

Time Course of Attention in Socially Anxious Individuals: Investigating the Effects of Adult Attachment Style

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Theoretical models of social anxiety propose that attention biases maintain symptoms of social anxiety. Research findings regarding the time course of attention and social anxiety disorder have been mixed. Adult attachment style may influence attention bias and social anxiety, thus contributing to the mixed findings. This study investigated the time course of attention toward both negative and positive stimuli for individuals diagnosed with social anxiety disorder (SAD) and assessed whether attachment style moderates this relationship.

One hundred and thirty participants (age: $M = 29.03$) were assessed using a semistructured clinical interview. Those meeting eligibility criteria for the clinical sample met DSM-IV criteria for SAD ($n = 90$, age: $M = 32.18$), while those in the control sample did not meet criteria for any mental disorder ($n = 23$, age: $M = 26.04$, 11 females). All participants completed self-report measures examining depression, social anxiety, adult attachment style, and completed an eye-tracking task used to measure the time course of attention. Eye-tracking data were analysed using growth curve analysis.

The results indicate that participants in the control group overall displayed greater vigilance towards emotional

stimuli, were faster at initially fixating on the emotional stimulus, and had a greater percentage of fixations towards the emotional stimulus as the stimulus presentation time progressed compared to those in the clinical group. Thus, the clinical participants were more likely to avoid fixating on emotional stimuli in general (both negative and positive) compared to those in the control group.

These results support the Clark and Wells (1995) proposal that socially anxious individuals avoid attending to emotional information. Attachment style did not moderate this association, however anxious attachment was related to greater vigilance toward emotional compared to neutral stimuli.

Keywords: social anxiety; eye-tracking; attention bias

SOCIAL ANXIETY DISORDER (SAD) represents a debilitating mental health problem affecting 7.4% of the population in the United States (Kessler et al., 2012) and 8.4% in Australia (Crome, et al., 2015). The two principal cognitive behavioral therapy (CBT) models of SAD, developed by Clark and Wells (1995) and Rapee and Heimberg (1997), propose that attention biases displayed by these individuals serve to maintain symptoms of SAD. Furthermore, both models acknowledge that a fear of negative evaluation is a central concern for those with SAD. Where the models differ, however, is in regard to the nature of the attention biases displayed by socially anxious individuals. The Clark and Wells

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(1995) model proposes that those with SAD will avoid attending to emotional stimuli (stimuli indicating negative evaluation; e.g., an audience member yawning during a speech), instead turning their attention resources inward, toward internally generated sources of threat. This response is seen as maladaptive as it prevents individuals from gaining exposure to feared stimuli, thus preventing reappraisal and maintaining associations with harm (Mogg & Bradley, 1998). On the other hand, the Rapee and Heimberg model suggests that those with SAD will be excessively vigilant towards threatening stimuli and, following that, display a difficulty disengaging attention from threatening stimuli (Heimberg, Brozovich, & Rapee, 2010; Rapee & Heimberg, 1997). This increased attention to threat suggests that these individuals are more likely to process negative information as opposed to positive or neutral information, thus maintaining their symptoms of SAD. The vigilance-avoidance model of attention is an alternative theory, which is relevant for anxiety in general, and proposes that anxious individuals will be initially vigilant towards threat and, following that, they will avoid attending to a threatening stimulus (Mogg & Bradley, 1998; Mogg, Mathews, & Weinman, 1987). While these disparate theories implicate different mechanisms of attention in maintaining social anxiety symptoms, they do however converge upon the idea that attention relevant to feared stimuli occurs and can be flexible over time. The majority of the research examining attention biases in SAD populations has neglected to examine the time course of attention, instead focusing on the measurement of initial biases in attention. This may be partly due to the use of reaction time-based measurement of attention biases.

Attention biases are commonly measured using either reaction time-based tasks (e.g., the dot-probe task) or eye-tracking tasks. Drawing from the vigilance-avoidance model, in these tasks either vigilance towards threat or the maintenance of attention toward threat is measured. In the dot-probe task, participants are presented with an emotional (e.g., either happy or angry face) stimulus paired with a neutral stimulus. Participants are required to respond to a probe that replaces either the emotional or neutral face. If they are quicker at responding to probes that replace the emotional stimulus (e.g., angry face), then they are thought to be vigilant towards threat. Maintenance of attention over time (time course of attention) in dot probe tasks is examined by presenting the stimulus for longer periods of time (e.g., 1250 msec) and examining responses to probes during these longer stimulus presentation times. There are, however, limitations

inherent in using probe-based methods for examining attention over time. For instance, during a typical 500 or 1250 msec stimulus presentation, it is possible for multiple shifts of attention to occur. Probe reaction time measures may only capture a snapshot of these nuanced attentional processes (Mogg, Phillipot, & Bradley, 2004). Thus, eye-tracking methods provide a more robust measure of attention over time by directly capturing eye movements made by participants while viewing stimuli.

The Rapee and Heimberg (1997) model that proposed individuals with SAD will be initially vigilant towards threat has received mixed empirical support. Some studies utilizing the dot probe task have found evidence to support an initial vigilance towards threat for individuals diagnosed with SAD (Asmundson & Stein, 1994; Mogg et al., 2004), while others have found no evidence to support this theory (Mansell, Clark, Ehlers, & Chen, 1999). Similarly, eye-tracking studies using clinical samples diagnosed with SAD have found that these individuals are initially vigilant towards threat (Shechner et al., 2013), while findings from other studies indicate no differences in vigilance towards threat between clinical and nonclinical control groups (Chen, Clarke, Macleod, & Guastella, 2012; Schofield, Inhoff, & Coles, 2013). Other studies have utilized a nonclinical population and found that high socially anxious individuals are more likely to initially attend to emotional stimuli in general (both negative and positive) relative to neutral stimuli (Garner, Mogg, & Bradley, 2006; Schofield, Johnson, Inhoff, & Coles, 2012; Wieser, Pauli, Weyers, Alpers, & Mühlberger, 2009).

Similarly, the Clark and Wells (1995) proposal that those with SAD will avoid attending to emotional information has received mixed support from the literature. Importantly, this theory also proposes that both initially and over time the socially anxious individual will avoid attending to emotional stimuli. Mansell et al. (1999), using the dot probe task, demonstrated that high levels of social anxiety symptoms were associated with the avoidance of emotional stimuli (positive and negative) in general. However, they failed to replicate this finding in a follow-up study drawn from the same population (Mansell, Ehlers, Clark, & Chen, 2002). Eye-tracking studies have the ability to directly measure attentional avoidance over time (time course of attention). These studies have examined the time course of attention by dividing the entire stimulus presentation time into shorter time intervals or time bins. The fixation data are then examined with reference to the time interval in which the fixation occurs (Armstrong & Olatunji, 2012). Some studies using eye-tracking

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