

**Power of Grit and Impulsiveness: a study of Adolescent Academic  
Motivation using the Theory of Planned Behaviour.**

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## Table of Contents

Acknowledgements.....	4
Abstract.....	5
1. Introduction.....	6
1.1 Intentions	
1.2 Theory of Planned Behaviour	
1.3 Grit	
1.4 Impulsiveness	
1.5 Hypotheses	
2. Methodology.....	13
2.1 Respondents	
2.2 Design	
2.3 Materials	
2.4 Procedure	
3. Results.....	19
3.3 Descriptive statistics	
3.4 Inferential statistics	
4. Discussion.....	30
5. References.....	36

## Appendices

Appendix 1 – Information sheet and informed consent.....	40
Appendix 2 – Survey Questions.....	41
Appendix 3 – 8–item Grit Scale.....	45
Appendix 4 - Barrett (BIS-11-A) Scale of Impulsiveness.....	48

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## **Abstract**

The purpose of this research is to explore the Intentions of adolescents to study and how study behaviour may be influenced by the internal variables of Azjen's Theory of Planned Behaviour, Attitudes to study, Perceived Behavioural Control (PBC) and Subjective Norms. The external variables of Impulsiveness and Grit were also investigated, with a view to discovering any gender differences. A correlational design, using purposive sampling, measured academic motivation through the Theory of Planned Behaviour (Ajzen & Fishbein, 1980; Ajzen, 1990), secondly, Grit using the 8 item Grit Scale for children (Duckworth & Quinn, 2009) and thirdly, Impulsiveness using the 15-item short version for adolescents of the Barratt Impulsiveness Scale (Fossati, Barratt, Acquarini, & Di Ceglie, 2002). This study found no gender differences between variables, with the exception of Indirect Attitude. Grit, measured was not found to be significantly correlated with Academic intentions, contrary to previous research. A significant correlation was found between academic intentions and Impulsiveness.

## **Introduction**

### **Purpose of the current research**

Second Year within the Irish education system is seen as a difficult year to maintain student engagement and motivation with the long term goal of academic success in the Junior Cert a year away. The recent Junior Cycle reforms have identified this as a problem and have attempted to enhance academic motivation and perseverance by introducing Classroom Based Assessment tasks into Second Year. Inspired by these changes in education in the Irish system this study takes a look at how in the words of William James (1890/1950), fourteen year old adolescents are asked to “attend to a difficult object and hold it fast before the mind”.

The purpose of this research is to explore the Intentions of adolescents to study and how study behaviour may be influenced by the internal variables of Azjen's Theory of Planned Behaviour, Attitudes to study, Perceived Behavioural Control (PBC) and Subjective Norms. The external variables of Impulsiveness and Grit will also be investigated, with a view to discover any differences between genders. Adolescents were the chosen sample surveyed, as the rationale for the significant impact of the variables upon their academic motivation and performance is suggested from previous research.

### **Previous Research**

#### *Intentions in Adolescents*

Adolescents also develop the capacity of establishing plans or preparing events that are more distant in time, in contrast to children, whose capacity is more limited to close events (Barkley, 1997). It is in adolescences that the functions of the prefrontal cortex, which

oversees the orientation to future experiences, goes through an important maturation process (Blakemore, den Ouden, Choudhury, & Frith, 2007). Blakemore et al., (2007) conducted an fMRI study revealing the neural strategy for thinking about intentions continues to develop during adolescence and early adulthood. When thinking about intentional causality (relative to physical causality), Blakemore et al. proposes adolescents recruit medial PFC (prefrontal cortex) to a greater extent than do adults, and adults use part of the right STS (superior temporal sulcus) more than do adolescents (Blakemore et al., 2007, p.137). It is unknown whether the synaptic pruning that occurs in parts of the brain during adolescence, including the PFC (Huttenlocher, 1979 as cited in Blakemore et al., 2007, p. 137) fine-tunes neural tissue in the same way as during early development. If this is the case then such regions may not function as efficiently in adolescents as in adults (Blakemore, den Ouden, Choudhury, & Frith, 2007, p. 137), which may lead to weaker decision making processes, forward planning and intentions to act.

### *Theory of Planned Behaviour*

This study will look at the extent Intentions to study correlate with the Direct and Indirect variables of Attitudes towards study, Perceived Behavioural Control and Subjective Norms. Together they can be held to predict academic motivation (Ajzen, 1991). As defined by Ajzen (1991), Attitude is the degree to which study is positively or negatively valued, with indirect attitude linking to expected outcomes. Subjective norm is the perceived social pressure to engage or not to engage in studying, while Indirect Subjective Norm measures normative beliefs and motivation to comply with peers, teachers and parents (Ajzen, 1991). According to Ajzen (2006), given a sufficient degree of actual control over the behaviour, people are expected to carry out their intentions when the opportunity arises, with Intention thus assumed to be the immediate antecedent of behaviour. A possible limitation to this

assumption however is that completing the behaviour may be influenced by control factors. Therefore PBC concerns, such as unexpected life events, have been included. As a general rule advised by Ajzen (1991), the more favourable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform the behaviour in question. The schematic representation of Ajzen's Theory of Planned Behaviour (1991) can be seen in Figure 1 below.

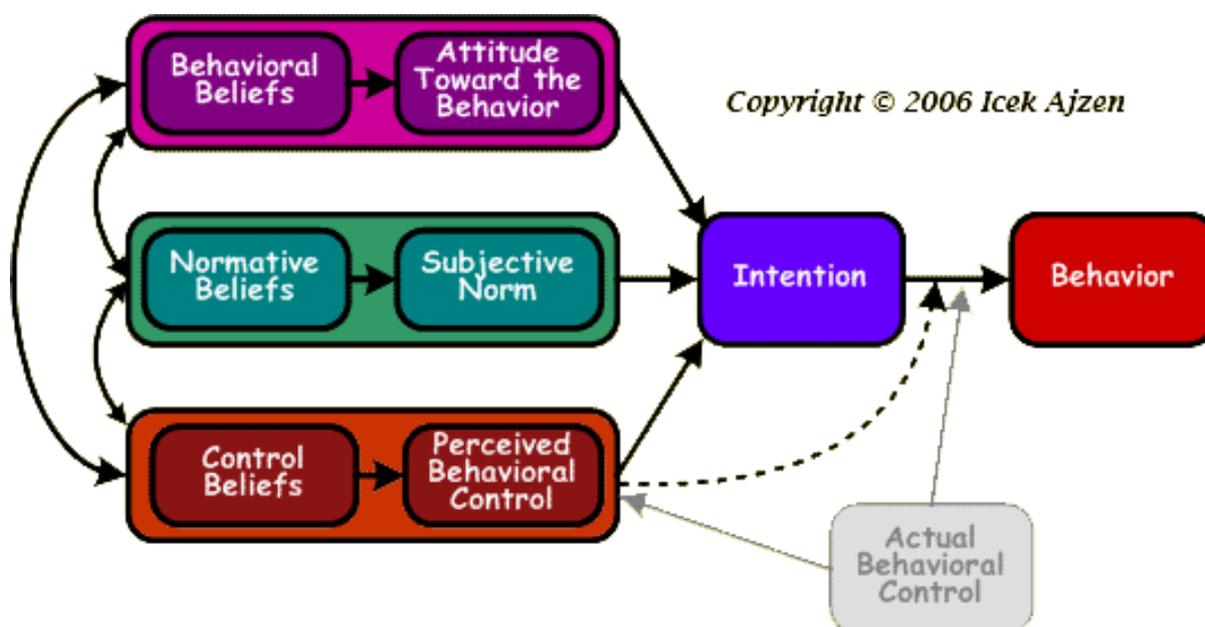


Figure 1. Schematic representation of Ajzen's Theory of Planned Behaviour.

The Theory of Planned behaviour has largely been used in studies of health related issues. Asare (2015) found the constructs of attitude towards behaviour, perceived behavioural control, and subjective norm significantly predicted intention to use condoms and they accounted for 64% of the variance. Behavioural intention significantly predicted condom use and it accounted for 15% of the variance (Asare, 2015). In application of the theory of planned behaviour to chronic illness sufferers, significant amounts of variance was explained

by the TPB model indicating its usefulness as a predictor of self-monitoring behaviour intentions. The results also highlighted the importance of subjective norm and perceived behavioural control within the TPB in predicting intentions (McGuckin, Prentice, McLaughlin, & Harkin, 2012).

Upon conducting a meta-analysis of 185 independent studies limitations to the TPB were put forward by Armitage (2001). Attitude, subjective norm and PBC were found to account for significantly more of the variance in individuals' desires than intentions or self-predictions, but intentions and self-predictions were better predictors of behaviour (Armitage & Conner, 2001). In addition, Armitage (2001) found the subjective norm construct is generally found to be a weak predictor of intentions. As the sample chosen for this study is adolescences of fourteen years, evidence suggests perceived social pressure will have more influence than in adults. There have been limited studies completed linking TPB with academic situations. One such study by Comerford (2012) found that TPB variables are significantly correlated with intention and therefore can be used as a model for academic behaviour. Gender differences were also found within this framework (Comerford, 2012). There is a gap in the research of academic motivation using the TPB for adolescence providing a rationale for this study.

### *Impulsiveness*

An ability to control short-term gratification for longer-term gain may be an important candidate in the search for powerful non-cognitive predictors of academic, and hence career success (Freeney & O'Connell, 2010). Resisting instant gratification in the hope of achieving a more significant reward in the future may aid academic competence. Resisting the

temptation of non-academic activities could reflect academic motivation and intention to study.

As students transition into adolescences they can have trouble trying to control their impulses, especially when their objective involves emotional components (Bell and McBride, 2010). Motivation becomes less intrinsic as age increases (Lepper, Corpus, & Iyengar, 2005). Lepper et al. (2005) found intrinsic motivation showed a significant linear decrease from 3rd grade through 8th grade in a sample of 797 students and proved positively correlated with children's grades at all grade levels. Extrinsic motivation showed few differences across grade levels and proved negatively correlated with academic outcomes (Lepper et al., 2005). In adolescents, behaviour and decision making is more influenced by extrinsic factors, such as social pressure of their peers (Wong and Csikszentmihalyi, 1991). In this context adolescents may behave more impulsively than children and adults (Casey and Caudle, 2013) and this could be directly related to the differences in grit and self-control found between children and adolescents (Oriol, Miranda, Oyanedel, & Torres, 2017). The influences of Impulsiveness, Grit and Perceived Subjective Norms, as measured by the Theory of Planned Behaviour, may gain higher significance as extrinsic motivation becomes more influential, proving the rationale for their inclusion in this study.

In a study exploring the influence of 31 personality traits on academic performance, Wolfe and Johnson (1995) found delay of gratification (i.e. self control correlated to impulsiveness) to be the variable more dominant than SAT scores in predicting academic success (Wolfe & Johnson, 1995), supporting the rationale for including Impulsiveness in this study of academic motivation. In Spinella and Miley's (2003) study the relationship between impulsivity and academic achievement in 27 undergraduate psychology college students was explored. Using the Barratt Impulsiveness Scale (BIS-11 [Barratt, 1994]), a significant

inverse relationship was found between impulsivity and academic performance (Spinella, M. & Miley, 2003). Spinella and Miley (2003) have interpreted impulsivity as a personality trait that influences social, emotional, cognitive, and behavioural functions. Impulsiveness can negatively impact academic motivation leading to, according to Spinella et al. (2003), "a painstaking, time-consuming grind that challenges one's fortitude as they strive towards their long-term educational destination".

### *Grit*

Angela Duckworth defines grit as "perseverance and passion for long-term goals. Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress" (Duckworth, Peterson, Matthews, & Kelly, 2007, p.1087). In her studies Duckworth found grit to be a better predictor of success than IQ. Findings suggested that perseverance and sustained focus on a long term goal can be more important than talent (A. L. Duckworth & Seligman, 2005). Students that exhibit passion and perseverance towards a specific goal should be given the same access to resources and opportunities as those with high IQ. Teaching students to be more dedicated to long term goals may be a beneficial strategy to promote academic achievement. The Short Grit Scale was validated by Duckworth and Quinn (2009) in a study that found grittier adolescents earned higher GPAs and watched less television. Duckworth presents evidence that there is significant gender differences within Grit with girls out performing boys in self-discipline (Duckworth & Seligman, 2006). Therefore influencing the rationale for the current study to include an analysis of gender differences. Kennedy implies that the construct of grit is highly influenced by value conflict when pursuing multiple goals and that academic goals must find their place within a goal hierarchy (Kennedy, 2013, p.183). According to Carver and Schrier's (1998) control theory, a student deciding between study and meeting friends will choose the

goal with higher valence as perceived by the student. Whichever goal has a quicker means to an end for success and more links between lower level and higher level goals will be chosen. So if a student feels that study achieves academic success and meeting friends achieves fun and meeting new people, holding that the 3 outcomes are held in equal valence, the student will pick meeting friends as it achieves more of the higher level goals. (Kennedy, 2013)

### *Hypothesis*

**Hypothesis 1.** The TPB variables i.e. attitude, Subjective norm and perceived behavioural control will significantly positively correlate with intention to study.

**Hypothesis 2.** The external variables of Grit will be positively correlated with academic motivation.

**Hypothesis 3.** The external variables impulsiveness will be positively correlated with academic motivation.

**Hypothesis 4.** Female adolescents will display higher levels of impulsiveness than male adolescents.

**Hypothesis 5.** Female adolescents will display higher levels of grit than male adolescents.

**Hypothesis 6.** Female adolescents will display higher levels of intent to study (i.e. TPB variables: attitude, Subjective norm and perceived behavioural control) than male adolescents.

## **Methods Section**

### ***Respondents***

Ninety six respondents (N = 96) participated in this study, with two excluded cases. In this sample the slight majority of respondents were male (n = 49, 51%) with forty seven females (n=47, 49%). Participants were not asked their age as they are all in Second Year in Post Primary school and so have an age range of 14-15 years . All respondents from this homogeneous purposive sample attended the same Post Primary school in North County Dublin.

### ***Questionnaire Design***

The questionnaire was developed on Google forms and administered through the online platform by students using their own individual iPads. Participants were assured on the cover page that their participation was voluntary, anonymous, they could leave the survey at any time they wished and that there were no right or wrong answers. A letter informing parents of the study was sent prior to carrying out the survey allowing them appropriate time of one month to withdraw their child from the survey. The Principal acted locus parentis for this research. Participants were asked for informed consent at the opening page of the survey.

The study design is quantitative and correlational in nature. Correlation designs search for relationships between variables, as opposed to causation. The criterion variable selected (CV) is academic motivation, measured through the construct of Intentions in TPB. The predictor variables (PV) were variables of Attitude, PBC and Subjective Norm within TPB, Impulsivity and Grit.

### ***Materials***

In the questionnaire three scales were used: firstly, academic motivation measured through the Theory of Planned Behaviour (Ajzen & Fishbein, 1980; Ajzen, 1990), secondly, grit using the 8 item Grit Scale for children (Duckworth & Quinn, 2009) and thirdly, impulsiveness using the 15-item short version for adolescents of the Barratt Impulsiveness Scale (Fossati et al., 2002). Using these three scales correlational data was analysed to find a model for academic motivation.

### ***Theory of Planned Behaviour***

In this questionnaire the questions were based on all the direct and indirect variables as proposed by Ajzen and Fishbein (1977): intention, attitude, perceived behavioural control (PBC), and social norm. These questions were based upon "study for at least 2 hours, 4 times a week for the next 3 months". The construction and scoring of the Theory of Planned Behaviour element of the study was guided by 'A Manual for Health Services Researchers' (Francis et al., 2004).

### ***Intentions***

There were three questions used to assess intention to study "for at least 2 hours, 4 times a week for the next 3 months." Participants were asked to rate whether they "expect", "want" or "intend" to study on a seven-point semantic differential scale from "Strongly disagree" to "Strongly agree". The mean of the three intention scores was calculated.

### ***Attitudes***

Direct Attitude was measured by asking if "study for at least 2 hours, 4 times a week for the next 3 months would be:" 'good/bad', 'pleasant/unpleasant', 'worthless/useful' with the bipolar adjectives rated on a seven point differential scale. Therefore measuring both instrumental

items (whether the behaviour achieves something e.g. useful–worthless) and experiential items (how it feels to perform the behaviour e.g. pleasant – unpleasant). The mean was calculated, after reverse scoring was taken into consideration, to give an overall attitude score towards study.

Indirect Attitude measured behavioural beliefs and outcome evaluations of studying. Participants were asked to rate whether 'to be successful', 'have good knowledge of my subjects' or 'good self-discipline after studying' was 'extremely undesirable/extremely desirable' and 'unlikely/likely' on a seven point differential scale. To calculate an overall attitude score each behavioural belief was multiplied by the appropriate evaluation score and all totals were added together.

### ***Social Norm***

Direct Social Norm was measured through three statements rated on a seven point differential scale: 'Most people who are important to me think that I should/should not; 'It is expected'; 'feel under social pressure' to 'study for at least 2 hours, 4 times a week for the next 3 months'. Reverse scoring assures that high scores reflect greater social pressure. The mean of the scores is calculated to measure social pressure to study the required amount.

Indirect Subjective Norm measured normative beliefs and motivation to comply with peers, teachers and parents. To calculate an overall Subjective Norm score each normative belief was multiplied by the appropriate motivation to comply score and all totals were then added together.

### ***Perceived Behavioural Control (PBC)***

Direct measures of Perceived Behavioural Control measures the person's self-efficacy and their beliefs about the controllability of the behaviour. Reserve scoring was done so that high scores reflected a greater level of control over studying behaviour. Three statements were

rated on a seven point scale: 'confident that I could study', study was 'entirely up to me' and study for the required time was 'easy/difficult'. The mean of the item scores gave an overall perceived behavioural control score.

Indirect Perceived Behavioural Control measures control beliefs and their perceived power to influence behaviour. Participants were asked if 'feeling tired' or the time demands of 'encountering unanticipated events' or 'other recreational activities' would make studying more difficult and if these factors occur rarely or frequently. Each control is multiplied by the relevant power to influence, with the scores summed up to give a total indirect PBC measure.

### ***Grit***

Duckworth, Peterson, Matthews and Kelly (2007) defined Grit as “perseverance and passion for long-term goals”. In this study it was measured using the 8 item Short Grit Scale for Children (Grit-S, Duckworth & Quinn, 2009). Participants were asked to rate eight statements on a five point scale from 'Very much like me' to 'Not like me at all'. Statements included two subscales of Grit: Consistency of Interests, with questions such as "I have difficulty maintaining my focus on projects that take more than a few months to complete."; and Perseverance of Effort with questions such as, "Setbacks don't discourage me." Answers were selected on a five point Likert scale ranging from 'Very much like me' to 'Not like me at all'. Taking reverse scoring into consideration, scores were then summed up and divided by eight. The score on this scale ranges from five (extremely gritty) to the lowest score on this scale one (not at all gritty). In this study Cronbach alpha of .68 was found. Considering Cronbach alpha is sensitive to the number of items in a scale a score of above .6 can be considered acceptable for an 8-Item test.

### ***Impulsiveness***

To measure Impulsiveness this study used the 15 item Barratt Impulsiveness Scale (Adolescent Version) (BIS-11-A; Fossati et al, 2002). The BIS-11-A consists of three subscales of impulsiveness: motor with questions such as "I do things without thinking.", non-planning with statements such as "I plan what I have to do." and attention impulsiveness with statements such as, "I make-up my mind quickly". Items are scored from 1 (rarely/never) to 4 (Almost Always/Always) with reverse scoring taken into consideration.

Correlations among these variables are significantly higher

for adolescents than for adults; therefore, BIS-11-A total scores are recommended to be the best indicator of impulsivity in adolescents (Sabet, 2011). Fossati et al. (2002) noted that internal consistency was adequate with adolescents, with a Cronbach's alpha of .78. In this study Cronsbach alpha of .7 was found. Again as in the case of the Grit Scale, BIS-11-A is a shorter version with 15 items and so .7 Cronsbach alpha is acceptable.

### ***Academic experience***

Academic experience is examined through three self reported questions. Past behaviour asked, "In the past 3 months, I have studied for at least 2 hours, 4 times a week". This was rated on a seven point Likert scale ranging from 'Strongly agree' to 'Strongly disagree'. The results were reversed to show more positive study behaviour on the higher scale. Self reported academic performance was rated on a four quartile scale, "In comparison to the rest of the class where do you think your grades are?", as was satisfaction of academic performance, "How satisfied are you with where your grades are?".

## **Procedure**

Students completed the survey on personal iPads in a classroom situation with the right to withdraw or not consent without prejudice clearly presented to all through a gatekeeper. This method of questioning is familiar to the participants reducing potential anxiety levels. Anonymity was guaranteed and participants were assured there were no right or wrong answers.

## Results

### *Descriptive statistics*

Descriptive statistics were carried out initially. Histograms were used to examine the distribution of values for each of the psychological variables within the Theory of Planned Behaviour, in addition to grit and impulsivity with the mean and standard deviation for each variable measured, as seen in Table 1 below.

Table 1: *Descriptive Statistics of Psychological Measures*

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Minimum Statistic</b>	<b>Maximum Statistic</b>
Total Intention	95	3.37	1.41	7.00	3.37
Direct Attitude	94	4.59	1.30	1.00	7.00
Indirect Attitude	93	20.22	21.14	-34.00	63.00
Direct PBC	95	3.83	1.01	1.33	6.67
Indirect PBC	93	-9.81	17.53	-63.00	54.00
Direct Subj Norm	96	4.40	1.23	2.00	7.00
Indirect Subj Norm	93	14.26	21.40	-63.00	63.00
Grit	93	3.15	.63	1	4.88
Impulsiveness	90	38.98	6.51	15	60

In analysing the 5% Trimmed Mean for each variable it was found that extreme scores were not having a strong influence on the mean for any of the variables and so it was decided not to exclude outliers. In analysing the Shapiro-Wilk statistics it was discovered that the variables of Intention, Direct and Indirect Attitudes and Grit were normally distributed with

scores above .05, seen in the histograms in Figure 1 and Figure 2 below. In contrast, however, the other variables of Direct and indirect Subjective Norm, Direct and Indirect PBC and Impulsiveness were not normally distributed.

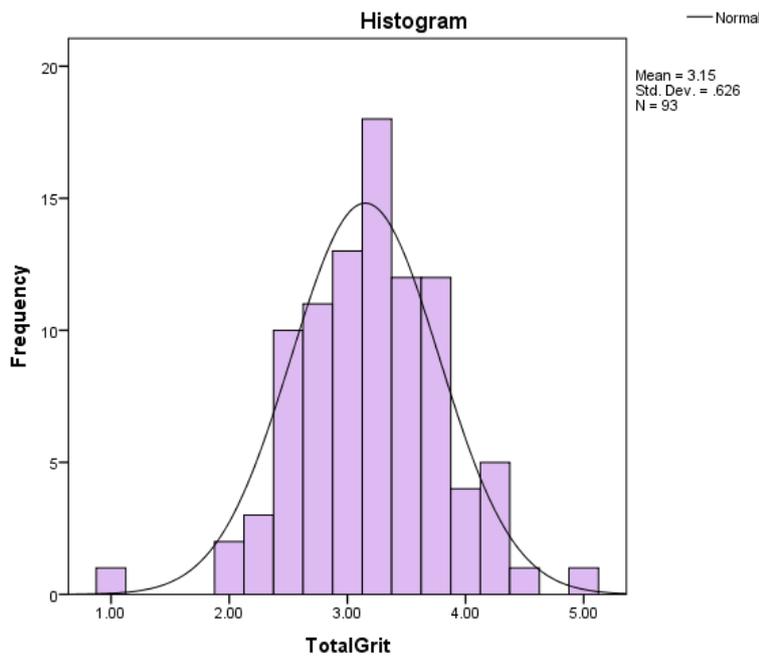


Figure 2. Histogram displaying the distribution of values for Grit.

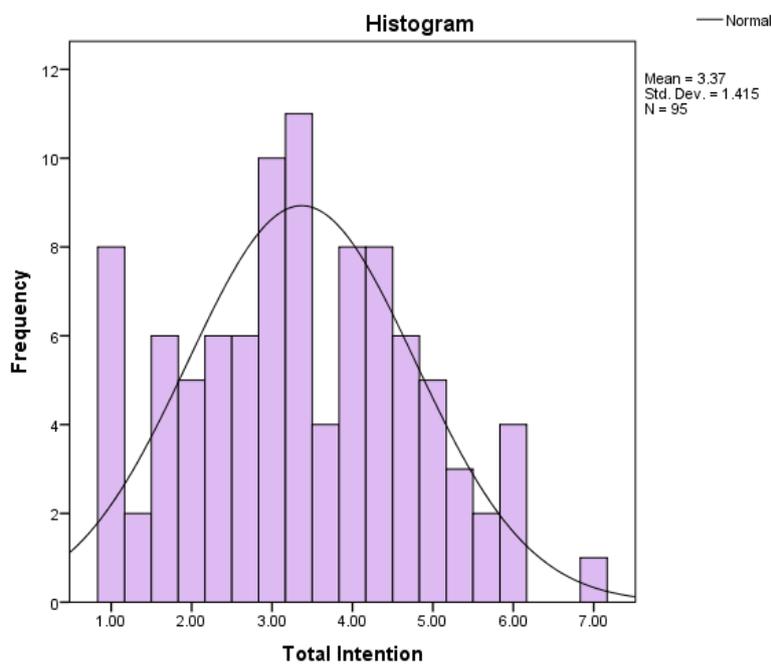


Figure 3. Histogram displaying the distribution of values for Intention to study.

### ***Inferential statistics***

In terms of inferential statistics, scatter plots were first created to investigate the relationship between variables listed in the hypotheses. Although normal distribution was assumed from the descriptive statistics, the assumptions of linear relationship and homoscedasticity were not evident from the scatter plots so parametric tests could not be chosen. In place of a Pearson's  $r$  Correlation as had been planned, a Spearman Rank Order Correlation was chosen as a non parametric alternative.

### **Theory of Planned Behaviour**

#### **Validation of Indirect measures in TPB**

A series of bivariate correlations were conducted between direct and indirect measures of the same construct, to confirm the validity of the indirect measures.

#### **Attitudes to study**

A Pearson Correlation was chosen to examine the relationship between overall attitude towards study and the outcome evaluation of this behaviour. A strong, positive, significant relationship was found between the two variables,  $r=.54$ ,  $n=91$ ,  $p<.01$ , reflecting more positive attitudes towards study associated with higher evaluations of the outcome of study.

#### **PBC**

The relationship between Direct PBC and Indirect PBC was investigated using a Spearman's  $\rho$ . There was a weak, non-significant, positive correlation between the two variables,  $r=.03$ ,  $n=93$ ,  $p=.76$ , with a person's self-efficacy belief (Direct PBC) only weakly associated with positive control over indirect factors, such as, unanticipated events demanding time.

### Subjective norm

A Spearman's rho was also used to measure the relationship between Direct and Indirect Subjective Norm beliefs. A significant, positive correlation of medium strength was found between the two variables,  $r=.45$ ,  $n=93$ ,  $p<.01$ , with high perceived social pressure strongly associated with the motivation to comply.

Table 2: Correlation for TPB variables, Grit and Impulsiveness

Variables	Total intention	Direct Attitude	Indirect Attitude	Direct PBC	Indirect PBC	Direct Subjective Norm	Indirect Subjective Norm	Total Grit	Total Impulsiveness
Total intention									
Direct Attitude	<b>.343**</b>								
Indirect Attitude	<b>.309**</b>	<b>.530**</b>							
Direct PBC	.502**	.248*	.222*						
Indirect PBC	.191	-.093	-.122	.032					
Direct Subjective Norm	.436**	.301**	.131	.156	.065				
Indirect Subjective Norm	.288**	.404**	.260*	.250**	-.027	.450**			
Total Grit	<b>.141</b>	<b>.161</b>	<b>.128</b>	.382**	-.086	-.020	.001		
Total Impulsiveness	.354**	.160	.318**	.268*	-.083	.250*	.205	.026	

Note: \*\*.Correlation is significant at the 0.01 level (2-tailed). \*.Correlation is significant at the 0.05 level (2-tailed). Statistics in bold are using Pearson's Correlation

**Hypothesis 1.** The TPB variables i.e. attitude, Subjective norm and perceived behavioural control will significantly positively correlate with intention to study.

### **Intention to Study and Attitudes**

A Pearson Correlation for Intention to Study showed a medium, positive, significant relationship with Direct Attitudes,  $r=.34$ ,  $n=93$ ,  $p=.001$ , and a medium, positive, significant relationship with Indirect Attitudes,  $r=.31$ ,  $n=92$ ,  $p=.003$ . Therefore we cannot accept the null hypothesis with regards to Attitudes within the TPB.

### **Intention to Study and Subjective Norms**

A Spearman's rho was conducted to measure relationship between Intention to Study and impact of Subjective norms. This showed a medium, positive, highly significant relationship with Direct Subjective Norms,  $r=.44$ ,  $n=95$ ,  $p<.01$ , and a weak, positive, highly significant relationship with Indirect Subjective Norms,  $r=.29$ ,  $n=92$ ,  $p=.005$ . This causes us to reject the null hypothesis with regards to Subjective Norms, within the TPB, correlating with Intention to study.

### **Intention to Study and PBC**

A Spearman's rho was conducted to measure the relationship between Intention to Study and impact of PBC. This measured a large, positive, highly significant relationship with Direct PBC,  $r=.50$ ,  $n=94$ ,  $p<.01$ , and a small, positive, non-significant relationship with Indirect PBC,  $r=.19$ ,  $n=92$ ,  $p=.068$ . This supports the null hypothesis with regards to PBC, within the TPB, correlating self efficacy with Intention to study but accepts the null that Indirect PBC has no relationship with Intention to Study.

**Hypothesis 2.** The external variables of Grit will be positively correlated with academic motivation. A Pearson Correlation investigating the relationship between Grit and academic motivation, as measured by TPB Intentions showed a weak, positive, non significant relationship,  $r=.14$ ,  $n=92$ ,  $p=.179$ . The null hypothesis is therefore accepted as Grit is not shown to be correlated with intentions to study.

**Hypothesis 3.** The external variables of Impulsiveness will be positively correlated with academic motivation. A Spearman rho was conducted to analyse the relationship between Impulsiveness and academic motivation, as measured by TPB Intentions. A medium, positive, highly significant relationship,  $r=.35$ ,  $n=89$ ,  $p<.01$ , was discovered. The null hypothesis is rejected as Impulsiveness is shown to highly correlate with intentions to study.

### **Gender differences in Intention, Grit and Impulsiveness**

**Hypothesis 4.** Female adolescents will display higher levels of impulsiveness than male Subjective. A Mann-Whitney U Test was conducted as a non parametric alternative to the Independent T test on the external variable Impulsiveness. No significant differences were found between females and males, as outlined in Table 3 below.

The Mann-Whitney U Test revealed no significant difference in the Impulsiveness levels of males ( $Md=39.5$ ,  $n=44$ ) and females ( $Md=37.5$ ,  $n=46$ ),  $U= 844.5$ ,  $z=-1.36$ ,  $p= .175$ ,  $r=-.14$ . The null hypothesis is accepted.

Table 3: *Mann-Whitney U Test table displaying the differences in Impulsiveness between females and males.*

<i>Variables</i>	<i>Groups</i>	<i>N total</i>	<i>Md</i>	<i>Mann-Whitney U</i>	<i>r</i>	<i>p-Value (2-tailed)</i>
Total Impulsiveness	Female	46	37.5	844.5	-.14	.175
	Male	44	39.5			

**Hypothesis 5.** Female adolescents will display higher levels of grit than male adolescent.

A Independent T-Test was conducted on the external variable Grit, as seen in Table 4 below. No significant differences were found between females ( $M=3.19$ ,  $SD=.59$ ) and males ( $M=3.11$ ,  $SD=.67$ ) in the external variable Grit, ( $t(91) = .603$ ,  $p=0.58$ ). This result suggests the hypothesis that girls are grittier than boys is a fallacy, the null hypothesis is accepted.

Table 4: *Independent T-Test table displaying the differences between females and males for the variables of Intentions, Attitude and Grit.*

<i>Variables</i>	<i>Groups</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i>
Grit	Female	3.19	.59	.603	91	.582
	Male	3.11	.67			

**Hypothesis 6.** Female adolescents will display higher levels of intent to study (i.e. TPB variables: attitude, Subjective norm and perceived behavioural control) than male adolescents. An independent Samples T-test was used to measure differences in Females and Males in variables that follow the assumptions. A Mann-Whitney U Test was conducted as a non parametric alternative to the Independent T test on the remaining variables. No significant differences were found between females and males in except Indirect Attitudes, as outlined in Table 5 below.

Table 5: *Independent T-Test table displaying the differences between females and males for the variables of Intentions and Attitudes, direct and indirect.*

<i>Variables</i>	<i>Groups</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>Df</i>	<i>Sig.</i>
Total intention	Female	3.38	1.39	.056	93	.659
	Male	3.36	1.45			
Direct Attitude	Female	4.76	17.18	1.265	92	.994
	Male	4.42	24.57			
Indirect Attitudes	Female	19.46	1.22	-.341	91	.014
	Male	20.96	1.36			

A Independent T-Test was conducted on Intentions and Attitudes, direct and indirect, as seen in Table 5 above. No significant differences were found between genders in the variable Intention, ( $t(92) = .056$ ,  $p=0.66$ ) or Direct Attitude, ( $t(91) = 1.265$ ,  $p= .99$ ). A significant difference was found between females, ( $M=19.46$ ,  $SD=1.22$ ) and males, ( $M=20.96$ ,  $SD=1.36$ ) in Indirect Attitude, ( $t(90) = -.341$ ,  $p=.014$ ), suggesting a difference in outcome evaluation.

Table 6: Mann-Whitney U Test table displaying the differences between females and males for the TPB variables of Direct and Indirect PBC and Direct and Indirect Subjective Norms.

<i>Variables</i>	<i>Groups</i>	<i>N total</i>	<i>Md</i>	<i>Mann-Whitney U</i>	<i>R</i>	<i>p-Value (2-tailed)</i>
Direct PBC	Female	47	3.67	1067	-.05	.650
	Male	48	3.8			
Indirect PBC	Female	45	-13	844	-.19	.069
	Male	48	-4			
Direct Subjective Norm	Female	47	4.33	1093	-.04	.667
	Male	49	4			
Indirect Subjective Norm	Female	45	11	1010	-.06	.593
	Male	48	14.5			

A Mann-Whitney U Test revealed no significant difference between females and males in Direct PBC,  $U = 1067$ ,  $z = -.45$ ,  $p = .65$ ,  $r = .05$ , or Indirect PBC,  $U = 844$ ,  $z = -1.817$ ,  $p = .07$ ,  $r = -.19$ . No significant difference between genders were found in the variables of Direct Subjective Norm,  $U = 1093$ ,  $z = -.43$ ,  $p = .67$ ,  $r = -.04$ , or Indirect Subjective Norm,  $U = 1010$ ,  $z = -.54$ ,  $p = .59$ ,  $r = -.06$ .

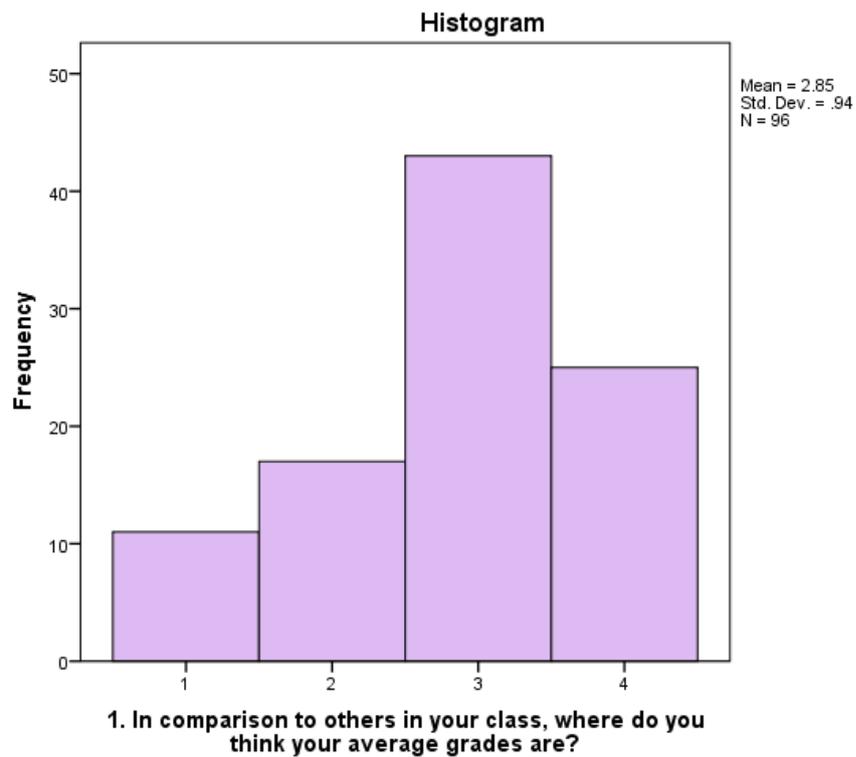
## **Additional Information**

### **Academic experience**

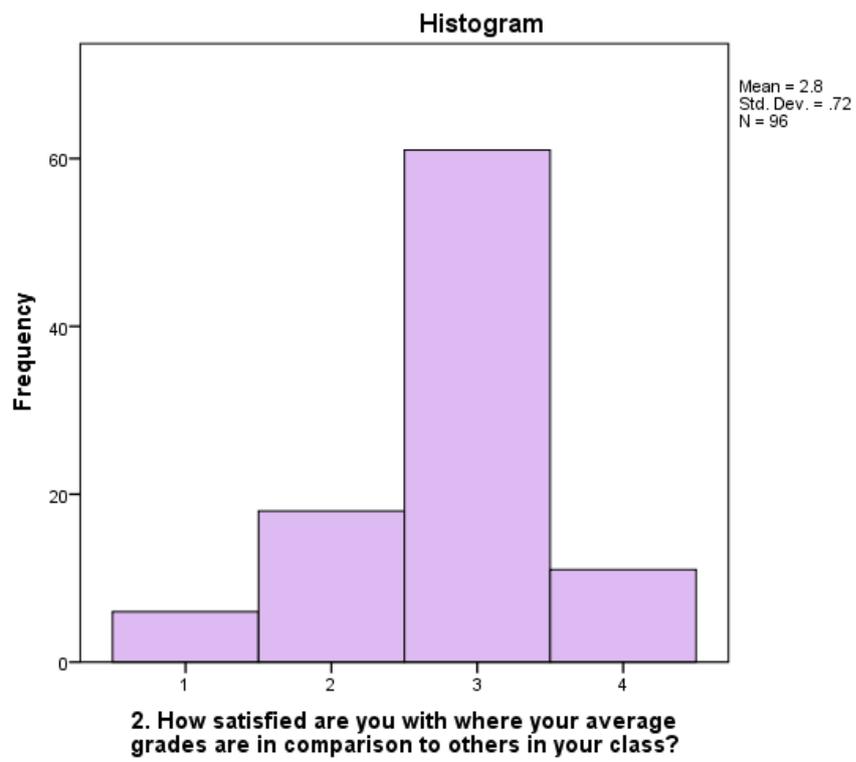
#### *Intention and Past Study Behaviour*

A positive significant relationship was found between intention to study and past study behaviour ( $r = .394$ ,  $p < .01$ , 2-tailed). Therefore, those with conscientious study patterns in the past showed strong intentions to study in the future.

See Figure 4 for Self reported academic performance and Figure 5 for Satisfaction with academic performance.



*Figure 4.* Histogram displaying the distribution of values for grade performance



*Figure 5.* Histogram displaying the distribution of values for satisfaction of grade performance

## Discussion

The aim of this research was to explore academic motivation of adolescents, as measured by the Intentions in the Theory of Planned Behaviour (Ajzen, 1991). All internal variables of Ajzen's Theory of Planned Behaviour, Attitudes to study, Perceived Behavioural Control (PBC) and Subjective Norms, in both direct and indirect form were measured against Intentions to check for correlation. The external variables of Impulsiveness, measured by the Barratt Impulsiveness Scale BIS-11 (Patton et al., 1995) and Grit, measured by the 8-Item Grit Scale Child adapted version (Duckworth & Quinn, 2009), were also investigated for relationship with academic motivation. In addition the research was conducted with a view to discover any differences between genders.

Hypothesis one proposed a positive correlation between intention to study and the other constructs of the Theory of Planned Behaviour. This was confirmed in this study with direct and indirect attitude, direct and indirect subjective norm and direct perceived behavioural control all significantly correlating with intention to study. The exception in this respect was indirect perceived behavioural control as no significant relationship was discovered. It is important to note that the Cronbach alpha of this variable was .04, an unacceptable score for reliability showing a lack of internal consistency in the questions.

Perhaps the most surprising result found in this research was the lack of a significant relationship between Grit and academic motivation, as measured by TPB Intentions. The null hypothesis is therefore accepted as Grit is not shown to be correlated with intentions to study. Hypothesis two investigated to what extent the external variables of Grit was positively correlated with academic motivation. However a Pearson Correlation investigating the

relationship between Grit and academic motivation, as measured by TPB Intentions showed a weak, non significant relationship. Our results reflected that of Credé, Tynan, & Harms (2017) who conducted a meta analysis based on 584 effect sizes from 88 independent samples representing 66,807 individuals. They indicated that the higher order structure of grit is not confirmed, that grit is only moderately correlated with performance and retention, and that grit is very strongly correlated with conscientiousness.

Hypothesis three measured how impulsiveness was positively correlated with academic motivation. Upon conducting a Spearman rho to analyse the relationship between Impulsiveness and academic motivation, as measured by TPB Intention, a medium, positive, highly significant relationship was discovered. The null hypothesis is rejected as Impulsiveness is shown to highly correlate with intentions to study. The results of the present study showing a positive correlation between impulsiveness and academic motivations reflect some previous research that suggested delay gratification and academic achievement are positively correlated also (e.g., Wulfert, Block, Santa Ana, Rodriguez & Colman, 2002). According to Herndon (1986) these cases highlighted an urgent need for more causal study to advocate the implementation of new curriculum that includes strategies for the development of gratification delay (Herndon, 1986). It is recommended that intrinsic motivation could increase the predictive utility of the Theory of Planned behaviour (Chatzisarantis, Hagger, Smith, & Sage, 2006). The inability for adolescents to delay gratification has many social causes but further study is required to decipher clearer patterns. The consequences of not conducting this research is clearer however. Wulfert et al. (2002) discovered that compared to students who delayed gratification, those who chose not to showed more self-regulatory deficits. They showed greater involvement with cigarettes, alcohol, and marijuana, had a poorer self-concept and underperformed academically. It was

recommended by Wolfe & Johnson, (1995) that the global trait of self-control or conscientiousness be systematically assessed and used in college admissions decisions. This could also be relevant to second level education. Hypothesis four proposed that female adolescents will display higher levels of impulsiveness than male adolescents. A Mann-Whitney U Test was conducted but no significant differences were found between females and males, therefore accepting the null hypothesis.

The investigation into gender differences in Grit was based on the previous research of Duckworth and Seligman (2005) which found eighth-grade girls more self-disciplined than their male counterparts according to delay of gratification measures and self-report, teacher, and parent ratings. Whereas girls earned higher grades in all courses, they did only marginally better on an achievement test and worse on an IQ test (Duckworth & Seligman, 2005). This study however did not find any significant differences in gender after conducting an Independent T-Test to investigate the fifth hypothesis of this study that female adolescents will display higher levels of grit than male adolescents. The null hypothesis was accepted.

In examining hypothesis six, it was expected female adolescents would display higher levels of intent to study (i.e. TPB variables: attitude, social norm and perceived behavioural control) than male adolescents. Through both independent T-Tests and Mann-Whitney U Test only one significant result was found. A significant difference was found between females, (M=19.46, SD=1.22) and males, (M=20.96, SD=1.36) in Indirect Attitude, ( $t(90) = -.341$ ,  $p=.014$ ), suggesting a difference in outcome evaluation. It must be considered that there may be a difficult for some participants to convert the hypothetical intention to actual intention. This can be seen as a limitation to the TPB.

### **Limitations of this research**

Although 96 students participated in the study with equal numbers of female and male, the nature of purposive sampling coming from one year group in one school means would cast doubt that the results are representative of the population. Demographic questions were not asked so as to secure the anonymity and limit the risk of identification within the sample. There may be dominant factors that could skew the results, such as the ethos of the school, socio-economic background, ethnicity, level of support available at home, that would influence academic behaviour. For example Mischel (1996) discovered that among children who had negative expectations of success due to the social environment in which they lived, they neither had the desire or determination to effectively delay gratification. (Herndon, 2008). Considering the significant result here this impulsiveness could be correlated with academic motivation. More diverse samples should be used when replicating future studies to control for these issues.

Using self-reports in a questionnaire format raise some issues of their own, according to Wulfert et al.(2002, as cited in Herndon, 2008, p.21), such as, the influence of peer pressure on both the study participant's level of interest in participating in the study process, and whether the participant was more worried about test taking expediency rather than truthfulness. The length of the survey and the phrasing of questions was a concern in the planning process but adolescent friendly psychological measures were selected to overcome this issue. Upon analysis of the data there did not seem to be a great number of data sets that suffered from response bias.

Despite a gatekeeper being used to administer the survey, in addition to a list of instructions being provided for each to maintain consistency this cannot be guaranteed. All communication with parents and participants hid the researchers identity to prevent a sense of obligation to comply. However, being asked to fill in a survey on academic intentions and subjective norm in a classroom environment may have inadvertently made participants feel obliged to complete the survey or give more socially desirable answers. Bearing these points in mind a clear consent form was sent to parents and instructions to the participant did not conceal the aim of the research. Participants are familiar with filling in Google docs and every attempt was made to comply with expectations of ethic codes.

### **Further studies**

The results of this study supports suggestions made by Crede et al. (2016) that interventions designed to enhance grit may only have weak effects on performance and success, that the construct validity of grit is in question, and that the primary utility of the grit construct may lie in the perseverance facet. Considering the results in this study it may be a better use of resources to focus on how cognitive methods of teaching could bring out measurable gains in impulse control, leading to stronger scholastic performances suggested by Spinella et al. (Herndon, 2008, p.31).

This line of research may suggest directions for educators. Cognitive training programs that emphasise executive, meta-cognitive strategies may be fruitful in improving students' academic performance (Bornas and Servera, 1992). It was shown in 5th and 6th grade children that training meta- cognitive strategies produced short-term improvements in academic achievement, and sustained improvements in impulsivity (Spinella & Miley, 2003).

Future educational interventions should aim to influence both cognitive and affective factors to promote sustained motivation. Further research, similar to that of Blakemore et al., (2007) using fMRI, is encouraged so researchers and policy makers can better understand the neural strategy for thinking about intentions continues to develop during adolescence and early adulthood.

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## **APPENDIX 1: Information sheet and Consent form for Study with Under 18s**

### ***Research Topic:***

Power of grit and impulsiveness: a study of gender differences in adolescent academic motivation.

### ***Researcher:***

Psychology student, Dublin Business School, xxxxxxx@dbs.ie

### ***Background and Purpose:***

Grit, as defined by Andrea Duckworth, is the perseverance and passion directed towards achieving a long term goal. From her studies in various fields, Duckworth has found that Grit can be a better prediction of success than IQ. Better understanding the role of grit in an academic environment could inform interventions into improving student attainment and engagement.

In this study I will look at how academic motivation of adolescents is correlated with grit (how well a student deals with challenges and failures; perceived behavioural control (to what extent they see success as due to their own hard work) and impulsiveness (ability of student to delay gratification now in order to achieve long term success later).

### ***What happens if my child takes part?***

Students from one year group will be asked to fill in a questionnaire on their iPad during one class period. It is a standard questionnaire designed for children. The right to withdraw will be offered at any time and the parents will have the right to opt their child out of the study.

### ***What will happen to the results of the study?***

Better understanding of the role of grit and impulsiveness in an academic environment could inform interventions into improving student attainment and engagement.

### ***How will my child's information be protected?***

The children's answers will remain confidential. There will be no identification ID numbers and the questionnaire will be answered anonymously. Once the study has been completed all the data will be destroyed after 10 years.

### ***Further Information:***

Should you have any further questions please do not hesitate to contact me at 10330428@dbs.ie

***Thank you very much for supporting this research study.***

## APPENDIX 2: SURVEY GIVEN FEB 2018

What gender are you? \*

Female

Male

1. In comparison to others in your class, where do you think your average grades are?

In the top 1/4 of the class

In the 2nd quarter of the class

In the 3rd quarter of the class

In the 4th quarter of the class

2. How satisfied are you with where your average grades are in comparison to others in your class?

Very satisfied

Quite satisfied

Quite dissatisfied

Very dissatisfied

### THEORY OF PLANNED BEHAVIOUR

#### INTENTIONS

3. I expect to study for at least 2 hours, 4 times a week for the next 3 months.

*Strongly disagree* :   1   :   2   :   3   :   4   :   5   :   6   :   7   : *Strongly agree*

4. I want to study for at least 2 hours, 4 times a week for the next 3 months.

Strongly disagree :   1   :   2   :   3   :   4   :   5   :   6   :   7   : Strongly agree

5. I intend to study for at least 2 hours, 4 times a week for the next 3 months.

Strongly disagree :   1   :   2   :   3   :   4   :   5   :   6   :   7   : Strongly agree

**DIRECT ATTITUDE**

6. For me to study for at least 2 hours, 4 times a week for the next 3 months would be:

good :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : bad

7. pleasant :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : unpleasant

8. worthless :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : useful

**INDIRECT ATTITUDE (BEHAVIOURAL BELIEFS AND OUTCOME EVALUATIONS)**

9. For me to be successful in my Summer exams after studying for at least 2 hours, 4 times a week for the next 3 months is:-

Extremely :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Extremely  
undesirable desirable

10. Unlikely :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Likely

11. For me to have good knowledge of my subjects after studying for at least 2 hours, 4 times a week for the next 3 months is:-

Extremely :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Extremely  
undesirable desirable

12. Unlikely :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Likely

13. For me to have good self-discipline after studying for at least 2 hours, 4 times a week for the next 3 months is:-

Extremely :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Extremely  
undesirable desirable

14. Unlikely :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Likely

**DIRECT SUBJECTIVE NORM**

15. Most people who are important to me think that

I should :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : I should  
not

study for at least 2 hours, 4 times a week for the next 3 months.

16. It is expected of me that I should study for at least 2 hours, 4 times a week for the next 3 months.

Strongly disagree :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Strongly agree

17. I feel under social pressure to study for at least 2 hours, 4 times a week for the next 3 months.

Strongly disagree :\_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Strongly agree

**INDIRECT SUBJECTIVE NORM (NORMATIVE BELIEFS & MOTIVATION TO COMPLY)**

18. My teacher thinks that

I should :\_\_1\_\_:\_2\_\_:\_3\_\_:\_4\_\_:\_5\_\_:\_6\_\_:\_7\_\_ : I should  
not

study for at least 2 hours, 4 times a week for the next 3 months.

19. Is their approval important to you?

Not at all :\_\_1\_\_:\_2\_\_:\_3\_\_:\_4\_\_:\_5\_\_:\_6\_\_:\_7\_\_ : Very  
much

20. My family thinks that

I should :\_\_1\_\_:\_2\_\_:\_3\_\_:\_4\_\_:\_5\_\_:\_6\_\_:\_7\_\_ : I should  
not

study for at least 2 hours, 4 times a week for the next 3 months.

21. Is their approval important to you?

Not at all :\_\_1\_\_:\_2\_\_:\_3\_\_:\_4\_\_:\_5\_\_:\_6\_\_:\_7\_\_ : Very  
much

22. My friends think that

I should :\_\_1\_\_:\_2\_\_:\_3\_\_:\_4\_\_:\_5\_\_:\_6\_\_:\_7\_\_ : I should  
not

study for at least 2 hours, 4 times a week for the next 3 months.

23. Is their approval important to you?

Not at all :\_\_1\_\_:\_2\_\_:\_3\_\_:\_4\_\_:\_5\_\_:\_6\_\_:\_7\_\_ : Very  
much

**DIRECT BEHAVIOURAL CONTROL**

24. I am confident that I could study for at least 2 hours, 4 times a week for the next 3 months.

*Strongly disagree* :\_\_1\_\_:\_2\_\_:\_3\_\_:\_4\_\_:\_5\_\_:\_6\_\_:\_7\_\_ : *Strongly agree*

25. For me to study for at least 2 hours, 4 times a week for the next 3 months is

*Easy* :\_\_1\_\_:\_2\_\_:\_3\_\_:\_4\_\_:\_5\_\_:\_6\_\_:\_7\_\_ : *Difficult*

26. Whether or not I study for at least 2 hours, 4 times a week for the next 3 months is entirely up to me.

*Strongly disagree* : \_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : *Strongly agree*

**INDIRECT BEHAVIOURAL CONTROL (CONTROL BELIEFS & THEIR POWER TO INFLUENCE BEHAVIOUR)**

27. If I encountered unanticipated events that placed demands on my time, it would make it more difficult for me to study for at least 2 hours, 4 times a week for the next 3 months.

Strongly agree : \_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Strongly disagree

28. How often do you encounter unanticipated events that place demands on your time?

Very rarely : \_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Very frequently

29. If I felt tired or just no energy, it would make it more difficult for me to study for at least 2 hours, 4 times a week for the next 3 months.

Strongly agree : \_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Strongly disagree

30. How often do you feel tired or just no energy?

Very rarely : \_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Very frequently

31. If other recreational activities placed heavy demands on my time, it would make it more difficult for me to study for at least 2 hours, 4 times a week for the next 3 months.

Strongly agree : \_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Strongly disagree

32. How often do other recreational activities place demands on your time?

Very rarely : \_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Very frequently

**PAST BEHAVIOUR**

33. In the past 3 months, I have studied for at least 2 hours, 4 times a week.

Strongly agree : \_\_1\_\_ : \_\_2\_\_ : \_\_3\_\_ : \_\_4\_\_ : \_\_5\_\_ : \_\_6\_\_ : \_\_7\_\_ : Strongly disagree

### Appendix 3: Short Grit Scale

**Directions for taking the Grit Scale: Please respond to the following 8 items. Be honest – there are**

**no right or wrong answers!**

**1. New ideas and projects sometimes distract me from previous ones.\***

- Very much like me**
- Mostly like me**
- Somewhat like me**
- Not much like me**
- Not like me at all**

**2. Setbacks don't discourage me.**

- Very much like me**
- Mostly like me**
- Somewhat like me**
- Not much like me**
- Not like me at all**

**3. I have been obsessed with a certain idea or project for a short time but later lost interest.\***

- Very much like me**
- Mostly like me**
- Somewhat like me**
- Not much like me**
- Not like me at all**

**4. I am a hard worker.**

- Very much like me**
- Mostly like me**

Somewhat like me

Not much like me

Not like me at all

**5. I often set a goal but later choose to pursue a different one.\***

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

**6. I have difficulty maintaining my focus on projects that take more than a few months to**

**complete.\***

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

**7. I finish whatever I begin.**

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

**8. I am diligent.**

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

**Scoring:**

**1. For questions 2, 4, 7 and 8 assign the following points:**

**5 = Very much like me**

**4 = Mostly like me**

**3 = Somewhat like me**

**2 = Not much like me**

**1 = Not like me at all**

**2. For questions 1, 3, 5 and 6 assign the following points:**

**1 = Very much like me**

**2 = Mostly like me**

**3 = Somewhat like me**

**4 = Not much like me**

**5 = Not like me at all**

**Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and**

**the lowest score on this scale is 1 (not at all gritty).**

**Grit Scale citation**

**Duckworth, A.L., & Quinn, P.D. (2009). Development and validation of the Short Grit Scale (GritS).**

**Journal of Personality Assessment, 91, 166-174.**

**<http://www.sas.upenn.edu/~duckwort/images/Duckworth%20and%20Quinn.pdf>**

**Duckworth, A.L., Peterson, C., Matthews, M.D., & Kelly, D.R. (2007). Grit: Perseverance and**

**passion for long-term goals. Journal of Personality and Social Psychology, 9, 1087-1101.**

**<http://www.sas.upenn.edu/~duckwort/images/Grit%20JPSP.pdf>**

**Appendix 4: BIS-11-A**

Directions:

People differ in the ways they act and think in different situations. This is a test to measure some

of the ways in which you act and think. Read each statement carefully and **CIRCLE THE APPROPRIATE NUMBER** to the right of the statement. Answer quickly and honestly.

Rarely/ Occasionally Often Almost

Never Always/Always

1. I plan what I have to do. . . . . 1 2 3 4
2. I do things without thinking. . . . . 1 2 3 4
3. I make up my mind quickly. . . . . 1 2 3 4
4. I am happy-go-lucky. . . . . 1 2 3 4
5. I do not “pay attention”. . . . . 1 2 3 4
6. My thoughts are racing too fast. . 1 2 3 4
7. I plan my spare time. . . . . 1 2 3 4
8. I am self controlled. . . . . 1 2 3 4
9. I concentrate easily. . . . . 1 2 3 4
10. I am a “saver”. . . . . 1 2 3 4
11. I cannot stand still at movies or school. . . . . 1 2 3 4
12. I like to think carefully about things. . . . . 1 2 3 4
13. I plan for my future. . . . . 1 2 3 4
14. I say things without thinking. . . . . 1 2 3 4
15. I like to think about complex problems. . . . . 1 2 3 4