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Anxiety and avoidance in psychogenic nonepileptic seizures: The role of implicit and explicit anxiety

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ABSTRACT

This study examined implicit and explicit anxiety in individuals with epilepsy and psychogenic nonepileptic seizures (PNESs) and explored whether these constructs were related to experiential avoidance and seizure frequency. Based on recent psychological models of PNESs, it was hypothesized that nonepileptic seizures would be associated with implicit and explicit anxiety and experiential avoidance. Explicit anxiety was measured by the State-Trait Anxiety Inventory; implicit anxiety was measured by an Implicit Relational Assessment Procedure; and experiential avoidance was measured with the Multidimensional Experiential Avoidance Questionnaire. Although both groups with epilepsy and PNESs scored similarly on implicit measures of anxiety, significant implicit–explicit anxiety discrepancies were only identified in patients with PNESs ($p < .001$). In the group with PNESs (but not in the group with epilepsy), explicit anxiety correlated with experiential avoidance ($r = .63$, $p < .01$) and frequency of seizures ($r = .67$, $p < .01$); implicit anxiety correlated with frequency of seizures only ($r = .56$, $p < .01$). Our findings demonstrate the role of implicit anxiety in PNESs and provide additional support for the contribution of explicit anxiety and experiential avoidance to this disorder.

1. Introduction

1.1. Anxiety and avoidance in psychogenic nonepileptic seizures

Psychogenic nonepileptic seizures (PNESs) bear a superficial resemblance to epileptic seizures. However, whereas the experiences and behaviors associated with epileptic seizures are caused by abnormal electrical activity in the brain, most PNESs are considered to be a psychological dissociative reaction to threatening situations, sensations, emotions, thoughts, or memories [1,2]. Indeed, while psychodynamic, cognitive, behavioral, and systemic psychological theories offer different accounts of PNESs [3], all recognize the patient's response to anxiety as a significant contributing factor and suggest that PNESs may reflect an inability, failure, or unwillingness to actively engage with anxiety. This recognition is supported by evidence that patients with PNESs generally report a greater preference for avoidant coping strategies and are more likely to somaticize their distress compared with those with epilepsy [4–10]. Nevertheless, relatively little research has specifically addressed avoidance in PNESs despite its key role in many psychological theories about the etiology of PNESs.

Within the broader psychological literature, avoidance of anxiety or avoidance of other introspective experiences, termed 'experiential avoidance', is frequently associated with psychopathology [11–13]. Experiential avoidance is not merely the avoidance of certain situations but rather the avoidance of one's own thoughts, sensations, and emotions, particularly anxiety-provoking ones [14]. Such avoidance can be voluntary or involuntary, with the involuntary aspect arguably most likely to precipitate clinical syndromes such as PNESs [15].

Anxiety itself is a complex physiological and behavioral experience with both 'explicit' and 'implicit' cognitive components [16,17]. As detailed below, 'explicit cognition' refers to thoughts or experiences in one's subjective awareness, as typically captured via self-report measures; 'implicit cognition' refers to attitudes, beliefs, preferences, learning processes, emotional experiences, or other knowledge or cognitive processes (e.g., attitudes about oneself or others) that occur outside of conscious awareness and that are captured using indirect measures [18,19]. Implicit and explicit measures are typically unrelated or only modestly related [20]. Discrepancies between the two would arguably be more pronounced among patients with limited self-awareness and have, for instance, been demonstrated in patients with borderline personality disorder [21]. Given the types of personality pathology associated with PNESs, including abnormalities of the borderline type

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[22–24], it may be reasonable to expect similar discrepancies between implicit and explicit measures in patients with nonepileptic seizures.

Studies comparing anxiety in individuals with PNESs and epilepsy have failed to identify clear and consistent differences, although the prevalence rates of anxiety disorders have been found to be approximately twice as high in both groups as in the general population [25,26]. Some studies showed similar mean levels of self-reported anxiety in patients with epilepsy or PNESs [27,28], whereas others found significant [29] or trend-level differences [30]. Such inconsistencies may be explained, in part, by the use of explicit measures, which not only are susceptible to social desirability biases but also assume a level of insight and awareness and an ability to accurately report on internal states — skills that may be diminished in individuals with neurological disorders or individuals who tend to avoid interoceptive experiences. Self-report measures such as the MMPI, which attempt to circumvent these problems, have been more likely to find group differences [29,31], although findings have not been consistently replicated and have been questioned in terms of sensitivity and specificity for the differential diagnosis of epilepsy and PNESs [32] (also discussed in [33]). What is more, while the MMPI has been used extensively, it does not separate clearly between psychopathology and normal findings, does not specifically describe different types of avoidance behaviors, and cannot measure implicit cognition.

1.2. Implicit cognition and measurement

'Implicit cognition' is a term widely used by psychologists to refer to hypothetical psychological attributes (e.g., beliefs about self or others, as noted earlier) that are outside of conscious awareness and, therefore, introspectively inaccessible [34]. Importantly, these cognitions can have a strong impact on physiological responses [35] and behavior [36]. Measures of implicit cognition aim to provide an index of an attitude or cognition without requiring a participant's awareness or conscious access to the attribute under investigation [37,38]. This is achieved through tasks where participants respond in an "automatic manner" (p. 347 [39]), with little or no opportunity for attentional controllability or self-monitoring [19,40,41].

Implicit measures often employ a response latency (reaction time) paradigm, underpinned by an assumption that implicit cognitive biases can be detected by examining efficiency of cognitive processing [19,40]. This can be done through the aggregation of many overt responses (e.g., key presses on computerized tasks), frequently under time pressure, and across various types of stimuli (e.g., words or pictures related to a targeted attribute) [42,43]. Studies using implicit measures have offered evidence for their convergent and discriminant validity in different scenarios and groups [44,45], with research to date finding that implicit indices appear to be better than self-report or clinical judgement at predicting important clinical behaviors such as suicide attempts [46], substance misuse [47], and sexual offending [48].

Very few previous studies have used measures of implicit cognition in patients with PNESs. One prior study compared covert attitudes toward sickness in patients with PNESs, patients with epilepsy, and controls using an Implicit Association Test that examined responses to pairings of sickness-related words and pleasant words [49]; however, there were no significant group differences in implicit attitudes toward sickness despite differences in reports of clinical symptoms (e.g., greater somatic complaints in those with PNESs versus those with epilepsy). Other studies found that individuals with PNESs do have implicit biases compared with healthy controls in that they show greater emotional arousal to neutral stimuli [50] and direct greater preconscious attention toward threat cues (angry faces; [51]). Therefore, it is possible that individuals with PNESs have a greater underlying — or implicit — sense of anxiety.

One contemporary measure of implicit cognition is the Implicit Relational Assessment Procedure (IRAP; [43]). The IRAP involves presenting (frequent word) stimuli with specific 'relational terms' (e.g., true, false, same, and opposite) so that the relationships between the presented stimuli (termed *verbal relations*) can be assessed. For example, participants may be shown a statement such as 'I am — anxious' or 'Others are — anxious' and asked to confirm or deny this relationship (in this example by choosing the term 'true' or 'false'). Importantly, participants are asked to respond quickly and accurately to these statements in ways that, depending on the trial type, are consistent or inconsistent with their beliefs. In the present study, for example, participants were asked to deny being anxious during consistent trials (e.g., selecting 'false' to the stimuli 'I am — anxious') and to endorse the opposite during inconsistent trials (e.g., selecting 'true' to the stimuli 'I am — anxious'). The methodology is predicated on the assumption that the strength of specific implicit verbal relations is reflected in the participant's response times; more simply, the basic IRAP principle is that average response latencies are relatively shorter across trials consistent with the participant's "true" (implicit) beliefs (e.g., those statements that cohere with the participant's implicit verbal relations) compared with trials inconsistent with their beliefs.

A wealth of studies have demonstrated the IRAP effect, providing support for its utility and reliability as an implicit measure (see [52] for an overview). Furthermore, research has indicated that the IRAP compares favorably with other implicit measures of individual differences [53], is perhaps less susceptible to 'faking' or overt manipulation [54], and can target clinically relevant phenomena [48,55].

1.3. Aims and hypotheses

The research outlined above suggests that anxiety and experiential avoidance may play a key part in PNESs. Specifically, this study aimed to (1) compare individuals with PNESs, individuals with epilepsy, and nonclinical controls on implicit and explicit measures of anxiety; (2) examine discrepancies between implicit and explicit anxiety within these groups; (3) examine correlations between anxiety and avoidance in PNESs; and (4) establish whether these measures of anxiety or avoidance have predictive utility in differentiating diagnostic groups. It was hypothesized that patients with PNESs would report higher levels of (explicit) anxiety and experiential avoidance compared with those with epilepsy or controls. However, previous studies have also highlighted that patients with PNESs are more likely than those with epilepsy to deny the relevance of psychological factors for their seizures [56], and, therefore, we predicted that those with PNESs would show greater implicit anxiety and show greater discrepancies between implicit and explicit anxiety (i.e., greater implicit relative to explicit anxiety) compared with those with epilepsy or controls.

2. Method

2.1. Participants

Thirty adults with PNESs and 25 adults with epilepsy (13 with focal epilepsy, 5 with idiopathic generalized epilepsy, and 7 with unclassifiable epilepsy) were recruited from outpatient seizure clinics at the Sheffield Teaching Hospital NHS Foundation Trust between February and September 2012. All diagnoses were made by neurologists specializing in the treatment of seizures, and only those whose diagnoses were supported by a previous video-EEG recording of a typical seizure were included. Patients with mixed seizure disorders (epilepsy and PNESs) were excluded. Thirty-one adults with no reported history of seizures were recruited through an advertisement and served as a nonclinical control group. All participants were at least 18 years old. Individuals unable to complete self-report questionnaires unaided, not fluent in English, and physically unable to a use a computer were excluded.

2.2. Ethical approval

The research was approved by both the Leeds Research and Ethics Committee (REC) and the Research Office of the Sheffield Teaching