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Meta-analytic evidence that attachment insecurity is associated with less frequent experiences of discrete positive emotions

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Abstract

Objective: Individual differences in attachment insecurity can have important implications for experiences of positive emotions. However, existing research on the link between attachment insecurity and positive emotional experiences has typically used a composite measure of positive emotions, overlooking the potential importance of differentiating discrete emotions.

Method: We conducted a meta-analysis of 10 cross-sectional samples ($N = 3215$), examining how attachment insecurity is associated with self-reported frequency of experiencing positive emotions, with a distinction made between more social (i.e., love and gratitude) and less social (i.e., peace and awe or curiosity) positive emotions.

Results: High (vs. low) levels of both attachment anxiety and avoidance were associated with less frequent experience of positive emotions regardless of their social relevance. When analyzing each emotion separately, we found that attachment anxiety showed negative relations to all emotions except gratitude. Attachment avoidance was negatively associated with all emotions, and the link was even stronger with love (vs. peace, awe, or curiosity). Additional analyses of daily diary data revealed that attachment anxiety and avoidance were also negatively associated with daily experiences of positive emotions, regardless of social relevance.

Conclusion: Our results underscore the need to further investigate the mechanisms underlying insecure individuals' blunted positive emotional experiences.

KEYWORDS

affect, attachment, emotional experiences

1 | INTRODUCTION

Attachment theory (e.g., Bowlby, 1969) postulates that as a result of developmental histories of support seeking that vary in the extent to which individuals have successfully recruited social support, individuals develop working models or social expectations that influence how they perceive and react to life events in general and close relationships in particular (Mikulincer & Shaver, 2016). Although the original theory's supposition that adult attachment security (i.e., feelings of confidence in one's relational value and in availability of others for support) is strongly influenced by childhood experiences has been called into question (Fraley & Roisman, 2019), what is clear is that adults demonstrate reliable individual differences in attachment security along dimensions of attachment anxiety and avoidance (Crowell et al., 2016). Individuals higher on the dimension of attachment anxiety tend to crave intimacy but have feelings of lower self-worth and greater fears of rejection that lead to hesitation in approaching closeness. On the other hand, individuals higher on the dimension of attachment avoidance value self-reliance and deprioritize close relationships (Mikulincer & Shaver, 2016).

Although attachment theory has largely focused on individuals' processing of negative emotion (e.g., Mikulincer & Shaver, 2019), attachment theorists have also suggested that attachment can play an important role in how one experiences and regulates positive emotions. In particular, both attachment anxiety and avoidance may be associated with reduced experiences of positive emotion, albeit through different mechanisms (Mikulincer & Shaver, 2013). Attachment anxiety may be an obstacle to experiencing positive emotions to the extent that it shifts one's focus to and intensifies experiences of negative emotions (e.g., Sadikaj et al., 2011). Given that simultaneous experiences of both positive and negative emotions are unlikely (Brehm & Miron, 2006; cf. Berrios et al., 2015), this difficulty disengaging from negative emotions for anxiously attached individuals may lead to less experience of positive emotion. This is in line with the dynamic model of affect (Ong et al., 2017; Reich et al., 2003) which suggests that for those undergoing chronic stress or pain, positive and negative affect (which may be otherwise relatively independent) may become inversely related as individuals come to adopt simpler representations of their affective experiences. By contrast, individuals higher in attachment avoidance may be motivated to suppress or deny positive emotional experience because they have a relatively strong goal of maintaining independence (Ren et al., 2017) and experiences of positive emotion invite emotional involvement with others (e.g., Algoe, 2012).

However, empirical research on the link between attachment insecurity and (self-reported) experience of positive emotions provides mixed evidence. Whereas some studies have indeed found negative correlational links between experiences of positive emotions and attachment anxiety as well as attachment avoidance (Hainlen et al., 2016; Palmer & Gentzler, 2018; Sadava et al., 2009; Wei et al., 2011), other studies have found that this negative association holds only for one or neither of the insecurity dimensions (Kaščáková et al., 2016; Molero et al., 2017; Nelson-Coffey et al., 2017; Prager et al., 2019; Richards & Schat, 2011).

One way to understand this inconsistency is to consider the need to differentiate among discrete positive emotions (Shiota et al., 2017). Although research on attachment and positive emotions has typically relied on composite measures of multiple positive affective states (e.g., the Positive and Negative Activation Schedule [PANAS]; Watson et al., 1988, 1999), empirical evidence from the affective science literature has shown that discrete positive emotions can differ with respect to their functions, and behavioral or physiological responses (Algoe & Haidt, 2009; Mortillaro et al., 2011; Shiota et al., 2011). Importantly, research has also shown that discrete positive emotions may also differ in their associations with individual differences such as attachment insecurity. For example, in Shiota et al.'s (2006) work which focused on dispositional tendencies to experience positive emotions, attachment anxiety was negatively associated with dispositional experience of four out of eight positive emotions (joy, contentment, pride, and love) while attachment avoidance was negatively associated with two (love and compassion). Notably, however, this analysis did not account for the covariance between attachment anxiety and avoidance, leaving the unique associations between each insecurity dimension and the positive emotions unclear. Further, their measure was focused on capturing positive emotion *dispositions*, thus it included assessment of beliefs that facilitate the experience of a given emotion (e.g., "Other people are generally trustworthy" for love dispositions).

In the present research, we examined how attachment anxiety and avoidance are uniquely associated with (self-reported) frequency of experiencing discrete positive emotions in 10 independent, cross-sectional samples. In doing so, we focused on one particular distinction between discrete positive emotions: the social nature of the presumed context in which specific positive emotions typically arise. Whereas social interactions are a common source of positive emotions in general (Ramsey & Gentzler, 2015), some positive emotions (e.g., gratitude; Algoe, 2012) are considered to be more inherently social or interpersonally-oriented in that they are expected to primarily be experienced in social contexts or in relation to people or other social entities. Indeed, recent investigations have shown that although commonly averaged

altogether, positive emotions are multidimensional, with one of the dimensions concerning social relevance. For example, in Stanton et al.'s (2021) factor analyses of positive emotion items (a comprehensive list based on multiple existing measures), a unique facet that include items such as "loving" and "grateful" consistently emerged, which they labeled as *social affection*. Similarly, Chung et al. (2022) conducted factor analyses on positive emotion items at the within-person level and identified facets of emotional experiences such as love and gratitude, which in turn comprised a broader family of social emotions, what they labeled as the *love* family. Importantly, their analyses also showed that when people reported experiencing emotions such as love or gratitude (vs. other facets of emotional experience), they indeed reported having been in situations where social interactions were possible or required, having been in a social place (e.g., bar), and engaging in social activities (e.g., texting) in the past hour. Taken together, these findings suggest that there may be some positive emotions that are distinguishable from others by their social relevance.

Importantly, this distinction may be useful in gaining a nuanced understanding of the links between attachment insecurity and any reductions in the experience of positive emotions. In the case of attachment anxiety, more anxious individuals may specifically experience less frequent *social* positive emotions because their amplified negative emotional experiences have been theorized and found to arise particularly from relational concerns (Mikulincer & Shaver, 2013). If social experiences are marked by negative emotions for those higher in attachment anxiety, then negative emotions might interfere with experiences of positive emotion particularly in social contexts. Indeed, previous research provides some evidence that attachment anxiety is associated with better affective outcomes after reliving details of a non-social positive event, but not a social positive event (Palmer & Gentzler, 2018). Alternatively, it is possible that deflated positive emotional experiences for individuals high in attachment anxiety could be driven by more general mechanisms such as their negative self-views (Foster et al., 2007), and thus manifest regardless of the social relevance of the emotions. Research suggests that individuals low in self-esteem are less inclined to maintain any positive emotions they experience and tend to return to a lower set-point for their positive emotions (Wood et al., 2003). Consistent with this idea, attachment anxiety has been associated with the tendency to dampen positive emotions (particularly among individuals with low self-esteem; Goodall, 2015).

In terms of attachment avoidance, if lower levels of positive emotion are driven by a goal to remain withdrawn from social closeness (Mikulincer & Shaver, 2013), then we might expect the negative link between attachment avoidance and positive emotions to be particularly strong for more socially relevant positive emotions. Attachment avoidance has indeed been associated with lower ratings of pleasantness for social positive images (e.g., people playing together), but not for non-social positive images (e.g., a tropical island; Vrtička et al., 2012), suggesting those high in attachment avoidance may demonstrate differential reactions to positive stimuli depending on their social nature. However, if attachment avoidance was found to be negatively associated with the experience of positive emotions regardless of their social relevance, then other explanations such as general insensitivity to pleasant experiences (rather than defensive avoidance of social closeness) become more plausible (e.g., Jiang & Tiliopoulos, 2014; but see Shahzadi & Walker, 2022). Overall, examining the links between both dimensions of attachment insecurity and positive emotion with both more and less social relevance may be valuable for accounting for the nature of the positive emotion experiences (or lack thereof) of those higher in attachment insecurity.

Accordingly, our research sought to answer the following question: *How are attachment anxiety and avoidance independently associated with experiencing more social and less social positive emotions?* To answer this question, we examined positive emotional experiences, recalled over the past 1–2 weeks in our primary analyses (pre-registered). In our additional analyses, we examined positive emotional experiences, reported daily for 10–30 days (not pre-registered; see Endnote 1). As reports made at the daily level are relatively less likely to be affected by memory bias (Robinson & Clore, 2002), combined with our cross-sectional analyses, examining daily emotional experiences can help us gain a fuller understanding of insecurely attached individuals' emotional lives. To ensure the robustness of our findings, we conducted a series of meta-analyses based on the effects found in individual datasets, as pre-registered.

2 | METHOD

We preregistered the research question and analytic plans for the present research on the Open Science Framework (OSF; https://osf.io/rj597/) before any of the authors had access to all datasets. Nine datasets have been posted on the same OSF repository.[1]

2.1 | Included datasets

We sought published or unpublished cross-sectional datasets that assessed participants' attachment orientations

(using any type of a continuous measure) and positive emotions (using any version of the modified Differential Emotions Scale [MDES]; Fredrickson et al., 2003). The MDES was chosen over the PANAS (Watson et al., 1988), a commonly used measure of positive affect, because the latter focuses on activated affective states, rather than emotions (see Fredrickson, 2004 for their differences), none of which appear prototypically social (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, active). Daily diary studies included for our additional analyses were selected based on similar criteria for assessment of attachment, but as described in detail below, less strict criteria for assessment of positive emotion.

2.1.1 | Assessment of attachment insecurity

The attachment scales used across the samples assessed the levels of attachment anxiety and avoidance in romantic relationships or close relationships in general. We included studies that utilized different measures of attachment under the assumption that these established and validated measures capture the same latent construct (although notably, there may exist a nested structure such that global [vs. relationship-specific] measures of attachment capture a higher-order construct; Sibley & Overall, 2008).

2.1.2 | Assessment of positive emotions

The MDES assessed how frequently participants felt various emotions in the past one or two weeks (assessed using either 4-point or 5-point scale, with anchors ranging from *never* to *most of the time*). Emotion items are presented in triplets (e.g., "love, closeness, or trust"). In our additional analyses using daily diaries (Samples 8–13), we were less strict about the specific wording of the emotion given the availability of emotion items across datasets and included datasets that had at least one emotion item that matched our operationalization of more social and less social positive emotions. A brief description of each sample can be found in Table 1.

2.2 | Operationalizing more social and less social positive emotions

Using items from the MDES, we first conducted a short pilot survey prior to pre-registration to examine which positive emotions are more or less likely to be elicited in social contexts and should be used in our research to operationalize more social and less social positive emotions. This pilot study was necessary as neither study discussed in the introduction distinguishing the social nature of various emotions (Chung et al., 2022; Stanton et al., 2021) was published at the time (but see below for the remarkable similarity in what we identified as social emotions and what these recent studies have revealed). Our survey asked 21 relationships and/or emotions researchers (faculty members, graduate students, and postdocs) to rate the triplets of positive emotions included in the MDES in terms of their level of social relevance. Specifically, they were asked to think about how often people experience each of the emotions exclusively in social [non-social] settings or in relation to [independent of] their relationships with other people. The results revealed a clear consensus on the top two more social and less social emotion items: "*love, closeness, or trust*" and "*grateful, appreciative, or thankful*" for more social emotions and "*serene, content, or peaceful*" and "*awe, wonder, or amazement*" for less social emotions. Thus, we computed average scores based on the two triplets for more or less social positive emotions.

For our analyses using daily diaries (Samples 8–13), we relied on two emotion constructs, one each of more social and less social positive emotions, that were consistent with our operationalization and were available across samples: that corresponding to "*love, closeness, or trust*" and "*serene, content, or peaceful*" in MDES. Specifically, for more social positive emotion, "*love, closeness, or trust*" was used in Samples 8 and 9, "*love*" was used in Sample 10, "*affectionate, loving, caring*" was used in Sample 11, and an average of "*loving*" and *"caring*" was used in Samples 12 and 13. For less social positive emotion, "*serene, content, or peaceful*" was used in Samples 8 and 9, "*contentment/peace*" and "*relaxed, calm*" were used in Sample 10 and Sample 11, respectively, and an average of "*content*" and *"calm*" was used in Samples 12 and 13.

For both cross-sectional and daily diary analyses, we acknowledge that the distinction between more social and less social emotions ultimately relies on assumptions about the contexts in which such emotions are likely to have been experienced (e.g., love is typically experienced in relation to others), rather than direct reports of the context in which each specific emotion was experienced.

2.3 | Analysis plan

As preliminary analyses, we examined means, standard deviations, and correlations among attachment anxiety and avoidance with more or less social positive emotions in each sample.

TABLE 1 Sample descriptions.

Sample	*N*	Year	Relationship/ marital status	Sex/gender	Age *M* (*SD*)	Race/ethnicity	Attachment scale	Emotion reference	Related citations
S1	200	2018	0% Partnered	114 M 84 W 1 O	33.81 (10.64)	147 White/Caucasian 31 Black/African American 11 Hispanic/Latino 7 Asian 4 Mixed/Other	AAS	Past 2 weeks	Unpublished (KS & GM)
S2	230	2018	100% Partnered	120 M 109 W 1 O	32.90 (9.07)	149 White/Caucasian 50 Black/African American 15 Asian 12 Mixed/Other 4 Hispanic/Latino	ECR-R	Past 2 weeks	Unpublished (KS & GM)
S3	981	2020	65% Partnered	466 M 501 W 13 O	41.55 (15.15)	699 White/Caucasian 142 Black/African American 70 Asian/Asian-American 48 Hispanic/Latino 18 Mixed/Other 3 Middle Eastern	ECR-12	Past 2 weeks	Leonhardt et al. (2022)
S4	428	2020	0% Partnered	195 M 228 W 5 O	29.70 (7.81)	328 White/Caucasian 36 Hispanic/Latino 22 Asian 20 Middle Eastern 14 Black/African American 17 Mixed/Other	ECR-RS (g)	Past 2 weeks	Park et al. (2022)
S5	747	2021	0% Partnered	376 M 371 W	38.82 (11.66)	—	ECR-S (g)	Past 2 weeks	Hill Roy et al. (2022)
S6[a]	158	2008	100% Partnered	78 M 80 W	28.01 (8.04)	117 White/Caucasian 20 Black/African American 8 Mixed/Other 7 Asian	ECR	Past 2 weeks/ Daily for 2 weeks	Algoe and Fredrickson (2019a)
S7[a]	105	2009	100% Partnered	53 M 52 W	29.78 (4.82)	69 White/Caucasian 9 Black/African American 5 Asian 4 Mixed/Other	ECR	Past 2 weeks/ Daily for 28 days	Algoe and Fredrickson (2019b)
S8	109	2015–2016	55% Unmarried	17 M 92 W	47.17 (10.37)	60 White/Caucasian 37 Black/African American 5 Asian 6 Mixed/Other	AAS (g)	Past week/ Daily for 2 weeks	West et al. (2022)

(Continues)

TABLE 1 (Continued)

Sample	*N*	Year	Relationship/ marital status	Sex/gender	Age *M* (*SD*)	Race/ethnicity	Attachment scale	Emotion reference	Related citations
S9	73	2018	92% Unmarried	19 M 54 W	24.80 (3.99)	73 Italian	ASQ (g)	Past 2 weeks/ Daily for 30 days	Unpublished (FC, OR, & GF)
S10	184	2019	30% Partnered	47 M 134 W 3 O	18.87 (1.42)	71 White/Caucasian 71 Asian 45 Hispanic/Latino 15 Mixed/Other 8 Black/African American	AAS (g)	Past week/ Daily for 2 weeks	Unpublished (PH & NC)
S11[a]	157	2008	100% Partnered	73 M 82 W	23.89 (6.42)	83 White/Caucasian 42 Asian 12 Black/African American 12 Hispanic/Latino 4 Mixed/Other	ECR	Daily for 2 weeks	Impett et al. (2010)
S12	113	2015	100% Partnered	22 M 91 W	22.09 (4.81)	47 White/Caucasian 24 Asian 20 Black/African American 17 Other	ECR-R	Daily for 10 days	Carmichael et al. (2021)
S13[a]	117	2015–2018	100% Partnered	60 M 56 W 1 O	36.14 (11.54)	64 White/Caucasian 27 Black/African American 16 Other 6 Asian	ECR-R	Daily for 2 weeks	Unpublished (CC)

Note: Demographic information is summarized based on available responses. Information on the ethnicity/race has been edited for the presentation (note that multiple responses were allowed for some samples); more precise details can be found in the Supplemental Material. Emotion reference column refers to the time window participants were asked to think about when reporting the frequency of positive emotions and for samples including the daily diary portion, the number of days daily reports were made. The related citations column shows a citation for each dataset from which samples for our meta-analysis were taken or a paper that used the given dataset. In cases in which no such references are available, initials of the authors are noted. ECR (Brennan et al., 1998) Scale; ECR-R (Fraley et al., 2000); ECR-12 (Lafontaine et al., 2015); ECR-RS (Fraley et al., 2011); ECR-S (Wei et al., 2007); AAS (Collins, 1996); ASQ (Feeney et al., 1994). (g) = assessment of global attachment (i.e., in reference to close relationships in general as opposed to the current romantic relationship). Note that four of the items in Sample 10 were accidentally asked in reference to romantic relationships rather than close relationships as did other items.

Abbreviations: AAS, Revised Adult Attachment Scale; ASQ, Attachment Style Questionnaire; ECR, Experiences in Close Relationships; ECR-12, 12-item ECR; ECR-R, ECR-Revised Questionnaire; ECR-RS, ECR-Relationship Structure; ECR-S, ECR-Short Form; M, man/male; O, Other; W, woman/female.

[a]Dyadic datasets.

2.3.1 | Primary analyses

We first ran two separate regression models, predicting more social and less social positive emotions in each of the ten cross-sectional datasets (Samples 1–10 in Table 1). Both attachment anxiety and avoidance were entered simultaneously as predictors. When analyzing dyadic data (Samples 6 and 7), we ran multilevel models in which participants were nested within dyads to account for the nonindependence of partners within dyads.[2]

We then used the partial correlation (Aloe, 2014) between attachment insecurity and positive emotions to meta-analyze the results. Partial correlation coefficients were computed based on the *t*-test statistics and degrees of freedom (Viechtbauer, 2010). As we did not expect our samples to come from a single population, we fitted a random-effects model using restricted maximum likelihood estimation which accounts for this additional source of variance. As tests of heterogeneity, we report Q and I^2 test results although they should be interpreted with caution in a mini meta-analysis such as ours (Goh et al., 2016). Significant Q statistics were interpreted as suggesting heterogeneity among effect sizes and higher values of I^2 indicating greater heterogeneity (25%, 50%, and 75% being benchmarks for small, medium, and high heterogeneity; Higgins et al., 2003). Additionally, we conducted leave-one-out analyses which allowed us to check if omitting any one individual sample altered our conclusion. We report any significant differences that emerged as a result of such omissions. Finally, we re-ran all the models in each of the samples controlling for sex/gender and age and re-conducted the meta-analyses with new effect sizes. We report all instances that yielded substantial differences in the results.

2.3.2 | Moderation analyses

As exploratory analyses, we examined two variables as potential moderators (at the sample level): (a) relationship status (0 = single, 1 = partnered), and (b) timing of data collection (0 = pre-pandemic, 1 = post-pandemic).[3] First, based on previous findings that attachment avoidance is differently related to processing of emotional information among those with and without a romantic partner (e.g., Edelstein & Gillath, 2008; Kafetsios et al., 2014), we explored whether relationship status moderated the link between attachment avoidance (as well as anxiety) and positive emotions. Second, some of the samples had been collected during the COVID-19 pandemic (Samples 3–5), when the attachment system was likely activated due to the chronic threat, thus we explored the possibility that the timing of data collection moderated the observed effects.

To examine whether the links between attachment and positive emotions vary depending on relationship status, we fitted two separate random-effects models for samples consisting of single and partnered individuals. We then fitted a fixed-effects model (note that the heterogeneity within each subset has already been accounted for in the random-effects models) using relationship status as a moderator. This is equivalent to running a Wald test to test the difference between estimates for single and partnered individuals. We used Samples 1–7 and 10 in which participants' partnership status was clear for this analysis. For Samples 3 and 10 which included both single and partnered individuals, separate regressions were run for each group before the meta-analysis. An equivalent analysis was run to examine the moderating role of data collection timing (i.e., prior to 2020 or not). All cross-sectional samples were used for this analysis.

2.3.3 | Additional analyses: Individual emotions as outcomes

Given theoretical perspectives on the social functions of awe (Stellar et al., 2017), we had pre-registered to run additional analyses using "*interested, alert, and curious*" (which was ranked as third highest in the degree of non-sociality) in place of "*awe, wonder, or amazement*." However, given the low reliability of this new emotion pair (i.e., "*serene, content, or peaceful*" and "*interested, alert, and curious*") as well as our primary item pairs (mean Spearman-Brown reliabilities were .64 for more social and .50 for less social positive emotions; also see Table 2 for a summary of correlations between emotions across samples), we decided to conduct analyses predicting each of the emotion items separately rather than creating another composite with poor reliability. That is, we conducted the meta-analyses with effect sizes drawn from models predicting each of the emotions we had pre-registered to use in our analyses. This indicates five different models, with "*love, closeness, or trust*" (love hereafter), "*grateful, appreciative, or thankful*" (gratitude), "*serene, content, or peaceful*" (peace), "*awe, wonder, or amazement*" (awe), or "*interested, alert, and curious*" (curiosity) as an outcome.

2.3.4 | Additional analyses: Daily diary data

Finally, as previously noted, we examined how attachment insecurity is associated with daily experiences of positive emotions using data from daily diary studies (Samples 6–13). Similar analytic steps were taken as in our primary analyses. We ran two multilevel models in which daily reports were nested within individuals in each of the eight samples. Both attachment insecurity dimensions were

entered as predictors of more social or less social positive emotions. In cases of dyadic data (Samples 6, 7, 11, 13), individuals were nested within dyads and individuals and days were crossed. We then meta-analyzed the effects obtained from each sample.

3 | RESULTS

Descriptive statistics can be found in the Supplemental Material and zero-order correlations among attachment orientations and positive emotions are reported in Table 3.

3.1 | Primary analyses

3.1.1 | Attachment anxiety

The forest plots in Figure 1 summarize findings from the meta-analyses. Overall, attachment anxiety was not significantly associated with more social (Figure 1a) or less social positive emotions (Figure 1b). Substantial heterogeneity was observed for both effects ($Q = 56.28$, $p < .001$; $I^2 = 85.10\%$, and $Q = 67.40$, $p < .001$; $I^2 = 87.34\%$, for more social and less social positive emotions, respectively), suggesting that effect sizes significantly varied across samples. Leave-one-out analysis suggested that the negative association between attachment anxiety and more social positive emotions was significant if Sample 2 was omitted. The same was true for less social positive emotions such that the negative association was significant with Sample 2 left out of the analysis. Of note, Sample 2 had been noted in the pre-registration as a sample with questionable data quality given the absence of an attention check in the survey and dubious reliability of the attachment anxiety items (suggested by negative loadings of some reverse-coded items even after they were reverse-coded). In sum, although our overall meta-analytic results indicate a null association between attachment anxiety and experiences of positive emotion, accounting for the heterogeneity in

TABLE 2 Summary of correlations between emotion items.

	1	2	3	4
1. Love				
2. Gratitude	.48 (.37–.58)			
3. Peace	.39 (.34–.46)	.40 (.09–.52)		
4. Awe	.32 (.19–.45)	.38 (.30–.50)	.35 (.01–.52)	
5. Curiosity	.30 (.17–.42)	.36 (.26–.47)	.34 (.22–.47)	.32 (.14–.53)

Note: Mean correlations across the cross-sectional samples are reported with minimum and maximum values. Full information is available in the Supplemental Materials. Also note that correlations between more social emotions (an average of love and gratitude) and less social emotions (an average of peace and awe) ranged from .43 and .62 ($M = .53$).

TABLE 3 Zero-order correlations between attachment insecurity and frequency of positive emotions across cross-sectional samples.

	Attachment anxiety		Attachment avoidance	
	More social PE	Less social PE	More social PE	Less social PE
S1 ($n = 200$)	−.23**	−.32**	−.43**	−.36**
S2 ($n = 230$)	−.12	.20**	−.40**	.05
S3 ($n = 981$)	−.24**	−.25**	−.48**	−.26**
S4 ($n = 428$)	−.30**	−.22**	−.21**	−.21**
S5 ($n = 747$)	−.24**	−.24**	−.34**	−.19**
S6 ($n = 158$)	.00	−.03	−.18*	−.19*
S7 ($n = 105$)	−.16	−.16	−.02	−.04
S8 ($n = 109$)	−.25**	−.21*	−.38**	−.30**
S9 ($n = 73$)	−.15	−.24*	−.20	−.06
S10 ($n = 184$)	−.06	−.07	−.28**	−.19*

Note: Correlations in dyadic datasets (S1 and S2) indicate overall correlations (see Griffin & Gonzalez, 1995).

Abbreviation: PE, positive emotions.

*$p < .05$; **$p < .01$.

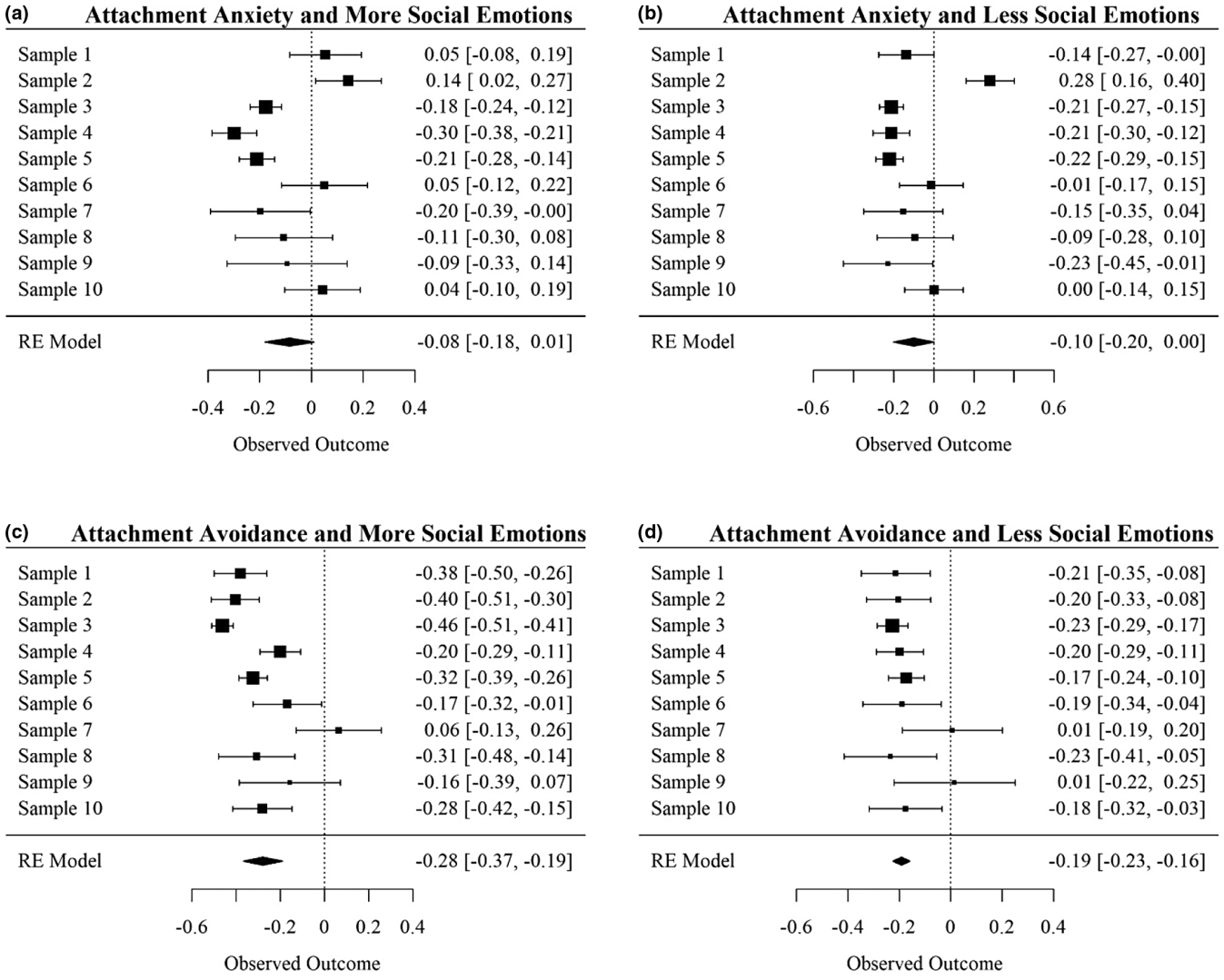

FIGURE 1 Forest plots summarizing meta-analytic results on attachment insecurity and recalled frequency of positive emotions. Panels (a) and (b) present results for attachment anxiety and (c) and (d) present results for attachment avoidance.

our samples seems to reveal some evidence that those higher in attachment anxiety experience less frequent positive emotions, both more social and less social.

3.1.2 | Attachment avoidance

Figure 1c,d suggest clear negative associations between attachment avoidance and both more social and less social positive emotions. Substantial heterogeneity was observed for the association between attachment avoidance and more social positive emotions ($Q = 58.76$, $p < .001$; $I^2 = 85.62\%$), but not less social positive emotions ($Q = 8.99$, $p = .44$; $I^2 = 0.00\%$). None of the effects significantly changed in the leave-one-out analysis. In sum, attachment avoidance appears to be associated with less frequent experiences of both more social and less social positive emotions.

We re-computed all the effect sizes based on models in which we controlled for sex/gender and age. The results for attachment avoidance did not significantly change. However, the negative associations between attachment anxiety and both more social and less social positive emotions became significant when using the effect sizes adjusted for covariates.

3.2 | Moderation analyses

3.2.1 | Relationship status

Whether the sample consisted of single or partnered individuals did not moderate any of the effects.

3.2.2 | Timing of data collection

Whether samples were collected before or during the pandemic did moderate the effects involving attachment

anxiety (but not attachment avoidance). Specifically, the association between attachment anxiety and more social positive emotions differed depending on when the samples were collected ($b = -0.23$, $SE = 0.06$, $z = -4.03$, $p < .001$, 95% CI = [−0.34, −0.12]). Attachment anxiety was associated with less frequent experiences of more social positive emotions among samples collected during the pandemic ($b = -0.22$, $SE = 0.03$, $z = -6.51$, $p < .001$, 95% CI = [−0.29, −0.16]), but not among samples collected before the pandemic ($b = 0.00$, $SE = 0.04$, $z = 0.08$, $p = .94$, 95% CI = [−0.08, 0.09]). The same moderation effect was found for less social positive emotions ($b = -0.17$, $SE = 0.07$, $z = -2.60$, $p = .01$, 95% CI = [−0.29, −0.04]). That is, attachment anxiety was associated with less frequent experiences of less social emotions among samples collected during the pandemic ($b = -0.22$, $SE = 0.02$, $z = -10.45$, $p < .001$, 95% CI = [−0.26, −0.17]), but not among samples collected before the pandemic ($b = -0.05$, $SE = 0.06$, $z = -0.84$, $p = .40$, 95% CI = [−0.17, 0.07]). Note that these results remained largely the same whether we included Sample 2 or not.

3.3 | Additional analyses

3.3.1 | Analysis with individual emotions

Table 4 presents results from models predicting each individual positive emotion as an outcome. As in our primary analyses, one of the significant results for attachment anxiety depended on the inclusion of Sample 2; the association between attachment anxiety and awe was significant when omitting Sample 2 ($b = -0.09$, $SE = 0.03$, $z = -3.15$, $p = .002$, 95% CI = [−0.14, −0.03]). Thus, overall, our results seem to suggest that the associations between attachment insecurity and the five positive emotions were all significantly negative. The only exception was the association between attachment anxiety and gratitude. Also notably, the negative association between attachment avoidance and love was stronger than that between attachment anxiety and love (also in analyses without Sample 2), as indicated by the non-overlapping confidence intervals. In fact, attachment avoidance showed particularly strong relation with love such that it was stronger than the relation with peace, awe, or curiosity.

3.3.2 | Daily diary data

Finally, to complement our primary analyses based on the cross-sectional samples, we examined the link between attachment insecurity and daily experiences of positive emotions in Samples 6–13. As illustrated in Figure 2, the meta-analytic results suggested that both attachment anxiety and avoidance were negatively associated with daily positive emotions, including those that were more social and less social.

4 | DISCUSSION

The present results suggest that high levels of attachment anxiety or attachment avoidance are associated with less frequent experiences of positive emotion, regardless of their social relevance. However, we found some evidence that the link between attachment anxiety and gratitude might be an exception. While insecure individuals' less frequent experience of positive emotions has been examined and reported elsewhere (e.g., Molero et al., 2017), most work has been unable to speak to the extent to which emotional experiences may differ across more versus less social emotions. This is

TABLE 4 Meta-analytic associations between attachment insecurity and discrete positive emotions.

	Estimate	*SE*	*z*	*p*	95% CI	*Q*	I^2
Attachment anxiety							
Love	−0.10	0.05	−2.12	.03	[−0.19, −0.01]	52.64**	83.64
Gratitude	−0.05	0.05	−1.02	.31	[−0.14, 0.04]	49.51**	83.80
Peace	−0.14	0.04	−3.39	<.001	[−0.22, −0.06]	43.11**	79.44
Awe	−0.03	0.05	−0.60	.55	[−0.14, 0.07]	71.33**	87.81
Curiosity	−0.11	0.03	−3.22	.001	[−0.17, −0.04]	21.10**	63.00
Attachment avoidance							
Love	−0.31	0.04	−8.07	<.001	[−0.38, −0.23]	61.75**	79.45
Gratitude	−0.18	0.05	−3.73	<.001	[−0.27, −0.08]	39.02**	85.04
Peace	−0.17	0.02	−8.02	<.001	[−0.21, −0.13]	14.74	22.20
Awe	−0.14	0.02	−7.00	<.001	[−0.18, −0.10]	10.91	16.73
Curiosity	−0.12	0.03	−4.49	<.001	[−0.17, −0.07]	13.70	39.87

**$p < .01$.

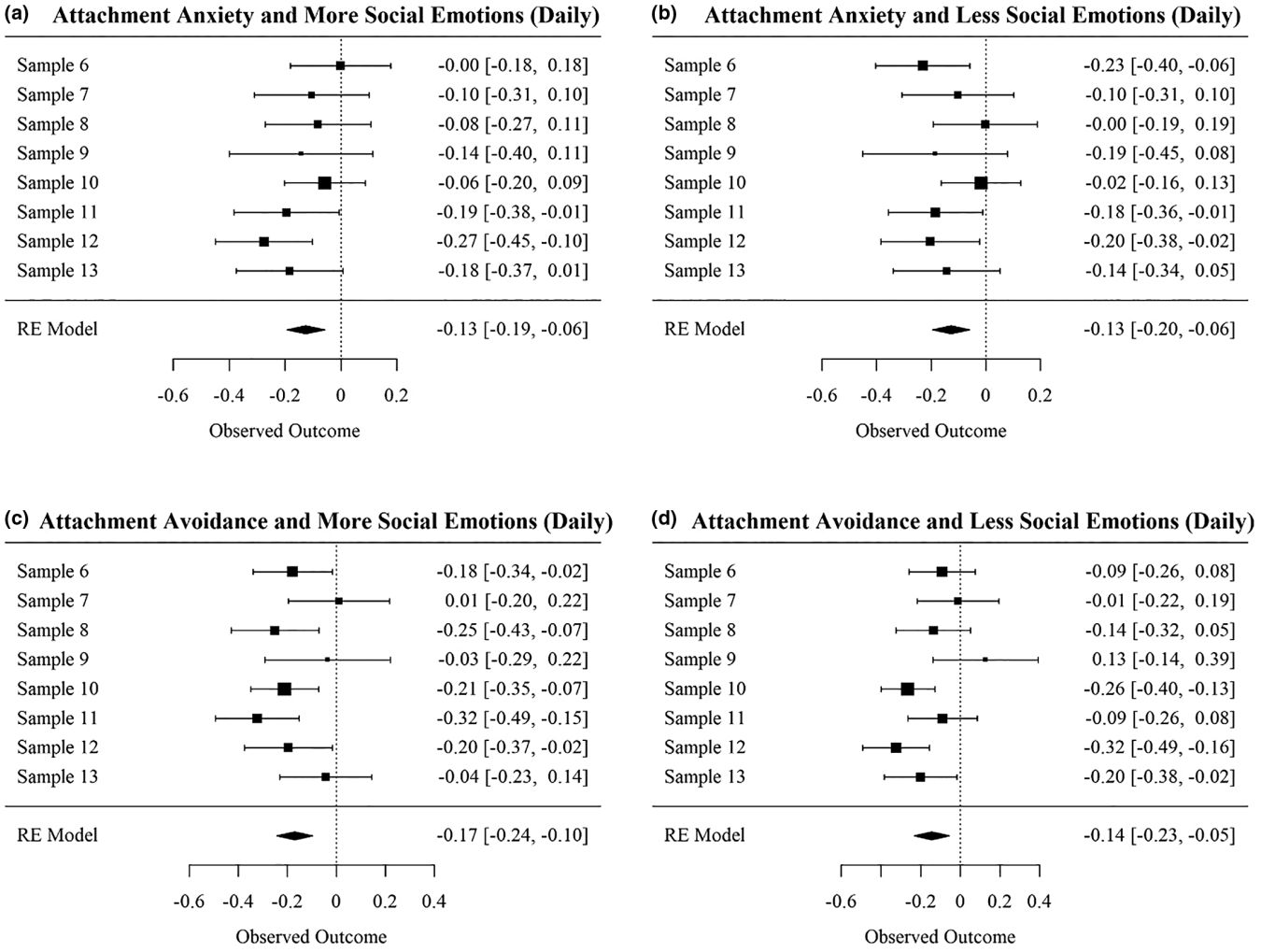

FIGURE 2 Forest plots summarizing meta-analytic results on attachment insecurity and daily experiences of positive emotions. Panels (a) and (b) present results for attachment anxiety and (c) and (d) present results for attachment avoidance.

important in part because the extent to which these emotional experiences are more (vs. less) social has the potential to speak to mechanisms underlying insecure individuals' reduced experiences of positive emotions.

Specifically, if attachment anxiety were more strongly associated with infrequent experiences of more social (vs. less social) positive emotions, this might suggest that anxious individuals' fear of rejection in social contexts (and subsequent intensified experiences of negativity) is what primarily interferes with experiences of positive emotions. This was not supported by our data. Instead, our results suggest that more general mechanisms such as anxious individuals' low self-esteem may be responsible for their infrequent positive emotional experiences. That is, anxiously attached individuals may be less likely to sustain their positive feelings and even inhibit them as they are more likely to feel they do not deserve them (Wood et al., 2003, 2009). An interesting finding of our analyses in this regard is that attachment anxiety did not show a significant link with gratitude (in the cross-sectional analyses). Perhaps gratitude was an exception as this emotion arises from receiving someone else's kind act on behalf of the self (Algoe et al., 2008; McCullough et al., 2008), which may serve to assure one of their relational value. Because gratitude typically follows specific (sometimes tangible) benefits conferred by the other, the relatively obvious presence of such benefits may mean gratitude is more readily accepted or is at least harder to dismiss as unjustifiable.

Of course, an alternative (or complementary) possibility remains that anxious individuals' heightened negativity is indeed what interferes with positive emotional experiences, but anxious individuals simply experience negative emotions just as intensely across non-social and social contexts (Robles & Kane, 2014), and this relatively chronic experience of negative emotions contributes to reduced experiences of positive emotions of any type. This view aligns with the well-established overlap between attachment anxiety and neuroticism (Noftle & Shaver, 2006), a dimension of personality capturing elevated stress reactivity and general negative affectivity.

We also found consistent evidence that attachment avoidance was associated with less frequent experience of all positive emotions examined. Of interest, however, avoidance was particularly strongly associated with less frequent experiences of "love, closeness, and trust." The negative association of attachment avoidance with love was demonstrably stronger than that between attachment avoidance and peace, awe or curiosity. No such contrast was found between gratitude, the other "social" positive emotion, and peace, awe or curiosity. Arguably, feelings of love are more intimacy-laden than feelings of gratitude as experiences of gratitude do not necessarily occur in an intimate context (despite its potential implications for being fueled by, and promoting intimacy; Algoe, 2012; Algoe et al., 2008). In fact, laypeople may recall a broad range of experiences when they think about instances in which they have felt grateful (Lambert et al., 2009), some of which may not be interpersonal (e.g., gratitude for an opportunity).

Thus, whereas our preregistered research questions focused on the idea that positive *social* situations may be triggers of avoidant defenses against experiences of positive emotion, perhaps we would have been better focusing on the notion that *intimacy* more specifically is a trigger. Indeed, avoidantly attached individuals are drawn to particular situations such as casual sexual opportunities (Gentzler & Kerns, 2004) that are inherently social yet may be lower in emotional intimacy. Future research should be conducted to more systematically examine our speculation that specific features of situations may trigger avoidant individuals' defensive emotional experiences. For example, an experiment involving gratitude situations that are more or less relevant to intimacy (e.g., benefit triggered by a close other versus a stranger) may help test this association with more precision. Overall, while our data do not permit any definitive conclusions about what underlies avoidants' limited positive emotional experiences, they are consistent with at least one possibility we did not consider: that avoidantly attached individuals may have deflated experiences of positive emotions in general (perhaps tied to broader personality traits such as low extraversion; Noftle & Shaver, 2006) or reduced up-regulation of positive emotions (Gentzler et al., 2010), while exhibiting particularly strong defenses against positive emotions in specific contexts (i.e., those with strong intimacy demands).

Research unpacking the mechanisms for insecurely attached individuals' reduced positive emotional experiences is important especially because most investigations into this issue, including the present work, are based on correlational data. Although there are experimental studies showing that priming attachment security leads to stronger experience of positive emotion (consistent with the notion that a paucity of positive emotional experience is a consequence rather than a cause of attachment insecurity), few studies test whether priming either type of attachment insecurity reduces positive emotions (see Rowe et al., 2020). Arguably, evidence for the benefits of attachment security does little to advance our full understanding of the costs of attachment insecurity; to fully understand how attachment insecurity shapes emotional experiences, it is essential to investigate which type of insecurity has what sort of emotional costs through what mechanisms. The development of adequate explanatory mechanisms can help design and justify future experimental research, which is promising but also difficult to implement (Hudson & Fraley, 2018).

Of course, although our research focused on providing distinct accounts for explaining the relation between each type of attachment insecurity and positive emotional experiences, there may be broad explanations applicable to emotional lives associated with both types of attachment insecurity. For example, the broaden-and-build theory of positive emotions (Fredrickson, 2001; Fredrickson & Joiner, 2002) posits that positive emotions broaden peoples' mindsets and build psychological resources, thereby leading to increases in positive emotions, the process which, some evidence suggests (Mikulincer & Sheffi, 2000), is disrupted in insecure individuals. That is, individuals high in either type of insecurity may be less likely than secure individuals to benefit from the upward spirals toward increased positive emotions. In other words, it may be the lack of the sense of security that contours positive emotion experiences more than the specific type of insecure attachment.

In interpreting our results, it is important to consider that our outcome variable was based on recollection of positive emotional experiences (either over the prior one or 2 weeks, or the day). As insecurely attached individuals are inclined to process information in line with their relational schemas (e.g., Dykas & Cassidy, 2011), it is possible that their cognitive processing or memories in particular may have affected the results (also see Robinson & Clore, 2002). For example, more avoidantly attached individuals' reports of limited positive emotional experiences may be exaggerated to the extent that they do not successfully encode (and thus will fail to recall) positive emotional memories more so than individuals low in attachment avoidance (Fraley & Brumbaugh, 2007). Future research incorporating momentary assessments in addition to later recall would be well positioned to capture the degree of match between immediate emotional experiences and conscious memory of positive emotion frequency; such research would help elucidate whether attachment insecurity interferes with emotional experiences in the moment and/or later recall of them.

Momentary assessment methods or Day Reconstruction methods can also help address the issue we encountered when measuring positive emotions. Specifically, low reliabilities of more social and less social positive emotion

pairs in our data suggested that the distinction we drew was less than ideal. Indeed, however socially relevant an emotion "typically" is considered to be, these distinctions can occasionally be blurred (e.g., peace may be felt in the presence of others), and possibly in distinct ways for secure and insecure individuals. Future research will benefit from acquiring information that allow for more fine-grained distinctions within what is meant by social relevance. For example, social relevance of an emotion could be referring to its cause (i.e., interpersonal experiences that trigger the emotion), consequence (i.e., interpersonal experiences that result from the emotion), or context (i.e., emotion occurring in the presence of others). Alternatively, it is possible that the low reliabilities of the emotion pairs simply attest to the different functions each emotion is theorized to serve (e.g., Algoe & Haidt, 2009; Shiota et al., 2004). Thus, another promising way to approach the question of what positive emotions insecure individuals lack will be to move away from considering an emotion as being social or not and examining what theoretical function it is considered to serve.

Lastly, we note some caveats in interpreting our moderation analyses that are also worth considering in future research. Our data suggested that timing of the data collection or presence of the pandemic threat may affect the link between attachment anxiety and positive emotional experiences. While we are careful to interpret these exploratory findings, they certainly suggest the need to consider the situational demands (e.g., chronic stressors) when examining anxiously attached individuals' emotional lives. Further, we did not find any significant moderations by relationship status although some research would have predicted being in a relationship to serve as a chronic prime for avoidant defenses (e.g., Kafetsios et al., 2014) that perhaps strengthens the negative link between attachment avoidance and positive emotions. Arguably, our sample-level moderation was not the best way to capture such differences as our samples differed in many characteristics other than relationship status. Future research might benefit from planning a study specifically focusing on testing this difference, accounting for the possibility of moderation by variables that might better imply a natural prime for avoidant defenses (e.g., cohabiting status).

To conclude, the present results suggest that attachment insecurity is associated with reporting less frequent experiences of positive emotions, however socially relevant the emotion typically is. Thus, on the one hand, our data seem to challenge the need to differentiate positive emotions. On the other hand, however, the low reliability of the emotion pairs we observed as well as some unique relations between attachment insecurity and individual emotions (e.g., the markedly strong association between attachment avoidance and experiences of love) suggest otherwise. That is, although social relevance may not be the precise distinction to draw, it may indeed be important to consider emotion specificity in order to fully understand attachment-related dynamics of emotional experiences.

AUTHOR CONTRIBUTIONS

YP, SS, GM (Conceptualization). YP, EAI, SBA, NDL, KS, CLC, NLC, FC, ODR, GF, BLF, PH, DK, TNW, GM (Data collection). YP (Analysis). YP, SS (Drafting of manuscript). GM (Supervision). All authors provided very helpful feedback on the draft and approved the final version of the paper.

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CONFLICT OF INTEREST

There is no conflict of interest.

ETHICS STATEMENT

All studies used in this study were approved by the ethics review board at the institution authors were affiliated with at the time of data collection.

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ENDNOTES

[1] Note that our final analyses involved more datasets than were initially pre-registered as during the manuscript revision process, we heeded reviewer suggestions to send out a call for more data, which increased our number of datasets. Specifically, we sent out a call for datasets in related research networks and targeted

private emails to authors who had published research using an MDES scale. Another addition made during the revision process was inclusion of data from daily diary studies providing repeated assessment of emotional experiences. Although our pre-registered plan focused on analysis of cross-sectional datasets, in response to the reviews and given the available datasets we were made aware of, we included additional analyses of the link between attachment insecurity and daily assessment of more or less social positive emotions.

[2] A model predicting non-social positive emotion resulted in a singular fit (indicating no significant variance for dyad clusters), thus a regression model was run.

[3] Although not pre-registered, we also examined whether sex/gender moderates the link between attachment insecurity and more or less social positive emotions. We did not find any significant interaction.

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