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Cognitive processing and acrophobia: Validating the Heights Interpretation Questionnaire

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ABSTRACT

Three studies were conducted to examine the psychometric properties of a new scale: the Heights Interpretation Questionnaire (HIQ). This scale was designed to measure height fear-relevant interpretation bias to help assess the relationship between biased interpretations and acrophobia symptoms. Studies 1 ($N = 553$) and 2 ($N = 308$) established the scale's factor structure and convergent and discriminant validity among two large undergraduate samples. Study 3 ($N = 48$) evaluated the predictive validity of the HIQ by examining how well the scale predicted subjective distress and avoidance on actual heights. Factor analysis resulted in four distinct factors, and results suggest that each of the factors, along with the full HIQ, have good reliability and validity. Additionally, the scale predicts subjective distress and avoidance on heights beyond self-reported acrophobia symptoms. Overall, the HIQ shows promise as a new tool to investigate cognitive processing biases in acrophobia.

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There is evidence that acrophobic individuals have biases in interpretation and judgment such that they tend to overestimate danger and doubt their ability to cope with anxiety in height-relevant situations (e.g., Menzies & Clark, 1995). However, there are no published measures (to our knowledge) that assess height-relevant interpretation biases in a standardized way. Given that biased interpretations are a critical component of cognitive models of anxiety (e.g., Beck & Clark, 1997) and treatment of anxiety disorders (e.g., Barlow, 2002), a simple way to measure height-relevant interpretation biases would provide a useful research and clinical tool. In this article, we report on a series of studies evaluating the factor structure, reliability and validity of a new scale: the Heights Interpretation Questionnaire (HIQ).

Lack of height-relevant interpretation bias questionnaires is surprising, given the centrality of biased interpretations in cognitive models of anxiety. These models posit that a maladaptive schema leads to biases in the ways fearful individuals interpret, attend to, and remember information, such that threatening information is kept salient, which increases anxiety and promotes avoidance (Beck & Clark, 1997; Williams, Watts, MacLeod, & Mathews, 1997). Moreover, cognitive-behavioral therapy and cognitive therapy for anxiety both have a strong emphasis on changing interpretations (e.g., Barlow, 2002). In fact, Beck and Clark state that "it is the propensity of this information processing apparatus to inappropriately generate threat meaning assignments to innocuous stimuli that is the main problem that must be rectified in the treatment of anxiety disorders" (p. 51). This is important even in exposure-based therapies, in which one of the desired outcomes of interacting with the feared object is the chance to disconfirm feared expectations and learn to make less threatening interpretations of the situation (e.g., Teachman & Smith-Janik, 2005). Therefore, a simple assessment of interpretations can be useful for both research purposes and for clinical practice to evaluate progress in treatment.

Although we know of no published questionnaires measuring height-relevant interpretation biases, a small number of studies have used height-relevant anxiety provocations (e.g., climbing ladders, looking over balcony railings) as a method of evaluating individuals' anticipatory and on-line judgments of physical danger and ability to cope with anxiety (Clerkin, Cody, Steffanucci, Proffitt, & Teachman, 2009; Menzies & Clark, 1995; Teachman, Stefanucci, Clerkin, Cody, & Proffitt, 2008). For instance, when anticipating climbing a ladder, acrophobic individuals gave higher estimates of the probability of falling from the ladder and gave higher estimates of the injuries that would result from falling (compared to non-fearful control participants; Menzies & Clark, 1995). Additionally, when asked to stand on a balcony, height-fearful individuals more strongly endorsed experiencing thoughts related to danger (e.g., "The railing will not protect me") and their inability to cope with anxiety ("I will be paralyzed by fear"), compared to low fear participants (Clerkin et al., 2009; Teachman et al., 2008). Together, these results provide evidence, consistent with cognitive models, that when confronted with an actual height, height fearful individuals interpret the height to be dangerous and doubt their ability to cope.

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Similarly, Williams and Watson (1985) asked acrophobic individuals to provide ratings of perceived danger and ratings of self-efficacy (e.g., confidence in their ability to climb stairs) while anticipating a behavioral test involving climbing and looking over the railings of progressively higher balconies. Instead of comparing acrophobic individuals' ratings to those of a control group, the authors evaluated how well the acrophobic individuals' ratings predicted actual behavior while on a height. Ratings of self-efficacy (and ratings of perceived danger, to a lesser extent) predicted avoidance during the behavioral task.

The current study builds on this research by validating a questionnaire that can be used to evaluate the relationship between height fear and interpretation biases without the need for a height-relevant anxiety provocation. In this way, the measure can be used across settings without the need for equipment or a special environment, and the measure can also be used for screening purposes. By examining a broad range of interpretations (including those related to perceived danger, physical consequences of anxiety, and emotional consequences of anxiety), the HIQ aims to provide a multi-faceted measure of height-relevant interpretation bias. Additionally, unlike past studies that compare relatively small groups of height fearful to non-height fearful individuals, the current study uses multiple large samples with a continuous range of height fear to permit a more comprehensive examination of the psychometric properties of the HIQ (e.g., this design allows for examination of the factor structure of the measure in addition to other standard measures of reliability and validity).

The HIQ asks individuals to read and imagine themselves in height-relevant scenarios and then rate the likelihood of interpretations related to each scenario. In Study 1, we determine the factor structure of the HIQ and examine the psychometric properties of the scale in terms of its relationship to acrophobic and other symptom domains. Study 2 attempts to reproduce the factor structure found in Study 1 and replicate the findings for convergent and discriminant validity. Study 3 evaluates the predictive validity of the HIQ by examining how well the scale predicts emotional vulnerability on actual heights. Additionally, Study 3 includes a highly fearful sample. Based on the prior research demonstrating biases associated with acrophobia (e.g., Menzies & Clark, 1995), we expect the factor analyses in studies 1 and 2 to reveal factors related to dangerousness of being on a height (e.g., falling), physical consequences of anxiety (e.g., fainting), and emotional consequences of anxiety (e.g., fears of not being able to cope). Regarding psychometric properties, we predict the HIQ will have strong reliability based on inter-item consistency, and good convergent, discriminant, incremental, and predictive validity across studies.

1. Study 1

1.1. Method

1.1.1. Participants

Participants included 553 undergraduate students (70.1% female) enrolled in a large public university's psychology department participant pool. The mean age was 18.46 years (*SD* = .94, range = 16–25). The reported ethnicity of the sample was Caucasian (74.7%), African American (5.4%), Hispanic (5.8%), Asian (18.1%), Middle Eastern (2.4%), Native Hawaiian/Pacific Islander (.7%), and multiple ethnicities (8.7%).[1]

1.1.2. Materials

The Heights Interpretation Questionnaire (HIQ; see Appendix) is a 16-item self-report questionnaire designed to measure height-relevant interpretations. It is modified from the Spider Interpretation Questionnaire (SIQ; de Jong & Muris, 2002).[2] In the HIQ, participants are asked to read and imagine themselves in two height-relevant scenarios (climbing a ladder and standing on a balcony—common fears for height phobic individuals; Antony, Craske, & Barlow, 2006) that are designed to be somewhat ambiguous in terms of how dangerous the heights are, and whether or not the individual will be able to cope with his/her anxiety. Next, participants rate the likelihood on a scale of 1 (*not likely*) to 5 *(very likely*) of eight interpretations related to each scenario (e.g., "You will fall").

The Acrophobia Questionnaire-Anxiety Subscale (AQ-Anxiety; Cohen, 1977) is a 20-item self-report questionnaire that asks participants to rate their anxiety related to height-relevant situations (e.g., "Riding a Ferris wheel") using a 0 (*not at all anxious; calm and relaxed*) to 6 (*extremely anxious*) scale. The AQ-Anxiety is a widely used measure of height fear and has good psychometric properties (Baker, Cohen, & Saunders, 1973).

The Depression Scale of the Depression Anxiety Stress Scales short form (DASS21-DS; Lovibond & Lovibond, 1995) is a self-report questionnaire measure of depressive symptoms that asks participants to rate how much seven statements tied to depressive symptoms (e.g., "I felt down-hearted and blue") applied to them over the past week on a scale from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). The DASS21-DS has adequate psychometric properties (Antony, Bieling, Cox, Enns, & Swinson, 1998) and was used to examine discriminant validity of the HIQ based on the expectation that the HIQ should relate more strongly to a measure of acrophobia symptoms (AQ-Anxiety), relative to a clinical problem that is not focused on fear and anxiety, like depression.

1.1.3. Procedure

Participants completed the HIQ, AQ-Anxiety, and DASS21-DS as part of a larger battery of questionnaires through the university's psychology department participant pool. The questionnaires were completed online and in random order, and participants were unaware these particular measures would be analyzed together.

1.2. Results

1.2.1. Descriptive statistics

HIQ scores ranged from 18 to 70 with a mean of 31.44 (*SD* = 9.33). As expected, AQ-Anxiety (*M* = 24.77, *SD* = 17.68, range = 0–97) and DASS21-DS (*M* = 8.00, *SD* = 7.27, range = 0–42) scores were comparable to those found in previous studies using student (Cohen, 1972) and non-clinical (Henry & Crawford, 2005) samples.

1.2.2. Factor structure

To determine the factor structure of the HIQ, an exploratory principal components analysis was conducted. To examine the unique components of heights interpretation bias, and to increase interpretability of factors, varimax rotation was used. Examination of the scree plot yielded a 4-factor solution that accounted for 66.91% of the total variance.[3] Factor loadings ranged from .32 to .83, with an average loading of .70 (*SD* = .15). Following Tabachnick

[1] For studies 1 and 2, participants were given the option of selecting more than one ethnicity, so summed ethnicities exceed 100%.

[2] In the SIQ, participants read short vignettes and rated the probability of various events occurring (e.g., "a spider will attack you"). The SIQ was designed to have four subscales: harm, contact, approach, and territory. The SIQ and its four subscales have adequate reliability and validity (de Jong & Muris, 2002).

[3] The first five eigenvalues were 6.03, 2.18, 1.47, 1.04, and .89.

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