# A psychometric evaluation of behavioral inhibition and approach self-report measures

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## Abstract

Despite the putative applicability and unquestioned heuristic value of capturing individual variation in behavioral inhibition (BIS) and approach system (BAS) sensitivities, the field has yet to achieve widespread agreement regarding a self-report instrument of choice. The current study evaluates perhaps the two strongest candidates, the BIS/BAS scales (Carver & White, 1994) and the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Torrubia, Avila, Molto, & Caseras, 2001). Using both confirmatory and exploratory factor analytic techniques in two university samples, we determined that neither measure achieved adequate fit to our data set, and both contain multiple items we deemed to be problematic. Models trimmed of the poor items achieved better fit than the full models. However, even after trimming the data, model fit was marginal at best. Caution is urged in the continued use of both measures on conceptual and psychometric grounds.
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## 1. Introduction

In terms of parsimony, utility, and external validity, few psychological theories can surpass the psychobiological model of personality initially developed by Gray (1987, 1990). The model consists largely of two independent neurobiological systems, the behavioral inhibition system (BIS) and behavioral approach system (BAS), which are differentially responsive to external cues. Gray's BIS/BAS model has garnered significant support from animal studies (see Gray, 1987; Gray & McNaughton, 2000) and, consequently, has stimulated a considerable body of human research. Gray's model has been used to explain individual differences in phenomena ranging from extinction learning (Avila, 1994) to various forms of psychopathology, including anxiety disorders (Gray & McNaughton, 2000), psychopathy (Fowles, 1980), depression (Harmon-Jones & Allen, 1997), and bipolar disorder (Depue & Iacono, 1989).

Despite the large heuristic impact of the BIS/BAS model, some have argued that the growth of this literature has been stunted by the inconsistent and not entirely successful operationalization of BIS and BAS (Jorm et al., 1999; Leone, Perugini, Bagozzi, Pierro, & Mannetti, 2001; Torrubia et al., 2001). Initially, there were several failed attempts to capture individual variation in BIS and BAS sensitivities by using self-report measures originally designed for other purposes (see Carver & White, 1994).

To address this problem, Carver and White (1994) developed the BIS/BAS scales, which have become the most popular instrument in the literature. The BIS/BAS scales consist of a single BIS subscale and three BAS subscales: Reward Responsiveness, Drive, and Fun Seeking. Despite the growing body of data that validates the BIS/BAS scales, some authors have criticized the scales on both psychometric and conceptual grounds. The evidence to this point is mixed regarding the relative adequacy of fit of two-factor versus four-factor structural models of the scales, though there is an emerging consensus in favor of the four-factor model (Heubeck, Wilkinson, & Cologon, 1998; Jorm et al., 1999; Leone et al., 2001; Ross, Millis, Bonebright, & Bailley, 2002). Conceptually, Torrubia and colleagues (2001) argue that it is unclear how to interpret interrelations among the subscales, or to predict how the subscales should differentially relate to external criteria. Furthermore, they suggest that although the BAS scale potentially can be distilled into three meaningful subscales, a three-factor BAS bears little theoretical alignment with Gray's unidimensional BAS construct. It is important to note, however, that the BIS/BAS scales may not align with Gray's original theory because the measure is conceptually grounded in a broader family of reward sensitivity theories.

In light of criticisms levied against the BIS/BAS scales, Torrubia and colleagues (2001) published a new measure of BIS/BAS, the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ). The SPSRQ was intended to be theoretically consistent with Gray's work and to improve upon weaknesses noted in the BIS/BAS scales' item content (see Torrubia et al., 2001 for a detailed discussion of these issues). The SPSRQ is comprised of two subscales, Sensitivity to Punishment or BIS, and Sensitivity to Reward or BAS. The authors report adequate psychometric properties and some initial evidence of the scales' construct validity. To date, there is very little additional data demonstrating either the construct or predictive validity of the SPSRQ. Additionally, the SPSRQ was written originally in Catalan, and data on the English version are yet to be confirmed in English-speaking samples. Only one independent report exists that provides a psychometric evaluation of the SPSRQ, with findings suggesting poor fit for a two-factor solution

(O'Connor, Colder, & Hawk, 2004). Those authors proceeded to trim 13 items with weak factor loadings, and finished with a measure that achieved adequate fit in two small samples.

## 2. The present study

Our study first sought to offer an additional evaluation of the BIS/BAS scales' factor structure, with the intention of contributing to the growing literature on this topic. We also conducted a large-scale administration of the English-language SPSRQ, in an effort to provide an independent appraisal of the scale's reliability and factor structure. This analysis allowed us to examine the appropriateness of using the SPSRQ in English-speaking populations, and further permitted a discussion of how to best modify the measure, if at all. Using exploratory techniques, we were able to pinpoint items in both the SPSRQ and BIS/BAS scales that have unsatisfactory factor loadings on their hypothesized subscales. We then tested our proposed modifications for the SPSRQ and the BIS/BAS scales using confirmatory techniques in a second sample. Finally, we explored how the BIS/BAS subscales related to the SPSRQ subscales, with the intention of clarifying how the two measures may be utilized separately, or in conjunction, to validly assess BIS and BAS.

## 3. Method

Sample 1 included 562 participants recruited from introductory psychology courses who were given course credit in exchange for their participation. The sample included 142 males (25.3%) and 420 females (74.7%). The mean age was 19.08 (SD = 2.80), and the sample was quite diverse, made up of approximately 63% Caucasians, 15% African–Americans, 8% Asian Americans, 2% Latino/Latinas, and 12% Other. Sample 2 was comprised of 578 participants, recruited and compensated in the same way as Sample 1. The sample included 156 males (27%) and 422 females (73%). The mean age was 19.17 (SD = 2.61), and the sample was similarly diverse, comprised of approximately 60% Caucasians, 19% African–Americans, 10% Asian Americans, 3% Latino/Latinas, and 8% Other. Each participant in both samples completed a screening packet of questionnaires, which included the BIS/BAS scales and the SPSRQ.

The BIS/BAS scales have 20 items written in Likert-type format, with potential responses along a four-point scale indicating level of agreement. The BIS subscale has 7 items, 2 of which are reverse keyed. The BAS subscales, Reward Responsiveness, Drive, and Fun Seeking, have 5, 4, and 4 items, respectively. All subscales are reported to have satisfactory internal consistencies, $\alpha$'s ranging from .66 to .76, and two-month test–retest reliabilities, $r$'s ranging from .59 to .69 (Carver & White, 1994).

The SPSRQ has 48 items written in yes–no format. The Sensitivity to Punishment subscale is comprised of all 24 odd items, and the Sensitivity to Reward subscale is made up of the 24 even items, with subscale scores derived from simply adding the number of yes responses. Both subscales have demonstrated acceptable levels of internal consistency, $\alpha$'s across male and female samples range from .75 to .83, and three-month test–retest reliabilities, $r$'s of .87 for Sensitivity to Reward and .89 for Sensitivity to Punishment (Torrubia et al., 2001).

Confirmatory factor analyses were conducted in AMOS (Arbuckle, 2003) for the BIS/BAS and Mplus (Muthén & Muthén, 2004) for the SPSRQ. Analyses with the SPSRQ were conducted in

Mplus because this software package is flexible in handling categorical data for latent variable modeling. Conventional estimation methods, such as Maximum Likelihood and General Least Squares estimation are not suited to handle categorical data due to the underlying multivariate normality assumption. In situations when data are categorical, Weighted Least Squares estimation is preferred (Muthén & Muthén, 2004).

CFAs were conducted in Sample 1 for psychometric evaluations of both measures. This strategy has an advantage over exploratory factor analysis in that CFA allows for model specification and calculation of fit indices. Additionally, exploratory factor analysis (EFA) was used for both measures in an attempt first to replicate the findings of O'Connor and colleagues (2004) regarding problematic factor loadings on the SPSRQ, and second to entertain the potential of problematic items on the BIS/BAS scales. We then trimmed the items deemed as poor from both scales, and used CFA to test the trimmed models in Sample 2. Finally, bivariate correlations were computed to determine the relations among BIS/BAS and SPSRQ subscales.

## 4. Results

To examine the BIS/BAS scales using Sample 1, we used CFA to compare a two-factor solution, with BIS and BAS represented as independent latent variables, to a four-factor solution, with BIS independent of three correlated BAS subscales as specified by Carver and White (1994). All results from these initial analyses are displayed in Table 1.

Adequate fit in CFA is hypothesized to be demonstrated by a root mean square error of approximation (RMSEA) below .05 and comparative fit index (CFI) above .95 (Hu & Bentler, 1999). Using these criteria, the two-factor model had poor fit, $\chi^2(170) = 1622.56$, $p < .001$, RMSEA = .087, CFI = .72. The four-factor solution also failed to achieve adequate fit,

Table 1
CFA of BIS/BAS scales and SPSRQ

| Scale and fitted model | df | $\chi^2$ | $p$ | RMSEA | CFI |
|---|---|---|---|---|---|
| BIS/BAS scales | | | | | |
| *Sample 1* | | | | | |
| Two-factor model | 170 | 1622.56 | <.001 | .087 | .72 |
| Four-factor model | 167 | 653.58 | <.001 | .072 | .81 |
| *Sample 2* | | | | | |
| Four-factor model | 167 | 604.06 | <.001 | .067 | .84 |
| Trimmed model | 101 | 315.28 | <.001 | .061 | .90 |
| SPSRQ | | | | | |
| *Sample 1* | | | | | |
| Two-factor model | 254 | 930.14 | <.001 | .071 | .72 |
| *Sample 2* | | | | | |
| Two-factor model | 262 | 943.11 | <.001 | .069 | .73 |
| Trimmed model | 217 | 750.63 | <.001 | .067 | .80 |

RMSEA = Root mean squared error of approximation; CFI = comparative fit index.

$\chi^2(167) = 653.58$, $p < .001$, RMSEA $= .072$, CFI $= .81$. As demonstrated in previous reports, a chi-square test for comparing nested models found the four-factor solution achieved significantly better fit than the two-factor solution, $\chi^2(3) = 968.98$, $p < .001$. It is important to emphasize, however, that neither the four-factor nor two-factor solutions adequately modeled the data.

Moving on to our evaluation of the SPSRQ, we conducted a CFA to replicate the two-factor solution suggested by Torrubia and colleagues (2001), again using Sample 1 (see Table 1). The model did not represent the data well, $\chi^2(254) = 930.14$, $p < .001$, RMSEA $= .071$, CFI $= .72$.

In light of the apparent failure of both measures to adequately represent our data, we conducted a set of EFAs to investigate the possibility that particular items are driving the poor fits of the two overall models. To be consistent with prior work on the SPSRQ (O'Connor et al., 2004; Torrubia et al., 2001), a principal components analysis was conducted, using a varimax rotation due to the hypothesized independence of the subscales. Based on the scree plot, and also the a priori two-factor nature of the scale, a two-factor solution was forced with varimax rotation, the solution accounting for 20.5% of the variance. The factor loadings from this analysis as well as Cronbach's alphas are presented in Table 2. O'Connor and colleagues (2004) found 13 of the SPSRQ items to be problematic, and we have noted those items in Table 2, as well as the 9 potentially poor items revealed by our analysis. We designated an item as ''poor'' if it failed to achieve a loading of at least .30 on its hypothesized factor, or if it achieved a loading of at least .30 on the alternative factor.

Principal components analysis was also carried out for the BIS/BAS scales, with the scree plot indicating that either two or four factors should be retained for rotation. Given the ambiguity in the scree plot, and our CFA findings in favor of a four-factor model of the BIS/BAS scales, a four-factor solution was forced, which accounted for 49.8% of the variance. We used promax rotation in this analysis, allowing factors to correlate given that three of the factors are hypothesized to be indicators of a higher order BAS construct. Factor loadings and alphas are displayed in Table 3, with notation indicating the four items deemed to be problematic, again using the same criteria discussed above.

Using Sample 2, we then conducted CFAs to replicate our findings from Sample 1, and to examine the fit of the trimmed SPSRQ and BIS/BAS scales models, that is, those excluding items identified as poor. We successfully replicated the findings reported from Sample 1 for both measures, and those results are depicted in Table 1. The trimmed two-factor solution for the SPSRQ achieved marginal fit, $\chi^2(217) = 750.63$, $p < .001$, RMSEA $= .067$, CFI $= .80$. As evidenced by a reduced RMSEA, the trimmed model also was an improvement on the replicated full model as tested in Sample 2. The trimmed four-factor BIS/BAS model also approached an adequate fit, $\chi^2(101) = 315.28$, $p < .001$, RMSEA $= .061$, CFI $= .90$. Similarly, the trimmed model of the BIS/BAS scales represented an improvement over the full four-factor replication from Sample 2.

We further computed bivariate correlations among BIS/BAS and SPSRQ subscales. Given that Samples 1 and 2 did not differ significantly on any subscale means, $p$'s $> .27$, the correlation matrix was derived for the two samples pooled together, and is depicted in Table 4. As expected, Sensitivity to Punishment was independent of Sensitivity to Reward and positively correlated with BIS. Also, Sensitivity to Reward was independent of BIS and positively correlated with each BAS subscale. Replicating findings of previous studies (Carver & White, 1994; Heubeck et al., 1998), we found that the BAS subscales differentially correlated with Sensitivity to Punishment, and perhaps most problematically, with BIS. More specifically, Sensitivity to Punishment was negatively

Table 2
SPSRQ EFA performed on Sample 1

| Scale and items | SP | SR |
|---|---|---|
| *Sensitivity to Punishment (M = 11.42, SD = 5.37, α = .83)* | | |
| Do you often refrain from doing something because you are afraid of it being illegal?[a,b] | .16 | −.08 |
| Do you prefer not to ask for something when you are not sure you will obtain it? | .39 | .05 |
| Are you often afraid of new or unexpected situations? | .57 | −.02 |
| Is it difficult for you to telephone someone you do not know? | .48 | −.21 |
| Do you often renounce your rights when you know you can avoid a quarrel with a person or an organization?[a] | .34 | .01 |
| As a child, were you troubled by punishments at home or in school?[a,b] | .11 | .06 |
| In tasks that you are not prepared for, do you attach great importance to the possibility of failure? | .44 | .11 |
| Are you easily discouraged in difficult situations? | .62 | −.02 |
| Are you a shy person?[b] | .43 | −.43 |
| Whenever possible, do you avoid demonstrating your skills for fear of being embarrassed? | .66 | −.06 |
| When you are with a group, do you have difficulties selecting a good topic to talk about? | .44 | −.24 |
| Is it often difficult for you to fall asleep when you think about things you have done or must do?[a] | .34 | .10 |
| Do you think a lot before complaining in a restaurant if your meal is not well prepared? | .30 | .07 |
| Would you be bothered if you had to return to a store when you noticed you were given the wrong change?[a] | .36 | .04 |
| Whenever you can, do you avoid going to unknown places?[b] | .27 | −.20 |
| Are you often worried by things that you said or did? | .54 | .09 |
| Would it be difficult for you to ask your boss for a raise (salary increase)? | .51 | −.11 |
| Do you generally try to avoid speaking in public? | .52 | −.22 |
| Do you, on a regular basis, think that you could do more things if it was not for your insecurity or fear? | .65 | −.06 |
| Comparing yourself to people you know, are you afraid of many things? | .53 | −.07 |
| Do you often find yourself worrying about things to the extent that performance in intellectual abilities is impaired? | .45 | .29 |
| Do you often refrain from doing something you like in order not to be rejected or disapproved of by others? | .59 | .09 |
| Generally, do you pay more attention to threats than to pleasant events?[a] | .38 | .11 |
| Do you often refrain from doing something because of your fear of being embarrassed? | .71 | −.09 |
| | | |
| *Sensitivity to Reward (M = 11.94, SD = 4.07, α = .74)* | | |
| Does the good prospect of obtaining money motivate you strongly to do some things? | .07 | .33 |
| Are you frequently encouraged to act by the possibility of being valued in your work, in your studies, with your friends or with your family?[a,b] | .03 | .22 |
| Do you often meet people that you find physically attractive?[a,b] | −.11 | .27 |
| Do you like to take some drugs because of the pleasure you get from them?[a,b] | .05 | .19 |
| Do you often do things to be praised? | .17 | .50 |
| Do you like being the center of attention at a party or a social meeting? | −.19 | .53 |
| Do you spend a lot of your time on obtaining a good image? | .19 | .35 |
| Do you need people to show their affection for you all the time?[a,b] | .31 | .36 |
| When you are in a group, do you try to make your opinions the most intelligent or the funniest? | .05 | .46 |
| Do you often take the opportunity to pick up people you find attractive? | −.20 | .42 |
| As a child, did you do a lot of things to get people's approval? | .26 | .34 |
| Does the possibility of social advancement move you to action, even if this involves not playing fair? | .07 | .44 |
| Do you generally give preference to those activities that imply an immediate gain? | .06 | .44 |
| Do you often have trouble resisting the temptation of doing forbidden things? | .12 | .34 |
| Do you like to compete and do everything you can to win? | −.10 | .40 |

Table 2 (*continued*)

| Scale and items | SP | SR |
|---|---|---|
| Is it easy for you to associate tastes and smells to very pleasant events?[a,b] | −.07 | .25 |
| Are there a large number of objects or sensations that remind you of pleasant events?[a,b] | −.09 | .25 |
| When you start to play with a slot machine, is it often difficult for you to stop?[a,b] | .21 | .21 |
| Do you sometimes do things for quick gains? | .06 | .49 |
| Does your attention easily stray from your work in the presence of an attractive stranger? | .25 | .30 |
| Are you interested in money to the point of being able to do risky jobs? | −.08 | .44 |
| Do you like to put competitive ingredients in all of your activities? | −.08 | .45 |
| Would you like to be a socially powerful person? | −.01 | .34 |
| Do you like displaying your physical abilities even though this may involve danger? | −.17 | .38 |

Factor loadings derived after varimax rotation.
[a] Item denoted as problematic by O'Connor et al. (2004).
[b] Item denoted as problematic by our analysis.

Table 3
BIS/BAS scales EFA on Sample 1

| Scale and items | BIS | RR | D | FS |
|---|---|---|---|---|
| *BIS (M = 20.46, SD = 3.65, α = .73)* | | | | |
| Even if something bad is about to happen to me, I rarely experience fear or nervousness[a] | .37 | .04 | .05 | −.37 |
| Criticism or scolding hurts me quite a bit | .67 | −.11 | −.07 | −.01 |
| I feel pretty worried or upset when I think or know somebody is angry at me | .64 | .13 | −.25 | .14 |
| If I think something unpleasant is going to happen I usually get pretty "worked up" | .76 | −.05 | .16 | .01 |
| I feel worried when I think I have done poorly at something | .64 | .10 | .02 | −.07 |
| I have very few fears compared to my friends[a] | .26 | .05 | .08 | −.53 |
| I worry about making mistakes | .75 | −.05 | −.05 | −.02 |
| *BAS Reward Responsiveness (M = 16.90, SD = 2.17, α = .71)* | | | | |
| When I'm doing well at something, I love to keep at it | −.16 | .81 | −.05 | −.21 |
| When I get something I want, I feel excited and energized | .04 | .72 | .13 | −.07 |
| When I see an opportunity for something I like, I get excited right away | .12 | .59 | .07 | .14 |
| When good things happen to me, it affects me strongly | .30 | .56 | .04 | .02 |
| It would excite me to win a contest | .04 | .50 | .01 | .02 |
| *BAS Drive (M = 10.74, SD = 2.23, α = .70)* | | | | |
| I go out of my way to get things I want | −.01 | −.06 | .82 | .06 |
| When I want something, I usually go all-out to get it | −.04 | .01 | .85 | .01 |
| If I see a chance to get something I want, I move on it right away | −.09 | .26 | .61 | −.01 |
| When I go after something I use a "no holds barred" approach[a] | .13 | −.20 | .24 | .63 |
| *BAS Fun Seeking (M = 11.67, SD = 2.23, α = .67)* | | | | |
| I'm always willing to try something new if I think it will be fun[a] | −.20 | .61 | −.10 | .28 |
| I will often do things for no other reason than that they might be fun | −.06 | .07 | .03 | .62 |
| I often act on the spur of the moment | −.01 | −.02 | −.02 | .71 |
| I crave excitement and new sensations | .14 | .13 | −.04 | .67 |

RR = Reward Responsiveness; D = Drive; FS = Fun Seeking; Factor loadings derived from pattern matrix after promax rotation.
[a] Item denoted as problematic by our analysis.

correlated with Drive and Fun Seeking and independent of Reward Responsiveness. BIS negatively correlated with Drive and Fun Seeking, but positively correlated with Reward Responsiveness. The alternating directionality of these BIS-BAS subscale correlations is likely in part responsible for the apparent "independence" of the BIS and BAS scales.

## 5. Discussion

Given the lack of consensus regarding measurement of BIS/BAS, and the potential heuristic value that such a consensus could yield, we investigated the two most widely utilized self-report scales. Our CFA of the BIS/BAS scales (Carver & White, 1994) demonstrated poor fit for both the two-factor BIS and BAS solution and for the four-factor solution, with BIS plus three BAS subscales. Converging with other reports, we found evidence that the four-factor model was superior to the two-factor model, but the fact remains that neither adequately represented the data from our sample. We would also argue that even though the four-factor model achieved better fit, it is less reflective of Gray's theoretical BIS/BAS model than the two-factor solution. While this may not be a problem given the BIS/BAS scales' broader adherence to the "family" of reward sensitivity theories, relations among the BIS/BAS subscales give reason for concern. As demonstrated in the literature and in our findings, the BIS scale differentially relates to the three BAS subscales, which is clearly problematic given the hypothesized independence of BIS and BAS. Psychometrically, our data certainly support the consideration of Carver and White's BAS as a three-factor as opposed to unidimensional construct, but it is unclear whether such an approach is indicated given our stated concerns.

Our analysis of Torrubia and colleagues (2001) SPSRQ yielded similarly unsatisfactory results. Using CFA, the proposed two-factor model failed to achieve adequate fit to our data, replicating the recent findings of the first English-language administration of the SPSRQ (O'Connor et al., 2004). In light of the exploratory analysis performed by O'Connor and colleagues in an attempt to identify particularly poor items, we conducted a similar evaluation to replicate and extend their work.

As displayed in Table 2, items identified as problematic by each group are noted, and it is clear that there is substantial overlap. In fact, we found 9 of the 13 items identified by O'Connor and colleagues also to be problematic. This finding would suggest that those 9 items should be removed from the SPSRQ, but it also advises caution about trimming items identified as problematic in only one investigation (four such items identified by O'Connor et al., two implicated by our data). We performed an identical analysis on the BIS/BAS scales in order to identify any problematic items that may have contributed to the poor fit indices described above. This analysis, depicted in Table 3, revealed that four of the scales' items significantly loaded on the "wrong" factor, and hence are considered poor items. Of course, we do not recommend simply removing those items from Carver and White's measure unless additional reports replicate our findings.

We were able to demonstrate improvement in the SPSRQ after excluding the 9 items deemed to be problematic in both our analysis and that of O'Connor and colleagues (2004). After trimming those particular items, the two-factor solution achieved significantly better fit in our second sample. Likewise, we offer a preliminary examination of a trimmed version of the BIS/BAS scales, eliminating four items identified as poor in our exploratory analysis with Sample 1. The trimmed

Table 4
Correlation matrix of pooled Samples 1 and 2

| Scale | BIS | RR | D | FS | SP | SR |
|---|---|---|---|---|---|---|
| BIS | | | | | | |
| RR | .20[**] | | | | | |
| D | −.07[*] | .33[**] | | | | |
| FS | −.10[**] | .37[**] | .44[**] | | | |
| SP | .54[**] | −.04 | −.22[**] | −.20[**] | | |
| SR | .04 | .26[**] | .40[**] | .37[**] | .03 | |
| Scale's α | .74 | .71 | .71 | .70 | .84 | .75 |

Alphas displayed along diagonal; RR = Reward Responsiveness; D = Drive; FS = Fun Seeking; SP = Sensitivity to Punishment; SR = Sensitivity to Reward.
  [*] Significant at $p < .05$ (two-tailed).
  [**] Significant at $p < .01$ (two-tailed).

version of the BIS/BAS scales was similarly an improvement over the full version of the measure, with the caveat that more research is necessary to confirm the superiority of the shortened BIS/BAS scales.

We advocate caution in continued investigations with the BIS/BAS scales and the SPSRQ. Although the BIS/BAS scales have been more thoroughly validated against external criteria, the preferred four-factor solution does not have an a priori theoretical justification, nor does the model achieve adequate fit in CFAs. Further, there is no clear interpretive strategy given the problematic intercorrelations among subscales. Conversely, the SPSRQ does not have the extensive validation literature of the BIS/BAS scales, nor does the measure's two-factor solution achieve acceptable levels of fit. The SPSRQ, however, is more faithful to Gray's theory and avoids the interpretive difficulties associated with the BIS/BAS scales. Although we provided a psycho-metric comparison of the BIS/BAS scales and SPSRQ as they were designed to be interpreted, the two measures may stem from somewhat divergent theoretical bases. Thus, it is important to ex-tend our work with investigations identifying the behavioral correlates of both measures, to clarify their differences in conceptual origin and predictive utility.

In addition to cautioning the use of the extant self-report measures of BIS/BAS, we also would like to echo a message put forth by O'Connor and colleagues (2004). If we are to continue assess-ing historically elusive constructs such as BIS/BAS with self-report scales, it is crucial that we entertain the possibility that these scales should be modified in efforts to make them more valid. Continued systematic evaluation of full versus trimmed versions of both the BIS/BAS scales and SPSRQ would likely be beneficial to researchers in this area. Such study would allow us to rule out a nagging alternative notion, that neither of these assessments serves as a viable foundation for capturing BIS and BAS.

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