



Short versions of two specific phobia measures: The snake and the spider questionnaires

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ABSTRACT

Zoophobias are the most prevalent form of specific phobia worldwide. Two of the most widely used measures, the Snake Questionnaire (SNAQ) and Spider Questionnaire (SPQ) are good indicators of specific fears, but researchers have recognised that shorter, yet nevertheless reliable measures are needed. Hence the aims of this research were to develop short forms of the SNAQ and SPQ using item response theory and to use receiver operating characteristic (ROC) curve analyses to determine cut-offs for use in future research. Twelve-item versions of both scales (SNAQ-12 and SPQ-12) demonstrated excellent discrimination along the latent continuum in a sample of 1354 people. The SNAQ-12 and SPQ-12 showed excellent reliability and were highly correlated with the corresponding full-length scale. The scales discriminated between participants who reported snake (3.25%) or spider (8.05%) phobia and those who did not. Further analyses revealed that non-phobic women report higher fear of both snakes and spiders than do men, but this difference was not present in phobics. These findings suggest that the SNAQ-12 and SPQ-12 have considerable strengths, including shorter assessment and scoring times, whilst retaining high reliability and potential utility as a clinical screening tool.

1. Introduction

Specific phobia is an anxiety disorder that is characterised by a persistent, excessive and unrealistic fear in the presence of the object of the phobia which is sufficient to impair functioning. Thus specific phobia leads to avoidance of situations and places where the object of the phobia might be encountered (American Psychiatric Association, 2013). Specific phobias can have fairly dramatic health consequences. They have been associated with cardiac disease, arthritic conditions, migraine and thyroid disease; moreover, repeatedly feeling anxious and stressed may weaken the immune system, leading to a general feeling of ill health and perhaps even reduced vaccine efficacy. The excretory and digestive systems may also suffer (Aquino, El-Gabalawy, Sala, & Sareen, 2017; Barlow, 2002; Roy-Byrne et al., 2008; Witthauer et al., 2016).

A recent World Health Organisation (WHO) survey (Wardenaar et al., 2017) of the lifetime prevalence of specific phobias in 22 countries found that rates range from 2.6% to as high as 12.5%, with a cross-national average prevalence of 7.4%. Animal phobia was found to be the most prevalent form of specific phobia, with a cross-national average lifetime prevalence of 3.8% (range: 1.4% to 8.1%). The WHO

survey did not report the prevalence of subcategories of specific phobias, but a Dutch survey (Oosterink, De Jongh, & Hoogstraten, 2009) indicated that snake and spider phobias, with lifetime prevalences of 5.4% and 11.4% respectively, were amongst the most common phobias. Despite their high prevalence and the potentially severe health consequences, snake and spider phobia are among the least investigated anxiety disorders. Further research is needed to provide a clearer picture on their epidemiology and improve clinical treatments and prevention initiatives.

Amongst the measures most widely used to assess snake and spider phobia are the Snake Questionnaire (SNAQ) and the Spider Questionnaire (SPQ; Klorman, Weerts, Hastings, Melamed, & Lang, 1974). There is a body of research (Fredrikson, 1983; Hunt et al., 2006; Johnsen & Hugdahl, 1990; Olatunji et al., 2009; Polák, Sedláčková, Nácar, Landová, & Frynta, 2016; Zsido, 2017) demonstrating that the SNAQ and SPQ have adequate psychometric properties in nonclinical and clinical populations: both scales have excellent internal consistency, test-retest reliability and convergent validity. Furthermore, they can discriminate between individuals diagnosed with phobia and nonclinical controls (Åhs et al., 2011; Kopp, Schlimm, & Hermann,

Abbreviations: 2PL, the unidimensional two parameter logistic item response model; AUC, area under the ROC curve; CFA, confirmatory factor analysis; IRT, item response theory; ROC, receiver operating characteristic curve analysis; SNAQ, snake questionnaire; SPQ, spider questionnaire; WHO, World Health Organisation

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2005; Pissioti et al., 2003) and are sensitive to treatment effects (Hunt et al., 2006; Olatunji et al., 2009; Teachman et al., 2003) and thus are reliable indicators of change in the strength of implicit fear associations.

One of the potential drawbacks of the SNAQ and SPQ is scale length, as they consist of 30 and 31 items respectively, nine of which are reverse-scored. It has already been pointed out (Berzins, Garcia, Acosta, & Osman, 2016; Fergus, Valentiner, McGrath, Gier-Lonsway, & Kim, 2012; Roberson-Nay, Strong, Nay, Beidel, & Turner, 2007) that researchers and clinicians frequently face the problem that although an assessment battery is becoming too long, in terms of total number of items, they would like to include more scales. In other words there is a growing need for shorter measures that are nevertheless reliable (Wong, Gregory, & McLellan, 2016). Furthermore, concerns have been raised about reverse-scored items in personality assessment - it has been suggested that participants might find them unclear and that as a result they reduce the reliability and validity of questionnaires (Corderly & Sevastos, 1993; Lindwall et al., 2012). This had led some researchers to argue that reverse-scored items should be avoided (Crego & Widiger, 2014; Zhang & Savalei, 2016). It has also been recognised that item response theory (IRT) can be used to refine existing clinical instruments (see e.g. Thomas, 2010), for example it can be used to reduce instrument length and error, to provide objective calibration and to evaluate model and personal fit. Importantly it can also be used to improve the diagnostic accuracy of measures and their sensitivity to changes due to therapeutic intervention.

The overarching goal of this study was to use IRT to refine the SNAQ and the SPQ and create shorter, more economical instruments for assessing snake and spider fear. A further goal was to determine cut-off scores by collecting data from a subsample of individuals with spider and snake phobias. Separate IRT analyses of the SNAQ and SPQ were conducted in order to determine the items that best discriminated between various levels of fear. In order to demonstrate that the short versions retained the excellent psychometric properties of the original questionnaires we carried out assessments of reliability and construct validity in groups with the target phobias, a sample of undergraduate students, with a subgroup of biology related studies serving as positive control group, as well as calculating descriptive statistics and the proportion of variance shared by the long and short versions.

2. Methods

2.1. Participants

The sample comprised 1354 Hungarian subjects (332 men), aged 16–65 years ($M = 25.64$, $SD = 9.51$). Thirty-nine (2.88%, 6 men) claimed to have snake phobia; and 104 (7.69%, 15 men, 89 women) reported having spider phobia; a further 5 people reported having both phobias (0.37%, 1 man, 4 women). Self-reported phobias were not confirmed by focused clinical interview.

One hundred and fifty-six (11.52%, 67 men) respondents reportedly studied biology or other biology related discipline. None of them had a phobia. This group was included as a positive control group as a previous study (Polák et al., 2016) showed that people with biology-related education score lower on the SNAQ than the general population without snake phobia.

Nine hundred and seventy-five (233 men, 742 women, M age = 24.76 years, $SD = 7.27$, range: 18–52) participants were recruited from undergraduate courses and participated on a voluntary basis. The rest of the sample was recruited through the Internet by posting invitations on various forums and mailing lists covering people from a variety of demographic, socio-economic and educational backgrounds. Our goal was to obtain a heterogeneous sample and so we deliberately made the survey accessible to different strata of the population. All respondents filled out the questionnaires online, using Google Forms.

The research was approved by the Hungarian United Ethical Review Committee for Research in Psychology and was carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). Informed consent was obtained from all participants.

2.2. Questionnaires

2.2.1. Snake questionnaire (SNAQ)

The Snake Questionnaire (Klorman et al., 1974) is a 30-item self-report measure of fear and phobia of snakes. It is a one-factor scale and has 9 reverse-scored items. It uses a dichotomous response format (true; false). ‘True’ responses are summed to yield a score ranging from 0 to 30. The Hungarian version used in this study has been shown to have excellent psychometric properties (Cronbach’s $\alpha = 0.93$; high test-retest stability: $r = 0.95$ (Zsido, 2017).

2.2.2. Spider questionnaire (SPQ)

The Spider Phobia Questionnaire (Klorman et al., 1974) is a 31-item scale which requires respondents to rate the fear and anxiety they would experience in a variety of situations involving spiders using a dichotomous (true; false) response format. The SPQ is a one factor questionnaire and has 9 reverse-scored items. The number of ‘true’ responses (range: 0–31) indicates the level of phobic fear. We used the Hungarian SPQ, which has been shown to have excellent psychometric properties (Cronbach’s $\alpha = 0.94$; high test-retest stability: $r = 0.94$ (Zsido, 2017).

2.2.3. Construct validity

There is a large body of research (Åhs et al., 2011; Fredrikson, 1983; Kopp et al., 2005; Muris & Merckelbach, 1996; Pissioti et al., 2003; Teachman et al., 2003) demonstrating that individuals scoring high on SNAQ or SPQ fulfil the DSM-IV criteria (assessed by telephone or face-to-face structured clinical diagnostic interview) for the corresponding phobia and, furthermore that both the SNAQ and SPQ can differentiate between individuals with and without a DSM spider or snake phobia diagnosis.

2.3. Data analyses

2.3.1. Item selection

Most self-report measures include negatively worded items, i.e. items that are phrased so that a positive response represents a relatively low level of the attribute being measured. Research on self-report questionnaires in a variety of domains—posttraumatic stress disorder (Conrad et al., 2004), social anxiety (Motl, Conroy, & Horan, 2000; Rodebaugh, Woods, Heimberg, Liebowitz, & Schneier, 2006), loneliness (Miller & Cleary, 1993), self-esteem, central life interest, administrative skills, interpersonal skills and activity level (Schmitt & Stults, 1985)—has shown that negatively worded items usually tap a single factor that is hard to interpret. Moreover negatively worded items sometimes reduce the internal consistency, reliability and validity of the scale (Corderly & Sevastos, 1993; Lindwall et al., 2012). In other words, not only are reverse-coded items apparently harder to answer correctly, they do not appear to measure the same phenomenon (Ahlawat, 1985; Zhang & Savalei, 2016). Given these findings the first step in our scale reduction procedure was to remove the reverse-scored SNAQ and SPQ items (numbers 6, 12, 14, 16, 17, 20, 25, 27 and 28 in both cases).

2.3.2. Item response analyses

An important prerequisite (Reise, Widaman, & Pugh, 1993) for use of IRT is the unidimensionality of the latent variable (here, spider snake phobia). We used CFA to check that this assumption was met.

The unidimensional two parameter logistic (2PL) item response model (Birnbaum, 1968) was used to explore the measurement properties of individual questionnaire items. This model specifies a

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