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# Sensory-Processing Sensitivity, dispositional mindfulness and negative psychological symptoms

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ABSTRACT

Sensory-Processing Sensitivity (SPS) refers to a trait-like difference in the extent to which individuals strongly and deeply process a variety of stimuli in the environment. While such sensitivities may be positive (i.e., greater appreciation and awareness of the environment) or negative (i.e., being overwhelmed by such stimuli), the majority of the literature to date has focused on the negative aspect of this relationship e.g., the higher propensity for depression and anxiety. Therefore, this research examined variables that may impact or moderate the relationship between SPS and distress. One prime moderator candidate is mindfulness – the ability to attend to and be accepting of present experience. In this research we aimed to investigate the relationship between SPS, mindfulness and distress using a cross-sectional methodology in a non-clinical sample. While SPS related to higher levels of depression, anxiety and stress, the results were taken to support the moderation hypothesis with respect to anxiety. In particular, SPS only related to anxiety when mindfulness and acceptance were low, but the relationships were not significant when mindfulness and acceptance were high. Theoretical and clinical implications are discussed.

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## 1. Introduction

The fundamental way in which an individual perceives and responds to their environment is through the processing of sensory information (Jerome & Liss, 2005). People have different thresholds for perceiving, responding to, and becoming overwhelmed by sensations, which are reflected in individuals' lifestyles, moods and temperaments (Dunn, 2001). Recently, attention has focussed on individuals with extremely low perceptual thresholds for stimuli – known as Sensory-Processing Sensitivity (SPS). Individuals with high SPS have been described as more observant of subtle environmental stimuli than are others (i.e., they have trouble ignoring irrelevant or unimportant features of the environment), and more easily bothered by high levels of stimulation; such as loud or consistent noise, or extreme temperatures (Aron, 2010). Given their low thresholds for sensory overload, it has been suggested that high-SPS individuals, among other things: organise their home environment so as to minimise their sensory experiences (Dunn, 2001); tend to be social introverts (Aron, 2004); are more likely to experience depression and anxiety (Liss, Timmel, Baxley, & Killingsworth, 2005). People with high SPS also tend to be more in tune with their own thoughts and emotions (which results in emotional sensitivity), as well as being aware of the emotions of others, and are prone to "pause to check" in new situations due to their predisposition to wariness (Aron & Aron, 1997; Aron, 2010). While similarities have been identified between temperamental sensitivity and other concepts such as introversion, behavioural inhibition, and shyness, it is considered to be a distinct construct (Aron & Aron, 1997). It has been suggested that SPS is likely a stable trait (Dunn, 2001) that may be biologically-based, and found in approximately 15–20% of the population (Kagan, 1994).

Recent research has examined the relationship between SPS and negative emotional states. High-SPS individuals experience higher levels of depression and trait anxiety (Liss et al., 2005), and there is also some evidence suggesting that parental care may influence the effect of SPS on depression (i.e., people with high SPS tend to experience more depression, especially if they have been exposed to low or "cold" parental care). In a study examining components of SPS, Liss, Mailloux, and Erchull (2008) identified that ease of excitation and low sensory threshold appear to represent the negative aspects of SPS, as both were positively related to anxiety and depression. In addition, research suggests links between SPS and greater perceived stress, as well as more frequent symptoms of physical illness (ranging from bodily aches and pains to faintness and nausea; Benham, 2006). SPS has also been utilised to explain why individuals from certain populations have elevated anxiety. For example, children with Autism-Spectrum Disorders are

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reported to have an increased sensory sensitivity, coupled with the tendency to avoid physical sensation, which may aid in explaining their high levels of anxiety (Joosten & Bundy, 2010). Finally, SPS or components of it have been related to neurotic personality traits (Ahadi & Basharpoor, 2010; Smolewska, McCabe, & Woody, 2006).

Despite the vast majority of literature investigating SPS in terms of negative outcomes, Aron (2003, 2010) maintains that high SPS is not necessarily a negative disposition. Research has shown evidence that high-SPS individuals tend to be more conscientious, intuitive and better at avoiding errors (Ahadi & Basharpoor, 2010; Aron, 2003). Additionally, they are greatly aware of subtleties or small changes, and also more in tune with thoughts and emotions of themselves and others (Aron, 2010). However, to date, little research has determined what characterises "functional" vs. "dysfunctional" SPS – but one potential candidate is dispositional mindfulness.

While derived from Buddhist conceptualisations, mindfulness is increasingly embraced by mainstream Western psychological approaches, and is a core component of so-called "third-wave" therapies such as Dialectic Behaviour Therapy for Borderline Personality Disorder, and Acceptance and Commitment Therapy (ACT). The earliest form of Buddhism (represented by the Theravada) comprised of three main teachings: the coming and going of perceptions and thoughts; the shifting and changing of the self; and the acceptance of suffering (Rosch, 2007). Mindfulness in the present day is generally referred to as an enhanced attention to, and awareness of, present experience – moment-by-moment – in an open and accepting way (Brown & Ryan, 2003; Coffey & Hartman, 2008; Davis & Hayes, 2011). The construct of mindfulness is similar to the cognitive and interpretive aspects of psychological flexibility and acceptance (see Brown, Ryan, & Creswell, 2007), in that they both encompass the "willingness to experience thoughts, feelings, and physiological sensations, especially those which are negatively evaluated ... without having to avoid them or let them determine one's actions" (Bond & Bunce, 2003, p. 1057).

A recent study demonstrated that mindfulness meditation training increases perceptual sensitivity and makes it easier to maintain sustained attention (Maclean et al., 2010). This suggests that meditation and mindfulness practices may be associated with enhanced sensory perception, in a positive way. Moreover, higher trait mindfulness has been related to improved ability to focus attention and ignore distracting information (Moore & Malinowski, 2009). Additionally, individuals with higher mindfulness may be less likely to perceive demanding situations as stressful or threatening, and be less likely to use avoidant-orientated coping strategies in stressful situations (Weinstein, Brown, & Ryan, 2009). Barnhofer and Duggan (2011) identified that mindfulness moderated the effect of neuroticism on the experience of depressive symptoms. An inverse relationship has also been identified between dispositional mindfulness and anxiety (Brown & Ryan, 2003). Given these findings, mindfulness has been incorporated into treatments for anxiety and depression, with a recent meta-analysis finding that mindfulness-based therapy led to large pre-post treatment effect sizes in improving symptoms of individuals with anxiety and depressive disorders (Hofmann, Sawyer, Witt, & Oh, 2010).

The literature above suggests that individuals who are particularly high on SPS may be susceptible to experiencing more depression and anxiety (e.g., Liss et al., 2005). Conversely, greater dispositional mindfulness relates to lower levels of stress, anxiety, depression (Barnhofer & Duggan, 2011; Miller, Fletcher, & Kabat-Zinn, 1995; Weinstein et al., 2009). Accordingly, there are theoretical grounds for a relationship between these constructs. In that high-SPS individuals, having greater non-judgemental awareness of sensory stimuli (characteristic of mindfulness) should reduce the tendency for such individuals to become overwhelmed by their environment, and consequently reduce the relationship between SPS and negative mood and anxiety.

Therefore, the current study investigated the relationships between SPS, mindfulness and acceptance, and negative affect, using a cross-sectional questionnaire design. While there are differing conceptualisations of mindfulness and acceptance, and other more complex relationships could have also been examined (e.g., moderated-mediation), for simplicity we have examined basic questions of moderation using two different, common measures of mindfulness and acceptance. First, it was hypothesised that higher Sensory-Processing Sensitivity and lower mindfulness would relate to greater psychological symptoms such as depression, anxiety, and stress. Second, it was suggested that mindfulness would moderate the relationship between SPS and negative symptoms.

## 2. Methods

### 2.1. Participants

Participants were a convenience sample, recruited from the community ($N = 94$) via social-networking sites, word of mouth, and the *HSP Network* (an online community for Highly Sensitive People – that is, people with high SPS) email bulletin; as well as through undergraduate research programs at the university for course credit ($N = 17$). Analyses were performed on 111 complete survey responses (79 females, 32 males), with ages ranging from 18 to 64 years ($M = 31.07$, $SD = 11.95$). Of the 111 participants, the majority (89%) were born in Australia or New Zealand, 5% in Europe, 3% in North America, and 3% in Asia; 45% were single, 36% (de facto) married; and 18.9% in a committed relationship. The sample was highly educated, with 50.4% having attained a tertiary qualification, and 41.4% having attained a High School Certificate, certificate, diploma or advanced diploma. The research was approved by and conducted in accordance with the Human Research Ethics code of the University.

### 2.2. Measures

#### 2.2.1. The Highly Sensitive Person Scale

(HSPS; Aron & Aron, 1997) is a 27-item self-report measure of Sensory-Processing Sensitivity. Participants responded to a series of questions by indicating how much it applied to them, on a 7-point Likert scale ranging from 1 (*Not at All*) to 7 (*Extremely*). Questions included "Are you easily overwhelmed by strong sensory input?" and "Do you startle easily?". Higher scores represent greater Sensory-Processing Sensitivity. The HSPS had been demonstrated to have good content validity and good reliability (see Aron & Aron, 1997; Smolewska et al., 2006).

#### 2.2.2. The Mindfulness Attention Awareness Scale

(MAAS; Brown & Ryan, 2003) is a 15-item self-report measure of dispositional mindfulness where participants endorse statements about their openness to, awareness of, and attention to, what is taking place at the present moment. Responses are indicated on a 6-point Likert scale ranging from 1 (*Almost Always*) to 6 (*Almost Never*), with items such as "I do jobs or tasks automatically, without being aware of what I'm doing". Greater scores represent higher dispositional mindfulness.

#### 2.2.3. The Acceptance and Action Questionnaire-II

(AAQ-II; Bond et al., 2011) is a 10-item self-report measure of psychological flexibility and acceptance, scored on a 7-point Likert scale, ranging from 1 (*Never True*) to 7 (*Always True*). Items include the negatively scored "Emotions cause problems in my life", and

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