

Does Anxiety Attachment Determine Sexting? A Meta-Analysis

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Abstract. Sexting is sexual behavior related to the use of communication technology. Anxiety attachment is a determining factor because it influences emotion-based social relations regarding sexuality. Therefore, a meta-analysis needs to be conducted to confirm this. The aim of this study was to measure the strength of the correlation between anxiety attachment and sexting by considering the effect size. This meta-analysis involved 36 studies with a total of 17,568 participants. The findings showed a weak correlation between anxious attachment and sexting ($r = 0.113$; $z = 4.816$, $p < .01$; 95% CI [0.06; 0.17]). This same correlation pattern was observed when the assessment was conducted among the general and married people group ($r = 0.125$; $z = 2.757$, $p < .01$; 95% CI [0.04; 0.21]), and the high school and college student group based on their educational level ($r = 0.107$; $z = 4.086$, $p < .01$; 95% CI [0.06; 0.16]). For these three groups, the heterogeneity test showed significant results, indicating a symmetrical distribution of scores based on the results of the funnel test and Egger's test. The findings also showed no publication bias. In other words, this meta-analysis proves that anxiety attachment is a determining factor but not a strong antecedent of sexting.

Keywords: anxiety attachment; emotion-based social relations; meta-analysis; sexting

Introduction

Sexting, as a social phenomenon, has not been popular for a long time. It involves a combination of sex and texting (Short Message Service, or SMS), wherein messages with sexual content are sent via information technology devices such as telephones (Bauermeister et al., 2014; Chalfen, 2009). The perpetrators themselves are referred to as sexters (Chalfen, 2009; Galovan et al., 2018). Further developments reveal that sexting is not only limited to text but also includes sexually provocative images and videos of oneself or others (Drouin et al., 2013; Gómez & Ayala, 2014; Weisskirch & Delevi, 2011; Zhang, 2010).

Sexting was found to be associated with other deviant behaviors related to sexuality, and this association is considered dangerous (Temple et al., 2019). Several studies have explained the

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association between sexting and risky sexual behavior, such as increased frequency of casual sex (Makgale & Plattner, 2017), inconsistency in condom use (Kosenko et al., 2017; Mori et al., 2021), and a higher number of casual sex partners (Kosenko et al., 2017; Rahardjo et al., 2015; Rahardjo et al., 2014; Yu & Zheng, 2020). Because it is related to risky sexual behavior, one of the domino effects is the high potential for infection with sexually transmitted diseases and HIV/AIDS (Halverson et al., 2022; Ward-Peterson et al., 2018). This is one of the most basic reasons for understanding sexting comprehensively through various types of research.

Several previous studies have examined sexting as a predictor variable for risky sexual behavior (Ayinmoro et al., 2020; Crimmins & Seigfried-Spellar, 2014). Meanwhile, there are not many studies that place sexting as a criterion variable. Several other studies have focused on demographic variables as antecedents such as age, gender, race, relationship status, and education (Benotsch et al., 2013; Drouin & Landgraff, 2012; Weisskirch & Delevi, 2011), some of which did not show significant correlation (Klettke et al., 2014).

Evidently, not many studies have examined the role of a variable as a dominant determining factor in sexting. Sexual scripts, for example, drive gender to become a demographic factor that triggers sexting (Gibson, 2016). Another factor considered to be a trigger is sexual motivations to tempt and get a sexual partner, attract a sexual partner, have fun with sexual encounters, and even express oneself (Drouin et al., 2013; Henderson, 2011). The internal factors found to trigger sexting are sexual sensation seeking (Rahardjo et al., 2015), low self-control (Reyns et al., 2014), and subjective norms (Walrave et al., 2014), or clinical reasons such as sexual coercion or sexual abuse (Rollero et al., 2023; Ross et al., 2019). Meanwhile, a review of the literature found many studies on sexting that placed attachment, especially anxiety attachment, as a determinant or antecedent.

Therefore, it is crucial to conduct a meta-analysis regarding anxiety attachment and sexting because several previously published sexting studies related to meta-analysis are still general in nature (Madigan et al., 2018; Mori et al., 2022). Even when a meta-analysis on sexting is available, it has focused solely on one specific variable, namely risky sexual behavior, as conducted by Kosenko et al. (2017). Attachment anxiety is also important in relation to sexting because it represents an internal factor that arises from emotion-based social relationships within the environment, such as those with parents. This is crucial because it also influences social relationships based on emotional closeness with other people, such as sexual partners or close friends (Weisskirch & Delevi, 2011). Therefore, it is important to understand sexting through meta-analysis involving specific antecedents such as anxiety attachment and obtain information regarding the true correlation (r) of the relationship between the two.

Method

Protocol Design

This meta-analysis summarizes several studies related to anxiety attachment and sexting. The selection of studies involves several stages, including identification, screening, eligibility, and inclusion of

studies for research. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) 2020 guidelines from Page et al. (2021) were used in the study selection process.

Search Strategy

Comprehensive efforts have been made to search for literature that is considered appropriate and representative for this research. The electronic databases used include EBSCO, SAGE, Elsevier, Taylor & Francis, and Springer. Google Scholar was used for registration. These electronic databases were chosen because they are the main literature sources that publish psychology journals and other scientific disciplines relevant to this research. The bibliography of the literature found spans from 2011 to 2022.

Inclusion Criteria

The literature search in this meta-analysis is based on several characteristics, namely (1) quantitative studies, (2) studies involving anxiety attachment variables as independent variables or antecedents and sexting as dependent variables, (3) studies conducted both globally and in national settings in Indonesia, and (4) studies conducted in English.

Exclusion Criteria

Several criteria serve as guidelines for excluding literature from this meta-analysis. Some of these criteria are as follows: (1) letters to the editor; (2) meta-analyses with the same theme and already published; (3) undergraduate theses, master's theses, and dissertations; (4) proceedings; and (5) literature with unclearly traceable publication resources. Additional considerations, such as unclear final statistical results, are also used as guidance in the final screening stage to determine the eligibility of studies to be included in this meta-analysis.

Data Collections and Analysis

The author conducted a search and screening process starting with the use of keywords, as well as modifying keywords from database sources and registers. The keywords were "anxiety attachment AND sexting," "anxious attachment AND sexting," and "attachment AND sexting." The studies that were found were then selected independently. Internal discussions were also conducted with other members of the writing team. The final decision is reached once the inclusion criteria are met, and other main requirements are clearly informed, such as the existence of a determined correlation coefficient, other statistical results that can be converted into a correlation coefficient, and the number of participants for each study.

Data Extraction

Data were extracted based on criteria previously determined by the author, including core criteria. Data extraction was also performed independently.

Statistical Analysis

Each selected literature was assessed to determine the number of studies. Subsequently, each study was reviewed, and the correlation coefficient and number of participants were identified. If the statistical findings are presented as scores in the form of F, d, t, or R, then they are converted into an r score. The next statistical step is to calculate the effect size (z), variance (Vz), and standard error (SEz). The results are then processed using the JASP 0.18.1.0 statistical program. This statistical program was used for all primary data processing in this meta-analysis. The main tasks involve searching for calculations related to the heterogeneity test, summary effect size, forest plot, funnel plot, Egger's test, and fail-safe N test.

Result

Screening results revealed that all groups of participants in various studies were sexters. However, there are variations in specific groups, namely the general and married people group and the high school and college student group. The majority of studies used the scale developed by Wei et al. (2007) to measure attachment anxiety. Conversely, measurements for sexting come from more varied sources, and no particular scale holds dominance. The national setting where the overall study was conducted was in the USA.

Based on keyword searches and other criteria, this meta-analysis succeeded in finding 28 pieces of literature. By considering the removal of duplicates and inclusion and exclusion criteria, 36 studies from 11 pieces of literature were considered eligible for review. For more details, see Figure 1 and Table 1. Meanwhile, the total number of participants collected was 17,568. For the general and married people group, the total sample included 7801 individuals, whereas for the high school and college student group, the total sample comprised 9767 individuals.

Table 2 presents the Q statistics for the heterogeneity test. Apart from studies involving all participants, meta-analysis was also carried out on studies involving groups of general and married people as well as groups of high school and college students. For the entire sample, the analysis results showed that the 36 studies examined were classified as heterogeneous ($Q = 192.135; p < .01$). These results indicate that the random-effects model is more suitable for estimating the average effect size of the 36 studies analyzed. Meanwhile, in the general and married people group, the 15 studies analyzed were also classified as heterogeneous ($Q = 93.147; p < .01$), and similarly, in the high school and college student group, the 21 studies were also found to be heterogeneous ($Q = 97.671; p < .01$).

Figure 1

PRISMA for Depicting the Screening Process

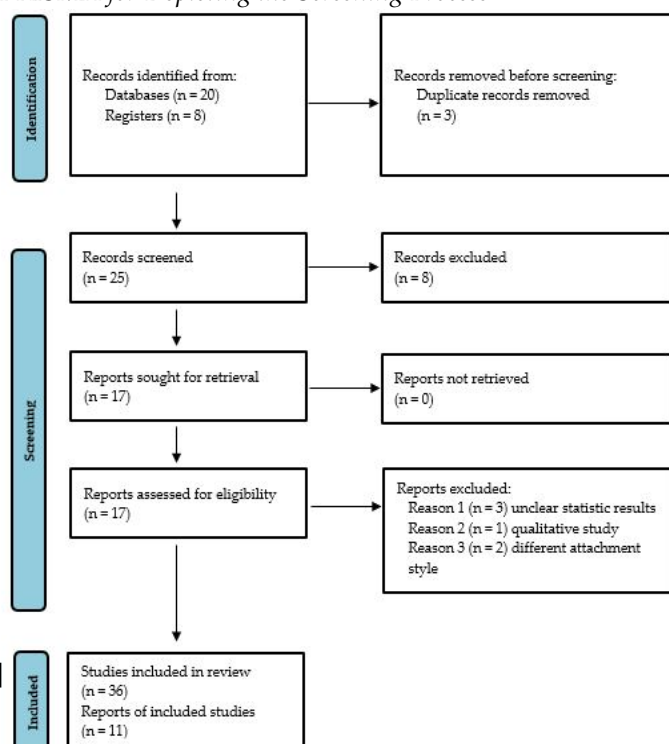


Table 1

Characteristics of the Studies

No	Study	Participants	N	Anxiety Attachment Scale	Sexting Scale
1	Currin et al. (2020) - study 1	Common group	323	Lafontaine et al.	Currin & Hubach
2	Currin et al. (2020) - study 2	Common group	323	Lafontaine et al.	Currin & Hubach
3	Drouin and Landgraff (2012) - study 1	College students	744	Wei et al.	Drouin and Landgraf
4	Drouin and Landgraff (2012) - study 2	College students	744	Wei et al.	Drouin and Landgraf
5	Drouin and Landgraf - study 3	College students	744	Wei et al.	Drouin and Landgraf

Table 1 (Continued)*Characteristics of the Studies*

No	Study	Participants	N	Anxiety Attachment Scale	Sexting Scale
6	Drouin and Landgraff (2012) - study 4	College students	744	Wei et al.	Drouin and Landgraf
7	Drouin and Landgraff (2012) - study 5	College students	744	Wei et al.	Drouin and Landgraf
8	Drouin and Landgraff (2012) - study 6	College students	744	Wei et al.	Drouin and Landgraf
9	Drouin and Landgraff (2012) - study 7	College students	233	Wei et al.	Drouin and Landgraf
10	Drouin and Landgraff (2012) - study 8	College students	511	Wei et al.	Drouin and Landgraf
11	Drouin and Tobin (2014) - study 1	College students	93	Wei et al.	Drouin and Landgraf
12	Drouin and Tobin (2014) - study 2	College students	62	Wei et al.	Drouin and Landgraf
13	Drouin and Tobin (2014) - study 3	College students	186	Wei et al.	Drouin and Landgraf
14	Drouin and Tobin (2014) - study 4	College students	186	Wei et al.	Drouin and Landgraf
15	Guest and Denes (2022) study 1	Emerging adults	133	Fraley et al.	Morelli et al.
16	Guest and Denes (2022) study 2	Emerging adults	133	Fraley	Morelli
17	Guest and Denes (2022) study 3	Emerging adults	133	Fraley et al.	Morelli et al.

Table 1 (Continued)

Characteristics of the Studies

No	Study	Participants	N	Anxiety Attachment Scale	Sexting Scale
18	Guest and Denes (2022) study 4	Emerging adults	133	Fraley et al.	Morelli et al.
19	Luo (2014)-study 1	College students	395	Brennan et al.	Luo
20	Luo (2014) - study 2	College students	395	Brennan et al.	Luo
21	McDaniel and Drouin (2015) - study 1	Married	355	Wei et al.	McDaniel and Drouin
22	McDaniel and Drouin (2015) - study 2	Married	355	Wei et al.	McDaniel and Drouin
23	McDaniel and Drouin (2015) - study 3	Married	355	Wei et al.	McDaniel and Drouin
24	Reed et al. (2020) - study 1	High school students	530	Wei et al.	Reed et al.
25	Reed et al. (2020) - study 2	High school students	417	Wei et al.	Reed et al.
26	Trub and Starks (2017) - study 1	Young adult woman	92	Fraley et al.	Trub and Starks
27	Trub and Starks (2017) - study 2	Young adult woman	92	Fraley et al.	Trub and Starks
28	Trub et al. (2022) - study 1	Young adult woman	2559	Wei et al.	Trub and Starks
29	Trub et al. (2022) - study 2	Young adult woman	2559	Wei et al.	Trub and Starks
30	Weisskirch and Delevi (2011) - study 1	Adolescent & young adulthood	128	Fraley et al.	Weisskirch and Delevi
31	Weisskirch and Delevi (2011) - study 2	Adolescent & young adulthood	128	Fraley et al.	Weisskirch and Delevi

Table 1 (Continued)

Characteristics of the Studies

No	Study	Participants	N	Anxiety Attachment Scale	Sexting Scale
32	Weisskirch et al. (2017) - study 1	College students	459	Wei et al.	Weisskirch and Delevi
33	Weisskirch et al. (2017) - study 2	College students	459	Wei et al.	Weisskirch and Delevi
34	Weisskirch et al. (2017) - study 3	College students	459	Wei et al.	Weisskirch and Delevi
35	Weisskirch et al. (2017) - study 4	College students	459	Wei et al.	Weisskirch and Delevi
36	Weisskirch et al. (2017) - study 5	College students	459	Wei et al.	Weisskirch and Delevi

Note: the anxiety attachment scale and sexting scale columns provide information about the scales used by researchers in their writing (as seen in the Study column)

Table 2

Fixed and Random Effects

Categories	Test	Q	df	p
All participants	Omnibus test of model coefficients	23.193	1	< .01
	Test of residual heterogeneity	192.135	35	< .01
General and married people	Omnibus test of model coefficients	7.601	1	< .01
	Test of residual heterogeneity	93.147	14	< .01
High school and college students	Omnibus test of model coefficients	16.694	1	< .01
	Test of residual heterogeneity	97.671	20	< .01

In Table 3, the analysis results using random effects show a significant positive correlation between anxiety attachment and sexting ($r = 0.113$; $z = 9.729$; $p < .01$; 95% CI [0.295; 0.444]). The same finding was observed in other sample groups, namely general and married people ($r = 0.125$; $z = 7.645$; $p < .01$; 95% CI [0.272; 0.469]), and high school and college students ($r = 0.107$; $z = 6.057$; $p < .01$; 95% CI [0.249; 0.488]). These three results have scores that are classified as weak (Cohen, 1988).

Table 3

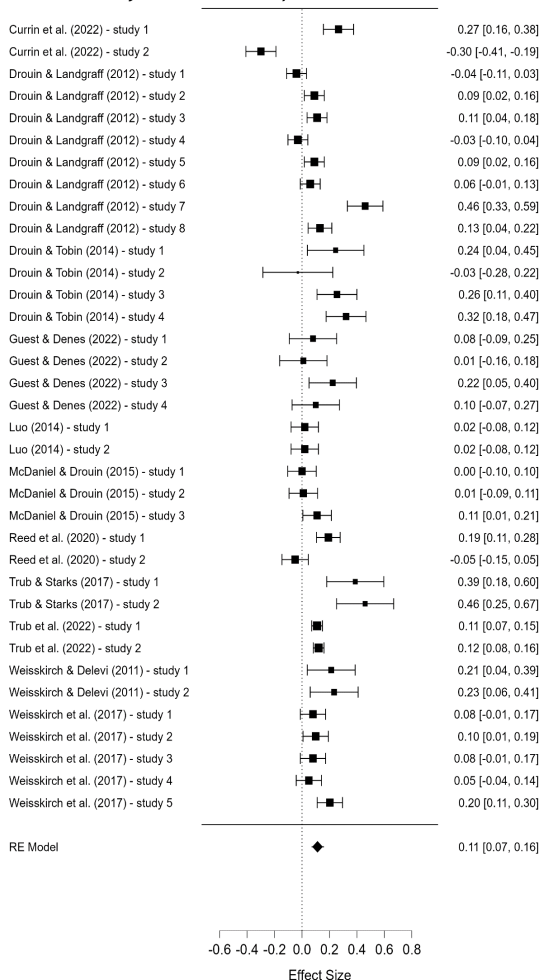
Coefficients of All Groups

	Estimate	SE	z	p	95% CI	
					LL	UL
All participants	0.113	0.023	4.816	< .01	0.07	0.16
General and married people	0.125	0.045	2.757	< .01	0.04	0.21
High school and college students	0.107	0.026	4.086	< .01	0.06	0.16

The forest plot results for all participants are shown in Figure 2. The studies present effect sizes with varying magnitudes and weak and moderate significance, with the smallest score being $z = -0.30$ with 95% CI $[-0.41; -0.19]$ and the largest score being $z = 0.46$ with 95% CI $[0.33; 0.59]$. Meanwhile, the summary effect size is 0.11 with 95% CI $[0.07; 0.16]$.

Figure 2

Forest Plot for All Participants



The forest plot results for the general and married people groups are shown in Figure 3. The studies also feature effect sizes with quite varied magnitudes, indicating weak and moderate significance, with the smallest score being $z = -0.30$ with 95% CI $[-0.41; -0.19]$ and the largest score being $z = 0.46$ with 95% CI $[0.25; 0.67]$. Meanwhile, the summary effect size is 0.12 with 95% CI $[0.04; 0.21]$.

Meanwhile, according to the forest plot for the high school and college student group. shown in Figure 4, the effect sizes from the studies also have quite varied magnitudes, indicating weak and moderate significance. The smallest score was $z = -0.05$ with 95% CI $[-0.15; 0.05]$, and the largest score was $z = 0.46$ with 95% CI $[0.33; 0.59]$. Meanwhile, the summary effect size is 0.11 with 95% CI $[0.06; 0.16]$.

Figure 3

Forest Plot for General and Married People Group

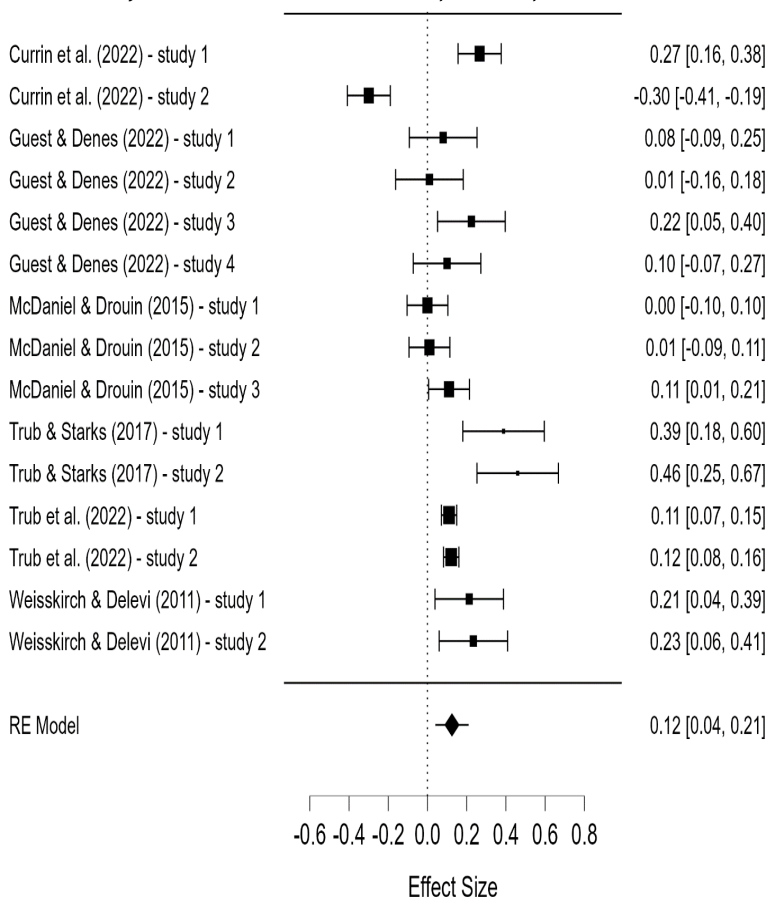
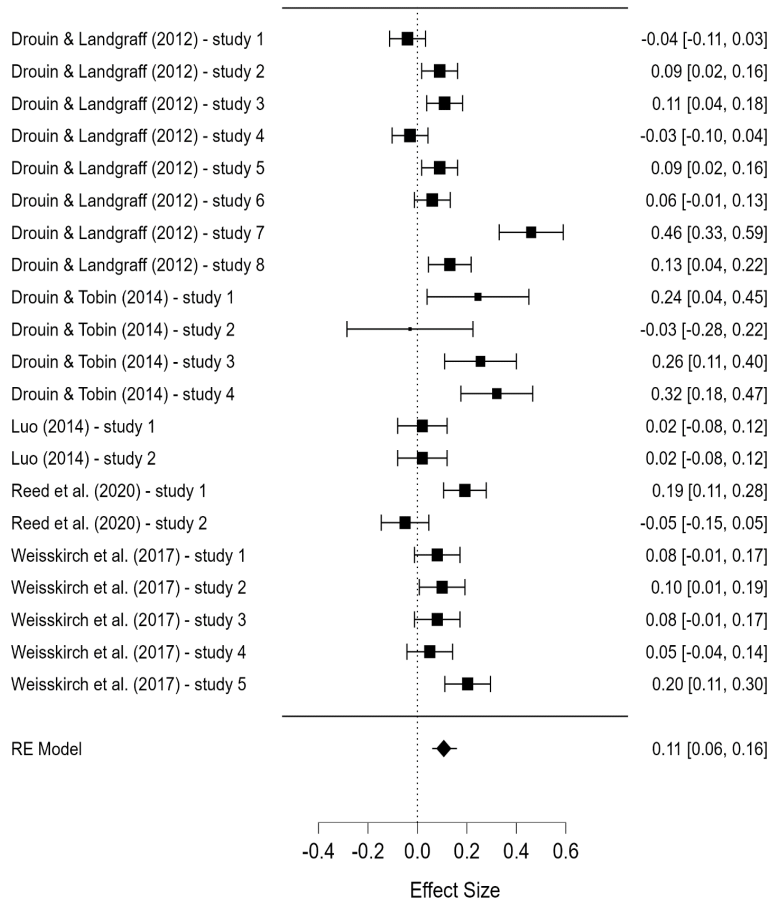


Figure 4

Forest Plot for High School and College Students Group



Next, an evaluation of publication bias is presented. The initial approach involves examining the funnel plot shown in Figure 5 to assess whether the distribution of scores from each study in this meta-analysis is symmetrical or asymmetrical. Publication bias does not occur when the distribution of scores in a funnel plot is symmetrical. However, there is a possibility that the distribution of scores in the funnel plot cannot be precisely justified as symmetrical or asymmetrical. Therefore, other methods are needed to determine the evaluation of publication bias.

Egger's test results revealed that for all participants, $z = 2.363$ ($p < .05$). This means that the distribution of scores in the meta-analysis for all samples regarding the relationship between anxiety attachment and sexting is classified as asymmetrical. Meanwhile, for the general and married people group, $z = 1.672$ ($p > .05$), which means symmetrical. The same thing was found for the high school and college student group ($z = 1.764$; $p > .05$). For more details, see Table 4.

Figure 5

Funnel Plots

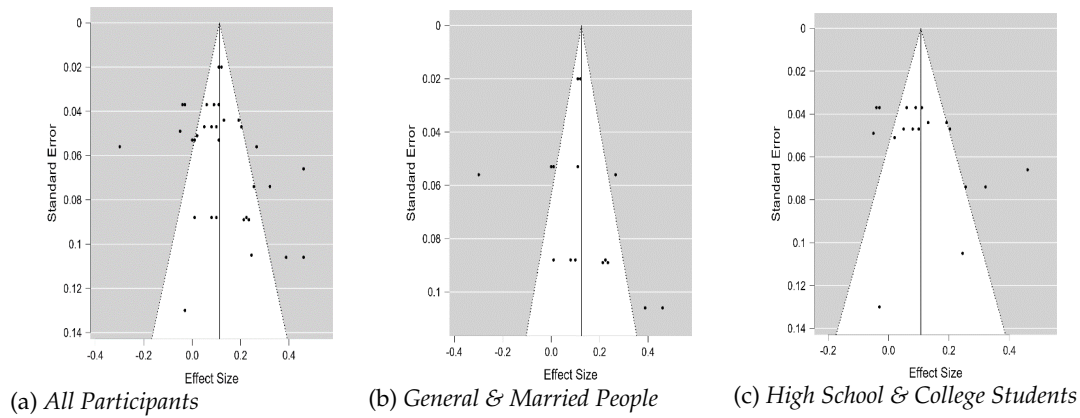


Table 4

Regression Test for Funnel Plot Asymmetry (Egger's Test)

	<i>z</i>	<i>p</i>
All participants	2.363	.018
General and married people	1.672	.095
High school and college students	1.764	.078

To obtain additional certainty regarding publication bias, the fail-safe N test was conducted using Rosenthal's formula. As shown in Table 5, the obtained score for all participants was 10,949 ($p < .01$), which was greater than $5K + 10 = 190$. Meanwhile, for the general and married people group, the obtained score was 340, which was greater than $5K + 10 = 80$. For the high school and college student group, the obtained score was 645, which was greater than $5K + 10 = 115$. These results indicate that there was no publication bias in this meta-analysis regarding the relationship between anxiety attachment and sexting across all sample groups.

Table 5

File Drawer Analysis for Rosenthal's Formula

	Fail-safe N	Target significance	<i>p</i>
All participants	10949	.05	.01
General and married people	340	.05	.01
High school and college students	645	.05	.01

Discussion

The findings of this meta-analysis, both for all participants and for the two subgroups (the general and married people group and the high school and college student group), indicate that there is indeed a correlation between anxious attachment and sexting with a weak level of association. This can happen

for several reasons, one of which is that sexting is mostly done to satisfy sexual urges and may lead to casual sex (Currin et al., 2020; Hicks et al., 2021; Marengo et al., 2019; Trub et al., 2022) or to find casual sexual partners (Currin et al., 2020; Rahardjo et al., 2015; Yu & Zheng, 2020). Apart from this, the weak correlation is also caused by individual factors. Individuals with anxious attachment tendencies in the past may not compensate in the form of sexting but in other forms of behavior such as excessive jealousy toward their partner (Kim et al., 2018; Richter et al., 2022) or excessive feelings of ownership or possessiveness (Honari & Saremi, 2015).

Based on a comparison of findings between groups, the correlation in the general and married people group is slightly higher than that in the high school and college student group. This could happen because sexting is often performed to explore sexual relations (Choi et al., 2019; Drouin & Tobin, 2014), and the general group or those who are no longer of student and university age display more permissive sexual behavior (Drouin & Tobin, 2014; Trub & Starks, 2017). Apart from this, sexting is also considered a behavior that can maintain the intimacy of individuals who are already in a couple (Roberts & Ravn, 2020; Van Ouytsel et al., 2020), especially in the context of romantic relationships and marriage (Brodie et al., 2019; McDaniel & Drouin, 2015; Oriza & Hanipraja, 2020). Furthermore, in groups of students and college students, communication with partners through communication media technology is aimed at increasing intimacy and not sex (Morey et al., 2013). Some findings even reveal that in adolescents, sexting does not always have the aim and may not result in sexual relations, for example, to share health information or fulfill the need to be recognized by the opposite sex (Mori et al., 2021; Reed et al., 2020; Widman et al., 2014).

Although previous meta-analyses have proven the role of anxiety attachment as a determining factor or antecedent of sexting, this study has several limitations. First, some studies do not clearly determine the characteristics of the participants, for example, emerging adulthood, which overlaps with the late adolescence group who usually work as students and young adulthood who work as employees or graduates. This limitation may result in the loss of characteristics of certain age groups, and thus, the meaning of the findings may not be very strong. Second, most studies used in this meta-analysis examined sexting as a whole and not specifically from the point of view of the role of the sender or receiver or the clarity of the roles of both parties. Therefore, the connection with anxious attachment is less sharp. Third, all the studies used in this meta-analysis come from the same national setting, namely the USA. As a result, the meaning of the findings can only be generalized to participants from the USA.

Conclusion

Attachment anxiety has been proven to be a determining factor in sexting with a positive correlation; however, the strength of this correlation is weak. These findings were tested in both the entire participant group and the specific subgroups, namely the general and married people group and the high school and college student group. This indicates that anxious attachment is not strong enough to be considered an antecedent of sexting. Future research may find an equally weak correlation if anxiety

attachment is involved in sexting research. This means that researchers can delve deeper into various internal and external factors that may correlate with and influence sexting across different potential groups.

Recommendations

Several recommendations can be proposed based on the findings of this meta-analysis. First, because anxiety attachment is quite weak in influencing sexting, future research could involve anxiety attachment in predicting sexting by placing mediator variables. Second, as an internal variable, attachment anxiety must be explored more deeply in predicting sexting. Third, future researchers should consider other variables related to social relationships that might strongly influence sexting.

Declaration

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Author Contribution

Conceptualization: WR; Methodology: WR, TRA; Writing original draft preparation: WR; Supervision: WR, TRA; Review and editing: WR, TRA

Conflict of Interest

This article has no potential conflict of interest with any person or institution. All the researchers agreed with the final manuscript.

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