loading = .87) shared similar wording (reluctance to depend on others). To retain both of these aspects of attachment in the short scale, we decided to drop Items 25 and 31, which had the lowest factor loadings, and retain Items 27, 33, and 35. Keeping these negatively worded items allowed three negatively worded items to be retained and thereby reduced the effects of response sets on the total scores of the measure. Each of these three items loaded $> .79$ on the second factor. All six items retained for the ECR-S had corrected item total correlations of .62 or higher with the total score from the original version of the Avoidance subscale. This set of six items we selected for the ECR-S Avoidance subscale also sampled three domains that our readings of the theoretical literature had suggested were critical components of attachment avoidance: (a) fear of interpersonal intimacy or closeness (Items 11, 13, and 17), (b) reluctance to depend on others or excessive need for self-reliance (Items 33 and 35), and (c) reluctance to self-disclose (Item 27).

Similarly, we conducted a principal axis factor analysis (with oblique rotation) on the Anxiety (18 items) subscale. From the scree plot result, we extracted three factors with eigenvalues > 1.0 , which accounted for 43%, 9%, and 7% of the total variance, respectively, prior to rotation. Results of

TABLE 2
Corrected Item Total Correlations and Factor Loadings for the Anxiety Subscale of the Experiences in Close Relationship Scale

Item	Anxiety			
	Item Total Correlation	Factor 1	Factor 2	Factor 3
2. I worry about being abandoned.	.68	.81	.01	-.05
4. I worry a lot about my relationships.	.65	.65	.01	.07
6. I worry that romantic partners won't care about me as much as I care about them.	.69 (.70)	.68	-.03	.15
8. I worry a fair amount about losing my partner	.72	.73	.02	.01
10. I often wish that my partner's feelings for me were as strong as my feelings for him/her.	.66	.53	-.07	.32
12. I often want to merge completely with romantic partners, and this sometimes scares them away.	.55	.05	-.07	.75
14. I worry about being alone.	.69	.74	.05	-.01
16. My desire to be very close sometimes scares people away.	.56 (.56)	-.08	.01	.84
18. I need a lot of reassurance that I am loved by my partner.	.66 (.67)	.25	.52	.02
20. Sometimes I feel that I force my partners to show more feeling, more commitment.	.59	-.06	.35	.46
22R. I do not often worry about being abandoned.	.56 (.57)	.67	-.05	-.09
24. If I can't get my partner to show interest in me, I get upset or angry.	.55	.07	.51	.12
26. I find that my partner(s) don't want to get as close as I would like.	.61 (.61)	.11	-.03	.70
28. When I'm not involved in a relationship, I feel somewhat anxious and insecure.	.57	.27	.24	.17
30. I get frustrated when my partner is not around as much as I would like.	.59	-.06	.81	.01
32. I get frustrated if romantic partners are not available when I need them.	.52 (.54)	-.07	.87	-.13
34. When romantic partners disapprove of me, I feel really bad about myself.	.51	.25	.52	-.16
36. I resent it when my partner spends time away from me.	.52	-.04	.54	.18
Eigenvalue (after rotation)		3.57	2.69	2.22
Proportion of variance (after rotation)		19.81	14.95	12.30

Note. $N = 851$. Boldfaced items and factor loadings mean that these items were selected for the short version. Numbers outside of parentheses are the item total correlation with a total score for the full subscale (18 items). Numbers within parentheses are the item total correlation with a total score for a subset of items (12 items) that are on the full subscale (18 items) but omitted from the short form (6 items). The order of the final 12-item short version is 33R, 18, 11, 26, 35R, 16, 17, 22R, 27R, 32, 13, and 6 based on the random ordering of items for each subscale. *Note.* The Experiences in Close Relationship Scale is from R = reversed item. *Attachment Theory and Close Relationships* (p. 65), by J. A. Simpson and W. S. Rholes (Eds.), 1998, New York: Guilford. Copyright 1998 by The Guilford Press. Reprinted with permission.

this analysis are shown in Table 2. The correlations between the factors after rotation ranged from .52 (Factors 2 and 3) to .70 (Factors 1 and 3); Factors 1 and 2 correlated .65 with each other. The items with the highest loading on the first factor tapped fears of abandonment (i.e., Items 2, 4, 8, 14, and 22) and participants' perceptions of their partners' responses toward them (i.e., Items 6 and 10). We wanted to retain items representing both of these facets of attachment anxiety. Although Item 22 (loading = .67) was not the highest loading item in this cluster, we retained it because it was the only negatively worded item from the 18-item Anxiety subscale and thereby could lessen the effects of response sets. In the pair of Items 6 (loading = .68) and 10 (loading = .53), we kept Item 6 because it had the higher factor loading. Therefore, we retained Items 6 and 22 to represent the first factor.

Items with the highest loading on the second factor assessed two additional aspects of attachment anxiety. One aspect was related to "need for reassurance" (i.e., Items 18 and 34). The other aspect pertained to "feelings of frustration or anger when one's partner is unavailable" (i.e., Items 24, 30, 32, and 36). The two Items 18 and 34 were related to need for assurance, and both had factor loadings of .52. We decided to keep Item 18 ("I need a lot of reassurance that I am loved by my partner") because it directly tapped the need for reassurance. Among the four items related to feeling of frustration and anger when one's partner is unavailable, we decided to keep Item 32 ("I get frustrated if romantic partners are not available when I need them") because of its highest loading. Therefore, we kept Items 18 and 32 to represent the second factor. Finally, the highest loading items on the third factor reflected two themes. The first theme pertained to the fear that one's desire for closeness may scare people away (i.e., Items 12 [loading = .75] and 16 [loading = .84]). From this pair, we retained Item 16 because it had the highest factor loading. The remaining theme was related to one's partner not being as close as one would like (i.e., Item 26). We therefore retained Item 26 to represent the third factor.

The six items retained for the ECR-S Anxiety subscale all had corrected, item total correlations > .52 with the total scores on the original version of the Anxiety subscale. We believe that these items provide a good representation of the three domains that adult attachment theorists have suggested are essential components of the attachment anxiety construct (Brennan et al., 1998; Mikulincer et al., 2003; P. Shaver, personal communication, July 26, 2004), namely, (a) fear of interpersonal rejection or abandonment (Items 6, 16, 22, and 26), (b) an excessive need for approval from others (Item 18), and (c) distress when one's partner is unavailable or unresponsive (Item 32). Thus, we developed a 12-item (6 per subscale) version of the ECR-S. In the next section, we examine the reliability and factor structure of these two subscales and compare the reliability and factor structure of the 12-item short version with the 36-item original version of the ECR. It is important to note that the

12-item ECR-S was embedded within items from the 36-item ECR for Studies 1 through 4. In Studies 5 and 6, however, we administered the 12-item ECR-S as a stand-alone measure.

Reliability

The internal consistencies for the subscales of the short and original versions of the ECR are shown in Table 3. Coefficient alphas were .78 (Anxiety) and .84 (Avoidance) for the 12-item ECR-S and .92 (Anxiety) and .93 (Avoidance) for the 36-item ECR in this sample. Although lower than the values for the original version of the measure, it appeared that the coefficient alphas of the 12-item ECR-S were acceptable for use in college student samples.

Correlations between the Anxiety and Avoidance subscales were $r = .19$ (12-item short version) and $r = .17$ (36-item original version), which indicated that these two measures reflected distinct dimensions of attachment. To examine whether the correlation between the two subscales for the 12-item ECR-S was equivalent to the correlation between the two subscales for the 36-item ECR, we conducted structural equation analyses to compare two models, the "free" model and the "equal" model. In the free model, the correlation between Anxiety and Avoidance for the 12-item ECR-S was freely estimated. By contrast, in the equal model, the correlation between these two subscales for the 12-item ECR-S was set to be equal to the correlation between these two subscales (i.e., $r = .17$) for the 36-item ECR. We then used a chi-square difference test to determine whether these correlations were equivalent. The results were not statistically significant, $\chi^2(1, N = 851) = .20, p = .65$, which indicated that the correlations between the Anxiety and Avoidance subscales were not significantly different for either version of the ECR. We also conducted analyses to examine the correlation between the short and the original Anxiety measures and the correlation between the two versions' Avoidance measures. Both pairs of measures were found to correlate .95 with one another. The high correlations between scores on the short

TABLE 3
Coefficient Alphas With 6 and 18 Items for
the Anxiety and Avoidance Subscale

Study	N	6 items		18 items	
		Anxiety	Avoidance	Anxiety	Avoidance
1	851	.78	.84	.92	.93
2	425	.78	.88	.93	.94
3	229	.79	.87	.92	.93
4 (Time 1)	122	.81	.88	.93	.95
4 (Time 2)	122	.81	.87	.94	.95
5	257	.77	.78		
6 (Time 1)	65	.84	.85		
6 (Time 2)	65	.86	.88		

and original versions of the Anxiety and Avoidance subscales from the ECR provide further evidence that both versions of the subscales assess the same underlying construct.

Confirmatory Factor Analysis

As part of a confirmatory factor analysis, we considered the possible influence of systematic errors or response sets that might be due to the direction (i.e., positive and negative) of item wording. That is, participants may have a systematic way of responding to the negatively and positively worded items, irrespective of item content. In a study of the factor structure of the University of California, Los Angeles (UCLA), Loneliness Scale (Version 3) reported by Russell (1996), results reflected the influence of response sets due to the direction of item wording (i.e., positively and negatively worded items). Russell (1996) removed this confound by specifying two orthogonal factors that corresponded to the negatively and positively worded items, with the negative items loading on one factor and the positive items loading on a second factor. In this study, we employed this procedure to remove response sets when we evaluated the factor structure of the short (12-item) and the original (36-item) versions of the ECR.

We tested four different models via confirmatory factor analyses to evaluate their fit to the data (see Table 4). In Model 1, we hypothesized a two-factor oblique model for the 12-item ECR-S, with 6 items loading on the Anxiety factor and 6 items loading on the Avoidance factor. Model 2 involved the same two-factor oblique model for the 36-item ECR; 18 items loaded on the Anxiety factor and 18 items

loaded on the Avoidance factor. In Model 3, we added two orthogonal response sets factors (i.e., a positively worded factor and a negatively worded factor) to Model 1 for the 12-item ECR-S (e.g., 12 additional paths would be freely estimated from two orthogonal response sets factors to the 12 items for Model 3; see Figure 1). Finally, in Model 4, we added the same two orthogonal response sets factors to Model 2 for the 36-item ECR (e.g., 36 additional paths would be freely estimated from two orthogonal response sets factors to the 36 items for Model 4). Similar to Russell's (1996) study, the two response sets factors included in Models 3 and 4 were not only uncorrelated with each other but were also uncorrelated with the Anxiety and Avoidance factors. However, we allowed the Anxiety and Avoidance factors to correlate with one another in all four models. (Note that we did not allow any error terms to correlate in Models 1–4.)

To evaluate the fit of these models to the data, we conducted confirmatory factor analyses using the maximum likelihood estimation method in LISREL (Version 8.54). As suggested by Hu and Bentler (1999), three indexes were used to assess the goodness of fit of the models: the comparative fit index (CFI; values of .95 or greater indicate a model that fits the data well), the root mean square error of approximation (RMSEA; values of .06 or less indicate a model that fits well), and the standardized root mean square residual (SRMR; values of .08 or less indicate a good fitting model). The results indicate that Models 1 and 2 did not fit the data well, with CFIs = .78 and .91, RMSEAs = .21 and .13, and SRMRs = .14 and .11, respectively (see results from Study 1 in Table 4). However, the fit of Models 3 and 4 to the data was improved, with CFIs = .95 and .96, RMSEAs = .09 and .07, and

TABLE 4
Results of the Confirmatory Factor Analyses and Correlations Between the Anxiety and Avoidance Subscales

Study	N	Model (Correlation Between Model Anxiety and Avoidance)	χ^2	df	RMSEA (90% CI)	CFI	SRMR
1	851	1: Two factors with 12 items ($r = .19$)	1419.28	53	.21 (.20, .21)	.78	.14
	851	2: Two factors with 36 items ($r = .17$)	5184.25	593	.13 (.12, .13)	.91	.11
	851	3: Two factors with 12 items + two method factors	347.80	41	.09 (.08, .10)	.95	.10
	851	4: Two factors with 36 items + two method factors	2567.64	557	.07 (.07, .07)	.96	.09
2	425	1: Two factors with 12 items ($r = .28$)	563.32	53	.17 (.16, .18)	.86	.11
	425	2: Two factors with 36 items ($r = .30$)	2468.98	593	.10 (.10, .10)	.94	.09
	425	3: Two factors with 12 items + two method factors	130.47	41	.07 (.06, .08)	.97	.08
	425	4: Two factors with 36 items + two method factors	1609.68	557	.07 (.07, .08)	.96	.07
3	229	1: Two factors with 12 items ($r = .25$)	343.12	53	.17 (.16, .19)	.85	.11
	229	2: Two factors with 36 items ($r = .20$)	4457.38	593	.11 (.11, .11)	.94	.09
	229	3: Two factors with 12 items + two method factors	92.92	41	.07 (.05, .09)	.97	.09
	229	4: Two factors with 36 items + two method factors	1150.50	557	.07 (.07, .08)	.96	.08
5	257	1: Two factors with 12 items ($r = .28$)	265.54	53	.14 (.12, .15)	.85	.11
	257	3: Two factors with 12 items + two method factors	91.89	41	.07 (.05, .09)	.96	.07

Note. RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; SRMR = standardized root mean square residual.

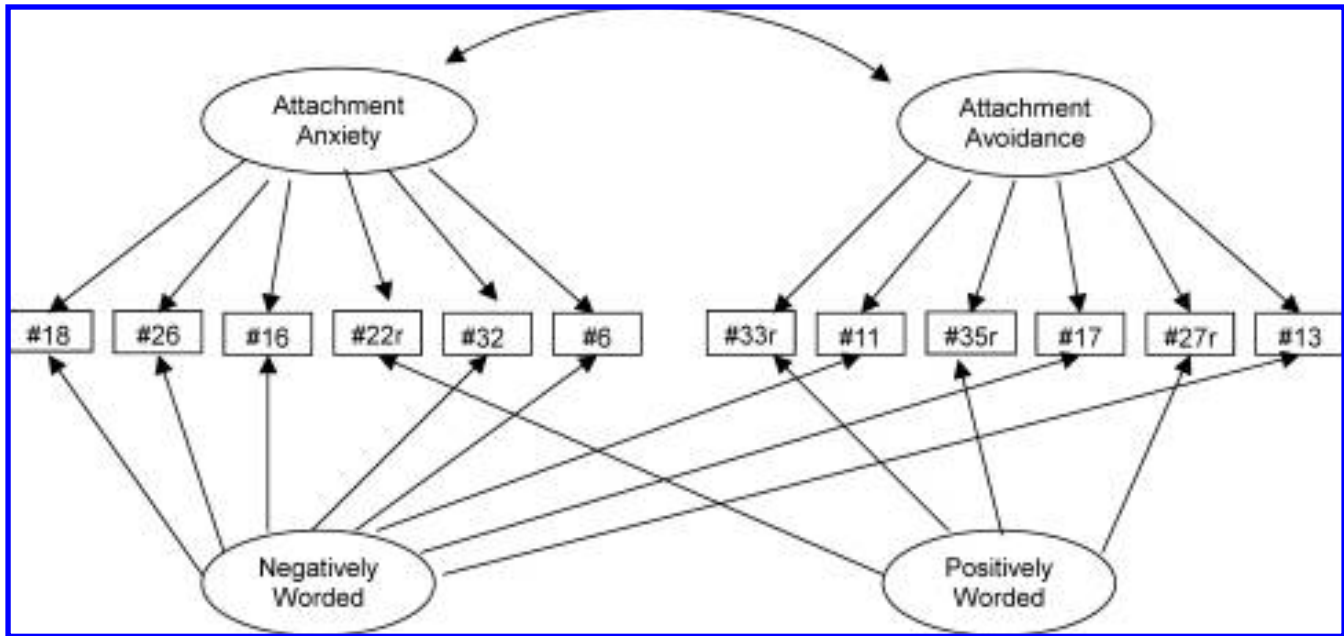


FIGURE 1. Two oblique factors (12 items) with two orthogonal positively and negatively worded factors. # = item number; r = items with reversed score.

$SRMRs = .10$ and $.09$, respectively (see results from Study 1 in Tables 4 and 5).² In summary, these results suggest that the two-factor oblique structure (Anxiety and Avoidance) for both the short (12-item) and original (36-item) versions provides an adequate fit to the data after removing systematic error due to response sets. Furthermore, the model appears to provide a comparably good fit to the data for both the short (12-item) and original (36-item) versions of the ECR.³

²Factor loadings for Model 3 across Studies 1, 2, 3, and 5 were included in Table 5 for conciseness and clarity. In addition, given our interest in developing a short form, only the results for Model 3 (the 12 items) were included in Table 5. If the reader is interested in the results for Model 4 (the 36 items), they can contact M Wei.

³We used Model 3 (two factors for 12 items + two method factors) to test for sex differences using data from Studies 1, 2, 3, and 5. We compared the factor loadings for equivalence between the male and female groups through the multiple group comparison approach (Byrne, 1998). Significant chi-square difference tests, $\chi^2 (12, N = 851) = 57.53, p = .00$ (Study 1) and $\chi^2 (12, N = 421) = 27.15, p = .01$ (Study 2), indicated that the factor loadings in Studies 1 and 2 were different for men and women. By contrast, the nonsignificant chi-square difference tests, $\chi^2 (12, N = 212) = 16.07, p = .19$ (Study 3) and $\chi^2 (12, N = 254) = 10.01, p = .07$ (Study 5), indicated that the factor loadings were not significantly different for men and women in Studies 3 and 5. However, because the values of the χ^2 statistics and the significance levels increased when sample sizes increased, we adjusted for the influence of the sample size on the χ^2 statistics by dividing the value by $N - 1$ (i.e., computing the value of F, the fit function). The values of the fit functions for the factor model were similar across all four studies: .068 (Study 1), .064 (Study 2), .070 (Study 3), and .072 (Study 5). Therefore, we can conclude that the amount of variation in factor loadings for men and women was similar across these four studies. In addition, results indicate that mean scores on the Anxiety subscale were not significantly different for men and women across Studies 1, 2, 3, and 5. However, the

STUDY 2

The purpose of Study 2 was to (a) replicate the reliability and factor structure found in Study 1 in a new sample of college students and (b) compare the short and original versions of the ECR in terms of construct validity. It is important to note that Nunnally (1978) indicated that different types of validity tend to complement one another. In general, criterion validity involves relations with other measures of the same construct (i.e., adult attachment). The ECR was developed from all adult attachment measures available in 1997 (in our awareness, no other self-report measure has been introduced since then). Thus, it would be inappropriate to use another measure of adult attachment to assess criterion validity of the ECR-S because every such measure contributed items to the original ECR item pool. Construct validity involves a determination of "the extent to which supposed measures of the construct produce results which are predictable from highly accepted theoretical hypotheses concerning the construct" (Nunnally, 1978, p. 98). Thus, for the ECR-S, we evaluated construct validity by correlations with measures of constructs expected on the basis of established theory to be associated with attachment anxiety and avoidance. Theory and previous research have suggested that attachment anxiety involves an excessive need for approval from others, whereas attachment avoidance is associated with an excessive need for self-reliance (Cassidy, 1994, 2000; Cassidy & Kobak, 1988; Lopez & Brennan, 2000; Mikulincer et al., 2003;

mean scores on the Avoidance subscale were significantly higher for men than women in Studies 1, 2, and 5.

TABLE 5
Results of the Confirmatory Factor Analyses

Item	Factor Loading							
	Study 1		Study 2		Study 3		Study 5	
	Anx	Avo	Anx	Avo	Anx	Avo	Anx	Avo
33R. It helps to turn to my romantic partner in times of need.	.00	.36	.00	.59	.00	.48	.00	.41
18. I need a lot of reassurance that I am loved by my partner.	.72	.00	.50	.00	.66	.00	.72	.00
11. I want to get close to my partner, but I keep pulling back.	.00	.82	.00	.80	.00	.83	.00	.77
26. I find that my partner(s) don't want to get as close as I would like.	.67	.00	.79	.00	.72	.00	.60	.00
35R. I turn to my partner for many things, including comfort and reassurance.	.00	.39	.00	.51	.00	.48	.00	.23
16. My desire to be very close sometimes scares people away.	.60	.00	.73	.00	.55	.00	.56	.00
17. I try to avoid getting too close to my partner.	.00	.75	.00	.79	.00	.79	.00	.72
22R. I do not often worry about being abandoned.	.56	.00	.45	.00	.56	.00	.58	.00
27R. I usually discuss my problems and concerns with my partner.	.00	.42	.00	.63	.00	.57	.00	.32
32. I get frustrated if romantic partners are not available when I need them.	.50	.00	.38	.00	.44	.00	.48	.00
13. I am nervous when partners get too close to me.	.00	.79	.00	.84	.00	.88	.00	.77
6. I worry that romantic partners won't care about me as much as I care about them.	.70	.00	.65	.00	.82	.00	.75	.00

Note: All factor loadings from Model 3 (two factors with 12 items + two method factors) were significant at $p = .001$. Anx = Anxiety; Avo = Avoidance. The order of the final 12-item short version is 33R, 18, 11, 26, 35R, 16, 17, 22R, 27R, 32, 13, and 6.

Pietromonaco & Feldman Barrett, 2000; Shaver & Mikulincer, 2002). Therefore, we expected that attachment anxiety (but not attachment avoidance) would be significantly associated with reassurance seeking. Moreover, based on Bowlby's (1980) attachment theory, we expected a positive relationship between depressed mood and both attachment anxiety and attachment avoidance.

Method

Participants and Procedure

Data for this study were collected as part of a previously published investigation by Wei, Mallinckrodt, Larson, and Zakalik (2005) with a sample of 425 college students. Demographic information and research procedures were reported in the original study.

Measures

ECR. The ECR (Brennan et al., 1998) was used to measure adult attachment. The ECR was also used to derive scores for the Anxiety and Avoidance subscale for the 12-item version (ECR-S) developed in Study 1.

Excessive Reassurance Seeking Scale (ERSS). The ERSS (Joiner & Metalsky, 2001) is a four-item instrument intended to measure the tendency to persistently seek reassurance even if reassurance has already been provided. Respondents use a 7-point response scale ranging from 1 (*not at all*) to 7 (*very much*). Higher scores indicate greater reassurance seeking. Joiner and Metalsky (2001) reported a coefficient alpha of .88 for the measure among college students. In this study, we found a coefficient alpha of .89. Validity was

supported through a positive association between the ERSS and scores on the Beck Depression Inventory (BDI; Joiner & Metalsky, 2001) in a sample of college students.

Center for Epidemiological Studies-Depression Scale (CES-D). The CES-D (Radloff, 1977) is a 20-item scale measuring the frequency of depressive symptoms. Items are rated on a 4-point Likert scale ranging from 0 (*rarely or none of the time [less than 1 day]*) to 3 (*most or all of the time [5 to 7 days]*). Higher scores indicate more frequent feelings of depression. Radloff (1977) reported that coefficient alpha was .85 for the measure; We found a coefficient alpha of .90 in this study. Validity has been supported through positive correlations with scores on the BDI (Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995).

Zung Self-Rating Depression Scale (SRDS). The SRDS (Zung, 1965) is a 20-item measure assessing three basic facets of depressive symptoms: pervasive affect, physiological features, and psychological concomitants. Participants are asked to rate how often they experience each symptom on a 4-point Likert scale ranging from 1 (*some or a little of the time*) to 4 (*most or all of the time*). Higher scores indicate more frequent depressive symptoms. Zung (1965) reported that coefficient alpha for the SRDS was .84. In this study, the coefficient alpha was .82. The measure has demonstrated validity through positive correlations with scores on the BDI.

Results and Discussion

We conducted analyses to evaluate the internal consistency (coefficient alpha) of the Anxiety and Avoidance subscales of the 12-item ECR-S and the 36-item ECR. For ease of comparison with the results of Study 1, findings from Study

TABLE 6
Correlations of Attachment Anxiety and Attachment Avoidance With Validity Criteria

<i>Validity Criteria</i>	<i>Anxiety (6 items)</i>	<i>Anxiety (18 items)</i>	<i>Avoidance (6 items)</i>	<i>Avoidance (18 items)</i>
Study 2 ^a				
Excessive Reassurance Seeking	.45***	.47***	-.04	-.03
Depression (CES-D)	.42***	.45***	.19***	.22***
Depression (SRDS)	.42***	.46***	.26***	.29***
Study 3 ^b				
Emotional Reactivity	.27***	.33***	.01	.02
Emotional Cutoff	.12	.15*	.25***	.31***
Depression (DASS-D)	.16*	.21**	.19**	.17*
Anxiety (DASS-A)	.18*	.20**	.19**	.15*
Interpersonal Distress	.25***	.27***	.24***	.25***
Loneliness	.39***	.39***	.43***	.44***
Study 5 ^c				
Excessive Reassurance Seeking	.41***		.06	
Emotional Reactivity	.45***		.08	
Emotional Cutoff	.30***		.59***	
Fear of Intimacy	.33***		.74***	
Comfort with Self-Disclosure (DDI)	-.11		-.39***	
Depression (CES-D-short version)	.35***		.27***	
Depression (DASS-D)	.32***		.31***	
Anxiety (DASS-A)	.32***		.21**	
Psychological Distress (OQ-10.2)	.41***		.38***	
Social Desirability (BIDS-IM)	-.14*		-.15*	

Note. CES-D = Center for Epidemiological Studies-Depression Scale; SRDS = Self-Rating Depression Scale; DASS-D and DASS-A = the Depression and Anxiety subscales of the Depression Anxiety and Stress Scale; DDI = Distress Disclosure Index; OQ-10.2 = Outcome Questionnaire 10.2; BIDS-IM = the Impression Management subscale of Balanced Inventory of Desirable Responding.

^a $N = 425$. ^b $N = 229$. ^c $N = 257$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

2 are reported in Table 3. As can be seen, the level of reliability for the two subscales was very similar to that found in Study 1. In addition, correlations between the Anxiety and Avoidance subscales were $r = .28$ for the 12-item ECR-S and $r = .30$ for the 36-item ECR (see Table 4), which indicated that these two subscales were assessing distinct dimensions of attachment. Using the same procedure in Study 1 for examining the equivalence of correlation, a nonsignificant result, $\chi^2(1, N = 425) = .19, p = .66$, suggested no difference was found between the correlations for the two versions of the ECR in Study 2. Also similar to Study 1, correlations between the short and original anxiety scores and between the short and original avoidance scores were .94 and .95, respectively, which suggested once again that the two measures of anxiety and avoidance assessed the same underlying constructs.

To cross-validate the factor structure results from Study 1, we tested the same four models via confirmatory factor analyses to evaluate their fit to the data. The patterns of results shown in Table 4 for Study 2 were equivalent to those found in Study 1. Similar to Study 1, the two-factor structure (i.e., Anxiety and Avoidance) with the short (12-item) or original (36-item) version of the ECR fit the data reasonably well after removing the influence of response sets on the items (see Table 5 and Footnotes 1 and 2).

The six correlations of the Anxiety and Avoidance subscales for ECR and ECR-S with excessive reassurance seeking and two measures of depressed mood (for construct validity) are shown in the top rows of Table 6. As expected, excessive reassurance seeking was significantly associated with attachment anxiety but not with attachment avoidance. In addition, the two measures of depression (CES-D and SRDS) were significantly associated with both attachment anxiety and avoidance. Taken together, these findings suggest considerable support for the construct validity of both versions of the ECR.

Next, we used structural equation modeling (SEM) analyses to examine whether the validity evidence was equivalent for the 12-item ECR-S and the 36-item ECR. Similar to the previous procedure for testing correlation equivalence, we compared two models: one called the free model and the other called the equal model. In the free model, we allowed the correlations for validity to vary (i.e., they were freely estimated). Conversely, in the equal model, we constrained the six correlations representing construct validity of the 12-item ECR-S to be equal to the six parallel correlations for construct validity of the 36-item ECR. We then compared these two models by performing a chi-square difference test to see whether the correlations for validity were equivalent for the ECR and the ECR-S. The chi-square difference

test was nonsignificant, $\chi^2(6, N = 425) = 1.38, p = .97$, which indicated that the correlations for construct validity were equivalent for the 12-item ECR-S and the 36-item ECR.⁴

STUDY 3

The purpose of Study 3 was to (a) replicate the results from Studies 1 and 2 with regard to the reliability and factor structure of the 12-item ECR-S and the 36-item ECR and (b) compare the construct validity of these two scales for a different sample and for a different set of validity criteria. The data used in Study 3 were from a previous investigation (Wei, Vogel, Ku, & Zakalik, 2005). Attachment theory predicts that individuals with high attachment anxiety tend to hyperactivate their distress experience, which involves exaggerating their experience and intensifying expressions of emotional distress (Fuendeling, 1998; Lopez & Brennan, 2000; Mikulincer et al., 2003). In contrast, individuals with high attachment avoidance tend to deactivate their distress experience, which involves the suppression of emotional experience and distancing from others. Therefore, we expected that attachment anxiety should be significantly associated with a hyperactivating emotional style (i.e., emotional reactivity) and not a deactivating emotional style (i.e., emotional cutoff). In contrast, we expected that attachment avoidance should be significantly associated with a deactivating emotional style (i.e., emotional cutoff) and not a hyperactivating style (i.e., emotional reactivity). In addition, based on attachment theory (Bowlby, 1980, 1988), we expected both attachment anxiety and avoidance to positively relate to depressed mood, interpersonal distress, and loneliness.

Method

Participants and Procedure

Participants were 229 undergraduate students. Demographic information and research procedures were reported in the original study (Wei, Vogel, et al., 2005).

⁴We also examined whether the construct validity of the short (12-item) and original (36-item) versions were equivalent for men and women in Studies 2, 3, and 5. We did not find any differences between the male and female groups in terms of the construct validity in these studies. In Study 2, the results were $\chi^2(6, N = 421) = 10.90$ and $7.41, p = .09$ and $.28$ for the short and original versions of the scale, respectively. In Study 3, the results were $\chi^2(12, N = 212) = 13.07$ and $14.75, p = .36$ and $.26$ for the short and original versions of the scale, respectively. In Study 5, the result, $\chi^2(20, N = 254) = 31.20, p = .05$, also indicated no significant differences between men and women in terms of the construct validity when the 12-item version was administered alone. In conclusion, the construct validity of the different versions of the ECR appeared to be invariant for men and women across three studies.

Measures

ECR. We used the ECR (Brennan et al., 1998), described previously, to measure adult attachment. We derived scores on both the short (12-item) and original (36-item) versions of the measure from the ECR.

Differentiation of Self Inventory (DSI). The DSI (Skowron & Friedlander, 1998) includes four subscales; we used only two in this study. The Emotion Reactivity subscale (11 items) reflects the degree to which a person responds to environmental stimuli with emotional flooding or hypersensitivity to the point of being consumed by the stimuli. The Emotional Cutoff subscale (12 items) reflects feeling threatened by intimacy and isolating oneself from others and their emotions when internal emotional experiences or interpersonal interactions are too intense. Skowron and Friedlander reported coefficient alphas of .88 for emotional reactivity and .77 for emotional cutoff in a sample of adults. In this study, the coefficient alphas were .83 (emotional reactivity) and .84 (emotional cutoff). In terms of validity of the scale, Skowron and Friedlander reported greater emotional reactivity was associated with greater symptomatic distress, whereas greater emotional cutoff was associated with less marital satisfaction.

Depression Anxiety and Stress Scales (DASS)-Short Form. The DASS-Short Form (Lovibond & Lovibond, 1995) contains Depression and Anxiety subscales that each consist of 7 items. Participants rated the extent to which each statement applied to them over the past week on a scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much or most of the time*). Higher scores indicate greater levels of depression and anxiety. In a sample of adults, Lovibond and Lovibond (1995) reported that coefficient alphas were .96 and .89 for Depression and Anxiety subscales, respectively. In this study, coefficient alphas were .87 for Depression and .76 for Anxiety. Validity evidence was provided by the positive association between scores on the Depression subscale and the Beck Depression Inventory ($r = .79$) and the Anxiety subscale and the Beck Anxiety Inventory ($r = .85$) in clinical groups and a community sample (Antony, Bieling, Cox, Enns, & Swinson, 1998).

Inventory of Interpersonal Problems-Short Circumplex (IIP-SC) Form. The IIP-SC (Soldz, Budman, Demby, & Merry, 1995) is a 32-item measure designed to assess an individual's self-reported interpersonal distress. Each item is designed as a 5-point Likert-type scale with a response format of 0 = *not at all*, 1 = *a little bit*, 2 = *moderately*, 3 = *quite a bit*, and 4 = *extremely*. Higher scores reflect greater distress related to interpersonal problems. Coefficient alphas have ranged from .88 to .89 for the measure in patient samples (Soldz et al., 1995). In this study, coefficient alpha was .91. Previous research suggested that the IIP-SC was positively

related to depression and anxiety (Wei, Heppner, & Mallinckrodt, 2003) in a sample of undergraduates, thus supporting the validity of the measure.

UCLA Loneliness Scale (version 3). The UCLA Loneliness Scale (Russell, 1996) contains 20 items reflecting high and low levels of loneliness. Participants indicate how often they feel the way described in each statement using a scale ranging from 1 (*never*) to 4 (*always*). Higher scores indicate a higher level of loneliness. Coefficient alpha for the measure has ranged from .89 to .94 in samples of adults (Russell, 1996). In this study, coefficient alpha was .92. Russell (1996) reported validity evidence for the measure based on the positive correlation with scores on the Differential Loneliness Scale and the negative correlation with scores on the Social Provision Scale, which is a measure of social support.

Results and Discussion

In terms of internal consistency for the ECR-S and ECR, results shown in Table 3 compared favorably with the values obtained in Studies 1 and 2. Correlations between the Anxiety and Avoidance subscales were .25 for the 12-item ECR-S and .20 for the 36-item ECR (see Table 4), which indicated that these two subscales assessed distinct dimensions of attachment. We employed the same procedure used in Studies 1 and 2 for testing correlation equivalence. Once again, a nonsignificant chi-square test, $\chi^2(1, N = 229) = 0.58, p = .44$, indicated that the correlations between the Anxiety and Avoidance subscales were equivalent for the ECR-S (i.e., $r = .25$) and the ECR (i.e., $r = .20$). Similar to Studies 1 and 2, the correlations between the short and original version of the Anxiety subscale and the short and original version of the Avoidance subscale were .94 and .95, respectively. Once again, these results suggest that the short and original versions of the Anxiety and Avoidance measures were assessing the same underlying construct.

As in Studies 1 and 2, we tested four different factor models via confirmatory factor analyses to evaluate their fit to the data (see Table 4). Once again, these results suggest that the two-factor structure (i.e., Anxiety and Avoidance) for the short (12-item) or original (36-item) versions of the ECR fit the data well after removing the influence of response sets on the data (see Table 5 and Footnotes 1 and 2).

The correlations of attachment anxiety and attachment avoidance with the variables used to evaluate construct validity (i.e., emotional reactivity, emotional cutoff, depression, anxiety, interpersonal distress, and loneliness) are shown in the middle section of Table 6. As expected, attachment anxiety was significantly associated with emotional reactivity but not with emotional cutoff for both the ECR and the ECR-S. By contrast, attachment avoidance was significantly associated with emotional cutoff but not emotional reactivity. These findings support the construct validity for attachment anxiety and avoidance in both the ECR and ECR-S. In addition,

further evidence of construct validity was provided by the significant correlations between attachment anxiety and avoidance and all four measures of negative emotional states (anxiety, depression, interpersonal distress, and loneliness; see Table 6). Once again, we found these same results in both the ECR and the ECR-S. Next, we employed the same procedure used in Study 2 to test the equivalence of construct validity for the ECR and the ECR-S. A nonsignificant result, $\chi^2(12, N = 229) = 3.85, p = .99$, indicated that construct validity of the 12-item ECR-S was equivalent to the construct validity of the 36-item ECR (see Footnote 3).

STUDY 4

We designed Study 4 to address three issues. First, we examined the test-retest reliabilities of the short and original versions of the ECR in a sample of college students. Second, we conducted an SEM analysis to compare the test-retest reliability of the two versions of the ECR. Third, we conducted analyses to examine whether there were mean differences over time for the short and original versions of the ECR.

Method

Participants and Procedure

Undergraduate students ($N = 122$) enrolled in psychology classes at a large public university completed the ECR initially and again 1 month later. There were 68 (56%) women and 54 (44%) men in the sample. Most of the participants were 1st-year students (55%), followed by sophomores (24%), juniors (12%), and seniors (9%). Their ages ranged from 19 to 32 years ($M = 20.04$ years, $SD = 1.80$). Participants were predominantly Euro-American (91.8%), followed by Asian American (4.9%), Hispanic American (1.6%), and African American (0.8%); 2 participants did not indicate their ethnic background. Most of the participants (72%) were single. Participants received extra course credit for their participation.

Measures

We again measured adult attachment with the ECR (Brennan et al., 1998) described previously. Participants completed the 36-item original version at both assessments.

Results and Discussion

As can be seen in Table 3, the results for internal consistency were very similar to those found in the previous three studies for the 12-item ECR-S and the 36-item ECR. The test-retest reliability of the 6-item Anxiety and Avoidance subscales over a 1-month interval were $r = .80$ and $r = .83$, respectively, in this sample. For the original (36-item) version of the ECR, the test-retest correlation coefficients were

TABLE 7
Means, Standard Deviations, and Test-Retest Reliability of the Short and Original Versions of the Experiences in Close Relationship (ECR) Scale

		Anxiety					Avoidance				
Scale		Time 1		Time 2		Test-Retest Reliability	Time 1		Time 2		Test-Retest Reliability
Study	Version	M	SD	M	SD		M	SD	M	SD	
4 ^b	12-item	21.73	7.04	22.35	6.63	.80	16.28	6.97	16.02	6.51	.83
	36-item	64.95	20.63	67.07	19.95	.82	51.24	20.34	50.15	18.86	.86
6 ^b	12-item	22.45	7.14	22.41	7.24	.82	14.97	6.40	15.66	6.25	.89

Note: The short version (i.e., 12-item) in Study 4 was embedded within the original versions of the ECR. However, the 12-item short version in Study 6 was administered alone.

^a*N* = 122. ^b*N* = 165.

$r = .82$ and $r = .86$ for the Anxiety and Avoidance subscales, respectively (see Table 7). It appears that scores on the two subscales were relatively stable for both the short and original versions of the ECR. We used the procedure from previous studies used for testing correlation equivalence to examine whether the test-retest reliabilities were equivalent for the two subscales (i.e., Anxiety and Avoidance) within the 12-item ECR-S and the 36-item ECR. The results indicate that the test-retest reliabilities for ECR-S and ECR were equivalent for both the Anxiety subscale, $\chi^2(1, N = 122) = 0.20, p = .65$, and the Avoidance subscale, $\chi^2(1, N = 122) = 0.67, p = .41$. We performed four paired-sample *t* tests to examine whether there were mean differences on the two subscales (i.e., Anxiety and Avoidance) from the first and second assessments for the ECR and ECR-S versions. Results indicated there were no statistically significant mean differences on the Anxiety or Avoidance subscales at the first and second assessments for either version of the ECR (all $ps > .05$; Cohen's $ds = -.10$ to $.03$).

STUDY 5

The purpose of Study 5 was to evaluate the reliability, factor structure, and validity of the 12-item ECR-S in a college population with the items presented alone (i.e., without being imbedded with the other items from the ECR). We then compared the results with those from the previous studies in terms of reliability, correlation, factor structure, and validity. We examined the same indicators of construct validity (i.e., excessive reassurance seeking, emotional reactivity, emotional cutoff, depression, and anxiety) we used in Studies 2 and 3 in this study. As such, the hypotheses were the same as those in Studies 2 and 3. That is, we predicted that attachment anxiety would be positively associated with excessive reassurance seeking and emotional reactivity; attachment avoidance would be positively associated with emotional cutoff; and both attachment anxiety and avoidance would be positively related to depression and anxiety.

We also included three new variables, comfort with self-disclosure, fear of intimacy, and psychological distress, in Study 5 to examine the construct validity of the 12-item ECR-S. Individuals with high attachment anxiety are believed to intensify expressions of emotional distress (e.g., Mikulincer et al., 2003). By contrast, individuals with high attachment avoidance tend to suppress their emotional experience and distance themselves from others. Empirically, Wei, Russell, and Zakalik (2005) found that comfort with self-disclosure was significantly associated with attachment avoidance ($r = -.40$) but only weakly associated with attachment anxiety ($r = -.16$). Mallinckrodt and Wang (2004) also found that fear of intimacy was more strongly associated with attachment avoidance ($r = .69$) than with attachment anxiety ($r = .45$). Therefore, we hypothesized that (a) attachment avoidance should be negatively associated with comfort with self-disclosure and positively associated with fear of intimacy and (b) both attachment anxiety and avoidance would be positively related to psychological distress. Finally, we measured social desirability to rule out the possibility that attachment anxiety and avoidance are significantly related to this construct.

Method

Participants and Procedure

Undergraduate students ($N = 257$) enrolled in introductory psychology courses at a large public university completed the survey packets. The sample included 164 (63.8%) women, 90 (35%) men, and 3 participants who did not report their sex. Participants ranged from 18 to 37 years of age ($M = 19.72$ years, $SD = 2.48$). Half of the participants were first-year students (52.5%), followed by sophomores (26.8%), juniors (12.1%), and seniors (8.6%). Participants identified their racial/ethnic background as White (89.5%), Asian American (4.3%), non-U.S. citizen (2.7%), multiracial American (1.9%), African American (1.2%), and Hispanic American (0.4%). Nearly half of the participants (49.8%) indicated they were single, and 46% of the participants were in

a committed relationship. Participants received extra course credit for their participation.

Measures

ECR-S. We used the new ECR-S (12-item) measure developed from the original 36-item ECR (Brennan et al., 1998) in this study. Coefficient alpha was .77 for Anxiety and .78 for Avoidance in this sample (see Table 3).

ERSS. We used the ERSS (Joiner & Metalsky, 2001), used in Study 2, in this study. Coefficient alpha was .86 in this sample.

DSI. We used the Emotional Reactivity and Emotional Cutoff subscales from the DSI (Skowron & Friedlander, 1998), used in Study 3, in this study. Coefficient alpha was .88 for Emotion Reactivity and .85 for Emotional Cutoff in this sample.

DASS-Short Form. We used the Depression and Anxiety subscales of DASS-Short Form (Lovibond & Lovibond, 1995), used in Study 3, once again. Coefficient alpha was .89 for Depression and .75 for Anxiety in this sample.

CES-D-Short version. We used the original version of the CES-D (20 items) in Study 2. We used a shorter 11-item version of the CES-D (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993) in this study to assess depression. Coefficient alpha was .85 in this sample.

The Distress Disclosure Index (DDI). We used the DDI (Kahn & Hessling, 2001) to measure comfort with self-disclosure. The DDI is a 12-item scale designed to measure the degree to which a person is comfortable talking to others about personally distressing information. Items are rated on a 5-point Likert-type scale with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores range from 12 to 60, with higher scores indicating greater comfort in disclosing personal distress information. DDI scores showed stable test-retest reliabilities across 2- and 3-month periods of .80 and .81, respectively, for college students (Kahn & Hessling, 2001). Internal consistency was shown to be high across studies and ranged from .92 to .95 (Kahn, Lamb, Champion, Eberle, & Schoen, 2002). Coefficient alpha was .93 in this sample. Regarding validity, Kahn and Hessling (2001) found that the DDI was positively associated with scores on the Self-Disclosure Index (Miller, Berg, & Archer, 1983) and the Self-Concealment Scale (Larson & Chastain, 1990).

The Fear of Intimacy Scale (FIS). The FIS (Descutner & Thelen, 1991) assesses fear of intimacy, defined as “the inhibited capacity of an individual because of anxiety, to exchange thoughts and feelings of a personal significance

with another individual who is highly valued” (p. 291). Respondents are directed to imagine that they are “in a close, dating relationship,” and items are rated on a 5-point Likert scale ranging from 1 (*not at all characteristic of me*) to 5 (*extremely characteristic of me*). Scores range from 35 to 175, with higher scores indicating greater fear of intimacy. Descutner and Thelen (1991) reported internal consistency reliability of .93 and test-retest reliability (1-month interval) of .89 in a sample of college students. In this study, coefficient alpha was .92. Descutner and Thelen reported evidence of validity through the positive correlations with loneliness, social intimacy, and self-disclosure.

The Outcome Questionnaire 10.2 (OQ-10.2). The OQ-10.2 (Lambert et al., 1998) was developed from the Outcome Questionnaire 45.2. The OQ-10.2 is a 10-item instrument designed to provide a standardized measure of symptom severity and overall functioning. The OQ-10.2 is a brief self-report instrument sensitive to changes in psychological distress over short periods of time. Items address commonly occurring problems across a wide variety of disorders. The 5-point Likert-type scale ranges from 0 (*never*) to 4 (*almost always*). Scores range from 0 to 40, with higher values indicating greater distress. Lambert et al. reported coefficient alphas between .82 and .92, and the OQ-10.2 has been found to be associated with depression, anxiety, and self-esteem. Coefficient alpha was .90 in this study.

The Impression Management subscale (IM) of the Balanced Inventory of Desirable Responding (BIDR). The IM subscale of the BIDR (Paulhus, 1984) is a 20-item questionnaire that measures the degree to which individuals consciously give inflated descriptions to please others. Items are rated on a Likert-type scale ranging from 1 (*not true*) to 7 (*very true*). The IM scoring key is balanced, with 10 items negatively worded and 10 items positively worded. Total scores are calculated by first assigning items for which respondents report an extreme response (6 or 7) a score of “1” and then summing each of these extreme response items. Scores can range from 0 to 20 on the IM subscale, with higher scores indicating responses that are more socially desirable. Paulhus (1984) reported internal consistency ranging from .75 to .86 for the IM subscale. The internal consistency in this study was .73. With regard to validity, Paulhus (1994) reported that IM scores related positively to scores on the Lie scale from the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1943).

Results and Discussion

The internal consistency (see Table 3) of the Anxiety and Avoidance subscales from the 12-item ECR-S used in this study were comparable to the values obtained from Studies 1 through 3. In addition, the correlation between the Anxiety and Avoidance subscales was .28 for the 12-item ECR-S (see

Table 4), which indicated that these two subscales assessed distinct dimensions of attachment. To examine whether the correlation for the 12-item ECR-S (presented as a stand-alone measure in Study 5) was equivalent to that of the 12-item ECR-S (presented as part of the original 36-item ECR in Studies 1, 2, and 3), we used a similar procedure for testing correlation equivalence. Here, the correlation between the two subscales for the stand-alone, 12-item ECR-S in Study 5 was specified as being equal to the correlations from the previous studies. The nonsignificant results, $\chi^2(1, N = 257) = 2.47, 0.00$, and $0.32, p = .12, .96$, and $.57$ for Studies 1, 2, and 3, respectively, indicated that the correlation between the Anxiety and Avoidance subscales for the 12-item ECR-S administered as a stand-alone measure was not significantly different from those for the 12-item measure completed as part of the original 36-item measure across the three studies.

In terms of factor structure, we followed the same procedure used in Studies 1, 2, and 3 to test two different factor models (labeled Model 1 and Model 3 for consistency across studies) via confirmatory factor analyses to evaluate the fit of these models to the data (see Table 4). We found the same pattern of results. Once again, these results suggest that the two factors structure (i.e., Anxiety and Avoidance) for this 12-item ECR-S fit the data well after removing the influence of response sets on the data (see Footnote 2). Factor loadings for Model 3 were significant (all $ps < .001$; see Table 5 and Footnote 1) across Studies 1, 2, 3, and 5.

The results of the construct validity analyses are shown in the bottom section of Table 6. As expected, excessive reassurance seeking and emotional reactivity were positively associated with attachment anxiety but had almost zero correlation with attachment avoidance. By contrast, comfort with self-disclosure was significantly and negatively associated with attachment avoidance but not significantly related to attachment anxiety. These findings are consistent with the previous results for the original version of the ECR (e.g., Wei, Mallinckrodt, et al., 2005; Wei, Russell, et al., 2005; Wei, Vogel, et al., 2005). Also, emotional cutoff and fear of intimacy were significantly related to attachment anxiety and avoidance. However, the results from t tests for dependent correlations (Cohen, Cohen, West, & Aiken, 2003; Kenny, 1987) indicated that the associations of emotional cutoff, $t(254) = -4.70, p < .001$ or fear of intimacy, $t(254) = -7.75, p < .001$ with attachment avoidance were significantly higher than those with attachment anxiety. These findings support the construct validity of the ECR-S. In addition, as expected, attachment anxiety and avoidance were significantly correlated with all the measures of negative emotional states (i.e., anxiety, depression, and psychological distress; see Table 6). Finally, the magnitude of the associations between social desirability and attachment anxiety ($r = -.14$) and attachment avoidance ($r = -.15$) indicated that scores on the 12-item ECR-S were not susceptible to social desirability response bias (see Footnote 3).

In terms of the equivalence of the validity evidence, using the same procedure we described previously for testing the correlation equivalence, we examined whether the correlations of the stand-alone, 12-item ECR-S in Study 5 were similar to those of the 12-item ECR-S when they were embedded in the 36-item measure in Study 2. A nonsignificant result, $\chi^2(4, N = 257) = 4.91, p = .30$, indicated that the four construct validity correlations (i.e., the associations of attachment anxiety and avoidance with excessive reassurance seeking and depression) were equivalent for the stand-alone, 12-item ECR-S in Study 5 and for the 12-item ECR-S as part of the 36-item ECR in Study 2.⁵ We used the same procedure to test the equivalence of eight correlations that examined construct validity (i.e., the associations of attachment anxiety and avoidance with emotional reactivity, emotional cutoff, depression, and anxiety) of the stand-alone, 12-item ECR-S in Study 5 and the 12-item ECR-S as part of the 36-item measure collected in Study 3. Once again, a nonsignificant result, $\chi^2(8, N = 257) = 14.17, p = .08$, indicated the equivalence of the correlations for this stand-alone, 12-item ECR-S and the 12-item ECR-S as a part of the 36-item measure.

STUDY 6

We designed Study 6 to examine the test-retest reliability when the 12-item ECR-S was administered alone to a sample of college students. We then used an SEM analysis to compare the equivalence of the test-retest reliability between the 12-item short version administered alone in this study and the 12-item short version administered as a part of the 36-item version in Study 4. Finally, we conducted analyses to examine whether there were mean differences over time for the 12-item short version administered alone.

Method

Participants and Procedure

Undergraduate students ($N = 65$) enrolled in a psychology course at a large state university completed the 12-item ECR-S initially and again 3 weeks later. There were 45 (74%) women and 16 (16%) men (4 participants did not report their sex) in the sample. Most of participants were sophomores (35%) and juniors (43%), followed by seniors (19%), and 1st-year students (3%). Their ages ranged from 19 to 29 years of age ($M = 20.55$ years, $SD = 1.67$). Participants were predominantly White (95%), followed by Hispanic American (3.1%), and Asian American (1.5%). Most of the participants were single (45%) or in a committed relationship (52%). Participants received extra course credit for their participation.

⁵Because we used the CES-D short (11-item) version in Study 5, we used only the same 11 items from the CES-D in Study 2 in computing the depression scores for this analysis.

Measures

ECR-S

We used the new ECR-S (12 items) described in Study 5 in this study at both assessments.

Results and Discussions

The internal consistencies of the Anxiety and Avoidance subscales of the ECR-S in Study 6 (see Table 3) were very similar to those found in the previous studies. The test-retest reliabilities over a 3-week interval of the six-item Anxiety and Avoidance subscales were $r = .82$ and $r = .89$, respectively (see Table 7). It appears that scores on the two subscales were relatively stable when the ECR-S was administered alone. We examined whether the test-retest reliability of the ECR-S administered alone in Study 6 was equivalent to the test-retest reliability of the ECR-S when it was administered as a part of the original 36 items in Study 4. The nonsignificant results for the Anxiety subscale, $\chi^2(1, N = 65) = 0.20, p = .65$, and the Avoidance subscale, $\chi^2(1, N = 65) = 3.30, p = .07$, indicate that the test-retest reliabilities were equivalent when the ECR-S was administered alone (Study 6) or as a part of original 36-items (Study 4). In addition, we used two paired-sample t tests to examine whether there were mean differences on attachment anxiety and avoidance in the first and second assessments for the ECR-S administered alone in Study 6. Results indicate there were no statistically significant mean differences on the Anxiety or Avoidance subscales at the first and second assessments, $t(64) = 0.06, p = .95$, Cohen's $d = .01$; and $t(64) = -1.88, p = .06$, Cohen's $d = -.11$, respectively.

GENERAL DISCUSSION

This project involved six studies intended to develop a short version of the ECR (i.e., the ECR-S). Findings across these studies suggest that the 12-item ECR-S (administered alone or as a part of the original 36-item version) retained psychometric properties similar to those of the original (36-item) ECR. We found the ECR-S to possess a stable factor structure and acceptable internal consistency, test-retest reliability, and construct validity across the six samples of undergraduates we examined. Furthermore, the levels of these psychometric attributes compared favorably with the values derived from the original 36-item version of the scale. It appears that we have been successful in reducing the number of items from 36 (18 for Anxiety and 18 for Avoidance) to 12 (6 for Anxiety and 6 for Avoidance) without losing the sound psychometric properties contained in the original version of the ECR when administered to college students.

Specifically, we found the internal consistency of the 12-item ECR-S to be adequate. The coefficient alphas were from

.77 to .86 for the Anxiety subscale and from .78 to .88 for the Avoidance subscale across studies. In addition, the test-retest reliabilities in Study 4 were adequate ($r = .80$ and $.82$ [Anxiety] and $r = .83$ and $.86$ [Avoidance]) for the short and original version of the ECR, respectively, over a 1-month period. These results indicate that adult attachment anxiety and avoidance were relatively stable in this sample of college students. Similarly, when we administered the 12-item short version alone in Study 6, the test-retest reliability results ($r = .82$ for Anxiety and $.89$ for Avoidance, respectively) over a 3-week period indicate that scores on the two subscales were relatively stable. In summary, these results suggest that the internal consistency and test-retest reliabilities for ECR-S were acceptable when used in samples of college students despite the reduction in the number of items.

In terms of the factor structure of the short and original versions of the ECR, confirmatory factor analyses indicated that a model with two oblique factors (i.e., Anxiety and Avoidance) along with two orthogonal response set factors (one for the positively worded items and the other for the negatively worded items) provided a relatively good fit to the data for both the short or original versions of the ECR across Studies 1, 2, 3, and 5. In other words, these results suggest that the hypothesized two factors oblique structure fit the data well for the two versions of the ECR (e.g., CFI ranges from .95 to .97) after we removed systematic error in the items due to response sets (i.e., positively and negatively worded items). The results suggest that individuals completing the ECR showed consistent patterns of responding to the items as a function of the direction of item wording. After removing this source of systematic error from the items, results support the prediction that attachment anxiety and attachment avoidance represent two oblique factors underlying the items of the ECR-S and the original ECR. It is important to note that the inclusion of positively and negatively worded factors allows researchers to evaluate the influence of systematic errors on the responding patterns for the positively or negatively worded items. We have empirically verified that the correlations between Anxiety and Avoidance were equivalent (a) with inclusion and (b) without inclusion of the positively and negatively worded factors across Studies 1, 2, 3, and 5. In addition, we verified that correlation coefficients that reflected the validity of the Anxiety and Avoidance subscales in relation to other variables were equivalent when the positively and negatively worded factors were either included or not included in Study 5 (i.e., 12-item measure administered stand alone). Because there was no influence on the magnitude of the correlations, we believe there is no need to alter the scoring of the Anxiety and Avoidance subscales. Therefore, these results have no implications for the applied use of the measure in either research or clinical contexts.

As expected, evidence of construct validity was provided by the positive association between attachment anxiety and excessive reassurance seeking in Study 2 (in which we administered the 12 items as a part of the larger 36-item

measure) and in Study 5 (in which we administered the 12 items alone). This result was consistent with attachment theory, which predicts that individuals with high levels of attachment anxiety (instead of attachment avoidance) have a tendency to rely excessively on social approval from others (e.g., Lopez & Brennan, 2000; Pietromonaco & Feldman Barrett, 2000). Construct validity was also supported by the positive associations of depression with attachment anxiety and avoidance in Studies 2 and 5. These results are consistent with the results from Wei, Mallinckrodt, et al. (2004, 2005). Analyses indicated that the magnitude of the construct validity was equivalent for the short and original versions of the ECR (i.e., the result from Study 2) as well as equivalent for the short version of the ECR when it was administered as part of the 36-item version of the measure in Study 2 and administered alone in Study 5.

Consistent with the attachment theory predictions, the construct validity of the ECR-S and the original ECR in Study 3 was supported by the positive association of attachment anxiety with emotional reactivity and the positive association of attachment avoidance with emotional cutoff. Once again, these results are consistent with results from previous research (for a review, see Fuendeling, 1998). In addition, the results of Study 3 also indicate that attachment anxiety and avoidance were significantly and positively related to depression, anxiety, interpersonal distress, or loneliness. Moreover, the magnitude of the construct validity coefficients for the short version of 12-item measure administered as part of the 36-item measure were equivalent to those for the original version of the ECR in Study 3 and for the short version of the 12-item measure administered alone in Study 5.

In Study 5, we found additional support for the construct validity of the ECR-S through the negative associations of attachment avoidance with fear of intimacy and comfort with self-disclosure as well as the positive associations of attachment anxiety and avoidance with psychological distress. Also, scores on the measures of attachment anxiety and avoidance were only weakly associated with a measure of social desirability. To summarize, results from Studies 2, 3, and 5 indicate that the construct validity of the ECR was not reduced by shortening the length of the scale.

Limitations

A number of important methodological limitations of these studies should be noted. Although it appears that the 12-item ECR-S was equivalent to the original version 36-item ECR in terms of test-retest reliability, factor structure, and construct validity, researchers should note that the internal consistency reliability of the short form is lower relative to the original version of the measure. This reduction in the reliability of scores of the 12-item ECR-S, as reflected by the alpha coefficient, is not surprising, as there are both the reduction in the number of items and the redundancy of the items. When we computed the average of the internal consistency

tencies from Studies 1 through 6 for attachment anxiety (the average coefficient alphas were .80 for the short version and .93 for the original version) and for attachment avoidance (the average coefficient alphas were .85 for the short version and .94 for the original version), both versions of the measure were sufficiently reliable across different undergraduate samples. However, it should also be noted that participants in these studies identified themselves predominantly as Euro-Americans, and they were undergraduate students from the same public university. It is unknown whether the psychometric properties of the two versions of the measure would be comparable when data are collected from other regions of the country or from different cultures. Moreover, because we selected unequal numbers of items to represent each facet during the process of selecting items for the two attachment constructs (i.e., anxiety and avoidance), it may bias the operationalization of these constructs. However, it is important to note that this bias is also present in the original version of ECR. Furthermore, we used a greater number of items to represent facets that accounted for more of the variance and fewer items for facets that accounted for less of the variance.

Wei, Russell, et al. (2004) examined the ECR and found that factor loadings were invariant across different ethnic groups. However, ethnic groups moderated the association between attachment anxiety and negative mood (i.e., a combination of anxiety and depression). Specifically, although attachment anxiety was significantly associated with negative mood in every ethnic group, Asian Americans reported a stronger association than their African American and White peers. When we reanalyzed these data for the ECR-S (i.e., 12 items were embedded within the 36 items), the invariance of the factor loadings was not replicated. Specifically, the loadings of two items (i.e., 32 [I get frustrated if romantic partners are not available when I need them] and 33 [It helps to turn to my romantic partner in times of need]) were significantly stronger for White, African American, and Hispanic American students relative to Asian American students (.39 vs. .19 and .60 vs. .45, respectively). This result seems to indicate that whether partners are available in time of need seems more important to White students and students from the other two racial groups relative to Asian American students. However, the pattern of results is similar for both the ECR and ECR-S regarding the association between attachment anxiety and negative mood for ethnic groups. Further research is still needed to replicate this study with different ethnic groups before the stand-alone ECR-S is used routinely with participants who do not identify themselves as White. Analyses should also be conducted to examine the reliability, factor structure, and validity of the measure when it is administered to different age groups (e.g., the elderly), participants who speak different languages (e.g., Spanish), and clinical populations (e.g., members of individual or group therapy). It is also important for future studies to examine the validity of the ECR-S by using data that are gathered using other assessment methods (e.g., observational data, peer

reports, or physiological measures) in addition to self-report measures.

Conclusions

In summary, the results from these studies indicate that the 12-item ECR-S provides a reliable and valid measure of adult attachment. The psychometric properties (i.e., internal consistency, test-retest reliability, factor structure, and validity) of the short (12-item) version of the scale appeared to be comparable or equivalent to the original (36-item) version of the scale. Given the equivalent psychometric properties of the short and original versions of the ECR, researchers are encouraged to use the 12-item ECR-S in their future research on adult attachment.

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