

# The Safety Behavior Assessment Form: Development and Validation

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**Objective:** To develop and validate an easy to administer measure of safety behaviors called the Safety Behavior Assessment Form (SBAF). **Method:** We provide reliability and validity evidence from four studies. The first study used a cross-sectional design with a sample consisting of both clinical (U.S. military Veterans;  $n = 42$ ) and nonclinical participants (undergraduates;  $n = 198$ ). Study 2 used a cross-sectional design with a sample of U.S. military Veterans ( $n = 215$ ). Study 3 used a pre-post treatment design with a sample of U.S. military Veterans ( $n = 42$ ). Study 4 used a 2-time-point longitudinal design with a sample of undergraduates ( $n = 77$ ). **Results:** The SBAF demonstrated strong levels of internal consistency and test-retest reliability in all four studies. The SBAF also demonstrated predictive and discriminant validity. In Study 3, the SBAF predicted anxious, but not depressive, treatment outcomes in a sample of Veterans. In Study 4, the SBAF predicted prospective changes in anxiety over a 2-week interval in a sample of undergraduates even after controlling for a competing measure of safety behaviors. **Conclusion:** Results of these four studies indicate that the SBAF is a reliable and valid measure of safety behaviors that can be used in both clinical and nonclinical settings. © 2016 Wiley Periodicals, Inc. *J. Clin. Psychol.* 00:1–13, 2016.

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People with anxiety often engage in “safety behaviors” to try to reduce their anxiety. Safety behaviors are typically defined as behaviors and cognitive processes aimed at preventing or minimizing a feared consequence (Salkovskis, 1991). Although safety behaviors are often idiosyncratic, research suggests some disorder-specific commonalities and themes in the types of behaviors people use (Schmidt et al., 2012). For example, individuals with posttraumatic stress disorder tend to engage in safety behaviors related to physical danger (e.g., checking the perimeter of one’s house for intruders; Dunmore, Clark, & Ehlers, 1999), whereas individuals with social anxiety engage in safety behaviors designed avoid negative evaluation (e.g., being overly polite; Wells et al., 1995). People with generalized anxiety disorder use safety behaviors to elicit reassurance and minimize uncertainty (e.g., trying to do things perfectly; Beesdo-Baum et al., 2012). In contrast, people with panic disorder tend to use behaviors aimed at reducing physical symptoms (e.g., checking heart rate; Radoemsky, Rachman, & Hammond, 2002). At first blush, safety behaviors appear to be adaptive because they mitigate anxiety; however, research suggests that safety behaviors may actually be harmful in the long term.

There is a growing body of research showing that safety behaviors can maintain and even exacerbate anxiety over time (Abramowitz 2013; Clark, 1999; Wells et al., 1995). There are a number of hypotheses for why this might be the case. First, many safety behaviors rely on avoiding

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the anxiety-provoking stimulus. Avoiding the anxiety-provoking stimulus leads to decreases in anxiety, which is negatively reinforcing and in turn can lead to even stronger avoidance tendencies in the future (Abramowitz 2013; Helbig-Lang & Petermann, 2010). Second, safety behaviors can maintain an individual's perception of threat (Lovibond et al., 2009). This is because the individual attributes the absence of anxiety to the safety behavior rather than a lack of true danger in the environment (Blakey & Deacon, 2015; Clark & Beck, 2010; Helbig-Land & Petermann, 2010; Rachman, Radomsky, & Shafran, 2008; Wells et al., 1995).

Third, in some disorders such as social anxiety, safety behaviors might lead to the negative consequences that the individual is trying to avoid (e.g., avoiding eye contact may cause one to be perceived as distant and in turn can lead to rejection; Alden & Bleling, 1998; McManus et al., 2008). Finally, safety behaviors can lead to an increase in self-focused attention, which is associated with persistent anxiety (Telch & Lancaster, 2011).

Consistent with this theoretical analysis, a growing number of empirical studies support the link between safety behaviors and increased anxiety. For example, a number of longitudinal studies show that safety behavior usage is associated with higher prospective levels of anxiety (e.g., Dunmore et al., 1999; McManus et al., 2008; Salkovskis, Clark, & Gelder, 1996; Stangier, Heidenreich, & Schermelleh 2006). Importantly, experimental designs demonstrate that safety behaviors may play a causal role in exacerbating anxiety. Olatunji, Etzel, Tomarken, Ciesielski, and Deacon (2011) found that participants instructed to engage in safety behaviors experienced an increase in health anxiety compared to a no-safety behavior control condition (see also Deacon & Maack, 2008).

Treatment studies also support the harmful effects of using safety behaviors (Helbig-Lang et al., 2014; Kim, 2005; Morgan & Raffle, 1999; Salkovskis, Clark, Hackmann, Wells, & Gelder, 1999; Wells et al., 1995). Treatment studies have shown that safety behavior usage leads to significantly higher levels of anxious symptoms posttreatment compared to treatments without safety behavior usage (Helbig-Lang et al., 2014; Sloan & Telch, 2002; for exceptions, see Sy, Dixon, Lickel, Nelson, & Deacon, 2011). Taken together, these studies provide strong support for the link between safety behaviors and greater levels of anxiety.

Given the importance of safety behaviors in the etiology and treatment of anxiety disorders, it is surprising that there are so few options for their assessment. Indeed, in their recent review article, Telch and Lancaster (2011) noted, "Despite the significant interest in safety behaviors and exposure therapy, far less attention has been given to the assessment of safety behaviors" (p. 323). Our own review of the literature supports this assertion. We were able to identify a small number of existing measures of safety behaviors: the Safety Behaviors Questionnaire (Clark, Wells, Hackmann, Butler, & Fennell, 1994); the Texas Safety Maneuvers Scale (Kamphuis & Telch, 1998); the Subtle Avoidance Frequency Examination (SAFE; Cuming et al., 2009); the Social Phobia Safety Behaviors Scale (Pinto-Gouveia, Cunha, & Salvador, 2003); the Presentation-Related Safety Behaviors Scale (Kim, 2005); the Panic Attack Coping Questionnaire (Borden, Clum, Broyles, & Watkins, 1988); the Questionnaire for Assessing Safety Behaviors in Hypochondriasis (Weck, Neng, Richtberg, & Stangier, 2012); and the Brief Safety Behaviors Scale (Waller et al., 2012).

Although the above-mentioned measures have demonstrated adequate levels of reliability (e.g., acceptable levels of internal consistency) and convergent validity (e.g., higher safety behavior scores are correlated with higher levels of anxiety) overall, research testing their psychometric properties is limited, particularly with regard to predictive validity, incremental validity, and clinical utility. To date, the SAFE has accumulated the greatest amount of empirical support. A preliminary study has shown that the SAFE is responsive to therapeutic change (Cuming et al., 2009). Specifically, changes on the SAFE during treatment were associated with changes in subsequent social anxiety symptoms. However, the study did not determine if changes in SAFE scores preceded changes in anxiety or if changes in anxiety preceded changes in SAFE scores.

There is preliminary support for the existing measures of safety behaviors (particularly the SAFE), but they also have a number of limitations. A primary limitation of these measures is that the majority of these focus exclusively on social anxiety, leaving other anxiety disorders unrepresented. Most treatment and research settings have patients with a wide-range of

anxiety conditions, and thus a measure that more accurately captures this range is sorely needed (Salkovskis et al., 1996, 1999). A second limitation is that none of these measures has been validated in multiple studies with adequate sample sizes in both clinical and nonclinical populations. There also is little longitudinal work with these measures to demonstrate predictive validity.

The purpose of the current research was to address this gap in the literature and create a reliable, valid, and easy-to-administer measure of safety behaviors that could be used in both clinical and nonclinical populations. Specifically, the goal of this research was to develop a broad measure (that includes safety behaviors from multiple anxiety diagnoses) that could be used to predict risk for future anxiety problems in nonclinical samples as well as prognosis and treatment decisions in clinical samples.

### Scale Development

We constructed our scale, titled the Safety Behavior Assessment Form (SBAF), using the scale development process described by Clark and Watson (1995). We first developed an item pool. Each author generated a comprehensive list of potential safety behavior items based on clinical experience and past research. Items that were generated represented a broad range of anxiety-related disorders, including posttraumatic stress disorder (PTSD), social anxiety disorder, generalized anxiety disorder, panic disorder, obsessive-compulsive disorder and health anxiety. A committee approach was then used to select the items to be included in the first version of the SBAF. This process resulted in a measure that contained 56 items. Consistent with prior research, we conceptualized the safety behavior construct as an individual difference variable by which the frequency of different safety behavior use varies. Thus, we chose to use a 4-point scale (0 = never, 1 = sometimes, 2 = often, 3 = always), with higher scores indicating higher frequency of safety behavior usage. The ordering of the items was determined with a random number generator.

### Study 1

#### *Method*

*Overview.* The next step in the development of the SBAF was to collect an initial set of data to evaluate the psychometric properties of the scale (e.g., coefficient alpha, average inter-item correlation) and determine which items should comprise the final measure. Item exclusion was determined by evaluating item distributions, contributions to internal consistency, factor loadings, and ability to discriminate clinical from nonclinical populations.

*Participant.* The study had 270 participants total—72 clinical participants and 198 nonclinical participants (undergraduates). Of the 72 clinical participants, 26 were from a VA outpatient clinic and 46 were from community anxiety disorders clinics. Of the clinical participants, 62 had either a primary or secondary anxiety disorder diagnosis (as determined by an intake interview by a staff psychologist). The 198 nonclinical participants were undergraduate students from a midsized private university. The mean age of the total sample was 25 (standard deviation [ $SD$ ]=12.8) and 67% ( $n=161$ ) were male. With respect to ethnicity, 77% ( $n=209$ ) were Caucasian, with the remaining 23% comprising African American, Asian, Hispanic, and other.

*Measures.* Participants were administered the SBAF (56-item version).

*Procedure.* Veteran participants were administered the SBAF as part of a standard assessment protocol, which included demographic information, psychosocial history, and a clinical interview. Veteran participants were presenting for evaluation for treatment as part of a PTSD clinical team. Participants from the community anxiety disorders outpatient clinics were administered the SBAF as part of a standard assessment protocol, which included demographic information, psychosocial history, a clinical interview, and several self-report measures.

Undergraduate participants were administered an informed consent form, a brief demographics questionnaire, and the SBAF (56-item version). Participants were given extra credit points for their psychology courses for participating.

### *Results*

Analyses showed that it was possible to reliably measure safety behaviors in this sample of clinical and nonclinical participants. The SBAF showed excellent internal consistency; Cronbach's  $\alpha$  for the SBAF was .91 ( $\alpha = .92$  in the clinical sample and  $\alpha = .90$  in the undergraduates). The average inter-item correlation for the measure was .16. This low mean correlation is considered desirable given the broad nature of the safety behavior construct being measured (Clark & Watson, 1995). The measure also was able to accurately discriminate clinical (mean [ $M$ ] = 76.07,  $SD = 24.19$ ) from nonclinical participants ( $M = 60.05$ ,  $SD = 16.10$ ,  $p < .001$ ). Receiver operating characteristics analyses corroborated these findings. Results showed that the area under the curve was .71, with 95% confidence interval [.63, .79]. The area under the curve was significantly different ( $p < .0001$ ) than .5, meaning that the SBAF classifies clinical from nonclinical participants significantly better than by chance.

To determine which items would be retained in the measure, we examined the response distribution of the items, the ability of each item to distinguish clinical from nonclinical participants, item skewness, and conducted a principal components analysis (Clark & Watson, 1995; Cortina, 1993). Items were considered for deletion from the measure if they performed poorly on multiple indices: (a) the response distribution for the item was skewed (showed little or no variability in response), (b) did not discriminate clinical from nonclinical participants, and (c) loaded weakly (below .4) on the first factor in principal components analysis but strongly on later factors (Clark & Watson, 1995). There were 15 items that performed poorly on at least two of the three indices and were thus deleted from the measure. Thus, the final version of the SBAF comprised 41 items (see Appendix for final scale). We conducted three additional studies to test the factor structure, reliability, and validity of the finalized SBAF measure.

## Study 2

### *Method*

*Overview.* The purpose of this study was to examine the factor structure and reliability (internal consistency) of the SBAF using a large clinical sample of Veterans presenting for treatment. Data were collected for institutional review board-approved quality assurance and quality improvement measurements, which means that this was not part of a research protocol but was conducted as part of routine clinical care.

*Participants.* Participants were 215 Veterans enrolled in treatment in a large, urban VA medical center. The mean age was 51 years ( $SD = 15.2$ ) and 91% were male. Self-reported ethnicity of sample was 50% Caucasian, 43% African American, 5% Hispanic, and 2% other. The most common diagnosis in the sample was PTSD (78%), followed by unipolar depression (39%).

*Procedure.* Participants were receiving treatment as part of standard programming in a mental health outpatient clinic at a large, urban VA medical center. Treatments comprised both individual and group-based treatments for PTSD, depression, and anxiety. As part of standard treatment, Veterans were administered the SBAF along with other self-report measures, which varied by the particular treatment.

## Results

As shown in Figure 1, SBAF scores in this clinical sample were normally distributed, indicating that safety behaviors are a dimensional construct, present to a greater or lesser degree in all

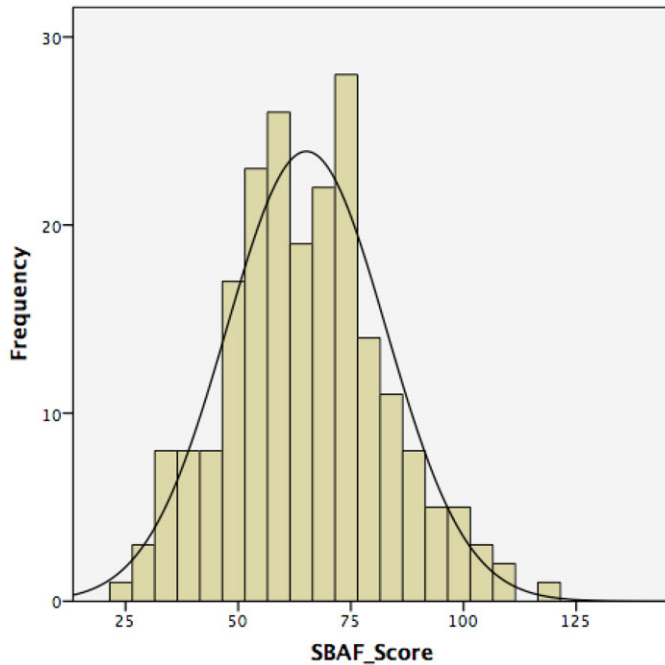


Figure 1. Histogram of SBAF scores (Study 2;  $n = 215$ ).

individuals. The measure also showed excellent internal consistency reliability; Cronbach's  $\alpha$  for the SBAF was .91.

Following the best practice guidelines put forth by Costello and Osborne (2005), we used maximum likelihood factor analysis with direct oblimin rotation to investigate the factor structure of the SBAF-41. Results and the interpretation of factor loadings suggest three factors that explain approximately 40% of the scale variance. The first factor had seven items assessing safety behaviors related to monitoring and vigilance. The second factor contained eight items broadly assessing bodily and health safety behaviors. The third factor had seven items relating to safety behaviors used to escape and evade social situations. The presence of these three factors corroborated prior work suggesting general themes in the types of safety behaviors people with anxiety tend to use (e.g., Schmidt et al., 2012).

The results also support our assertion that a broad measure of safety behaviors is needed because existing measures focused on social anxiety (or on any one disorder) were missing a variety of behaviors used by people with clinically significant anxiety disorders. In the analyses to follow, we test the reliability and validity of these three factors (now labeled as vigilance subscale, health subscale, and social subscale) as well as SBAF total scores. The internal consistency of these subscales in the current sample was good: coefficient alpha for vigilance = .86; coefficient alpha for health = .83; and coefficient alpha for social = .77.

### Study 3

#### *Method*

*Overview.* We evaluated the reliability and validity of the SBAF in a sample of United States military Veterans enrolled in a 12-week behavioral activation group for anxiety and depression. Data were collected for institutional review board-approved quality assurance and quality improvement measurements, which means that this was not part of a research protocol but was conducted as part of routine clinical care. As a consequence, these data are consistent

with the principles of effectiveness studies (largely to maximize external validity), and there was no control group.

### *Participants*

Participants were 42 Veterans (81% male) receiving therapeutic services in an outpatient mental health clinic at an urban VA medical center. All participants experienced clinically significant symptoms of anxiety and were referred by their individual providers. Approximately two thirds of participants were from minority backgrounds (63% African America and 30% White) and the mean age was 60 (range 41–78,  $SD = 8.80$ ). The majority of participants carried diagnoses of PTSD ( $n = 27$ ).

### *Measures*

*Anxious symptoms.* The State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA)-Trait Version (Gros, Antony, Simms, & McCabe, 2007) was used to measure anxious symptoms. The STICSA is a 21-item self-report measure of general anxiety that has been validated in large clinical and nonclinical samples and has demonstrated excellent psychometric properties (Ree et al., 2008).

*Depressive symptoms.* Depression symptoms were measured using the Patient Health Questionnaire–9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), a nine-item self-report measure designed to assess the frequency and severity of depression symptoms. Each item on this measure corresponds directly to a Diagnostic and Statistical Manual of Mental Disorders Fourth Edition diagnostic criterion for a major depressive episode. The diagnostic validity and high levels of sensitivity and specificity for major depression have been established for the PHQ-9 in several studies (Kroenke et al., 2001).

*Safety behaviors.* The SBAF was used to assess safety behaviors.

*Procedure.* The behavioral activation group followed standard behavioral activation protocol (Martell, Dimidjian, & Herman-Dunn, 2013) and was adapted for Veterans with anxiety and mood problems. Early sessions focus on education regarding the bidirectional relationship between symptoms of anxiety and behavioral avoidance. In subsequent sessions, Veterans are asked to monitor their daily activities and plan activities that are mood elevating. Final sessions emphasize relapse prevention strategies. As a component of activity scheduling and activation, Veterans were provided with education about the effect of safety behaviors on maintaining anxiety. Groups had four to eight Veterans each, met for 90 minutes per week for 12 weeks, and were led by a doctoral-level psychologist. Group members completed measures of anxiety, depressive symptoms, and safety behaviors at baseline (session 1) and 13 weeks later (i.e., 1-week posttreatment).

### *Results*

*Reliability.* To test the reliability of the SBAF and the three subscales for measuring safety behaviors in Veterans, we examined internal consistency and test-retest reliability. As hypothesized, it was possible to reliably measure safety behaviors in this ethnically diverse clinical sample. Cronbach's  $\alpha$  for the SBAF at baseline was .94 and the test-retest correlation over the 13-week interval was excellent, at .76. The subscales also exhibited strong levels of internal consistency (Cronbach's  $\alpha$  for vigilance = .85, health = .82, and social = .77). Test-retest correlations were strong for the subscales (vigilance = .79; health = .58; and social = .79).

*Validity.* Our second hypothesis was that the SBAF would demonstrate predictive validity in a VA clinical sample. Specifically, we hypothesized that decreases in safety behaviors during

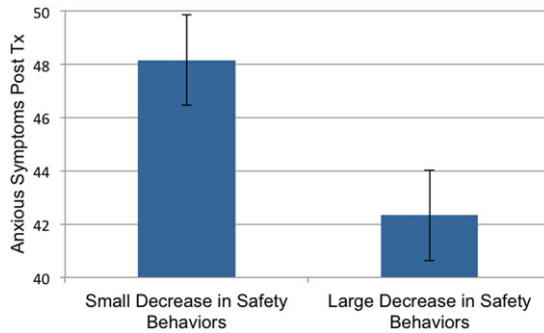


Figure 2. Anxiety symptoms (STICSA score) posttreatment as a function of change in safety behavior (SBAF scores) pre- to posttreatment controlling for pretreatment anxiety symptoms.

treatment would result in lower levels of anxiety posttreatment. To examine the predictive validity of the SBAF on intervention effectiveness, we used multiple regression. The dependent variable was level of anxious symptoms posttreatment (i.e., STICSA score 1-week posttreatment). The independent variable was changes in safety behaviors score from pretreatment to posttreatment (i.e., SBAF change score; pretreatment score minus posttreatment score). Anxiety score at baseline was used as a covariate to control for initial anxiety levels. As predicted, changes in SBAF scores predicted therapeutic changes in anxious symptoms ( $b = -.34$ ,  $t = -3.17$ ,  $p = .004$ , partial correlation =  $-.53$ ). The effect size for the SBAF was in the medium to large range.

Results corroborated prior research showing that individuals who had the greatest reduction in SBAF scores reported the lowest levels of anxious symptoms posttherapy after controlling for initial anxiety levels (see Figure 2). To examine the discriminant validity of the SBAF, we tested whether changes in SBAF scores also could predict changes in depressive symptoms from pretreatment to posttreatment. As predicted, changes in SBAF scores did not predict therapeutic changes in depressive symptoms when controlling for initial depression scores ( $b = .07$ ,  $t = -.62$ ,  $p = .54$ , partial correlation =  $-.12$ ).

We also examined predictive validity of each SBAF subscale on intervention effectiveness. Changes in the vigilance ( $t = -2.29$ ,  $p = .03$ ; partial correlation =  $-.41$ ) and social ( $t = -3.20$ ,  $p = .004$ ; partial correlation =  $-.53$ ) subscales were significant predictors of posttherapy anxiety levels. The health subscale ( $t = -1.34$ ,  $p = .19$ ; partial correlation =  $-.26$ ) did not predict posttherapy anxiety levels.

## Study 4

### Method

**Overview.** We evaluated the reliability and validity of the SBAF in a sample of undergraduates. We hypothesized that the SBAF would exhibit strong levels of reliability in a nonclinical sample and demonstrate both predictive validity and incremental validity.

### Participants

Participants were 77 unselected undergraduates (mean age = 19.49; 58 women, 19 men) from the volunteer participant pool at the University of Notre Dame. The self-reported ethnicity of the sample was 63% Caucasian, 17% Hispanic/Latino, 17% Asian, and 3% African American.

### Measures

**Anxious symptoms.** The Beck Anxiety Inventory (BAI; Beck & Steer, 1993) was used to measure anxious symptoms. The BAI is a 21-item measure of anxiety assessing the emotional,

cognitive, and physiological symptoms of anxiety. The BAI has strong psychometric properties (Beck, Epstein, Brown, & Steer, 1988).

*Safety behaviors.* The SBAF and SAFE (Cuming et al., 2009) were used to assess safety behaviors. The SAFE is a 32-item measure assessing subtle avoidance and safety behaviors common in social anxiety disorder (Cuming et al. 2009).

### *Procedure*

The study used a 2-week prospective longitudinal design. At time 1, participants were administered an informed consent form, a brief demographics questionnaire, and two measures of safety behaviors (the SBAF and SAFE) and anxious symptoms (BAI). Participants completed the same measures 2 weeks later.

## Study 4

### *Results*

Consistent with the findings of Study 2, SBAF scores were normally distributed indicating that safety behaviors also are a dimensional construct in nonclinical samples.

*Reliability.* As hypothesized, it was possible to reliably measure safety behaviors in this nonclinical sample. Cronbach's  $\alpha$  for the SBAF was .91 and the test-retest correlation over the 2-week interval was excellent at .87. Reliability also was strong for the three SBAF subscales. Cronbach's  $\alpha$  was good for all three of the subscales (vigilance = .74; health = .76; and social = .75) and the test-retest correlations were excellent (vigilance = .81; health = .80; social = .77).

*Validity.* We hypothesized that, unlike those with low levels of safety behaviors, undergraduates exhibiting high levels of safety behaviors at baseline would exhibit the highest levels of anxious symptoms 2 weeks later. To test this hypothesis, we used hierarchical multiple regression. The dependent variable was anxiety at time 2 (BAI at time 2). The main effects of safety behaviors (SBAF and SAFE) were entered. As predicted, SBAF scores predicted future anxious symptoms ( $b = .22, t = 2.70, p = .009$ , partial correlation = .36), even when controlling for baseline anxiety as well as a competing measure of safety behaviors, the SAFE (which was not a significant predictor of BAI scores;  $b = -.03, t = -.62, p = .54$ , partial correlation =  $-.08$ ). Individuals with higher SBAF scores reported higher levels of anxious symptoms in the future than those with lower SBAF scores. The effect size for SBAF predicting changes in anxiety was in the small to medium range, even after controlling for baseline anxiety and the SAFE.

We also examined predictive validity of each SBAF subscale (when controlling for baseline anxiety and the SAFE). Only the health subscale ( $t = 4.05, p < .0001$ ; partial correlation = .50) was a significant predictor of future anxious symptoms. The effect size for the health subscale on future anxiety was in the large range. The vigilance ( $t = 1.94, p = .06$ ; partial correlation = .27) and social ( $t = 1.96, p = .06$ ; partial correlation = .27) subscales were only predictors of future anxiety at the level of a trend.

## Discussion

Given the importance of safety behaviors in the etiology and treatment of anxiety disorders, it is surprising that there are so few empirically validated options for their assessment. The purpose of the current research was to develop and validate an easy-to-administer measure of safety behaviors that could be used in both clinical and nonclinical populations. To this end, we created the SBAF. The SBAF was created in 2 stages. First, we generated an initial item pool, which was refined based on reliability and validity (i.e., discriminating items) data from an initial validation study (Study 1) using a sample of clinical and nonclinical participants. We then tested the final version of our measure in three more independent studies.



Findings from these three studies indicate that the SBAF is a reliable measure of safety behaviors with multiple types of validity. The SBAF showed strong levels of internal consistency (coefficient  $\alpha > .9$  in the studies) and test-retest reliability in both clinical and nonclinical populations. Similarly, the three SBAF subscales (as determined by factor analysis) showed strong internal consistency and adequate test-retest reliability. Further, the SBAF showed predictive and discriminant validity. In Study 3, the SBAF predicted anxious, but not depressive, treatment outcomes in a sample of Veterans. And, in Study 4, the SBAF predicted prospective changes in anxiety over a 2-week interval in sample of undergraduates.

The SBAF also demonstrated incremental validity in Study 4 by showing that the SBAF accounted for unique variance in predicting future anxiety levels, even when controlling for the SAFE. To our knowledge, the SBAF is the first measure of safety behaviors to predict future anxiety levels in a prospective longitudinal design. Our finding lends support to theoretical models of anxiety development, which posit safety behaviors as important risk factors for anxiety (Dunmore et al., 1999; Clark, 1999). These results also are the first to suggest that safety behaviors might represent a continuous construct that is present to some degree in all individuals (those with and without problems of a clinical magnitude).

Importantly, the SBAF was able to predict treatment outcomes in a sample of Veterans. Those with the greatest reductions in safety behavior usage during treatment had the fewest anxious symptoms posttherapy when controlling for initial levels of anxiety. Our results are consistent with findings by Helbig-Lang and colleagues (2014), who found that safety behavior usage during therapy was associated with less favorable treatment response.

One advantage of the SBAF over existing measures of safety behaviors is that it assesses safety behaviors featured in a variety of anxiety disorders (and not just social anxiety). All three SBAF subscales demonstrated adequate psychometric properties. Internal consistencies for most subscales were acceptable with Cronbach's alphas all greater than .70. Test-retest correlations also were strong. Further, the vigilance and health subscales demonstrated a double association. The vigilance subscale predicted anxiety outcomes in Veterans but not undergraduates, whereas the health subscale predicted anxiety outcomes in undergraduates but not Veterans. These results support the assertion that it is necessary to assess a broad array of safety behaviors because different subsets of symptoms can have different predictive validities depending on the sample (clinical vs. nonclinical). These results indicate that different sets of safety behaviors might confer different risk in clinical and nonclinical samples.

It is important to note strengths and weaknesses of the current research. A significant strength of this research was the use of four independent studies to develop and validate the SBAF. The initial validation study (Study 1) used both clinical and nonclinical participants to ensure the scale could discriminate clinically significant safety behavior usage from normal usage. Then three additional studies with new samples were used to examine the factor structure of the SBAF (Study 2) and to test its reliability and validity (Studies 2, 3, and 4). In Study 4, we were able to demonstrate incremental validity for the SBAF by comparing it to the SAFE. This pitting of measures against each other is important to determine measure overlap. Despite the importance of demonstrating incremental validity, research shows that only about 9% of studies of assessment tools assess this type of validity (Haynes & Lench, 2002). Our research study is one of the few studies to establish this type of validity in measurement evaluation.

### *Limitations*

There also were limitations to the current research. For example, we did not establish incremental validity for the SBAF in a clinical sample. It will be important to show that the SBAF can predict treatment outcomes when controlling for a competing measure of safety behaviors (similar to our approach in Study 4). A second limitation is that we did not examine the onset of clinically significant behaviors in the undergraduate sample. We showed that the SBAF could predict future anxious symptoms, but it is unclear if the results generalize to the development of clinically significant anxiety.

## Conclusion

In conclusion, the SBAF fills a critical gap in the literature in the area of safety behaviors and anxiety. The SBAF is a broad measure of safety behaviors found in those suffering from social anxiety, PTSD, generalized anxiety, panic, obsessive-compulsive disorder, and health-related anxiety. This breadth in measurement holds several potential benefits. In clinical settings, patients often use different types of safety behaviors in various combinations (Salkovskis et al., 1996, 1999), and thus their patterns of safety behavior usage are more likely to be captured by a measure such as the SBAF. Further, the SBAF is ideally suited to match the recent proliferation of transdiagnostic treatment protocols and interventions (Barlow et al., 2011; Gros, 2014). The current research indicates that this new measure has strong psychometric properties and can be used with both clinical and nonclinical populations.

## References

- Abramowitz, J. S. (2013). The practice of exposure therapy: Relevance of cognitive-behavioral theory and extinction theory. *Behavior Therapy, 44*, 548–558.
- Alden, L. E., & Bieling, P. (1998). Interpersonal consequences of the pursuit of safety. *Behaviour Research and Therapy, 36*, 53–64.
- Barlow, D. H., Farchione, T. J., Fairholme, C. P., Ellard, K. K., Boisseau, C. L., Allen, L. B., & Ehrenreich-May, J. (2011). *The unified protocol for transdiagnostic treatment of emotional disorders: Client workbook*. New York: Oxford University Press.
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56*, 893–897.
- Beesdo-Baum, K., Jenjahn, E., Hofler, M., Lueken, U., Becker, E. S., & Hoyer, J. (2012). Avoidance, safety behavior, and reassurance seeking in generalized anxiety disorder. *Depression and Anxiety, 29*, 948–957.
- Blakey, S. M., & Deacon, J. B. (2015). If a safety aid is present, there must be danger: The paradoxical effects of hand sanitizer during a contamination exposure task. *Journal of Behavior Therapy and Experimental Psychiatry, 50*, 171–177.
- Borden, J. W., Clum, G. A., Broyles, S. E., & Watkins, P. L. (1988). Coping strategies and panic. *Journal of Anxiety Disorders, 2*, 339–352.
- Clark, D. M. (1999). Anxiety disorders: Why they persist and how to treat them. *Behaviour Research and Therapy, 37*, S5–S27.
- Clark, D. M., & Beck, A. T. (2010). *Cognitive therapy for anxiety disorders: Science and practice*. New York: Guilford Press.
- Clark, D. M., Wells, A., Hackmann, A., Butler, G., & Fennell, M. J. U. (1994). *Social behavior questionnaire* (Unpublished manuscript). Department of Psychiatry, University of Oxford, Warneford Hospital, Oxford, UK.
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation, 10*, 1–9.
- Cuming, S., Rapee, R. M., Kemp, N., Abbott, M. J., Peters, L., & Gaston, J. E. (2009). A self-report measure of subtle avoidance and safety behaviours relevant to social anxiety: Development and psychometric properties. *Journal of Anxiety Disorders, 23*, 879–883.
- Deacon, B., & Maack, D. J. (2008). The effects of safety behaviors on the fear of contamination: An experimental investigation. *Behavior Research and Therapy, 46*(4), 537–547.
- Dunmore, E., Clark, D. M., & Ehlers, A. (1999). Cognitive factors involved in the onset and maintenance of posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy, 37*, 809–829.
- Gros, D. F. (2014). Development and initial evaluation of transdiagnostic behavior therapy (TBT) for veterans with affective disorders. *Psychiatry Research, 220* (1-2), 275–285.
- Gros, D. F., Antony, M. M., Simms, L. J., & McCabe, R. E. (2007). Psychometric properties of the state-trait inventory for cognitive and somatic anxiety (STICSA): Comparison to the state-trait anxiety inventory (STAI). *Psychological Assessment, 19*, 369–381.
- Haynes, S. N., & Lench, H. C. (2003). Incremental validity of new clinical assessment measures. *Psychological Assessment, 15*, 456–466.

- Helbig-Lang, S., & Petermann, F. (2010). Tolerate or eliminate: A systematic review of the effects of safety behaviors across anxiety disorders. *Clinical Psychology: Science and Practice*, 17, 218–233.
- Helbig-Lang, S., Richter, J., Gerlach, A. L., Fehm, L., Strohle, A., Kircher, T., . . . Wittchen, H. U. (2014). The role of safety behaviors in exposure-based treatment for panic disorder and agoraphobia: Associations to symptom severity, treatment course, and outcome. *Journal of Anxiety Disorders*, 28(8), 836–844.
- Kamphuis, J. H., & Telch, M. J. (1998). Assessment of strategies to manage or avoid perceived threats among panic disorder patients: The Texas Safety Maneuver Scale (TSMS). *Clinical Psychology and Psychotherapy*, 5, 177–186.
- Kim, E.-J. (2005). The effect of decreased safety behaviors on anxiety and negative thoughts in social phobias. *Journal of Anxiety Disorders*, 19, 69–86.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16, 606–613.
- Lovibond, P. F., Mitchell, C. J., Minard, E., Brady, A., & Menzies, R. G. (2009). Safety behaviours preserve threat beliefs: Protection from extinction of human fear conditioning by an avoidance response. *Behaviour Research and Therapy*, 47, 716–72.
- Martell, C., Dimidjian, S., Herman-Dunn, R. (2013). *Behavioral activation for depression: A clinician's guide*, New York: Guilford Press.
- McManus, F., Sacadura, C., & Clark, D. M. (2008). Why social anxiety persists: An experimental investigation of the role of safety behaviors as a maintaining factor. *Behavior Therapy and Experimental Psychiatry*, 39(2) 147–161.
- Morgan, H., & Raffle, C. (1999). Does reducing safety behaviours improve treatment response in patients with social phobia? *Australian and New Zealand Journal of Psychiatry*, 33(4), 503–510.
- Olatunji, B. O., Etzel, E. N., Tomarken, A. J., Ciesielski, B. G., & Deacon, B. (2011). The effects of safety behaviors on health anxiety: An experimental investigation. *Behavior Research and Therapy*, 1–10.
- Pinto-Gouveia, J., Cunha, M. I., & Salvador, D. C. (2003). Assessment of social phobia by self-report questionnaires: The social interaction and performance anxiety and avoidance scale of the social phobia safety behaviors scale. *Behavioural and Cognitive Psychotherapy*, 31(3), 291–311.
- Rachman, S., Radosky, A., & Shafran, R. (2008). Safety behaviour: A reconsideration. *Behaviour Research and Therapy*, 46, 163–173.
- Radosky, A. S., Rachman, S., & Hammond, D. (2002). Panic termination and the post-panic period. *Journal of Anxiety Disorders*, 16, 97–111.
- Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: A cognitive account. *Behavioural Psychotherapy*, 19, 6–19.
- Salkovskis, P. M., Clark, D. M., & Gelder, G. M. (1996). Cognition-behaviour links in the persistence of panic. *Behaviour Research and Therapy*, 34 (5-6), 453–458.
- Salkovskis, P. M., Clark, D. M., Hackmann, A., Wells, A., & Gelder, M. G. (1999). An experimental investigation of the role of safety-seeking behaviours in the maintenance of panic disorder with agoraphobia. *Behaviour Research and Therapy*, 37, 559–574.
- Schmidt, N. B., Buckner, J. D., Pussner, A., Woolaway-Bickel, K., Preston, J., & Norr, A. (2012). Randomized controlled trial of false safety behavior elimination therapy: A unified cognitive behavioral treatment for anxiety psychopathology. *Behavior Therapy*, 43(3), 518–532.
- Sloan, T., & Telch, M. J. (2002). The effects of safety-seeking behavior and guided threat reappraisal on fear reduction during exposure: An experimental investigation. *Behaviour Research and Therapy*, 40, 235–251.
- Stangier, U., Heidenreich, T., & Schermelleh, K. (2006). Safety behaviors and social performance in patients with generalized social phobia. *Journal of cognitive Psychotherapy: An international Quarterly*, 29(1), 17–31.
- Sy, J. T., Dixon, L. J., Lickel, J. J., Nelson, E. A., & Deacon, B. J. (2011). Failure to replicate the deleterious effects of safety behaviors in exposure therapy. *Behaviour Research and Therapy*, 49(5), 305–314.
- Telch, M. J., & Lancaster, C. L. (2011). Exposure therapy: Rethinking the model-refining the method. In D. McKay, J. S. Abramowitz, & E. A. Storch (Eds.), *Handbook of obsessive-compulsive disorder across the life span* (1st ed.). New York: Wiley.

- Waller, G., & Marcoulides, O. K. (2013). Safety behaviors in eating disorders: Factor structure and clinical validation of the Brief Safety Behaviours Scale. *European Eating Disorders Review, 21*, 257–262.
- Weck, F., Neng, J. M., Richtberg, S., & Stangier, U. (2012). Dysfunctional beliefs about symptoms and illness in patients with hypochondriasis. *Psychosomatics, 53*, 148–154.
- Wells, A., Clark, D. M., Salkovskis, P., Ludgate, J., Hackmann, A., & Gelder M. (1995). Social phobia: The role of in-situation safety behaviors in maintaining anxiety and negative beliefs. *Behavior Therapy, 26*, 153–161.

## Appendix

### *SBAF*

Below is a list of behaviors that people sometimes use to make themselves feel more comfortable. For each behavior please pick the response that most accurately describes how often you engage in that behavior.

	Never	Sometimes	Often	Always
1. Scope places out before entering	0	1	2	3
2. Over-plan for everyday events	0	1	2	3
3. Call or contact loved ones to make sure they are ok	0	1	2	3
4. Sit with back to wall	0	1	2	3
5. Stay within certain distances from home (or other safe places)	0	1	2	3
6. Prepare things to say while others are talking	0	1	2	3
7. Rush through stores or go directly to desired items and leave as quickly as possible	0	1	2	3
8. Call doctors' offices (or health-lines) frequently	0	1	2	3
9. Check yard or the area around your home ("Perimeter Checks")	0	1	2	3
10. Talk through silences or talk so that silences do not occur	0	1	2	3
11. Check locks on doors or windows	0	1	2	3
12. Procrastinate before I start something or make a decision	0	1	2	3
13. Make up contingency plans in case someone is physically aggressive or there is some kind of emergency	0	1	2	3
14. Take it easy when I exercise (or do other activities that require physical exertion) so my heart rate does not get too high	0	1	2	3
15. Monitor others reactions to things I say	0	1	2	3
16. Stay on the outside of crowds and/or monitor for exits or escape routes	0	1	2	3
17. Be overly polite or agreeable	0	1	2	3
18. Attempt to hide anxiety (e.g., put hands in pocket because they are shaking)	0	1	2	3
19. Check my body for problems (pain, discomfort, symmetry, discoloration, new growth, etc.)	0	1	2	3
20. Carry a medication in case I need it	0	1	2	3
21. Research medical symptoms on the internet	0	1	2	3
22. Check my body temperature	0	1	2	3
23. Leave events or activities early	0	1	2	3
24. Make little eye contact	0	1	2	3
25. Respond to calls with text messages	0	1	2	3
26. Research things before I start or before making a decision	0	1	2	3
27. Monitor the clock	0	1	2	3
28. Try to do things perfectly	0	1	2	3
29. Plan and/or rehearse what I am going to say ahead of time	0	1	2	3

	Never	Sometimes	Often	Always
30. Walk slowly to let someone pass who is close behind	0	1	2	3
31. Make myself look busy while at work or when out in public so that others do not talk to me	0	1	2	3
32. Cut conversations short	0	1	2	3
33. Monitor what I say in conversations	0	1	2	3
34. Watch others for signs of danger	0	1	2	3
35. Ask others for reassurance (e.g., about a decision or worry)	0	1	2	3
36. Check my pulse or heart rate	0	1	2	3
37. Talk to others about my health or health-related activities	0	1	2	3
38. Pay attention to body for physical symptoms or sensations	0	1	2	3
39. Check that I can swallow without choking	0	1	2	3
40. Pretend I do not see or recognize someone so that I do not have to speak with them	0	1	2	3
41. Request specialized medical exams from providers	0	1	2	3

**Subscales:**

1. Vigilance: Items 1, 4, 9, 11, 13, 16, and 34
2. Health: Items 8, 19, 22, 36, 37, 38, 39, and 41
3. Social: Items 6, 18, 23, 30, 31, 32, and 40