



City Research Online

City, University of London Institutional Repository

Citation: Krupić, D., Križanić, V. & Corr, P. J. (2016). Personality and defensive behaviour: A factor analytic approach to threat scenario choices. *Personality and Individual Differences*, 94, pp. 303-308. doi: 10.1016/j.paid.2016.01.045

This is the accepted version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: <http://openaccess.city.ac.uk/15894/>

Link to published version: <http://dx.doi.org/10.1016/j.paid.2016.01.045>

Copyright and reuse: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

City Research Online:

<http://openaccess.city.ac.uk/>

publications@city.ac.uk

1
2
3
4
5
6
7
8
9

Personality and defensive behaviour:
A factor analytic approach to threat scenario choices

Krupić, D.

Krizanic, V.

Corr, P. J.

10 **Abstract**

11 Although people tend to react in specific ways in threatening situations, research
12 points to the importance of individual differences in these defensive behaviours. From the
13 perspective of the reinforcement sensitivity theory (RST), this study examined the role of
14 personality traits in predicting these fight, flight and freeze behaviours. Four RST
15 questionnaires and the Blanchards' threat scenarios were used with a total of 1,019
16 participants. Threat scenarios were modified and examined by exploratory factor analysis
17 (EFA), while their relationship with RST questionnaires was explored by correlational and
18 regression analyses. The EFA revealed an orthogonal two-dimensional structure of defensive
19 direction: Defensive direction toward threat, and defensive direction away threat while
20 defensive intensity was not separately extracted. Results revealed that different
21 operationalisations of the BAS, BIS and FFFS, from the various RST questionnaires,
22 produced different associations with the Blanchards' threat scenarios. In general, BIS, Flight
23 and Freezing scales predicted tendencies moving away from the threat, while Fight and some
24 BAS scales predicted tendencies moving toward threat in dangerous situations. These
25 findings challenge some aspects of RST, especially the lack of association between the BIS
26 and defensive direction toward threat. Directions for further research are indicated.

27

28 **Keywords: reinforcement sensitivity theory, personality, threat, defensive behaviour**

29 Personality and defensive behaviour:

30 A factor analytic approach to threat scenario choices

31 Imagine you are walking alone in the street. Suddenly a man with a knife starts
32 running in your direction. How would you react? Would you fight or flee? If there are no
33 individual differences in defensive behaviour, all people should behave in the same manner
34 in such a life-threatening situation. Certainly, when the influence of situations and traits are
35 compared, the situation has the greater impact at the behavioural level (Ein-Dor & Perry-
36 Paldi, 2014). Still, people differ in their levels of fear and anxiety, and as shown below these
37 differences should be expected to relate to differences in defensive reactions. For example, in
38 occupation life some people have a preference towards occupations such as soldiers, fire-
39 fighters, and during leisure activities some have a preference towards dangerous hobbies such
40 as free climbing and paragliding. Other people would not dream of engaging in these
41 occupations or activities. In the clinical domain, people who suffer from phobic disorders can
42 perceive even walking in a neighbourhood as a life dangerous activity. Hence, it seems that,
43 indeed, people do differ in the way they perceive and behave in potentially threatening
44 situations.

45 Currently, RST is the most prominent theory explaining the role of individual
46 differences in fear and anxiety-related behaviours, and also approach-related behaviours. It is
47 a neuropsychological theory of personality that assumes the existence of three emotional-
48 motivational systems: one approach system (i.e., Behavioural Approach System, BAS); and
49 two avoidance systems (i.e., Behavioural Inhibition System, BIS; and Fight, Flight, Freeze
50 System, FFFS). The most distinctive features of the two avoidance systems are emotional
51 output and defensive direction: The BIS activates behavioural repertoire when moving
52 *toward* threat, eliciting the emotional state of anxiety; while the FFFS activates behaviour

53 that moves the individual *away* from threat and elicits the emotional state of fear (Corr, 2008;
54 Corr, 2011; Gray & McNaughton, 2000; McNaughton & Corr, 2004).

55 FFFS-related fear should occur in the context of much clearer danger, eliciting
56 avoidance and escape behaviours; whereas BIS-related anxiety should occur in ambiguous
57 threat situations, leading to risk assessment (checking out, exploration, investigation)
58 (Blanchard, Hynd, Minke, Minemoto, & Blanchard, 2001). In prediction of specific defensive
59 behaviour, situation factors need to be taken into account. When a place of
60 concealment/protection is present in clearly dangerous situations, hiding is elicited; but, in
61 the context of inescapable dangerous situations, two distinct defensive behaviours could be
62 elicited: freezing or attack (defensive fight). If the source of threat is in near temporo-spatial
63 distance, and escape is not possible, then freezing ('playing dead') is an adaptive form of
64 immobilization in order evade detection – however, if spotted by the threat, then the only
65 viable behavioural reaction is to attack the source of threat in order (a) to protect oneself, and
66 (b) escape the situation. There are now extensive experimental animal studies supporting
67 these statements (Blanchard et al., 2001; Blanchard, Griebel, Pobbe, & Blanchard, 2011; Corr
68 & McNaughton, 2008; Shuhama, Del-Ben, Loureiro, & Graeff, 2007).

69 In marked contrast to animal studies, examination of human defensive behaviour
70 typically relies on self-report data, which is reasonable from ethical and convenience points
71 of view. Although self-report methodology has limitations, it still presents an invaluable
72 source of information (Pappens et al., 2013). However, issues are raised concerning the
73 compatibility of behavioural and questionnaire data, and how each set of data relates to
74 findings from experimental animals.

75 The best known self-report instrument for measuring defensive behavioural repertoire
76 in human was developed by Blanchard et al. (2001) on the basis of their extensive rodent

77 studies. Twelve scenarios present different threatening situations are modelled on distance to
78 threat and situational factors of avoidance/escapability. Additionally, ten behaviours are
79 provided from which participants must chose to match the 12 threat scenarios: hide; freeze,
80 immobilization; run away, try to escape; threaten to scream or call for help; yell, scream, or
81 call for help; threaten to attack; attack or struggle; check out, approach, or investigate; look
82 for something to use as a weapon; and, beg, plead for mercy, or negotiate. Studies have
83 indicated that threat scenarios can predict (Erber, Szuchman, & Prager, 2001) or even elicit
84 emotional and physiological reactions (Bernat, Calhoun, & Adams, 1999; Conklin, Tiffany,
85 & Vrana, 2000). Hence, findings suggest that it can be used as roughly fair measure of
86 defensive behavioural repertoire.

87 Previous data indicate that personality explains a significant portion of individual
88 variances in the Blanchard's threat scenarios. Perkins and Corr (2006) developed a coding
89 system to assess *defensive direction* and *defensive intensity* (see Figure 1). These constructs
90 present an important way to understand individual differences in defensive behaviours (Gray
91 & McNaughton, 2000; McNaughton & Corr, 2004). Defensive intensity presents a perceived
92 temporo-spatial distance of the threat, while defensive direction presents behavioural
93 tendencies that can be divided into direction *toward* or direction *away* from the threat.
94 Studies have shown that anxious and fear-prone individuals have shorter defensive distance
95 (i.e., they experience threatening stimuli as being more intense than others). In relation to
96 personality, Spielberger's trait anxiety is associated with a tendency to orientate towards
97 threat (Perkins & Corr, 2006); psychoticism (tough-mindedness) negatively relates to
98 defensive intensity; while the BIS scale positively correlates to both defensive intensity and
99 direction (Perkins, Cooper, Abdelall, Smillie, & Corr, 2010; Perkins & Corr, 2006).

100

- Figure 1 -

101 Studies showing the importance of personality in these threat scenarios pose some
102 methodological problems and unresolved issues. First, threat scenarios provide responses on
103 nominal measurement level, which limits the possible range of available statistical
104 procedures to analyse defensive behaviours. The first attempt to calculate total scores from
105 threat scenarios came from Perkins and Corr (2006). They developed a coding system for
106 defensive direction and distance upon theoretical assumptions of RST, but it has not yet been
107 empirically tested by means of exploratory factor analysis EFA. Secondly, a recent study
108 suggests differences in operationalization of the BIS and FFFS scales between various RST
109 purpose built questionnaires (Krupić, Križanić, Ručević, Gračanin, & Corr, 2015). Hence,
110 both the threat scenarios and personality questionnaires deserve further empirical
111 examination, before relation between personality and threat scenarios can be established.

112 The aim of this study is to test the relevance of personality traits in threat scenarios.
113 Bearing in mind these methodological problems, the coding system will be examined and
114 several RST questionnaires that contain separate BIS and FFFS scales will be compared.

115 Psychometric examination of the coding system requires a slight methodological
116 modification of the threat scenarios. Beside the original procedure for the threat scenarios,
117 five point rating scales are provided for each of 10 defensive behaviours for the 12 threat
118 scenarios. This modification in procedure allows the computing of total scores for 10
119 defensive behaviours across 12 threat situations. This modified procedure permits closer
120 examination by exploratory factor analysis (EFA). These results may support or suggest
121 modifications to the operationalization of defensive intensity and defensive direction.
122 Furthermore, administering four RST questionnaires alongside the threat scenarios allows
123 detection of operational differences between competing questionnaires in relation to the
124 statistical derived factors of defensive behaviour.

125 On the basis of previous studies, we expected to replicate past findings: (a) the BIS
126 and FFFS correlate with defensive intensity, reflecting greater overall threat sensitivity; (b)
127 the FFFS positively correlates with defensive direction (moving away from the source of
128 threat); and (c) the BIS negatively correlates with defensive direction (moving towards the
129 source of threat).

130

131

Method

Participant and procedure

133 A total of 1,019 university students (412 males) ranging in age from 12 to 68 (M =
134 23.78, SD = 8.23) completed a battery of questionnaires online via Limesurvey software.

Instruments

136 *Threat scenarios* (Blanchard et al., 2001) have been studied previously (Mesquita et
137 al., 2011; Perkins & Corr, 2006; Perkins et al., 2010; Shuhama et al. 2008). They are
138 designed to measure 10 defensive behaviours in 12 threatening situations. This instrument
139 was administered in original procedure as in Blanchard et al's (2001). Defensive behaviours
140 were rated on a 5-point Likert type scale. Furthermore, scores for defensive direction and
141 defensive intensity were computed in accordance with the procedure detailed by Perkins &
142 Corr (2006) using the formula: *Defensive intensity* = (Risk assessment + Threaten to scream
143 + Threaten to attack + Begging) + 2 X (Looking for a weapon + Freeze + Run + Hide) + 3 X
144 (Attack + Yell/Scream); and *Defensive direction* = (Risk assessment + Threaten to scream +
145 Threaten to attack + Begging + Looking for a weapon + Attack + Yell/Scream) + 1.5 X
146 Freeze + 2 X (Run + Hide).

147 All subscales computed with the modified procedure achieved Cronbach's alpha
148 greater than .80, while Defensive intensity and direction bellow .70, $\alpha = .66$ and .62,
149 respectively (*see Table 2*).

150 ***RST personality trait.*** Four RST questionnaires were administered to obtain measures
151 of the BAS, BIS and FFFS. The most widely used RST questionnaire, the 20-item BIS/BAS
152 Scales (Carver & White, 1994) contains the BIS scale and three BAS subscales: Drive, Fun
153 seeking and Reward Responsiveness. Later, Corr & McNaughton (2008) suggested splitting
154 the BIS scale into BIS and FFFS scale, which is applied in this study. Items "*Even if*
155 *something bad is about to happen to me, I rarely experience fear or nervousness*" and "*I have*
156 *few fears compared to my friends*" formed FFFS, whereas the other five formed BIS scale, as
157 used in Beck, Smits, Claes, Vandereycken, & Bijttebier (2009). One of the most recent RST
158 questionnaires, the 30-items Jackson 5 (Jackson, 2009), contains five scales: BAS, BIS,
159 Fight, Flight and Freezing, the same as 29-item Reinforcement Sensitivity Questionnaire
160 (RSQ; Smederevac, Mitović, Čolović & Nikolašević, 2014). Finally, a 73-item
161 Reinforcement Sensitivity Theory Personality Questionnaire (RST-PQ; Corr & Cooper,
162 2015) has four scales: BAS (with four subscales: Reward Interest, Goal-Drive Persistence,
163 Reward Reactivity, and Impulsivity), BIS and FFFS, accompanied with a separate measure of
164 Defensive Fight. All of the four RST questionnaires are well studied and possess adequate
165 psychometric characteristics. All questionnaires are translated and validated in Croatian
166 language (Krupić et al., 2015).

167 **Results**

168 Results of EFA examining factor structure of Blanchard's threat scenarios are
169 presented in Table 1, and descriptive statistics and correlations with personality
170 questionnaires in Table 2. Measurement adequacy coefficient KMO was .79. We used

171 principal axis factoring as a method of extraction with oblique rotation. All three criteria
172 (eigenvalue larger than one, Scree plot and parallel analysis) suggested a two-factor solution
173 that explained 59.61% of variance. Correlation between two axes was $r = .02$. The two
174 factors are labelled *defensive direction away from threat* and *defensive direction toward*
175 *threat*.

176 For comparability with previous studies, defensive intensity and defensive direction
177 were computed upon original coding system. Defensive direction away and defensive
178 direction toward threat are reliable scales achieving Cronbach's α reliability coefficient .78
179 and .89, respectively, while defensive intensity and defensive direction have somewhat lower
180 reliability coefficients, $\alpha = .66$ and $.62$, respectively. Correlations between defensive direction
181 and defensive direction away and defensive direction toward threat were $r = .52$ and $r = -.48$,
182 respectively; while defensive intensity correlated only with defensive direction away threat (r
183 $= .39$). Finally, defensive direction and defensive intensity correlated positively ($r = .41$),
184 which is very similar to ones obtained in Perkins & Corr (2006), and Perkins et al. (2010).

185 All correlation coefficients were significant at $p < 0.01$. These results suggest that
186 Defensive direction is not unidimensional, but rather is a two-dimensional and orthogonal
187 construct, while defensive intensity is not uniquely captured with modified threat scenarios.

188 - TABLE 1 -

189 *Correlation between personality and behavioural defensive tendencies*. Data are
190 presented in 14 x 22 correlation matrix. Two main patterns of correlations are most relevant.
191 First, scales of BIS, Flight and Freezing correlate positively with defensive direction away
192 threat, and negatively with defensive direction toward threat. The only exception is the BIS
193 from Jackson 5, which correlated very poorly with all defensive behaviours. Secondly, all
194 fight scales correlated positively with defensive direction toward threat. Correlations with

219 Both BIS scales from BIS/BAS Scales, Jackson-5 and RST-PQ correlated positively
220 with defensive direction away threat, and only BIS from RST-PQ correlated negatively to
221 defensive direction toward threat. All Flight/Freezing scales have predicted defensive
222 direction away threat, while only RST-PQ have predicted defensive direction toward threat.
223 All fight scales have predicted defensive direction toward threat. Finally, BAS from RSQ,
224 Impulsivity and Drive predicted defensive direction toward threat, while rests of BAS
225 subscales were not significant predictors.

226 Discussion

227 The main aim of this study was to examine the role of personality traits in predicting
228 defensive behavioural repertoire in Blanchard et al.'s (2001) threat scenarios using a new
229 methodological approach. The second aim was to explore potential bias in results due to
230 differences between various RST purpose built questionnaires. Using a 5-point scale, and
231 measuring 10 threat reactions for all 12 scenarios, defensive intensity and defensive
232 directions as defined by nominal measurement were replaced by two orthogonal dimensions
233 of defensive direction toward threat and defensive direction away threat. This modified
234 procedure revealed a different set of results: originally, defensive direction represented a
235 bipolar continuum, while our data indicate that two sides of the continuum reflect two
236 orthogonal dimensions.

237 In line with our first hypothesis, we replicated the findings using the original coding
238 system of defensive intensity and defensive direction. Specifically the BIS and FFFS of all
239 four RST questionnaires correlated positively with defensive intensity and defensive
240 direction (Perkins & Corr, 2006; Perkins et al., 2010). Furthermore, theoretically congruent
241 findings are correlations between fight, flight, freezing behavioural reactions and their same-
242 named personality traits, indicating good predictive validity. However, the BIS from all four

243 questionnaires did not correlate with either risk assessment or with defensive direction
244 toward threat, which did not meet the RST prediction and also confirm previous findings
245 (Perkins & Corr, 2006; Perkins et al., 2010). The BIS and Flight and Freezing scales
246 represents defensive behaviour that moves away from the threat, while fight scales represent
247 defensive behaviours that moves individual toward threat. According to the theory, the BIS
248 should show an opposite pattern. The one crumb of comfort was the higher correlation of
249 RST-PQ fear with defensive direction away threat, as compared with RST-PQ anxiety.
250 Overall, results provide partial support for the theoretical assumption. The Flight/Freeze
251 scales predict defensive direction away threat, while Fight scales predict defensive direction
252 toward threat.

253 The most problematic finding is the positive correlation between the BIS and
254 defensive direction away threat, instead with defensive direction toward threat (particularly
255 with risk assessment), as was predicted. This finding is not in line with pharmacologic study
256 of Perkins et al. (2013), where anxiolytic drug lorazepam had decreased risk assessment
257 behaviour in anxious individuals. This discrepancy may be caused by difference between
258 self-report and behavioural experiments. However, in the same study, Perkins et al. (2013)
259 also discuss on joint effects of lorazepam on panic and anxiety symptoms. They explain that
260 it is possible that anxiolytic drugs effects on threat perception that can trigger both anxiety
261 and phobia. This may be relevant for evaluation of the items in RST questionnaires in this
262 study. Items in BIS scales in all four RST questionnaires refer to end states of anxiety that are
263 very similar to end-states of fear. It may be more appropriate if the BIS scales focuses on
264 situations that *trigger* anxiety and related defensive behaviours. According to RST, anxiety
265 rises when approaching a threat and in the end it will result in similar emotional state of fear
266 (high arousal). On other hand, fear should rise momentary after presence of the threat and

267 should result in moving away from threat. According to this view, highly anxious individuals
268 should have lower threshold of experiencing anxiety when *entering* in threat situations, while
269 more fearful individuals should express more intense behavioural reaction when threat is
270 already present. Similarly, this argument also applies for Blanchard's threat scenarios. All
271 items describe final behavioural manifestations, without describing processes that precedes
272 the final behavioural output. In light of this, the BIS and FFFS both predicting defensive
273 direction away threat can be interpreted as being consistent with RST if we assume that they
274 concern end-state. Therefore, before coming to any final conclusions concerning defensive
275 direction of anxiety it may be more suitable to use behavioural tasks or more carefully
276 planned experimental studies that could operationalize processes underlying the BIS.

277 To conclude, four RST questionnaires highly converge, except the BIS scale from
278 Jackson-5. Further, the BIS/BAS scales show the lowest predictive validity for defensive
279 behaviours, and it should be more suitable to use RSQ and RST-PQ in study of defensive
280 behaviour. Finally, Blanchard's threat scenarios differentiate two defensive behaviours that
281 are distinguished by direction, and it is not appropriate as an instrument of defensive
282 intensity. We suggest future studies use more experimental designs to study anxiety and fear-
283 related behaviours.

284

285

Reference

286

Beck, I., Smits, D. J. M., Claes, L., Vandereycken, W., & Bijttebier, P. (2009). 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. *Personality and Individual Differences, 47*, 407-412.

290

doi.org/10.1016/j.paid.2009.04.007

291

Bernat, J. A., Calhoun, K. S., & Adams, H. E. (1999). Sexually aggressive and nonaggressive men: Sexual arousal and judgments in response to acquaintance rape and consensual analogues. *Journal of Abnormal Psychology, 108*, 662–673. doi:10.1037/0021-843X.108.4.662

295

Blanchard, C. D., Hynd, A. L., Minke, K. A., Minemoto, T., & Blanchard, R. J. (2001). Human defensive behaviors to threat scenarios show parallels to fear- and anxiety-related defense patterns of non-human mammals. *Neuroscience and Biobehavioral Reviews, 25*, 761–770. doi:10.1016/S0149-7634(01)00056-2

299

Blanchard, D. C., Griebel, G., Pobbe, R., & Blanchard, R. J. (2011). Risk assessment as an evolved threat detection and analysis process. *Neuroscience and Biobehavioral Reviews, 35*(4), 991-998. doi:10.1016/j.neubiorev.2010.10.016

302

Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and

303

affective responses to impending reward and punishment: The BIS/BAS Scales. *Journal*

304

of personality and social psychology, 67(2), 319-333. [doi:/10.1037/0022-3514.67.2.319](https://doi.org/10.1037/0022-3514.67.2.319)

- 305 Conklin, C. A., Tiffany, S. T., & Vrana, S. R. (2000). The impact of imagining completed
306 versus interrupted smoking on cigarette craving. *Experimental and clinical*
307 *psychopharmacology* 8, 68–74. doi:10.1037/1064-1297.8.1.68
- 308 Corr, P. J. (2008). Reinforcement sensitivity theory (RST): Introduction. In P. J. Corr (Ed),
309 *The reinforcement sensitivity theory and personality* (pp.1-28). Cambridge: Cambridge
310 University Press. doi:10.1017/CBO9780511819384.002
- 311 Corr, P. J. (2011). Anxiety: Splitting the phenomenological atom. *Personality and Individual*
312 *Differences*, 50, 889–897. doi:10.1016/j.paid.2010.09.013
- 313 Corr, P. J., & Cooper, A. (2015). The Reinforcement Sensitivity Theory Personality Scales
314 (RST-PQ): Development and validation. *In submission*.
- 315 Corr, P. J., & McNaughton, N. (2012). Neuroscience and approach/avoidance personality
316 traits: A two stage (valuation-motivation) approach. *Neuroscience and Biobehavioral*
317 *Reviews*, 36, 2339-2354. doi:10.1016/j.neubiorev.2012.09.013
- 318 Corr, P.J. (2013). Approach and avoidance behavior: Multiple systems and their interactions.
319 *Emotion Review*, 5, 286-291. doi:10.1177/1754073913477507
- 320 Ein-Dor, T., & Perry-Paldi, A. (2014). Human reaction to threat: Examining the interplay
321 between personality dispositions and situational features. *Psychological Research*, 4,
322 599-622. Retrieved from [http://www.researchgate.net/profile/Tsachi_Ein-](http://www.researchgate.net/profile/Tsachi_Ein-Dor/publication/269053771_Human_Reaction_to_Threat_Examining_the_Interplay_Between_Personality_Dispositions_and_Situational_Features/links/547ebd8f0cf2c1e3d2dc240a.pdf)
323 [Dor/publication/269053771_Human_Reaction_to_Threat_Examining_the_Interplay_Be-](http://www.researchgate.net/profile/Tsachi_Ein-Dor/publication/269053771_Human_Reaction_to_Threat_Examining_the_Interplay_Between_Personality_Dispositions_and_Situational_Features/links/547ebd8f0cf2c1e3d2dc240a.pdf)
324 [tween_Personality_Dispositions_and_Situational_Features/links/547ebd8f0cf2c1e3d2dc](http://www.researchgate.net/profile/Tsachi_Ein-Dor/publication/269053771_Human_Reaction_to_Threat_Examining_the_Interplay_Between_Personality_Dispositions_and_Situational_Features/links/547ebd8f0cf2c1e3d2dc240a.pdf)
325 [240a.pdf](http://www.researchgate.net/profile/Tsachi_Ein-Dor/publication/269053771_Human_Reaction_to_Threat_Examining_the_Interplay_Between_Personality_Dispositions_and_Situational_Features/links/547ebd8f0cf2c1e3d2dc240a.pdf)
- 326 Erber, J. T., Szuchman, L. T., & Prager, I. G. (2001). Ain't misbehavin': The effects of age
327 and intentionality on judgments about misconduct. *Psychology and Aging*, 16, 85–95.
328 doi:10.1037/0882-7974.16.1.85

- 329 Gray J.A., & McNaughton N. (2000): *The Neuropsychology of Anxiety*, 2nd ed. New York:
330 Oxford University Press.
- 331 Jackson, C. J. (2009). Jackson-5 scales of revised Reinforcement Sensitivity Theory (r-RST)
332 and their application to dysfunctional real world outcomes. *Journal of Research in*
333 *Personality*, 43, 556-569. [doi:/10.1016/j.jrp.2009.02.007](https://doi.org/10.1016/j.jrp.2009.02.007)
- 334 Krupić, D., & Corr, P.J. (2014). Individual differences in emotion elicitation in university
335 examinations: A quasi-experimental study. *Personality and Individual Differences*, 71,
336 176-180. [http: 10.1016/j.paid.2014.08.001](http://dx.doi.org/10.1016/j.paid.2014.08.001)
- 337 krupić, D., Gračanin, A., & Corr, P.J. (2015). Evolved components of behavioral approach
338 system: Insights from inter-individual variance. Submitted.
- 339 krupić, D., Križanić, V., Ručević, S., Gračanin, A., & Corr, P. J. (2015). Reinforcement
340 Sensitivity Theory (RST) of personality questionnaires: Comparison, validity and
341 generalization. Submitted.
- 342 McNaughton, N., & Corr, P. J. (2004). A two-dimensional neuropsychology of defense:
343 Fear/anxiety and defensive distance. *Neuroscience and Biobehavioral Reviews*.
344 doi:10.1016/j.neubiorev.2004.03.005
- 345 Corr, P. J. & McNaughton, N. (2008). Reinforcement Sensitivity Theory and personality. In
346 P. J. Corr (ed), *The Reinforcement Sensitivity Theory of Personality* (pp. 155-187).
347 Cambridge: Cambridge University Press. doi:10.1017/CBO9780511819384.003
- 348 Mesquita, S. C. V, Shuhama, R., Osorio, F. L., Crippa, J. A. S., Loureiro, S. R., Landeira-
349 Fernandez, J., & Del-Ben, C. M. (2011). The response of social anxiety disorder
350 patients to threat scenarios differs from that of healthy controls. *Brazilian Journal of*
351 *Medical and Biological Research*, 44(12), 1261-1268. doi:10.1590/S0100-
352 879X2011007500137

- 353 Pappens, M., Claes, L., Versleegers, T., Vansteenwegen, D., Van den Bergh, O., & Van
354 Diest, I. (2013). Disentangling fear and anxiety in self-reported responses to situational
355 scripts. *Psihologijske Teme*, 22, 221–236. Retrived from:
356 <http://hrcak.srce.hr/file/159879>
- 357 Perkins, A. M., & Corr, P. J. (2006). Reactions to threat and personality: Psychometric
358 differentiation of intensity and direction dimensions of human defensive behaviour.
359 *Behavioural Brain Research*, 169, 21–28. doi:10.1016/j.bbr.2005.11.027
- 360 Perkins, A. M., Cooper, A., Abdelall, M., Smillie, L. D., & Corr, P. J. (2010). Personality and
361 Defensive Reactions: Fear, Trait Anxiety, and Threat Magnification. *Journal of*
362 *Personality*, 78, 1071–1090. doi:10.1111/j.1467-6494.2010.00643.x
- 363 Shuhama, R., Del-Ben, C. M., Loureiro, S. R., & Graeff, F. G. (2007). Animal defense
364 strategies and anxiety disorders. *Anais Da Academia Brasileira de Ciencias*, 79, 97–109.
365 doi:10.1590/S0001-37652007000100012
- 366 Smederevac, S., Mitrović, D., Čolović, P., & Nikolašević, Ž. (2014). Validation of the
367 Measure of Revised Reinforcement Sensitivity Theory Constructs. *Journal of Individual*
368 *Differences*, 35(1), 12-21. doi:[10.1027/1614-0001/a000121](https://doi.org/10.1027/1614-0001/a000121)
- 369 Smillie, L. D., Jackson, C. J., & Dalgleish, L. I. (2006). Conceptual distinctions among
370 Carver and White's (1994) BAS scales: A reward-reactivity versus trait impulsivity
371 perspective. *Personality and Individual Differences*, 40(5), 1039-1050.
372 doi:10.1016/j.paid.2005.10.012
- 373
- 374
- 375

376

Table 1. Pattern matrix of defensive behaviours scale

	Factor		<i>h</i> ²
	Defensive	Defensive	
	direction away	direction toward	
	from threat	threat	
Yell scream	.869	.085	.759
Threaten to scream	.849	.162	.740
Run	.795	-.167	.666
Hide	.741	.015	.549
Freeze	.694	-.231	.543
Beg plead negotiate	.644	.168	.437
Attack	-.028	.907	.824
Threaten to attack	.076	.876	.770
Look for a weapon	.188	.639	.438
Risk assessment	-.252	.408	.235

377 * Loadings above 0.30 are bolded. The eigenvalue of the third, unretained factor was 0.84 .

378 *h*² = communality coefficient.

379

380

381

382

383

384

385

386 *Table 2. Correlation matrix of four RST questionnaires and defensive intensity, defensive*
 387 *direction, defensive tendency moving away and toward threat and ten distinct defensive*
 388 *behaviours of threat scenarios threat scenarios and descriptive data for threat scenarios*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
BIS/BAS scales														
Drive	.02	-.05	-.05	-.06	.01	.04	.03	.01	-.00	.10**	.08*	.09**	.11**	.14**
Fun seeking	.02	-.01	-.05	-.06	.02	-.01	.01	-.02	-.02	.07*	.08*	.07*	.09**	.10**
Reward	.09**	.15**	.04	.08*	.19**	.10**	.14**	.03	.13**	-.07*	-.10**	-.04	.08*	-.04
Responsiveness														
BIS-Anxiety	.17**	.26**	.24**	.33**	.28**	.20**	.27**	.13**	.32**	-.14**	-.15**	-.16**	.01	-.15**
BIS-Fear	.20**	.27**	.19**	.31**	.22**	.16**	.22**	.14**	.25**	-.11**	-.13**	-.22**	-.03	-.18**
Jackson 5														
BAS	-.03	-.02	-.05	-.07*	.02	.00	.02	.00	-.01	.04	.04	.15**	.07*	.11**
BIS	.06*	.09**	.07*	.11**	.16**	.10**	.13**	.07*	.14**	.01	-.04	.05	.10**	.07*
Fight	.04	-.24**	-.11**	-.18**	-.14**	-.05	-.05	-.09**	-.14**	.36**	.38**	.16**	.37**	.44**
Flight	.32**	.36**	.39**	.43**	.40**	.38**	.44**	.30**	.53**	-.05	-.08**	-.27**	.07*	-.11**
Freezing	.28**	.35**	.40**	.52**	.36**	.32**	.36**	.31**	.50**	-.07*	-.12**	-.28**	.03	-.16**
RST-PQ														
Reward Interest	-.07*	-.08*	-.08**	-.09**	-.04	-.010	-.02	-.02	-.06	.07*	.06	.16**	.02	.11**
Goal Drive	-.00	.05	-.02	.02	.09**	.07*	.07*	.02	.06*	-.04	-.05	.05	.02	.02
Persistence														
Reward	.09**	.10**	.09**	.13**	.18**	.14**	.18**	.09**	.18**	.05	.01	.03	.11**	.07*
Reactivity														
Impulsivity	.07*	-.02	-.01	.03	.02	.10**	.08**	.00	.05	.20**	.15**	.08**	.16**	.18**
BIS	.21**	.32**	.28**	.38**	.29**	.24**	.26**	.18**	.36**	-.06	-.10**	-.20**	.04	-.12**
FFFS	.33**	.43**	.38**	.52**	.42**	.37**	.42**	.27**	.53**	-.10**	-.15**	-.31**	.01	-.19**
Defensive Fight	.01	-.20**	-.12**	-.14**	-.12**	-.07*	-.08**	-.11**	-.14**	.29**	.29**	.19**	.27**	.35**
RSQ														
BAS	-.04	-.14**	-.09**	-.14**	-.08*	-.01	-.04	-.05	-.08**	.19**	.17**	.19**	.10**	.22**
BIS	.21**	.27**	.29**	.39**	.26**	.24**	.27**	.23**	.37**	-.06	-.10**	-.23**	-.01	-.15**
Fight	.09**	-.19**	-.07*	-.10**	-.09**	.02	.01	-.06	-.07*	.30**	.30**	.12**	.28**	.33**
Flight	.19**	.39**	.35**	.38**	.44**	.29**	.34**	.26**	.45**	-.16**	-.20**	-.23**	.02	-.20**
Freeze	.26**	.30**	.35**	.53**	.31**	.29**	.32**	.28**	.46**	-.09**	-.14**	-.25**	-.05	-.20**
Cronbach's α														
M	20.67	16.16	22.78	26.99	36.54	27.69	30.08	22.04	166.10	28.24	29.14	37.40	34.57	129.18
SD	3.26	2.31	7.86	10.97	9.78	10.01	10.31	9.10	46.85	9.53	9.25	9.98	10.03	30.14
Skewness	.12	.00	.71	.40	-.50	.13	-.06	.83	.02	.23	.34	-.08	-.12	.21
Kurtosis	1.29	.12	.29	-.71	-.14	-.79	-.77	-.00	-.43	.34	-.20	-.32	-.60	-.27

389 **Note:** 1- Defensive intensity; 2 - Defensive direction; 3 - Hide; 4 - Freeze; 5 - Run; 6 - Threaten to scream; 7 - Yell scream; 8 - Beg plead/
 390 negotiate; 9 - Total - Defensive direction away from threat; 10-Threaten to attack; 11-Attack; 12 -Risk assessment; 13-Look for a weapon;
 391 14-Total - Defensive direction toward threat

392

393 *Table 3. Hierarchical regression analysis for RST questionnaires in prediction of Defensive*
 394 *direction away threat and Defensive direction toward threat controlled for effects of*
 395 *gender and age*

		Defensive direction away threat				Defensive direction toward threat			
<i>BIS/BAS Scales</i>									
Predictors and step		β	R ²	ΔR^2	ΔF	β	R ²	ΔR^2	ΔF
1	Gender	-.498**	.265	.265	173.488**	.295**	.087	.087	45.899**
	Age	-.096**				.000			
2	Gender	-.433**	.310	.045	12.602**	.268**	.124	.037	8.073**
	Age	-.092**				.000			
	Drive	-.001				.143**			
	Fun Seeking	-.030				.066			
	Reward Responsiveness	-.003				-.069			
	BIS-Anxiety	.150**				-.024			
	BIS-Fear	.115**				-			
						.078*			
<i>Jackson -5</i>									
Predictors and step		β	R ²	ΔR^2	ΔF	β	R ²	ΔR^2	ΔF
1	Gender	-.498**	.265	.265	173.488**	.295**	.087	.087	45.899**
	Age	-.096**			64.166**	.000			
2	Gender	-.341**	.450	.185		.207**	.254	.167	42.903**
	Age	-.067**				-.017			
	BAS	.000				.017			
	BIS	.080**				-.052			
	Fight	-.112**				.415**			
	Flight	.273**				-.014			
	Freezing	.197**				-.069			

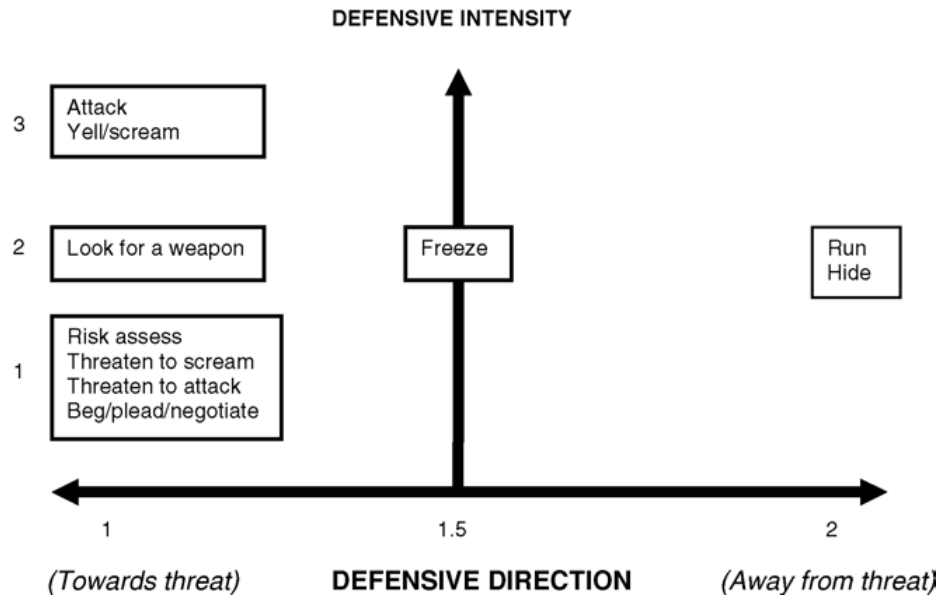
RST-PQ

Predictors and step	β	R ²	ΔR^2	ΔF	β	R ²	ΔR^2	ΔF
1 Gender	-.498**	.265	.265	173.488**	.295**	.087	.087	45.899**
Age	-.096**				.000			
2 Gender	-.336**	.424	.158	37.498**	.232**	.216	.129	22.404**
Age	-.061*				-.013			
Reward Interest	-.020				-.030			
Goal Drive Persistence	-.007				-.053			
Reward reactivity	.077*				.047			
Impulsivity	-.004				.092**			
BIS	.072*				-			
					.081*			
FFFS	.346**				-			
					.089*			
Defensive fight	-.144**				.297**			

RSQ

Predictors and step	β	R ²	ΔR^2	ΔF	β	R ²	ΔR^2	ΔF
1 Gender	-.498**	.265	.265	173.488**	.295**	.087	.087	45.899**
Age	-.096**				.000			
2 Gender	-.374**	.409	.143	46.435**	.248**	.206	.119	28.678**
Age	-.073**				.003			
BAS	-.035				.100**			
BIS	.027				.003			
Fight	.021				.271**			
Flight	.210**				-.034			
Freezing	.229**				-			
					.078*			

397 Figure 1



398

399 Fig. 1. Threat scenario response choices coded for defensive intensity and defensive direction

400 (Perkins & Corr, 2006)

401

402

403