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Psychometric evaluation of the behavioral inhibition/behavioral activation system scales and the sensitivity to punishment and sensitivity to reward questionnaire in a sample of eating disordered patients

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ABSTRACT

Gray (1987) proposed two systems underlying much of our behavior and personality. One system (Behavioral Inhibition System, BIS) relates to avoidance or withdrawal behavior, whereas the other system (Behavioral Approach System, BAS) relates to approach behavior. Underreactivity and overreactivity of those systems have been presumed to explain a broad range of psychopathologies. Despite the increasing interest and use of questionnaires measuring BIS and BAS reactivity in psychopathological research, studies examining psychometric qualities of these measures in clinical samples are scarce. This study evaluated the psychometric properties of the BIS/BAS Scales and the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ) in eating disordered patients. Structural validity is investigated by means of Confirmatory Factor Analysis. Convergent validity is examined by investigating associations with conceptually related personality traits. For the BIS/BAS Scales, CFA favors a five-factor structure in line with a recent revision of Gray's theory (Gray & McNaughton, 2000). For the SPSRQ, sufficient support was found for a two-factor structure. Reliability and validity of both instruments are in line with previous reports.

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1. Introduction

A great deal of human behavior is motivated by obtaining rewards or avoiding punishment. According to Gray's (1987) Reinforcement Sensitivity Theory (RST), three specific brain systems are involved in these two fundamental types of behavior, namely approach and avoidance. One system, the Behavioral Approach System (BAS), deals with appetitive stimuli and is engaged in approach behavior, whereas the other two systems, the Behavioral Inhibition System (BIS) and the Fight–Flight System (FFS), deal with aversive stimuli and are engaged in avoidance or withdrawal behavior. The BIS relates to avoidance of conditioned aversive stimuli whereas the FFS relates to avoidance of unconditioned aversive stimuli. Gray suggested that individual differences in BAS and BIS reactivity give rise to the personality dimensions of Impulsivity and Anxiety respectively. Individuals with high BAS reactivity are more prone to engage in approach behavior and experience positive affect in situations with stimuli that are associated with reward. They are supposed to exhibit higher levels of impulsivity and more likely engage in risk-taking behaviors (Carver & White, 1994). Persons with high BIS reactivity are expected to exhibit greater levels of anxiety, to tend towards cautiousness and to more likely engage in avoidance behavior.

Gray's RST was recently updated (Gray & McNaughton, 2000). In the revised Reinforcement Sensitivity Theory (rRST), the role of the BAS remains relatively unchanged. The BAS still mediates reactions to appetitive stimuli and relates to approach behavior. The Fight-Flight-Freezing System (FFFS) is responsible for mediating reactions to all aversive stimuli, conditioned and unconditioned, and relates to avoidance and escape behaviors. The BIS is responsible for the resolution of goal conflicts (e.g., between BAS-approach and FFFS-avoidance). Individual differences in personality and behavior are presumed to be based on differences in reactivity of these three systems. High BAS reactivity is associated with optimism, reward orientation and impulsiveness. Persons with high FFFS reactivity exhibit greater levels of fear and are more likely to engage in avoidance behavior. High BIS reactivity is related to worry-proneness and anxious rumination (Corr & McNaughton, 2008).

Several authors explored the hypothesis that extreme levels of reactivity in Gray's systems are related to psychopathology (Bijttebier, Beck, Claes, & Vandereycken, in press). Research suggests that specific profiles of FFFS, BAS and BIS functioning characterize specific disorders: elevated FFFS reactivity is typically found in phobia

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and panic, elevated BAS reactivity in addictive behaviors and elevated BIS reactivity in generalized anxiety and obsessive–compulsive disorder (Corr & McNaughton, 2008).

Several researchers studied BIS and BAS reactivity in individuals with eating disorders (ED). Bulimia nervosa patients (Kane, Loxton, Staiger, & Dawe, 2004) as well as anorexia nervosa patients (Claes, Nederkoorn, Vandereycken, Guerrieri, & Vertommen, 2006) showed higher BIS reactivity than normal controls. Bulimia patients also reported higher BAS reactivity than normal controls. Studies on dysfunctional eating in other samples (e.g., university students) showed that heightened sensitivity to both reward and punishment was predictive for dysfunctional eating (Loxton & Dawe, 2001). Heightened BAS reactivity was positively related to food craving and BMI (Franken & Muris, 2005), whereas heightened BIS reactivity was related to unhealthy weight loss (Mussap, 2006).

To study individual differences in BIS and BAS reactivity several self-report instruments have been developed. The two most frequently used questionnaires are the BIS/BAS Scales (Carver & White, 1994) and the SPSRQ (Torrubia, Ávila, Moltó, & Caseras, 2001). The BIS/BAS Scales tap BIS reactivity or three types of BAS reactivity. The BIS scale (7 items) measures concerns regarding the possible occurrence of negative events and the sensitivity to such events when they occur. The BAS Reward Responsiveness scale (BAS-RR; 5 items) measures the degree to which (the expectation of) rewards lead to positive emotions. The BAS-Drive scale (BAS-D; 4 items) measures the tendency to actively pursue appetitive goals. The BAS Fun Seeking scale (BAS-FS; 4 items) measures the tendency to seek out and approach impulsively potentially rewarding activities. The SPSRQ taps Sensitivity to Punishment (SP; 24 items) and Sensitivity to Reward (SR; 24 items). An important limitation of both instruments is that they have been designed to measure behavioral inhibition and activation as conceptualized in Gray's original RST. Thus far, it is unclear how these measures map unto the constructs from the revised RST. Given that the theoretical implications of the RST revision for BAS are only minor, the BAS scales and the SR scale may still be useful to measure BAS reactivity. BIS reactivity, however, is now considered to be spread across BIS-Anxiety and FFFS, which is inconsistent with the unidimensional BIS and SP scales. Recently, Heym, Ferguson, and Lawrence (2008) and Poythress et al. (2008) have successfully separated out BIS-Anxiety and FFFS items in the BIS/BAS Scales.

To our knowledge, only one study has examined psychometric properties of the BIS/BAS Scales in a clinical sample, more specifically outpatients with anxiety and mood disorders (Campbell-Sills, Liverant, & Brown, 2004) and no study has tested the psychometric properties of the SPSRQ in a clinical sample.

The current study aimed to provide a psychometric analysis of the BIS/BAS Scales and the SPSRQ in a sample of ED patients. Reliability and validity of both questionnaires were investigated. Structural validity was examined by means of CFA and convergent validity was investigated by associations with measures of conceptually related personality traits (e.g., Neuroticism, Extraversion). Based on previous studies (e.g., Caseras, Ávila, & Torrubia, 2003; Gray & McNaughton, 2000), we hypothesized that BIS scales would be positively related to Neuroticism and Anxiety and that BAS scales would be positively related to extraversion and impulsivity. With respect to BAS subscales, some studies (Carver & Miller, 2006; Franken & Muris, 2006) suggested that BAS-RR and BAS-D are related to impulses arising from heightened reward sensitivity, whereas BAS-FS is related to impulses stemming primarily from a lack of constraint (rash impulsiveness). Therefore, we expected the BAS-FS scale to be more strongly related to Eysencks' Impulsiveness scale than both, BAS-RR and BAS-D. With regard to BIS and BAS reactivity in ED subtypes, we expected that BAS functioning would be higher in bulimia and bingeing–purging anorexia patients than in restrictive anorexia patients, seeing much has been written on impulsive traits in these ED subtypes (e.g., Claes, Vandereycken, & Vertommen, 2002; Dawe & Loxton, 2004). We also expect that BIS reactivity will be similar in all ED subtypes since clinical and epidemiological studies have consistently shown that the majority of ED patients experience one or more anxiety disorders (Claes et al., 2006; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004).

2. Method

2.1. Participants

The sample consisted of 103 female eating disordered outpatients (mean age 25.5 years, SD = 8.8) living in the Dutch speaking part of Belgium. DSM-IV diagnoses (APA, 1994) were obtained using of a clinical interview in combination with the Eating Disorder Evaluation Scale (EDES; Vandereycken, 1993): 31.1% ($n = 32$) was diagnosed as anorexia nervosa, restrictive subtype (AN-R), 16.5% ($n = 17$) as anorexia nervosa, bingeing–purging subtype (AN-P), 33.9% ($n = 35$) as bulimia nervosa (BN) and 14.6% ($n = 15$) as eating disorder not otherwise specified (EDNOS). Four participants could not be assigned to one of these subtypes due to missing information on their eating habits.

Questionnaires were distributed through the therapist of the patients. After informed consent was given, participants anonymously filled out the questionnaires.

2.2. Instruments

The Behavioral Inhibition/Behavioral Activation System Scales (BIS/BAS Scales; Carver & White, 1994) are a 20-item self-report questionnaire designed to assess BIS reactivity and three types of BAS reactivity (Reward Responsiveness, Drive and Fun Seeking). All items are judged on a four-point scale ranging from 1 ('I strongly agree') to 4 ('I strongly disagree'). Cronbach's alphas of the Dutch version are reported by Smits and De Boeck (2006): BIS scale (0.82), BAS scale (0.73), BAS-RR (0.54), BAS-D (0.75) and BAS-FS (0.55).

The Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Franken & Muris, 2006; Torrubia et al., 2001) consists of 48 items with a yes/no response format divided into two subscales, Sensitivity to Punishment (SP; $\alpha = 0.84$) and Sensitivity to Reward (SR; $\alpha = 0.70$).

The Eysenck Personality Questionnaire–Revised Short Scale (EPQ-R Short Scale; Eysenck, Eysenck, & Barrett, 1985) was administered to measure Neuroticism and Extraversion. Each scale consists of 12 items to be rated on a yes–no response scale.

Trait anxiety was assessed by the Trait scale of the State-Trait Anxiety Inventory (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). It consists of 20 items to be rated on a 4-point scale, ranging from "almost never" to "almost always". Higher scores indicate higher trait anxiety.

Impulsiveness was measured by the Impulsiveness and Venturesomeness scale of the Impulsiveness Questionnaire (IVE; Eysenck & Eysenck, 1991). The Impulsiveness scale taps the failure to evaluate risk, whereas the Venturesomeness scale measures behavior in which risk is perceived by an individual but yet accepted by the individual.

2.3. Analyses

Confirmatory factor analyses (CFAs), performed with LISREL 8.71 (Jöreskog & Sörbom, 2004) were used to test the factorial structure of the BIS/BAS Scales and SPSRQ. For the BIS/BAS Scales, 5 models were compared: A one-factor model, with all items loading to a general behavior regulation factor, a two-factor model conforming to Gray's theory, a four-factor model as proposed by the

authors of the BIS/BAS Scales (BIS, BAS-RR, BAS-D, and BAS-FS) and 2 five-factor models comprising 3 BAS factors and 2 BIS factors faithful to the rRST. The first five-factor model corresponds to the model suggested by Johnson, Turnen, and Iwata (2003). The BIS-items 'Even if something bad is about to happen to me, I rarely experience fear or nervousness' and 'I have few fears compared to my friends' are conceived of as a separate Fear factor, related to the Freeze–Fight–Flight system (FFFS-Fear), whereas the other 5 BIS items are conceived as reflecting the BIS system (BIS-Anxiety). The second five-factor model is identical to the just described model, except the item 'If I think something unpleasant is going to happen, I usually get pretty worked up' is switched from the BIS-Anxiety factor to the FFFS-Fear factor (Heym et al., 2008), in correspondence to the suggestion of Corr and McNaughton (2008).

With regard to the SPSRQ, the fit of a two-factor model was compared to the fit of a one-factor model. The two-factor model comprises an SP and an SR factor. A one-factor model was additionally tested to examine whether the power of the two-factor model was large enough to reject the more parsimonious one-factor alternative (Bentler, 2007).

CFA models were estimated using a Robust Weighted Least Square method, as our indicators are all categorical variables (Flora & Curran, 2004). For the BIS/BAS scales, items are used as indicators. In contrast, for the SPSRQ, item parcels were used (e.g., Bandalos, 2002), because the SPSRQ comprises a rather large number of items, in comparison to our relatively low number of participants ($n = 103$), which inflates the degrees of freedom in the resulting models, causing bad fit indices. Items were randomly combined into groups of three items, reducing the amount of indicators per factor from 24 to 8.

Fit was assessed by multiple criteria: χ^2 for absolute fit, comparative fit index (CFI) for fit relative to a null model and root mean squared error of approximation (RMSEA). The criterion for fit was defined according to Hu and Bentler (1999) as CFI > .95 and RMSEA < .06. Fit of nested models is compared with χ^2 difference test, and Akaike's information criterion (AIC, Akaike, 1977) is used for nonnested models. Reliability was examined by Cronbach's alpha.

Relations between Gray's concepts and other personality traits were investigated by correlating BIS and BAS scales with scales that measure related personality traits.

To examine whether self-reported BIS and/or BAS reactivity were significantly different for the different ED subtypes, multivariate analysis of variance was used in combination with Scheffe's post-hoc tests (SPSS, version 15).

3. Results

3.1. Structure of the BIS/BAS Scales and the SPSRQ

For the BIS/BAS scales, the four-factor model and the five-factor models reached acceptable fit. Fit of both five-factor models was significantly better than for the four-factor model ($p < .03, \chi^2_{\text{difference}}(4)$). The model as proposed by Johnson et al. (2003) demonstrated the best fit (AIC). It comprises three BAS scales: BAS-Drive, BAS Reward Responsiveness, and BAS FunSeeking. In addition, BIS is modeled by two subscales: one reflecting BIS mediated anxiety (BIS-Anxiety) associated with conflict or uncertainty, and the other scale (FFFS-Fear) referring to fear associated with activity of the Freeze–Fight–Flight system (Heym et al., 2008; Poythress et al., 2008).

Following Torrubia et al. (2001), a two-factor model with one SP factor reflecting BIS reactivity and one SR factor reflecting BAS reactivity fitted our data well. The competing one-factor model can be rejected ($p < .01, \chi^2_{\text{difference}}(1)$) (Table 1).

3.2. Reliability

As to the BIS/BAS Scales, the internal consistency varies from marginal (BAS-FS, $\alpha = .51$) to good for BIS-Anxiety ($\alpha = 0.86$). Item deletion did not result in more satisfying alpha coefficients. The reliability of the BIS, BAS-RR and BAS-D scale were similar to earlier findings (Leone, Perugini, Bagozzi, Pierro, & Mannetti, 2001). With regard to the SPSRQ, the internal consistency is lower for the SR scale ($\alpha = .62$) than for the SP scale ($\alpha = .87$), a finding also reported by Caseras et al. (2003) and Torrubia et al. (2001).

3.3. Correlations between scales of the BIS/BAS Scales and the SPSRQ

Correlations between the BIS/BAS Scales and the SPSRQ scales are given in Table 2, together with descriptive statistics for all scales. Scales measuring BAS reactivity were all significantly correlated, except for the BAS-RR and the SR scale. The SR scale was most strongly related to the BAS-FS scale. As expected, the BIS scales and the SP scale were significantly positively correlated. The SP and the SR scale were unrelated. The BAS-RR correlated positively with the BIS-Anxiety scale, whereas the other two BAS subscales correlated negatively with the SP scale.

3.4. Correlations between BIS and BAS reactivity and related personality traits

As can be seen in Table 3, scales measuring BIS reactivity showed similar patterns of correlation, having positive associations with Neuroticism and Anxiety and negative associations with Extraversion and Venturesomeness. Scales measuring BAS reactivity correlated positively with Extraversion, with BAS-FS and SR relating stronger to Extraversion than BAS-RR and BAS-D. BAS-FS and SR showed similar patterns of correlation: unlike BAS-RR and BAS-D, these scales correlated positively with Impulsivity and Venturesomeness.

3.5. BIS and BAS reactivity in ED subtypes

A MANOVA was performed with the ED subtypes as independent variable and the subscales of the BIS/BAS Scales and the SPSRQ as dependent variables (Wilks' $\lambda = .75$, $p = .04$). The different types of ED patients significantly differ from each other with respect to BAS-FS and SR (see Table 4). With respect to BAS-FS, referring to the willingness to approach impulsively potentially rewarding activities, AN-P and BN patients report significantly more BAS reactivity than AN-R patients. The different types of ED patients did not significantly differ from each other with respect to BIS reactivity. When compared with the results of the undergraduate students of Heym et al. (2008), ED patients, in general, obtain a higher score on FFFS-Fear and on BIS-Anxiety ($p > .01$).

Table 1
Fit indices of CFA models for BIS/BAS Scales and SPSRQ.

	df	χ^2	AIC	CFI	RMSEA
BIS/BAS Scales					
One-factor model	170	1101.00	619.44	.78	.15
Two-factor model	169	637.18	360.92	.93	.08
Four-factor model	164	544.57	312.37	.97	.06
Five-factor model (Johnson et al.)	160	530.10	308.10	.97	.05
Five-factor model (Heym et al.)	160	533.65	310.40	.97	.06
SPSRQ					
One-factor model	104	362.92	272.97	.90	.10
Two-factor model	103	263.44	212.20	.96	.06

Table 2
Descriptive statistics and correlations for BIS and BAS reactivity.

	Mean	SD	α	FFFS-Fear	BIS-Anxiety	BAS-RR	BAS-D	BAS-FS	SP	SR
BIS/BAS Scales										
FFFS-Fear	6.92	1.28	.63	–	.68**	.14	−.17	−.12	.43**	−.13
BIS-Anxiety	17.63	2.87	.86		–	.32**	.04	−.07	.46**	−.17
BAS-RR	15.48	2.74	.67			–	.34**	.40**	−.10	.08
BAS-D	10.02	2.54	.76				–	.44**	−.22*	.30**
BAS-FS	10.55	2.29	.51					–	−.35**	.36**
SRQRQ										
SP	15.18	5.53	.87						–	−.09
SR	10.78	3.30	.62							–

* $p < 0.05$.
** $p < 0.01$.

Table 3
Correlations between BIS and BAS reactivity and other scales.

	N	E	Anx	Imp	Vent
BIS/BAS Scales					
FFFS-Fear	.25*	−.29**	.31**	−.05	−.25*
BIS-Anxiety	.37**	−.24*	.35**	−.09	−.32**
BAS-RR	−.17	.24*	−.20*	.00	−.05
BAS-D	−.01	.21*	−.06	.03	−.07
BAS-FS	−.04	.37**	.13	.48**	.33**
SPSRQ					
SP	.60**	−.61*	.64**	−.14	−.37**
SR	.07	.40**	.08	.52**	.38**

N = Neuroticism; E = Extraversion; Anx = Anxiety; Imp = Impulsiveness; Vent = Venturesomeness.
* $p < 0.05$.
** $p < 0.01$.

4. Discussion

The current study extends the psychometric basis of the BIS/BAS Scales and the SPSRQ by evaluating their factorial structure, reliability and validity in a sample of ED patients. For the BIS/BAS Scales, a five-factor solution achieved a significantly better fit than a one-, two- or four-factor solution, which converges with findings of Poythress et al. (2008). In contrast to Heym et al. (2008), a two-items scale for FFFS-Fear achieved a better fit than a three-items scale. Note that the items reflecting the FFFS-Fear are the only reverse scored items, so that this factor may also be a method-related factor. However, the finding of Poythress et al. (2008) that FFFS-Fear is uniquely associated with Harm Avoidance, and our and Poythress' finding that BIS-Anxiety is uniquely related to BAS-RR whereas FFFS-Fear is not, militates against this conclusion.

Factor analysis of the SPSRQ favors a two-factor solution. However, the SPSRQ is based on the original RST, and not the more recent rRST, which is a serious drawback.

In accordance with results from non-clinical samples (e.g., Caseras et al., 2003), internal consistency of both questionnaires was reasonable. FFFS-Fear, BAS-FS, BAS-RR and SR demonstrated marginal to moderate internal consistency, replicating findings of other researchers (e.g. Smits & De Boeck, 2006). For both questionnaires, internal consistency of scales reflecting BIS reactivity (BIS-Anxiety and SP) was better than of those measuring BAS reactivity. Because the manifestation of BAS reactivity in human behavior is less well defined than the manifestation of BIS reactivity, scales measuring BAS reactivity often consist of a heterogeneous item set. This can account partly for lower internal consistency.

Correlations between the scales measuring BAS reactivity were positive and significant, just as the correlation between the scales measuring BIS reactivity. The correlation between the BIS scales was higher than that between the BAS factors.

With regard to the BIS/BAS Scales, BAS scales interrelated, whereas these BAS scales did not correlate with the BIS scales except for BIS-Anxiety and BAS-RR. This positive correlation converges with results obtained in clinical (Campbell-Sills et al., 2004) as well as non-clinical samples (e.g., Carver & White, 1994). Campbell-Sills et al. (2004) explained this positive relation by suggesting that affective responding is a common characteristic in BIS-Anxiety and BAS-RR, whereas BAS-D and BAS-FS focus on behavior. The two SPSRQ subscales, SP and SR, were unrelated.

Convergent validity analyses showed that scales measuring BIS reactivity correlated positively with Neuroticism and Anxiety and negatively with Extraversion and Venturesomeness, whereas scales measuring BAS reactivity correlated positively with Extraversion. No correlations between BAS reactivity and Neuroticism were found. Although all scales measuring BAS reactivity showed similar correlational patterns with Neuroticism and Extraversion, they differed in their relation to Impulsivity and Venturesomeness. BAS-FS scale and SR scale correlated positively with Impulsivity and Venturesomeness, whereas BAS-D and BAS-RR did not. A number of studies concluded that these scales, designed to relate to a

Table 4
Means (standard deviations) of BIS and BAS reactivity in the different ED types.

	AN-R (a)		AN-P (b)		BN (c)		*F*	Post hoc
	M	SD	*M*	SD	*M*	SD		
BIS/BAS Scales								
FFFS-Fear	6.91	1.51	6.65	1.27	6.97	1.01	.381	n.s.
BIS-Anxiety	17.66	3.34	17.00	2.48	18.03	2.20	.775	n.s.
BAS-RR	14.94	3.17	16.29	2.42	15.31	2.39	1.394	n.s.
BAS-D	10.10	2.79	10.94	2.79	9.83	2.32	1.01	n.s.
BAS-FS	9.28	2.19	11.88	2.42	10.94	1.92	9.559**	a < b,c
SPSRQ								
SP	16.67	5.04	13.06	6.16	15.18	5.39	2.41	n.s.
SR	9.60	3.05	11.23	3.72	11.68	3.40	3.15*	a < c

* $p < .05$.
** $p < .01$.

common construct, reflect distinct but related traits (e.g., Carver & Miller, 2006; Franken & Muris, 2006; Quilty & Oakman, 2004). Some studies (Carver & Miller, 2006; Franken & Muris, 2006) suggested that BAS-RR and BAS-D are related to impulses arising from heightened incentive sensitivity or reward sensitivity, whereas BAS-FS is related to impulses stemming primarily from a lack of constraint (rash impulsiveness). Quilty and Oakman (2004), on the other hand, suggested that BAS-D and BAS-RR reflect key concepts of the BAS, whereas BAS-FS has a broader focus, being equally related to BAS reactivity and impulsiveness. The SR scale of the SPSRQ, assumed to measure a unidimensional BAS factor, seems to have more in common with BAS-FS than with BAS-RR or BAS-D.

Confirming previous findings (Claes et al., 2006), we found lack of BAS reactivity to be associated with AN-R. More particularly, a lack of BAS reactivity could be found with regard to BAS-FS and SR. These results may suggest that a particular aspect of BAS reactivity discriminates between AN-R patients and other ED patients. Based on our previous considerations regarding the relation of BAS-FS and SR with impulsiveness, this discriminating aspect could probably reflect an impulsive trait related with BAS reactivity. Other studies already pointed out that impulsiveness was associated with BN and AN-P (Claes et al., 2006; Sohlberg, 1991). The AN-P patients seem to have more in common with BN patients than with restricting anorexics, which is also consistent with previous findings (e.g., De Silva & Eysenck, 1987). A significant difference in self-reported BIS reactivity did not emerge.

To summarize, the BIS/BAS Scales and the SPSRQ both have reasonable psychometric qualities in an ED sample. Most of our findings converge with results of other studies so that both measures can be used in an ED population with similar precautions as in a normal population (see e.g., Cogswell, Alloy, Van Dulmen, & Fresco, 2006). BIS/BAS Scales are preferred as those scales are in line with recent evolutions in the RST of Gray. However, the sample size of the current study is a serious caveat: it is rather small, possibly affecting fit measures and estimates of CFAs, and the power of detecting significant differences between ED types with MANOVA.

Studying BIS and BAS reactivity in ED patients can be most interesting as several disturbed eating behaviors (dieting, binge eating, purging) can be motivated by obtaining rewards or avoiding punishments. Dieting and purging can help people to achieve their thin ideal and as such, the reduced intake of calories can be experienced as rewarding. On the other hand, not being able to uphold this thin ideal and becoming overweight, can be experienced as a serious punishment, so that fear of punishment (i.e., fatness) becomes a motive to diet or purge. Also binge eating can have a rewarding function, for example when food is used to soothe disturbed affects or distress. Both the BIS/BAS Scales and the SPSRQ can be useful instruments to study these eating behaviors, however currently, only BIS/BAS Scales are in line with rRST.

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