

A Meta-Analysis of Predictors of Loneliness During Adolescence

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Abstract

Background: Extensive research has investigated loneliness in adolescents over the past several decades; identification of predictors of loneliness was in order using meta-analytic techniques.

Objectives: The purpose of this study was to identify the predictors of loneliness in adolescents through a comprehensive review of the literature and to use quantitative meta-analysis to determine the magnitude of the relationships between each of the predictors and loneliness.

Methods: The literature reviewed included 242 research articles published between 1980 and 2004, of which 95 met the inclusion criteria. Eleven predictors of loneliness were identified in the 95 studies. A meta-analysis was conducted on the 11 predictors.

Results: Four predictors (gender, depression, shyness, and self-esteem) had large effect sizes, four predictors (social support, social anxiety, maternal expressiveness, and paternal expressiveness) had large medium to medium effect sizes, two predictors (stress and self-disclosure) had low effect sizes, and one predictor (age) had a very low effect size.

Discussion: Contemporary theories of loneliness served as a framework for interpreting the findings of the meta-analysis. A meta-analytic study of loneliness in adults would complement the present work.

Key Words: Adolescents, Loneliness, Meta-analysis

Loneliness is significant to health and quality of life, and thus to the discipline of nursing (Karnick, 2005). Theorists have suggested that loneliness increases during adolescence (Brennan, 1982; Larson, 1999; Sullivan, 1953; Weiss, 1973), making adolescent loneliness important to study. In the past several decades, scientists have studied adolescent loneliness, identifying many concepts that explain the phenomenon. A meta-analysis of the studies done to date can identify the predictors of loneliness that can be used to advance knowledge development, provide the basis for nursing interventions in experimental studies, and guide nursing practice with adolescent populations. The purpose of this study was to identify the predictors of loneliness in adolescents through a comprehensive review of the literature and to use quantitative meta-analysis to determine the magnitude of the relationships between each of the predictors and loneliness.

A meta-analysis focusing on the adolescent loneliness literature is justified based on an analysis by Perlman and Landolt (1999). They identified the points of continuity and discontinuity between the loneliness literature for children-adolescents and for adults. In terms of continuities, they argued that there are comparable definitions and measures of loneliness, common personal and social problems related to loneliness, similar correlates, and the use of common theoretical perspectives for adolescents and adults. In terms of discontinuities, Perlman and Landolt argued that loneliness can be experienced earlier in life than was commonly believed, some predictors of loneliness are age-related, loneliness may be less stable in children and adolescents than in adults, and that the topics investigated for adolescents and adults tend to be somewhat different. For example, life transitions, such as the loss of a loved one, is a topic of concern in adult

loneliness whereas developmental issues, such as self-identity and self-esteem, are topics of concern in childhood-adolescent loneliness. Given the discontinuities identified, a meta-analysis focusing only on adolescent loneliness was warranted.

Perlman and Peplau (1982) argued that “most commentators see loneliness as an aversive, unpleasant experience; yet only a minority of observers discuss loneliness as a pathological response” (p. 129). Measures of loneliness reflect this aversive, unpleasant experience. Studies included in this meta-analysis involved a variety of instruments measuring loneliness as a unitary phenomenon yielding a total score. Measures of typologies of loneliness yielding subscale scores were not included in this analysis.

In the present study, the research questions were: (a) What is the magnitude of the relationship between loneliness and each of the following predictor variables: depression, social support, self-esteem, social anxiety, shyness, self-disclosure, maternal expressiveness, paternal expressiveness, age, and gender? and (b) To what extent are the effect sizes of the relationships between the predictor variables and loneliness correlated with the methodological variables of sample size and quality index?

Methods

Sampling

The sample consisted of all available studies in which loneliness was investigated in an adolescent population. Several methods recommended by Cooper (1998) were used to find these studies. Online computer searches, the ancestry approach, and informal sources of information were used. Informal sources of information included contacting researchers who published in the area of loneliness, either personally or via the e-mail. The online search was limited to publications from 1980 to 2004. The online data bases

searched were CINAHL, Psych Info, Medline, and Dissertation Abstracts. The only search terms used initially were loneliness and adolescence. Then, when the predictors were selected, each was searched in relation to loneliness to ensure the comprehensiveness of the review.

The inclusion criteria for the meta-analysis were: (a) the chronological ages of the sample studied had to range from 11 to 23 years of age, which is consistent with adolescence as defined by most developmental theorists; if ages were not reported, the study was not used; (b) different measures could be used for each predictor of loneliness; (c) different measures yielding a total score could be used to operationalize loneliness, such as the UCLA Loneliness Scale ($n = 72$), the Asher Loneliness Scale ($n = 19$), Woodward Loneliness Inventory ($n = 2$), Marcoe and Brumagne Loneliness Scale ($n = 1$), and an investigator-adapted loneliness tool ($n = 1$); (d) given the vast number of variables examined in relation to loneliness, a minimum of 9 hypotheses had to test the relationship between loneliness and each predictor variable; (e) adequate statistics were reported to allow for meta-analytic calculations, (f) the studies were published in English; and, (g) the studies were published as a scientific article or unpublished as a dissertation; chapters in book were not included.

Using the methods recommended by Cooper (1998), a total of 242 potential studies were located. Of the 242, 95 studies, which met the inclusion criteria, comprised the sample upon which the meta-analysis was performed. Of these 95 studies, 84 had one sample, ten (10) had two samples, and one (1) had three samples for a total of 107 samples across the studies.

Procedure

The 95 studies were reviewed and coded for substantive, methodological, and miscellaneous variables using Beck's (2001) codebook as modified by Yarcheski, Mahon, Yarcheski, and Cannella (2004) for meta-analysis. Substantive (predictor) variables included variables such as depression and self-esteem, and demographic variables such as age and gender. Methodological variables included variables such as research design, sampling method, sample size, instruments used to measure the predictor variables and loneliness, type of statistical analysis, and statistical results. The miscellaneous variables included such information as source derivation (e.g., online computer search, informal sources), publication type (e.g., journal article or dissertation), funding, and country of publication.

All authors participated in locating and reviewing the studies in the analysis. Then, the first two authors eliminated studies that did not meet the inclusion criteria. The first and third authors independently coded 48 of the 95 studies. The second and fourth authors independently coded 47 of the studies. Initial inter-rater agreement between the pairs ranged from 95% to 100%. All disagreements were discussed until 100% consensus was achieved between the two raters for all coding. Then the first two authors reviewed a random sample of 45 studies and achieved 100% agreement.

Using the criteria developed by Beck (2001) and modified by Yarcheski et al. (2004) as a guide, we constructed a quality index for each study to be used for meta-analyses. The highest possible score a study could achieve on the quality index was 24. The quality index consisted of the following criteria: (a) first author expertise was scored 1 (bachelor's or master's degree was the highest degree held), 2 (doctoral degree was the highest degree held), or 3 (doctoral degree plus multiple publications on loneliness); (b)

funding was scored 0 (no funding reported) or 1 (received funding); (c) sampling method was scored as 1 (convenience), 2 (matched), or 3 (random); (d) sample size (number of participants) was scored as 1 (1 to 50), 2 (51 to 100), 3 (101 to 200), or 4 (201 or more); (e) reported reliability (R) and validity (V) for the loneliness instrument and each predictor instrument were scored as 0 (no mention of R and V), 1 (mention of previous R or V), 2 (R or V reported for current study), or 3 (R and V stated for current study); (f) research design was scored as 1 (correlational), 2 (causal modeling), 3 (comparative), 4 (methodological, e.g., instrument development), or 5 (longitudinal); and, (g) data analysis was scored as 1 (bivariate statistics used) or 2 (multivariate statistics used).

Data Analysis

The Advanced BASIC Meta-Analysis software system by Mullen (1989) was used to conduct the meta-analysis. For the first research question, the general combinations and comparisons of effect sizes and significance levels were calculated in three separate ways: unweighted, weighted by sample size, and weighted by quality score. The r was used as the indicator of effect size. Cohen's (1988) standard definitions of small (.10), medium (.30), and large (.50) effect sizes were used to interpret the effect size findings.

For the second research question, the effect of a single methodological predictor (sample size or quality index) was correlated with the magnitude of the relationship between each substantive predictor and loneliness. Statistically significant correlations are reported with the findings.

One assumption in meta-analysis is independent data (Curllette & Cannella, 1985). To offset problems with dependent data in selected studies, such as those using a

longitudinal design, we randomly selected which point in time to include in the meta-analysis. The predictor variables of self-disclosure and social support occasionally had several subscales studied in relation to loneliness. For self-disclosure, we selected to study peers as target individuals in relation to loneliness as opposed to mother and father. For social support, we randomly selected the type of support (subscale) studied in relation to loneliness.

Results

Sample

The total sample consisted of 95 studies published in English between 1980 and 2004. Of the 95 studies, 78 were published journal articles and 17 were unpublished doctoral dissertations. Of the 78 journal articles, 73 were published in the United States and 5 were published abroad. The dissertations were all conducted in the United States. Relative to the first authors' expertise, 44 of the studies were first authored by doctorally educated researchers with multiple loneliness publications. Of the remaining studies, 48 first authors were researchers with doctoral degrees, and 3 first authors had masters' degrees. Twenty-six of the studies were funded and 69 were not.

Research designs were primarily correlational ($n = 52$), 6 included causal modeling techniques, 13 had comparative designs, 3 were methodological, and 21 had longitudinal designs. Relative to sampling methods, samples of convenience were used most often ($n = 103$); four samples were obtained using random sampling. Most sample sizes ($n = 49$) were characterized by more than 200 participants, 35 sample sizes ranged from 101 to 200, 19 ranged from 51 to 100, and 4 had 59 or fewer participants. The smallest sample size was 21 and the largest was 3,786. For data analysis, 27 studies

used bivariate statistics whereas 68 used multivariate statistics. The quality index score ranged from 6 to 24 with a median of 14 and a mode of 15.

Predictors

Because of the vast number of variables studied in relation to loneliness across the studies reviewed and because of the vast number of articles, a decision was made that the substantive predictor had to be studied in relation to loneliness a minimum of 9 times in order to be included in the meta-analysis. Using this criterion, 11 predictors were identified. Table 1 shows the number of hypothesis tested, total number of participants, fail-safe N , homogeneity test, and 95% confidence intervals for each of the 11 predictors.

The fail-safe N addresses the “file drawer problem”, which is the tendency of studies not supporting research hypotheses to be buried away in file drawers (Rosenthal, 1991). Editors tend to publish studies with results that are statistically significant, creating the likelihood of a type 1 publication bias error in the literature. According to Cooper (1998), the fail-safe N calculates the number of studies needed to change the conclusions that a relation exists. Rosenthal (1991) recommended that reasonable tolerance for discounting the file drawer problem is attained if the fail-safe N exceeds $5K + 10$ (K = number of hypotheses included in the analysis). With this formula, one predictor (age) had a fail-safe N below the reasonable tolerance level.

The test of homogeneity is used to determine whether separate studies are testing the same hypothesis. According to Wolf (1986), “if a series of independent studies provide a homogeneous estimate of the population effect size, then it is more likely that the various studies are testing the same hypothesis” (p. 42). Homogeneity tests were conducted for each predictor. Seven of the 11 predictors (depression, self-esteem, social

support, social anxiety, self-disclosure, shyness, and stress) had statistically significant homogeneity tests, using chi square, indicating that outliers were present.

Non-significant homogeneity tests were achieved for the seven predictors when outliers were identified and removed from the analysis (see Table 1).

The use of confidence intervals to interpret effect size sheds light on the importance of the findings. A 95% confidence interval was constructed around the average effect size for the study findings for each predictor to examine whether it encompasses zero. As stated by Wolf (1986), “it would be desirable for the average effect size *not* to encompass zero in order for us to be more certain that there is a significant effect across studies” (p. 27). As seen in Table 1, none of the confidence intervals contained zero.

Depression: The relationship between depression and loneliness was examined via 33 hypotheses derived from 30 studies. The quality index scores ranged from 7 to 20. The homogeneity test was not significant after 15 outliers were removed. As seen in Table 2, the r effect sizes indicated that the relation between depression and loneliness were in the range of a large effect size for studies with outliers ($r = .61$ to $.62$) and when outliers were removed ($r = .55$ to $.60$).

Shyness: The relationship between shyness and loneliness was investigated via 13 hypotheses derived from 9 studies. The quality index scores ranged from 7 to 20. The homogeneity test was not significant when 5 outliers were removed. As shown in Table 2, the r effect sizes for the relationship between shyness and loneliness were in the range of a large effect size with outliers ($r = .50$ to $.51$) and when outliers were removed ($r = .47$ to $.51$). When the outliers were removed, the magnitude of the relationship for the

two variables co-varied significantly with quality index ($r = .43, p < .01$). This correlation indicates that as the quality of the studies increased, the effect size between shyness and loneliness increased.

Self-Esteem: The relationship between self-esteem and loneliness was investigated via 30 hypotheses derived from 27 studies. The quality index scores ranged from 6 to 24. The homogeneity test was not significant when 10 outliers were removed. As shown in Table 2, the r effect sizes for the relationship between self-esteem and loneliness were in the range of a high medium effect size with outliers ($r = -.42$ to $-.45$) and when outliers were removed ($r = -.48$ to $-.50$). When the outliers were removed, the magnitude of the relationship between the two variables co-varied significantly with sample size ($r = .14, p = .03$). This correlation indicates that as sample size increased, the effect size between self-esteem and loneliness increased.

Social Support: The relationship between social support and loneliness was investigated via 20 hypotheses derived from 18 studies. The quality index scores ranged from 8 to 19. The homogeneity test was not significant when 10 outliers were removed. As shown in Table 2, the r effect sizes for the relationship between social support and loneliness were in the range of a medium effect size with outliers ($r = -.27$ to $-.29$) and high medium when outliers were removed ($r = -.40$ to $-.47$).

Social Anxiety: The relationship between social anxiety and loneliness was investigated via 15 hypotheses derived from 12 studies. The quality index scores ranged from 9 to 19. The homogeneity test was not significant when 5 outliers were removed.

As shown in Table 2, the r effect sizes for the relationship between social anxiety and loneliness were in the range of a medium effect size with outliers (all $r = .35$) and high medium when outliers were removed ($r = .41$ to $.42$).

Maternal Expressiveness: The relationship between maternal expressiveness and loneliness was investigated via 9 hypotheses derived from 6 studies. The quality index scores ranged from 8 to 16. The homogeneity test was not significant. As shown in Table 2, the r effect sizes for the relationship between maternal expressiveness and loneliness were in the range of a medium effect size ($r = -.34$ to $-.35$).

Paternal Expressiveness: The relationship between paternal expressiveness and loneliness was investigated via 9 hypotheses derived from 6 studies. The quality index scores ranged from 8 to 16. The homogeneity test was not significant. As shown in Table 2, the r effect sizes for the relationship between paternal expressiveness and loneliness were in the range of a medium effect size (all $r = -.34$).

Stress: The relationship between stress and loneliness was investigated via 10 hypotheses derived from 10 studies. The quality index scores ranged from 9 to 17. The homogeneity test was not significant when 4 outliers were removed. As shown in Table 2, the r effect sizes for the relationship between stress and loneliness were in the range of a low effect size with outliers ($r = .18$ to $.19$) and when outliers were removed ($r = .25$ to $.26$).

Self-Disclosure: The relationship between self-disclosure and loneliness was investigated via 15 hypotheses derived from 9 studies. The quality index scores ranged from 11 to 15. The homogeneity test was not significant when 5 outliers were removed. As shown in Table 2, the r effect sizes for the relationship between self-disclosure and

loneliness were in the range of a low effect size with outliers ($r = -.13$ to $-.14$) and when outliers were removed (all $r = -.22$).

Age: The relationship between age and loneliness was investigated via 17 hypotheses derived from 17 studies. The quality index scores ranged from 9 to 18. The homogeneity test remained significant after repeated analyses to remove the outliers. As seen in Table 2, the r effect sizes for the relationship between age and loneliness were in the range of very low effect sizes ($r = .04$ to $.07$).

Gender: The relationship between age and loneliness was investigated via 31 hypotheses derived from 30 studies. The quality index scores ranged from 7 to 18. The homogeneity test was significant after repeated analyses to remove the outliers. As shown in Table 2, the r effect sizes for the relationship between age and loneliness were in the range of a large effect size ($r = .58$ to $.75$).

Discussion

The two predictors of age and gender probably presented different problems in the analysis. With respect to age, the range of ages was restricted either by one criterion for inclusion of samples in the meta-analysis (ages 11 to 23) or the actual ages of the samples studied (for example, early adolescents aged 12 to 14 studied only). These restrictions probably affected effect sizes for the relationship between age and loneliness across studies because of limited variability. These two explanations might account for the very low effect size of age in relation to loneliness. More importantly, because age did not achieve a reasonable tolerance level for its fail-safe N , no conclusions can be drawn regarding the effect size between age and loneliness.

With respect to gender, 19 of the 31 hypotheses included in the meta-analysis were non-significant. Of the remaining 12 studies that reported statistically significant results, nine reported that boys were lonelier than girls, two reported the opposite, and 1 did not report which sex was lonelier. Given the vast number of studies reporting non-significant differences in loneliness according to gender, it was surprising to find a large effect size for gender in relation to loneliness. Either there is some unknown methodological issue with this particular predictor, or gender is a powerful predictor of loneliness. Gender in relation to loneliness deserves further investigation in adolescents.

In this meta-analysis, nine of the eleven predictors had statistically significant tests of homogeneity requiring the identification and removal of outliers to achieve a non-significant test. A non-significant test of homogeneity was achieved for seven of the nine predictors; homogeneity was not possible to achieve with the demographic variables of age and gender. Heterogeneity indicates that it may not be appropriate to combine all the study results in one meta-analysis (Wolf, 1986). For seven predictors (depression, shyness, self-esteem, social support, social anxiety, stress, and self-disclosure), an attempt was made to identify different subsets of studies among the outliers that might represent homogenous results by conducting separate meta-analyses, as suggested by Wolf (1986). None of the separate meta-analyses conducted for the outliers of each of the seven predictors resulted in a homogenous subset. Because many studies by different investigators using different methods can result in heterogeneity, Becker and Hedges (1984) suggested that it may not be inadvisable to draw inferences from heterogeneous estimates, which justifies reporting the results with outliers in this meta-analysis.

For whatever reason, the methodological predictors of sample size and quality index did not play a major role in influencing the effect sizes of most predictors. The relationships between the effect size for the relationship between shyness and loneliness was moderately influenced by quality index, while the effect size for the relationship between self-esteem and loneliness was weakly influenced by sample size.

In 1987, Perlman credited the seminal work of Weiss (1973) with advancing knowledge in the field of loneliness, which continues to permeate the loneliness literature. Weiss's (1973) contemporary theories attempt to explain loneliness as either situationally or characterologically based. The theories serve as a framework to interpret the present findings in that the predictors in this meta-analysis represent one or the other of these theories of loneliness.

The most powerful predictors emerging in the meta-analysis tend to fit the characterological explanation of loneliness, which suggests that certain personality characteristics make individuals prone to loneliness (Weiss, 1973). This characterological theory by Weiss directs our attention to defects in motivation or skills that leave individuals vulnerable to loneliness. In the order of the magnitude of their effect sizes, the predictors in this framework are depression, shyness, low self-esteem, and social anxiety, all of which had large effect sizes. Self-disclosure had a low effect size in the analysis, and thus does not play a major role in adolescent loneliness.

The less powerful predictors emerging in the meta-analysis tend to fit the situational explanation of loneliness, which posits that anyone is liable to suffer loneliness in situations that are deficient in relational provisions (Weiss, 1973). This theory by Weiss suggests that loneliness is a response to a deficit or absence of relational

provisions with attachment figures or peers. In the order of the magnitude of their effect sizes, the predictors in this framework are social support, maternal expressiveness, paternal expressiveness, and perceived stress, three of which had a medium effect size and one of which had a low effect size (stress).

In the final analysis, eight (gender, depression, shyness, self-esteem, social support, social anxiety, maternal expressiveness, paternal expressiveness) of the 11 predictors in this meta-analysis had large or medium effect sizes making them useful variables for practitioners to identify adolescents at risk for loneliness and for advancing knowledge in the field of loneliness. A meta-analysis of predictors of adult loneliness is recommended.

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* Studies included in the meta-analysis.

Table 1.

Profile Statistics of the Predictors of Loneliness

Predictors	Number of Hypotheses	Total Participants	Fail-Safe N	Homogeneity test (Diffuse comparison of effect sizes)		95% Confidence Intervals
				X ²	One-tailed <i>p</i>	
Depression	33	17,691	56,673.14	848.69	0	.595 - .625
No outliers	18	6,058	13,172.55	24.57	.10	.684 - .736
Self-Esteem	31	9,010	19,310.96	230.42	1.54E-31	-.518 - -.562
No outliers	20	6,346	6,801.99	28.89	.06	-.456 - -.515
Social Support	20	3,918	4,952.96	331.14	3.39E-44	-.469 - -.531
No outliers	10	1,623	375.06	15.30	.08	-.251 - -.349
Social Anxiety	15	3,853	3,463.99	58.82	9.26E-09	.409 - .471
No outliers	10	2,705	1,178.69	10.17	.34	.323 - .397
Self-Disclosure	15	2,367	590.64	60.34	4.21E-09	-.189 - -.271
No outliers	10	1,562	88.86	11.32	.25	-.103 - -.177
Shyness	13	3,509	3,721.25	59.01	8.40E-10	.527 - .593
No outliers	8	1,762	1,418.52	8.48	.29	.503 - .597
Stress	10	2,622	554.43	71.57	1.16E-14	.211 - .289
No outliers	6	1,043	70.84	7.59	.18	.119 - .241
Maternal Expressiveness	9	1,090	413.26	5.97	.65	-.311 - -.429

Predictors	Number of Hypotheses	Total Participants	Fail-Safe N	Homogeneity test (Diffuse comparison of effect sizes)		95% Confidence Intervals
				X ²	One-tailed <i>p</i>	
Paternal Expressiveness	9	1,090	415.69	9.61	.29	-.301 - -.419
Age	17	5,617	85.92	56.92	1.77E-07	.034 - .086
Gender	31	17,056	545.40	13,800.35	0	.654 - .686

Table 2.

Significance Levels and Effect Sizes for Each of the Predictors of Loneliness

Predictor	Significance Levels		Effect sizes Mean r^c
	Z for Combination ^a	Associated 1-tailed p^b	
Depression			
Unweighted	68.19 (44.53)	0 (0)	.55 (.61)
Weighted by Sample Size	83.11 (46.10)	0 (0)	.60 (.61)
Weighted by Quality Score	71.30 (45.26)	0 (0)	.56 (.62)
Shyness			
Unweighted	21.97 (27.88)	0 (0)	.50 (.51)
Weighted by Sample Size	22.01 (25.04)	0 (0)	.50 (.47)
Weighted by Quality Score	21.83 (27.49)	0 (0)	.51 (.50)
Self-Esteem			
Unweighted	-41.77 (-30.38)	1(1)	-.49 (-.45)
Weighted by Sample Size	-40.57 (-30.60)	1 (1)	-.48 (-.42)
Weighted by Quality Score	-44.39 (-30.29)	1 (1)	-.50 (-.45)

Predictor	Significance Levels		Effect sizes Mean r^c
	Z for Combination ^a	Associated 1-tailed p^b	
Social Support			
Unweighted	-10.21 (-25.94)	1 (1)	-.29 (-.47)
Weighted by Sample Size	-10.21 (-19.87)	1 (1)	-.27 (-.40)
Weighted by Quality Score-	-10.23 (-26.36)	1 (1)	-.28(-.47)
Social Anxiety			
Unweighted	17.93 (25.05)	1.08E-40 (0)	.35(.41)
Weighted by Sample Size	18.44 (25.80)	9.66E-42 (0)	.35 (.41)
Weighted by Quality Score	18.54 (26.14)	6.06E-42 (0)	.35 (.42)
Maternal Expressiveness			
Unweighted	-11.27	1	-.35
Weighted by Sample Size	-10.93	1	-.34
Weighted by Quality Score	-11.71	1	-.35

Predictor	Significance Levels		Effect sizes Mean r^c
	Z for Combination ^a	Associated 1-tailed p^b	
Paternal Expressiveness			
Unweighted	-11.30	1	-.34
Weighted by Sample Size	-11.15	1	-.34
Weighted by Quality Score	-11.25	1	-.34
Stress			
Unweighted	5.89 (12.36)	2.41E-09 (1.65E-27)	.18 (.25)
Weighted by Sample Size	6.29 (12.67)	2.22E-10 (2.51E-28)	.19 (.26)
Weighted by Quality Score	5.95 (13.06)	1.63E-09 (2.39E-29)	.19 (.26)
Self-Disclosure			
Unweighted	-5.17 (-10.45)	1 (1)	-.19 (-.22)
Weighted by Sample Size	-4.63 (-9.88)	1 (1)	-.13 (-.22)
Weighted by Quality Score	-5.22 (-10.18)	1 (1)	-.14 (-.22)

Predictor	Significance Levels		
	Z for Combination ^a	Associated 1-tailed p^b	Effect sizes Mean r^c
Age			
Unweighted	4.05	2.59E-05	.06
Weighted by Sample Size	2.16	.02	.04
Weighted by Quality Score	3.99	3.24E-05	.07
Gender			
Unweighted	7.09	1.51E-12	.58
Weighted by Sample Size	5.21	1.04E-07	.75
Weighted by Quality Score	6.73	1.49E-11	.58

^a Z without parentheses excludes outliers; Z in parentheses includes outliers.

^b Associated 1-tailed p without parentheses excludes outliers; associated 1-tailed p in parentheses includes outliers.

^c Effect sizes without parentheses excludes outliers; effect sizes in parentheses includes outliers.