

A Confirmatory Approach to the Factor Structure of the Boredom Proneness Scale: Evidence for a Two-Factor Short Form

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We analyzed previous exploratory factor analytic structures on the Boredom Proneness Scale (BPS; Farmer & Sundberg, 1986) using confirmatory factor analysis in structural equation modeling in LISREL 8 (Jöreskog & Sörbom, 1993). These analyses indicated that 2 factors were generally consistent across 6 exploratory models. Items that had significant loadings on these two factors ($N = 12$; 6 for each factor) indicated a lack of Internal Stimulation and External Stimulation. In further analysis on these 12 items using LISREL, we found a much improved fit and provided support for a short form version of the original BPS. We also found the shortened version to be invariant across gender. We discuss implications for the more precise measurement of boredom proneness and the use of the scale in applied settings.

The assessment of boredom has been comparatively neglected in the psychological literature. For instance, it has been common to assume that individuals experience boredom in the performance of repetitive or monotonous activities (e.g., O'Hanlon, 1981) or to assess boredom with single-item measures (e.g., Larson & Richards, 1991; Shaw, Caldwell, & Kleiber, 1996). The former approach does not consider individual, subjective reactions to potentially boring stimuli that has been advocated by many researchers (e.g., DeChenne & Moody, 1988; Geiwitz, 1966; Hill & Perkins, 1985; Mikulas & Vodanovich, 1993), whereas the use of single-item devices lack sufficient reliability and validity.

The only complete measure available to assess an individual's propensity to be bored is the Boredom Proneness Scale (BPS; Farmer & Sundberg, 1986). The widely used Boredom Susceptibility Scale is a subscale of the Sensation Seeking Scale that primarily focuses on boredom due to perceived monotony or lack of variety (see Zuckerman, 1979). Other instruments exist that appraise specific types of boredom.

That is, two scales have been developed that measure leisure/free-time boredom (Iso-Ahola & Weissinger, 1990; Ragheb & Merydith, 2001), another measures boredom with regard to sexual matters (Watt & Ewing, 1996), two scales assess job-related boredom (Grubb, 1975; Lee, 1986), and one instrument has been designed to evaluate how people cope with boredom (Hamilton, Haier, & Buchsbaum, 1984).

The internal consistency of the original true-false form of the BPS has ranged from .72 to .79 (e.g., Ahmed, 1990; Blunt & Pychyl, 1998; Gana & Akremi, 1998; Farmer & Sundberg, 1986), and the 7-point format has yielded coefficient alphas from .79 to .84 across numerous studies (e.g., Harris, 2000; Kass & Vodanovich, 1990; Seib & Vodanovich, 1998; Vodanovich & Kass, 1990b; Vodanovich, Verner, & Gilbride, 1991; Watt & Vodanovich, 1992a; Wink & Donahue, 1997).

The validity of the BPS has been established by significant relationships with a host of constructs measuring negative affect (e.g., Blaszczyński, McConaghy, & Frankova,

1990; Sommers & Vodanovich, 2000; Vodanovich et al., 1991; Watt & Ewing, 1996), anger and aggression (Dahlen, Martin, Ragan, & Kuhlman, 2004; Rupp & Vodanovich, 1997), poor impulse control (Leong & Schneller, 1993; Watt & Vodanovich, 1992b), procrastination (e.g., Blunt & Pychyl, 1998; Vodanovich & Rupp, 1999), cognitive/attentional shortcomings (e.g., Gordon, Wilkinson, McGown, & Jovanoska, 1997; Polly, Vodanovich, Watt, & Blanchard, 1993; Wallace, Kass, & Stanny, 2002; Wallace, Vodanovich, & Restino, 2003), narcissism (Wink & Donahue, 1997), and indicators of poor work performance (e.g., Kass, Vodanovich, & Callander, 2001; Kass, Vodanovich, Stanny, & Taylor, 2001; Sawin & Scerbo, 1995). A detailed account of the psychometric properties of the BPS can be found in a recent review article by Vodanovich (2003).

Researchers have suggested that information on boredom proneness could be useful in a variety of applied settings. Indeed, Vodanovich and Kass (1990b) discussed how the differentiation between boredom proneness subscores (dimensions) could be beneficial in the assessment of boredom. That is, Vodanovich and Kass stressed that "one individual's boredom may be associated with a deficiency in generating internal stimulation, whereas the lack of external stimulation (perceived or real) may be responsible for the other person's boredom" (p. 118–120). For instance, Schubert (1978) suggested that the identification of those who are boredom prone could aid in the choice of coping strategies best suited for such individuals (e.g., providing opportunities for creativity). DeChenne and Moody (1988) discussed how therapeutic interventions for boredom ought to be focused on the specific reasons (e.g., deficits) that account for one's boredom. Despite appeals for boredom scores to be used for clinical purposes, the primary utility of the BPS is as a research tool that may be shown to have clinical applications.

A shortcoming of the BPS is the lack of consensus regarding the number and type of factors that may comprise the instrument. Having agreement on this issue is particularly important because the use of BPS subscales could allow a more detailed assessment of boredom. For instance, Vodanovich and Kass (1990b) stated that the use of BPS subscale scores "would allow a more precise assessment of the construct since the contribution of each factor to the overall BP score could be investigated" (p. 118). To date, five studies have performed factor analyses on BPS scores (Ahmed, 1990; Gana & Akremi, 1998; Gordon et al., 1997; Vodanovich & Kass, 1990b; Vodanovich, Watt, & Piotrowski, 1997). These investigations have identified different factors that comprise the BPS, with the existence of two to five factors generally being reported.

Two factor analytic studies of the BPS were conducted in 1990. Ahmed (1990) surveyed university students in Canada ($N = 154$) and found support for two factors using the true-false format of the scale. One of these was labeled as Apathy because it was thought to indicate "a lack of interest

in the environment" (Ahmed, 1990, p. 964). The other factor was considered to represent "the subject's capacity to concentrate and attend" (Ahmed, 1990, p. 964) and was named Inattention. Vodanovich and Kass (1990b) administered the 7-point Likert format of the BPS to a sample of primarily White college students in the United States ($N = 385$). Vodanovich and Kass (1990b) concluded that the BPS contained five factors that were labeled as a) External Stimulation, b) Internal Stimulation, c) Affective Responses, d) Perception of Time, and e) Constraint.

Gana and Akremi (1998) constructed a French version the BPS and administered the scale to college students and elderly individuals ($N = 270$). Using a true-false response format, their results provide support for two categories of items that they labeled as Internal and External Stimulation. Vodanovich et al. (1997) gave the 7-point Likert version of the BPS to a sample of United States African American college students, and their factor analysis indicated the presence of eight factors. However, in comparing their results to the five factors found by Vodanovich and Kass (1990b), Vodanovich et al. (1997) considered their "additional" factors to be subsets of Vodanovich and Kass's (1990b) Internal and External Stimulation subscales. Three of these additional factors possessed only two items, thus casting some doubt on the meaningfulness of these dimensions. Specifically, the factors were labeled a) Internal Stimulation–Creativity, b) External Stimulation–Monotony, c) Constraint, d) Affect, e) Patience, f) Internal Stimulation–Attention Maintenance, g) External Stimulation–Challenge, and h) Perception of Time.

Finally, Gordon et al. (1997) performed a factor analysis on data gathered from 345 undergraduates and workers in Australia. Using a 7-point scale, Gordon et al. imposed a five-factor solution on their data and concluded that "the PAF 5 solution ... provides partial support for the structure indicated by Vodanovich and Kass" (p. 88). Gordon et al.'s two factors named as Low Self-Regulation and Needs A Buzz were thought to be comparable to Vodanovich and Kass's (1990b) Internal and External Stimulation factors. However, Gordon et al.'s Self-Regulation factor contained four items that were in the original Perception of Time factor found by Vodanovich and Kass. Also, this factor did not contain three items in Vodanovich and Kass's Internal Stimulation factor that measure creative tendencies. Another factor found by Gordon et al. was labeled as Restless in Restraint and was considered to be similar to Vodanovich and Kass's Constraint factor. Two other factors found by Gordon et al. were referred to as Lack of Creativity and Inattention.

One common theme across these factor analytic studies is the existence of two overall factors; one indicating boredom due to one's inability to generate interesting activities (e.g., internal stimulation) and the perception of low environmental stimulation (e.g., external stimulation). Evidence for an Internal Stimulation factor has been found in three studies (Gana & Akremi, 1998; Vodanovich & Kass, 1990b; Vodanovich et al., 1997), whereas conceptually similar fac-

tors (Low Self-Regulation and Inattention) were reported by Gordon et al. (1997) and Ahmed (1990), respectively.

Gana and Akremi (1998), Vodanovich and Kass (1990b), and Vodanovich et al. (1997) have all found a factor that was named External Stimulation. Also, the Apathy factor found by Ahmed (1990) and the Needs a Buzz cluster suggested by Gordon et al. (1997) reflect insufficient external stimulation. Finally, eigenvalues for the factors reflecting internal and external stimulation were substantially larger than all other factors that have been found in previous research.

A limitation of these factor analytic investigations is that they have differed on many crucial variables, thereby making comparisons of their results problematic. For instance, the true-false version of the BPS has been employed in some studies (Ahmed, 1990; Gana & Akremi, 1998), whereas other researchers have used the 7-point format (e.g., Vodanovich & Kass, 1990b; Gordon et al., 1997). The studies have also differed in their use of statistics and/or statistical criteria. For instance, varying factor analytic rotations have been conducted in the research. Specifically, an oblique rotation was used by Gana and Akremi, a varimax rotation was performed by Gordon et al. and Vodanovich and Kass, and unrotated findings were offered by Ahmed. The criteria for including an item into a given factor has been .40 in some studies (e.g., Vodanovich & Kass, 1990b) and .30 in other investigations (e.g., Ahmed, 1990; Gordon et al., 1997). Finally, the research has varied in the type and size of the samples employed. For instance, the sample sizes have ranged from a low of 154 Canadian students (Ahmed, 1990) to a high of 385 mostly White, American undergraduates (Vodanovich & Kass, 1990b).

Consequently, the purpose of this research was to perform a large scale confirmatory factor analysis to assess the fit of all previously developed factor structures using structural equation modeling and revise the scale as necessary. We did not anticipate finding a suitable fit with any factor structure due to the differing methods that were utilized in previous research. On the other hand, we did expect to find a more parsimonious factor structure using structural modeling with the aid of findings from past studies and fit indexes. In other words, we expected to find a solution that best captured boredom proneness by identifying two generalizable factors of internal and external stimulation, which have been proposed and reported by many researchers to best represent the composition of the BPS (e.g., Ahmed, 1990; Gana & Akremi, 1998; Gordon et al., 1997). Indeed, Gordon et al. (1997) concluded that "the underlying structure of the BPS was best tapped by two factors: Needs a Buzz and Low Self Regulation" (p. 94).

The second purpose of this study was to assess the measurement equivalence of the final and accepted factor structure of the BPS found in Study 1. Measurement equivalence allows researchers to determine if items in a survey mean the same thing to members in different groups (Cheung & Rensvold, 2002). Prior research on the BPS has assumed that

different groups (e.g., men, women) interpret and respond in the same fashion. However, empirical support on this issue has been lacking. Thus, testing the measurement equivalence of the BPS would add support regarding the meaningfulness of such differences. We expected the structure of the instrument to be invariant for both women and men.

STUDY 1

Method

Participants and procedure. The sample contained 787 adults employed in a variety of occupations (e.g., office work, labor, real estate, finance, self-employed). Each participant completed the BPS. Of the sample, 54% were men with a mean age of 28.5 years ($SD = 3.1$) and had a racial breakdown of White = 91%, Black = 6%, Hispanic = 2%, and other or nondisclosed = 1%. All participants completed the BPS online at a secure Web site. Participants were recruited from a standing panel of participants that has been developed to aid behavioral researchers in collecting large amounts of survey data (for more information, see <http://istprojects.syr.edu/~studyresponse/studyresponse/index.htm>). Similar approaches to data collection (e.g., mass mailings) typically yield poor return rates (< 20%). We recruited 1,000 participants using email¹ with the assistance of panel administrators and obtained useable data from 787, which gave us a return rate of 78.7%. We feel that this method of data collection provided us an acceptable and representative sample. Moreover, recent research has demonstrated that collecting data online yields comparable results to traditional methods such as paper and pencil forms (e.g., Krantz & Dala, 2000). In addition, such methods allow for a larger number of participants, which helps identify a more stable model (Guadagnoli & Velicer, 1988).

Several a priori criteria must be met to establish the best fitting model. We elected to follow the recommendations of Hu and Bentler (1999) in which they proposed a combination of fit indexes based on simulation methods that yielded the most stable models. First, the comparative fit index (CFI) must meet or exceed .95 or the root mean square error of approximation (RMSEA) is below .06 and the standard root mean square residual (SRMR) is less than .08. In addition to these criteria, the expected cross-validation index (ECVI) for nonnested models was assessed to determine which model had the best chance of replication in new samples (i.e., lower scores represent best chance of replication). We also report more traditional fit indexes: goodness-of-fit index (GFI), adjusted GFI (AGFI), and the parsimony GFI (PGFI). All struc-

¹Participants all received a generic email from Studyresponse.com administrators asking them to participate in a short survey. A link to our survey was contained within the recruitment email.

tural equation analyses were based on the variance-covariance matrix that was calculated using PRELIS 2 (Jöreskog & Sörbom, 1993).

Measure. The BPS consists of 28 items (e.g., “It takes a lot of change and variety to keep me really happy,” “I am good at waiting patiently”) that were originally designed to be answered using a true–false format. However, other researchers have employed a 7-point modification of the instrument ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) to help increase the sensitivity of measurement, which was the version used in this investigation. The range of BPS scores was from 28 to 196, with a high score being indicative of greater boredom proneness.

Results

We analyzed all previously described factor analytic structures (see Appendix for all loading patterns) using structural equation modeling in LISREL 8. As expected, resulting fit indexes were not acceptable and are reported in Table 1. As mentioned previously, the lack of fit for all models is most likely due to certain BPS items being “noise” and subsequently being loosely interpreted in previous exploratory factor analytic studies. In other words, we believe that due to the differing methods employed in previous studies combined with the inadequacy of certain items for capturing boredom proneness and the two primary and theoretically driven factors, the measure could be improved by removing certain items from the original BPS. In the following, we describe the process we took to reduce the number of items and gain an acceptable fit for the revised factor structure for the BPS.

Although confirmatory factor analysis is primarily designed to “confirm” previous findings, it also allows researchers to explore data using the confirmatory factor analytic model with aid of theory, modification indexes, and the pattern and significance of factor loadings. Based on prior research, we anticipated finding two factors related to internal and external boredom proneness. We inspected the modification indexes associated with previous factor ana-

lytic models examining items that greatly reduced the fit of the models. Doing so allowed us to identify, with an iterative process, items possessing nonsignificant loadings or ones that modification indexes identified as having loadings on multiple factors. This approach identified a more parsimonious two-factor structure. Interestingly, this structure appeared to be represented across the six exploratory models (i.e., the two dominant factors related to a lack of internal and external stimulation). These two factors, as represented by BPS items, are referred to as a lack of internal stimulation and a lack of external stimulation. The additional factors found in previous factor analytic studies beyond ones measuring internal and external stimulation were not confirmed in our analysis (i.e., nonsignificant item loadings, cross-loadings). Thus, we removed items that were not logically related to one of these two factors as well as those questions having nonsignificant factor loadings. In essence, we revised the scale to arrive at a more parsimonious instrument that only contained items that directly assessed either a lack of internal stimulation or a lack of external stimulation. This process left us with a shortened scale of 12 items, 6 for each factor. Often 6 items per subscale have been found to result in reliable and useful measures. Indeed, Hinkin (1998) recommended that measures should be developed with 4 to 6 good items per factor. In addition, many psychometrically sound subscales within larger measures have been shown to possess 6 items or less such as the Organizational Commitment Scale (Caldwell, O'Reilly, & Chatman, 1990), the Cognitive Failures Questionnaire (Wallace et al., 2002), the Symptom Checklist–90–Revised (Derogatis, 1994), and several subscales within the Minnesota Multiphasic Personality Inventory–2 (Butcher & Williams, 2000).

We tested the two-factor model (six items per factor) with LISREL and found the fit to be much improved: $\chi^2(53, N = 787) = 220.39$; CFI = .92; RMSEA = .05; SRMR = .05; ECVI = .34; GFI = .94; AGFI = .92; PGFI = .90. The model met the criteria of Hu and Bentler (1999) by having an RMSEA less than .06 and an SRMR less than .08. Although the CFI was not at or above .95, traditional rules of thumb suggest that a CFI greater than .90 is acceptable (e.g., Jöreskog & Sörbom, 1993; Mulaik

TABLE 1
Goodness-of-Fit Summary for Previous Exploratory Factor Analytic Models

Measurement Model	χ^2	df	RMSEA	SRMR	CFI	ECVI	GFI	AGFI	PGFI
Ahmed (1990; two factors; true–false version)	3,238.19	322	.11	.11	.66	4.26	.71	.70	.70
Gana & Akremi (1998; two factors; true–false version)	3,617.14	298	.12	.10	.64	4.73	.75	.68	.67
Gordon, Wilkinson, McGown, & Jovanoska (1997; four factors; 7-point Likert scale)	2,727.49	292	.10	.09	.73	3.62	.73	.67	.65
Vodanovich & Kass (1990b; five factors; 7-point Likert scale)	2,293.53	314	.09	.09	.77	3.08	.85	.81	.80
Gordon et al. (1997; five factors; 7-point Likert scale)	3,335.15	340	.11	.09	.70	4.41	.85	.84	.72
Vodanovich, Watt, & Piotrowski (1997; eight factors; 7-point Likert scale)	1,399.87	247	.08	.08	.82	1.98	.84	.83	.81

Note. RMSEA = root mean square error of approximation; SRMR = standard root mean square residual; CFI = comparative fit index; ECVI = expected cross-validation index; GFI = goodness-of-fit index; AGFI = adjusted GFI; PGFI = parsimony GFI.

TABLE 2
Boredom Proneness Scale–Short Form

<i>Standardized Loadings and Phi Coefficient</i>	<i>Internal</i>	<i>External</i>
1. It is easy for me to concentrate on my activities	.54	
8. I find it easy to entertain myself	.68	
11. I get a kick out of most things I do	.65	
13. In any situation I can usually find something to do or see to keep me interested	.82	
22. Many people would say that I am a creative or imaginative person	.51	
24. Among my friends, I am the one who keeps doing something the longest	.51	
6. Having to look at someone's home movies or travel slides bores me tremendously		.50
9. Many things I have to do are repetitive and monotonous		.50
19. It would be very hard for me to find a job that is exciting enough		.67
25. Unless I am doing something exciting, even dangerous, I feel half-dead and dull		.59
27. It seems that the same old things are on television or the movies all the time; it's getting old		.57
28. When I was young, I was often in monotonous and tiresome situations		.61
Phi coefficient		
1. Internal	—	
2. External	.38	—

Note. The Phi coefficient is used in structural equation modeling to indicate the relationship between latent variables (Jöreskog & Sörbom, 1993).

et al., 1989). In addition, each item loading was significant and greater than .50, and the internal consistency of each subscale also proved to be acceptable: Internal Stimulation = .86, External Stimulation = .89 (see Table 2). Finally, the model appeared to yield the best fit by meeting our a priori criteria and representing the two subscales of boredom proneness that have been found in many previous factor analytic studies. Thus, we accepted this revised model and subsequently named this version the BPS–Short Form (BPS–SF). Although we did obtain a confirmatory model that met our a priori criteria, we arrived at such a model using confirmatory factor analysis in a developmental fashion, which might allow for some of the same issues we fault previous factor analytic studies falling victim to. However, in Study 2, we retested this factor structure in hopes of actually confirming this more parsimonious structure.

STUDY 2

We designed Study 2 to assess the measurement equivalence of the BPS–SF. To assess measurement equivalence, we tested three levels of invariance: configural, metric, and scalar (Steenkamp & Baumgartner, 1998; Vandenberg & Lance, 2000). *Configural* invariance is a test of weak factorial

invariance in which the same pattern of fixed and free factor loadings are significant across groups (Vandenberg, 2002). Configural invariance must be met for subsequent tests (i.e., metric, scalar invariance) to be meaningful. *Metric* invariance postulates that all factor loadings are equal across groups (Cheung & Rensvold, 2002). If an item or items “satisfies the requirement of metric invariance, difference scores on an item can be meaningfully compared across countries [groups] and these observed item differences are indicative of similar cross-national [group] differences in the underlying construct” (Steenkamp & Baumgartner, 1998, p. 80). In essence, the item(s) measure the latent variable on the same metric. In many research settings, it is quite important to conduct mean comparisons across groups. *Scalar* invariance postulates that all item intercepts are the same across groups. To meaningfully compare groups and avoid biases that might be present even when satisfying metric invariance, scalar invariance is needed. “Scalar invariance implies that cross-national [group] differences in the means of the observed items are due to differences in the means of the underlying construct(s)” (Steenkamp & Baumgartner, 1998, p. 80). If scalar invariance is met, then group means can be meaningfully compared across groups. We believed that the BPS–SF will be invariant between genders.

Method

Participants, procedure, and measure. A sample of 432 skilled and unskilled laborers (e.g., plumbers, electricians, machine operators, general laborers) working for a large university in the Southeastern United States were asked to participate in Study 2. Within this sample, 300 participated in the study, of which 280 provided usable data. The remaining 132 did not participate due to logistical issues (i.e., part-time workers; their work schedule did not allow them to participate). The mean age of the sample was 26.2 years ($SD = 2.8$) and consisted of 154 women. The racial breakdown was White = 94%, Black = 4%, Hispanic = 1%, and 1% other or nondisclosed. All data were collected online in a single session. Instead of relying on a Web-based panel of participants, we collected data from a single employee sample. Participants were asked to complete the BPS–SF at one of several computer terminals located at the facility in which they worked. All data were transmitted to a secure server for which only we had access. These employees possessed knowledge of computers, as they were used regularly in their daily work. The BPS–SF that was identified in Study 1 was the only measure used in Study 2.

Results

To assess the invariance of the BPS–SF across gender, we again employed structural equation modeling and confirmatory factor analysis. Following the guidelines suggested by Vandenberg and Lance (2000) and Steenkamp and

Baumgartner (1998), we first tested configural invariance. The fit of the configural model was satisfactory: $\chi^2(106, N = 280) = 134.45$; CFI = .96; RMSEA = .04; SRMR = .05; GFI = .96; AGFI = .93; PGFI = .92. All factor loadings were significant for both groups. Thus, the BPS-SF was configurally invariant across these two samples. In addition, in this factor analysis, we essentially have retested the fit of the two-factor model identified in Study 1 and provides a nice replication of fit for this model.

Metric invariance was tested by constraining the factor loadings to be equal across samples. To assess metric invariance, one can rely on fit statistics as well as chi-square difference tests. The more constrained metrically invariant model fit the data well: $\chi^2(116, N = 280) = 145.80$; CFI = .96; RMSEA = .04; SRMR = .06; GFI = .94; AGFI = .93; PGFI = .93. In addition, the change in chi-square was nonsignificant: $\Delta\chi^2(10, N = 280) = 11.35$. These results suggest that metric invariance has been satisfied.

When imposing scalar invariance on the model, the model fit the data well: $\chi^2(126, N = 280) = 164.55$; CFI = .94; RMSEA = .05; SRMR = .06; GFI = .92; AGFI = .90; PGFI = .89. The change in chi-square was $\Delta\chi^2(10, N = 280) = 18.75$, which just missed the significant cutoff for chi-square with 10 degrees of freedom (i.e., 18.31). We could have continued to assess partial scalar invariance, but by following the recommendation of Steenkamp and Baumgartner (1998), we retained the full scalar invariant model because the fit indexes suggest that this model fits the data quite well. In addition, the change in model fit barely reached significance. Thus, these results suggest that the BPS-SF is scalar invariant for men and women, and latent mean differences can be meaningfully compared across groups.

After supporting the measurement invariance of the BPS-SF, we decided to test for gender differences using an analysis of variance. Prior research on the BPS has indicated that men often possess significantly greater overall scores than women (e.g., Polly et al., 1993; Sundberg, Latkin, Farmer, & Saoud, 1991; Tolor, 1989). In addition, males have been shown to have significantly higher scores on the BPS subscale of External Stimulation (e.g., McLeod & Vodanovich, 1991; Vodanovich & Kass, 1990a; Watt & Vodanovich, 1999). In this study, the 7-point scale equivalent means for men was significantly higher for both External ($M = 5.14$, $SD = .99$), $F(1, 278) = 4.59$, $p < .05$, Cohen's $d = .26$ and Internal ($M = 3.79$, $SD = 1.06$), $F(1, 278) = 4.18$, $p < .05$, Cohen's $d = .25$ subscales compared to women (External $M = 4.88$, $SD = .98$; Internal $M = 3.54$, $SD = .95$).

DISCUSSION

The results of this study add clarity to the dimensionality of the BPS by providing empirical evidence that the BPS may be best considered as possessing two general factors (i.e., Ex-

ternal Stimulation, and Internal Stimulation) that are invariant across gender. Specifically, the BPS items on the External Stimulation subscale reflect a need for variety and change, whereas the Internal Stimulation subscale refers to a perceived inability to generate sufficient stimulation for oneself. These findings generally confirm the factor analytic results from previous studies that have found the strongest support (e.g., percent of variance accounted for, largest eigenvalues) for two BPS factors that are conceptually similar to the Internal Stimulation and External Stimulation dimensions we found here.

The 12-item version of the BPS-SF resulting from this research may offer a concise (i.e., short-form) alternative to the original scale. Despite its shortened length, such a scale would yield data on what are arguably the two most fundamental and robust facets of boredom proneness. The use of a BPS-SF results in a loss of information that may possibly be gleaned from additional boredom proneness dimensions. However, such additional factors have often been found to be of unsatisfactory reliability (e.g., Gordon et al., 1997; Vodanovich and Kass, 1990b), thereby limiting their utility.

Differences in scores on the Internal Stimulation and External Stimulation subscales may reflect distinct reasons for the occurrence of boredom and guide intervention strategies. It would appear that information on such broad differences would be useful in many settings such as counseling, education, and organizational applications. In addition, the measure is invariant across gender, which would allow both researchers and practitioners to assess men and women equally. Although men had significantly greater scale-equivalent means on the BPS-SF subscales, these differences were relatively small. That is, for the External Stimulation subscale, the difference was .26, and for Internal Stimulation, the mean difference was .25. Consequently, although significant, the practical utility of these subscale differences are questionable.

One benefit of this research is the assessment of the goodness of fit of the BPS factor structure based on findings from several previous studies. The results from this procedure provide the basis for the subsequent two-factor model that was found. It is important to note that this model was comprised of data from a large sample of participants ($N = 787$). This number exceeds the recommendation of Nunnally (1978) that factor analysis studies ought to possess a minimum of 10 people per item to place confidence in one's results (e.g., not due to chance). Also, our samples consisted of employed adults, which extends the generalizability of past factor analytic studies of the BPS that primarily collected data from college students.

Although we found (in Study 1) and confirmed a two-factor model (in Study 2), it would be useful for future research to assess the stability and validity of the two-factor BPS-SF across additional samples. This would increase one's knowledge of the generalizability of the measure and allow meaningful comparisons of demographic differences

on the construct (e.g., age, culture). In particular, research focused on the criterion-related validity of the scale would be especially constructive. For instance, assessing the validity of the BPS-SF by going beyond the collection of self-report, paper-and-pencil data (e.g., information indicative of educational achievement, work performance) would be beneficial.

CONCLUSIONS

It appears that the BPS-SF consists of two distinct factors that signify the perceived lack of internal and external stimulation. However, further research is needed to assess the merits of this factor structure across diverse samples. In addition, the results of this investigation provide a short-form alternative to the original BPS (BPS-SF) that appears to be invariant with regard to gender. Although these results are promising, further research is required to ascertain if the BPS-SF possesses satisfactory reliability and validity to warrant its use as a short-form option to the BPS.

It is our hope that this research will encourage researchers to pursue such investigations.

REFERENCES

- Ahmed, S. M. S. (1990). Psychometric properties of the Boredom Proneness Scale. *Perceptual and Motor Skills*, 71, 963-966.
- Blaszczynski, A., McConaghy, N., & Frankova, A. (1990). Boredom proneness in pathological gambling. *Psychological Reports*, 67, 35-42.
- Blunt, A., & Pychyl, T. A. (1998). Volitional action and inaction in the lives of undergraduate students: State orientation, procrastination, and proneness to boredom. *Personality and Individual Differences*, 24, 837-846.
- Butcher, J. N., & Williams, C. L. (2000). *Essentials of MMPI-2 and MMPI-A interpretation*. Minneapolis: University of Minnesota Press.
- Caldwell, D. F., O'Reilly, C. A., & Chatman, J. (1990). Building organizational commitment: A multi-firm study. *Journal of Occupational Psychology*, 63, 245-261.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement equivalence. *Structural Equation Modeling*, 9, 233-255.
- Dahlen, E. R., Martin, R. C., Ragan, K., & Kuhlman, M. M. (2004). Boredom proneness in anger and aggression: Effects of impulsiveness and sensation seeking. *Personality and Individual Differences*, 37, 341-348.
- DeChenne, T. K., & Moody, A. J. (1988). Boredom: Theory and therapy. *The Psychotherapy Patient*, 3, 17-29.
- Derogatis, L. R. (1994). *Symptom Checklist-90-R: Administration, scoring, and procedures manual*. Minneapolis, MN: National Computer Systems, Inc.
- Farmer, R., & Sundberg, N. D. (1986). Boredom proneness: The development and correlates of a new scale. *Journal of Personality Assessment*, 50, 4-17.
- Gana, K., & Akremi, M. (1998). French adaptation and validation of the Boredom Proneness Scale (BP). *Annae Psychologique*, 98, 429-450.
- Geiwitz, P. (1966). Structure of boredom. *Journal of Personality and Social Psychology*, 3, 592-600.
- Gordon, A., Wilkinson, R., McGown, A., & Jovanoska, S. (1997). The psychometric properties of the Boredom Proneness Scale: An examination of its validity. *Psychological Studies*, 42, 85-97.
- Grubb, E. A. (1975). Assembly line boredom and individual differences in recreational participation. *Journal of Leisure Research*, 7, 256-269.
- Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to the stability of component factors. *Psychological Bulletin*, 103, 265-275.
- Hamilton, J. A., Haier, R. J., & Buchsbaum, M. S. (1984). Intrinsic enjoyment and boredom coping scales: Validation with personality, evoked potential, and attention measures. *Personality and Individual Differences*, 5, 183-193.
- Harris, M. B. (2000). Correlates and characteristics of boredom proneness and boredom. *Journal of Applied Social Psychology*, 30, 576-598.
- Hill, A. B., & Perkins, R. E. (1985). Towards a model of boredom. *British Journal of Psychology*, 76, 235-240.
- Hinkin, T. R. (1998). A brief tutorial on measures for use in survey questionnaires. *Organizational Research Methods*, 1, 104-121.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55.
- Iso-Ahola, S. E., & Weissinger, E. (1990). Perceptions of boredom in leisure: Conceptualization reliability, and validity of the Leisure Boredom Scale. *Journal of Leisure Research*, 22, 1-17.
- Jöreskog, K., & Sörbom, D. (1993). LISREL 8: Structural equation modeling with the SIMPLIS command language. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Kass, S. J., & Vodanovich, S. J. (1990). Boredom proneness: Its relationship to Type A behavior pattern and sensation seeking. *Psychology: A Journal of Human Behavior*, 27, 7-16.
- Kass, S. J., Vodanovich, S. J., & Callander, A. (2001). State-trait boredom: The relationship to absenteeism, tenure and job satisfaction. *Journal of Business and Psychology*, 16, 317-327.
- Kass, S. J., Vodanovich, S. J., Stanny, C., & Taylor, T. (2001). Watching the clock: Boredom and vigilance performance. *Perceptual and Motor Skills*, 92, 969-976.
- Krantz, J. H., & Dalal, R. (2000). Validity of web-based psychological research. In M. Birnbaum (Ed.), *Psychological experiments on the internet* (pp. 35-60). San Diego: Academic.
- Larson, R. W., & Richards, M. H. (1991). Boredom in the middle school years: Blaming schools versus blaming students. *American Journal of Education*, 99, 418-443.
- Lee, T. W. (1986). Toward the development and validation of a measure of job boredom. *Manhattan College Journal of Business*, 15, 22-28.
- Leong, F. T., & Schneller, G. R. (1993). Boredom proneness: Temperamental and cognitive components. *Personality and Individual Differences*, 14, 233-239.
- McLeod, C. R., & Vodanovich, S. J. (1991). The relationship between self-actualization and boredom proneness. *Journal of Social Behavior and Personality*, 6, 137-146.
- Mikulas, W., & Vodanovich, S. (1993). The essence of boredom. *The Psychological Record*, 43, 3-12.
- Mulaik, S. A., James, L. R., Alstine, J. V., Bennett, N., Lind, S., & Stilwell, C. D. (1989). Evaluation of goodness-of-fit indices for structural equation modeling. *Psychology Bulletin*, 105, 430-445.
- Nunnally, J. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- O'Hanlon, J. F. (1981). Boredom: Practical consequences of a theory. *Acta Psychologica*, 49, 53-82.
- Polly, L. M., Vodanovich, S. J., Watt, J. D., & Blanchard, M. J. (1993). The effects of attributional processes on boredom proneness. *Journal of Social Behavior and Personality*, 8, 123-132.
- Ragheb, M. G., & Merydith, S. P. (2001). Development and validation of a unidimensional scale measuring free time boredom. *Leisure Studies*, 20, 41-59.
- Rupp, D. E., & Vodanovich, S. J. (1997). The role of boredom proneness in self-reported anger and aggression. *Journal of Social Behavior and Personality*, 12, 925-936.
- Sawin, D. A., & Scerbo, M. W. (1995). Effects of instruction type and boredom proneness in vigilance: Implications for boredom and workload. *Human Factors*, 37, 752-765.

- Schubert, D. S. (1978). Creativity and coping with boredom. *Psychiatric Annals*, 8, 46–54.
- Seib, H. M., & Vodanovich, S. J. (1998). Cognitive correlates of boredom proneness: The role of private self-consciousness and absorption. *Journal of Psychology*, 132, 642–652.
- Shaw, S. M., Caldwell, L. L., & Kleiber, D. A. (1996). Boredom, stress and social control in the daily activities of adolescents. *Journal of Leisure Research*, 28, 274–292.
- Sommers, J., & Vodanovich, S. J. (2000). Boredom proneness: Its relationship to psychological and physical health symptoms. *Journal of Clinical Psychology*, 56, 149–155.
- Steenkamp, J. E. M., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research*, 25, 78–90.
- Sundberg, N. D., Latkin, C. A., Farmer, R. F., & Saoud, J. (1991). Boredom in young adults: Gender and cultural comparisons. *Journal of Cross-cultural Psychology*, 22, 209–223.
- Tolor, A. (1989). Boredom as related to alienation, assertiveness, internal-external expectancy, and sleep patterns. *Journal of Clinical Psychology*, 45, 260–265.
- Vandenberg, R. J. (2002). Toward a further understanding of an improvement in measurement invariance methods and procedures. *Organizational Research Methods*, 5, 139–158.
- Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3, 4–69.
- Vodanovich, S. J. (2003). Psychometric measures of boredom: A review of the literature. *Journal of Psychology*, 137, 569–593.
- Vodanovich, S. J., & Kass, S. J. (1990a). Age and gender differences in boredom proneness. *Journal of Social Behavior and Personality*, 5, 297–307.
- Vodanovich, S. J., & Kass, S. J. (1990b). A factor analytic study of the Boredom Proneness Scale. *Journal of Personality Assessment*, 55, 115–123.
- Vodanovich, S. J., & Rupp, D. E. (1999). Are procrastinators prone to boredom? *Social Behavior and Personality: An International Journal*, 27, 11–16.
- Vodanovich, S. J., Verner, K. M., & Gilbride, T. V. (1991). Boredom proneness: Its relationship to positive and negative affect. *Psychological Reports*, 69, 1139–1146.
- Vodanovich, S. J., Watt, J. D., & Piotrowski, C. (1997). Boredom proneness in African-American college students: A factor analytic perspective. *Education*, 118, 229–236.
- Wallace, J. C., Kass, S. J., & Stanny, C. J. (2002). The cognitive failures questionnaire revisited: Dimensions and correlates. *Journal of General Psychology*, 129, 238–256.
- Wallace, J. C., Vodanovich, S. J., & Restino, R. (2003). Predicting cognitive failures from boredom proneness and daytime sleepiness scores: An investigation within military and undergraduate samples. *Personality and Individual Differences*, 34, 635–644.
- Watt, J. D., & Ewing, J. E. (1996). Toward the development and validation of a measure of sexual boredom. *Journal of Sex Research*, 33, 57–66.
- Watt, J. D., & Vodanovich, S. J. (1992a). An examination of race and gender differences in boredom proneness. *Journal of Social Behavior and Personality*, 7, 169–175.
- Watt, J. D., & Vodanovich, S. J. (1992b). Relationship between boredom proneness and impulsivity. *Psychological Reports*, 70, 688–690.
- Watt, J. D., & Vodanovich, S. J. (1999). Boredom proneness and psychosocial development. *Journal of Psychology*, 133, 303–314.
- Wink, P., & Donahue, K. (1997). The relation between two types of narcissism and boredom. *Journal of Research on Personality*, 31, 136–140.
- Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Appendix follows on next page.

APPENDIX
BPS Item Loading Patterns for all Previous Factor Analyses

<i>BPS Item</i>	<i>Ahmed (1990) 2 Factors</i>	<i>Gana & Akremi (1998) 2 Factors</i>	<i>Gordon, Wilkinson, McGown, & Jovanosko (1997) 4 Factors</i>	<i>Gordon et al. (1997) 5 Factors</i>	<i>Vodanovich & Kass (1990b) 5 Factors</i>	<i>Vodanovich, Watt, & Piotrowski (1997) 8 Factors</i>
1	x	x			x	x
2	x	x				
3	x	x	x	x	x	x
4	x	x	x	x	x	x
5	x		x	x		
6	x	x	x	x	x	x
7		x	x	x	x	
8	x	x	x	x	x	
9	x	x	x	x	x	
10	x	x	x	x		x
11	x	x	x	x	x	x
12	x	x	x	x	x	
13	x	x	x	x	x	
14	x	x	x	x		x
15	x	x	x	x	x	
16	x	x	x	x	x	
17	x	x	x	x	x	
18	x	x	x	x	x	
19	x	x	x	x	x	
20	x	x	x	x	x	
21	x	x	x	x	x	
22	x	x	x	x	x	
23	x	x	x	x	x	
24	x	x	x	x	x	
25	x	x	x	x	x	
26	x	x	x	x	x	
27	x	x	x	x	x	
28		x	x	x	x	

Note. BPS = Boredom Proneness Scale.

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