



## Does attachment anxiety increase vulnerability to headache?



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### ABSTRACT

**Background:** Attachment-related anxiety and avoidance are potentially important aspects of pain experience and management, but have not been investigated in episodic headache sufferers or in relation to experimentally-evoked headache.

**Objective:** To determine whether adult insecure attachment styles were associated with sensitivity to pain or headache before, during or after stressful mental arithmetic in an episodic migraine or tension-type headache (T-TH) sample.

**Methods:** Thirty-eight participants with episodic migraine, 28 with episodic T-TH and 20 headache-free participants intermittently received a mild electric shock to the forehead before, during and after stressful mental arithmetic.

**Results:** A preoccupied attachment style and attachment anxiety, but not attachment avoidance, were associated with forehead pain and the intensity of headache before and after, but not during stressful mental arithmetic. These relationships were independent of Five Factor Model personality traits. Neither attachment anxiety nor avoidance was associated with episodic migraine or T-TH.

**Conclusions:** Anxiously attached individuals may express greater pain or show a stronger attentional bias toward painful sensations than securely attached individuals. However, distraction during psychological stress may override this attentional bias.

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### Introduction

The psychophysiological response to stress is one of the most commonly recognised triggers of headache. This link between stress and headache, identified in retrospective case studies and prospective diary studies [1,2], has been verified in experimental investigations. For example, Cathcart et al. [3] reported that headache developed in 91% of patients with chronic tension-type headache (T-TH) during an hour-long stressful mental arithmetic task compared with only 4% of healthy controls. Similarly, Stronks et al. [4] observed that headache developed more frequently in patients with T-TH than in controls or migraine sufferers during stressful mental arithmetic.

While the link between stress and headache seems clear, much remains to be learned about contextual and interpersonal vulnerability factors that may contribute to this link. Long-standing clinical observations suggest that relationship distress may play a role in migraine onset. For instance, Wolff and Marcussen [5] proposed that “the migraine headache represents a collapse of a way of dealing with life situations which are stressful to the individual” (p. 255) following

accumulated tension and hostility. The neurologist Sacks [6] described a migraine sub-type driven by a chronic life situation in which the person felt caught in a ‘malignant emotional bind’ (p. 221).

Bowlby’s attachment theory [7–10] provides a theoretical base for examining the influence of particular interpersonal styles on stress-related headache. Attachment style – a trait-like pattern of relating to family and friends – reflects a mental representation of relationships arising from an individual’s close relationship experiences. These styles strongly influence emotional bonds and reactions to social partners, reflect profound differences in sensitivity to social signals of support or conflict, and guide affect regulation and support-seeking in threatening situations [11,12].

Research during the past two decades has converged on a definition of adult attachment based on two primary dimensions [13]. These orthogonal dimensions are thought to reflect attachment-related anxiety, or a model of self, and attachment-related avoidance, or a model of others [14–16]. According to Fraley and Shaver [17], attachment-related anxiety reflects an individual’s predisposition toward “anxiety and vigilance concerning rejection and abandonment”, whereas the avoidance dimension “corresponds to discomfort with closeness and dependency or a reluctance to be intimate with others” (pp. 142–143). Four category measures can be derived from these dimensions, based on a high or low score on attachment anxiety or avoidance: Secure (low on both dimensions), Preoccupied (high anxiety, low avoidance), Dismissing (high avoidance, low anxiety) and Fearful (high on both

*Abbreviations:* T-TH, tension-type headache; ACC, anterior cingulate cortex; NEO-PI-R, NEO Personality Inventory, Revised; ECR-R, Experiences in Close Relationships Revised.

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dimensions) [14]. The last three categories are deemed insecure styles of attachment.

Theoretical models link attachment orientations to the development and maintenance of chronic pain (e.g., [18, 19]). In the Attachment Diathesis Model of Chronic Pain [19], attachment insecurity represents a vulnerability factor for both acute and chronic pain [20–22], as a temporary state and a more permanent trait [20,22,23]. Based on repeated experiences of sensitive, reassuring and comforting responses from primary attachment figures, secure individuals are thought to have acquired self-efficacy in response to threat [24] and optimal regulation of negative emotions when pain is experienced [25]. These experiences also influence pain report and communication about pain to others [26,27]. Driven by a desire to have their attachment needs met, anxiously attached (preoccupied) individuals are thought to actively focus on or exaggerate their pain to elicit comfort and support, whereas avoidantly attached (dismissing) individuals inhibit distress caused by pain as a way to minimise dependence on others whose responsiveness they distrust.

In community surveys, secure attachment was associated with greater levels of control over pain and lower catastrophising [18], while attachment anxiety was associated with greater pain intensity [28,29] and with experiencing pain as highly threatening and distressing [11]. In a painful cold-pressor task, attachment anxiety was associated with reduced pain thresholds, lower perceptions of control over pain, more stress and greater catastrophising [21]. Dismissing (and fearful) attachment was associated with less intense pain as well as increased cold pressor endurance (pain tolerance), albeit only in the presence of a known assessor [20]. These associations were retained after controlling for measures of neuroticism, negative affect, age, and social desirability. Controlling for neuroticism (negative affectivity) is important as it correlates highly with attachment insecurity [30,31].

Attachment-related neurobiological research suggests compromised regulatory functioning of the right orbitofrontal cortex in individuals with an insecure attachment history [32,33]. This area of the brain has been implicated in headache onset [34] and pain sensitivity in migraine sufferers [35]. Correlational studies have reported an over-representation of insecure attachment styles in a combined migraine, T-TH and chronic daily headache clinic sample compared with controls [36]. Attachment insecurity also predicted migraine-related disability [37]. However, referral bias [38,39] and depression [40,41] were possible confounds. Likewise, these studies did not control for personality traits which may contribute to pain or headache, including neuroticism—a headache vulnerability factor reliably identified in epidemiological studies [42,43]. Other major personality factors, such as extroversion (sociability) [44–46], low openness to experience (conservatism) [47], aggression–hostility [48] and ‘sensation seeking’ [49] may also be associated with migraine and/or T-TH.

Hence, it was hypothesised that individuals with an insecure attachment style would be more likely than secure individuals to (i) suffer from migraine or T-TH; and (ii) develop a headache during a stressful laboratory task. We expected that these relationships would be independent of neuroticism.

## Method

### Participants

A university undergraduate sample of 88 women and 18 men aged between 17 and 52 years was recruited by a general campus advertisement to participate in “a study of the relationship between stress and head pain”. Two groups were recruited separately—those who “regularly or frequently suffered from headaches”, and those who “seldom experienced headaches” (Table 1). The sample size was selected based on a concern that sufficient power was available to detect a large effect with Type I error set at the conventional alpha of  $p < .05$  [50]. A large effect size was chosen based on the results of related studies [51,52].

**Table 1**  
Headache history data for participants

	Migraine	T-TH	Controls	Total
N	49	35	22	106
Gender				
Female	41	28	19	88 (83%)
Male	8	7	3	18 (17%)
Mean age (yrs)	25 ± 8.3 (18–52)	21.74 ± 4.5 (18–40)	23.8 ± 5.5 (17–36)	23.6 ± 6.8 (17–52)
Aura or ‘warning’	24	3 (“warning”, e.g., ‘dizziness’)	0	
Mean headache frequency (days per month)	4.2 ± 4.1 (2–15)	2.27 ± 2.1 (2–10)	0.29 ± 0.2 (0–1)	
Mean headache duration (hours)	16.49 ± 23	5.8 ± 12.9	1.09 ± 1	

A standard clinical interview that addressed International Headache Society (I.H.S.) criteria [53] was used to assign people to the different diagnostic groups. Migraine was defined as a headache of at least 4 h duration, with at least two of the following: unilateral location, pulsating quality, moderate or severe intensity, and aggravation by routine physical activity [53]. The headache was accompanied by photophobia, phonophobia and nausea or vomiting. T-TH was defined as a moderate or severe bilateral headache without migrainous features [53]. Where appropriate, a medical opinion was sought (e.g., when there were suggestions of disease or an atypical headache presentation); three participants were excluded on this basis. Participants were also excluded if they took headache or psychiatric medications, had a chronic medical or psychological condition or had used mood-altering drugs including alcohol in the previous 24 h.

Eligible participants were scheduled for two appointments, approximately a week apart. Eighty-six of the 106 participants completed both testing sessions. Of these 86 participants, 38 met I.H.S. criteria for episodic migraine, 28 for episodic T-TH and 20 formed a headache-free control group (less than 6 headaches per year, with an average duration of less than an hour). Of the 20 participants who attended the first but not the second testing session, seven were excluded to maintain gender and/or diagnostic balance in the headache groups and 13 elected not to continue, citing work or study commitments. None of the participants withdrew during the second session.

Participants provided informed consent for the procedures, which were approved by the Murdoch University Human Research Ethics Committee. Participants were paid \$30 or awarded course credit points.

### Assessment instruments

Attachment style was measured by the Close Relationships Questionnaire available at <http://www.authentic happiness.sas.upenn.edu>. This test was uploaded in 2005 and is the same instrument as the Experiences in Close Relationships—Revised (ECR-R) [54], modified for online scoring. Participants were either currently in a romantic relationship or had been in one in the past. Each of the 36 items described feelings generally experienced in intimate relationships and participants rated their agreement with each item on a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree). For each person, the scores for all items within each scale were averaged, yielding a category measure – Secure, Preoccupied, Dismissing or Fearful – and two continuous measures: attachment-related anxiety (the extent to which people feel insecure about the availability and responsiveness of romantic partners) and attachment-related avoidance (the extent to which people are uncomfortable about depending on others). The ECR-R demonstrates excellent stability (internal consistencies and test–retest reliability coefficients above .90) as well as good convergence and discriminant validity [54,55].

The NEO-PI-R [56] was used to measure five personality traits: neuroticism–emotional stability, extraversion–introversion, openness

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