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Sex Differences in Romantic Attachment: A Meta-Analysis

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Abstract

This article presents the first meta-analysis of sex differences in the avoidance and anxiety dimensions of adult romantic attachment, based on 113 samples (N = 66,132) from 100 studies employing two-dimensional romantic attachment questionnaires (Experiences in Close Relationships, Experiences in Close Relationships–Revised, and Adult Attachment Questionnaire). Overall, males showed higher avoidance and lower anxiety than females, with substantial between-study heterogeneity. Sex differences were much larger in community samples (bivariate D = .28) than in college samples (D = .12); web-based studies showed the smallest sex differences (D = .07) in the opposite direction. Sex differences also varied across geographic regions (overall Ds = .10 to .34). Sex differences in anxiety peaked in young adulthood, whereas those in avoidance increased through the life course. The relevance of these findings for evolutionary models of romantic attachment is discussed, and possible factors leading to underestimation of sex differences are reviewed.

Keywords

romantic relationships, adult attachment, gender differences, evolution

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The extension of attachment theory to the domain of adult close relationships has proven a remarkably fertile enterprise, fostering major theoretical advancements and generating a large and increasingly sophisticated empirical literature. Originally formulated to explain the function and dynamics of parent–child relationships, attachment theory has provided researchers with powerful tools for understanding the psychology of couple relationships, romantic love, and sexual behavior.

In its current form, however, the theory of romantic attachment might have a blind spot on the issue of sex differences. The tacit consensus in the field is that sex differences do not exist, or at least can be safely ignored; romantic attachment is seen as a sexually monomorphic trait, and in most published studies the effects of sex either go entirely untested or are examined only to be statistically controlled for. The reasons can be traced to the origin of attachment theory in the study of early parent–child relationships. Parent–infant attachment patterns show an almost complete absence of sex differences; hundreds of studies have found the same distribution of attachment patterns in males and females (e.g., van IJzendoorn, 2000), the only notable exception being a higher proportion of disorganized attachment in males (see David & Lyons-Ruth, 2005). A similar picture emerges from the research tradition employing the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985). The AAI evaluates an individual's state of mind with respect to past attachment relations with his or her parents; AAI studies consistently fail to detect any sex difference in attachment-related states of mind (see Bakermans-Kranenburg & van IJzendoorn, 2009, 2010). Early studies of romantic attachment also failed to reveal clear differences between males and females (e.g., Collins & Read, 1990; Hazan & Shaver, 1987).

Evolutionary Perspectives on Romantic Attachment

The sex-neutral view of romantic attachment has been challenged by a number of researchers working in an evolutionary perspective. Kirkpatrick (1998) argued that romantic attachment styles largely reflect alternative mating strategies; attachment avoidance would indicate short-term mating orientation, whereas security would indicate long-term mating orientation. Jackson and Kirkpatrick (2007) refined Kirkpatrick's original proposal by arguing that attachment avoidance should specifically predict reduced willingness to engage in long-term relationships

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and be only weakly related to increased pursuit of short-term sexual relations—a prediction that was supported by their own data and confirmed by Del Giudice and Angeleri (2010). Men are consistently more short-term oriented than women (e.g., Schmitt, 2005), and paternal investment (fostered by long-term, committed couple relationships) is more facultative and variable than maternal investment (see Geary, 2005; Quinlan, 2007). It follows that men should display higher avoidance than women across cultures; at the same time, the magnitude of sex differences is expected to reflect ecological variation in factors that promote short-term versus long-term mating strategies.

These predictions were confirmed by a large ($N = 17,804$) cross-cultural study by Schmitt and colleagues (Schimtt, 2008; Schmitt et al., 2003). Men rated themselves as more dismissing (i.e., more avoidant and less anxious) than women across geographic regions, with considerable between-region variation. The overall effect size was $d = .18$, corresponding to about one sixth of a standard deviation; country-level effect sizes ranged from $d = -.26$ to $d = .43$. The local magnitude of effect sizes was predicted by measures of ecological stress: In countries with higher mortality and fertility, dismissiveness scores increased but sex differences in dismissiveness became smaller. This effect was mainly driven by increased dismissiveness in females.

More recently, Del Giudice (2009a, 2009b) proposed an integrative model of sex differences in romantic attachment based on life history (LH) theory and sexual selection, extending the earlier model by Belsky, Steinberg, and Draper (1991). In Del Giudice's model, romantic attachment plays a central role in the regulation of long-term couple bonding and parental investment; attachment styles can thus be considered as a facet of human LH strategies. When slow, parenting-oriented strategies are favored, the sexes are not expected to differ much (if at all), as the reproductive interests of males and females converge to a large extent. Sex differences are expected to arise specifically in insecure styles, which in turn correlate with fast, mating-oriented LH strategies. Avoidance is seen as a male-biased strategy promoting reduced commitment and parental investment, as theorized by Jackson and Kirkpatrick (2007). By contrast, anxiety is seen as a female-biased strategy designed to maximize closeness with kin and investment from both kin and partners; in this respect, anxiety may work as a counterstrategy against partner avoidance. In women, anxiety is hypothesized to be maximally adaptive under moderate environmental stress, whereas highly stressful and dangerous conditions would prompt avoidance and reduced parental investment in both sexes. Although this brief summary emphasizes environmental effects, genetic factors and gene–environment interactions also play an important role in determining individual differences in LH strategies and attachment styles. Finally, Del Giudice (2009a) argued that sex differences in adult romantic attachment have their developmental precursor in the sex differences in parent–child attachment styles that seem to emerge in middle childhood (see Del Giudice & Belsky, 2010a).

A crucial implication of this model is that the *average* sex differences in romantic attachment styles should be relatively small in most populations (Del Giudice, 2009b). In safe and supportive ecologies, most people of both sexes display secure attachment patterns (where the sexes are not expected to differ); thus, the male and female means should be quite similar even in presence of sizable sex differences in the distribution of *insecure* styles. At high levels of environmental stress, both sexes are expected to shift toward avoidance/dismissiveness, again reducing the magnitude of sex differences.

Not all psychologists working in an evolutionary perspective subscribe to the idea of adaptive sex differences in romantic attachment. For example, Beckes and Simpson (2009) and Penke (2009) argued that sex differences are too small to be of biological and psychological significance. Ein-Dor, Mikulincer, Doron, and Shaver (2010) advanced a different hypothesis on the adaptive value of attachment styles: In their model, the primary benefit of insecure attachment styles is enhanced individual and group survival in case of danger. Anxious attachment promotes hypervigilance to threats and quick detection of imminent dangers; avoidance promotes rapid fight-or-flight reactions, allowing individuals to quickly find ways to escape danger without worrying about group cohesion and the welfare of other members. The authors argued that heterogeneity in attachment styles is maintained by a combination of individual and group benefits in the response to danger, and they questioned the importance and consistency of sex differences in attachment styles. It is important to note, however, that Ein-Dor et al. did not focus specifically on romantic attachment; their analysis does not clearly distinguish between parent–child attachment, romantic attachment, and attachment to other relational partners. Even if all these schemata correlate with one another, attachment styles also display relationship-specific components (Overall, Fletcher, & Friesen, 2003), so that sex differences in romantic attachment do not necessarily imply the existence of sex differences in other types of attachment relations. Still, there are biological reasons to expect sex differences even in the danger-related strategies envisioned by Ein-Dor et al. For reasons best explained by LH theory, females are consistently more risk-averse tan males (e.g., Kruger & Nesse, 2006; Wang, Kruger, & Wilke, 2009); intriguingly, the hypervigilant "sentinel" strategy associated with anxiety appears to be more risk-averse than the fight-or-flight strategy associated with avoidance.

Even more important, a broader LH perspective suggests that the proposals by Del Giudice (2009a) and Ein-Dor et al. (2010) are not mutually exclusive and may well turn out as representing two sides of the same coin. The correlates of LH strategies are not limited to reproduction and mating but coordinate the organism's physiology and behavior in a multiplicity of domains, including attachment, mating, aggression, cooperation, risk taking, and stress responsivity (see Del Giudice & Belsky, 2010b; Del Giudice, Ellis, & Shirtcliff, in press; Figueredo & Jacobs, in press; Figueredo, Vásquez, Brumbach, & Schneider, 2004).

Romantic attachment styles are but *one* facet of the behavioral realization of LH strategies (Del Giudice, 2009b); indeed, both risk sensitivity and responsivity to stress/danger are linked to individual differences in LH strategy (Del Giudice et al., in press). In other words, individual differences in mating styles, parental investment, and responsivity to danger may all covary as functionally related manifestations of human LH strategies. It remains to be seen whether the more controversial proposal made by Ein-Dor et al.—that is, that heterogeneity in attachment styles evolved because of group-level benefits—could fit in this individual-centered theoretical framework.

Aim of the Study

The aim of the present study is to contribute to the ongoing debate by providing the first meta-analytic evaluation of sex differences in romantic attachment. If sex differences were shown to be nonexistent or negligible, the evolutionary arguments proposed by Kirkpatrick (1998), Schmitt (2008), and Del Giudice (2009a) would lose much of their force; if, on the contrary, the evidence revealed reliable and sizable differences between the sexes, both mainstream theory and research practice would be in need of substantial revision. A meta-analytic approach is needed to make sense of the inconsistent results in the empirical literature and to separate sampling error from real effects. Of course, no single analysis can address all the critical issues involved in the measurement of sex differences. As will be discussed in more detail below, numerous methodological factors can affect the magnitude of sex differences in a given study—including sample selection, participants self-selection, and the response format of questionnaire items. Fully understanding the role of these factors will require a substantial amount of empirical research. Although a systematic examination of the already-available data is overdue, the present analysis should be seen as a starting point for future investigation, not as an attempt to prematurely settle the debate.

Method

Construct Definition

Many measures of romantic attachment have been developed over the years, and not all of them are easily comparable with one another. For example, attachment styles can be treated as dimensional constructs (with the number of dimensions ranging from two to five) as well as discrete categories. Attempting to include every possible study in a meta-analysis would have the drawback of reducing comparability between different studies; in contrast, a narrower focus on a specific model would compensate for the smaller number of studies with increased theoretical meaningfulness and precision.

In the present study, the choice was made to privilege the comparability and theoretical interpretability of the results. Therefore, it was decided to focus on the most general and widely adopted conceptualization of romantic attachment, the two-dimensional model proposed by Brennan, Clark, and Shaver (1998). By doing so it was possible to obtain separate effect size estimates for each of the two dimensions (anxiety and avoidance), as well as for the overall sex difference in the two-dimensional space. The available two-dimensional questionnaires of romantic attachment are the Experiences in Close Relationships (ECR; Brennan et al., 1998), the Experiences in Close Relationships–Revised (ECR-R; Fraley, Waller, & Brennan, 2000), and the Adult Attachment Questionnaire (AAQ; Simpson, Rholes, & Nelligan, 1992). AAQ scales have been shown to correlate strongly with the corresponding scales in the ECR (Brennan et al., 1998).

Moderation Hypotheses

Three moderation hypotheses were formulated before data collection. The hypothesized moderators were *sample type* (community, college, or web based), *geographic region* of data collection, and participants' *age*.

Sample type. Based on an informal review of the literature, Del Giudice (2009b) hypothesized that community samples would show larger effects compared to college or web samples. There are two reasons for this prediction: First, college students tend to come from a very restricted segment of the population; second, most college samples are actually composed of psychology students, and psychology is a markedly female-biased faculty. Standard samples of psychology students are unlikely to adequately represent the full range of sex-related variation in the population. Students from different faculties show large average differences in sex-typical cognitive and personality traits (e.g., Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001; Wheelwright et al., 2006); there are also data indicating that prenatal testosterone levels may correlate with faculty choice (Brosnan, 2006). More generally, differences in effect sizes between college and community samples seem to be the rule rather than the exception (Peterson, 2001). Participants in web-based studies show similarly restricted demographics and tend to be ethnically less diverse than college students (Bailey, Foote, & Throckmorton, 2000; Gosling, Vazier, Srivastava, & John, 2004; Krantz & Dalal, 2000); moreover, web samples are often highly sex biased due to strong self-selection by potential participants (Krantz & Dalal, 2000).

Geographic region. Cross-cultural data (Schmitt et al., 2003) indicate that the size of sex differences may show considerable variation between different geographic areas. In the study by Schimtt et al. (2003), sex differences were smaller in Oceania and East Asia than in most of the other regions (America, Europe, the Middle East, and South/Southeast Asia), and virtually no sex differences were observed in Africa.

Participants' age. Based on reanalysis of published data, Del Giudice (2009a) tentatively suggested that participants' age may affect the magnitude of sex differences in attachment. Specifically, sex differences were found to peak in early adulthood (the time of maximal sexual and reproductive activity, at least in traditional societies) and decline toward middle age.

Selection of Studies

Studies suitable for inclusion in the analysis were located by three methods. First, a literature search was performed in PsycInfo using combinations of the following keywords: *attachment, adult, romantic, close, questionnaire, ECR, AAQ, Simpson,* and *Brennan*. Second, a similar search was performed in Google Scholar, and citation links were used to extend the search to studies citing, or cited by, the target articles. Third, most authors were directly contacted by e-mail (see below) and asked for other published or unpublished data sets they might be aware of.

Candidate studies were retrieved and read in full-text. Since the focus of the meta-analysis was normative between-sex variation in romantic attachment, a study was excluded from the candidate set if it met one or more of the following criteria: (a) attachment questionnaires had been modified so that they no longer measured attachment to *romantic* partners (e.g., they were used to evaluate attachment to friends or relatives, or attachment in close relationships in general), (b) only an extremely reduced subset of items from the original questionnaire was employed (≤ 3 items per scale), (c) the study sample was a clinical group (e.g., patients with personality disorders), (d) participants were tested in highly stressful or unusual conditions (e.g., just before the birth of a child or shortly after romantic breakup), or (e) participants had been selected on the basis of specific personality traits (e.g., high anxiety) or sexual orientation. Studies were also screened for multiple publication of data from the same sample.

Most of the studies retrieved at this stage still lacked essential information: Only a minority (about 20%) included enough information to compute sex differences, and many lacked useful secondary information such as scales reliability, mean sample age, and the correlation between anxiety and avoidance. The authors of these studies were contacted by e-mail and asked to provide either the raw data matrix or the appropriate summary statistics. The studies for which estimates of sex differences could be obtained were included in the meta-analytic set.

Coding

Each independent sample was coded for the following variables: sample size (separately for males and females), sample type (community, students, or web-based), participants' relationship status (married/cohabiting couples, noncohabiting couples, or unspecified), mean/median participants' age, and questionnaire employed (ECR, ECR-R, or AAQ). Six geographic regions were identified following Schmitt et al. (2003): North America, Western Europe, Southern Europe, Middle East, Oceania, and East Asia. The single available study from Eastern Europe (Croatia) was included in the Western Europe set.

Overview of the Study Set

One hundred thirteen independent samples (N = 66,132) from 100 published (89%) and unpublished (11%) studies were included in the meta-analytic set (see the appendix). Sample size ranged from N = 45 to N = 22,000; the median sample size was N = 226. For 70% of the samples, additional information (e.g., descriptive statistics by sex, mean sample age, or the raw data matrix) was provided by the authors of the studies. Reliability coefficients were available for 83% of the samples, and correlations between anxiety and avoidance were available for 76 samples (N = 55,651). The original ECR validation study by Brennan et al. (1998) was included in the analysis of correlations.

Of the 112 samples that were included in the sex differences analysis (N = 65,047), 29 (N = 7,566) were composed of community or mixed (community + student) participants; 73 (N = 26,676) were composed of college students, and 10 (N = 30,805) had been collected on the web. Of the non-web samples, 65 (N = 24,542) came from North America (United States and Canada), with the remaining samples distributed as follows: 7 (N = 1,842) from Western Europe (including one study from Croatia), 8 (N = 2,837) from Southern Europe; 6 (N = 1,581) from the Middle East, 12 (N = 2,081) from Oceania (Australia and New Zealand), and 4 (N = 1,359) from East Asia. Finally, the ECR was the most frequently employed measure (75.9%), followed by the ECR-R (18.7%) and the AAQ (5.4%).

Statistical Analysis

Effect size calculation: Univariate effect sizes. Univariate sex differences were expressed as standardized differences between means (Cohen's d). By convention, d was always computed so that positive values indicate higher scores in males. Point-biserial correlations between sex and attachment scores were converted to d taking into account the proportion of males and females in the sample. Following Hunter and Schmidt (2004), all effect sizes (ds and correlations) were corrected for measurement unreliability before computing meta-analytic statistics.

Effect size calculation: Bivariate effect sizes. Univariate effect sizes can be calculated for the two dimensions of romantic attachment, providing separate estimates of sex differences in anxiety and avoidance. However, romantic attachment is an integrated two-dimensional construct, and univariate effect sizes can only convey a partial picture of the overall pattern of sex differences. To assess *overall* sex differences in attachment, it is necessary to consider differences in both anxiety and avoidance simultaneously (Del Giudice, 2009c). For this reason, bivariate effect sizes were computed in addition to univariate ones. The multivariate generalization of Cohen's d is the Mahalanobis distance D (Mahalanobis, 1936). D represents the (unsigned) distance between two groups, standardized by the standard deviation of the multivariate distribution. D has the same substantive meaning as d; the only difference is that D cannot take negative values. An important feature of D is that it fully takes correlations into account; when variables are correlated (as is the case with attachment scales), the same univariate effects can give different values of the multivariate effect size, depending on the sign and magnitude of correlations. For detailed discussion of the Mahalanobis distance and its role in the measurement of sex differences, see Del Giudice (2009c), Huberty (2005), and De Maesschalck, Jouan-Rimbaud, and Massart (2000).

Missing alpha values. Among the samples included in the final set, 27.4% lacked information on test reliability. This proportion was sufficiently small to allow missing reliabilities to be replaced with the average of the nonmissing values (Hunter & Schmidt, 2004). The average α values for anxiety and avoidance were, respectively: .88 and .90 for the ECR, .93 and .93 for the ECR-R, and .72 and .79 for the AAQ. In two studies with missing reliabilities (Donnellan, Burt, Levendosky, & Klump, 2008; Saroglou, 2004), shortened questionnaire forms were employed, and α was estimated with the Spearman–Brown formula.

Meta-Analytic Approach

The present study adopted the meta-analytic approach described by Hunter and Schmidt (2004). The distinctive features of this approach are: (a) meta-analytic models are random effects, allowing for between-population variation in effect size; (b) significance testing is deliberately avoided in homogeneity analysis—instead of relying on problematic null hypothesis tests of heterogeneity, this approach privileges the substantive interpretation of meta-analytic statistics and moderator effects (see Hunter & Schmidt, 2004, pp. 393-406); and (c) artifact correction is seen as an essential step of the meta-analytic process; artifacts such as measurement unreliability and range restriction are corrected whenever possible to achieve the best estimate of population-level effects. The main statistics reported in the analysis are described in the following sections.

Average population effect size ($\bar{\delta}$, $\bar{\rho}$). This is the estimated average effect size in the population, obtained by a weighted average of the individual corrected effect sizes.

Confidence interval. This is the standard confidence interval for the average effect size. Note that the confidence interval only provides accuracy estimates for the *average* effect but does not provide information about between-study variability in population effect size.

Standard deviation of the population effect size (SD_δ, SD_ρ) and credibility interval. In random effect models, the population effect size is allowed to vary between different studies. The standard deviation of the population effect size quantifies its between-study variability and represents the primary measure of heterogeneity in Hunter and Schimdt's (2004) framework. The standard deviation can then be used to compute a *credibility interval*, which provides an estimate of the effect size range of between-study variation based on the assumption that effect sizes are normally distributed.

Variance ratio ($var(\delta)/var(d_c)$, $var(\rho)/var(r_c)$). To estimate how much of the observed variation in effect sizes is due to between-study variation rather than to sampling error and other artifacts, the variance of the population effect size can divided by the total effect size variance. The variance ratio indicates how much of the overall variance in effect sizes can be likely attributed to heterogeneity. Based on simulation studies, Hunter and Schmidt (2004) proposed the "75% rule" as a heuristic for determining the homogeneity of a data set, especially when testing for moderator effects not hypothesized a priori. If the estimated variance ratio is 25% or less (i.e., if sampling error and corrected artifacts account for more than 75% of the observed variance), it is reasonable to assume that the real heterogeneity is zero, the residual 25% being probably due to artifacts that have not been corrected for. The 75% rule has been shown to be generally more accurate in discriminating homogeneous versus heterogeneous data sets than traditional significance tests for homogeneity (Sackett, Harris, & Orr, 1986; see also Hedges & Pigott, 2001). The variance ratio should always be examined alongside the standard deviation of the population effect size; the standard deviation provides an *absolute* estimate of heterogeneity, thus providing a better measure of practical significance.

Results

Correlation Between Anxiety and Avoidance

Meta-analytic results for the correlation between anxiety and avoidance are shown in Table 1. The average correlation was $\bar{\rho} = .32$; however, there was substantial between-study variation, with $SD_\rho = .16$ and 95% of the overall variance in effect size explained by heterogeneity. Grouping the samples by

Table 1. Summary of Meta-Analytic Results: Correlations Between Attachment Anxiety and Avoidance

All samples		$\bar{\rho}$ (k = 77; N = 55,651)	**.32**
		95% CI	.29 ÷ .36
		SD_ρ	.16
		95% credibility	.01 ÷ .64
		var(ρ)/var(r_C)	.95
Moderator: Test	ECR	$\bar{\rho}$ (k = 58; N = 25,650)	**.18**
		95% CI	.14 ÷ .22
		SD_ρ	.13
		var(ρ)/var(r_C)	.87
	ECR-R	$\bar{\rho}$ (k = 15; N = 29,049)	**.44**
		95% CI	.43 ÷ .46
		SD_ρ	.03
		var(ρ)/var(r_C)	.68
	AAQ	$\bar{\rho}$ (k = 4; N = 952)	**.13**
		95% CI	.00 ÷ .25
		SD_ρ	.10
		var(ρ)/var(r_C)	.55
Moderator: Sample type	Community	$\bar{\rho}$ (k = 19; N = 4,419)	**.27**
		95% CI	.17 ÷ .37
		SD_ρ	.21
		var(ρ)/var(r_C)	.90
	Students	$\bar{\rho}$ (k = 50; N = 21,705)	**.20**
		95% CI	.16 ÷ .24
		SD_ρ	.14
		var(ρ)/var(r_C)	.87
	Web	$\bar{\rho}$ (k = 8; N = 29,527)	**.41**
		95% CI	.35 ÷ .48
		SD_ρ	.10
		var(ρ)/var(r_C)	.97

ECR = Experiences in Close Relationships; ECR-R = Experiences in Close Relationships–Revised; AAQ = Adult Attachment Questionnaire. Summary effect size estimates are shown in boldface.

test type revealed a clear moderating effect: The ECR-R showed the highest correlation (.44), with a small SD_ρ = .03 revealing substantial homogeneity in effect sizes. The ECR and the AAQ showed lower average correlations between anxiety and avoidance (.18 and .13, respectively). There was no overlap between the confidence interval for the ECR-R and those for the ECR and AAQ, indicating high statistical separation between the tests. ECR samples (and, to a lower extent, AAQ samples) showed sizable heterogeneity, with SD_ρ = .13 (accounting for 87% of the total variance). In summary, correlations between anxiety and avoidance appeared to be widely variable, due in part to between-test variation (with the ECR-R showing the highest correlation) and in part to other, unknown factors. There was little difference between correlations measured in the community (.27) and college (.20) samples; most of the web studies employed the ECR-R and, accordingly, showed larger correlations (.41). No effect of participants' age was detected.

The correlation between anxiety and avoidance is used to obtain bivariate effect sizes (D) in the analysis of sex differences. Systematic exploration showed that estimates of D were virtually unaffected (± .01) by changing the correlation size from ρ = .20 to ρ = .40. Because the exact magnitude of the correlation coefficient was not critical for estimating D, the overall estimate (.32) was used in the analysis of sex differences.

Sex Differences

Meta-analytic results for sex differences in attachment are shown in Tables 2-3 and Figures 1-4. The average effect sizes in the 112 samples were $\bar{\delta}_{ANX}$ = –.04 and $\bar{\delta}_{AVD}$= .02. Although sex differences were in the expected direction (higher avoidance and lower anxiety in males), the effects were small, adding up to bivariate D = .05. However, SD_δ values were very large compared to the estimated effects (accounting for 64%-68% of the total effect size variance), and 95% credibility intervals ranged from –.27 to .27, indicating substantial heterogeneity between samples. The causes of heterogeneity were then investigated by testing a number of possible moderators, both individually and in combination.

Analysis by Sample Type

Analysis by sample type revealed a definite trend in effect sizes (Table 2). Community samples showed the largest sex

Table 2. Summary of Meta-Analytic Results: Sex Differences in Romantic Attachment With Single Categorical Moderators

			Anxiety	Avoidance	*D*
All samples		$\bar{\delta}$ (*k* = 112; *N* = 65,047)	**−.04**	**.02**	**.05**
		95% CI	−.07 ÷ −.01	−.01 ÷ .05	
		SD_δ	.12	.13	
		95% credibility	−.27 ÷ .19	−.23 ÷ .27	
		var(δ)/var(d_C)	.64	.68	
Moderator: Sample type	Community	$\bar{\delta}$ (*k* = 29; *N* = 7,566)	**−.18**	**.14**	**.28**
		95% CI	−.26 ÷ −.10	.06 ÷ .22	
		SD_δ	.18	.17	
		var(δ)/var(d_C)	.65	.61	
	Students	$\bar{\delta}$ (*k* = 74; *N* = 26,676)	**−.06**	**.08**	**.12**
		95% CI	−.09 ÷ −.02	.04 ÷ .11	
		SD_δ	.11	.11	
		var(δ)/var(d_C)	.52	.48	
	Web	$\bar{\delta}$ (*k* = 10; *N* = 30,805)	**.01**	**−.06**	**.07**
		95% CI	−.03 ÷ .04	−.11 ÷ −.01	
		SD_δ	.05	.07	
		var(δ)/var(d_C)	.64	.77	
Moderator: Region	North America	$\bar{\delta}$ (*k* = 65; *N* = 24,542)	**−.04**	**.07**	**.10**
		95% CI	−.08 ÷ .00	.03 ÷ .11	
		SD_δ	.11	.12	
		var(δ)/var(d_C)	.49	.56	
	West Europe	$\bar{\delta}$ (*k* = 7; *N* = 1,842)	**−.25**	**.13**	**.33**
		95% CI	−.41 ÷ −.08	.07 ÷ .19	
		SD_δ	.18	.00	
		var(δ)/var(d_C)	.63	.00	
	South Europe	$\bar{\delta}$ (*k* = 8; *N* = 2,837)	**−.26**	**.12**	**.34**
		95% CI	−.37 ÷ −.14	.02 ÷ .23	
		SD_δ	.12	.11	
		var(δ)/var(d_C)	.54	.46	
	Middle East	$\bar{\delta}$ (*k* = 6; *N* = 1,581)	**−.18**	**.15**	**.28**
		95% CI	−.29 ÷ −.07	−.04 ÷ .35	
		SD_δ	.04	.20	
		var(δ)/var(d_C)	.08	.69	
	Oceania	$\bar{\delta}$ (*k* = 12; *N* = 2,081)	**−.18**	**.09**	**.24**
		95% CI	−.31 ÷ −.04	−.02 ÷ .19	
		SD_δ	.17	.08	
		var(δ)/var(d_C)	.51	.20	
	East Asia	$\bar{\delta}$ (*k* = 4; *N* = 1,359)	**.01**	**.25**	**.26**
		95% CI	−.18 ÷ .19	.06 ÷ .43	
		SD_δ	.14	.14	
		var(δ)/var(d_C)	.59	.58	

Positive values of δ indicate higher scores in males. Summary effect size estimates are shown in boldface.

differences, with females higher in anxiety and males higher in avoidance: $\bar{\delta}_{ANX} = -.18$, $\bar{\delta}_{AVD} = .14$, and $D = .28$. As predicted, effect sizes in student samples were considerably smaller: $\bar{\delta}_{ANX} = -.06$, $\bar{\delta}_{AVD} = .08$, $D = .12$. Further inspection of effect sizes in college students showed that, as expected from its large sample size ($N = 8{,}318$), Study 1 in Noftle and Shaver (2006) had a disproportionate weight on the estimate of sex differences. Since this study was somewhat atypical (participants were psychology students but questionnaires were administered on the web), effect sizes were also estimated without the sample ($N = 18{,}358$), which yielded larger sex differences: $\bar{\delta}_{ANX} = -.07$, $\bar{\delta}_{AVD} = .12$, and $D = .17$. Finally, web samples showed the smallest effects in the opposite direction (only significant for avoidance): $\bar{\delta}_{ANX} = .01$, $\bar{\delta}_{AVD} = -.06$, $D = .07$. As can be seen in Figure 1, the confidence intervals of the three sample types were largely nonoverlapping, suggesting a statistically robust difference between sets. Web samples showed high homogeneity, whereas both community and student samples still had relatively high SD_δ, indicating the presence of unexplained variability within categories.

Table 3. Summary of Meta-Analytic Results: Sex Differences in Romantic Attachment With Combined Categorical Moderators

Region	Type		Anxiety	Avoidance	*D*
North America	Community	$\bar{\delta}$ (k = 14; N = 3,327)	**–.19**	**.10**	**.25**
		95% CI	–.32 ÷ –.07	–.01 ÷ .21	
		SD_δ	.19	.15	
		var(δ)/var(d_C)	.65	.55	
	Students	$\bar{\delta}$ (k = 51; N = 21,215)	**–.02**	**.07**	**.08**
		95% CI	–.05 ÷ .01	.03 ÷ .11	
		SD_δ	.06	.12	
		var(δ)/var(d_C)	.26	.56	
West Europe	Community	$\bar{\delta}$ (k = 3; N = 546)	**–.10**	**.15**	**.22**
		95% CI	–.16 ÷ –.04	.09 ÷ .20	
		SD_δ	.00	.00	
		var(δ)/var(d_C)	.00	.00	
	Students	$\bar{\delta}$ (k = 4; N = 1,296)	**–.30**	**.12**	**.38**
		95% CI	–.55 ÷ –.07	.04 ÷ .20	
		SD_δ	.20	.00	
		var(δ)/var(d_C)	.74	.00	
South Europe	Community	$\bar{\delta}$ (k = 4; N = 1,671)	**–.25**	**.10**	**.31**
		95% CI	–.44 ÷ –.07	–.05 ÷ .24	
		SD_δ	.16	.10	
		var(δ)/var(d_C)	.68	.49	
	Students	$\bar{\delta}$ (k = 4; N = 1,166)	**–.27**	**.16**	**.37**
		95% CI	–.40 ÷ –.13	.01 ÷ .32	
		SD_δ	.05	.09	
		var(δ)/var(d_C)	.15	.36	
Middle East	Community	$\bar{\delta}$ (k = 2; N = 672)	**–.33**	**.41**	**.64**
		95% CI	–.44 ÷ –.22	.25 ÷ .58	
		SD_δ	.00	.00	
		var(δ)/var(d_C)	.00	.00	
	Students	$\bar{\delta}$ (k = 4; N = 909)	**–.08**	**.02**	**.08**
		95% CI	–.14 ÷ –.02	–.12 ÷ .08	
		SD_δ	.00	.00	
		var(δ)/var(d_C)	.00	.00	
Oceania	Community	$\bar{\delta}$ (k = 4; N = 693)	**–.17**	**.01**	**.18**
		95% CI	–.33 ÷ .00	–.25 ÷ .24	
		SD_δ	.06	.19	
		var(δ)/var(d_C)	.11	.58	
	Students	$\bar{\delta}$ (k = 8; N = 1,388)	**–.18**	**.13**	**.27**
		95% CI	–.36 ÷ .00	.06 ÷ .21	
		SD_δ	.20	.00	
		var(δ)/var(d_C)	.60	.00	
East Asia	Community	$\bar{\delta}$ (k = 2; N = 657)	**.13**	**.35**	**.35**
		95% CI	–.15 ÷ .41	.15 ÷ .56	
		SD_δ	.16	.07	
		var(δ)/var(d_C)	.63	.24	
	Students	$\bar{\delta}$ (k = 2; N = 702)	**–.11**	**.16**	**.23**
		95% CI	–.15 ÷ –.07	–.08 ÷ .40	
		SD_δ	.00	.13	
		var(δ)/var(d_C)	.00	.55	

Positive values of δ indicate higher scores in males. Summary effect size estimates are shown in boldface.

Analysis by Geographic Region

The samples were then analyzed by grouping them into six geographic regions. There were marked differences between some of the regions, and within-cell homogeneity increased compared to the full sample set (with some variance ratios falling below the 25% cutoff). As can be seen in Table 2 and Figure 2, the largest sex differences were observed in Europe (*D*s = .33 and .34) and the Middle East (*D* = .28). Effect sizes were smallest (yet statistically significant) in North America

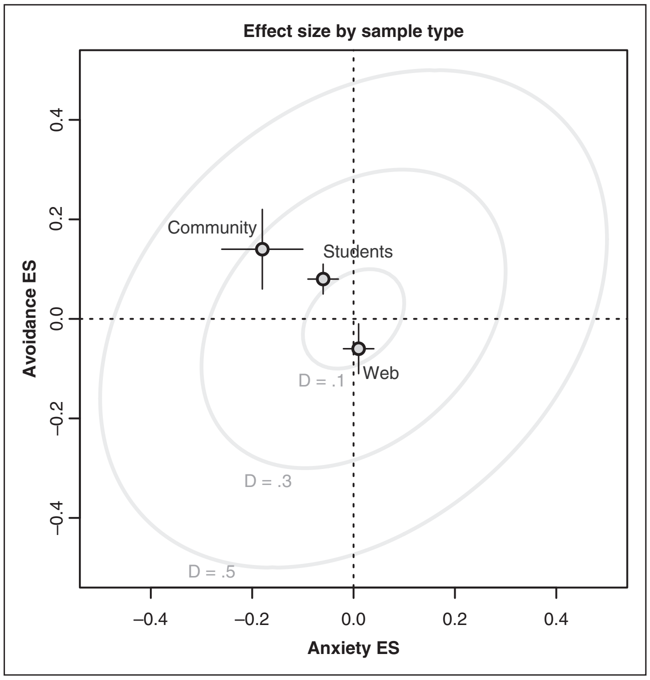

Figure 1. Sex differences in romantic attachment by sample type
The plot shows both univariate effect sizes (δ) with 95% confidence intervals and bivariate effect size (*D*) as the distance from the origin in elliptic polar coordinates. Positive values of δ represent higher scores in males.

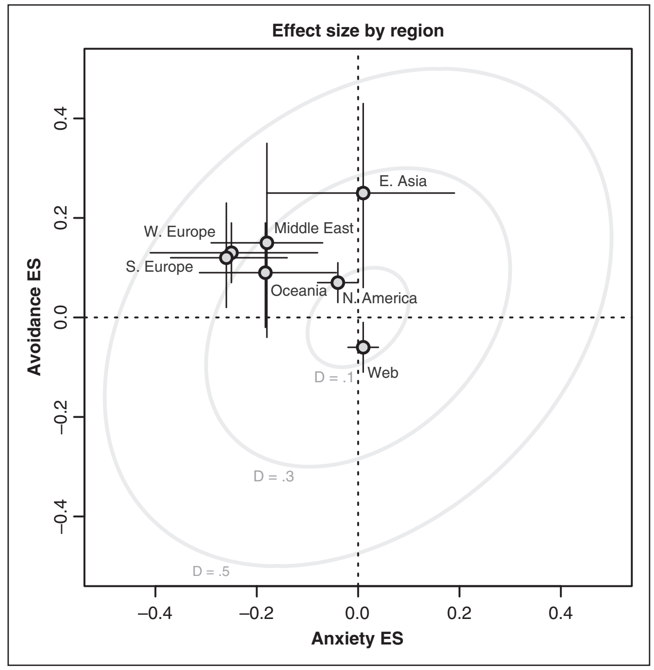

Figure 2. Sex differences in romantic attachment by geographic region
The plot shows both univariate effect sizes (δ) with 95% confidence intervals and bivariate effect size (*D*) as the distance from the origin in elliptic polar coordinates. Positive values of δ represent higher scores in males.

(D = .10). The effect size pattern of East Asia was peculiar: Although males were higher in avoidance ($\bar{\delta}_{AVD}$ = .25) as in the other regions, there were virtually no sex differences in anxiety ($\bar{\delta}_{ANX}$ = .01). The bivariate effect size was still in the upper range (D = .26). However, the confidence intervals for the average effect sizes were wide, potentially overlapping with those of other regions (Figure 2). Thus, further evidence is needed to ascertain whether Asian samples really show reduced sex differences in anxiety (see also Del Giudice, 2009b). Despite increased homogeneity overall, heterogeneity was still relatively high in North America, Southern Europe, and East Asia.

Combined Analysis

After individual testing, the effects of sample type and geographic region were assessed in combination (see Table 3 and Figure 3). The two moderators were not significantly associated, $\chi^2(5) = 4.82$, $p = .438$.

When combining region and sample type (see Table 3), homogeneity increased noticeably, with half of the variance ratios falling below the 25% cutoff. The largest combined effects were observed in North America and the Middle East: Community samples in these two regions showed considerably larger sex differences than student samples (D = .28 vs. D = .08 in North America, D = .64 vs. D = .08 in Middle East). In the Middle East, the confidence intervals of community

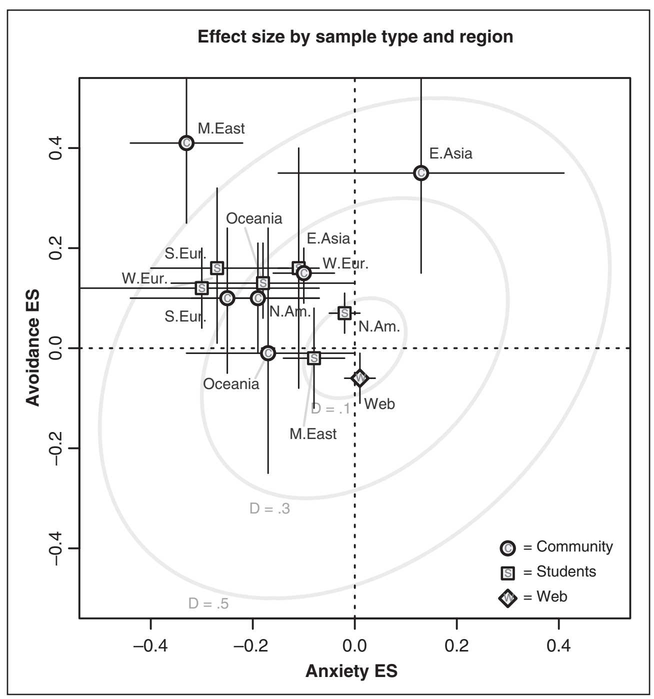

Figure 3. Sex differences in romantic attachment by sample type and geographic region
The plot shows both univariate effect sizes (δ) with 95% confidence intervals and bivariate effect sizes (*D*) as the distance from the origin in elliptic polar coordinates. Positive values of δ represent higher scores in males.

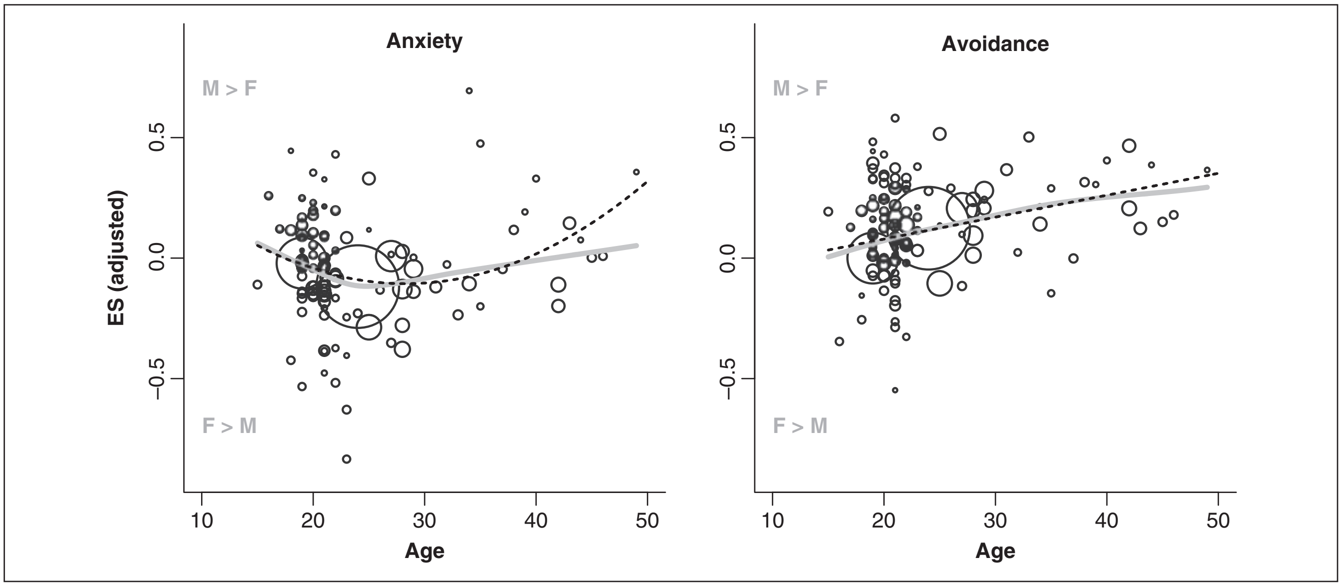

Figure 4. The effect of age on sex differences in attachment
Dotted black lines: polynomial weighted least squares regression of effect size on age, controlling for sample type and relationship status. Solid gray lines: weighted local regression (loess). Each circle represents one sample, with circle area proportional to sample size. Effect size values are adjusted for sample type and relationship status, using student samples as the reference group.

and student samples were completely nonoverlapping for both anxiety and avoidance; in North America, this was only true for anxiety. The small effect size observed in North American students ($D = .08$) strongly depended on the inclusion of Study 1 from Noftle and Shaver (2006); effect size estimates without this sample (N = 12,897) were almost twice as large ($\bar{\delta}_{ANX} = -.02$, $\bar{\delta}_{AVD} = .12$, $D = .14$). In Europe and Oceania, the difference between community and student samples was not as pronounced, with largely overlapping confidence intervals in all cases (see Figure 4). Again, East Asian samples showed a peculiar pattern: Whereas sex differences in Asian students were similar to those observed in other regions (see Figure 4), community samples displayed an unusual combination of higher avoidance *and* higher anxiety in males ($\bar{\delta}_{ANX} = .13$, $\bar{\delta}_{AVD} = .35$, $D = .35$). It should be noted that confidence intervals for East Asian samples were especially wide, inviting caution in interpreting this finding.

Age-Related Effects

The hypothesized moderating effect of age was tested by fitting weighted least squares polynomial regression models to the data set. The models included sample type (community, students, or web) and relationship status (married/cohabiting couples, noncohabiting couples, or unspecified) as independent variables to control for potential confounding effects. Following Hunter and Schmidt (2004), sample sizes were used as regression weights instead of the traditional inverse of sampling error variances.

Fitted regression curves for anxiety and avoidance are shown in Figure 4. For anxiety, the quadratic term was significant, $B = .0009$, $t(1,105) = 2.241$, $p = .027$, and indicated a U-shaped trend, with the female bias in attachment anxiety peaking between 20 and 30 years of age. In contrast, in the avoidance model, only the linear term was significant, $B = .0091$, $t(1,105) = 2.396$, $p = .018$, indicating that the male bias in avoidance tends to increase with age. Local regression fit (gray lines in Figure 4) suggested that age-related trends may level off after age 40.

Mean Differences Versus Relative Distributions

The focus of the present analysis was on average sex differences in romantic attachment scores, and standardized mean differences were used as effect size indices. Standardized effect sizes such as *d* and *D* are most interpretable when the data are normally distributed; however, there is evidence that romantic attachment scores often display skewed distributions (e.g., Del Giudice, 2009b; Jackson & Kirkpatrick, 2007), and evolutionary models explicitly predict that sex differences should be larger in insecurely attached people. Thus, standard effect size indices may underestimate the actual magnitude of sex differences and their practical implications by giving too

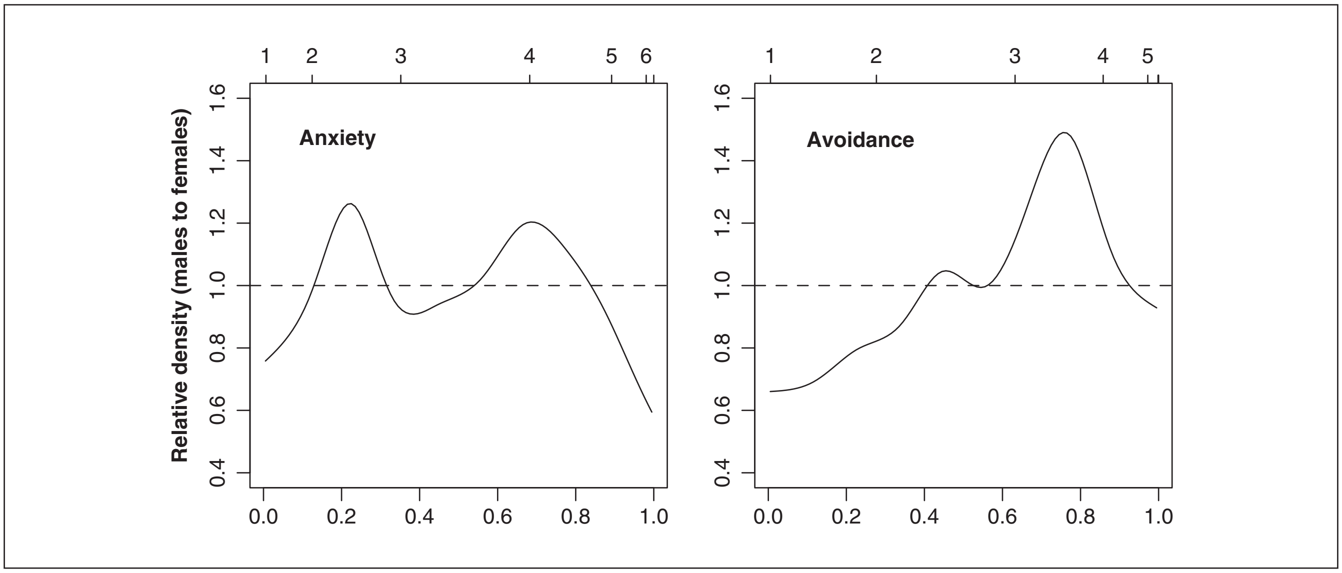

Figure 5. Relative density plots of anxiety and avoidance scores in 2,584 college students from Europe and the United States
The quantiles of the female distribution are shown on the lower axis, with the corresponding raw scores on the upper axis. Data are from Allen and Beaucom (2004); Del Giudice and Angeleri (2008); Fairchild and Finney (2006); Hawley, Shorey, and Alderman (2009); Jackson and Kirkpatrick (2007); Langhinrichsen-Rohling, Palarea, Cohen, and Rohling (2002); and Picardi, Caroppo, Toni, Binetti, and Di Maria (2005). Only complete cases were used to draw the plots.

much weight to average differences at the expense of potentially interesting differences at the distribution extremes.

For exploratory purposes, relative density functions (Handcock & Morris, 1998, 1999) were plotted from the combined raw data of seven college samples comprising a total of 2,584 individuals (Figure 5). The overall effect size in this sample set was D = .19, which corresponds to 86% overlap between distributions when scores are normally distributed. As can be seen in Figure 5, males were overrepresented at intermediate levels of anxiety but underrepresented at the extremes; specifically, about 40% fewer males than females had anxiety scores at the upper extreme of the female distribution. At the same time, males were underrepresented in the lower range of avoidance but remarkably overrepresented in the upper range, with 50% more males than females scoring at the 8th female decile. Intriguingly, sex differences disappeared in the 10th female decile, suggesting the presence of a subgroup of highly avoidant females. Further analyses (available on request) revealed that these effects were largely due to sex differences in distribution shape.

This kind of analysis reveals a more complex and interesting picture than that conveyed by standardized differences alone; it also shows that conventional effect sizes can lead to underestimating the extent of sex differences when distributions are non-normal. Hopefully, these promising results will encourage more researchers to examine full score distributions in addition to summary statistics.

Discussion

Meta-Analytic Findings

The primary goal of this study was to assess the magnitude of sex differences in romantic attachment and to test for possible moderators. A major effect of sample type was observed: Sex differences were largest in community samples (D = .28), smaller in college samples (D = .12), and smallest in web samples (D = .07). In community and college samples, males were higher in avoidance and lower in anxiety compared to females. The magnitude of effect sizes suggested substantial overlap between male and female distributions, a finding consistent with the hypothesis that sex differences mostly concern insecurely attached people. The analysis of relative distributions provided additional support for this proposition: Sex differences were stronger at the extremes of anxiety and in the upper and lower ranges of avoidance. Relative distribution analysis also pointed to the existence of a subgroup of highly avoidant females; this finding is especially interesting in the light of the speculative hypothesis that, in females, high avoidance may sometimes indicate "reproductive suppression" (i.e., a temporary interruption of mating and reproduction following acute stress) rather than a low-investment LH strategy (Del Giudice, 2009a).

The magnitude of effect sizes was also moderated by geographic region, with Europe and the Middle East showing the largest sex differences (Ds = .28 to .34). East Asia displayed a peculiar pattern of higher male avoidance but no sex differences in anxiety, although the wide confidence intervals associated with this finding invite caution in its interpretation. The small effect observed in North America ($D = .10$) was essentially due to the high proportion of student samples in that region: Combining the two predictors showed that sex differences in North American community samples were comparable to those in other countries ($D = .28$). Combined moderator analysis also showed that the difference between community and college samples was relatively small in Europe and Oceania compared to North America, the Middle East, and East Asia. Finally, the prediction that sex differences would show an early-adulthood peak was only partially confirmed; whereas anxiety showed the predicted pattern (peaking between 20 and 30 years), sex differences in avoidance tended to increase linearly with age.

Sample Selection and Participant Self-Selection

The difference in effect sizes between college and community samples indicates that sample selection is a major methodological issue in this area of research (as in many others; see Peterson, 2001). This is to be expected if—as maintained by some evolutionary theorists—romantic attachment styles are a facet of LH strategies. Compared to the general population, college students are much less likely to come from the high-risk contexts that favor fast LH strategies, and the common practice of relying on psychology students probably biases the sampling process even more strongly. Prosociality and cooperativeness are crucial markers of slow LH strategies (Belsky et al., 1991; Del Giudice, 2009a; Del Giudice & Belsky, 2010b; Figueredo et al., 2004), and psychology students include an especially large number of prosocial, highly cooperative individuals (Van Lange, Schippers, & Balliet, 2010). On top of that, prosocial students are also much more likely than their peers to volunteer in psychology experiments (Van Lange et al., 2010). It follows that, as shown by the present data, researchers working with psychology students and with small to medium sample sizes will fail to detect significant sex differences most of the time. Only large, demographically representative samples will enable researchers to get realistic estimates of population-level sex differences in romantic attachment.

The small and atypical effects observed in web-based studies deserve close scrutiny. The representativeness of web samples has often been questioned, especially because of the increased opportunity for self-selection by participants. The available evidence suggests that web samples give similar results to traditional college samples when the research focus is on *correlations* between variables (see Gosling et al., 2004; Krantz & Dalal, 2000). However, bigger problems may arise when (as in the present case) the research focus is on population *means*. Of special concern is the fact that male-to-female ratios in web samples are extremely variable and depend strongly on the topic of the study (Krantz & Dalal, 2000). In the 10 web samples included in the present meta-analysis, only 24% of participants were males. This indicates, perhaps unsurprisingly, that females are much more interested than males in taking online questionnaires about romantic relationships. Such an extreme imbalance in sex composition casts serious doubts on the representativeness of male participants with respect to the general male population; self-selection based on gender-typical interests and personality traits may explain the reduced size (and atypical sign) of sex differences in web samples.

Limitations

The present meta-analysis has some limitations because of the nature of the available studies. First, no studies from Africa, South America, and South Asia could be included in the set. Second, most community samples were composed of couples and older individuals; this limited the comparability between community and college studies. Third, it cannot be excluded that cohort effects were responsible for the observed effects of age (e.g., sex differences in avoidance may have decreased in recent decades). Two-dimensional attachment questionnaires are a relatively recent innovation, and almost all of the studies included in the meta-analysis have been carried out during the last 10 years. This makes it presently impossible to properly test the independent effect of birth cohort as a moderator.

Theoretical Implications

The main implication of the present analysis is that sex differences in romantic attachment exist and can be reliably demonstrated. Thus, a strictly sex-neutral view of romantic attachment does not seem tenable any longer, and it is likely that the debate will move to the magnitude of effect sizes and their practical significance. In most of the investigated world regions, overall sex differences (averaged over college and community samples) were about one fourth to one third of a standard deviation, corresponding to an overlap of 76%-83% between the male and female distributions (assuming normality). These effects are similar to those reported by Schmitt et al. (2003), whose sample consisted of a mixture of college and community participants.

Such effect sizes are often mechanically interpreted as "small," supposedly following Cohen (1988). Many would be surprised to learn that Cohen did, in fact, advise *against* the use of conventional effect size measures; he reluctantly proposed his famous guidelines as a last-resort approximation to employ when researchers need to perform power analysis but have no previous information on the investigated variables (Cohen, 1988; see also Hedges, 2008). Indeed, there is no justification in statistical theory or methodology for using such conventional labels in the interpretation of research findings; it is impossible to evaluate the practical magnitude of an effect size without considering the theoretical relation between variables, their measurement error, and the context in which they are measured and analyzed (see, e.g., Burchinal, 2008; Hill, Bloom, Black, & Lipsey, 2008).

The above applies in full to sex differences in romantic attachment. As discussed in the Introduction, the evolutionary model by Del Giudice (2009a, 2009b) predicts relatively small differences, certainly smaller than those in other sexually dimorphic psychological traits such as short-term mating orientation. Moreover, sex differences are expected to occur mostly in insecure individuals, which renders normality assumptions problematic and calls for whole-distribution methods of analysis. Relatively small differences are more vulnerable to sample and participants selection, and the present data indicate a strong effect of sample choice on effect size magnitude. Other possible factors that may cause underestimation of sex differences are reviewed below. Sex differences in community samples are already large enough to challenge the assumption by Ein-Dor et al. (2010) that sex differences in attachment do not carry much biological significance. This certainly does not disconfirm their model but suggests that the effects of romantic attachment on mating could have a bigger evolutionary role than they presently acknowledge.

Directions for Future Research

The present meta-analysis confirmed the finding that attachment styles show cross-cultural variation. For reasons of space, it was not possible to perform detailed analyses of how social and ecological factors affect the magnitude of sex differences. Future studies may use the present data set to test specific, theory-driven hypotheses, for example, concerning the effects of local mortality rates and sex ratios (Schmitt, 2008; Schmitt et al., 2003). Another interesting and currently unexplained finding is the linear age-related increase of sex differences in avoidance. Future research should try to replicate this result and, most important, discover its underlying causes (e.g., is the effect driven by increased male avoidance, decreased female avoidance, or both?).

As argued above, sample selection and participants self-selection can substantially reduce the observed magnitude of sex differences. There are, however, other methodological factors that might mask the true extent of sex differences in romantic attachment. The first is the low dimensionality of attachment questionnaires. The two-dimensional model of romantic attachment proposed by Brennan et al. (1998) is highly general and has proven an excellent research tool; however, it is likely that more than two dimensions are needed to fully describe individual variation in attachment styles (Feeney, 2002). Refining the construct of romantic attachment may require inclusion of entirely new factors (e.g., a scale measuring the adult equivalent of disorganization; Del Giudice, 2009b) as well as the articulation of anxiety and avoidance in lower level facets (Fossati et al., 2003). Sex differences may be especially strong in some specific facets of romantic attachment, and may be significantly reduced when facets are averaged to form broad avoidance/anxiety dimensions (e.g., as happens with Big Five personality traits; see Costa, Terracciano, & McCrae, 2001). Indeed, both Fossati et al. (2003) and Hawley, Shorey, and Alderman (2009) found larger sex differences in the Relationships as Secondary scale than in the Discomfort With Closeness scale of the five-dimensional Attachment Style Questionnaire (Feeney, Noller, & Hanrahan, 1994); these scales are facets of the higher order avoidance factor.

Another process that may reduce the magnitude of effect sizes is the anchoring of response scales to same-sex norms. It is possible that when asked to evaluate their feelings and behaviors in the context of relationships with the opposite sex, people tend to implicitly compare themselves with the typical range of behaviors they observe *in their own sex* (as discussed in Biernat, 2003). For example, when faced with items such as “I worry a lot about my relationships” or “I need a lot of reassurance that I am loved by my partner,” males and females may give different interpretations of what “a lot” means. If this were the case, sexually differentiated patterns of feelings and behavior would result in similar scores for males and females. A way to address this issue would be to modify the response format to increase the objectivity of attachment scores, for example, by translating words such as *often* and *a lot* into objective frequencies (e.g., every day, once in a week, once in a month). A modified version of the ECR employing explicit anchors has been developed by the present author and is now being validated.

Although the field of romantic attachment has been growing steadily in the last two decades, sex has been conspicuously missing from the picture for most of this time. Recent interest in evolutionary models has revamped the interest for sex differences and given rise to the beginnings of a healthy debate. Hopefully, the present study will help advance the debate and stimulate new research on this fascinating and controversial topic.

Appendix

Summary of the Samples Included in the Meta-Analysis With Uncorrected Effect Sizes

Sample	Region	Type	Age	N		Scale	*r*	Reliability (α)		Effect size (*d*)	
				M	F			Anx	Avd	Anx	Avd
		Community samples									
Bradford, Feeney, & Campbell (2002)	Australia	Couples[b]	20	113	113	ECR	.02	.88	.91	–.30	.13
O'Rourke (2006) Study 2	Australia	Couples	21	48	107	ECR-R	.34	.92	.92	–.23	–.33
Pearce (2005)	Australia	Couples	40	59	59	ECR				.16	.33
Tempelhof & Allen (2008)	Australia	Community[b]	32	40	107	ECR-R				–.09	–.04
Alonso-Arbiol, Balluerka, & Shaver (2007)[a] Study 2	Basque country	Community	31	190	203	ECR		.83	.86	–.17	.28
Alonso–Arbiol et al. (2007)[a] Study 3	Basque country	Couples	39	46	46	ECR	.14	.87	.86	.03	.23
Saroglou (2004)[a] Study 2	Belgium	Married couples	46	98	98	ECR (18-item)	.33			–.15	.18
Bouthillier, Julien, Dubé, Bélanger, & Hamelin (2002)	Canada	Cohabiting couples	44	40	40	AAQ	–.20	.62	.83	–.08	.37
Brassard, Shaver, & Lussier (2007)	Canada	Couples	29	260	260	ECR	.44	.88	.87	–.28	.14
Butzer & Campbell (2008)	Canada	Couples	38	116	116	ECR	.67	.89	.94	–.04	.25
Godbout, Lussier, & Sabourin (2006)	Canada	Couples	42	316	316	ECR	.28	.86	.88	–.25	.14
Maunder, Lancee, Nolan, Hunter, & Tannenbaum (2006)[a]	Canada	Community	49	23	47	ECR-R	.53			.28	.29
Li, He, & Li (2009)[a] High school sample	China	High school	15	101	97	ECR	.08	.82	.74	–.16	.11
Li et al. (2009)[a] Workers sample	China	White collar employees	25	245	214	ECR	.15	.83	.75	.24	.39
Ben-Ari & Lavee (2005)	Israel	Married couples	42	248	248	ECR		.82	.82	–.34	.44
Birnbaum (2007)	Israel	Community[b]	26	69	107	ECR	.09	.91	.87	–.19	.21
Picardi et al. (2002)[a]	Italy	Community[b]	28	305	441	ECR		.89	.89	–.42	–.05
Conradi, Gerlsma, van Dujin, & de Jonge (2006)[a] Community sample	Netherlands	Community	45	127	104	ECR	.39	.86	.88	–.06	.08
Moreira et al. (2006)[a]	Portugal	Cohabiting couples	43	220	220	ECR (+ 3-item ECR-R)		.88	.83	–.03	.13
Otway & Vignoles (2006)[a]	U.K.	Community[b]	29	60	59	ECR	.09	.87	.92	–.06	.17
Albino, Cooper, & Levitt (2005)[a]	U.S.	Couples[b]	21	82	82	ECR				–.25	.23
Bartz & Lydon (2006)[a] Study 3	U.S.	Community[b]	21	26	33	ECR	.06	.91	.91	–.29	–.15
Butner, Diamond, & Hicks (2007)	U.S.	Cohabiting couples	27	48	48	ECR	.48	.86	.87	–.15	.11
Dykas, Woodhouse, Cassidy, & Waters (2006)[a]	U.S.	Adolescents	17	66	111	ECR		.86	.92	.05	.06
Jerome & Liss (2005)[a]	U.S.	Community[b]	22	47	85	ECR	.07	.91	.94	–.42	–.38
Sanford & Rowatt (2004) Study 1	U.S. (Texas)	Married individuals	34	38	41	ECR	.45	.79	.89	.46	.22

(continued)

Appendix (continued)

Sample	Region	Type	Age	N M	N F	Scale	r	Reliability (α) Anx	Reliability (α) Avd	Effect size (d) Anx	Effect size (d) Avd
Sanford & Rowatt (2004) Study 3	U.S. (Texas)	Married individuals	35	60	74	ECR	.54	.88	.90	.28	–.12
Watson et al. (2004)	U.S. (Iowa)	Married couples	28	291	291	ECR (16-item)		.77	.83	–.40	.24
Weems, Berman, Silverman, & Rodriguez (2002)[a] High school sample	U.S. (Florida)	Adolescents	16	61	117	ECR	.02			.18	–.39
		Student samples									
Alonso-Arbiol, Shaver, & Yárnoz (2002)	Basque country	College	21	311	291	ECR	–.01	.85	.87	–.14	.16
Watt, McWilliams, & Campbell (2005)[a]	Canada	College	19	76	150	ECR	.20			–.21	.10
Li et al. (2009)[a] College sample	China	College	21	309	162	ECR	–.12	.79	.80	–.12	.26
Marušić, Kamenov, & Jelić (2007)	Croatia	College	21	136	216	ECR (18-item)	.08	.83	.86	–.35	–.01
Gordon et al. (2008)[a]	Israel	Not involved in relationships	25	21	24	ECR				.11	.13
Mikulincer (2008)[a]	Israel	College	22	112	354	ECR				–.09	.05
Attili & Cesarini (2005)[a]	Italy	College	23	51	91	ECR				–.23	.36
Del Giudice & Angeleri (2008)	Italy	College	22	100	100	ECR	.07	.86	.91	–.48	.29
Picardi, Caroppo, Toni, Binetti, & Di Maria (2005)[a]	Italy	College	27	80	142	ECR	.14			–.33	–.11
Nakao & Kato (2004)[a]	Japan	College	19	96	135	ECR	–.07	.87	.91	–.07	–.07
Conradi et al. (2006)[a] College sample 1	Netherlands	College	21	104	276	ECR	.14	.88	.93	–.11	.13
Conradi et al. (2006)[a] College sample 2	Netherlands	College	21	107	288	ECR	.14	.88	.93	–.17	.21
Overall, Fletcher, & Friesen (2003)[a]	New Zealand	College	23	100	100	AAQ		.88	.79	–.59	.15
Sibley (2007)[a] Study 1, Sample 1	New Zealand	College	21	127	290	ECR	.07			–.03	.08
Sibley (2007)[a] Study 1, Sample 2	New Zealand	College	21	68	175	ECR-R	.40			.09	.32
Sibley (2007)[a] Study 2	New Zealand	Involved in relationships	21	22	79	ECR-R	.31			–.20	.04
Sibley & Liu (2004)[a] Time 1	New Zealand	College	22	37	104	ECR-R		.95	.93	.03	.06
Sibley & Liu (2006)[a] Study 2	New Zealand	Involved in relationships	23	16	60	ECR-R	.50	.93	.91	–.39	.20
Sibley & Overall (2007)[a]	New Zealand	Involved in relationships	21	29	92	ECR-R	.20	.92	.93	–.37	.01
Sibley & Overall (in press)[a]	New Zealand	Involved in relationships	21	14	75	ECR-R	.38	.93	.94	–.46	.08
Eğeci & Gençöz (2006)[a]	Turkey	College[c]	22	71	71	ECR-R				–.16	–.02
Selcuk, Gunaydin, Sumer, & Uysal (2005)[a]	Turkey	College	21	140	116	ECR-R				–.04	–.17
Bowles & Meyer (2008)[a]	U.K.	College	23	16	153	ECR	.14	.92	.93	–.80	.11
Allen & Baucom (2004)[a] College sample	U.S. (Southeast)	Reporting extradiadic involvement	19	201	297	ECR	–.18	.91	.93	–.02	–.05
Barber & Cooper (2008)[a]	U.S. (Missouri)	College	18	65	120	ECR	.00	.89	.88	–.40	–.24

(continued)

Appendix (continued)

Sample	Region	Type	Age	*N* M	*N* F	Scale	*r*	Reliability (α) Anx	Reliability (α) Avd	Effect size (*d*) Anx	Effect size (*d*) Avd
Bartz & Lydon (2006)[a] Study 2	U.S.	College	21	26	33	ECR	.19	.90	.90	.31	–.52
Brennan, Clark, & Shaver (1998)	U.S. (Texas)	College	18	403	682	ECR	.11	.91	.94		
Britton & Fuendeling (2005)	U.S. (Arkansas)	College	19	63	120	ECR	.09	.92	.94	.00	.32
Brumbaugh & Fraley (2007)[a]	U.S. (Midwest)	College	19	28	69	ECR	.23	.87	.87	–.01	.15
Burnette, Taylor, Worthington, & Forsyth (2007)[a] Study 1	U.S.	College	21	73	140	ECR				.08	–.10
Burnette et al. (2007)[a] Study 2	U.S.	College	20	47	171	ECR				–.04	.32
Campbell, Simpson, Kashy, & Rholes (2001)	U.S. (Texas)	Couples	19	83	83	AAQ	.08	.60	.81	–.01	.04
Campbell, Simpson, Boldry, & Kashy (2005)	U.S. (Texas)	Couples	20	103	103	AAQ		.75	.73	.01	.14
Cash, Thériault, & Milkewicz Annis (2004)	U.S. (Mid-Atlantic)	College	20	103	125	ECR		.94	.93	.19	.30
Crawford et al. (2006)[a] Validation sample	U.S.	College		90	217	ECR	.26	.93	.93	–.15	.36
DiTommaso, Brannen, & Best (2004)[a,d]	U.S.	College	21	119	239	ECR				.00	.07
Donnellan, Burt, Levendosky, & Klump (2008)[a]	U.S. (Midwest)	College	19	62	240	ECR-R (20-item)				–.04	.09
Earls & Huth-Bocks (2006)[a]	U.S. (Michigan)	College	22	79	166	ECR-R				.19	.32
Edelstein (2006)[a]	U.S.	College	n.a.	61	76	ECR	.25	.92	.93	–.13	–.06
Fairchild & Finney (2006)[a]	U.S. (Southeast)	College	19	165	258	ECR-R	.51	.92	.93	–.01	.38
Gentzler & Kerns (2004)	U.S. (Midwest)	College	21	126	202	ECR		.93	.93	–.04	–.19
Gillath, Shaver, Baek, & Chun (2008)[a]	U.S.	College	19	40	107	ECR	.09	.92	.87	.08	.45
Goldstein, Chesir-Teran, & McFaul (2008)[a]	U.S.	College	20	107	359	ECR	.14	.90	.93	–.14	–.07
Hawley, Shorey, & Alderman (2009)[a]	U.S.	College	20	287	320	ECR-R	.48	.93	.94	–.12	–.02
Jackson & Kruger (2006)[a]	U.S.	College	19	83	118	ECR	.15			–.13	.31
Jackson & Kirkpatrick (2007)[a]	U.S. (Virginia)	College	19	94	79	ECR	.06			–.50	.05
Keklik (2004)	U.S. (Florida)	College	21	48	107	ECR-R				–.16	.56
Langhinrichsen-Rohling (2008)[a]	U.S. (Alabama)	College	20	94	130	ECR	–.06	.90	.87	.05	.00
Langhinrichsen–Rohling, Palarea, Cohen, & Rohling (2002)[a]	U.S. (Nebraska)	College	20	121	156	ECR	.09	.90	.92	.10	.33
Locke (2008)[a]	U.S. (Northwest)	College	21	10	50	ECR	.37	.96	.93	.21	.13
Lopez (2001)	U.S. (Midwest)	College	19	55	192	ECR	.07	.91	.92	–.14	.10
Lopez & Gormley (2002)[a]	U.S. (Midwest)	College	19	102	143	ECR		.91	.92	.16	.02
Lopez et al. (1997)	U.S. (Midwest)	College	22	32	110	AAQ	.05	.70	.83	.36	.26
Lopez, Mitchell, & Gormley (2002)	U.S. (Midwest)	College	20	36	91	ECR	.32	.92	.91	.34	.41
MacDonald & Figueredo (2007)[a]	U.S. (California)	College	24	45	155	ECR	.35	.55	.81	–.17	.25
MacDonald & Figueredo (2004-2006)[a]	U.S. (California)	College	23	81	330	ECR	.19	.89	.90	.08	.03
McGregor, Nail, Marigold, & Kang (2005)[a] Study 2	U.S.	College	19	14	40	ECR	.17	.91	.94	.03	.45
Noftle & Shaver (2006)[a] Study 1	U.S. (West Coast)	College (Web administration)	19	2901	5417	ECR	.22	.92	.93	–.02	.00
Noftle & Shaver (2006)[a] Study 2	U.S. (West Coast)	College	20	58	227	ECR	.15	.89	.92	–.15	.12

(continued)

Appendix (continued)

Sample	Region	Type	Age	N M	N F	Scale	*r*	Reliability (α) Anx	Reliability (α) Avd	Effect size (*d*) Anx	Effect size (*d*) Avd
Rice, Lopez, & Vergara (2005)[a]	U.S. (South)	College	19	43	198	ECR	.11	.92	.94	–.16	.36
Rodrigues & Kitzmann (2007)[a]	U.S. (South)	College	18	10	53	ECR	.18	.89	.93	.42	–.15
Rogers, Bidwell, & Wilson (2005)	U.S.	Couples	21	80	80	AAQ		.77	.76	–.12	-.23
Sanford & Rowatt (2004) Study 2	U.S. (Texas)	College	20	52	62	ECR	.26	.76	.91	.20	.24
Schachner & Shaver (2004)	U.S. (California)	College	20	64	167	ECR	.08	.92	.92	–.11	–.13
Schwartz, Lindley, & Buboltz (2007)	U.S. (South)	College	20	147	175	ECR-R	.42	.92	.88	.17	.23
Vicary (2008)[a]	U.S.	College	19	57	59	ECR-R				.24	.24
Weems et al. (2002)[a] College sample	U.S. (Florida)	College	22	83	241	ECR	.02			–.06	.18
Wei, Russell, Mallinckrodt, & Zakalik (2004)[a]	U.S. (Midwest)	College	22	343	417	ECR	.24			–.08	.13
Wei, Mallinckrodt, Larson, & Zakalik (2005)[a]	U.S. (Midwest)	College	19	161	264	ECR		.93	.94	.09	.21
Wei, Russell, & Zakalik (2005)[a]	U.S. (Midwest)	College	18	147	204	ECR		.92	.94	.11	.19
Wei, Shaffer, Young, & Zakalik (2005)[a]	U.S. (Midwest)	College	20	96	203	ECR		.93	.93	.10	–.03
Wei, Heppner, Russell, & Young (2006)[a] Time 1	U.S. (Midwest)	College	20	153	219	ECR				–.14	–.07
Wei & Ku (2007) [a]	U.S. (Midwest)	College	19	145	224	ECR	.11	.92	.90	.13	.01
Withers & Vernon (2006)	U.S.	College	22	157	193	ECR		.90	.92	–.07	.06
Web samples											
Davis et al. (2006)	Web	Web	25	724	1221	ECR (20-item)	.06	.90	.86	–.16	–.27
Ehrenthal, Dinger, Lamia, Funken, & Schauenburg (2008)[a] Nonclinical sample	Web (in German)	Web	29	323	683	ECR-R	.49	.91	.92	.07	.09
Fraley (2005)	Web	Web	24	4840	17160	ECR-R	.41			.00	–.06
Mount (2005)	Web	In committed relationships	35	26	106	ECR-R	.76	.95	.94	–.08	.10
Skowron & Dendy (2004)[a]	Web	Web	37	110	113	ECR	.24	.92	.92	.07	–.18
Swann, Rentfrow, & Gosling (2003)[a] Study 3	Web	Web	34	154	410	AAQ	.15			.01	–.04
Vicary & Fraley (2007)[a] Study 1	Web	Web	28	116	442	ECR-R	.42	.92	.94	.14	.01
Vicary & Fraley (2007)[a] Study 2	Web	Web	28	230	895	ECR-R	.41	.93	.94	–.01	–.09
Vicary & Fraley (2007)[a] Study 3	Web	Web	27	815	2165	ECR-R	.39	.90	.93	.12	.02
Whiffen (2005) Time 1	Web	Couples	33	136	136	ECR				–.11	.30

Positive values of *d* indicate higher scores in males. Anx = anxiety; Avd = avoidance; ECR = Experiences in Close Relationships; ECR-R = Experiences in Close Relationships–Revised; AAQ = Adult Attachment Questionnaire.

[a]Additional information and/or original data were provided by the authors.

[b]The sample also includes college students.

[c]The sample also includes graduate students.

[d]Only a subset of the sample was included in the meta-analysis due to technical problems.

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