



The influence of positive and negative affect on emotional attention

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A B S T R A C T

Background and objectives: Mechanisms of engagement and disengagement of attention to emotional information are thought to contribute to the onset and maintenance of anxiety and depression, a conclusion based largely on findings in analogue subclinical samples. However, we argue that traditionally defined analogue samples can be misleading. Firstly, research has challenged the adequacy of conventional measures of subclinical traits by illustrating that supposedly distinct scales are highly inter-correlated and do not therefore measure independent constructs. Secondly, recent research in clinical groups has revealed results opposite to those expected from the analogue literature, suggesting speeded, rather than impaired, disengagement from threat.

Methods: We present analogue findings, from a sample of 70 healthy participants, allowing a purer distinction between the phenomenology of anxiety versus depression using the orthogonal traits of positive and negative affect to classify individuals.

Results: Using emotional peripheral cueing we found that, at short cue durations, dysphoric individuals' (those with low positive and high negative affect) attention to facial expressions was slowed by emotional compared to neutral invalid cues.

Limitations: Limitations included a small sample size and limited generalisability due to sampling from a student population.

Conclusions: The data suggest that, in line with the previous subclinical literature, dysphoric individuals are slow to disengage attention from emotional information at early stages of processing and are consistent with the possibility that patterns of orienting of attention might be qualitatively different in subclinical versus clinical populations.

1. Introduction

1.1. Emotional cueing reveals engagement and disengagement of selective attention

A substantive body of empirical work has demonstrated that emotional material, relative to neutral, is prioritised for attentional processing (Yiend, 2010; Vuilleumier, 2005). One paradigm used to examine these effects is the peripheral cueing task (Posner, 1980) in which visual onsets (cues) are assumed to direct participants' attention towards the location in which they appear. Reaction times to detect targets subsequently appearing in cued (valid) or uncued (invalid) locations can be used to assess the relative attentional costs and benefits of different types of cue (e.g., those with positive and negative valence) and are taken to reflect the cognitive mechanisms of disengagement and engagement of selective attention, respectively (Fox, Mathews, Calder, & Yiend, 2007; Fox, Russo, Bowles, & Dutton, 2001; Yiend & Mathews,

2001). Although this emotional version of the cueing methodology has been criticized (Clarke, MacLeod, & Guastella, 2013; Mogg, Holmes, Garner, & Bradley, 2008), expert opinions remain mixed (Yiend, 2010) and there is widespread agreement that the emotional cueing task has played an important part in the advancement of our understanding of the attentional mechanisms associated with anxiety and depression.

1.2. Attentional biases in anxiety and depression

Mechanisms of engagement and disengagement of attention to emotional information, along with other cognitive biases, are thought to contribute to the onset and maintenance of psychological disorders. For instance, group differences in biased processing related to pathology tend to be present at low intensities of affective content and are especially evident where stimuli are disorder-relevant (Yiend, 2010). Anxious individuals, for example, show increased attentional orienting towards the location of anxiety-relevant versus neutral stimuli at short

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stimulus onset asynchronies (SOAs: Mathews, Fox, Yiend, & Calder, 2003; Yiend & Mathews, 2001) and detect fear-related relative to happy faces more efficiently in an attentional blink paradigm (Fox, Russo, & Georgiou, 2005). In depression, increased attentional orienting towards the location of depression-relevant stimuli usually occurs at longer SOAs (eg. Donaldson, Lam, & Mathews, 2007; Joormann & Gotlib, 2007). One possible explanation for this pattern in depression is that these individuals fail to inhibit depression-relevant information once it has been attended. Supporting this, depressed participants have been found to show impaired disengagement of attention from negatively valenced stimuli at longer stimulus presentations in both cueing and attentional blink paradigms (Koster, De Raedt, Goeleven, Franck, & Crombez, 2005; Koster, De Raedt, Leyman, & De Lissnyder, 2010; Koster, De Raedt, Verschuere, Tibboel, & DeJong, 2009; Leyman, De Raedt, Schacht, & Koster, 2007), while anxious participants show delayed disengagement from anxiety-relevant information at relatively short stimulus presentations (Fox et al., 2001; Yiend & Mathews, 2001).

Evidence suggests that biases in attention to emotional material are linked to traits predisposing people to depression and anxiety rather than the acute affective states themselves. For instance, in depression similar biases have been found in recovered depressed participants and also in never-depressed daughters of depressed mothers (Joormann & Gotlib, 2007; Joormann et al., 2007). Most of the engagement and disengagement effects described above have used analogue samples of preselected individuals from the healthy population. Although not meeting criteria for a clinical disorder themselves, these individuals are assumed to perform like those who do. In the literature on anxiety and attention, in many cases this assumption has proven justified. For example, individuals with elevated trait anxiety show enhanced attentional biases toward threat following a similar pattern to that found in Generalized Anxiety Disorder (GAD) patients, on emotional Stroop and attentional probe tasks (Yiend, 2010).

Recent work on engagement and disengagement effects using the emotional cueing paradigm described above has, however, raised the possibility that the continuity between analogue and clinically anxious samples may not be ubiquitous. In work reported by Yiend et al. (2015), two separate studies investigated individuals diagnosed with GAD, healthy volunteers, and individuals with high trait anxiety (but not meeting GAD diagnostic criteria). While previous research using cueing methods in studies with high trait anxious participants suggested that negative attentional bias is due to slowed disengagement of attention from negative information (e.g., Fox et al., 2001), Yiend et al. (2015) found *faster* disengagement from negative (angry and fearful) faces in the clinically anxious (GAD) group, suggesting that once a clinical disorder has developed, the pattern of attentional orienting might actually reverse; the attentional ‘hold’ of threat seen in high trait samples, may become an attentional ‘avoidance’ effect with the onset of GAD.

1.3. The inadequacy of traditional trait anxiety and depression measures

Discontinuities of this sort between subclinical samples and their corresponding clinical diagnoses highlight a potential difficulty with the use of subclinical trait measures as analogue markers of psychopathology. One possible confound is that some of the instruments commonly used to measure trait anxiety and trait depression do not adequately distinguish these conditions. Thus, while anxiety and depression are phenomenologically distinct (anxiety reflecting agitation, worry and dread but depression reflecting gloom, apathy and hopelessness), measures of trait anxiety and depression are frequently highly correlated (coefficients in the range .45–.75 according to Clark & Watson, 1991a, b) and item content can overlap. Such difficulties have led to alternative conceptualisations of anxiety and depression, with the aim of improving their discriminant validity (e.g., Watson, Clark, & Tellegen, 1988). This approach might allow for a better understanding of the unique patterns of cognitive biases associated with anxiety and depression.

1.4. The positive and negative trait affect alternative

To illustrate, Watson and colleagues (e.g., Watson, Clark & Carey, 1988) argue that subjective emotional experience falls into two broad categories: positive (PA) and negative affect (NA: Watson et al., 1988). An individual with high trait PA will have a general tendency to experience a greater intensity and frequency of positive mood states, whilst an individual with high trait NA will experience a greater intensity and frequency of negative mood states. Depression and anxiety are highly correlated with trait NA, both concurrently and prospectively, whilst only depression is systematically related to PA (Watson & Clark, 1995). Watson and Clark’s tripartite model proposes that while depression and anxiety are both characterised by high negative affect, only depressed individuals experience low levels of positive affect (Clark & Watson, 1991a). This approach suggests that using self-reported scales of positive and negative affective traits can therefore provide a more valid way to investigate the phenomenology of anxiety versus depression.

As discussed by others (e.g. Koster et al., 2005), there are strong arguments for exploring how trait PA and NA relate to attentional biases, rather than focusing on traditionally defined concepts of anxiety and depression. Firstly, self-report measures of anxiety and depression are typically highly correlated creating difficulties in independently investigating these constructs (Clark & Watson, 1991b; Koster et al., 2005, 2009, 2010). In contrast, the constructs of PA and NA are orthogonal and can therefore be investigated independently of each other (Watson et al., 1988). Secondly, evaluating trait PA and NA encourages the exploration of a wider area of emotional space and can potentially generate results more readily applicable across both the general population and the extremes of psychopathology. Finally, this approach is also in line with the increasingly popular focus on functional mechanisms and transdiagnostic processes as an important way to understand a wide variety of psychopathologies (Harvey, 2008; Yiend, Savulich, Coughtrey, & Shafran, 2011).

1.5. Covert or overt attention?

The emotional attentional cueing task has generally been assumed by previous studies to measure covert, as opposed to overt, attention, since participants are instructed to fixate the central cross throughout each trial, without moving their eyes. However this assumption can only be justified if eye movements are measured during each trial, to confirm that central fixation is indeed maintained. Many studies omit this methodological check for practical reasons, such as the need for specialist equipment and the additional burden on participants. The distinction between covert and overt attention is especially important in the context of psychopathology, since it clarifies which mechanisms are maladaptive: the internal, covert, process of assigning attentional priority, and/or the physical manifestation of attentional selection, namely moving the eyes to a salient stimulus. Here, we used a compromise solution to check the assumption of eye fixation, by measuring eye movements in a subset of our sample.

In summary, the present research aimed to investigate how positive and negative trait affect influences covert attentional orienting to emotional facial expressions, using an emotional cueing paradigm with emotional and neutral faces. Single peripheral cues were used to investigate the allocation of spatial attention at short and long cue durations across a range of emotions in order to evaluate both early and late stages of information processing. We hypothesised that dysphoric individuals, defined as those with low PA and high NA, would show emotion specific biases at longer cue durations, indicating reduced inhibition of emotionally valenced stimuli. We chose this categorical approach in preference to a dimensional design in order to most closely map the present data onto the previous subclinical literature, which has almost exclusively compared

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