Ambulatory Measurements of the Relation between Insecure Attachment Style and Stress: A Systematic Literature Review

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Abstract

Attachment is seen as relevant throughout life and influences one's stressor appraisal and emotional responses. More specifically, the insecure attachment styles, anxious and avoidant attachment, have been associated with an increase in stress. Moreover, there is growing evidence that individual characteristics, such as attachment, actively influence the occurrence of negative life events and stress. Therefore, this systematic review tries to test whether there is an association between insecure attachment and stress among given literature. Nine studies out of the Stress in Action databank met the inclusion study and were systematically reviewed. Clinical studies were excluded, and studies that used ecological momentary assessment (EMA) were included. Results are in line with previous research, supporting the positive association between insecure attachment and stress. While the association between anxious attachment and stress was consistent across stress measures and populations, results for avoidant attachment and stress were less consistent. Some studies found a significant positive association while others did not. Differences for avoidant attachment could be explained by differing research methodologies. Future research should further understand and establish the directionality between anxious and avoidant attachment with stress.

Keywords: systematic review, insecure attachment styles, anxious attachment, avoidant attachment, stress, ambulatory measures

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Attachment can be considered one of the best researched and universal theories about interpersonal relationships (Cassidy & Shaver, 2016) and is seen as relevant throughout the whole life (Bowlby, 1973). A recent meta-analytic review revealed that around half of the studied infant-parent attachment relationships in research, can be considered insecure (Madigan et al., 2023). Several studies found that insecure attachment styles, avoidant and anxious, prognosticate an increase in distress and dependent stressors (Bottonari et al., 2007; Hankin et al., 2005; Sheinbaum et al., 2015). Furthermore, insecure attachment is seen as one of the individual characteristics that is influencing life stress (Eberhart & Hammen, 2009). This is line with the assumption of Mikulincer and Florian (1995, 1998) that one's attachment style has an influence on stressor appraisal and the aligning emotional response. Consequences of repeatedly experiencing stress can be seen as wide-ranging and include various health strains such headaches (Francisco et al., 2023), depression (Colodro-Conde et al., 2017), or obesity (Siddiqui et al., 2022) posing a strain on the individuals health. By acknowledging insecure attachment as one contributor to life stress (Eberhart & Hammen, 2009) this systematic review could help to further understand the association between insecure attachment styles and stress and give advice for future interventions and treatment.

Attachment styles are already formed in early life by children observing their caregivers dealing with distress and internalize this as expectations about themselves and others in the form of coping and emotional responds to stressors (Cassidy, 1994; Fraley and Shaver, 2000; Mikulincer and Florian, 1995). Therefore, attachment and stress are closely related with each other. Attachment entails different attachment types which can be best explained along the two dimensions anxiety and avoidance (Brennan et al., 1998). If both dimensions are low, the attachment is considered secure (Richards & Hackett, 2012).

An anxious attachment style is characterized by heightened negative affect (NA) within interpersonal relationships (Allen et al., 1998; Smyth et al., 2013). Anxiously attached individuals seek proximity, support, and interpersonal contact of others, as they are afraid and sensitive to rejection or loss (Mikulincer & Shaver, 2007; Shaver & Mikulincer, 2002). Comfort is often sought by excessively expressing their NA (Gentzler & Kerns, 2006) and by clinging to or controlling their attachment figure (Mikulincer & Shaver, 2007). Rather than experiencing comfort, these behaviors often increase the experienced distress with respect to interpersonal contact (Cooper et al., 1998). According to Shih et al. (2017) anxious attachment can be even seen as predictor for stress generation as it fosters the occurrence of interpersonal stressors, such as conflict. The increase in interpersonal stressors of individuals with anxious attachment further supports the assumption that anxious attachment and stress generation are related.

People who are high in avoidance have an avoidant attachment style, which is generally characterized by greater interpersonal distance (Cafferty et al., 1994). Individuals tend to distance themselves from intimacy and dependency, withdraw from conflicts or deny and dismiss their NA when confronted with (potential) stressors (Bonache, 2019; Cafferty et al., 1994; Cassidy, 1994; Fraley & Shaver, 1997; Smyth et al., 2013). Instead of seeking proximity or engage in support-seeking behaviors, avoidantly attached individuals handle their distress alone (Mikulincer et al., 2003). Furthermore, insecurely attached individuals experience more interpersonal stressors that contribute to stress generation (Hankin et al., 2005), indicating a possible association between avoidant attachment and stress.

Several studies investigated the relationship between insecure attachment and stress to further understand how the two could be related (Cohen et al., 2013; Hankin et al., 2005; Shih et al., 2018). Across research it was found that insecure attachment is associated with stress as it contributes to the generation of interpersonal stressors (Cohen et al., 2013; Hankin et al.,

2005; Shih et al., 2017). Insecure attachment as a contributor to stress generation holds over time as several studies included follow-up studies over a period of up to two years (Cohen et al., 2013; Hankin et al., 2005). As stress and attachment seem to be closely intertwined, it is important to further conceptualize stress to understand their relation. Stress as a concept has already been defined in various ways (Vaessen et al., 2021). Its definition can include both, psychological or physiological responses to internal and external stressors (American Psychological Association, 2018). Physiological responses, among other things, include the release of hormones, such as adrenaline and cortisol, to fight or flee when faced with a stressful event (Guilliams, 2015). An increase in cognitive performance to prepare for a stressful situation could be considered a psychological response (Guilliams, 2015). Even though definitions vary, all of them declare a situation as stressful, if the affected individual perceives it as such (Vaessen et al., 2021). Therefore, different conceptualizations have been used to capture stress. Occurrences of negative life events, perceived stress, NA and interpersonal arguments, all illustrate the underlying concept of psychological stress (Almeida, 2005; Cohen et al., 1993a, 1993b). The commonality of different stress definitions to declare situations as stressful if the individual perceives it as such, implies that the individual´s perception is crucial to stress and further supports the findings that insecure attachment increases stressor appraisal (Bottonari et al., 2007; Hankin et al., 2005; Sheinbaum et al., 2015). These findings align with the growing evidence that individuals affect their own environment as well, a process called stress generation (Hammen, 1991). The stress generation model states that the occurrence of negative life events is actively influenced by individual characteristics (Rnic et al., 2023) A distinction is drawn between dependent and independent stressors (Rnic et al., 2023). Independent stressors are not dependent on individual actions but occur uncontrolled by these actions, such as death of loved ones (Rnic et al., 2023). In contrast, dependent stressors refer to situations/events that are partly shaped

by the individual's characteristics or behaviors, such as the occurrence of arguments (Rnic et al., 2023). One´s attachment style is associated with dependent stressors (Shih et al., 2017) as it influences how someone deals with different situations through its influence on one´s cognitive processes, support-seeking behaviors, or emotion regulation strategies (Bowlby, 1969). The association of dependent stressors and attachment is in line with the finding that insecure attachment influences life stress (Eberhart & Hammen, 2009).

The following systematic review studies the relationship between insecure attachment styles, anxiety and avoidance, and stress within the general population. It aims at better integrating the different findings into a coherent picture, to lay a foundation for possible future interventions and stress the importance of (early) interpersonal interactions. To reduce the confounding effects of possible mental health illnesses this literature review excludes the clinical population. By using a general population, one establishes a baseline of normative data which, later, can be used to investigate clinical deviations. The current systematic review specifically includes studies that make use of ambulatory measurements such as ecological momentary assessment (EMA). This data allows for generalization, as it is collected in a natural environment, avoids error bias due to immediate assessment of the current state, records variations across situations and over time, and allows for a strategic selection of assessment moments (Symth & Stone, 2003). Therefore, the included studies are low on recall bias and have an increased external validity as EMA allows for data collection beyond laboratory settings.

Methods

The present study is part of a larger project titled Stress in Action (Weverling, 2023). This project is a collaboration between multiple universities, focused on reviewing research on daily measures of stress dynamics with the overarching goal of creating a more stress-resilient population. The present study was designed according to the Preferred Reporting

Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) statement (Page et al., 2021). The study was also pre-registered (https://osf.io/24auc).

2.1 Eligibility criteria

To be included in the overall study, the articles needed to meet a set of eligibility criteria. Firstly, only studies involving human participants are considered eligible for inclusion. However, studies incorporating animals as intervention agents, such as those investigating the impact of canine companionship on daily mental distress among humans, are also included, given the focus on human participants. Additionally, single-participant case studies (N=1) are excluded from consideration.

Secondly, empirical studies are simply included for inclusion, while non-empirical sources such as dissertations, reviews, comments, opinion articles, books (chapters), and similar publications are excluded. Nevertheless, protocols detailing the methodologies of empirical studies are included to optimize the selection of relevant articles.

Thirdly, selected studies must incorporate daily measures that are recorded at least once a day for several consecutive days (≥ 2 days in a row). These measures could be subjective self-reports, reported by others, or objective measures of physiology or activity. However, studies reporting daily treatments without accompanying measures, Intensive Care Diaries (ICD) documenting the status and treatments of unconscious patients in intensive care units, or daily measures unrelated to human experiences, such as emotional word searches or crime reports, were excluded. These criteria serve to ensure selection of studies that directly contribute to understanding daily measures of stress and mental well-being in human populations while excluding irrelevant sources.

2.2 Search strategy and information sources

The search was conducted in Web of Science with Core Collection and MEDLINE searched and PsycINFO (through EBSCOhost) on December 15th, 2023. For these electronic

databases, the search string was developed on three core components: a) stress concept (context); AND b) mental health outcome; AND c) the design of the study (daily measurements). The search was conducted in the title or abstract. The first component “stress concept” used: a) stress* or “life event*” or “negative event*” or hassles or trauma* or abuse or neglect or "child* maltreatment" or "child* experiences" or violence or disaster*. The second component used: b) psychopathol* or "mental disorder*" or anxiet* or depress* or "CIDI" or "DSM" or phobia* or "ptsd" or "panic disorder*" or "GAD" or "MDD" or “MDE”. The last component used: c) diary or daily or "time series" or "time-series" or "experience sampling" or "ESM" or "ecological momentary assessment*" or "EMA" or "intensive longitudinal" or ambulatory or “micro-longitudinal”.

2.3 Selection process

A preparation stage was conducted, in addition to a pilot screening of 1200 hits, an update on selection criteria and continuation of work on screening, pilot extraction, extraction and synthesis stage. After removing duplicates using RStudio and Rayyan, abstract screening was conducted using ASReview available at https://asreview.nl/ (van de Schoot et al., 2021). This software uses active learning to prioritize abstracts based on the similarity of included articles. The software was trained using 400 records as signifiers of articles that should be included or excluded (200 each). The prioritized records were then screened by four individuals, each looking at a different subset of abstracts. Only the title and abstract of the record were displayed on the screen with two decision options (relevant/irrelevant). The screening process continued until fifty records in a row were marked as irrelevant, after which, the criteria were met to stop semiautomatic screening, the remaining articles were not included and not seen by reviewers. Another round of screening of the excluded records was done by a different reviewer, also using ASReview. For the purpose of this review, we only included published articles in peer-reviewed journals.

2.4 Data collection process and items

A data extraction sheet in Excel was set up to be used for the primary data extraction phase. Twelve extractors were given instructions on how to code the articles, with each of them coding approximately 100 articles in five weeks. The coding was supervised and assisted by one of the project leaders, to ensure extraction reliability. From the included articles, the following data was extracted regarding the population characteristics: year of publication, sample country, sample size, mean age, population, physical health, and mental health diagnosis. The data extraction sheet was separated into two blocks: for ambulatory measurements and cross-sectional measures. sampling frequency per day, as well as type of report (subjective, objective, or mixed) was collected for the ambulatory measurements part, and the following variables were extracted when measured either ambulatory or cross-sectionally: stress response (stressor, stress, affect/emotions, cognitions, physiology, behavior), and mental health symptoms (coping, mental health concept, measurement). Additionally, there was an 'other' column, where variables that do not fit into the other categories, could be coded. Each study was coded as either including an intervention (1) or not (0). Information that couldn't be obtained was referred to as non-available (N/A).

2.5 Studies selection from the database

To find all eligible articles for the systematic review on the association between insecure attachment and stress following inclusion and exclusion criteria were defined. The articles should measure participants attachment style, either cross-sectionally or daily, and their daily stress at least once a day for a minimum of two consecutive days in a row either subjectively or objectively measured. Daily stress measures include subjective stress, NA, conflict stress, negative events and cortisol levels as they are all associated with stress (Cohen et al., 1993a, 1993b; Guilliams, 2015; Vittengl & Holt, 1998). Studies with a) a clinical sample or b) a sample size < 2 were excluded.

Then the following columns (behavior daily, other daily, behavior cross-sectionally, and other cross-sectionally) were searched with the following search terms: attachment*, inter*, bond*, social*, relation*, proximity, alliance, sociability, romantic*. Furthermore, the abstract was searched with the same search terms as well, to ensure that all matching articles were found. Articles found through snowballing of included articles references were also incorporated. It is aimed to include effect measures whenever possible. Mostly effect measures that capture the strength of associations were used such as Pearson´s r or the standardized beta coefficient, as they are compatible and accurate for continuous, categorical and experimental data (Ferguson, 2009). If not available corrected estimates, such as R^2 were used as a measure of effect size. Effect sizes were interpreted following suggestions for social science data. Therefore Ferguson (2009) refers to a small effect size as a recommended minimum for practically significant effects in social sciences.

For strength of association effect size measures .2 is seen as a small effect, .5 as moderate, and .8 as a strong effect (Ferguson, 2009). For squared association indices effect size measures .04 is seen as a small effect, .25 as moderate, and .64 as a strong effect (Ferguson, 2009). The results are summarized and analyzed in a textual approach, following a narrative synthesis.

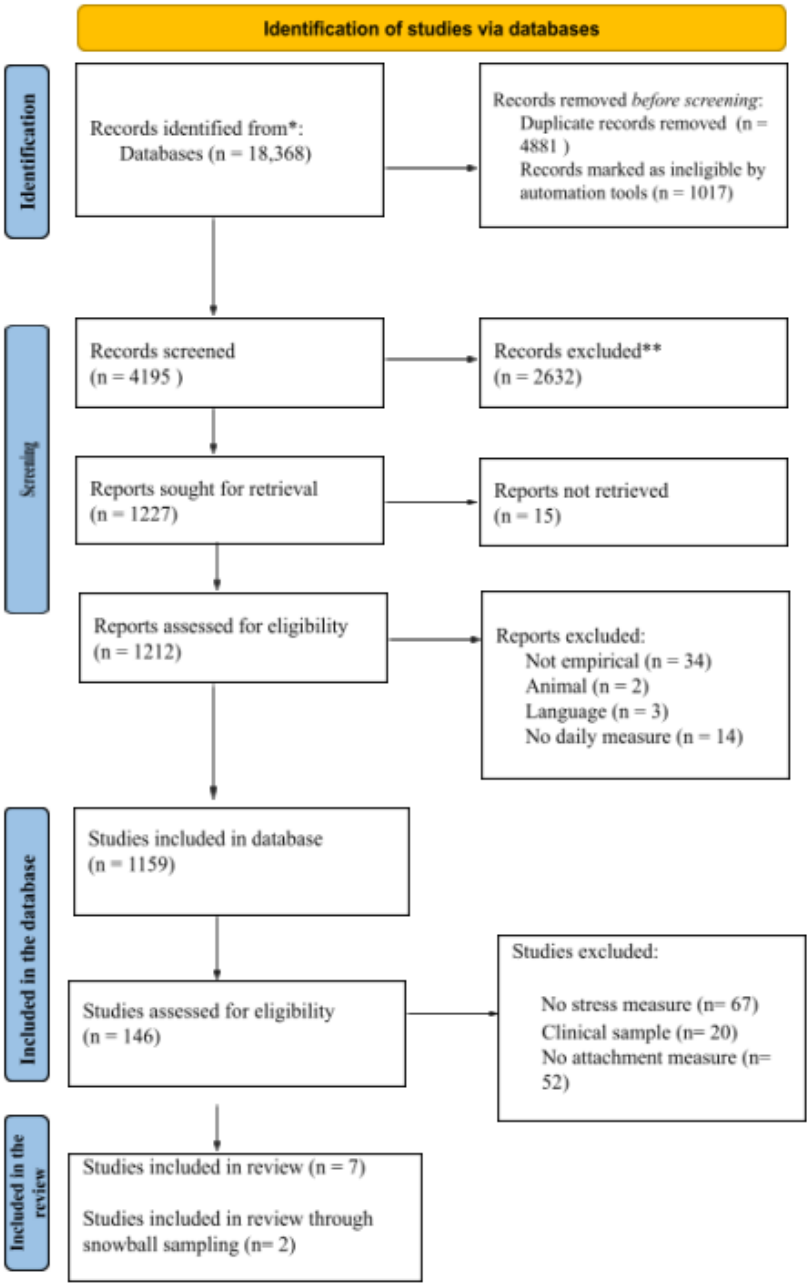
Results

3.1 Study Selection

After searching the database 146 articles were identified of which 7 articles met the inclusion criteria. Two more articles were found through snowballing, as reflected in the flow chart which shows the screening process (Figure 1). The results and information of the included studies can be found in Table 1 and Table 2.

Figure 1.

PRISMA Flow Chart of Systematic Literature Review



3.2 Study Characteristics

The publication years of the included studies range from 1996 to 2023. Three of the studies were conducted in Europe (Slovakia, Austria, Spain) (Dančík et al., 2021; Schusterschitz et al., 2018; Sheinbaum et al., 2015), five in the United States (Diamond et al., 2008; Eberhart & Hammen, 2009; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023;

Tidwell et al., 1996) and one in Canada (Lapierre et al., 2023). The total sample size ranged from 44 to 416 (M=181). Four studies had university samples (Eberhart & Hammen, 2009; Gentzler & Kerns, 2006; Sheinbaum et al., 2015; Tidwell et al., 1996), two studies cohabitating couples (Diamond et al., 2008; Haydon & Salvatore, 2023) and three others (community sample (Dančik et al., 2021), adolescents (Lapierre et al., 2023), and employees (Schusterschitz et al., 2018)). The Mean age ranged from 17.09 to 36.2 (M=24.91), while one study only reported the age range (17 to 21) (Tidwell et al., 1996). Stress was measured in different ways with some of the studies including multiple stress measurements. Five studies measured stress through NA (PANAS, NA negative emotions) (Dančik et al., 2021; Diamond et al., 2018; Schusterschitz et al., 2018; Sheinbaum et al., 2015; Tidwell et al., 1996)), three through conflict (conflict engagement, relationship conflict, relationship argument, and relationship stress) (Eberhart & Hammen, 2009; Haydon & Salvatore, 2023; Lapierre et al., 2023), three through occurrence of negative events (daily events and situation stress) (Diamond et al., 2008; Gentzler & Kerns, 2006; Sheinbaum et al., 2015), and one through cortisol levels (Diamond et al., 2008). Six studies used the Experience in Close Relationships questionnaire (Dančik et al., 2021; Diamond et al., 2008; Eberhart & Hammen, 2009; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Lapierre et al., 2023), one study the Attachment Style Interview questionnaire (Sheinbaum et al., 2015) and two studies items on attachment style or insecurity (Schusterschitz et al., 2018; Tidwell et al., 1996) to measure the participants attachment style. Attachment style was measured daily by Eberhart & Hammen (2009) and Lapierre et al. (2023). Only the former computed the daily attachment style into an average one (Eberhart & Hammen, 2009), while the other studies only measured attachment style cross-sectionally (Dančik et al., 2021; Diamond et al., 2008; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Schusterschitz et al., 2018; Sheinbaum et al., 2015; Tidwell et al., 1996). Duration of the studies ranged from four days to 21 days (M=10.9), not including one

study that specified their duration no further than two workweeks (Schusterschitz et al., 2018). Measurements per day ranged from one to eight (M= 2.29), while the measurements per day were dependent on the social interactions encountered (any <10min) for one study (Tidwell et al., 1996) and another study indicated a range from one to two measurements per day (Dančik et al., 2021).

3.3 Overall Findings

Insecure attachment was investigated in terms of anxious and avoidant attachment style, by all studies. Having a close look at the found associations, it becomes clear that the relation between stress and attachment can be differentiated by the type of attachment. Anxious attachment shows a more consistent and positive relation to stress than avoidant attachment. Overall, it was found that both attachment styles can be associated with higher stress levels (Dančik et al., 2021; Diamond et al., 2008; Eberhart & Hammen, 2009; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Lapierre et al., 2023; Schusterschitz et al., 2018; Sheinbaum et al., 2015; Tidwell et al., 1996) and are in some cases even seen as a predictor for stress generation (Dančik et al., 2021; Eberhart & Hammen, 2009; Schusterschitz et al., 2018; Sheinbaum et al., 2015). Both attachment styles were associated with higher subjective stress levels (Dančik et al., 2021; Diamond et al., 2008), higher NA (Dančik et al., 2021; Schusterschitz et al., 2018; Tidwell et al., 1996), conflicts stress (Eberhart & Hammen, 2009; Haydon & Salvatore, 2023; Lapierre et al., 2023), and negative life events (Gentzler & Kerns, 2006; Sheinbaum et al., 2015).

The results indicate that the strength of the association differs for anxious and avoidant attachment. Anxious attachment shows consistently higher effect sizes, such as Pearson correlations and (standardized) beta coefficients, with stress than avoidant attachment. The more distinct association of anxious attachment with stress holds over a wider range of stress

measures than avoidant attachment as well. Therefore, the following section divides the findings into findings for anxious and avoidant attachment to evaluate them more precisely.

3.4 Findings Anxious Attachment

Overall, a significant positive association between anxious attachment and stress was found (Dančík et al., 2021; Diamond et al., 2008; Eberhart & Hammen, 2009; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Lapierre et al., 2023; Schusterschitz et al., 2018). The linkage between anxious attachment and stress even holds for different stress measures, a significant positive relation to anxious attachment was found for subjective levels of stress (Dančik et al., 2021; Diamond et al., 2008; Lapierre et al., 2023), for NA (Dančik et al., 2021; Diamond et al. 2008; Schusterschitz et al., 2018; Sheinbaum et al., 2015), conflict stress (Eberhart & Hammen., 2009; Haydon & Salvatore, 2023; Lapierre et al., 2023), and occurrence of negative events (Gentzler & Kerns, 2006; Sheinbaum et al., 2015) but not for salivary cortisol levels (Diamond et al., 2008). No significant positive association could be found between salivary cortisol levels and stress (Diamond et al., 2008).

Study results indicate a positive relation between subjective stress and anxious attachment (Dančik et al., 2021; Diamond et al., 2008; Lapierre et al., 2023). The three studies investigating this relation all found a significant positive association between the two variables (Dančik et al., 2021; Diamond et al., 2008; Lapierre et al., 2023). Statistical significance and effect sizes are given by all three studies (Dančik et al., 2021; Diamond et al., 2008; Lapierre et al., 2023), with effect sizes indicating a rather small effect (see Table 2) (Ferguson, 2009). Nevertheless, it can be said that anxious attachment and subjective stress hold a positive association (Dančik et al., 2021; Diamond et al., 2008; Lapierre et al., 2023).

Anxious attachment is also positively associated with NA as stress measure. Four out of five studies which measured stress through NA found a significant positive association of anxious attachment and NA (Dančik et al., 2021; Diamond et al. 2008; Schusterschitz et al.,

Table 1
Sample Characteristics

Author (Year)	Population				Measurements				
	Country	Total N	Mean Age *(SD)*	Population Type	Measurements per Day	Attachment	Daily Stressor	Daily Stress	Daily Emotion
Dančík et al. (2021)	Slovakia	44	26.27 *(4.87)*	Community sample	Once or twice a day for 6 days	ECR-R	3 items on 7-point Likert Scale (This is a pleasant situation; This is an unpleasant situation; I would prefer to avoid this situation)	1-item on 7-point Likert scale (I feel stressed)	PANAS
Eberhart & Hammen (2009)	United States	104	18.82 *(1.24)*	University students	Every evening for 14 days	ECR-R	Romantic life events questionnaire; 20-items relationship conflict	-	-

Note. *Age range; ECR-R= Experience in Close Relationships revised questionnaire; ECR= Experience in Close Relationships questionnaire; ASI= Attachment style interview questionnaire; PANAS= Positive and Negative Affect Schedule

Table 1 Continued

Author (Year)	Population				Measurements				
	Country	Total N	Mean Age *(SD)*	Population Type	Measurements per Day	Attachment	Daily Stressor	Daily Stress	Daily Emotion
Diamond et al. (2008)	United States	82	30 *(7.5)*	Cohabitating heterosexual couples	Every evening for 21 days	ECR	Modified version Daily Event Checklist	3 items subjective daily stress on a 5-point Likert scale; salivary cortisol	PANAS
Lapierre et al. (2023)	Canada	196	17.09 *(1.79)*	Adolescents	Every day at 8pm for 14 days	Adapted French revised version of ECR-R	4-items conflict engagement	Daily level of Stress (VAS 0-100) "Not stressed at all" to "most stressed that I have ever been."	-
Gentzler & Kerns (2006)	United States	119	20.9 *(n/a)*	University students	Three times a day for 4 days	ECR	1-item daily most negative event	-	-
Haydon & Salvatore (2023)	United States	416	28.7 *(5.5)*	Cohabitating couples	Once a day for 14 days	9-items ECR	Item relationship argument (yes/no)	Item 7-point Likert romantic relationship stress	-

Table 1 Continued

Author (Year)	Population				Measurements				
	Country	Total N	Mean Age *(SD)*	Population Type	Measurements per Day	Attachment	Daily Stressor	Daily Stress	Daily Emotion
Tidwell et al. (1996)	United States	125	17-21*	University students	All social encounters (<10min) for 7 days	Single-item measure attachment style; Likert-format version attachment style	-	-	10 items negative affect (sad, frustrated, rejected, bored, hurt, worried, tense, disgusted, embarrassed, imposed upon)
Schusterschitz et al. (2018)	Austria	340	36.2 *(11.1)*	Employees	Once a day for 2 workweeks	24-items attachment insecurity	-	-	5-items daily negative emotions (angry, nervous, anxious, frustrated, depressed)
Sheinbaum et al. (2015)	Spain	206	21.3 *(2.4)*	University students	8 times a day for 7 days	ASI	1-item situation stress (“My current situation is stressful”)	-	Item negative affect index

Table 2
Outcome Data

Author (Year)	Outcomes							
	Data Analysis	Type of Measure	Other Variables	Outcome Anxious Attachment	P-value Anxious Attachment	Outcome Avoidant Attachment	P-value Avoidant Attachment	Results
Dančík et al. (2021)	Multilevel linear regression analyses	Baseline anxious and avoidant attachment as predictors for average momentary NA and subjective stress levels	Social company, emotional closeness, PA	Subjective stress: ß=0.30, SE=.118, 95% CI [0.066;0.528] NA: ß=.26, SE=.108 95% CI [.049; .473]	Subjective stress: p=.012 NA: p=.016	Subjective stress: ß=0.16, SE=.098, 95% CI [-0.032;0.353] NA: ß=.12, SE=.112, 95% CI [-.101; .338]	Subjective stress: p=.102 NA: p=.289	Increased levels of stress and NA for anxious attachment, but not avoidant.
Eberhart & Hammen (2009)	Hierarchical linear regression analysis	Baseline interpersonal style as predictor for conflict stress over a 4-week period	Depressive symptoms, reassurance seeking, dependency	Conflict stress: b=.94, SE= .33, R^2=.07	Conflict stress: p<.01	Conflict Stress: b=.43, SE=.29, R^2=.02	-	Anxious attachment predicted conflict stress.

Note. NA= negative affect; PA= positive affect; physical DVP= dating violence perpetration

Table 2 Continued

Author (Year)	Outcomes							
	Data Analysis	Type of Measure	Other Variables	Outcome Anxious Attachment	P-value Anxious Attachment	Outcome Avoidant Attachment	P-value Avoidant Attachment	Results
Diamond et al. (2008)	Multilevel random coefficient modelling	Correlation of average attachment style with mean subjective stress, negative events, and cortisol.	PA, physical symptoms, sleeping problems, positivity & negativity of partner interactions, No. of positive events, No. of remote contacts, longest phone call with partner	Subjective stress: r=.22 Negative events: r=.11 NA: r=.37 Cortisol: r=.13	Subjective stress: p<.05 NA: p<.05 Cortisol: p>.05	Subjective stress: r=-.02 Negative events: r=.14 NA: r=.03 Cortisol: r=.07	Subjective stress: p>.05 NA: p>.05 Cortisol: p>.05	Significant positive relation of anxious attachment, NA and subjective stress.
Lapierre et al. (2023)	General linear multilevel model	Correlation of daily attachment styles with average stress and conflict levels	Daily hostile attributions to partner´s behavior, positive problem solving, withdrawal, physical DVP	Stress: r=.29 Conflict: r=.16	Stress: p<.001 Conflict: p<.001	Stress: r=.37 Conflict: r=.23	Stress: p<.001 Conflict: p<.001	Both attachment styles show significant positive relation to stress and conflict levels.

Table 2 Continued

Author (Year)	Outcomes							
	Data Analysis	Type of Measure	Other Variables	Outcome Anxious Attachment	P-value Anxious Attachment	Outcome Avoidant Attachment	P-value Avoidant Attachment	Results
Gentzler & Kerns (2006)	Repeated measures ANOVA	Correlation of average attachment style with immediate NA for negative events	Daily most positive event, PA, recalled affect for most positive/negative event, current feelings about positive/negative event	Immediate NA for negative interpersonal events: r=.47 Immediate NA for negative non-interpersonal events: r=.29	Immediate NA for negative interpersonal events: p<.001 Immediate NA for negative non-interpersonal events: p<.05	Immediate NA for negative interpersonal events: r=.30 Immediate NA for negative non-interpersonal events: r=.10	Immediate NA for negative interpersonal events: p<.05 Immediate NA for negative non-interpersonal events: p>.05	Positive relation of both attachment styles and NA for interpersonal events, non-interpersonal ones positive related to anxious attachment.
Haydon & Salvatore (2023)	Dyadic within-subjects causal process modelling	Correlation of baseline attachment styles with average relationship stress and average quantity of arguments across 14 days	Positive conflict recovery, sleep quality, relationship satisfaction	Relationship stress: r=.41 Arguments: r=.26	Relationship stress: p<.001 Arguments: p<.001	Relationship stress: r=.27 Arguments: r=.04	Relationship stress: p<.001 Arguments: p>.05	Positive association for both attachment styles and relationship stress, positive association for anxious attachment and arguments.

Table 2 Continued

Author (Year)	Outcomes							
	Data Analysis	Type of Measure	Other Variables	Outcome Anxious Attachment	P-value Anxious Attachment	Outcome Avoidant Attachment	P-value Avoidant Attachment	Results
Tidwell et al. (1996)	3x2 Analysis of Variance	Baseline attachment style as predictor for average negative emotion	Intimacy, promotive interaction, enjoyment, positive emotions	Negative emotions: M=1.6 F=7.1 with df (2,105)	-	Negative emotions: M=1.94 F=7.1 with df (2,105)	Negative emotions: p<.001	Attachment style influences occurrence of negative emotions.
Schusterschitz et al. (2018)	Multilevel analysis (two-level model)	Moderating effect of global attachment style on daily negative emotions	Co-worker specific attachment style, Big Five traits, daily workload, daily PA	Negative emotions: ß=.16, SE=.068	Negative emotions: p=.017	Negative emotions: ß=.13, SE=.057	Negative emotions: p=.027	Attachment style influences occurrence of negative emotions.
Sheinbaum et al. (2015)	Multilevel analysis	Direct effects of attachment style on daily experiences	Appraisals about self and others, social contact, social appraisals, and functioning	Situation stress: ß=.56, SE=.185 with df = 203 NA: ß=0.34, SE=.089 with df =203;	Situation stress: p<.01 NA: p<.001	Situation stress: ß=.06, SE=.174 with df = 203 NA: ß=.07, SE=.103 with df=203	Situation stress: p>.05 NA: p>.05	Increased situation stress and NA for anxious attachment.

2018; Sheinbaum et al., 2015), the other one found a non-significant positive relation (Tidwell et al., 1996). Effect sizes were reported as standardized beta coefficients, except Diamond et al. (2008), who reported Pearson´s correlation, and indicated a small effect (see Table 2).

The relation between conflict stress and anxious attachment was studied by three different studies (Eberhart & Hammen., 2009; Haydon & Salvatore, 2023; Lapierre et al., 2023). All of them found a significant positive association even though conflict stress was operationalized differently, as romantic life stress and conflict (Eberhart & Hammen, 2009), conflict engagement (Lapierre et al., 2023), or relationship arguments (Haydon & Salvatore, 2023). Reported p-values, again, indicate statistical significance and the three studies all present small effect sizes (Table 2). The reported outcomes suggest an association between anxious attachment and conflict stress (Eberhart & Hammen., 2009; Haydon & Salvatore, 2023; Lapierre et al., 2023).

The occurrence of negative life events seems to be related to anxious attachment (Gentzler & Kerns, 2006; Sheinbaum et al., 2015). Two out of the three studies that measured the relation of attachment style and negative events found a significant positive association between anxious attachment style and appearance of negative events (Gentzler & Kerns, 2006; Sheinbaum et al., 2015), the third one found a non-significant positive relation (Diamond et al., 2008). Values for effect sizes varied from too small to be indicative of a small effect (Diamond et al., 2008) to indicating a moderate effect (Gentzler & Kerns, 2006) (see Table 2). Results indicate an association between negative life events and the anxious attachment style.

Out of the nine studies which investigate the relation between anxious attachment and stress four studies disclosed that anxious attachment even predicts stress generation (Dančik

et al., 2021; Eberhart & Hammen, 2009; Schusterschitz et al., 2018; Sheinbaum et al., 2015). The four studies used different stress measures, subjective stress (Dančik et al., 2021), conflict stress (Eberhart & Hammen, 2009), negative emotions (Schusterschitz et al., 2018), and situation stress (Sheinbaum et al., 2015) but still yielded similar results (see Table 2). All four studies report their p-values to prove statistical significance ($p<.05$) and report effect sizes. Effect sizes range from small to moderate effects (see Table 2). Only Dančik et al. (2021) includes a 95% confidence interval (CI) to give a range indication of the effect size within the population (Schober et al., 2018). Putting together the association of the different stress measures with anxious attachment it becomes clear that there seems to be an overarching positive relation between anxious attachment and stress, with the possibility of the anxious attachment style influencing stress occurrence in individuals.

3.5 Findings Avoidant Attachment

Overall, contradictory results for the relation between avoidant attachment and stress have been found. An association between avoidant attachment and stress can be found across different stress measures, namely subjective stress, NA, conflict stress, occurrence of negative events, and salivary cortisol levels, while significant associations have only been established by around half of the studies (Dančík et al., 2021; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Lapierre et al., 2023; Schusterschitz et al., 2018; Tidwell et al., 1996). No statistically significant association between cortisol levels and avoidant attachment could be found (Diamond et al., 2008).

Inconsistent results have been found for the relation between avoidant attachment and subjective stress (Dančík et al., 2021; Diamond et al., 2008; Lapierre et al., 2023). Lapierre et al. (2023) found a positive significant association while Dančík et al. (2021) and Diamond et al. (2008) did not. Interestingly, the effect size differed a lot as well with Lapierre et al. (2023)

reporting a small to moderate effect, Dančík et al. (2021) a small, and Diamond et al. (2008) reporting no effect (see Table 2).

The associations found between avoidant attachment and NA are mixed. Two out of five studies found a significant positive relation (Schusterschitz et al., 2018; Tidwell et al., 1996), while the other studies did not show such relation (Dančík et al., 2021; Diamond et al., 2008; Sheinbaum et al., 2015). Furthermore, Tidwell et al. (1996) and Schusterschitz et al. (2018) did not report any effect size.

The relation between conflict stress and avoidant attachment is more consistent. Two out of three studies found a significant positive association, and both also reported a small effect (Haydon & Salvatore, 2023; Lapierre et al, 2023). Eberhart & Hammen (2009) did not find a significant association between the two variables and did not find an effect. Haydon & Salvatore (2023) also measured the association of avoidant attachment and the occurrence of arguments but neither yielded statistically significant results nor found an effect.

Furthermore, the relationship between the occurrence of negative events and avoidant attachment was studied (Diamond et al., 2008; Gentzler & Kerns, 2006; Sheinbaum et al., 2015). Only Gentzler & Kerns (2006) found a significant positive association, while a small effect was found in two studies (Gentzler & Kerns, 2006; Diamond et al., 2008). Again, the results for an association between stress measures, more specifically occurrence of negative events, and avoidant attachment are inconsistent.

Recounting, the linkage between different stress measures and the avoidant attachment style seems to be inconsistent with some studies suggesting a significant association (Dančík et al., 2021; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Lapierre et al., 2023; Schusterschitz et al., 2018; Tidwell et al., 1996) and others not (Dančík et al., 2021; ; Diamond et al., 2008; Eberhart & Hammen, 2009; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023).

Discussion

This systematic review is consisting of nine studies which measured the relation between the insecure attachment styles, anxiety and avoidance, and stress with the means of ambulatory measurements. Overall, this review supports the pre-existing suggestion that an association between insecure attachment styles and stress exists, while it indicates that the strength of the association differs for anxious and avoidant attachment.

4.1 Anxious Attachment and Stress

Throughout all studies a significant positive association between anxious attachment and increased stress levels was found. The unchanging significant positive association between anxious attachment and distinct stress measures is in line with the theoretical framework. Through being loss-sensitive (Mikulincer & Shaver, 2007; Shaver & Mikulincer, 2002) anxiously attached individuals tend to interpret events as threatening which increases their distress (Fraley & Shaver, 1997; Smyth et al., 2013). The increased distress is in line with and displaced in this systematic review, even though the population and mean ages differ (from adolescents to cohabitating heterosexual couples) for all three studies (Dančik et al., 2021; Diamond et al., 2008; Lapierre et al., 2023).

The increased frequency of negative events supports the stress generation model (Hammen, 1991; Rnic et al., 2023) and can be seen as an indication that anxious attachment might be a characteristic that boosts dependent stressors. This possible explanation is further supported by the fact that all three studies found a significant positive association between conflict stress and anxious attachment (Eberhart & Hammen, 2009; Haydon & Salvatore, 2023; Lapierre et al., 2023), as arguments are seen as one dependent stressor (Rnic et al., 2023). The three studies found a significant positive association despite differing population samples (adolescents, university students, and cohabitating couples) and even operationalized

conflict stress differently (romantic life stress, conflict engagement, or relationship arguments) (Eberhart & Hammen, 2009; Haydon & Salvatore, 2023; Lapierre et al., 2023).

The found significant positive association between anxious attachment and NA (Dančik et al., 2021; Diamond et al. 2008; Schusterschitz et al., 2018; Sheinbaum et al., 2015) is in line with previous research. An individual's attachment style influences one´s emotional response to stressors (Mikulincer & Florian, 1995, 1998), more specifically anxiously attached individuals tend to express their NA to comfort their distress (Gentzler & Kerns, 2006), which is reflected within the heightened NA for anxious attachment in the systematic review.

4.2 Avoidant Attachment and Stress

The results for avoidant attachment and stress are less indicative and inconsistent. Some studies found positive significant associations between subjective levels of stress, NA, conflict stress or occurrence of negative events (Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Lapierre et al., 2023; Schusterschitz et al., 2018; Tidwell et al., 1996) other studies did not (Dančik et al., 2021; Diamond et al., 2008; Eberhart & Hammen, 2009; Sheinbaum et al., 2015).

According to Fraley & Shaver (1997) avoidantly attached individuals experience but dismiss their NA and subjective stress when confronted with stressors, which could explain why some studies found an association between avoidant attachment and stress (Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Lapierre et al., 2023; Schusterschitz et al., 2018; Tidwell et al., 1996) and why others did not (Dančik et al., 2021; Diamond et al., 2008; Eberhart & Hammen, 2009; Sheinbaum et al., 2015). Furthermore, Lapierre et al. (2023) and Haydon and Salvatore (2023) found a significant positive association between avoidant attachment and conflict stress while Eberhart & Hammen. (2009) did not. Research supports the association of insecure attachment and stress, as insecure attachment increases the

occurrence of dependent interpersonal stressors (Cohen et al., 2013; Hankin et al., 2005; Shih et al., 2017) As the findings are inconsistent it is difficult to refine whether there is an association between avoidant attachment and stress or not. The inconsistent results could reflect the individual's withdrawal from conflict and their isolating handling with distress while they still experience NA but dismiss it (Bonache, 2019; Fraley & Shaver, 1997). Increased levels of conflict stress could also be explained by the circumstance that avoidantly attached individuals do not engage in support-seeking behaviors to reduce their stress levels (Mikulincer et al., 2003). Furthermore, Gentzler and Kerns (2006) found a significant positive association between avoidant attachment and immediate NA for negative interpersonal but not non-interpersonal events. These results can be seen as another indicator that avoidantly attached individuals dismiss intimacy and dependency and therefore show elevated NA in situations in which they cannot keep great interpersonal distance (Fraley & Shaver, 1997).

4.3 Strengths and Limitations of the Present Systematic Review

Research methodologies differed between studies. Attachment and stress were operationalized differently, measurement frequency and duration differed as well as population types and mean ages. The association between anxious attachment and stress holds across the different research methodologies, which further strengthens this association. As results for the association between avoidant attachment and stress are ambivalent, more coherent methodologies should be used to further establish a coherent and reliable association between avoidance and stress. Furthermore, it should be noted that the systematic review only included studies published in English and therefore might have missed studies that could have contributed to the body of knowledge. Only nine articles have been included in this systematic review making it difficult to draw conclusive results.

It can be criticized that all nine studies made use of WEIRD samples. WEIRD samples consist of white, educated, industrialized, rich, and democratic individuals and are known to

deviate from the population norm in terms of their characteristics (Henrich et al., 2010). Furthermore, WEIRD individuals are far less prevalent in society than in research, conveying a skewed image (Azar, 2010). Therefore, it can be said that external validity is limited, and it should be further investigated to what extent the results are generalizable to other populations.

It can be negatively evaluated that different effect size measures were used across the nine studies, complicating comparisons between effect sizes. Four studies reported effect sizes in terms of Pearson´s correlation (Diamond et al., 2008; Gentzler & Kerns, 2006; Haydon & Salvatore, 2023; Lapierre et al., 2023). Pearson´s correlation can be seen as a unit-free effect size measure but can only measure the strength of a linear relationship. Therefore, it reminds uncertain whether the relationship of insecure attachment styles and stress might deviate from a linear relationship for the four studies. Furthermore, two studies did not report standardized effect sizes (Eberhart & Hammen, 2009; Tidwell et al., 1996), which makes it more difficult to compare the outcomes of different studies (Cumming, 2012). Only one study (Dančik et al., 2021) included CI´s into their results section, allowing for a range indication of the mention effect size within the population (Schober et al., 2018). Future studies should therefore incorporate different effect size measures that allow for easier comparison across studies and are suitable for different relationship types across variables.

It can be positively highlighted that all included studies made use of EMA as it allows increased external validity (Symth & Stone, 2003). Nevertheless, measurements of frequency and duration differed across studies. As measurements ranged from four (Gentzler & Kerns, 2006) to 21 days (Diamond et al., 20008) with one (Diamond et al., 2008; Eberhart & Hammen, 2009; Haydon & Salvatore,2023; Lapierre et al., 2023) to eight (Sheinbaum et al., 2015) measurements per day it can be assumed that measurements of frequency and duration are quite heterogenous. As the found results are relatively stable despite the wide duration and

measurement range, the use of EMA and the heterogeneity across measurements methods gives further support for the found associations between insecure attachment and stress.

4.4 Implications for Research and Treatment

Future research should further establish and understand the directionality between anxious and avoidant attachment to stress. One option to do so, could be to conduct longitudinal studies. Furthermore, it seems that only little studies have investigated the relation of physiological stress measures, such as cortisol, and attachment style. By closing this research gap, valuable knowledge could be generated to further understand stress generation and its implications. To enrich the body of knowledge it would be also important to study the relation of insecure attachment and stress in non-WEIRD contexts. It would be useful to establish interventions that could possibly decrease stress generation for anxious and avoidant attachment or teach affected individuals' skills to handle distress better. Adding to that, more focus should be paid on practical implementation of the generated findings. Knowledge about the relation between anxious and avoidant attachment and stress should be incorporated into therapeutic practices with a special focus on early interventions to reduce the risk of stress generation.

4.5 Conclusion

To conclude the following systematic review provides further support for an association between insecure attachment and stress. Results differed for anxious and avoidant attachment. A clear positive association for anxious attachment across various stress measures have been found, which is in line with previous research. The results for avoidant attachment remain ambiguous. Based on the findings it is suggested to further study the relation of avoidant attachment and stress. Moreover, future study could try to establish directionality of anxious attachment and stress as well.

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