Journal of Child and Family Studies (2023) 32:3848–3859
https://doi.org/10.1007/s10826-023-02585-1

REVIEW

Attachment Security with Mothers and Fathers: A Meta-Analysis on Mean-Level Differences and Correlations of Verbal Attachment Measures

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Accepted: 22 April 2023 / Published online: 8 September 2023
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Abstract

As mothers and fathers remain important attachment figures beyond infancy and toddlerhood, comparisons of attachment security of older children with their mothers and fathers are relevant for family researchers and practitioners. We analyzed mean-level differences between verbal reports of attachment security with mothers and fathers, and correlations between both attachments. A systematic search in electronic databases identified 826 studies that were included in random-effects meta-analyses. Although security of attachment with fathers was, on average, lower than security of attachment with mothers, mean-level differences were small ($g = -0.29$). Large correlations were found between security with mothers and fathers ($r = 0.53$). While mean-level differences were larger in studies with questionnaires rather than interviews, the reverse was found when analyzing correlation. The size of mean-level differences increased with age, while the size of the correlation between security with mothers and fathers declined. More recent studies found smaller mean-level differences and larger correlations of security with both attachment figures. There were smaller differences between security with mothers and fathers as well as larger correlations of security with both parents if samples included more intact families. Mean level-differences were smaller and correlations were stronger if studies included more males. Finally, there were larger correlations of security with mothers and fathers in low-risk samples than in clinical/high-risk samples. We conclude that correlations and mean-level differences of self-reported attachment security are stronger than in studies with behavioral measures of observed security in younger children. Further research is recommended on factors that explain the observed correlations and mean-level differences.

Keywords Attachment · Fathers · Mothers · Meta-analysis · Concordance

Highlights

- Security of attachment with fathers tends to be lower than security with mothers.
- Reports on security with mothers and fathers share about 28% of their variance.
- Older participants report larger mean-level differences and lower accordance of attachment with their mothers and fathers.
- Reports on attachment with mothers and fathers have become more similar in recent studies.

There is a growing scientific interest in whether attachment to mothers and fathers tends to be similar or different (e.g., Dagan et al., 2021; Dagan & Sagi-Schwartz, 2019). While some meta-analyses have addressed this topic with regard to observed attachment security in infants and toddlers (Fox et al., 1991; Pinquart, 2022; van IJzendoorn & De Wolff, 1997), mean-level differences in security with mothers and fathers and correlations of security with both attachment figures beyond toddlerhood have not yet been addressed in a meta-analysis or systematic review. Knowledge on these topics is relevant with regard to attachment theory (e.g., for testing the assumption of a coalescence and integration of attachment with mothers and fathers in adolescence; e.g., Bretherton, 1985), research (e.g., whether to separately assess attachment to both parents or only one global

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attachment pattern), and practice (e.g., custody issues; Forslund et al., 2022). The present meta-analysis is the first to test whether mean-level differences and correlations are found when analyzing attachment to both parents beyond toddlerhood, based on verbal attachment measures. In addition, we analyzed moderating effects of study characteristics, such as mean age and gender composition of the sample.

Attachment Security with Mothers Versus Fathers

Infants' and toddlers' attachment security with a parent has been defined as the (observed) child's tendency to use an attachment figure both as a safe haven in times of distress as well as a secure base from which to explore (Bowlby, 1969). Attachment security in older children has been more broadly characterized as a lasting affectionate bond that includes one's general feelings of trust, positive communication, and being accepted and supported in close relationships with one's attachment figure(s) (Armsden & Greenberg, 1987). Bowlby (1969, 1973) had hypothesized that early relationship experiences with the primary caregiver lead to generalized expectations about the self, others, and the world ("working models"), thus indicating (some) continuity between behavioral and verbal assessments of attachment security over time. He described attachment representations as persistent, yet open to revision in light of new experiences. Longitudinal studies showed a moderate correlation between initial behavioral assessments of security with mothers and fathers and verbal measures assessed at a later point in time (Pinquart et al., 2013). The size of this correlation did not differ from the size of longitudinal correlation of two behavioral assessments.

A recent meta-analysis found that infants and toddlers showed, on average, higher attachment security with their mothers rather than fathers (as assessed with behavioral measures, such as the Strange Situation Test), but these differences were very small according to the guideline by Cohen (1992) ($g = -0.07$ standard deviation units; Pinquart, 2022). The present meta-analysis tested whether beyond toddlerhood, individuals will also report higher levels of security with their mothers rather than their fathers (in attachment interviews and questionnaires).

There are three arguments for children being more likely to form secure attachment with their mothers rather than their fathers. First, attachment to several people is hierarchically organized (Bowlby, 1969). For example, Kobak et al. (2005) reported that in late childhood and early adolescence, mothers tend to be on the top of the attachment hierarchy in about 75% of the cases. This trend continues among high school and college students with about 50% of the mothers and 10% of the fathers being the primary attachment figure (N.L. Rosenthal & Kobak, 2010). Second, mothers tend to show, on average, higher levels of behaviors that promote secure attachment compared to fathers. For example, a cross-national study from nine countries found that mothers tend to show higher levels of warmth and sensitivity towards their children than fathers do (Rothenberg et al., 2020), behaviors that are linked to secure attachment of children and adolescents (Koehn & Kerns, 2018). Adolescents tend to perceive their mother as more emotionally available than their father and are more likely to discuss emotional issues with their mother than their father (Miller-Slough & Dunsmore, 2016; Stocker et al., 2007). Third, average differences in security with mothers and fathers may be influenced by the fact that, in the case of non-intact families, children will be more likely to live with their mothers rather than fathers (Forslund et al., 2022; Gall, 2020), thus providing more opportunities for mothers to satisfy their children's attachment needs.

A second focus of research on attachment with mothers and fathers addresses the concordance of attachment patterns to both parents and the correlation of security with both parents. Three meta-analyses on infant and toddler attachment found positive associations of $\phi = 0.17$ to $r = 0.32$ between security with mothers and fathers. This association has been attributed to effects of the child's temperament and/or to similarity of the parent's attachment, as well as the related parental behavior towards the child (Fox et al., 1991; Pinquart, 2022; van IJzendoorn & De Wolff, 1997). The size of correlations may be higher when conducting research beyond toddlerhood with verbal assessments of attachment. First, when applying attachment questionnaires, data on security with mothers and fathers come from the same source – the child's self-report rather than reports from different observers. This leads to shared measurement variance. Second, it has been suggested that by adulthood, the independent representations of attachment to mothers and fathers tend to coalesce and integrate into a single state of mind with respect to attachment (e.g., Bretherton, 1985; Crowell et al., 2002; Furman & Simon, 2004). Based on the acquisition of cognitive skills of formal operations, adolescents become able to build abstractions about their attachment relations, which may make reports on attachment with mothers and fathers more similar. It is less clear whether this leads to a perfect match of attachment with mothers and fathers, as even in the case of a generalized working model of attachment relations, individuals may make relationship-specific adjustments in their representations of others based on the experiences with the individual attachment figures (Cook, 2000).

Factors that May Affect Mean-Level Differences and Correlations of Attachment Security

Assessment Measure

Attachment security beyond toddlerhood is assessed via attachment questionnaires and representational measures, such as attachment interviews and story stem procedures. In interviews, such as the Child Attachment Interview (CAI; Target et al., 2003), participants are asked for evaluations of relationships and/or events as well as actual evidence supporting these evaluations. Assessments of attachment are based on the emotional openness in the description of the attachment relationship, balance of positive/negative references, use of examples, sense of having resolved the conflict, and coherent narrative (Privizzini, 2017). While the coherence of the reports is an important characteristic of security in attachment interviews, attachment questionnaires (Armsden & Greenberg, 1987) ask for self-categorizations as securely or insecurely attached (Bartolomew & Horowitz, 1991), or sum-up self-ratings on feelings of trust, positive communication, and being accepted and supported in a close relationship with an attachment figure (e.g., Armsden & Greenberg, 1987). As some subscales of the CAI measure behaviors that are at least partially independent from specific attachment figures (e.g., expressing and labeling emotions, using examples, overall coherence, Target et al., 2003), associations of security with mothers and fathers may be stronger and mean-level differences may be weaker than in attachment questionnaires where each item addresses experiences with a specific attachment figure.

Child Age

Based on the assumption of an age-associated coalescence and integration of attachment representations to mothers and fathers (e.g., Bretherton, 1985; Crowell et al., 2002; Furman & Simon, 2004), the size of the correlation between reported security with mothers and fathers is expected to increase across adolescence. The assumption of coalescence of attachment with different attachment figures also indicates that mean-level differences between attachment security with mothers and fathers may decline in adolescence.

Family Structure

After parental divorce, physical custody is granted exclusively to the mother in the majority of cases (Gall, 2020). As many researchers assume that physical custody by an individual parent facilitates secure attachment with this caregiver (Forslund et al., 2022), we tested whether mean-level differences in attachment security will be amplified if samples include more children who live with only one parent, as this would be most often the mother. We also tested whether the correlation of security with both parents will be reduced if children share the household with only one parent as they will be less likely to use the other parent for satisfying their attachment needs.

Child Gender

The present meta-analysis tested whether the trend of higher attachment security with mothers is amplified in studies with higher percentages of girls. A number of individual studies had found this (Diener et al., 2008; Keizer et al., 2019), which may indicate that parents tend to be more emotionally involved in the lives of children of the same sex. In particular, mothers have been found to be more emotionally expressive to daughters than sons and to engage in more positive interactions with daughters than with sons (Brody, 1993; Root & Denham, 2010). This could promote secure attachment of daughters with their mothers, in particular.

Cohort Differences

Scholars have noted a cultural shift in the father role with today's fathers being ideally more emotionally involved with their children (Bretherton, 2010; Wall & Arnold, 2007). At the same time, increasing rates of working mothers (Lubotzky & Qureshi, 2018) reduced disparities in the time that mothers and fathers spend with their children. Thus, we tested whether mean-level differences in security with mothers and fathers would be smaller in more recent studies while the size of the correlation increased.

Study Quality

Three variables from the Mixed Methods Appraisal Tool (Hong et al., 2018) were used to evaluate study quality (validity of attachment measure, sampling, response rate). As a previous meta-analysis could not find significant moderator effects of these (Pinquart, 2022), we did not state a directed hypothesis.

Publication Status

We tested whether the size of mean-level differences and correlations would be smaller in unpublished studies compared to published ones because of a possible file-drawer problem (R. Rosenthal, 1979).

Research Questions

The first research question asked whether individuals report, on average, lower levels of attachment security with their

fathers than with their mothers. The second research question asked for the size of correlation between attachment security with each parent. The third research question asked whether the sizes of mean differences and correlations are moderated by child age, assessment measure (interview versus questionnaire), living situation (with both parents versus one), child gender, year of publication, quality of study, and publishing status.

Method

Data Collection

A systematic search for studies was conducted in five electronic databases [Google Scholar, ProQuest Dissertation & Theses Global, PSYCINFO, PSYNDEX, PubMed] with the combined search terms: attachment AND mothers AND fathers. The References Sections of the identified papers were checked for additional studies. We included studies that met the following inclusion criteria: Studies (a) separately assessed attachment security with mothers and fathers, (b) used self-report measures of attachment security (interviews or questionnaires), (c) reported correlations or cross-tabulations of attachment security with both parents and/or provided mean levels and standard deviations of attachment security with mothers and fathers, and (d) were published or presented before October, 2022.

Studies were excluded if they (a) used observational measures of attachment security, (b) reported only a sum score of attachment to parents and/or (c) reported attachment to two parents of the same sex (because this would not allow comparing security with fathers and mothers).

No language restrictions were applied. We also set no limit for the highest age of the participants, although separate assessments of attachment with mothers and fathers were rarely reported beyond college age. Unpublished studies (e.g., dissertations) were identified as part of the systematic search using the electronic databases and cross-referencing. If we had no access to the full text, we contacted the authors if contact information was available. The final literature search was completed on October 3rd, 2022. We identified 2871 papers. After screening and assessing for eligibility, we were able to include 826 studies in the meta-analysis. The meta-analysis was conducted following PRISMA guidelines. The PRISMA flow chart is provided in Fig. 1, and the studies included are listed in supplementary online material I and II.

The following data were entered: number of participants, children's mean age (in years), percentage of female participants, percentage of children who belonged to an ethnic minority, percentage of children living with both parents, year of publication/presentation, publication status (1 = published, 2 = unpublished), type of assessment of attachment (1 = interview, 2 = questionnaire), name of the measure, study quality, and the size of difference of attachment security between mothers and fathers, as well as the size of the correlation between both attachments.

With regard to study quality, studies with community samples were considered of high quality as compared to those with clinical/at risk samples, as we were interested in attachment to mothers and fathers in the general population. Measures of attachment security were considered of high quality if support for the validity was provided in the study or in other included studies. As there was no consensual criterion for an adequate response rate, we used a median split and categorized studies with a response rate of ≥75% as fulfilling this criterion.

If data were available for subgroups (e.g., male and female participants), separate effect sizes for the subgroups were coded. All studies were coded by the author, and a random sample of 40 studies was coded by a psychologist with experience in meta-analyses. Bonett (2002) had shown that a sample size of 21 is required for reliably estimating an intra-class coefficient with a proportion of 90% agreement between two raters. Inter-rater reliability was high (mean intra-class correlation = 0.92). Differences between the two coders were resolved by discussion.

Analytic Approach

Calculations for the meta-analysis were performed with *Comprehensive Meta-Analysis* software (CMA; Borenstein et al., 2005), random-effects models, and the method of moments.

We computed the standardized difference between levels of attachment security with fathers and mothers, divided by the pooled standard deviation (*SD*). If the number of individuals with and without secure attachment were reported instead of continuous security scores, logged Odds-Ratios (*OR*) were computed and transformed into *d*-scores (Lipsey & Wilson, 2001). Associations of attachment security with mothers and fathers were coded as Pearson correlation coefficients or ϕ-coefficients, which are statistically equivalent. Outliers that were more than two *SD's* from the mean of the effect sizes were recoded to the value at two *SD's* (Lipsey & Wilson, 2001). In order to correct for bias due to overestimation of the population effect size in small samples, we transformed *d*-scores to Hedges' *g*. Correlation coefficients were transformed using Fisher's *r*-to-*z* transformation.

We computed weighted mean effect sizes and 95% confidence intervals (*CI*). The mean *z*-scores were later converted to the original metric of product–moment correlations. Significance of the mean was tested by dividing the weighted mean effect size by the standard error of the mean.

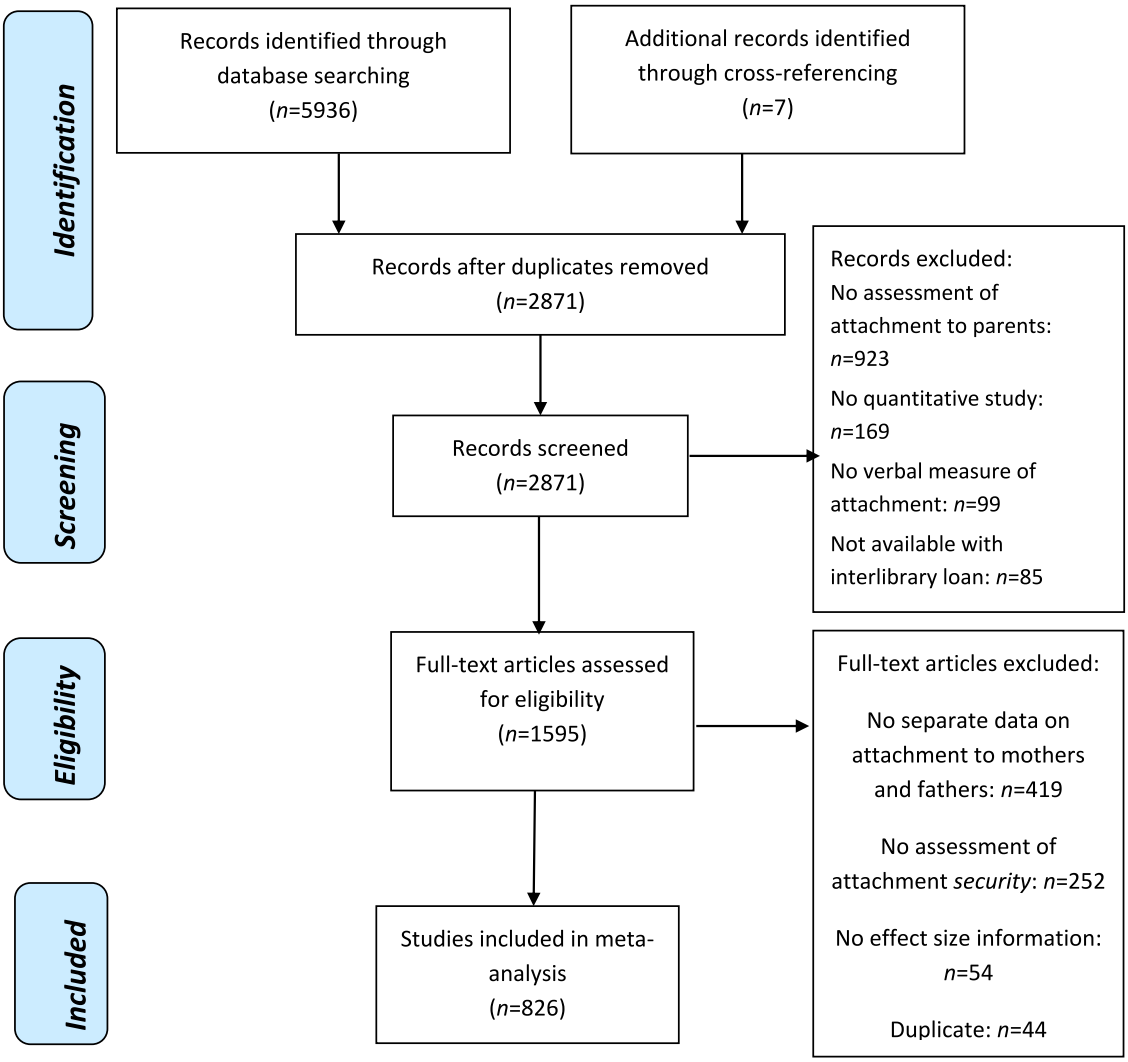


Fig. 1 PRISMA Flow Diagram

To interpret the practical significance of the results, we used criteria by Cohen (1992) and Schuengel et al. (2021). Cohen (1992) defined $r = 0.1/g = 0.2$ as a small, $r = 0.3/g = 0.5$ as a medium, and $r = 0.5/g = 0.8$ as a large effect size. Schuengel et al. (2021) suggested $r = 0.1$ for small, $r = 0.2$ for medium, and $r = 0.3$ for large effect sizes in the field of attachment research. Homogeneity of effect sizes was analyzed by use of the Q and I^2 statistics.

An analogue of the analysis of variance was used for testing moderator effects of categorical variables. Weighted regression analyses (meta-regressions) were applied for continuous moderator variables. Finally, we used Egger's regression test and trim-and-fill analysis for analyzing whether the results may be influenced by publication bias (Duvall & Tweedie, 2000). Egger's regression test analyzes asymmetry of the funnel plot, that is the graphical representation of the standard errors plotted against the effect sizes of the studies. Funnel plot asymmetry is a possible sign of publication bias, although asymmetry can also be found if both effect sizes and its standard errors are correlated with study characteristics. Trim-and-fill procedure corrects for funnel plot asymmetry by imputing possibly missing effect sizes needed for producing a symmetrical funnel plot, and re-estimating effect sizes.

Results

Data from 313,365 children, adolescents, and young adults were included in the present meta-analysis. The participants had a mean age of 15.44 years ($SD = 4.75$); 54.8% of them were female, and 29.3% belonged to an ethnic minority. In studies that reported type of family, the majority of children and adolescents (79.5%) lived with both parents while 17.5% lived only with their mothers and 2.3% only with their fathers.

Attachment was assessed with versions of the Inventory of Parent and Peer Attachment (IPPA; Armsden &

Table 1 Mean-level difference between attachment security to fathers and mothers

Condition	*k*	*g*	95%-CI		*Z*	*Q*	I^2
Total	1217	−0.29	−0.30	−0.28	−49.66***	10705.96***	88.6
Kind of Assessment						50.17***	
Interviews	76	−0.11	−0.16	−0.06	−4.17***	70.57	0
Questionnaires	1138	−0.30	−0.31	−0.29	−48.87***	1131.01***	0
Attachment measure						94.84***	
CAI	46	−0.06	−0.12	0.01	−1.68	16.34	0
IPPA	838	−0.31	−0.32	−0.29	−43.84***	851.00	1.6
PAQ	36	−0.23	−0.30	−0.17	−6.79***	20.61	0
QVPM	22	−0.08	−0.16	0.01	−1.95	21.90	4.0
RQ	21	−0.42	−0.51	−0.33	−9.21***	9.43	0
KSS	143	−0.27	−0.30	−0.23	−15.17***	109.96	0
Other measures	111	−0.31	−0.35	−0.27	−16.02***	175.87***	37.5
Support for validity of the attachment measure						0.01	
Yes	1135	−0.29	−0.30	−0.28	−46.06***	1099.11	0
Limited	82	−0.28	−0.34	−0.25	−12.51***	112.67*	28.0
Sampling						0.10	
Community (convenience sample)	1022	−0.29	−0.30	−0.28	−44.27***	979.10	0
Clinical/at risk	195	−0.29	−0.33	−0.26	−17.87***	232.91*	16.7
Response rate						0.87	
≥75%	209	−0.28	−0.31	−0.25	−19.43***	152.73	0
<75%/not reported	1007	−0.29	−0.31	−0.28	−43.56***	1057.80	4.9
Publication status						2.96	
Unpublished	327	−0.31	−0.33	−0.28	25.82***	333.78	2.3
Published	890	−0.28	−0.30	−0.27	40.25***	878.37	0

Note. k = number of effect sizes, g = difference between security to fathers and mothers (negative g-scores indicate lower security to fathers than mothers). *CI* confidence interval, Z = test for significance of g, Q = test for homogeneity of g, I^2 = ratio of true heterogeneity to total observed variation.

*$p < 0.05$; ***$p < 0.001$.

Greenberg, 1987; 569 studies), the Security Scale (KSS; Kerns et al., 1996; 98 studies), the Child Attachment Interview (CAI; Target et al., 2003; 32 studies), the Parental Attachment Questionnaire (PAQ; Kenny, 1987; 22 studies), and related measures (105 studies). Regarding study quality, 93.6% of the studies applied validated attachment measures and 86.7% used community samples rather than clinical or at-risk samples; the median response rate was 75.2%.

When pooling the results of all included studies, we found lower security with fathers than with mothers ($g = -0.29$; Table 1). This difference can be interpreted as small (Cohen, 1992). The size of the difference means that about 2.1% of the variance of security can be explained by parental gender (Lipsey & Wilson, 2001). The I^2 and Q-statistic show between-study heterogeneity, thus indicating a need for moderator analysis.

The weighted mean correlation between security with fathers and mothers was $r = 0.53$ (Table 2), indicating that attachment to fathers and mothers shared 28% of their variance. The mean correlation was, again, heterogeneous.

Next, we searched for sources of heterogeneity. Results on categorical moderators are reported in Tables 1 and 2, and results on continuous moderator variables are presented in Tables 3 and 4.

We observed that differences between security with fathers and mothers became larger as age increased, and age explained 4% of the variance of the effect sizes. The size of the correlation decreased with age, with age explaining 6% of the between-study variance.

The sizes of the mean-level differences and of the correlations also varied by the type of assessment of attachment. While only very small mean differences between security with mothers and fathers were found in studies with attachment interviews (in favor of mothers, $g = -0.11$), the size of the difference increased to $g = -0.30$ if questionnaires were used (Table 1). In contrast, the size of the correlation of security with mothers and fathers was significantly larger in studies with interview measures ($r = 0.63$) than in those with attachment questionnaires ($r = 0.52$; Table 2).

When comparing research with the six most common attachment measures, studies with the CAI and the

Table 2 Correlation between attachment security to fathers and mothers

Condition	*k*	*r*	95%-CI		*Z*	*Q*	I^2
Total	582	0.53	0.51	0.54	62.62***	8861.22***	93.4
Kind of assessment						9.00**	
Interviews	25	0.63	0.56	0.68	14.71***	61.52**	61.0
Questionnaires	557	0.52	0.51	0.54	60.63***	523.22	0
Attachment measure						55.74***	
CAI	14	0.77	0.71	0.82	14.99***	21.85	40.5
IPPA	416	0.52	0.50	0.53	54.27***	414.32	0
PAQ	16	0.60	0.53	0.67	12.43***	18.13	17.3
QVPM	5	0.60	0.47	0.71	7.29***	7.59	47.3
RQ	10	0.35	0.22	0.47	5.40***	1.15	0
KSS	69	0.52	0.48	0.56	21.77***	60.13	0
Other measures	52	0.53	0.49	0.58	19.30***	61.29	16.8
Support for validity of the attachment measure						0.00	
Yes	545	0.53	0.51	0.54	59.93***	540.08	0
Limited	37	0.52	0.46	0.57	15.65***	46.63	22.8
Sampling						6.54*	
Community (convenience sample)	524	0.53	0.52	0.55	60.10***	501.47	0
Clinical/at risk	55	0.47	0.42	0.52	15.41***	82.26**	34.4
Response rate						0.37	
≥75%	117	0.53	0.50	0.56	28.85***	108.94	0
<75%/not reported	464	0.53	0.51	0.56	55.09***	477.17	3.0
Publication status						2.52	
Unpublished	163	0.51	0.49	0.54	30.93***	188.32	14.0
Published	419	0.53	0.52	0.55	53.81***	398.10	0

Note. k = number of effect sizes, r = correlation, *CI* confidence interval of r, Z = test for significance of r, Q = test for homogeneity of r. I^2 = ratio of true heterogeneity to total observed variation.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 3 Moderating effects of study characteristics on the size of difference between attachment with mothers and fathers

Predictor	*k*	*B*	95%-CI		β	*Z*	R^2
Child age	1087	−0.0087	−0.0114	−0.0060	−0.19	−6.35***	0.04
Percent intact families	357	0.0013	0.0003	0.0022	0.14	2.62**	0.02
Percent girls	1153	−0.0013	−0.0017	−0.0010	−0.21	−7.43***	0.05
Year of publication/ presentation	1217	0.0034	0.0018	0.0049	0.12	4.24***	0.01

Note. k = number of effect sizes B/β = un-/standardizes regression coefficient, *CI* confidence interval of B, Z = test for significance of B, R^2 = explained variance.

*$p < 0.05$; ***$p < 0.001$.

Table 4 Moderating effects of study characteristics on the correlation of attachment security with mothers and fathers

Predictor	*k*	*B*	95%-CI		β	*Z*	R^2
Child age	510	−0.0111	−0.0151	−0.0072	−0.24	−5.56***	0.06
Percent intact families	176	0.0043	0.0028	0.0058	0.38	5.62***	0.15
Percent girls	548	−0.0009	−0.0016	−0.0002	−0.10	−2.43*	0.01
Year of publication	582	0.0040	0.0015	0.0066	0.13	3.07**	0.02

Note. k = number of effect sizes B/β = un-/standardizes regression coefficient, *CI* confidence interval of B, Z = test for significance of B, R^2 = explained variance.

*$p < 0.05$; ***$p < 0.001$.

Portuguese Questionnaire of Attachment with Fathers and Mothers (QVPM; Matos & Costa, 2001) did not find significant mean-level differences (Table 1). In contrast, security with fathers was significantly lower than security with mothers in studies that used the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991; $g = -0.41$), the IPPA ($g = -0.31$), the KSS ($g = -0.27$), the PAQ ($g = -0.23$), and other measures ($g = -0.31$).

We also found a moderating effect of the attachment measures on the size of the correlations between security with mothers and fathers (Table 2). While significant correlations were observed for all compared measures, the correlation was larger in studies with the CAI ($r = 0.71$) than in the other studies. Correlations were also larger in studies that used the PAQ ($r = 0.60$) than in studies with the RQ ($r = 0.35$).

There were smaller mean-level differences (Table 3) and stronger correlations (Table 4) in studies with higher percentages of intact families, with family structure explaining 15% of the variance of the correlation coefficients. The size of security differences was also moderated by child gender. The trend of higher attachment security with mothers than fathers was amplified if samples included larger percentages of girls, and child gender explained 5% of the variance of the mean level differences (Table 3). We also compared the mean-level differences in subsamples that included only girls versus boys. A relatively higher security with mothers over fathers was found in both subsamples, although the difference was larger in girls-only samples ($Q = 42.69$, $p < 0.001$; girls-only: $k = 263$, $g = -0.35$, CI -0.38 to -0.33, $Z = -28.25$, $p < 0.001$; boys-only: $k = 254$, $g = -0.24$, CI -0.26 to -0.21, $Z = -18.04$, $p < 0.001$). The correlation of security with mothers and fathers declined in studies with a higher percentage of girls.

In more recent studies, we found smaller mean-level differences between security with fathers and mothers (Table 3), as well as higher correlations of security with both parents (Table 4). We found only one moderating effect of study quality: Correlations of security with mothers and fathers were stronger in community-based, low-risk samples than in clinical and at-risk samples (Table 2).

Finally, we tested whether the effect sizes differed between published and unpublished studies and found no moderating effect of publication status. Egger's test identified funnel plot asymmetry of the distribution of mean-level differences and correlations, $t(1216) = 3.58$, $p < 0.001$; $t(581) = 3.70$, $p < 0.001$; funnel plots can be found in the supplementary online material III. The trim-and-fill analysis added three possibly missing difference scores, but the recomputed mean difference between security with fathers and mothers remained unchanged ($g_{corr} = -0.29$, CI -0.30 to -0.27, $Z = -45.53$, $p < 0.001$). In addition, the trim-and-fill algorithm added 83 possibly missing correlation coefficients and the mean correlation increased slightly ($r_{corr} = 0.56$, CI 0.55 to 0.57, $Z = 82.99$, $p < 0.001$).

Discussion

Based on 826 papers, the present meta-analysis showed that self-reported attachment of young people is, on average, more secure with their mothers rather than fathers, but this difference is smaller when using attachment interviews rather than questionnaires such as the IPPA, KSS, and RQ. Attachment security with mothers and fathers was, on average, strongly correlated, with attachment interviews finding the strongest concordance. In addition, mean-level differences and/or correlations of attachment to mothers and fathers varied by child age, child gender, family structure (living with both parents), year of publication, and sampling procedure.

When comparing the present results on mean-level differences in verbal attachment measures to those on behavioral measures of attachment security (Pinquart, 2022), we found larger differences in studies with attachment questionnaires, while the size of mean-level differences in behavioral measures and attachment interviews were very similar. In contrast, questionnaire and interview data on security with mothers and fathers were more strongly correlated than behavioral measures (Fox et al., 1991; Pinquart, 2022; van IJzendoorn & De Wolff, 1997).

The observed largest mean-level differences in studies with attachment questionnaires may be based on particularities in the assessed contents. Most of these questionnaires address the general quality of the relationship with the caregiver rather than focusing exclusively on the secure base and safe haven function as core components of attachment (Bowlby, 1969). For example, some items of the IPPA ask whether children perceive their mothers and fathers as good parents, whether the parents are perceived as expecting too much from their child, or whether the child gets upset easily with the individual parent (Armsden & Greenberg, 1987). The focus on the relationship quality in these attachment questionnaires may cause stronger differences between the perception of the mother-child and father-child relationship than the narrower focus on the secure base and safe haven function of relations to the parents in behavioral measures.

The observed largest difference between levels of security with mothers and fathers in the RQ may be based on the measure's strong focus on emotional closeness. The security items ask about becoming emotionally close with the attachment figure and feeling comfortable depending on the attachment figure (Bartholomew & Horowitz, 1991).

These descriptions may be most fitting for the mother-child relationship while other aspects of supporting and protecting the child that may fit similarly for both parents (Miller-Slough & Dunsmore, 2016; Nievar & Becker, 2008; Paquette, 2004).

The higher correlation between security with mothers and fathers in verbal as compared to behavioral measures may be based, amongst others, on shared method variance as verbal reports on attachment come from the same source, the child, while different observers tend to code the attachment behavior with mothers versus fathers (Fox et al., 1991). A trend of giving socially desirable answers could also increase the correlation of reports on attachment with mothers and fathers, although associations of verbal reports on attachment with social desirability tend to be small (e.g., Armsden & Greenberg, 1987; Kenny & Donaldson, 1992). Specifics of the CAI probably explain the above-average association between maternal and paternal attachment, such as the assessment of behaviors that are at least partially independent from the relationship with a specific attachment figure (e.g., expressing and labeling emotions and using examples, Target et al. 2003).

The observed decrease of the correlation between security with mothers and fathers and the increase in mean-level differences in older samples contradicts the assumption of an increasing integration and coalescence of attachments with mothers and fathers across adolescence and young adulthood (Bretherton, 1985; Crowell et al., 2002; Furman & Simon, 2004). Our results indicate that experiences with mothers versus fathers and/or perceptions of these experiences become more divergent with increasing age. This increasing divergence might result, amongst others, from the higher parental divorce rates in families with older children (Kippen et al., 2013) or from children moving out of the parental home which could lead to more individualized contact with individual parents (e.g., by phone; Sargiani et al., 2013). In fact, if a higher percentage of the children lived only with one parent, the size of mean-level differences between security with mothers and fathers increased while correlations decreased. This reflects the fact that after divorce or parental separation, physical custody is predominantly granted to the mother (Gall, 2020), thus increasing her tendency to satisfy most attachment needs of the child. Alternatively, differences between security-promoting behaviors of mothers and fathers may, in general, increase across adolescence and emerging adulthood. However, available studies found no support for this assumption (Desjardins & Leadbeater, 2017; Liu et al., 2022).

The observed moderating effects of child gender indicate that girls differ more between attachment with their mothers and fathers than boys do. This may be based on the particularly high emotional expressiveness of the mother-daughter dyad (Brody 1993; Root & Denham, 2010). Nonetheless, we also found higher security with mothers than fathers in samples that included only male children. Thus, we conclude that young people of both genders tend to report more security with their mothers rather than with their fathers.

The cultural shift in expectations about more emotionally involved fathering (Bretherton, 2010; Wall & Arnold, 2007) and increased employment of mothers (Lubotzky & Qureshi, 2018) probably explains the observed decline in the size of difference between attachment with mothers and fathers, and the increase of the correlation of maternal and paternal attachment in the more recent studies. Nonetheless, moderating effects of time of measurement were statistically small (Cohen, 1992; Schuengel et al., 2021).

The present results were robust with regard to most assessed criteria of study quality. For example, non-validated assessments of security were often derived from validated measures, which probably reduced the differences between results of studies with validated and non-validated measures. The smaller correlation in studies with clinical/at risk samples indicates that some risk factors for mental health problems affect attachment with mothers versus fathers to a different extent (e.g., reducing, in particular, the security with the perpetrator of family violence; Baer & Martinez, 2006).

Comparisons of results from published and unpublished studies as well as Egger's test and trim-and-fill analysis indicate that there was no evidence for the overestimation of effect sizes in published studies (a file-drawer problem; Rosenthal, 1979). As mean-level differences between security with mothers and fathers and correlations of both security scores were not the central research questions of most included studies, related nonsignificant results would not affect the probability of being published. The observed asymmetry of the funnel plot of correlations of security with mothers and fathers may have been based on the fact that studies with attachment interviews found above-average correlations while assessing rather small samples.

Limitations and Conclusions

Some limitations of the present meta-analysis have to be mentioned. First, we limited our meta-analysis to attachment *security*. Meta-analytic comparisons of other patterns of attachment with mothers and fathers could be conducted in future studies. Second, the number of studies was limited in some subgroups, such as those using the CAI. Third, some of the included studies combined data on biological parents and a few stepparents. We were not able to compute separate analyses on both targets. In addition, a few participants had only provided data on attachment with one parent. While correlations always only refer to those participants who provided information on attachment to both parents, some difference scores included a few participants

who provided data on only one parent. As only a few participants did not provide data on both parents, they probably had a minimal impact on our results. Finally, although the included studies implicitly assumed that security of attachment with mothers and fathers can be assessed with the same instrument without restrictions, most studies did not explicitly test for measurement invariance.

Despite these limitations, the following conclusions can be drawn. First, although young people tend to be more secure with their mothers than with their fathers, the size of these differences is small on average, and even very small when using attachment interviews.

Second, we conclude that verbal measures of attachment security provide stronger correlations of security with mothers and fathers than behavioral measures do. Although reports on attachment with mothers and fathers tend to be strongly correlated, the mean correlation of $r = 0.53$ indicates that these measures reflect similarities as well as differences between the relationships with both parents. These differences are, in particular, obvious if the child lives only with one parent. Thus, separately assessing attachment with both parents provides a more differentiated picture than only assessing security with one parent or with the parents (as a dyad). Third, we conclude that, in contrast to assumptions on the coalescence and integration of attachment with mothers and fathers in adolescence (Bretherton, 1985), verbal reports on attachment with mothers and fathers tend to become more dissimilar with increasing age. Although we offered some possible reasons for this, roles of increasing parental divorce rates, leaving the parental home, and other factors need to be systematically tested. Fourth, we conclude that reports on attachment with mothers and fathers have become more similar in recent cohorts, probably reflecting changes in fathers' and mothers' roles. Fifth, although the size of difference between reported security with mothers and fathers varies by child gender, we conclude that there is no evidence for sons being more securely attached to their fathers than their mothers.

Sixth, with regard to future research needs, we recommend more studies on attachment with mothers and fathers of children who live with only one of their biological parents, particularly in cases where the father has custody. We also recommend studies that empirically identify sources of correlations as well as mean-level differences in security with mothers versus fathers, such as the quality of behaviors of mothers and fathers and the emotional availability of the parents (Sargiani et al., 2013).

Implications

Regarding practical implications, family courts have often assumed that the best decision would be to maximize the likelihood of secure attachment with one primary caregiver, which is usually the mother (Forslund et al., 2022). However, the observed small differences between security with mothers and fathers indicate that children and adolescents are almost equally likely to form secure attachment with both parents, and in intact families in particular. We conclude that joint physical custody will likely promote opportunities to form and retain secure attachment with both parents.

Given the small mean-level differences in favor of security with mothers, more efforts are recommended to include fathers in interventions aimed at promoting secure attachment and positive family relationship. Recently, Hoegler et al. (2023) showed that a family-based program aimed at improving the parent-child and marital relationship increased attachment security of adolescents with mothers and fathers.

Materials Availability

Selected information on the included individual studies is available as an electronic supplement.

Supplementary information The online version contains supplementary material available at https://doi.org/10.1007/s10826-023-02585-1.

Funding Open Access funding enabled and organized by Projekt DEAL.

Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

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