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WHAT MOTIVATES ACADEMIC DISHONESTY IN STUDENTS? A  
REINFORCEMENT SENSITIVITY THEORY EXPLANATION.

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## **Abstract**

**Background:** Academic dishonesty (AD) is an increasing challenge for universities worldwide. The rise of the internet has further increased opportunities for students to cheat.

**Aims:** In this study, we investigate the role of personality traits defined within Reinforcement Sensitivity Theory (RST) as potential determinants of AD. RST defines behaviour as resulting from approach (reward interest/reactivity, goal-drive and impulsivity) and avoidance (behavioural inhibition and fight-flight-freeze) motivations. We further consider the role of deep, surface or achieving study motivations in mediating/moderating the relationship between personality and AD.

**Sample:** A sample of UK undergraduates (N = 240)

**Method:** All participants completed the RST Personality Questionnaire, a short-form version of the Study process questionnaire and a measure of engagement in AD, its perceived prevalence and seriousness.

**Results:** Results showed that RST traits account for additional variance in AD. Mediation analysis suggested that GDP predicted dishonesty indirectly via a surface study approach while the indirect effect via deep study processes suggested dishonesty was not likely. Likelihood of engagement in AD was positively associated with personality traits reflecting impulsivity and fight-flight-freeze behaviours. Surface study motivation moderated the impulsivity effect and Achieving Motivation the FFFS effect such that cheating was even more likely when high levels of these processes were used.

**Conclusions:** The findings suggest that motivational personality traits defined within RST can explain variance in the likelihood of engaging in dishonest academic behaviours.

**Keywords:** Reinforcement sensitivity theory; academic dishonesty; cheating; student; deep learning; surface learning

Dishonest academic behaviours, such as plagiarism, copying of other students' work, or cheating in examinations are a problem worldwide, with estimates suggesting that between 60% and 95% of undergraduate students employ dishonest tactics at some point in their university career (Simkin & McLeod 2010; Burton et al. 2011). In a survey of over 20,000 American high school students, (51% admitted to cheating on a test, 74% had copied another student's homework, and 32% had copied an Internet document for a classroom assignment (Josephson Institute, 2012). In the UK, the problem has received much media attention and a report in *The Times* (2016), based on a freedom of information request, stated that some 50,000 university students had admitted to academic dishonesty within the previous three years. The rise of the internet has increased immensely the number of ways students can cheat. It provides access to easily copyable articles, purchasing of coursework essays (through so called "essay mills") and the facility to text exam questions and answers in real time (Etter et al., 2006; Simkin and McLeod 2010; Thibodeau, 2007).

Academic dishonesty is not only a moral issue, but also a practical one. If students are cheating their way to success, this raises the question of how much is actually being learned, which has implications for professional careers beyond university. Some students may be graduating without the knowledge expected of them by employers. In addition, academic dishonesty is strongly related to subsequent unethical behaviour in the workplace (e.g., Lawson, 2004; Thompson, 2000). With these considerations in mind, much of the research on academic dishonesty has been conducted with students in business faculties. Furthermore, publicity about academic dishonesty practices can tarnish perceptions of educational institutions and devalue their awards (Gulli et al., 2007).

So why do students cheat? Evidence suggests that students are more likely to cheat if they believe academic dishonesty is commonplace (i.e. a social norm) which many do (Genereux & McLeod 1995), and if they believe there is little chance of detection or

repercussions. One study suggested that only about 2.5% of students who cheat get caught (Diekhoff et al. 1996), and Simkin and McLeod (2010) highlight the “small or non-existent penalties” that exist (p. 447). The likelihood of cheating may also be influenced by the way an assessment task is presented. For instance, tasks which emphasise the need to follow specific instructions are more likely to be associated with dishonest academic behaviours than is the case when students are allowed to choose the approach they adopt (Kanat-Maymon, Stavsky, Shoshani & Roth, 2015). In terms of Basic Need Theory (Ryan & Deci, 2000) the former context frustrates students’ basic need for autonomy, while the latter facilitates it (Kanat-Maymon, et al, 2015).

While we know much about the prevalence, nature and consequences of academic dishonesty, relatively little is known about its causes beyond the above contextual factors (Simkin & McLeod 2010). However, intervention on the contextual level is not always successful. Many higher education institutions already attempt to prevent academic dishonesty from happening but these efforts have largely been unsuccessful. Therefore, there could be opportunities to focus on individual, rather than contextual, explanations of academic dishonesty. Personality approaches to this issue would offer insight for screening, intervening and understanding why one person would choose to violate rules in this way while another would not. In the present study, we examine individual differences in the likelihood of academic dishonesty in terms of both personality traits and the study processes that students adopt. In terms of personality, there is existing evidence that two of the Big Five traits may be relevant: Conscientiousness (the tendency to be organised, goal-directed and self-regulating) and Agreeableness (the tendency to be warm, trusting and caring) are both found to be negatively associated with cheating behaviours (Giluk & Postlethwaite, 2015). In terms of factors outside the Big Five model, an external locus of control (Vohs & Schooler, 2008) and Type A personality profile (Perry, Kane, Bernesser, & Spicker, 1990) have both

been suggested to increase the likelihood of engagement in academic dishonesty. Type A encompasses traits such as hostility, impatience, difficulty expressing emotions, competitiveness, drive, perfectionism and an unhealthy dependence on external rewards such as wealth, status, or power (Friedman & Rosenman, 1959). Given this, it is unsurprising that the major motivators for academic dishonesty are suggested to be the desire to get ahead and achieve at all costs, while students who do not cheat are constrained by a personal moral anchor such as a belief that cheating is unacceptable (Simkin & McLeod, 2010). Most recently, research has highlighted links between academic dishonesty and honesty/humility, a trait claimed to specifically reflect unethical aspects of behaviour (van Rensburg, Kock & Derous, 2018).

In the present study, we examine the relationship between likelihood of academic dishonesty and traits described in the Reinforcement Sensitivity Theory of personality (RST). This is a useful framework because it conceptualises personality in terms of emotion, motivation, and learning (Corr, 2008). RST specifies three systems that underpin individual differences in personality and psychopathology. The behavioural approach system (BAS) is sensitive to potential rewards and motivates goal-directed behaviours in the presence of appetitive information. Individuals disposed towards BAS activation will more frequently experience excitement and elation on attaining rewards. The primary function of BAS is considered to be moving an individual along a spatio-temporal gradient towards a final biological reinforcer. In order to achieve this goal, there are a number of distinct but related BAS processes. “Reward Interest” and “Goal-Drive persistence” that characterize the early stages of approach and which can be distinguished from “Reward Reactivity” and “Impulsivity” as the final reinforcer is approached and captured (Corr, 2008; Corr & Cooper, 2016; Gray & McNaughton, 2000). These may be particularly important in the present context as impulsivity has been identified as predicting academic dishonesty as it can offer a

shortcut to obtaining academic goals (e.g. DeAndrea, et al, 2009; Millar et al, 2007; Tibbetts, 1999). The lack of self-restraint/control intrinsic to impulsivity is also common to sensation seeking, a trait which reflects a drive to seek varied and intense sensations and experiences, and the willingness to take risks for the sake of this (Zuckerman, 2007). Students are more likely to cheat and to believe in the acceptability of cheating when they report a high need for sensation (Anderman & Won, 2017). Although distinct factors (Sharma, Markon & Clark, 2014), both impulsivity (e.g. (Maneiro, Gómez-Fraguela, Cutrín, & Romero, 2016) and sensation seeking (e.g. Peach & Gaultney, 2013) have been consistently linked with antisocial and delinquent behaviours, especially in adolescence and young adulthood. Satchell, et al (2018) have summarised GDP and RI traits together as “Future BAS” whereas they refer to RR and Impulsivity as “Now BAS” (page 166). While Future BAS is forward focussed, Now BAS is immediate and short term and more directly related to antisocial behaviour (Bacon, Corr and Satchell, 2017). We may therefore also expect these traits to be directly implicated in academic dishonesty.

RST also defines two further systems. The Fight-Flight-Freeze System (FFFS) motivates behaviours aimed at the avoidance and escape of threats - manifested as fear and panic, while the Behavioural Inhibition System (BIS) is activated by goal conflict, which occurs when there is equal activation of the FFFS and BAS, i.e. when stimuli is ambiguous. Each of the systems corresponds to a circumscribed set of neural pathways (e.g. Corr, 2004) which control emotional and behavioural responses to reward and punishment cues.

In addition to RST traits, we also examine the effects of the type of study process students employ. Biggs (1987, 1993) conceptualized three major learning approaches to classify students: Deep, Surface and Achieving. A deep approach to learning is characterised by intrinsic motivation, engagement with the subject matter, and the desire to understand it. Conversely, students who opt for a surface approach to learning aim at learning the minimum



amount of material and expending the minimum amount of effort to pass assessments.

Achieving approaches are typified by pragmatic, goal-oriented learning strategies. Biggs (1987) further differentiated between motives and strategies, but in the present study we focus specifically on motivations.

Learning approaches and personality traits are distinct, but related, constructs with the deep approach positively associated with Emotional Stability (low Neuroticism), Openness and Agreeableness, while the surface approach is negatively related to these traits. Conscientiousness is found to be associated with both deep and achieving learning approaches (Chamorro-Premuzic, Furnham & Lewis, 2007). The extent to which people express an intention to behave unethically in education (and also in work and sport) is a function of their dominant achievement motivation (Anderman & Koenka, 2017; van Yperen et al 2011) and some research has specifically linked study approaches to academic dishonesty, with deep learners the least likely to cheat, and surface learners the most likely (Fleming, 1996; Xin, 2011). Performance-based goals (e.g. highest grades and competition with others) were more strongly associated with cheating than mastery-based goals (e.g. acquiring a deep understanding of the subject; Anderman & Koenka, 2017). Furthermore, Anderman, Cupp and Lane (2009) suggested that impulsive tendencies may be less likely to become activated in a mastery-focused classroom, where students are deeply engaged in learning. Again this suggests that students who have a deep learning approach to study are least likely to cheat. However, these findings may also suggest that students with an achieving approach to study are at risk for academic dishonesty, as they also have goal strivings, albeit not necessarily to master the subject in depth. Recent research by Satchell, Hoskins, Corr and Moore (2017) has further shown that academic persistence beyond compulsory education is predicted by GDP whilst impulsivity predicted desistance.

We made the following specific predictions.

1. RST factors will account for additional variance in the likelihood of engaging in academic dishonesty over and above that explained by perceptions that dishonesty is serious and prevalent.
- 2a. BAS factors which are future goal related (RI, GDP) will not show a significant direct relationship with AD per se. However,
- 2b. a mediating influence of deep motivation will result in a negative indirect effect, whereas a mediating influence of surface or achieving study process will result in a positive indirect effect.
- 3a. Response Reactivity and Impulsivity (“Now BAS” factors, Satchell, et al, 2018) will present a positive association with dishonesty.
- 3b. These effects will be moderated such that the relationship will be strengthened in the presence of a high level of surface or Achieving study process.
- 4a. BIS and FFFS will present a negative direct association with dishonesty.
- 4b. A moderating effect of surface or achieving study process will result in a positive association.

We also include a measure of intelligence. Chamorro-Premuzic and Furnham (2008) reported a significant positive association between a deep leaning approach and intelligence, although no relationship with either surface or achievement learning. However, other research has found the opposite, no relationship between IQ and deep strategies, but a negative association with surface and achieving approaches (Bloodgood, et al, 2008). In terms of academic cheating, Bloodgood et al suggest that a lack of cognitive flexibility may lead less intelligence students to have difficulty imagining anything other than a self-interested response when faced with a temptation to cheat. In contrast, individuals operating at a higher

level of intellectual complexity may be able to discern the less obvious ramifications of their actions. Early research indeed suggested that less intellectually able students are most likely to cheat (Johnson & Gonnly, 1971; Kelly & Worrell, 1978), and this is usually accepted to be the case (Miller, Murdock & Grotewiel, 2017). However, cheating is reported amongst students from highly selective schools (Yess, 2012) and amongst medical students (Dyrbye, Thomas, & Shanafelt, 2005). We made no *a priori* prediction regarding the role of intelligence, but treated it as a covariate in analysis of the variables of primary interest.

## **Methods**

### Participants

Two hundred and forty undergraduate students took part in return for course credit (212 females; Mean age = 21.01, SD = 4.52).

### Materials and Procedures

Participants were sent a link to the following questionnaire measures which were presented via an online research platform.

*Reinforcement Sensitivity Theory of Personality Questionnaire* (RST-PQ, Corr & Cooper 2016). This 65-item scale measures three major systems: Fight/Flight/Freeze System (FFFS; e.g., “I am the sort of person who easily freezes up when scared”); Behavioural Inhibition System (BIS; e.g., “When trying to make a decision, I find myself constantly chewing it over”); and four Behavioural Approach System (BAS) factors: Reward Interest (e.g., “I regularly try new activities just to see if I enjoy them”); Goal-Drive Persistence (e.g., “I am very persistent in achieving my goals”); Reward Reactivity (e.g., “I get a special thrill when I am praised for something I’ve done well”); and impulsivity (e.g., “I find myself doing things on the spur of the moment”). Participants respond on a scale from 1 (not at all) to 4 (highly). The RST-PQ scales showed

good internal reliability in the present sample: FFFS  $\alpha = 0.80$ ; BIS  $\alpha = 0.92$ ; BAS Reward Interest  $\alpha = .78$ ; BAS Goal-Drive Persistence  $\alpha = 0.89$ ; BAS Reward Reactivity  $\alpha = 0.81$ ; BAS Impulsivity  $\alpha = 0.79$ .

*Academic Dishonesty* (Craig & Dalton, 2014). This questionnaire asks students about their perceptions of academic dishonesty across three scales: Perceived Prevalence, Seriousness, and Likelihood of engaging personally. In each section, eight academic dishonesty offences are presented (e.g. “Plagiarizing work from others and passing it off as your own”; “Having a friend or colleague do the work for you”) and participants respond on a scale from 1 (not at all prevalent/serious/likely) to 4 (very prevalent/serious/likely). Responses are summed to provide an overall score (max 32) for each of the three sections.

*The Shortened Study Process Questionnaire* (SPQ; Fox et al, 2001). This 18 item short-form version of Biggs’s (1987) original SPQ comprises three items for each of the six study process factors: Surface motivation (SM, e.g. “Whether I like it or not, I can see that further education is for me a good way to get a well-paid or secure job”;  $\alpha = .44$ ), surface strategy (SS, e.g. “I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra”;  $\alpha = .54$ ), Deep motivation (DM, e.g. “I find that at times studying gives me a feeling of deep personal satisfaction”,  $\alpha = .75$ ), deep strategy (DS, e.g. “While I am studying, I often think of real life situations to which the material that I am learning would be useful”;  $\alpha = .52$ ), achievement motivation (AM, e.g. “I want top grades in most or all of my courses so that I will be able to select from among the best positions available when I graduate”;  $\alpha = .62$ ) and achievement strategy (AS, e.g. “I try to work consistently throughout the term and review regularly when the exams are close”;  $\alpha = .76$ ). We analysed just the motivation scores as this was the primary focus of the study.

*Intelligence: Numerical Reasoning Test* (NRT; Chamorro-Premuzic, 2010). This measure was included in order to be able to control for effects of intelligence in our analysis.

The NRT is a short measure of fluid intelligence comprising 20 non-verbal reasoning problems. Scores are computed as number of correct items and are found to correlate with other measures of fluid intelligence, Raven's Progressive Matrices ( $r = .60$ ) and Wonderlic Personnel Test ( $r = .70$ ; Chamorro-Premuzic, 2017).

Participant anonymity was ensured as no names, contact details or IP addresses were recorded. Participants were asked to generate an original personal ID code in case they wished to withdraw their data at a later date. Citation of this code would allow the researchers to identify the appropriate anonymous data. No participants chose to do this. The online questionnaire battery was developed such that participants were required to answer every item to avoid missing data through error. Before starting the questionnaires, participants were instructed in how to withdraw from the study should they not wish to answer particular items. As such no missing data replacement strategy was required.

### Planned Analysis

Firstly, to examine the relationship between RST factors and academic dishonesty two correlational analyses were conducted, one a straightforward bivariate analysis, and the second a partial correlation controlling for possible effects of IQ. A regression analysis examined whether RST variables shared additional variance with the likelihood of engagement in academic dishonesty over and above that accounted for by IQ and perceptions of prevalence/seriousness. We entered these three variables at stage 1 and the RST variables at stage 2. A significant increase in adjusted  $R^2$  at stage 2 would suggest an incremental effect of RST. To test for additional effects of the study motivations these were entered into the model at stage 3. These analyses were all conducted using SPSS version 23. Moderation analysis was conducted using Hayes (2013) PROCESS procedure, a publicly available SPSS macro for mediation and moderation analyses. We tested whether surface study processes mediate significant effects of Impulsivity, BIS and FFFS on likelihood of engagement. Finally,

mediation analysis also using PROCESS, investigated whether deep and surface study processes can account for the direction of the shared variance between RI, GDP, RR and dishonesty.

**Results**

Table 1 presents descriptive statistics for all measures. As this shows, some degree of skewness and kurtosis are indicated, but all values are well within the -2/+2 threshold for assumed normality (West, Finch & Curren, 1996).

Table 1. Descriptive statistics

	Mean	SD	Skewness	Kurtosis
AD-E	15.00	6.57	0.52	-1.18
AD-S	21.46	6.86	-0.32	-1.07
AD-P	20.10	6.11	-0.23	-0.60
RI	16.61	3.59	0.45	0.03
GDP	20.22	4.39	0.19	-1.12
RR	27.14	5.11	-0.40	-0.22
Imp	19.37	4.25	0.08	-0.14
BIS	65.50	12.81	-0.35	-0.52
FFFS	23.59	5.36	-0.03	0.18
DM	8.59	2.88	.06	-0.81
SM	8.88	2.53	0.29	-0.40
AM	10.14	2.75	-1.0	-.77
IQ	9.53	3.54	0.15	-0.54

AD-E = likelihood of engaging in AD; AD-S = perception that AD is serious; AD-P = perception that AD is prevalent; RI = Reward reactivity; GDP = goal-drive persistence; RI – reward interest; Imp = impulsivity; SM = surface motivation; DM = deep motivation; IQ = NRT score.

Table 2 shows bivariate correlations (lower part of the table) and partial correlations controlling for intelligence (upper part of the table). In line with our Prediction 2, neither RI, GDP nor RR showed a significant relationship with likelihood of engaging in academic dishonesty. However GDP and RR both present positive associations with the perception that cheating was prevalent. Impulsivity on the other hand presented a positive association as per Prediction 3. Our fourth prediction suggested that BIS and FFFS would be negatively associated with dishonesty. However while BIS presented no significant associations with dishonesty at all, FFFS was positively correlated with likelihood of engagement and negatively with perception of seriousness.

To test whether RST factors accounted for additional variance in academic dishonesty engagement over and above perception of seriousness and prevalence (Prediction 1), we conducted regression analyses on the likelihood of engaging in academic dishonesty (see Table 3). We first entered the three dishonesty variables together with the covariate, intelligence, at stage 1. This initial model accounted for 47% variance in engagement with perceptions of seriousness and prevalence both independent predictors. At stage 2, we added the RST factors. This resulted in a significantly better fitting model;  $\Delta R^2 = .07$ ,  $F(6, 228) = 5.39$ ,  $p < .001$ , in line with our Prediction 1. Perception of seriousness remained an independent negative predictor. RI (negatively) and Impulsivity and FFFS (positively) also emerged as independent predictors of academic dishonesty. Finally, at stage 3 we added the three study motivations. Again this made a significant improvement to the model;  $\Delta R^2 = .02$ ,  $F(2, 226) = 4.34$ ,  $p = .01$ , with surface motivation an independent predictor, along with perception that dishonesty is serious, RI, Impulsivity and FFFS. It is notable that RI shows no significant correlations with dishonesty (Table 2) though presents as a significant factor in regression because of its associations with other RST BAS factors.

Table 2. Partial correlations between all measures controlling for IQ (top of table in bold) and standard bivariate correlations (2-tailed; lower part of table).

	AD-E	AD-S	AD-P	RI	GDP	RR	I	BIS	FFFS	SM	DM	AM
AD-E		<b>-0.67*</b>	<b>0.08</b>	<b>-0.08</b>	<b>0.04</b>	<b>0.10</b>	<b>0.21*</b>	<b>0.08</b>	<b>0.26*</b>	<b>0.28*</b>	<b>-0.13*</b>	<b>-0.01</b>
AD-S	-0.68*		<b>0.03</b>	<b>0.03</b>	<b>-0.02</b>	<b>0.02</b>	<b>-0.02</b>	<b>0.00</b>	<b>-0.14*</b>	<b>-0.19*</b>	<b>0.11</b>	<b>0.07</b>
AD-P	0.08	0.03		<b>0.06</b>	<b>0.15*</b>	<b>0.20*</b>	<b>0.27*</b>	<b>0.06</b>	<b>0.02</b>	<b>0.02</b>	<b>0.09</b>	<b>0.10</b>
RI	-0.09	0.04	0.06		<b>0.51*</b>	<b>0.38*</b>	<b>0.27*</b>	<b>-0.27*</b>	<b>-0.13*</b>	<b>0.01</b>	<b>0.30*</b>	<b>0.33*</b>
GDP	0.04	-0.02	0.15*	0.50		<b>0.37*</b>	<b>0.07</b>	<b>-0.13*</b>	<b>0.07</b>	<b>0.28*</b>	<b>0.44*</b>	<b>0.55*</b>
RR	0.07	0.04	0.20*	0.39*	0.37*		<b>0.32*</b>	<b>0.00</b>	<b>0.27*</b>	<b>0.17*</b>	<b>0.24*</b>	<b>0.36*</b>
I	0.20	-0.02	0.26*	0.29*	0.07	0.33*		<b>0.12</b>	<b>0.10</b>	<b>0.06</b>	<b>0.04</b>	<b>0.04</b>
BIS	0.08	0.01	0.06	-0.29*	-0.13*	0.003	0.08		<b>0.29*</b>	<b>0.28*</b>	<b>-0.05</b>	<b>0.07</b>
FFFS	0.25*	-0.13*	0.02	-0.15*	0.07	0.26*	0.08	0.30*		<b>0.16*</b>	<b>0.04</b>	<b>0.06</b>
SM	0.28*	-0.20*	0.01	0.03	0.28*	0.16*	0.08	0.25*	0.14*		<b>0.16*</b>	<b>0.49*</b>
DM	-0.10	0.10	0.09	0.30*	0.44*	0.23*	0.05	-0.06	0.03	0.16*		<b>0.48*</b>
AM	-0.02	0.08	0.10	0.33*	0.55*	0.37*	0.05	0.06	0.05	0.49*	0.48*	

\* = significant at .05 or above; AD-E = likelihood of engaging in AD; AD-S = perception that AD is serious; AD-P = perception that AD is prevalent; RI = Reward reactivity; GDP = goal-drive persistence; RI – reward interest; Imp = impulsivity; SM = surface motivation; DM = deep motivation; AM = achieving motivation.



Table 3. Results of linear regression analyses of likelihood of engaging in academic dishonesty

		St. $\beta$	95.0% CI for $\beta$		t	p	Adj. R <sup>2</sup>
			Lower	Upper			
1	IQ	-.03	-.23	.12	-.63	.53	.46
	AD-S	-.68	-.74	-.56	-14.16	< .001	
	AD -P	.10	.01	.21	2.14	.03	
2	IQ	-.04	-.24	.10	-.77	.44	.52
	AD-S	-.65	-.71	-.53	-14.16	< .001	
	AD -P	.04	-.06	.14	.83	.41	
	RI	-.15	-.49	-.06	-2.49	.01	
	GDP	.06	-.08	.24	.99	.32	
	RR	.05	-.08	.20	.81	.42	
	I	.20	.15	.47	3.86	< .001	
	BIS	-.01	-.06	.05	-.18	.86	
	FFFS	.12	.02	.26	2.23	.03	
3	IQ	-.01	-.20	.15	-.29	.77	.53
	AD-S	-.62	-.67	-.50	-12.99	< .001	
	AD -P	.05	-.05	.15	1.06	.29	
	RI	.12	-.44	-.01	-2.05	.04	
	GDP	.03	-.13	.23	.55	.58	
	RR	.04	-.09	.19	.66	.51	
	I	.19	.14	.46	3.77	< .001	
	BIS	-.05	-.07	.03	-.96	.34	
	FFFS	.12	.02	.26	2.34	.02	
	SM	.16	.13	.68	2.92	.001	
	DAM	-.09	-.62	.12	-1.33	.21	

To test Prediction 2b, we tested for mediating effects of deep study processes on the relationships between BAS factors RI and GDP on the likelihood of dishonesty. The results are shown in Figure 1 and show the only significant effect was on GDP. This shows a non-significant direct effect on dishonesty, but when combined with a deep motivational study process, is associated with a lesser likelihood of dishonest behaviour, in line with our expectations.

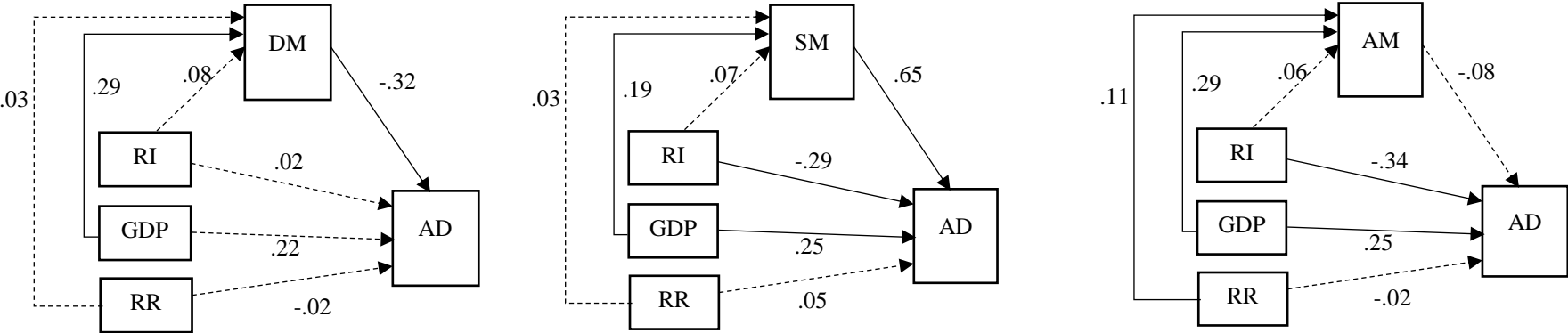


Figure 1. Mediating effects of Deep, Surface and Achieving study processes respectively on the relationships between BAS factors and likelihood of engaging in academic dishonesty. Solid lines indicate significant effect. AD = likelihood of engaging in academic dishonesty; RI = response interest; GDP = goal drive persistence; RR = response reactivity; DM = deep motivation; SM = surface motivation; AM = Achieving motivation

Predictions 3b and 4b concerned the moderating effects of surface and achieving study processes on the relationships between dishonesty and RR/impulsivity and with FFF/BIS respectively. Results are shown in Table 4. The relationship between Impulsivity and dishonesty was strengthened in the presence of higher levels of SM. RR was not significantly related to dishonesty but the relationship is moderated such that cheating becomes likely at higher levels of Achieving Motivation. The FFFS- dishonesty association was similarly mediated by Achieving Motivation.

Table 4. Moderating effects of surface and achieving study approaches on association between RST traits Impulsivity, RR, BIS and FFFS and likelihood of engaging in academic dishonesty.  $\beta$  relates to coefficient of the interaction.

	Moderator	RST trait	$\beta$	95% CI for $\beta$		t	p
				Upper	Lower		
Prediction 3b	SM	RR	.05	-.02	.12	1.42	.16
		Imp	.07	.01	.17	2.16	.03
	AM	RR	.08	.02	.13	2.48	.01
		Imp	-.003	-.08	.07	-.06	.95
Prediction 4b	SM	BIS	.02	-.01	.04	1.49	.14
		FFFS	.01	-.05	.07	.33	.74
	AM	BIS	.01	-.01	.04	1.20	.23
		FFFS	.06	.001	.13	1.97	.05

RR = response reactivity; Imp = Impulsivity; BIS = Behavioural Inhibition System; FFFS = Fight Flight Freeze System; SM = surface motivation; AM = Achieving motivation

## Discussion

The aim of this study was to examine the extent to which personality traits defined within Reinforcement Sensitivity Theory (RST) are associated with the likelihood of engaging in academic dishonesty and whether those effects were influenced by students' choice of study process. The results largely fulfilled our predictions. Firstly, we established that RST traits account for further variance in dishonesty over and above that explained by perception that dishonesty is serious and prevalent. Our second prediction focussed on BAS components which are suggested to drive an individual along a path from goal awareness to attainment, whereby Reward Interest (RI) reflects a sense of hopeful anticipation of reward and Goal-drive persistence (GDP) actively pursuing the reward (Corr & Cooper, 2016). Satchell et al (2018) refer to these as Future BAS as they reflect the movement towards a future reward. We predicted these traits would influence academic dishonesty indirectly via study processes. This was exactly what our mediation analyses found for GDP, with a deep motivation leading to a lower likelihood of dishonesty and a surface approach leading to a greater likelihood of dishonesty. We can imagine a student, goal-driven, but not deeply motivated in their learning, taking a short cut to success with academically dishonest behaviours, whereas those with a deeper motivation to learn about the subject, are less likely to cheat. RI on the other hand emerged as sharing negative independent variance with dishonesty in regression, though no significant mediating effects of study processes were observed.

Reward Reactivity (RR; action taken to claim the reward) and Impulsivity can be thought of as Now BAS (Satchell, et al, 2018) as they reflect an "of the moment" response. In motivating an individual to approach a goal, a tendency towards Impulsivity can result in a lack of self-restraint and this has previously been associated with cheating (DeAndrea, et al,

2009; Millar et al, 2007), as well as wider dishonest behaviours. In the present study Impulsivity was associated with the likelihood of academic dishonesty. In RST terms, a tendency to low self-control may manifest particularly once a final reinforcer is close. At this stage, planning and self-restraint can give way to an impulsive urge to reach for and grasp the reward (Corr, 2008; Corr & Cooper, 2016). In the present data, the effect of impulsivity on academic dishonesty was mediated in the presence of higher surface study motivation such that the effect was strengthened, in line with our Prediction 3. A surface approach would suggest little intrinsic motivation and academic dishonesty can be a way to achieve the goal quickly and effortlessly in the context of low self-restraint.

Response reactivity presented no significant relationship with likelihood of dishonesty, although it was positively correlated with all three study motivations. However, a positive moderating effect suggested that at higher levels of Achievement motivation, RR can contribute to cheating behaviour, in contrast to the other Now BAS factor, Impulsivity, which is moderated by Surface motivation. Achieving study processes are employed by students with purely performance (as opposed to mastery) goals and cheating is an activity to boost performance (Anderman, 2007; Anderman et al, 2009). Students who use achieving strategies have a strong desire to succeed, but differ from deep and surface learners in their underlying motivations (Biggs, 1987, 1993; Fox et al, 2001; see Table 1). Whereas surface motivation is based on fear of failure and lack of interest, Achieving motivation is based in achievement for its own sake, competitiveness and an urge to be the best. Our findings are therefore in line with Corr and Cooper's (2016) description of RR as concerned with excitement at doing well and winning.

Corr and Cooper (2016) describe BIS as activated in the context of approaching danger, associated with anxiety and apprehension. It resolves conflict (such as performance anxiety conflicting with a desire to achieve) by iteratively increasing the negative valence of

stimuli until a behavioural decision is made in favour of either cautious approach or avoidance. BIS presented no direct correlation with academic dishonesty, though regression analysis suggested they shared negative variance in the presence of other factors. The predicted moderating effects of Surface and Achieving motivation on BIS were not observed.

In contrast, and contrary to our expectations, Academic dishonesty was positively correlated with FFFS in our data. FFFS is reflected in defensive avoidance behaviours linked to fear and panic and there are two possible routes to FFFS involvement (Corr & McNaughton, 2012). In the Primary route, FFFS is activated when there is certainty of punishment. Therefore, fear of (expected certain) failure should activate the FFFS, especially in those individuals with a highly reactive FFFS where ‘defensive distance’ to threat is perceived to be closer and the threat is, therefore, perceived as imminent and probable. In the Secondary route, where doubt occurs, (i.e., goal-conflict), then the BIS should be activated, which then activates the FFFS. The effect of this may be observed in higher FFFS scores, and not BIS ones, especially among those with a highly sensitive FFFS (Corr & McNaughton, 2012). We suggest this may have been the case in our data. Interestingly, the effect of FFFS was moderated such that high Achieving Motivation increased the likelihood of dishonest behaviour. It may be that the competitiveness associated with this study process arises not from grandiose narcissistic or sensation seeking traits, but from a deep-seated fear of failure and need to be noticed (more typical of vulnerable narcissism, Pincus et al, 2009). If so, this may activate FFFS and trigger academic dishonesty as an adaptive solution by means of the Primary route described by Corr and McNaughton (2012). This issue will be an interesting focus for further research.

### Limitations

This study is not without limitations, not least those generally associated with self-report measures. In addition, although our approach to examining academic dishonesty is novel, it must be recognised that a focus on individual differences alone may mask other causes. Future research might adopt a more detailed design which allows for the study of the interrelationships between individual, contextual and social factors. We also acknowledge that some of the reliability coefficients which emerged for the SPQ were low. This has been noted in previous research also and Fox et al. (2001) present analysis to indicate reliability of the SPQ despite low alpha values, given the scales comprise just three items apiece. Nevertheless we might interpret some of the results with caution, particularly for surface motivation.

### Conclusion

In conclusion, this research highlights how RST can offer a new explanation for why students engage in dishonest academic behaviours, and the role played by their choice of study approach. Understanding these factors can support efforts by educational institutions to combat the problem. Most to date have focussed on assessment design and detection methods, educating student about what constitutes dishonesty, making penalties opaque and the publication of policy/honour statements (Betain, 2010; Lanier, 2006; Fang, 2012; Olt, 2002). However, these practices do not take into account student factors in terms of basic personality and study motivations. Our results suggest that for students with strong surface or achieving learning preferences, the likelihood of academic dishonesty is high. We might further imagine that if these students also have a tendency toward BIS or FFFS activation, emphasis on penalty would make them all the more apprehensive and conflicted, possibly leading to course withdrawal. Conversely, interventions which help to encourage a mastery culture in

the classroom generally, focussed on scholarship rather than simple achievement, may support the development of deep learning approaches. Understanding more about students' intrinsic personality factors is vital if we are to address the growing challenge of academic dishonesty.



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