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# Attending away from the body predicts increased physical symptom reports at six months in primary care patients

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ABSTRACT

*Objective:* High symptom reporting (HSR) and medically unexplained symptoms (MUS) are associated with considerable distress, disability, healthcare utilization and costs, but are poorly understood, and current treatments are of limited benefit. Most models of HSR and MUS implicate cognitive-perceptual factors, such as increased body-focused attention, reduced perceptual thresholds and a tendency to experience somatic misperception, but little is known about the causal role of these variables. We investigated this issue by studying whether there is a longitudinal relationship between perceptual-attentional variables and later clinical outcomes in primary care patients.

*Method:* Primary care patients (N = 102) completed clinical (physical symptom reporting, health anxiety and healthcare utilization) and perceptual-attentional (body-focused attention, perceptual threshold, somatic misperception) measures at baseline and then again six months later (N = 72). Hierarchical regression was used to examine cross-lagged relationships between baseline and follow-up scores.

*Results:* Contrary to expectation, attending away from the body at baseline predicted increased not decreased symptom reporting six months later. Neither perceptual threshold nor somatic misperception predicted clinical outcomes at six months.

*Conclusions:* These findings suggest that body avoidance, rather than increased body focus, contribute to the development of HSR. Future studies should consider the potential clinical benefits of reducing bodily avoidance, via techniques that promote adaptive engagement with bodily sensations.

## 1. Introduction

The more physical symptoms a person reports, the more distressed and disabled they are, and the more healthcare resources they consume [1, 2]. The number of symptoms reported is only loosely coupled with the extent of any physical pathology, however, with many of the symptoms encountered in medical settings lacking a clear biomedical source (so-called functional or medically unexplained symptoms, MUS; e.g., [3, 4]). Even in well-defined diseases such as asthma [5], heart disease [6], and diabetes [7], some patients report more symptoms than others, even when the extent of their physical pathology is comparable. Although the personal and societal costs associated with MUS and high symptom reporting (HSR; i.e., reporting disproportionate numbers of symptoms) are well documented [8, 9], they remain poorly understood and existing interventions only produce modest improvements [10–13].

Studies suggest that state and trait negative affect are strongly associated with MUS and HSR [e.g., 14–16], predict symptoms better than physiological markers [e.g., 5, 17, 18] and can trigger a transient change in symptom perception in people with clear-cut organic disorders [19, 20]. Nevertheless, other studies have shown somatic symptom reports to be independent of these factors [e.g., 4, 21, 22]. Thus, while anxiety, depression, health anxiety and negative affect probably account for an important proportion of the variance in MUS and HSR, there are other factors that need to be understood if we are to manage these phenomena more effectively.

Most contemporary accounts of MUS/HSR rely on the concept of somatosensory amplification, a perceptual trait characterized by increased emotional reactivity, hypervigilance for somatic sensations and a tendency to attribute them to malign causes [e.g., 23, 24]. From this perspective, many of the symptoms reported by individuals with MUS/

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HSR reflect benign variations in the body that would normally be filtered out as irrelevant, but which are afforded undue significance due to unhelpful illness beliefs [e.g., 25–27].

Numerous studies have found a correlation between self-reported somatosensory amplification and physical symptom reports [e.g., 23, 28–30]. The evidence from more objective measures of amplification is much less consistent, however. Numerous studies have found that individuals with MUS require less stimulation than controls to experience sensory inputs as aversive [e.g., 6, 18, 31, 32], although it is unclear whether these indicate a reduced perceptual threshold per se (i.e., increased sensitivity) or simply a negative response bias. When the latter is taken into account using signal detection methods, group differences tend to be much less consistent [e.g., 33, 34]. Katzer et al. [35], for example, found that tactile thresholds were not associated with MUS or health anxiety in students, whereas Katzer et al. [36] found that lower thresholds were associated with *reduced* symptom reports in patients with MUS, even though thresholds were lower overall compared to healthy controls.

Other studies have investigated the somatosensory amplification model using attentional bias paradigms, typically in the visual modality. Some studies have found an association between MUS and difficulties disengaging visual attention from neutral [37, 38] or threatening stimuli [39]. There is also evidence for increased cognitive interference on the emotional Stroop task in MUS patients [e.g., 40–42]. However, studies using dot-probe and attentional cueing paradigms have generally not found such differences [39, 42–46].

There has been less research investigating attentional biases in more body-relevant sensory modalities, such as touch. Brown et al. [47] found that high symptom reporters were slower to disengage their attention from tactile cues than low symptom reporters under neutral conditions, but then displayed avoidance of tactile stimuli following a negative mood induction. In contrast, Brown et al. [48] found that non-clinical participants with high symptom reports were disproportionately faster than controls when responding to tactile versus visual targets (suggesting body bias), but only following presentation of threatening stimuli. In that study, self-reported somatosensory amplification was associated with reduced tactile bias, however, suggesting body avoidance. More recently, Brown [49] has argued that attention to "top-down" symptom representations in memory may be a stronger determinant of MUS and symptom reporting than attention to "bottom-up" signals coming from the body [also 50]. According to this Integrative Cognitive Model, attention to expectations and predictions about illness may cause the system to misinterpret bodily information, creating a misperception that is more consistent with prior beliefs than somatic reality. The Somatic Signal Detection Task (SSDT; [51]) was developed to measure individual differences in the tendency to experience such somatic misperceptions, which might interact with other factors (e.g., symptom-focused attention) to produce increased symptom reports. In the SSDT, participants are presented with a series of trials where they judge whether a subtle vibration has been presented to their fingertip, which occurs on half of the trials. The tendency to experience somatic misperception is operationalized as the frequency with which the individual reports the presence of the vibration when no vibration has been given (i.e., false alarms or "illusory touch"). Evidence suggests this is a trait-like variable [52] that correlates with symptom reporting even when controlling for anxiety, depression, negative affect and health anxiety [35, 36, 53, 54].

The cross-sectional, correlational nature of most research in this area means that it is unclear whether attentional and perceptual factors play a causal role in the development of high symptom reporting and other related variables. The use of experimental methods to assess causality raises ethical issues, however, meaning that analogue or quasi-experimental studies are often the only way of enhancing knowledge about underlying disease mechanisms. Although still correlational, longitudinal methods are particularly useful in this regard as they provide information about temporal antecedence and thereby the likely direction of causality when two variables are related. With that in mind, the current study investigated whether tactile perceptual thresholds, body-focused attention and somatic misperception predict somatic symptom reporting, health anxiety and healthcare utilization in primary care patients longitudinally. Following the amplification model, we expected lower perceptual thresholds and increased body-focus to predict greater symptom reporting, health anxiety and healthcare utilization over time. Following the Integrative Cognitive Model, we predicted similar relationships between these outcome variables and the tendency to experience somatic misperception on the SSDT.

## 2. Methods

### 2.1. Design

A prospective cohort design with primary care attendees was employed. Perceptual-attentional (tactile perceptual threshold, somatic misperception, body-focused attention) and clinical (symptom reporting, health anxiety, healthcare utilization) variables were measured at baseline (T1) and six months later (T2). We studied longitudinal relationships between the perceptual-attentional and clinical variables, controlling for relevant covariates (age, gender, medical conditions, state/trait anxiety, depression). Cross-lagged relationships were studied using hierarchical regression, with a view to identifying the likely direction of causality.

### 2.2. Participants

Individuals waiting to attend an appointment within one of seven general practices in NW England, UK, were approached to take part in the study between October 2011 and January 2013. Those who agreed to take part and who met the inclusion criteria (primary care patients aged 18–50 years; no major [uncorrected] sensory impairment; able to read/write English) were booked a research appointment and sent a questionnaire pack to complete at home. We focused on people under the age of 50 to minimise the proportion of participants with significant medical pathology, and to maximise sample homogeneity in terms of sensory acuity and overall reaction times. Of 126 participants sent the questionnaires, 109 attended a baseline appointment (T1: 75.2% female; mean [SD] age = 30.1 [10.0] years; 67% white British; 13.8% unemployed; 64% single; 99% educated to ≥ 16 years); of these, 72 (66.1%) returned for a second appointment six months later (T2: 70.8% female; mean [SD] age = 30.0 [9.6] years; 72.2% white British; 12.5% unemployed; 66.6% single; 98.6% educated to ≥ 16 years). Fig. 1 illustrates participant flow.

### 2.3. Clinical variables

#### 2.3.1. Symptom reporting

The 15-item patient health questionnaire (PHQ-15; [3]) was adopted as the most reliable measure of physical symptom reporting in this area [55]. Each item describes a common physical symptom (e.g. stomach pain); respondents rate the degree to which each symptom has bothered them in the past four weeks ('0' = not bothered at all; '1' = bothered a little; '2' = bothered a lot). Good reliability and validity have been demonstrated previously [3].

#### 2.3.2. Health anxiety

The short-form health anxiety inventory measured health anxiety. The HAI consists of 18 items, each comprising four statements; respondents indicate which of each set of statements best describes how they felt in the preceding six months. Each statement is scored from zero to three, with increasing scores corresponding to higher levels of health anxiety. Scale reliability is excellent [56].