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Loneliness and attention to social threat in young adults: Findings from an eye tracker study

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ABSTRACT

Cacioppo and Hawkley (2009) have hypothesized that lonely people are hyper-vigilant to social threat, with earlier work (Jones & Carver, 1991) linking this bias specifically to threats of social rejection or social exclusion. The current study examined this hypothesis in eighty-five young adults (mean age = 18.22; SD = 0.46; 17–19 years in age) using eye-tracking methodology, which entailed recording their visual attention to social rejecting information. We found a quadratic relation between the participants' loneliness, as assessed by the revised UCLA loneliness scale, and their visual attention to social threat immediately after presentation (2 s). In support of Cacioppo and Hawkley's (2009) hypothesis, it was found that young adults in the upper quartile range of loneliness exhibited visual vigilance of socially threatening stimuli compared to other participants. There was no relation between loneliness and visual attention to socially threatening stimuli across an extended subsequent period of time. Implications for intervention are considered.

1. Introduction

Cacioppo & Hawkley's model of loneliness (2009) proposes that loneliness is associated with hyper-vigilance to social threat. This could mean that lonely people in their everyday lives (1) fail to make accurate appraisals of social events, such that they misinterpret social events negatively, but also (2) that they have visual attention biases, such that they are 'on the look out' for negative social events so that they can avoid them and protect themselves against psychological pain. Empirical research, thus far, has focused on the first of these two possibilities, but there is a major gap in our knowledge regarding whether lonely adults show visual attention biases to social threat information. The current study directly assesses whether there are differences between lonely and non-lonely adults in the way they attend to social threatening stimuli using eye-tracker methodology.

1.1. Loneliness and attention to social threat

Loneliness is the feeling of distress caused by an individuals' *perceived* lack of fulfilling social relationships (Peplau & Perlman, 1982); the quality, and not the quantity, of social relationships is important in loneliness. Loneliness is a prevalent problem among adults, with recent statistics showing that 1 in 20 adults report feeling completely lonely (Randall, 2012). Loneliness has been implicated in poor mental and physical health in adults (Hawkley, Thisted, Masi, & Cacioppo, 2010) and has been known to cause significant distress and/or intensify mental disorders or conditions, such as depression (Heinrich & Gullone, 2006).

The model of loneliness proposed by Cacioppo and Hawkley (2009) sees lonely people as hyper-vigilant to social threats in the environment; being lonely influences how people perceive their social world, such that they are more likely to remember negative social events, hold negative social expectations, and attend more to information that is socially threatening than non-lonely individuals. Specifically, past research suggests that lonely people are focused on issues of rejection and social exclusion (Jones & Carver, 1991; Jones, Freemon, & Goswick, 1981; Sloan & Solano, 1984). This means that social threat for lonely people may be conceptualized as threats that are linked to social rejection or social exclusion.

In support of Cacioppo & Hawkley's model, evidence shows that lonely people use threat-related cognitions to explain their social world. For example, lonely adults report feeling more threatened in social situations and worry that others will ignore or reject them (Cacioppo et al., 2000; Jones et al., 1981); they also report higher

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levels of interpersonal stress than non-lonely people (Doane & Adam, 2010). In addition, lonely individuals more often blame themselves when explaining the causes of social exclusion compared to non-lonely people (Qualter & Munn, 2002; Solano, 1987).

Interestingly, whilst lonely people have a bias to use threat-related cognitions, these do not match their social experience. Empirical evidence suggests that lonely people perceive or anticipate rejection, but they are not necessarily rejected by others (Jones et al., 1981; London, Downey, Bonica, & Paltin, 2007; Qualter & Munn, 2005).

Research also shows attention and memory biases in lonely people. Lonely adults show greater recall for social events compared to non-lonely people (Gardner, Pickett, Jefferis, & Knowles, 2005), suggesting that social events are particularly salient to them. However, in a classic Stroop test, negative social words (e.g., rejected, alone, disliked) created greater interference for lonely than non-lonely adults (Egidi, Shintel, Nusbaum, & Cacioppo, 2008); there were no differences on positive social words. This finding is consistent with Cacioppo and Hawkley's (2009) theory because it suggests that loneliness intensifies feelings of potential threat: loneliness appears to prime people to look for negative social events in the environment. Further support comes directly from Cacioppo, Norris, Decety, Monteleone and Nusbaum (2009) who showed loneliness increases attention to negative social information. They report that lonely people had fewer neural responses to pleasant social stimuli, with heightened neural activation in the visual cortex during the viewing of unpleasant social pictures, thus, indicating lonely adults have greater visual attention to these stimuli.

Although these latter studies provide important information about attentional biases for social threat among lonely people, the assessment is incomplete because it does not look at visual processing of social threat information. There is a necessity for research investigating attentional biases in loneliness using eye-tracker technology to complete the picture of cognitive biases of lonely people (Goossens, 2012); we need further examination of whether the hyper-vigilance for social threat hypothesis for loneliness extends beyond negative cognitive appraisals of the social world to visual attention deployment.

1.2. Use of eye-tracker technology to measure attention deployment

The use of eye-tracking measures allows an examination of sustained visual processing and is ideally suited for a study of information processing amongst lonely people because the line of visual gaze can be assessed relatively continuously across long periods of time (Hermans, Vansteenwegen, & Eelen, 1999). In the eye-tracking literature, there are different patterns of attention processing to threat stimuli: (1) initial vigilance and maintenance relates to the orientation of attention to threat (Armstrong & Olatunji, 2012), (2) disengagement difficulties refers to attention being captured by the threat stimuli (see Buckner, Maner, & Schmidt, 2010), and (3) attentional avoidance refers to orienting attention away from threat (see Lange et al., 2011). The latter attention process is thought to occur on a later timescale during extended viewing as it is under voluntary control (Cisler & Koster, 2010). Based on Cacioppo and Hawkley's (2009) model of loneliness, we would expect to find an attentional bias amongst lonely adults that is consistent with the initial vigilance and maintenance pattern of attention.

1.3. Examination of a quadratic relation between loneliness and hyper-vigilance to social threat

In 2006, Cacioppo and colleagues argued that severe loneliness is qualitatively different from milder forms of loneliness or non-loneliness. Evidence for this discontinuity perspective would be the distinction in behaviour between severe lonely groups and milder lonely or non-lonely groups; severe lonely people should be characterized by a specific type/subset of behaviour. Recently, discontinuity was found in relation to cognitive biases (Qualter et al., 2013): only children in the upper quadrant of loneliness showed a distinct pattern of attention deployment to the socially threatening stimuli, an elevated hostility to ambiguously motivated social exclusion, and higher scores on the rejection sensitivity questionnaire. Guided by the notion that there is something distinct about those scoring very high on loneliness, we examined whether the relation between loneliness and attention deployment to social threat among adults is curvilinear, specifically quadratic, and thus discontinuous.

1.4. The current study

There has been little examination of visual attention and loneliness, specifically in response to social threats that are linked to social rejection or social exclusion. In the current study, we examined whether lonely young adults displayed attentional biases towards socially threatening stimuli, and if so, which pattern of attentional processing was evident. The study consists of testing the pattern of eye-gaze in lonely and non-lonely young adults when viewing social scenes that include both positive and socially threatening stimuli. This is the first study to assess attention-processing styles in lonely adults using eye-tracking technology to gain a continuous measure of selective attention for socially threatening information.

2. Method

2.1. Participants

The sample included 85 undergraduate students ($M = 33$; $F = 52$) studying at a university in the North West of England, UK. The mean age of participants was 18 years and 2 months (SD = 4 months). The age range was between 17 and 19 years.

2.2. Measures

2.2.1. Loneliness

Loneliness was measured using the University of California, Los Angeles Loneliness scale (UCLA; Russell, 1996). The scale comprises 20 questions, including 'How often do you feel that you lack companionship?' and 'How often do you feel left out?'. Participants rated how often they felt the way described in each statement on a 4-point scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often). Scores for each statement were summed to give a total loneliness score. The possible range of scores for the full measure was 20–80, with higher scores indicating higher levels of loneliness. In our sample, the loneliness scores ranged from 24 to 74, with no difference between males and female participants ($t = .404$, $p = .687$). The scale exhibited excellent internal consistency in the current study, $\alpha = .98$.

2.2.2. Video stimuli

Video footage included social scenes of adolescents during lunch or free periods, depicting both positive and negative social interactions. The footage was taken from colleges and schools in the North of England. The video stimuli consisted of eight clips, with each clip lasting 20 s; there was a 3 s interval between each clip. The session started with a centrally fixated cross, followed by the viewing of the eight clips. The order of clips was counterbalanced for each participant to reduce order bias. Each clip included some form of socially threatening behaviour (lone individual