The psychometric properties of the German language Reinforcement Sensitivity Theory-Personality Questionnaire (RST-PQ)

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Abstract

The aim of this study was to assess the psychometric properties of a German translation of the Reinforcement Sensitivity Theory of Personality Questionnaire (RST-PQ; Corr & Cooper, 2016). Five hundred and twenty-seven participants completed the German version of the RST-PQ, in addition to a battery of related self-report personality questionnaires. A six-factor structure, with two unitary defensive factors, fight–flight–freeze system (FFFS; related to fear) and the behavioural inhibition system (BIS; related to anxiety), and four behavioural approach system (BAS) factors (Reward Interest, Goal-Drive Persistence, Reward Reactivity, and Impulsivity), was supported by confirmatory factor analysis, confirming the English language version of the RST-PQ. Convergent and discriminant validity for the 6-factor structure was demonstrated in relation to existing personality scales. Results showed that the German version of the RST-PQ is a reliable and valid self-report measure of the revised Reinforcement Sensitivity Theory (rRST) of personality. The RST-PQ may facilitate future research on rRST specifically and, more broadly, on approach-avoidance theories of personality using German language samples.

Keywords: RST-PQ; approach; avoidance; BIS; FFFS; BAS; goal conflict; Reinforcement Sensitivity Theory.

The Reinforcement Sensitivity Theory (RST) is one of the more prominent theories of personality, especially among the biologically inspired family (Collins, Jackson, Walker, O'Connor, & Gardiner, 2016). It postulates that the source of the variation observed in the surface structure of personality resides in neurobehavioural systems responsible for appetitive and aversive motivation (Corr, 2016; Gray & McNaughton, 2000; McNaughton & Corr, 2004, 2008). The most recent version of RST postulates three major neuropsychological systems: the behavioural approach system (BAS), the fight-flight-freeze system (FFFS) and the behavioural inhibition system (BIS; Gray & McNaughton, 2000). As highlighted by Corr and McNaughton (2012), these biobehavioural systems are activated by stimuli appraised as reflecting either gain or loss – it is these attractors and repulsors, respectively, that activate the biobehavioural systems.

More specifically, the BAS is activated by attractor stimuli; the FFFS by repulsor stimuli; and the BIS by conflicting stimuli (e.g. coactivation of FFFS and BAS). The current version of RST is a revision of the original model of RST based on the work of Gray (e.g. Gray, 1982). The most significant change in revised RST (rRST) is the separation of FFFS/fear and BIS/anxiety processes, which are postulated to have different functional properties and distinct neuropsychopharmacological bases (Corr & McNaughton, 2012; McNaughton & Corr, 2004, 2008; Perkins et al., 2009) – there have also been refinements to the structure of the BAS (Corr, 2016).

One issue that has hampered progress in the development of rRST in human research is the lack of suitable self-report personality measures consistent with its theoretical tenets. Much research continues to use measures that were initially developed using the original model of RST (e.g. the BIS/BAS Scales; Carver & White, 1994). More recently, there have been several attempts to develop self-report measures that align more closely with rRST, including the Jackson 5 (Jackson, 2009) and the rRST-Q (Reuter, Cooper, Smillie, Markett, &

Montag, 2015). While the development of these measures represents a step forward in terms of testing rRST, they have several potential limitations. For example, both measures only have one factor for the BAS, and the Fight scales tend to positively correlate more strongly with the BAS rather than the FFFS (see Corr, 2016, for a fuller summary and comparison of RST questionnaires).

Another recent addition to the field of RST personality measurement is the Reinforcement Sensitivity Theory of Personality Questionnaire (RST-PQ; Corr & Cooper, 2016). The RST-PQ was developed on the basis of thematic facets consistent with the core features of rRST. After the development of a large pool of items, exploratory and confirmatory factor analyses were used to develop a theoretically faithful factor structure (see Corr & Cooper, 2016, for a much fuller description of the development of the items and the subsequent analyses). These analyses ultimately arrived at a six-factor structure: four BAS factors (Reward Interest, Goal-Drive Persistence, Reward Reactivity, and Impulsivity), and two unitary defensive factors, FFFS (related to fear) and BIS (related to anxiety). (An additional Fight factor was developed to complement the RST-PQ – previous research shows this is a problematic construct in rRST and needs to be kept separate; see Corr, 2016.) This structure was replicated across several large samples and its factors showed good internal consistency. Cronbach's alpha values for BIS, FFFS, Reward Interest, Goal-Drive Persistence, Reward Reactivity, and Impulsivity were 0.93, 0.78, 0.75, 0.86, 0.78 and 0.74, respectively (N = 831). The BAS scales showed moderate positive correlations with each other (r = .33-.48) except of Reward Reactivity and Impulsivity, which were not correlated (r = 0.02). BIS and FFFS showed also a moderately strong positive correlation with each other (r = .44) and both showed small to moderate positive correlations with Reward Reactivity and Impulsivity (r = .16-.21) and only weak correlations with Reward Interest and Goal-Drive Persistence (r = -.08-.07). The factors also largely showed good convergent and discriminant validity in relation to other widely used measures of personality.

Our aim in the current study is to introduce and evaluate the psychometric properties of a German language version of the RST-PQ. It is clearly an important step for this recently developed measure of rRST to be translated into different languages and replicated in order to facilitate rRST research. There is currently only one published German language measure for rRST; this is the measure by Reuter et al. (2015), mentioned above. The development of a German language version of the RST-PQ will allow researchers to compare the structure and validity of these measures. In the current study, we report on the factor structure of a German translated version of the RST-PQ. We expected to find the same six-factor structure found in the English version of the scales. We also examined the convergent and discriminant validity of the German RST-PQ with regards to theoretically-relevant personality measures related to the FFFS, BIS, and BAS.

In line with previous findings, we expect positive correlations of FFFS and BIS with Neuroticism. We predict that BIS would correlate much higher than the FFFS with STAI trait anxiety and, more specifically, with social anxiety, while FFFS would correlate higher with specific fear scales. For the BAS factors we expect positive correlations with Extraversion. In terms of the other Big Five factors, we predict Conscientiousness to correlate positively with Goal-Drive Persistence, and Openness to correlate positive with Reward Interest. For Impulsivity, we would expect a strongly positive correlation with other measures of Impulsivity and a negative correlation with Conscientiousness.

Method

Participants and Procedure

Five hundred and 27 healthy volunteers (259 males, M_{age} = 26.97, *SD* = 7.44; 268 females, M_{age} = 26.31, *SD* = 7.50) were recruited using emails, newspaper advertisements, and flyers distributed around the local community in Munich, Germany. Participants were first contacted and screened for their suitability in a telephone interview and were then invited to take part in the psychometric assessments in the laboratory. Exclusion criteria were: (1) any

current DSM-IV Axis I disorders (established using the German version of the Mini-International Neuropsychiatric Interview; Sheehan et al., 1998); (2) a past or current diagnosis of ADHD; (3) any diagnoses of psychotic disorders or ADHD amongst first-degree relatives; (4) a history or evidence of neurological disorders; (5) any current physical impairment; (6) any current consumption of over-the-counter or prescription medication (except for oral contraceptives in females); and (7) any visual impairments (other than the use of corrective lenses or glasses). Inclusion criteria were: (1) being aged between 18 and 55 years; and (2) speaking German as first language. Demographic data were collected using a purpose-written questionnaire recording age, gender, and years spent in full-time education.

Ethical approval was obtained from the ethics committee of the Faculty of Medicine of the University of Munich. All volunteers provided written informed consent and were reimbursed for their participation (25 Euros). The self-report personality data reported here were collected as part of a larger series of studies examining the genetic and neurobiological bases of cognition, brain function, and personality.

Materials

The Reinforcement Sensitivity Theory Personality Questionnaire. The Reinforcement Sensitivity Theory Personality Questionnaire (RST-PQ; Corr & Cooper, 2016) is a 65-item self-report questionnaire measure of the rRST of personality, comprising: BIS scale (23 items); FFFS scale (10 items); and four BAS scales - Reward Interest (7 items), Goal-Drive Persistence (7 items), Reward Reactivity (10 items), and Impulsivity (8 items). Each item is answered using a four-point Likert scale, ranging from 1 (*Not at all*) to 4 (*Highly*). The English version of the measure was translated into German by a bilingual German-English speaker; this version was then back-translated to English by a different bilingual English-German speaker. The resultant back-translated English items were checked against the original English items by one of the developers of the RST-PQ who is a native

English speaker. Some minor modifications were made to several of the items. The final version of the German RST-PQ is given in Electronic Supplementary Material 1. Cronbach's alpha values for the six scales in the current are reported in Table 3.

The NEO-FFI. The NEO-FFI (Costa & McCrae, 1992; Borkenau & Ostendorf, 1993) is an established 60-item self-report measure of the five-factor model of personality. It has a Likert-type response format, ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). Cronbach's alpha values for Extraversion, Neuroticism, Conscientiousness, Agreeableness, and Openness in the current study were 0.82, 0.85, 0.83, 0.73 and 0.71, respectively.

The State–Trait Anxiety Inventory. The State-Trait Anxiety Inventory Form-Y2 (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; Laux & Spielberger, 1981) is a 40-item self-report measure of trait and state anxiety. Only trait anxiety was measured in the current study. Items were rated on a four-point Likert-type response format, ranging from 1 (*almost never*) to 4 (*almost always*). Items were summed to form a total score for trait anxiety. The Cronbach's alpha value in the current study was 0.89.

A German version of the Fear Survey Schedule. The Fear Survey Schedule (FSS; Wolpe & Lange, 1977) is one of the most widely used measures of fear. The FSS comprises a list of items representing specific aversive stimuli such as *'open wounds'* or *'making mistakes'*. Different versions of the FSS, ranging in length from 8 items to 108 items, have been developed. The current study used a five-factor solution from the FSS based on a subset of 52 FSS items (Arrindell, 1980). The English version of the measure was translated into German in the same way as the RST-PQ. Respondents indicated, using a scale of 0 (*no fear*) to 4 (*very much fear*), how much they would be disturbed by each item. Total scores for each factor were derived by summing scores across the items within each respective factor. Cronbach's alpha values for the five factors Tissue Damage Fear, Social Fear, Fear of Sexual or Aggressive situations, Agoraphobia, and Animal Fear in the current study were 0.82, 0.92, 0.71, 0.68, and 0.77, respectively.

The Barratt Impulsiveness Scale. The Barratt Impulsiveness Scale (BIS-11; Patton et al., 1995; Preuss et al., 2008) is a 30-item self-report measure of impulsivity. All items are answered on a four-point Likert-type scale, ranging from 1 (*rarely/never*) to 4 (*almost always/always*). Cronbach's alpha for the BIS-11 total score was 0.82 in this study.

Data Analysis

Confirmatory factor analysis (CFA) was conducted with Mplus 7.11 (Muthén & Muthén, 2012) using a mean and variance adjusted weighted least squares estimation of the sample covariance matrix. This estimation provides more precise results for categorical data in comparison to the frequently used maximum-likelihood-method (Beauducel & Herzberg, 2006). Model fit was ascertained using the minimum fit function χ^2. As χ^2 values are potentially inflated by large sample sizes, fit was also examined using the root mean square error of approximation (RMSEA; Steiger, 1990) and the comparative fit index (CFI; Bentler, 1990). These fit indexes have been demonstrated to reliably indicate model fit in models with factor loadings ranging between .40 and .60 (Beauducel & Wittmann, 2005). The RMSEA provides a measure of model fit relative to the population covariance matrix when the complexity of the model is taken into account. RMSEA values of < .05 are suggestive of good fit and .05 to .08 as moderate fit. The CFI provides a measure of the fit of the hypothesized model relative to the baseline or independent model, with values usually ranging from 0.00 to 1.00. For the CFI, values above .95 are suggestive of good model fit and values above 0.90 suggest adequate model fit. Because the models were estimated by means of WLSMV, the significance tests for nested models were calculated with the χ^2difference test developed by Muthén and Muthén (Asparouhov & Muthén, 2006). We also investigated measurement invariance for gender and age by means of Multiple-Indicator Multiple-Cause (MIMIC) models. Only modification indices equal or greater than 10 were regarded as substantial. In order to address the construct validity of the German version of the RST-PQ, we explored

Pearson correlations of the RST-PQ scales with well-established measures of general personality.

Results

Skewness and kurtosis values for all items ranged from -1.48 to 1.52, and -1.00 to 2.33, respectively. According to Curran, West, and Finch (1996) skewness and kurtosis values of 0–2, and 0–7, respectively, can be taken as descriptive parameters of univariate normality. Mardias Multivariate Normality Test indicated that the data is not multivariate normal distributed. To account for the fact of dealing with categorical data which doesn't conform to the multivariate normal distribution, the more robust WLSMV estimator was used for the confirmatory factor analyses.

Confirmatory Factor Analysis

The hypothesized model (Model 1) was a six-factor single-order model with a BIS factor, a FFFS factor and four BAS factors (Reward Interest, Goal-Drive Persistence, Reward Reactivity, and Impulsivity) with all items freely loading on their respective *a priori* latent factor and loadings fixed at 0 for all other latent factors. The latent factors were free to correlate and all of the observed variable error terms were uncorrelated. This model corresponds to the final combined single-order factor model, which was evaluated in the English version of the RST-PQ (Corr & Cooper, 2016). The model fit indices for Model 1 were as follows in the current study: χ^2 (2118, N = 527) = 4705.002, $p < .0001$; CFI = 0.82; RMSEA = 0.048. This indicates acceptable global model fit in terms of the RMSEA, although it should be noted that the CFI value is below the cutoff point often used for assessing acceptable model fit (0.90). Despite this, all items had a robust loading on their respective factor, and the global model fit indices are similar to those reported for the English version in Corr and Cooper (2016). The BIS and FFFS latent factors were significantly positively correlated at 0.54. We investigate three alternative models which were all nested under Model 1 and could therefore be compared to it by means of a χ^2difference test.

The differentiation of FFFS/fear and BIS/anxiety is a central conceptual intention of the rRST and is operationalized in the conceptualization of the hypothesized factor structure of the RST-PQ. Therefore, we expect Model 1 (comprising two distinct factors, namely FFFS and BIS) to show an improved model fit compared to Model 2, a single-order model, in that the correlation between FFFS and BIS is fixed to one, implying that FFFS and BIS represent one factor. As expected, Model 2 showed significantly poorer global model fit than Model 1 $\chi^2_{diff}(1) = 165.774$, $p < .0001$. In accordance with Corr and Cooper (2016), we believe FFFS and BIS can conceptually and operationally be separated, but it is unrealistic to assume that FFFS-fear and BIS-anxiety processes are completely uncorrelated – indeed, rRST does not posit this (Corr, 2016). Hence, we expect Model 1 should show better model fit than Model 3, a single-order model, where the correlation between FFFS and BIS were fixed to 0. As expected, this model showed significant poorer global model fit than Model 1 $\chi^2_{diff}(1) = 136.577$, $p < .0001$.

The fourth model investigated in this study considered the hierarchical structure of the RST-PQ, namely that the four BAS factors load on a higher order "reward sensitivity" factor while FFFS and BIS were conceptualized as in Model 1. Model 4 also showed significantly poorer global model fit than Model 1 $\chi^2_{diff}(2) = 76.86$, $p < .0001$.

All CFA models were tested in terms of MIMIC models (Muthén, 1989) to investigate the measurement invariance across gender and age. Measurement invariance was observed for the investigated variables across all models. Model fit indices of all tested models are reported in Table 5.

Table 3 shows the descriptive statistics, Cronbach's alpha values and correlations for the RST-PQ scales. The BAS factors had moderately large positive correlations with each other, with the exception of the correlation between Goal Drive-Persistence and Impulsivity, which was close to 0. The BIS and FFFS factors were significantly positively correlated. The four BAS factors generally had low correlations with the FFFS and BIS.

Correlations with Other Personality Measures

Table 4 shows the intercorrelations of the sum scores of RST-PQ factors with other well-established personality measures. For the RST-PQ BIS factor, there are large significant positive correlations with the Neuroticism scale of the NEO-FFI and the Trait Anxiety scale, and moderate positive correlations with the FSS sub-scales, particularly the Social Fear scale. The RST-PQ FFFS factor showed moderately strong positive correlations with the FSS scales and NEO-FFI Neuroticism but is only weakly positively correlated with STAI anxiety. These associations are as expected from rRST and are consistent with the findings of the English version RST-PQ.

All of the RST-PQ BAS scales positively correlated with NEO-FFI Extraversion. Reward Interest is negatively correlated with NEO-FFI Neuroticism, STAI anxiety and more weakly with the FSS scales. In addition, Reward Interest is the only BAS factor which is positively correlated with NEO-FFI Openness. For Goal-Drive Persistence, there are large positive correlations with NEO-FFI Conscientiousness and negative correlations with the NEO-FFI Neuroticism and STAI anxiety. The BAS Reward Reactivity factor had small to modest positive correlations with the FSS scales and the Barratt Impulsivity Scale. Lastly, the BAS Impulsivity showed a strong correlation with the Barratt Impulsivity Scale. In general, these associations are in accordance with the theoretical bases of rRST. Gender was moderately related to RST-PQ FFFS scores, with females having higher scores, which has been found before with the English version RST-PQ. Otherwise, gender and age had only weak relationships with all other scales.

Discussion

We examined the factor structure and psychometric properties of a German-translated version of the recently developed RST-PQ (Corr & Cooper, 2016). We also examined the convergent and discriminant validity by correlating its factors with established measures of personality. The results support the six-factor structure reported from the original English

version of the scales, with clear differentiation of FFFS and BIS, and four separate BAS factors comprising Reward Interest, Goal Drive-Persistence, Reward Reactivity, and Impulsivity. Regarding the BAS scales, the conceptualization of four single-order BAS factors showed significantly better model fit than a hierarchical structure with a higher order BAS factor “reward sensitivity”. Regarding FFFS and BIS the conceptualization of two separate but correlated factors demonstrated better fit than the factor models in which FFFS and BIS were either uncorrelated (correlation fixed to zero) or reflected one factor (correlation fixed to one).The hypothesized six-factor CFA model with all items showed reasonably good fit with the data: the model fit indices, factor loadings and factor inter-correlations were very similar to those reported in the English language version (Corr & Cooper, 2016). Cronbach's alpha values for the resultant scales were acceptable.

The correlations between the RST-PQ scales and other personality measures were largely as predicted, and were very similar to those reported in the original study, where the same or similar scales were used (Corr & Cooper, 2016). In broad terms, the FFFS, BIS and BAS scales from the RST-PQ correlated most strongly with the scales that were expected. Of particular note, RST-PQ BIS was very highly positively correlated with STAI trait anxiety and NEO-FFI Neuroticism, as we would expect, with the RST-PQ FFS scale also having positive correlations with these scales, but of a substantially lower magnitude. This provides further support for the psychometric separation of the FFFS and BIS scales. Also, both the FFFS and the BIS were moderately correlated with social fear and tissue damage fear, but the FFFS showed a higher correlation with tissue damage fear (representing fear proper), whereas the BIS showed a higher correlation with social fear (representing goal-conflict related anxiety). The Barratt Impulsivity Scale showed the highest correlation with the RST-PQ BAS Impulsivity scale, but did not correlate strongly with the other BAS scales, as expected. For the other NEO-FFI scales, Extraversion correlated positively and moderately with all of the BAS scales, while Conscientiousness had a large positive correlation with BAS Goal-Drive

Persistence, but none of the other RST-PQ scales. Agreeableness and Openness had only small correlations with each of the RST-PQ scales. In sum, this initial investigation of the psychometric properties of the German language RST-PQ suggests it is comparable to the English language RST-PQ and potentially a viable tool for research on rRST in German speaking samples.

Further research will be needed to evaluate in more detail the psychometric properties of the German RST-PQ. For example, it would be important to establish the divergent validity of the BIS and FFFS scales in the RST-PQ in relation to neuroscientific and behavioural data, given the putative differences in the functional properties and neuropsychopharmacological bases associated with these systems (Corr & McNaughton, 2012; McNaughton & Corr, 2004, 2008; Perkins et al., 2009). Similarly, it would be important for future research to test directly, and contrast the validity and efficacy, of the different measures that have been developed recently for rRST in relation to theoretically relevant variables (see Corr, 2016). With regards to German speaking samples, this would involve a direct contrast with the German RST-PQ reported here and the existing German language version of the Reuter et al. (rRST-Q; Reuter et al., 2015). Establishing the validity of the German RST-PQ in relation to a broader set of more widely used personality measures, for example the German version of the Carver and White BIS/BAS scales (Strobel, Beauducel, Debener, & Brocke, 2001), should also be a priority for future research.

In conclusion, we present and report a German language version of the RST-PQ. The factor structure of the original English version was replicated in the German version, and initial evidence for the convergent and discriminant validity of the resulting scales was good. Future studies should seek to establish further the validity of the RST-PQ using neuroscientific and behavioural data. Having a version of the RST-PQ that is suitable for German speaking samples will clearly assist in this process.

Electronic Supplementary Material

ESM1. German version of the RST-PQ (Corr-Cooper-RST-PQ-German-2016.pdf)

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Table 1

Factor loadings of BAS items for confirmatory factor analyses (CFA) of the six-factor single-order model.

	CFA			
Thematic Facets	**1:RI**	**2: GDP**	**3:RR**	**4: Imp**
Reward Interest				
I am always finding new and interesting things to do.	0.84			
I regularly try new activities just to see if I enjoy them.	0.60			
I get carried away by new projects.	0.66			
I take a great deal of interest in hobbies.	0.68			
I am very open to new experiences in life.	0.58			
I am a very active person.	0.72			
I am always 'on the go'.	0.60			
Drive-Persistence				
I put in a big effort to accomplish important goals in my life.		0.76		
I am motivated to be successful in my personal life.		0.78		
I often overcome hurdles to achieve my ambitions.		0.72		
I feel driven to succeed in my chosen career.		0.64		
I am very persistent in achieving my goals.		0.81		
Goal Planning				
I think it is necessary to make plans in order to get what you want in life.		0.41		
I will actively put plans in place to accomplish goals in my life.		0.76		
Reward Reactivity				
I am especially sensitive to reward.			0.43	
Good news makes me feel over-joyed.			0.58	
I love winning competitions.			0.68	
I get a special thrill when I am praised for something I've done well.			0.61	
I get very excited when I get what I want.			0.76	
I always celebrate when I accomplish something important.			0.47	
I find myself reacting strongly to pleasurable things in life.			0.60	
I often feel that I am on an emotional high.			0.45	
Sometimes even little things in life can give me great pleasure.			0.47	
I often experience a surge of pleasure running through my body.			0.68	
Impulsivity				
I think I should 'stop and think' more instead of jumping into things too quickly.				0.48
I sometimes cannot stop myself talking when I know I should keep my mouth closed.				0.44
I often do risky things without thinking of the consequences.				0.60
I find myself doing things on the spur of the moment.				0.65
I'm always buying things on impulse.				0.50
I would go on a holiday at the last minute.				0.50
I think the best nights out are unplanned.				0.36
If I see something I want, I act straight away.				0.48
1. Reward Interest	-			
2. Goal-Drive Persistence	0.57*	-		
3. Reward Reactivity	0.56*	0.39*	-	
4. Impulsivity	0.55*	0.08	0.59*	-

Note.. * $p < .001$. RI = Reward Interest; GDP = Goal-Drive Persistence; RR = Reward Reactivity; Imp = Impulsivity.

Table 2
Factor loadings of FFFS and BIS items for confirmatory factor analyses (CFA) of the six-factor single-order model.

	CFA	
Thematic Facets	**FFFS**	**BIS**
Flight		
I would run fast if I knew someone was following me late at night.	0.34	
I would run quickly if fire alarms in a shopping mall started ringing.	0.60	
I would leave the park if I saw a group of dogs running around barking at people.	0.58	
Active Avoidance		
There are some things that I simply cannot go near.	0.66	
I would not hold a snake or spider.	0.56	
Freezing		
I would be frozen to the spot by the sight of a snake or spider.	0.58	
Looking down from a great height makes me freeze.	0.55	
I would instantly freeze if I opened the door to find a stranger in the house.	0.53	
I would freeze if I was on a turbulent aircraft.	0.54	
I am the sort of person who easily freezes-up when scared.	0.72	
Motor Planning Interruption		
I take a long time to make decisions.		0.52
When nervous, I find it hard to say the right words.		0.46
When nervous, I sometimes find my thoughts are interrupted.		0.61
I often find myself lost for words.		0.61
My behavior is easily interrupted.		0.56
Cautious Risk Assessment		
I worry a lot.		0.47
People are often telling me not to worry.		0.61
I often worry about letting down other people.		0.54
The thought of mistakes in my work worries me.		0.58
When trying to make a decision, I find myself constantly chewing it over.		0.78
Obsessive Thoughts		
I find myself thinking about the same thing over and over again.		0.66
I am often preoccupied with unpleasant thoughts.		0.71
It's difficult to get some things out of my mind.		0.52
My mind is dominated by recurring thoughts.		0.75
My mind is sometimes dominated by thoughts of the bad things I've done.		0.83
I often wake up with many thoughts running through my mind.		0.53
I'm always weighing-up the risk of bad things happening in my life.		0.82
Behavioral Disengagement		
I often find myself 'going into my shell'.		0.62
I feel sad when I suffer even minor setbacks.		0.68
I often feel depressed.		0.43
I have often spent a lot of time on my own to "get away from it all".		0.55
I sometime feel 'blue' for no good reason.		0.76
When feeling 'down', I tend to stay away from people.		0.72
1	-	
2	0.54	-

Note. Factor correlation significant at $p < .001$.

FFFS = Flight-Fight-Freeze System; BIS = Behavioural Inhibition System

Table 3
Descriptive Statistics and Scale Correlations of the RST-PQ scales.

	1	2	3a	3b	3c	3d
1. FFFS:		.46	-.12	.02	.26	.16
2. BIS:		-	-.21	-.13	.11	.14
3. BAS						
3a. Reward Interest			-	.43	.45	.40
3b. Goal-Drive Persistence				-	.35	.05
3c. Reward Reactivity					-	.45
3d. Impulsivity						-
Mean	19.44	45.05	20.24	21.42	27.76	18.33
SD	5.50	11.07	3.78	3.70	4.84	3.86
Min	10.00	24.00	7.00	8.00	14.00	8.00
Max	34.00	84.00	28.00	28.00	39.00	31.00
Skewness	0.35	0.54	-0.31	-0.44	-0.25	0.29
Kurtosis	-0.65	-0.01	-0.01	-0.23	-0.23	0.03
Alpha	0.76	0.91	0.80	0.82	0.78	0.67
Range of Corrected Item Total Correlation	.31-.57	.37-.70	.46-.59	.40-.69	.28-.61	.27-.50
Range of Item Difficulty	0.38-0.60	0.36-0.63	0.58-0.82	0.69-0.85	0.51-0.89	0.43-0.80

Note. FFFS = Flight-Fight-Freeze System; BIS = Behavioural Inhibition System;

BAS = Behavioural Approach

Table 4

Correlations Between RST-PQ and Other Measures of Personality

	RST-PQ Factors					
Personality:	FFFS	BIS	BAS-RI	BAS-GDP	BAS-RR	BAS-Imp
BIS-11:						
Impulsivity	.15**	.24***	.10*	-.37***	.20***	.60***
Five-Factor Model:						
Openness	-.11**	.12**	.20***	.07	.08	.06
Conscientiousness	.02	-.23***	.27***	.59***	.12**	-.13
Extraversion	-.11*	-.38***	.59***	.35***	.46***	.38***
Agreeableness	.05	-.12**	.16***	.08	.13**	-.09*
Neuroticism	.38***	.70***	-.28***	-.24***	.01	.13**
Fear Survey Schedule:						
Tissue Damage Fear	.43***	.30***	-.08	-.01	.20***	.15***
Social Fear	.34***	.56***	-.20***	-.11**	.09*	.07
Agoraphobia	.43***	.43***	-18***	-.09*	.10*	.05
Sex Fear	.39***	.39***	-15**	-.05	.11*	.06
Animal Fear	.48***	.24***	-10*	-.01	.10*	.12*
STAI:						
Trait Anxiety	.27***	.76***	-34***	-.30***	-.10*	.05
Age	-.01	-.14**	.00	-.14**	-.17***	.04
Gender	.44***	.23***	.06	.05	.21***	.20***

Note. N = 526 for the FSS, N=527 for all other correlations; BIS-11 = Barratt Impulsiveness Scale; BIS = Behavioural Inhibition System; FFFS = Flight-Fight-Freeze System; BAS = Behavioural Approach System; RI = Reward Interest; GDP = Goal-Drive Persistence; RR= Reward Reactivity; Imp = Impulsivity.

* p < .05. ** p < .01. *** p < .001.

Table 5

Fit Indices of the four tested CFA MIMIC models

CFA model	X^2	*df*	CFI	RMSEA	X^2 difference test
Model 1: combined single order factor model	4705.002***	2118	.82	.048	-
Model 2: combined single order factor model with correlation fixed to 1 between BIS and FFFS	4977.715***	2119	.80	.051	165.774 (1) ***
Model 3: combined single order factor model with correlation fixed to 0 between BIS and FFFS	5652.384***	2119	.76	.056	136.577(1) ***
Model 4: Second order factor model with BAS	5020.644***	2128	.80	.051	.119.778(10) ***

*** $p < .001$