How Reinforcement Sensitivity Theory Relates to Self-Determination Theory

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Highlights

- Scales of RST and goal-orientation within SDT are assessed

- The BIS and FFS did not predicted goal importance

- Various BAS scales differentially predicted intrinsic and extrinsic goal importance

- Data support discriminative validity of the BAS subscales

1   **Abstract**

2   Reinforcement Sensitivity Theory (RST) and Self-Determination Theory (SDT) are two well-

3   known theoretical frameworks in the fields of personality and motivation. Despite their rich

4   histories, they have not yet been studied together. Here we examine their empirical

5   relationships with special emphasis on the behavioural approach system (BAS) of RST. Based

6   on a community sample of 314 participants, our study examined relationships between: (1)

7   RST-related personality factors of the RST-PQ and SPSRQ-20 questionnaires; and (2) the

8   Aspiration Index for goal-orientation within SDT. Regression analyses revealed that BAS

9   factors explained intrinsic and extrinsic goals, whereas the defensive behavioural inhibition

10   system (BIS) and the fight-flight-freeze system (FFFS) did not. Furthermore, BAS scales

11   differentially predicted intrinsic and extrinsic classes of goals, which suggests their unique

12   effects should be considered when attempting to provide a theoretical account of human

13   motivation within the RST framework.

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15   **Keywords**: intrinsic and extrinsic goals, self-determination theory, reinforcement sensitivity

16   theory, motivation, aspiration

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23   **How Reinforcement Sensitivity Theory Relates to Self-Determination Theory**

24   Reinforcement Sensitivity Theory (RST) recognises three brain-behavioural systems

25   underlying personality traits. The Behavioural Approach System (BAS) is responsible for

26   striving to attain important resources for survival and reproduction. The other two systems are

27   defensive in nature: the Fight-Flight-Freeze System (FFFS) and the Behavioural Inhibition

28   System (BIS), respectively, responsible: (a) for the avoidance of threats endangering survival:

29   and (b) the resolution of goal-conflict. The original version of RST was focused on describing

30   the brain-behavioural circuits underlying individual differences in sensitivities to reward and

31   punishment cues (Corr, 2008; Gray, 1982; Gray & McNaughton, 2000). In contrast, more

32   recent formulations focusing on the general notions of attractors and repulsors, as this

33   distinction recognises the ambiguities inherent in 'reward' and 'punishment' – furthermore,

34   refinements to RST point to a stronger role of the FFFS than seen in the original version (Corr

35   & McNaughton, 2012).

36   Since the 2000 revision of RST, a major concern has been the operational definition of

37   its main components (Corr, 2016; Krupić, Corr, Ručević, Križanić, & Gračanin, 2016; Walker

38   & Jackson, 2017). There is now a reasonably good agreement on the operationalization of the

39   BIS and FFFS (e.g., Krupić, Križanić, & Corr, 2016). However, the same cannot be said of

40   the BAS. Specifically, there is no clear consensus regarding how it should be conceptualised

41   and measured, which has led to the development of a number of RST questionnaires with

42   varying theoretical bases and different number of factors (see Krupić & Corr, 2017). The

43   issue of the dimensionality of the BAS does not arise solely from the revision of the theory; it

44   reflects also the more general problem of translating RST from animal to human contexts.

45   Four RST questionnaires contain a one-dimensional operationalisation of the BAS

46   (Jackson, 2009; Reuter, Cooper, Smillie, Markett, & Montag, 2015; Smederevac, Mitrović,

47   Čolović, & Nikolašević, 2014; Torrubia, Ávila, Moltó, & Caseras, 2001), while two

48   questionnaires contain a multidimensional conceptualisation (Carver & White, 1994; Corr &

49   Cooper, 2016) – with only the latter based on revised RST (Gray & McNaughton, 2000) and

50   subsequent refinement of the theory (Corr & McNaughton, 2012) . Moreover, some authors

51   propose to calculate a total BAS score from these multidimensional scales (e.g., Kelley et al.,

52   2019), but this suggestion is not in accord with views regarding the structural properties of the

53   BAS (e.g., Smillie, Jackson, & Dalgleish, 2006; see Corr, 2016).

54   The problem addressed by our study concerns the predictive validity of

55   unidimensional versus multidimensional BAS conceptualizations in explaining intrinsic and

56   extrinsic goals aspiration within Self-Determination Theory (SDT; Deci & Ryan, 2000). This

57   is relevant both for understanding the role of the BAS and its sub-factors, and, more

58   generally, for the relationships between RST factors and SDT-related human motivation.

59   **Reinforcement sensitivity theory and self-determination theory**

60   Establishing differences between intrinsic and extrinsic motivations has been a major

61   contribution of SDT. Ryan and Deci (2000) define intrinsic motivation as the inherent

62   tendency to seek out novelty and challenges, extending and exercising one's capacities, as

63   well as exploring and learning. Intrinsic motivation increases when environmental

64   circumstances afford beneficial effects on basic psychological needs: autonomy, competence,

65   and relatedness. In contrast, extrinsic motivation is typically driven by environmental cues

66   and incentives. Moreover, the presence of external incentives may undermine intrinsic

67   motivation by shifting the perceived locus of control from internal to external factors (Ryan &

68   Deci, 2000).

69   Perhaps surprisingly, RST and SDT have not yet been studied together. This might be

70   the result of their different research traditions. While SDT focused on the study of human

71   behaviour, original RST examined the behaviour of laboratory animals (principally rodents),

72 at least until the 1980s when it started to be extended to human behaviour – although there

73 were some earlier attempts in the 1970s (for a review, see Pickering, Corr, Powell, Kumari,

74 Thornton, & Gray, 1997). Furthermore, SDT focused on cognitive and internal variables, such

75 as interpretations, desires and motives (Deci & Ryan, 1985) that intervene between stimulus

76 and response, which in studies conducted on experimental (non-human) animals were either

77 ignored or considered unimportant – largely because they are so difficult to measure and

78 prone to inferential hazard (see Corr, 2013). After shifting focus from experimental animal to

79 human studies, revised RST (Gray & McNaughton, 2000) paid much more attention to the

80 processes underlying human motivation and behaviour. However, until recently, little

81 attention was paid to central states of motivation (goal representations) as opposed to the

82 behavioural machinery that subserves these goals (e.g., FFFS, BAS and BIS) (Corr & Krupić,

83 2017). Also, RST has been dominantly focused on behaviours related to survival and

84 reproduction typical of all mammals; in contrast, SDT was always and exclusively interested

85 in human motivation. To characterise the differences between the two theories, we may say

86 that RST has been principally oriented towards lower, while SDT toward upper, levels of

87 Maslow's hierarchy of needs/motives. Only until recently (see Di Domenico & Ryan, 2017),

88 SDT was not interested in the identification of brain-behavioural mechanisms underlying

89 intrinsic and extrinsic motivation, which has been the main focus of RST.

90   For these and, no doubt, other reasons, some of the well-studied aspects of human

91 functioning within SDT have not yet captured the attention of RST researchers. This is

92 unfortunate because ignoring the relevance of extrinsic and intrinsic motivation only

93 downplays the potential of the RST framework to explain more fully human motivation. The

94 time seems ripe to try to synthesize these two major approaches.

95   Within SDT, the importance of goals (i.e., aspirations) is studied within goal contents

96 theory (GCT) that recognises intrinsic (i.e., community, personal growth, relationship and

97   health) and extrinsic (i.e., image, fame and wealth) classes of goals (Kasser & Ryan, 1993,

98   1996). The standard instrument for the measurement of these goals is the Aspiration Index

99   (AI; Kasser & Ryan, 1993). The sum of goals represents the strength of intrinsic and extrinsic

100   aspirations. In addition, SDT places emphasis on the importance of the *relative* salience of

101   intrinsic and extrinsic aspirations. This quality of motivation is measured by intrinsic versus

102   extrinsic value orientation (Sheldon & McGregor, 2000; Sheldon & Krieger, 2014), which is

103   calculated by subtracting one from the other.

104   The GCT group of extrinsic goals or motives have been studied also under different

105   theoretical frameworks. For instance, they are highly congruent with the motives reflecting

106   competitive resource acquisition strategies (Bernard, 2013) and the fast lifestyle within life

107   history theory (Figueredo, 2007). Recent studies (Krupić, Banai, & Corr, 2018; Krupić,

108   Gračanin, & Corr, 2016) found these motives to be correlated with the Sensitivity to Reward

109   (SR) scale from the Sensitivity to Punishment Sensitivity to Reward Questionnaire (SPSRQ;

110   Torrubia, et al., 2001) and Impulsivity from the Reinforcement Sensitivity Theory Personality

111   Questionnaire (RST-PQ; Corr & Cooper, 2016). On the other hand, motives defined as

112   intrinsic are congruent with Bernard's (2013) other group of motives, representing

113   cooperation (care for the community, kin, relationships, environment exploration, living a

114   meaningful life) and slow lifestyle (Figueredo, 2007). This category of motives has been

115   found to correlate with other BAS scales (Reward Interest, Goal-Drive Persistence, and

116   Reward Reactivity).

117   To sum up, there is a paucity of empirical findings examining relationships between

118   RST dimensions and SDT-relevant intrinsic/extrinsic motivation. The empirical studies

119   reviewed above suggest two hypotheses. First, SR and Impulsivity scales should predict

120   extrinsic goal aspiration. Secondly, Reward Interest, Goal-Drive Persistence and Reward

121   Reactivity should predict intrinsic goals aspirations. We expect that the results of the test of

122   these hypotheses will provide a better understanding of the implications of the different

123   operationalisations of the BAS (one or multidimensional), serving to fill a significant

124   theoretical gap in the RST literature. It should also throw new light on how RST relates to

125   intrinsic and extrinsic motives.

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Method

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Participants and procedure

128   The study was conducted in Osijek, Croatia on a community sample of 327

129   participants (41.3% of males) who completed personality questionnaires administered via an

130   online survey. The average age of participants was 27.75 (SD = 9.88) - 58% were students,

131   26.7% employed, 12.4% unemployed, and 2.9% in retirement. They were recruited by

132   psychology students in exchange to course credit (ten participants for one credit) and no

133   payment was made for participation.

Instruments

135   **Reinforcement Sensitivity Theory-Personality Questionnaire** (RST-PQ; Corr &

136   Cooper, 2016) contains 73 items distributed over BIS, Flight-Freeze System, four BAS scales,

137   and Defensive Fight. The first BAS scale is the seven-item Reward Interest (e.g. "*I regularly*

138   *try new activities just to see if I enjoy them*"), reflecting an openness to experience and

139   searching for new and potentially rewarding stimuli. The second scale is the ten-item Goal-

140   Drive Persistence (e.g. "*I put in a big effort to accomplish important goals in my life*"),

141   reflecting sustained effort in pursuing goals. The third scale is the ten-item Reward Reactivity

142   scale (e.g. "*Good news makes me feel over-joyed*"), reflecting reactivity on rewarding stimuli.

143   Finally, the eight-item Impulsivity scale (e.g. "*I think I should 'stop and think' more instead*

144   *of jumping into things too quickly*"), reflects non-planning and fast reactions The remaining

145   three scales assess defensive motivation: BIS scale contains 23 items ("*I worry a lot*"); Fight-

146 Flight-Freeze contains 10 items ("*I would be frozen to the spot by the sight of a snake or*

147 *spider*"); and Defensive Fight 8 items ("*I have found myself fighting back when provoked*").

148 **Sensitivity to Punishment Sensitivity to Reward-Short version** (SPSRQ-20; Aluja &

149 Blanch, 2011) is a 20-item version of the original SPSRQ (Torrubia et al., 2001). It contains

150 two scales: Sensitivity to Reward (SR; e.g. "*Do you like being the centre of attention at a*

151 *party or a social meeting*") and Sensitivity to Punishment (SP; e.g. "*Are you often afraid of*

152 *new or unexpected situations"*).

153 **Aspiration index** (AI; Kasser & Ryan, 1993) is a 35-item questionnaire that measures

154 three dimensions of goals: Importance of the goal, likelihood of attaining the goal, and the

155 current level of attainment of the goal. In this study, participants were instructed only to rate

156 the personal importance of four intrinsic goals: Community (e.g., "*To work for the betterment*

157 *of society*"), Personal growth (e.g., "*To grow and learn new things*"), Relationship (e.g., "*To*

158 *have good friends that I can count on*"), and Health (e.g., "*To keep myself healthy and well*");

159 and three extrinsic goals: Fame (e.g., "*To have my name known by many people*"), Image

160 (e.g., "T*o have people comment often about how attractive I look*"), and Wealth (e.g., "*To be*

161 *a very wealthy person*"). Each of these seven scales contains five items.

162 As mentioned earlier, some studies suggest that scales from Aspiration Index (AI) can

163 be summarized into general classes of intrinsic and extrinsic motives. Surprisingly, this has

164 often been done according to theoretical assumptions, but without assessing how the model

165 fits the data. For this reason, we conducted two confirmatory factor analyses to examine

166 whether we can use the AI to calculate Total Intrinsic Values and Total Extrinsic Values.

167 First, we tested a two-factor model consisting of the four intrinsic and three extrinsic

168 goals. Data did not show adequate goodness of fit indices: $\chi^2 = 47.78$, df = 12, p < .01, χ^2/df =

169 3.98, CFI = .976, RMSEA = .098, SRMR = .041. Due to high RMSEA, we removed the AI

170   Health scale from the model, just as Martos and Kopp (2012) did in their study, which

171   significantly improved the model fit: $\chi^2 = 16.10$, df = 7, p < .05, χ^2/df = 2.30, CFI = .992,

172   RMSEA = .064, SRMR = .030. Total extrinsic and intrinsic values (without the Health scale)

173   correlated, r = .48, $p < .01$. Since we obtained a satisfactory two-dimensional model of AI, we

174   were able to calculate the extrinsic versus intrinsic value orientation (Sheldon & McGregor,

175   2000) by subtracting composites of Total Extrinsic from Total Intrinsic Values.

176   All Croatian-language versions of the questionnaires used in this study were back-

177   translated into English and have been previously used and validated (e.g., Krupić, Corr et al.,

178   2016; Rijavec, Brdar, & Miljković, 2011). The ethics committee of the Faculty of Humanities

179   and Social Science in Osijek, Croatia approved the study.

180   **Results**

181   Descriptive statistics and Pearson's correlation coefficients are presented in Table 1.

182   All scales, except the SR, had Cronbach's alpha internal consistency coefficients above .70.

183   Concerning zero-order correlations between BAS scales and goals within the GCT, overall,

184   the SR correlated positively with Total Extrinsic Values, while RST-PQ BAS scales and

185   Defensive fight correlated positively with both Total Extrinsic and Intrinsic Values. In

186   addition, the BIS and FFFS scale, but not the SP, correlated positively to Total Intrinsic

187   Values.

188   - Table 1 –

189   Table 2 shows the results of ten multiple regression analyses. Controlling for the

190   effects of gender and age, the SPSRQ and RST-PQ scales were entered in the model as

191   predictors of AI scales and composite variables of intrinsic and extrinsic motivation, and the

192   relative extrinsic versus intrinsic value orientation index. Results provided evidence of a clear

193   distinction between the BAS scales. On a general level, Reward Interest and Reward

194 Reactivity positively predicted intrinsic goals only, while Goal-Drive Persistence predicted

195 both extrinsic and intrinsic goals. In contrast, SR predicted negatively intrinsic, and highly

196 positively extrinsic, goals. The BIS, FFFS and SP scales were not significantly related to any

197 type of goals orientations. Regarding the relative extrinsic versus intrinsic value orientation,

198 Reward Interest was positive, whereas the SR was a negative predictor. As is evident from

199 Table 2, the BAS scales differed in their prediction of AI facets. Overall, the results of

200 regression analyses supported our hypotheses. We expected and observed that Reward

201 Interest, Goal-Drive Persistence and Reward Reactivity would predict the importance of

202 intrinsic goals and that SR, and that Impulsivity would predict the importance of extrinsic

203 goals.

204   - Table 2 -

205   **Discussion**

206   Our study examined how RST dimensions relate to intrinsic and extrinsic aspirations,

207 which to our knowledge is the first empirical study of its kind. Multiple regression analyses

208 revealed that BIS and FFFS scales did not show any statistically significant associations,

209 whereas the BAS subscales predicted extrinsic and intrinsic goals, almost entirely consistently

210 with our hypotheses. The only unpredicted relationship was found for Goal-Drive Persistence,

211 which predicted intrinsic and extrinsic goal aspirations, whereas Impulsivity lost its predictive

212 power when SR was entered in the model.

213 **Extrinsic goals**

214   The SR scale predicted positively all three extrinsic goals and negatively aspirations

215 toward the community. RST-PQ Impulsivity showed a similar pattern of correlations, but was

216 lower in magnitude as compared with SR. These findings are in line with past studies

217 examining relationships between SR and evolutionarily-evolved motives (Krupić, Gračanin et

218   al., 2016) and the fast lifestyle within life history theory (LHT) (Krupić et al., 2018). Thus,

219   our findings suggest that high SR individuals are motivated by extrinsic rewards, which might

220   explain why their behaviour is directed towards resources and is accompanied by a lack of

221   concern for the social environment. This finding supports earlier studies pointing to the

222   extrinsic nature of the motivation of individuals high on SR. For example, students high on

223   BAS Drive (similar to Goal-Drive Persistence from RST-PQ) show more interest in studying,

224   while high SR individuals show the opposite inclination (Krupić & Corr, 2014). In a more

225   recent study, high SR individuals were found to be less motivated after negative feedback,

226   while individuals high on other BAS scales were better able to maintain their initial

227   motivation (Krupić, 2017). Overall, it seems that high SR individuals favour a quick pay-off

228   and if they feel they are losing then they give up (quit) quickly.

229   **Intrinsic goals**

230   Other BAS scales correlated with intrinsic goals, which is also consistent with

231   previous findings. Reward Interest positively related to intrinsic (community and personal

232   growth) and negatively to extrinsic (i.e. wealth) aspirations; and it was the only factor that

233   positively related to intrinsic value orientation (see Table 2). This is not surprising given that

234   the content of Reward Interest scale captures the tendency to explore potential rewards from

235   the environment and entails making plans to attain them. In addition, Reward Interest

236   correlates highly with: (a) openness to experience (Corr & Cooper, 2016), which has been

237   related to intrinsic value orientation (Prentice, Kasser, & Sheldon, 2019); (b) explorative

238   behaviour (Krupić, Gračanin et al., 2016); and (c) such individuals are more motivated by

239   challenging tasks (Krupić, 2017), which is in line with the definition of intrinsic motivation.

240   The two key features of Goal-Drive Persistence are the drive in pursuing goals and the

241   resistance to momentary distraction, both of which are reflected in high correlations with

242   extraversion and conscientiousness (Corr & Cooper, 2016). Persistent individuals believe that

243   success depends on their effort (Corr & Mutinelli, 2017), which explains their endurance in

244   pursuing goals. In contrast, Goal-Drive Persistence correlates positively with the strength

245   (quantity) of both extrinsic and intrinsic motivation, while it has no relationship with

246   motivation as measured by the relative extrinsic versus intrinsic value orientation. On a facet

247   level, it predicted wealth and image from the extrinsic group of goals and all four intrinsic

248   goals. Finally, Reward Reactivity predicted intrinsic motivation. These data are in line with

249   previous studies that have consistently related this scale to prosocial tendencies, such as

250   commitment to a romantic partner and care for relatives (Krupić et al., 2018; Krupić,

251   Gračanin et al., 2016).

252   As predicted, the FFFS and BIS did not account for variance in goals. This was

253   expected given the nature of these defensive systems. However, we cannot exclude the

254   relevance of the BIS when there is a need to decide between two or more competing goals - .

255   for instance, the choice between two job offers where one is less well paid but allows more

256   time to be spent with family. Making such a (goal-conflicted) decision may well increase

257   anxiety in individuals with a more reactive BIS – an expectation that still has to be explored.

Contribution to the understanding of how the BAS operates

259   Our study supports the claim that different RST questionnaires have implications for

260   how we view relationships between BAS and SDT constructs. Importantly, accounting for

261   personality variance in intrinsic and extrinsic motivation is not optimal within a one-

262   dimensional BAS framework. Table 1 shows the discrepancy in the psychometric

263   operationalisation of the SPSRQ (based on original RST) and RST-PQ (based on revised

264   RST). As seen, the SR is exclusively correlated with extrinsic motives, while the RST-PQ

265   scales correlate with both intrinsic and extrinsic motives. According to the original version of

266   the theory, the BAS is conceptually closely aligned to impulsivity (Torrubia et al., 2001)

267   reflecting the desire to attain extrinsically important resources, whereas in the revised version

268   it is more aligned to extraversion and decomposed into four stages that explain the complex

269   sequence of stages comprising approach motivation (Corr & Cooper, 2016). The results of

270   this study indicate that the operationalisation of the BAS by RST-PQ offers a more

271   comprehensive and nuanced framework to explain human motivation and enables a better

272   integration of findings with other theories and models – in contrast, the SPSRQ is useful in

273   explaining extrinsic motivation only.

274   Limitations

275   Our study was based exclusively on self-report questionnaires and, therefore, the

276   results might be distorted by participants' desire to adhere to, what they perceive to be,

277   acceptable responses and they may discard negative responses regarding themselves due to

278   social-desirability responding. Since we did not measure social desirability, we cannot address

279   this possibility in the present study. In addition, to explore this possibility more fully, it would

280   be valuable to use more objective measures of aspirations, such as information of current job

281   position or professional interests.

282   To conclude, our study examined the relationships between RST constructs, as

283   measured by the SPSRQ and RST-PQ, and intrinsic/extrinsic goals within SDT. The SR of

284   the SPSRQ predicted only extrinsic goals, while the BAS subscales of the RST-PQ predicted

285   both extrinsic and intrinsic goals. These findings indicate a redirection of the focus of RST in

286   the study of approach motivation toward the multidimensional nature of the BAS. In addition,

287   future RST studies should pay much more attention to the *type* of rewarding stimuli, since

288   they seem to trigger different motivational aspects of the BAS.

289   Our study is the first empirical attempt to examine the relationships of RST constructs

290   with intrinsic and extrinsic motivation, as defined by SDT. It should serve as a starting point

291   for the further exploration of these two well-known and influential theories that, hitherto, have

292   been studied separately.

293

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Table 1. Correlations between RST dimensions and intrinsic and extrinsic aspirations

	α	M	SD	Total Intrinsic goals	Total extrinsic goals	Extrinsic value orientation	Fame	Image	Wealth	Community	Personal growth	Relationship	Health
							Extrinsic goals			**Intrinsic goals**			
SPSRQ-20													
SR20	.65	4.05	2.29	-.01	.53**	-46**	.53**	.45**	.42**	-.04	.04	-.01	.05
SP20	.83	4.88	3.03	.03	-.10	.11	-.12*	-.01	-.10	.03	.02	.02	-.06
RST-PQ													
Reward Interest	.84	12.09	4.39	.27**	.22**	.06	.21**	.19**	.17**	.31**	.28**	.18**	.30**
Goal-Drive Persistence	.83	13.99	4.06	.37**	.28**	.11	.14*	.27**	.30**	.31**	.38**	.33**	.40**
Reward Reactivity	.79	18.57	5.02	.32**	.30**	.04	.24**	.32**	.26**	.25**	.30**	.31**	.27**
Impulsivity	.70	12.36	4.25	.13*	.27**	-.11	.20**	.31**	.21**	.14*	.11*	.10	.12*
BIS	.93	36.47	13.33	.17**	.06	.11	.03	.14**	.02	.16**	.14*	.15**	.11
FFFS	.80	14.30	6.31	.14*	-.01	.14*	-.02	.12*	-.03	.14*	.07	.18**	.10
Defensive Fight	.70	13.43	3.98	.19**	.29**	-.07	.21**	.29**	.25**	.10	.20**	.19**	.20**
α				.95	.92	-	.90	.81	.87	.93	.86	.91	.91
M				85.00	45.99	39.00	11.73	16.56	17.92	26.64	28.65	30.08	28.62
SD				17.21	15.69	18.44	6.04	5.83	6.38	6.63	5.98	6.05	6.25

* p < .05, ** .01;

Table 2. Multiple regression analysis using RST dimension as a predictors of extrinsic and intrinsic aspirations

	Total Intrinsic goals	Total extrinsic goals	Extrinsic value orientation	Extrinsic goals			Intrinsic goals			
				Fame	Image	Wealth	Community	Personal growth	Relationship	Health
Gender	.021	-.166**	.147**	-.133*	-.065	-.223**	.055	-.010	.010	-.024
Age	.150**	.097*	.026	.043	.088	.118*	.085	.156*	.175**	.092
SR20	-.142*	.413**	-.457**	.451**	.351**	.271**	-.157**	-.105	-.124*	-.087
SP20	.041	-.015	-.009	-.059	.013	.006	.041	.090	-.018	-.023
Reward Interest	.190**	-.065	.229**	.032	-.033	-.160*	.302**	.159*	.047	.161**
Goal-Drive Persistence	.204**	.147*	-.050	-.027	.139*	.260**	.129	.233**	.202**	.273**
Reward Reactivity	.159*	.083	-.027	.067	.052	.095	.084	.156*	.203**	.067
Impulsivity	-.117	.007	-.095	-.036	.044	.012	-.038	-.135*	-.155*	-.115
BIS	.063	.069	.017	.065	.100	.016	.055	-.001	.118	.070
FFFS	.092	.017	.086	.043	.026	-.023	.117	.076	.056	.099
Defensive Fight	.092	.102	-.027	.060	.119	.086	.000	.125*	.137*	.111
R	.48	.60	.53	.55	.53	.54	.48	.45	.46	.46
R^2	.23	.36	.28	.30	.28	.29	.23	.20	.21	.21
$F_{(11, 302)}$	8.38**	15.43**	10.88**	11.67**	10.89**	11.26**	8.11**	8.84**	7.46**	7.30**

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