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Mindfulness, personality and disordered eating

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ABSTRACT

Understanding individual differences that may predispose certain individuals to disordered eating may help guide more effective screening and intervention. Furthermore, identification of how protective factors interact with such individual differences may help inform interventions strategy. The current study used a self-report questionnaire based on revised Reinforcement Sensitivity Theory completed by university students ($N = 332$) to investigate if trait mindfulness moderated the relationship between personality and disordered eating. Results showed that the Behavioural Inhibition System was associated with increased emotional and external eating behaviours whilst the Behavioural Activation System was associated with increased restrictive eating. Trait mindfulness was associated with lower levels of all disordered eating patterns. Overall, there was no significant moderation effect of mindfulness, although the interaction between mindfulness and the Behavioural Inhibition System for external eating approached significance, with a small effect size suggesting that the benefits of mindfulness may be less for those with high sensitivity to goal conflict. The findings support the use of mindfulness as an intervention for disordered eating but highlight the importance of individual differences.

1. Introduction

Disordered eating encompasses a wide range of dysfunctional eating patterns, including fasting, dieting, vomiting, over-eating, binge-eating, taking laxatives and diet pills (Croll, Neumark-Sztainer, Story, & Ireland, 2002). The effects of such eating patterns include physical deficiencies (growth retardation, weight fluctuations, poor bone health); nutrient deficiencies; (Bryla, 2003); and adverse psychological effects (e.g., psychological distress, depression, anxiety, substance abuse and suicide); (Neumark-Sztainer, Story, Dixon, & Murray, 1998). There is evidence that disordered eating is a pathway to more serious health related concerns including an increased risk of developing more severe eating-related problems; clinically diagnosed eating disorders (Bryla, 2003); and obesity (Desai, Miller, Staples, & Bravender, 2008). Early identification and effective treatment of disordered eating is important for reducing the risk and impact of these more severe outcomes (Neumark-Sztainer et al., 2006). Research has found that individual differences can predict those at risk for disordered eating (e.g. Loxton & Dawe, 2006), and mindfulness has received growing support as an effective intervention (e.g. Atkinson & Wade, 2014).

1.1. Reinforcement sensitivity theory

Reinforcement Sensitivity Theory (RST) is a biologically grounded theory of personality, based on the sensitivity of brain systems that respond to reward and punishment that mediate approach and avoidant behaviour respectively (Smillie, Loxton, & Avery, 2013). The original model (o-RST; Gray, 1970) proposed two primary motivation systems; the Behavioural Inhibition System (o-BIS), proposed to mediate avoidance behaviour in response to negatively valenced stimuli; and the Behavioural Activation System (o-BAS), attributed to mediating approach behaviour in response to rewarding conditioned stimuli (Pickering & Smillie, 2008).

The theory has been revised (Revised Reinforcement Sensitivity Theory (r-RST); Gray & McNaughton, 2000) to incorporate a third system, the Fight/Flight/Freeze System (FFFS). The BAS remained largely unchanged by the revision, the major difference being that r-BAS now mediates approach behaviour towards all rewarding stimuli, rather than just conditioned stimuli as with o-BAS (Smillie, Pickering & Jackson, 2006). The biggest revision to RST was the partitioning of the o-BIS into two separate systems; the r-BIS, which is related to anxiety; and the FFFS, which is related to fear (Corr, Deyoung, & McNaughton, 2013). The FFFS takes on the role of mediating avoidance behaviour in response to all aversive stimuli, whereas the role of the r-BIS is conflict resolution between the r-BAS and FFFS in situations presenting both rewarding and aversive stimuli.

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1.2. RST and disordered eating

Research investigating RST and disordered eating symptomology among non-clinical populations has yielded consistent results, including positive correlations between o-BIS and o-BAS sensitivity and disordered eating symptomology (e.g., Hasking, 2006; Hennegan, Loxton, & Mattar, 2013; Loxton & Dawe, 2001, 2006, 2007). The only study in this area to use a r-RST measure found that r-BIS and FFFS were positively associated with disordered over-eating behaviours (Emotional and external eating; Hennegan et al., 2013). Additionally, r-BAS was found to have no relationship to emotional eating (eating to help cope with extremes of emotion), but a positive relationship with external eating (eating in response to the sight and/or smell of palatable food).

1.3. Mindfulness and disordered eating

Studies have consistently shown that trait mindfulness is inversely related to disordered eating symptomology (e.g., Lavender, Gratz, & Tull, 2011; Lavender, Jardin, & Anderson, 2009; Masuda & Wendell, 2010). Additionally, mindfulness-based interventions are accruing evidence as effective treatments for eating disorders (e.g., Atkinson & Wade, 2014; Masuda & Hill, 2013). However, intervention studies show that whilst some experience benefit from mindfulness for disordered eating, many do not (Atkinson & Wade, 2014). Investigation into r-RST may be of benefit to elucidate how individual differences influence the efficacy of mindfulness as an effective intervention for reducing disordered eating.

1.4. Mindfulness, RST and psychological outcomes

There has been preliminary research using RST to investigate the relationship between mindfulness on psychological outcomes. First, Sauer, Walach, and Kohls (2011) explored o-BIS as a mediator of the pathway between mindfulness and psychological wellbeing, finding that o-BIS mediated the relationship between the mindfulness and psychological wellbeing. On this basis, Sauer et al. (2011) concluded that mindfulness produced beneficial effects on wellbeing by reducing o-BIS sensitivity. However, this conclusion is incongruous with the research that showed o-BIS (and o-BAS) were stable, enduring traits exhibiting minimal change over time. For instance, longitudinal studies by Takahashi et al. (2007) and Braams, van Duijvenvoorde, Peper, and Crone (2015) demonstrated stable measurements of o-RST across sampling points. Harrison, Sternheim, O'Hara, Oldershaw, and Schmidt (2016) measured o-RST in a group of clinically-diagnosed ED patients both before and after treatment, finding no significant change in o-RST. On the basis of this, it could be interpreted that whilst treatment effects are unlikely to change the sensitivity of RST subsystems, they may act to moderate the effects of such sensitivity by allowing greater self-regulation capacity.

Noting the limitations of the conclusions drawn by Sauer et al. (2011), Hamill, Pickett, Amsbaugh, and Aho (2015) argued that mindfulness would act by mitigating the effects of o-BIS on adverse psychological outcomes, rather than changing the sensitivity of o-BIS itself. The authors found the mindfulness facet *Acceptance* moderated the relationship between o-BIS reactivity and depression and anxiety, while *Non-reactivity* moderated the relationship between o-BIS and stress.

Reese, Zielinski, and Veilleux (2015) found mindfulness mediated the relationship between o-RST and emotional dysregulation. They concluded that high o-BIS would lead to emotional dysregulation through underutilization of mindfulness skills, although justification was lacking as to why high o-BIS would be associated with underutilization of mindfulness skills. They did not test a moderation model of mindfulness.

Harnett, Reid, Loxton, and Lee (2016) presented the only study, to the authors' knowledge, to use r-RST to investigate the relationship between mindfulness, RST and psychological distress (as measured by the global score on the DASS). They found that FFFS mediated the relationship between mindfulness and psychological distress, and mindfulness moderated the relationship between FFFS and psychological distress. The authors concluded that both results were consistent with the view that high mindfulness can protect against the adverse psychological outcomes of high threat sensitivity.

1.5. Hypotheses

Informed by Hamill et al. (2015) and Harnett et al. (2016), it was hypothesized that mindfulness would moderate the relationship between subsystems of r-RST and disordered eating, as depicted in Fig. 1. Specifically, it was hypothesized that as mindfulness increased, the relationship between r-BIS and FFFS sensitivity and disordered eating symptomology would decrease.

2. Methods

2.1. Participants and procedure

Students ($N = 332$, 62% female, mean age 20.77 years) from an Australian University (QUT); were recruited to complete the questionnaire and were offered either course credit or the chance to go into the draw for a $50 gift voucher from a national department store. The questionnaire was completed online in the participants own time. The study received ethical approval by the QUT Human Research Ethics Committee.

2.2. Measures and internal consistencies

2.2.1. r-RST

The Jackson Five (Jackson, 2009) is a 30-item questionnaire measuring the five r-RST subsets of r-BAS ($\alpha = 0.78$), r-BIS ($\alpha = 0.75$), Fight, Flight and Freeze ($\alpha = 0.74$). The scores for the Fight, Flight and Freeze subsets were combined to form a total measure of FFFS.

2.2.2. Mindfulness

The Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) is a 39-item self-report questionnaire measuring five mindfulness facets consisting of observing ($\alpha = 0.73$), describing ($\alpha = 0.88$), acting with awareness ($\alpha = 0.86$), non-judging of inner experience ($\alpha = 0.90$), and non-reactivity to inner experience ($\alpha = 0.79$). As this study focused on a university student sample, the Observe facet was excluded from the analyses in line with recommendations by Williams, Dalgleish, Karl, and Kuyken (2014) that this four-factor mindfulness model is a superior measure of mindfulness in adult samples without specific meditating experience.

2.2.3. Restrictive eating

The Eating Attitudes Test (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982) is a 26-item measure of disordered eating behaviours and attitudes, and consists of three subscales, bulimia and food preoccupation, oral control and dieting. The Eat-26 was derived from studies of Anorexia Nervosa (AN) populations, and designed for clinical use to measure the symptoms of AN. As designed, items are scored on a 6-point Likert scale ranging from '*Always*' to '*Never*', with items scored as 3-2-1-0-0-0. However, in subclinical populations, recommendations

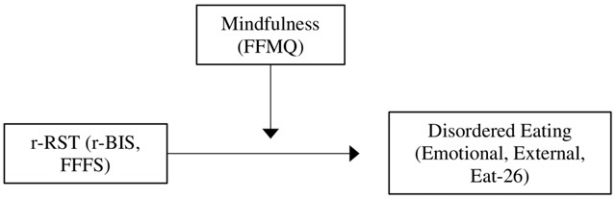

Fig. 1. Moderation model tested. Mindfulness is expected to moderate the relationship between r-RST subsystems and disordered eating measures.