



The utility of the bifactor model in understanding unique components of anxiety sensitivity in a South Korean sample[☆]



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ABSTRACT

The present study was the first to examine the applicability of the bifactor structure underlying the Anxiety Sensitivity Index-3 (ASI-3) in an East Asian (South Korean) sample and to determine which factors in the bifactor model were significantly associated with anxiety, depression, and negative affect. Using a sample of 289 South Korean university students, we compared (a) the original 3-factor AS model, (b) a 3-group bifactor AS model, and (c) a 2-group bifactor AS model (with only the physical and social concern group factors present). Results revealed that the 2-group bifactor AS model fit the ASI-3 data the best. Relatedly, although all ASI-3 items loaded on the general AS factor, the Cognitive Concern group factor was not defined in the bifactor model and may therefore need to be omitted in order to accurately model AS when conducting factor analysis and structural equation modeling (SEM) in cross cultural contexts. SEM results also revealed that the general AS factor was the only factor from the 2-group bifactor model that significantly predicted anxiety, depression, and negative affect. Implications and importance of this new bifactor structure of Anxiety Sensitivity in East Asian samples are discussed.

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1. Introduction

Anxiety sensitivity (AS)—the fear of physical and psychological sensations surrounding anxiety (McNally, 2002; Reiss and McNally, 1985)—is viewed as a cognitive predisposition that is relatively stable. It is a concept of growingly importance in the area of anxiety research and has been noted to be unique from the general tendency to experience negative emotional states, such as negative affect (McNally, 2002). According to the theory of AS, anxious individuals experience fear due to beliefs that anxiety-related sensations are associated with physical, social, and/or psychological negative consequences (Taylor et al., 2007). This theory is empirically supported and AS has been found to be associated (both concurrently and prospectively) with an increased risk of anxiety symptoms (e.g., panic attacks) and the development of anxiety disorders such as panic disorder, and posttraumatic stress disorder (Feldner et al., 2008; Hayward et al., 2000; Li and Zinbarg, 2007; Marshall et al., 2010; Schmidt et al., 2006). Research on AS also has broad application and utility given that AS has found to be

related not only to anxiety (Ebesutani et al., 2014), but also to constructs outside of the anxiety domain, including depression (Taylor et al., 1996) and substance use (Chavarría et al., 2015).

1.1. The Anxiety Sensitivity Index-3

Due to the increasing interest in AS in recent years, several self-report measures have been developed to assess this construct. One of the most recent measures developed to assess AS is the Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007). The Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007) was developed to measure the following three fears of anxiety symptoms: (a) physical concerns, (b) social concerns, and (c) cognitive concerns. Based on both nonclinical (n = 4494) and clinical (n = 390) samples of both males and females, Taylor et al. (2007) found support for a three-factor hierarchical structure underlying the ASI-3 in their initial development study. In this model, the three specific domains of physical concerns, social concerns, and cognitive concerns are theorized to be nested within a broader AS dimension. In other words, physical concerns, social concerns, and cognitive concerns together comprise and make up the higher AS dimension. Since then, additional support has been found for this three-factor hierarchical structure in (a) mixed-gendered clinical samples (Kemper et al., 2012; Wheaton et al., 2012) with sample sizes ranging from 506 to 514 clinically-diagnosed

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individuals, as well as in (b) mixed-gendered undergraduate samples (Lim and Kim, 2012; Wheaton et al., 2012) with sample sizes ranging from 315 to 761 nonclinical college individuals. Support for other structures of AS have also been found, such as Zvolensky et al. (2003) finding empirical support for the social concerns and cognitive concerns items combining to form a single factor, named the ‘Social-Cognitive Concerns’ factor. More recently, studies also found that a bifactor model fits the ASI data well. For example, two recent mixed-gendered university-based studies conducted by Ebesutani et al. (2014) (n=954 undergraduate students) and Osman et al. (2010) (n=462 undergraduate students) found significantly better fit for a bifactor model in US samples. Even more recently, a bifactor model of ASI demonstrated utility in modeling AS in the context of researching smoking in undergraduate, clinical, and community samples (Allan et al., 2015a, 2015b; Chavarría et al., 2015).

1.2. Bifactor models

Bifactor models were first introduced over seventy years ago by researchers studying cognitive ability (Holzinger and Swineford, 1937). In bifactor models, a “general” factor is posited (as responsible for item variance across *all* items), as well as “group” factors (responsible for item variation in more narrow subdomains). All dimensions are posited as not correlated, and the reliability of group factors reflect additional shared variance not accounted for by the general factor (Reise et al., 2010). With bifactor structures, “the general and group factors are on equal conceptual footing and compete for explaining item variance.” (Reise et al., 2010). In (the more well-known) hierarchical models, on the other hand, higher-order factors account for the shared variance across lower-order factors (Brown, 2006), and thus second-order factors (e.g., “general AS”) exert their effects *through* first-order factors. Because of this, one advantage of the bifactor model is that it allows for easier interpretation and understanding of how specific subscale domains predict/relate to other criteria independently from the general factor (cf. Chen et al., 2006). The bifactor model has since been shown to fit the structure of psychological constructs well in adults (e.g., Reise et al., 2007), children and adolescents (e.g., Ebesutani et al., 2011).

When put to the test recently in the context of anxiety sensitivity, the bifactor model fit the ASI-3 data well in two US-based studies (Osman et al., 2010; Ebesutani et al., 2014). No studies to date however have examined the degree to which the bifactor structure adequately represents Anxiety Sensitivity among East Asian samples, despite certain contextual differences existing across cultures that suggest the need for further study of this construct in diverse cultural settings.

1.3. Bifactor model for Asian samples: weaker relevance of the cognitive concerns domain

In Asian societies, the social and physical concerns dimensions will likely account for unique variability above and beyond that accounted for by the general AS dimension. For example, Asian societies have been found to have more concerns related to “saving face” than Western societies (Yabuuchi, 2004), as well as a strong emphasis on social relationships (Yum, 1988)—hence the relevance of the social concerns dimension. Physical symptoms have also been found to be strongly related to psychological distress among Asians (Kim et al., 1999)—hence, the relevance of the physical concerns dimension. However, the cognitive domain may be of weaker relevance in the area of anxiety sensitivity, particularly among Korean populations. In South Korea, mental health and related concerns (akin to AS Cognitive Concerns) are still relatively

taboo topics (Lee et al., 2009). For example, issues of mental health and related cognitive concerns are not openly addressed in society (such as in school systems or in employment settings). For these reasons, worries of mental health and cognitive consequences of AS (i.e., Cognitive Concerns) are not particularly salient areas of anxiety in Korean society. There will therefore likely be very little unique variance (in item responses) accounted for by a Cognitive Concerns related factor beyond that accounted for by the general AS dimension.

1.4. The present study

In the present study, we therefore examined for the first time (a) the applicability and fit of the bifactor model in an East Asian (Korean) sample, (b) the salience of the Cognitive Concerns dimension relative to the general AS factor, and (c) the ability of the AS dimensions to significantly predict anxiety, depression, and negative affect. We hypothesized that a modified bifactor model (with the Cognitive Concerns domain omitted) would be the most supported model given the less emphasis of mental health and related (cognitive) concerns in the Korean society. We also hypothesized that the general AS factor would significantly predict anxiety, depression, and negative affect given its strong, salient nature as found in previous studies (Ebesutani et al., 2014). We did not make specific predictions about the specific group AS factors, given that some studies have found that they did not predict external criteria (e.g., Ebesutani et al., 2014), while others have found that they did predict external criteria, such as mood and anxiety symptoms (e.g., Allan et al., 2015b).

2. Methods

2.1. Participants

The present sample included 289 undergraduate psychology students who completed an assessment battery at a large, urban South Korean university. All students who filled out the ASI-3 were included in the present study. This sample comprised 180 females (62.3%) and 109 males (37.7%). Ages ranged from 18 to 27 years old ($M_{age} = 21.19$; $SD = 2.17$). All participants were Korean and fluent in Korean.

2.2. Procedure

Following IRB-approved consent procedures, undergraduate students in Introductory Psychology courses over the age of 18 years were asked to complete measures anonymously online for course credit.

2.3. Measure

2.3.1. Anxiety Sensitivity Index-3—Korean version (K-ASI-3, Lim and Kim, 2012)

The Anxiety Sensitivity Index-3 (Taylor et al., 2007) assesses the degree to which respondents fear negative consequences related to anxiety symptom (i.e., physical concerns, cognitive concerns, and social concerns). The Korean version of the ASI-3 was translated by Lim and Kim (2012). They noted that they checked the linguistic equivalence between the original English and translated Korean versions of the ASI-3 via standard forward-backward translation procedures. Items are rated on a 5-point Likert-type scale from 0 = *very little* to 4 = *very much*. Internal consistency for these three scales in the present study was adequate, ranging from 0.77 to 0.88.

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