Multiple mediators of reward and punishment sensitivity on loneliness

D. Matthew T. Clark [a,*], Natalie J. Loxton [b], Stephanie J. Tobin [a]

[a] School of Psychology, The University of Queensland, Brisbane 4072, Australia
[b] School of Applied Psychology, Griffith University, Brisbane 4122, Australia

ABSTRACT

The purpose of this paper was to use the revised Reinforcement Sensitivity Theory as a framework to understand loneliness. We expected higher loneliness to be associated with high reward sensitivity and low punishment sensitivity. We tested how reward and punishment sensitivity could affect loneliness by exploring potential mediators including shyness, sociability, communal orientation, and acceptance. We tested 370 participants using an online questionnaire. High punishment sensitivity, but not anxiety, predicted higher loneliness. This association was mediated by higher shyness and lower psychological acceptance. High reward sensitivity was associated with lower loneliness. This association was mediated by lower shyness, higher sociability, higher communal orientation, and higher acceptance. The mediated model with reward and punishment sensitivity accounted for over half the variance in loneliness. Considered in isolation, acceptance predicted over a quarter of the variance in loneliness. These results allow us to identify those at risk of loneliness and, by addressing the mediators, especially acceptance, suggest possible interventions for loneliness.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

Loneliness is the subjective experience of a lack of social connection and it predicts poor immune function (Pressman et al., 2005), higher stress hormones (Kiecolt-Glaser et al., 1984), suicidal ideation (Stravynski & Boyer, 2001), and depression (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006). Loneliness may be influenced by how one relates to the rewards and punishments of the social world. People vary in their sensitivities to reward and punishment and these individual differences are elaborated by Reinforcement Sensitivity Theory (RST). Using this theory, researchers have found lonely people to be low in reward sensitivity and high in punishment sensitivity (Chang, Kahle, Yu, & Hirsch, 2014). RST, however, was substantially revised in 2000 (Gray & McNaughton, 2000) and previous measures of reward and punishment sensitivity could be tapping other constructs such as anxiety (Heym, Ferguson, & Lawrence, 2008). Thus, the link between loneliness and reward and punishment sensitivity needs to be re-evaluated with measures designed to assess the revised theory. Furthermore, it is unknown what processes mediate the relationship between RST traits and loneliness. The aim of the current paper is to use the revised RST as framework for studying traits associated with loneliness and to examine potential mediators between RST traits and loneliness.

1.1. Reinforcement sensitivity theory

The original RST proposed the existence of two motivational systems that regulate approach and avoidance behaviour (Gray, 1982). The Behavioural Activation System (BAS) is sensitive to rewards and regulates approach behaviour, whereas the Behavioural Inhibition System (BIS) is sensitive to punishment and involves anxiety. Because social relationships contain powerful rewards and punishments, RST provides a useful framework for studying loneliness. Lonely people, for instance, are high in punishment sensitivity and low in reward sensitivity (Chang et al., 2014). High punishment sensitivity and low reward sensitivity have also been linked to poorer social functioning, as measured by both loneliness and low popularity ratings (Kingsbury, Coplan, Weeks, & Rose-Krasnor, 2013). Although these studies are consistent in their findings, both used Carver and White's (1994) BIS/BAS scale, a measure of the original RST. In this scale, BIS taps both fear and anxiety (Heym et al., 2008). There is, however, substantial evidence that fear and anxiety are distinguishable, leading to the revised RST, which split the BIS into a fear system and an anxiety system (Gray & McNaughton, 2000). Thus, it is unknown whether the association between loneliness and original BIS is based on fear, anxiety, or both.

In the revised RST, fear and anxiety are clearly distinguished. The Fight, Flight, Freeze System (FFFS) underlies fear and the revised BIS (r-BIS) underlies anxiety (Gray & McNaughton, 2000). The FFFS reflects punishment sensitivity and is the primary

* Corresponding author. Tel.: +61 (7) 431 849 524; fax: +61 (7) 3365 4466.
E-mail addresses: david.clark4@uqconnect.edu.au (D. Matthew T. Clark), n.loxton@griffith.edu.au (N.J. Loxton), s.tobin@uq.edu.au (S.J. Tobin).

detector of threat. R-BIS detects conflict between FFFS and r-BAS, when both reward and threat are present. The revised BAS (r-BAS) remains relatively unchanged (although see Smillie, Pickering, & Jackson, 2006). The new components of RST can be measured with a new scale (Jackson, 2009) that measures r-BIS and FFFS, distinguishing between anxiety/conflict and fear/punishment sensitivity.

The purpose of the current paper is to test the relationship between the revised RST and loneliness. Because high levels of the original BAS are associated with lower loneliness (Chang et al., 2014) and because social situations hold many rewards including status and affiliation that those high in r-BAS would pursue more strongly (Corr, DeYoung, & McNaughton, 2013), we expect that high r-BAS should predict lower loneliness. High levels of the original BIS are associated with higher loneliness (Chang et al., 2014); however, because original BIS taps fear and anxiety, it is unclear whether loneliness is more related to fear (FFFS) or anxiety (r-BIS). Social situations frequently engage r-BIS because r-BIS manages conflict between approach and avoidance, which emerge frequently in social situations (Corr, 2005). For example, talking to people involves approach despite fearing rejection (Corr et al., 2013). Despite r-BIS being heavily engaged in social situations, being high in r-BIS would not necessarily relate to loneliness because the cautious approach typical of r-BIS would not necessarily damage social relationships. In contrast, FFFS is more strongly related to avoidance, which especially if applied to avoiding other people, could be damaging to social connection. Thus, we expect that high FFFS, rather than r-BIS, will predict higher loneliness.

1.2. Mediators of reinforcement sensitivity

We sought to identify mediators that would help us understand the association between r-RST traits and loneliness. We identified four potential mediators that relate to the rewards and threats in social situations: shyness, sociability, communal orientation, and acceptance. High punishment sensitivity may increase loneliness through higher shyness because someone who is punishment sensitive may seek to avoid the potential threats inherent in social interactions. Avoiding social interaction is characteristic of shy people, who experience negative affect around others and are withdrawn, a set of tendencies that predict higher loneliness longitudinally (Cheek & Busch, 1981). Shyness overlaps with social anxiety, which is predicted, in the original RST, by high levels of punishment sensitivity and low reward sensitivity (Coplan, Wilson, Frohlick, & Zelenski, 2006). Therefore, shyness should mediate the link between punishment sensitivity (FFFS) and loneliness and between reward sensitivity (r-BAS) and loneliness.

Reward sensitivity may reduce loneliness by increasing sociability. Sociability is defined as the motivation to interact with others and is distinguished from shyness, which is discomfort with strangers or acquaintances (Cheek & Buss, 1981). Although sociability shows a moderate negative correlation with shyness, shyness and sociability are distinguishable (Cheek & Buss, 1981), meaning both could independently predict loneliness. R-BAS should relate to sociability because high r-BAS individuals should be more motivated by the potential rewards of social interaction. We do not expect a correlation between punishment sensitivity (fear) and sociability because trait fearfulness, measured by items like, "When I get scared, I panic," correlates with shyness but not sociability (Bruch, Gorsky, Collins, & Berger, 1989). Thus, sociability should mediate the link between reward sensitivity (r-BAS) and loneliness but not between punishment sensitivity (FFFS) and loneliness.

High reward sensitivity may also reduce loneliness through higher communal orientation. Communal orientation reflects helpfulness and a disposition to be concerned with others' welfare (Clark, Oullette, Powell, & Milberg, 1987). Communal orientation

may improve a person's social network and social interactions because others may be more attracted to helpful people. Communal orientation could be predicted by reward sensitivity because people find it rewarding to help others (Weiss, Boyer, Lombardo, & Stich, 1973) and those high in reward sensitivity may experience a greater reinforcing effect from helping others. Thus, communal orientation should mediate the link between reward sensitivity (r-BAS) and loneliness.

Lastly, reinforcement sensitivity may affect loneliness through acceptance. Acceptance is a disposition to accept thoughts and feelings rather than seeking to control or change them (Bond et al., 2011). The most effective way to control feelings in the short-term is to avoid situations linked to these feelings; thus, experiential avoidance is the opposite of acceptance (Hayes, Strosahl, & Wilson, 2003). High reward sensitivity should encourage approach behaviour, reducing levels of experiential avoidance, increasing levels of acceptance. In contrast, high fear (FFFS) should encourage avoidance, reducing acceptance. Previous research has found high FFFS predicts lower levels of acceptance (Clark & Loxton, 2012).

High acceptance may improve connection between people and reduce loneliness. Controlling thoughts can be cognitively draining (Klein & Boals, 2001), potentially leaving people impaired in social interactions. Lonely people pay less attention to people in interactions (Jones, Hobbs, & Hockenbury, 1982) and are perceived to be less involved in their conversations (Bell, 1985). Controlling thoughts and feelings may also bias people towards focusing on their inner thoughts and feelings. Self focus increases anxiety during social interactions (Woody, 1996). Thus, acceptance should mediate the link between reward (r-BAS) and loneliness and between punishment sensitivity (FFFS) and loneliness.

1.3. Current study

Previous research found high levels of the original BAS predicted lower loneliness and high levels of the original BIS predicted higher loneliness. However, original BIS conflated fear and anxiety, so we used the revised RST to test whether FFFS (fear) or r-BIS (anxiety) would relate to loneliness. We expected that high FFFS would be associated with higher loneliness because those high in trait fear more likely to withdraw from potential relationships. We expected no relationship between r-BIS and loneliness because those with a tendency to cautiously approach may be more able to continue to seek out companionship even in the face of possible rejection. We expected that high r-BAS would be associated with lower loneliness because r-BAS would motivate pursuit of social rewards. We examined potential mediators between loneliness and FFFS and r-BAS, including communal orientation, shyness, sociability, and acceptance. We expected high sociability, communal orientation, and acceptance would be associated with lower loneliness, whereas high shyness would be associated with higher loneliness. We expected that all four mediators would mediate the relationship between r-BAS and loneliness. We expected that only shyness and acceptance will mediate the relationship between FFFS and loneliness. Fear has been previously linked to shyness and acceptance, whereas fear has shown no relationship to sociability, and there is no reason to expect a relationship between communal orientation and fear.

2. Method

2.1. Participants and procedure

We recruited 406 people from Amazon's Mechanical Turk. We restricted participation to US residents who had a high approval