

Psychological skills linked to success: examining the correlation between grit, stress mindset and decision making.

Niamh Dalton

Submitted in partial fulfilment of the requirements of the Higher Diploma in Arts in Psychology at Dublin Business School, School of Arts, Dublin.

Supervisor: Dr. Jonathan Murphy

Head of Department: Dr. Rosie Reid

March 2016

Department of Psychology

Dublin Business School

Contents

Acknowledgements.....	4
Title.....	5
Abstract.....	6
Introduction.....	7
What is grit?.....	9
What is stress mindset?.....	10
What is maximization?.....	10
Summary of rationale.....	12
Hypotheses.....	13
Methodology.....	14
Participants.....	14
Design.....	15
Materials.....	17
Procedure.....	20
Results.....	22
Descriptive statistics.....	22
Inferential statistics.....	27
Discussion.....	43
Research aim and summary of findings.....	43
Strengths and limitations.....	45
Future research ideas.....	45
Conclusion.....	46
References.....	47

Appendices.....	49
Appendix 1 – Information sheet and informed consent.....	49
Appendix 2 – Demographic questions.....	50
Appendix 3 – 12-item Grit Scale.....	51
Appendix 4 - Stress Mindset Measure-General (SMM-G)	55
Appendix 5 - Maximization Scale.....	58

Acknowledgements

I would like to thank my supervisor, Dr. Jonathan Murphy for his advice and support, Dr. Pauline Hyland for her technical support, the research participants for their time, my family and friends for their patience, and finally, for their encouragement and enthusiasm, my partner Alex and my daughter Alannah.

Title

Psychological skills linked to success: examining the correlation between grit, stress mindset and decision making.

Abstract

The motivation behind this research was to examine the relationships between the psychological variables grit, stress mindset and decision making style. Measures used included the 12-item Grit Scale, Stress Mindset Measure-General and the Maximization Scale. Participation was voluntary and obtained from a convenience sample. The design was correlational and the responses were collected via an online survey. As hypothesized, a Pearson r Correlation revealed that high levels of grit were positively correlated with a satisficing style of decision making. A multiple regression analysis revealed that, as hypothesized stress mindset and maximization significantly predict grit. Existing research has shown the importance of these variables in terms of wellbeing and success. The main conclusions drawn from the results are that further research in this area would be of value.

Introduction

Purpose of the current research

The purpose of the current research is to examine whether there is a significant relationship between the psychological variables grit, stress mindset and decision making style, in order to further investigate these and other variables associated with success and wellbeing, and to assist in a potential future meta analysis of data with the purpose of examining further the correlation between measures of personal qualities to advance personal skills development. The value of this research lies in its potential to identify further areas of study in relation to the aim of developing training interventions for school children and teenagers, students and indeed the wider public, in terms of developing these important skills.

Previous Research

What is the recipe for a successful life? In such a personally competitive world with an abundance of self-help literature and a "you can have it all" attitude this question has never been more pertinent. Since the economic crash self-help book sales in Ireland have quadrupled, indicating that more and more people are actively searching for mindfulness, meaning, life's purpose, motivation, improved mental health, happiness, change (Clifford, 2015). The growth in the sector indicates the perceived growing need for personal development and lessons on success.

Historically, the cognitive skill intelligence was thought of as the single best predictor of success in life (Gottfredson; Hartigan & Wigdor, as cited in Duckworth, Peterson, Matthews & Kelly, 2007). One of the first major pieces of research to cast doubt on the assumption that high IQ automatically leads to success was a longitudinal study entitled "Genetic Studies of Genius" (Johnson, as cited in Kaufman, 2013, p. 6&7), which was

conducted by Lewis Terman in the early twentieth century, which tracked the lives of mentally gifted children over a number of decades, the results of which indicated that intelligence when considered alone is not an effective predictor of success (Duckworth et al, 2007). Individuals with a high IQ do not necessarily become successful and in the case of the Terman's subjects known as "Termites" who were chosen based on their high IQ levels, the most intelligent did not necessarily become the highest achievers: according to Johnson the study failed to include two Nobel prize winners, and a number of world renowned musicians (as cited in Kaufman, 2013, p. 6&7). The results of Terman's research did not permeate throughout the general public, however, it did influence research carried out in the world of psychology and in particular it initiated the search for personal qualities or characteristics other than intelligence which may be better predictors of success in life. "Intelligence is the best-documented predictor of achievement" (Duckworth, Peterson, Matthews & Kelly, 2007), it could be noted that this quote should come with the caveat that intelligence being the predictor of achievement most written about is not synonymous with it being the only predictor or indeed the best predictor of achievement. The quote reveals where the focus of research has been over the last number of decades.

There is an obvious subjectivity to each researcher's understanding of the word success, but whatever the definition is and whether it be referred to as high performance, achievement or goal attainment, when it comes to success, what else matters? "There is overwhelming empirical support for the strong predictive power of IQ measures with regard to a broad spectrum of human achievements" (Kaufman, 2013, p. 207). The importance of IQ measures cannot be denied however it must be noted that intelligence was and is typically measured using a very narrow test: the IQ test, which only measures part of an individual's intelligence, normally analytical thinking, mathematical ability, memory and spatial recognition. IQ tests do not attempt to measure all aspects of intelligence; Robert Sternberg

developed the Triarchic Theory of Successful Intelligence, which expands the definition of intelligence to include creative intelligence and practical intelligence in addition to analytical intelligence (Sternberg, 2005, p. 189). Sternberg defined successful intelligence as “1) the ability to achieve one’s goals in life, given one’s sociocultural context; 2) by capitalizing on strengths and correcting or compensating for weaknesses; 3) in order to adapt to, shape, and select environments; and 4) through a combination of analytical, creative and practical abilities” (Sternberg, 2005, p. 189).

Recent research

More recent research suggests that variables other than intelligence need to be taken into account when considering success in life in the 21st century. Without dismissing the importance of IQ (whether it is defined in the more traditional and limited sense or the more expansive recent definition), research is now pointing to “non-cognitive” skills, also known as personal characteristics or “21st century skills” such as “persistence, self-control, curiosity, conscientiousness, grit and self confidence” (Tough, 2013, p. xv) being potentially equally if not more important. When it comes to success and wellbeing the focus is shifting from IQ to other personal qualities. Current research in this area aims to uncover what variables other than IQ are linked to success and indeed what leads to individual differences of these variables arising in individuals.

What is grit?

Grit is a personal quality defined 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 et al, 2007, p. 1087-1088). Grit has been show not to relate positively with IQ (Duckworth et al, 2007, p. 1087) and has

been shown to be a valid predictor of success over and beyond IQ and the personality variable conscientiousness: one of the “big five” personality traits contained in Costa and McCrae’s Five Factor Model of personality (Cervone & Pervin, 2014, p. 239). The researchers point out that when they refer to success and achievement in relation to grit the intended understanding is the “the accomplishment of widely valued goals” (Duckworth et al, 2007, p. 1087-1088) and that grit is distinct from self-control: “individuals high in grit deliberately set for themselves extremely long-term objectives and do not swerve from them – even in the absence of positive feedback” (Duckworth et al, 2007, p. 1089).

What is stress mindset?

Stress mindset is defined as the attitude that an individuals hold in relation to stress, and Crum, Salovey and Achor conceptualize a stress-is-enhancing mindset as being a belief that the effects of stress are enhancing, and a stress-is-debilitating mindset is defined as a belief that stress is debilitating and both mindsets believe stress can effect “performance and productivity, health and wellbeing, and learning and growth” (Crum, Salovey & Achor 2013, p. 716). The researchers point out that stress can be enhancing and debilitating, however their research has indicated that it may be possible to alter one’s mindset from a stress-is-debilitating one (which for many is probably their default mindset) to a stress is enhancing one using a short intervention, and that their research has shown this to have a positive effect on health and work performance (Crum, Salovey and Achor, 2013, p.724-729).

What is maximization?

Maximization or optimization is the conceptualization of decision making style and is defined as the search for the best possible outcome or choice and can be measure on the Maximization Scale created by Schwartz, Ward, Monterosso, Lyubomirsky, White, &

Lehman (2002, p. 1180). Respondents who score above the median on this scale are categorized as maximizers while those scoring below the median are referred to as satisficers. Maximizers search for the best possible choice, whereas satisficers “pursue not the best option, but a good enough option” (Schwartz et al, 2002, p. 1178). Research has shown a “negative correlations between maximization and happiness, optimism, self-esteem, and life satisfaction, and positive correlations between maximization and depression, perfectionism, and regret” (Schwartz et al, 2002, p. 1178).

What else matters in relation to wellbeing and success?

The role that our stress mindset plays in relation to success has already been discussed, in addition to stress mindset another mindset that is being shown to have a massive impact on success is growth mindset: Carol Dweck has been carrying out extensive research in this area and has developed a theory of Growth Mindset which outlines that individuals who possess this mindset “believe that their qualities can be developed”: in other words this mindset allows the individual to believe that their skills and abilities can grow and improve with effort (Dweck, 2012, p. 614). Dweck’s theory outlines that the opposite to growth mindset is fixed mindset: individuals with fixed mindsets feel that their skills and abilities are fixed and cannot improve with effort (Dweck, 2012, p. 614). The strength of Dweck’s Growth Mindset Theory lies in the observation that any individual is likely to have a fixed mindset when it comes to certain aspects of life but for other aspects of life they will most certainly have a growth mindset, and furthermore that the research suggests that it is possible to alter one’s mindsets from fixed to growth is changing the lives of those who utilize this knowledge and are having a massive impact on the development of potential in particular of school children in “Growth Mindset” classrooms (Mangels, Butterfield, Lamb, Good, Dweck,

2006, p. 75). Harnessing the power of growth mindset theory and other potential developing theories and implementing interventions to utilize this research is worthy of further research.

Success is known to create happiness but conversely happiness also creates success according to research by Lyubomirsky, King and Diener: “happiness is associated with and precedes numerous successful outcomes, as well as behaviors paralleling success” (2005, p. 803). The researchers further state that “the evidence suggests that positive affect – the hallmark of well-being – may be the cause of many of the desirable characteristics, resources, and successes correlated with happiness” (Lyubomirsky, King & Diener, 2005, p. 803).

Positive affect refers to experiencing positive emotions. Two of the variables in this research are related to elevated levels of happiness: a stress-is-enhancing mindset and a satisficing style of decision making. There is value in attempting to uncover how these psychological variables associated with success and wellbeing come to exist in individuals and uncovering how they can be developed in individuals.

This research is deemed to be interesting and important in terms of identifying areas for further research in the area of personal skill development in its attempts to uncover a relationship between the “non-cognitive skills” grit, stress mindset and maximization, which have been linked to success, achievement and wellbeing. Further investigation of these skills which have been identified as being critical for successful living in the 21st century, is a valuable step in the pursuit of the development of these skills for the betterment of society, whether correlations are uncovered or not will add to the research body in the area.

Rationale for research

The research in this study aims to uncover if there is any relationship between three variables that are associated with success and wellbeing in the twenty first century. Grit is predictive of success in many areas of life (Duckworth et al, 2007, p. 1087). Possessing a stress-is-enhancing mindset is associated with higher happiness levels, positive effects on

health, wellness and work performance (Crum, Salovey & Achor, 2013, p. 716). Possessing a satisficing style of decision making is associated with higher levels of happiness, optimism, self-esteem and life satisfaction (Schwartz, Ward, Monterosso, Lyubomirsky, White & Lehman, 2002, p. 1178).

Research aims

Hypothesis one:

It was predicted that there would be a significant correlation between high levels of grit and stress mindset.

Hypothesis two:

It was predicted that there would be a significant correlation between high levels of grit and a satisficing style of decision making.

Hypothesis three:

It was predicted that there would be a significant correlation between a stress-is-enhancing mindset and a satisficing style of decision making.

Hypothesis four:

It was predicted that grit and maximization would significantly predict stress mindset.

Hypothesis five:

It was predicted that stress mindset and maximization would significantly predict grit.

Method

Participants

Participants in this study consisted of a convenience sample of individuals approached and recruited through a link to an online survey which was posted and reposted on the social networking website Facebook, creating a snowball effect. Participation was voluntary and anonymous, and informed consent was obtained from all participants by means of informing them on the information page that once they clicked on to the next page, completed and submitted the survey they were consenting to participate. Individuals under eighteen years of age were excluded from participating – the survey was set-up to bring any participant who clicked under 18 years of age to the final page and their data was excluded from the research. A total of 136 individuals participated in the study. From the sample of 136, females represented 71.3% while males represented 28.7%, see table 1. Age ranges of the participants went from the lowest range (18-29) right up to the highest range (age 70 and above) and broke down as follows 18-29 (n = 32), 30-39 (n = 63), 40-49 (n = 23), 50-59 (n = 11), 60-69 (n = 6), and 70 and above (n = 1), see table 2. The majority of participants were 49 or below, with almost half the total of participants (at 46.3%) being in the age range of 30-39.

Table 1. Descriptive Statistics of Gender

Variable	Frequency	Valid Percent
Male	39	28.7
Female	97	71.3

Table 2. Descriptive Statistics of Age Ranges

Variable	Frequency	Valid Percent
Age 18-29	32	23.5
Age 30-39	63	46.3
Age 40-49	23	16.9
Age 50-59	11	8.1
Age 60-69	6	4.4
Age 70 and above	1	0.7
Total	136	100.0

Design

The study design is quantitative and correlational in nature: with the numerical scores from each of the three psychometric measures being collocated and analyzed along with the demographic information gathered. Following the demographic information page in the survey three variables were measured: firstly, grit (using the 12-item Grit Scale, Duckworth, Peterson, Matthews and Kelly, 2007), secondly, stress mindset (using the Stress Mindset Measure – General – SMM-G, Crum, Salovey & Achor, 2013) and thirdly maximization (using the Maximization Scale, Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, 2002). Correlational designs search for relationships between variables as opposed to causation or differences. Correlational data can be used to estimate the effectiveness of one variable predicting another. The design contains the control variables gender and age range,

nominal and ordinal respectively, a main effect predictor variable (PV) grit, and criterion variables (CV) stress mindset and maximization, the latter three variables all being scale variables. Descriptive statistics were carried out initially in the form of a bar chart and pie chart to analyze age range and gender breakdown respectively, in addition to histograms to examine the distribution of values for each of the psychological variables grit, stress mindset and maximization and analyze the mean and standard deviation for each variable.

In terms of inferential statistics as the level of measurement of the three psychological variables being studied are scale and the data is normally distributed, parametric tests were chosen. Scatterplots were conducted initially, followed by Pearson's r Correlation which was used to establish if there was a significant relationship between the variables grit and stress mindset. Following on from this further analysis was conducted in the form of Multiple Regression which was used to analyze the relationships between grit, stress mindset and maximization. In relation to hypothesis one, hypothesis two and hypothesis three the design used was a scatterplot to establish if there appeared to be a relationship between the variables, and following on from this for each of the hypotheses Pearson's r Correlation was conducted. For hypothesis one the predictor variable was grit and the criterion variable was stress mindset. For hypothesis two the predictor variable was grit and the criterion variable was maximization. For hypothesis three the predictor variable was stress mindset and the criterion variable was maximization. Further inferential statistic analyses were conducted to test hypotheses four and five. To test hypothesis four Multiple Regression was conducted with grit and maximization as the predictor variables and stress mindset as the criterion variable. To test hypothesis five Multiple Regression was again conducted with stress mindset and maximization as the predictor variables and grit as the criterion variable.

Materials

Grit.

Grit, defined as “perseverance and passion for long-term goals” by Duckworth, Peterson, Matthews and Kelly (2007) is measured using their 12–item Grit Scale, see Appendix 3 for full measure. The scale was developed by reviewing existing self-report measures relating to perseverance, tenacity, career advancement ambition and goal commitment scales and developed 27 items relating specifically to the construct of grit, which were after careful research and pre-testing reduced to the current 12 items (Duckworth et al, 2007, p. 1089 – 1090). There are twelve items in the measure: six relating to the factor Consistency of Interests, such as “I often set a goal but later choose to pursue a different one”, and a further six items are categorized under the factor Perseverance of Effort, for example “I have achieved a goal that took years of work”. Written instructions provided to participants for this part of the questionnaire came from the authors of the grit measure and were as follows: “Please respond to the following 12 items. Be honest – there are no right or wrong answers!”. Participants were required to choose one response to each item from a 5-point Likert scale. The response options range from “Very much like me” to “Not like me at all”. The Cronbach’s alpha for the overall scale is .85 demonstrating strong reliability; the Cronbach’s alpha for the factor Consistency of Interests is .84, and the Cronbach’s alpha for the factor Perseverance of Effort is .78, all indicating strong reliability. According to the research grit “demonstrated incremental predictive validity of success measures over and beyond IQ and conscientiousness” (Duckworth et al, 2007, p. 1087). The measure is a reliable and valid measure of grit.

Stress Mindset.

Stress mindset, categorized as “stress-is-enhancing mindset” or “stress-is-debilitating”, is measured using the Stress Mindset Measure-General (SMM-G) (Crum, Salovey & Achor, 2013), see Appendix 4 for full measure. The measure was developed by firstly examining if stress mindset is a reliable construct, a focus group was conducted to develop the items for the measure relating to general stress mindset, signs and symptoms of stress related to the enhancing and debilitating nature of stress in terms of “health and vitality, learning and growth, performance and productivity and uncertainty and change” (Crum et al, 2013). Two measures were developed – the Stress Mindset Measure General (SMM-G), the measure being used in this study and the Stress Mindset Specific (SMM-S) which refers to the nature of stress in terms of specific stressors (Crum et al, 2013, p. 719). The measure contains eight items: four negative items such as “The effects of stress are negative and should be avoided”, and four positive items such as “Experiencing stress facilitates my learning and growth”. The following is the written instruction that was provided to participants in order for them to complete the measure: “Please rate the extent to which you agree or disagree with the following statements”. The response options were on a 5 point Likert scale and ranged from “Strongly disagree” to “Strongly agree”. The four negative items were reverse scored (4=Strongly disagree to 0=strongly agree) and the mean was taken of all eight items. Cronbach’s alpha for the measure was .86, demonstrating high reliability. The researchers reported that their research found significant incremental validity of the measure for stress mindset.

Maximization.

Maximization, the desire to make the optimal decision is measured using the Maximization Scale (Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, 2002), see Appendix 5 for full measure. The measure was developed to “assess the tendency to satisfice or maximize” the maximization scale being used in this study and a further measure to “assess the tendency to experience regret” (Schwartz et al, 2002, p. 1180). Research and testing led the researchers to reduce the scale to its current form, excluding items with low item total correlations (Schwartz et al, 2002, p. 1181). There are thirteen items in the measure relating to choice and decision making ranging from “When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program”. Participants were given the following written instructions “Indicate how much you agree with each of the following statements”, and were required to choose from the following options on a seven point Likert scale: Completely disagree/Strongly Disagree/Disagree/Neither Agree nor Disagree/Agree/Strongly Agree/Completely agree. The Regret Scale was not included. No items are reverse scored on this measure. Participants who score above the median are referred to as maximizers and those who score below the median are categorized as satisficers. Maximizers pursue the optimal option, whereas satisficers pursue “a good enough option” (Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, 2002). Cronbach’s alpha for the Maximization Scale was satisfactorily reliable at .71. The researchers report after analyses they concluded that the scale is a reliable and valid measure of maximization (Schwartz et al, 2002, p. 1178).

Procedure

Individuals were invited to participate in this research via a post that was published on the social networking website Facebook. The post contained a link to a survey that had been created on Google Forms and an indication of how long it would take to complete. The survey was comprised of an information page, a demographic page, the 12-item Grit Scale (Duckworth, Peterson, Matthews & Kelly, 2007), the Stress Mindset Measure General (SMM-G) (Crum, Salovey & Achor, 2013), the Maximization Scale (Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, 2002) and a concluding page. The information page assured anonymity to respondents, offered details on informed consent: participants were informed that by proceeding to the next page, completing and submitting the survey consent would be obtained. A warning was offered that as responses could not be identified once submitted, participants could not withdraw from the study once they had taken part. The nature of the study was reduced to “21st century skills” in the information page as well as the title so as to avoid influencing participants’ responses to the measures. The demographic page included basic demographic questions: gender and age range. The concluding page offered thanks for participating, provided details on the three measures used and the aims of the research and supplied researcher and supervisor contact information should participants wish to obtain further information regarding the research.

Once sufficient responses were received the data was exported to Microsoft Excel, where it was coded for importing to IBM SPSS 22 for analysis. In terms of descriptive statistics, statistical analyses were conducted to establish frequencies of the demographic and psychological variables, in addition to identifying the mean and standard deviation (SD). The analysis conducted for descriptive statistics of the data is represented in bar chart, histogram, pie chart and table format: see figures 1, 2, 3, 4 and 5 and table 3 in the Results section.

In terms of inferential statistics, initial analysis consisted of conducting scatterplots for each of the variables in relation to each of the hypotheses. As there did appear on visual inspection to be clustering around the central line on the scatterplots further analysis was conducted in the form of Pearson's r Correlation to establish if there was any significant relationship between each the variables being tested in relation to each of the hypotheses. A further statistical analysis was conducted on the data in the form of Multiple Regression to explore the relationships between each of the variables: grit, stress mindset and maximization.

Results

Descriptive statistics

Demographic variables

The sample of 136 participants consisted of 97 female participants and 39 male participants which in percentages is 71.3 and 28.7 respectively. Figure 1 displays the frequency of the various age ranges of the participants in a bar chart. The bar chart reveals that the majority of participants were within the 30-39 age range.

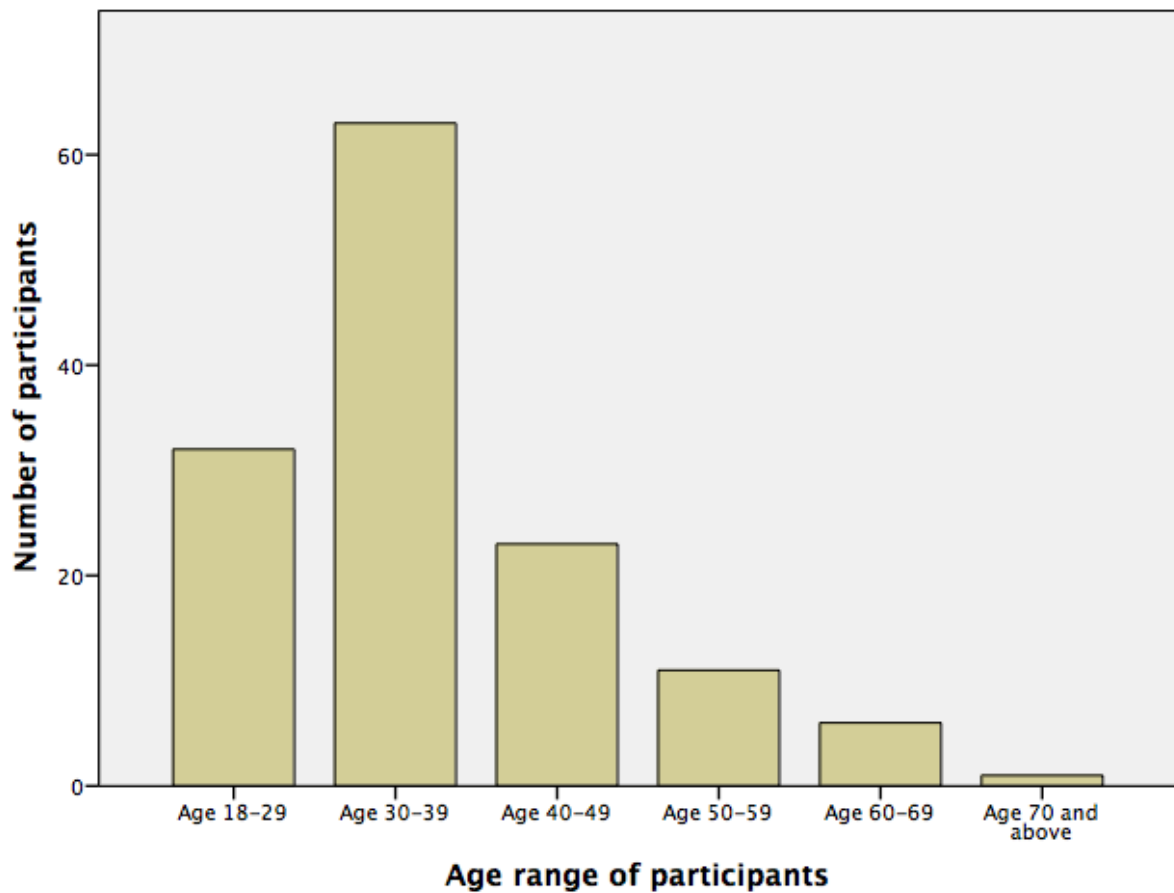


Figure 1. Bar chart displaying age range of participants.

Main effect predictor and criterion variables

The main effect predictor variable grit had a mean score of 2.6 (SD = .437). The maximum score on the 12-item Grit Scale (Duckworth, Peterson, Matthews, & Kelly, 2007) is 5, and is classified as ‘extremely gritty’, whereas the minimum score on the scale is 1, classified as ‘not at all gritty’. The data reflects that the participants in this sample are moderately gritty. Figure 2 displays a histogram outlining the distribution of values for the variable grit among participants of this research.

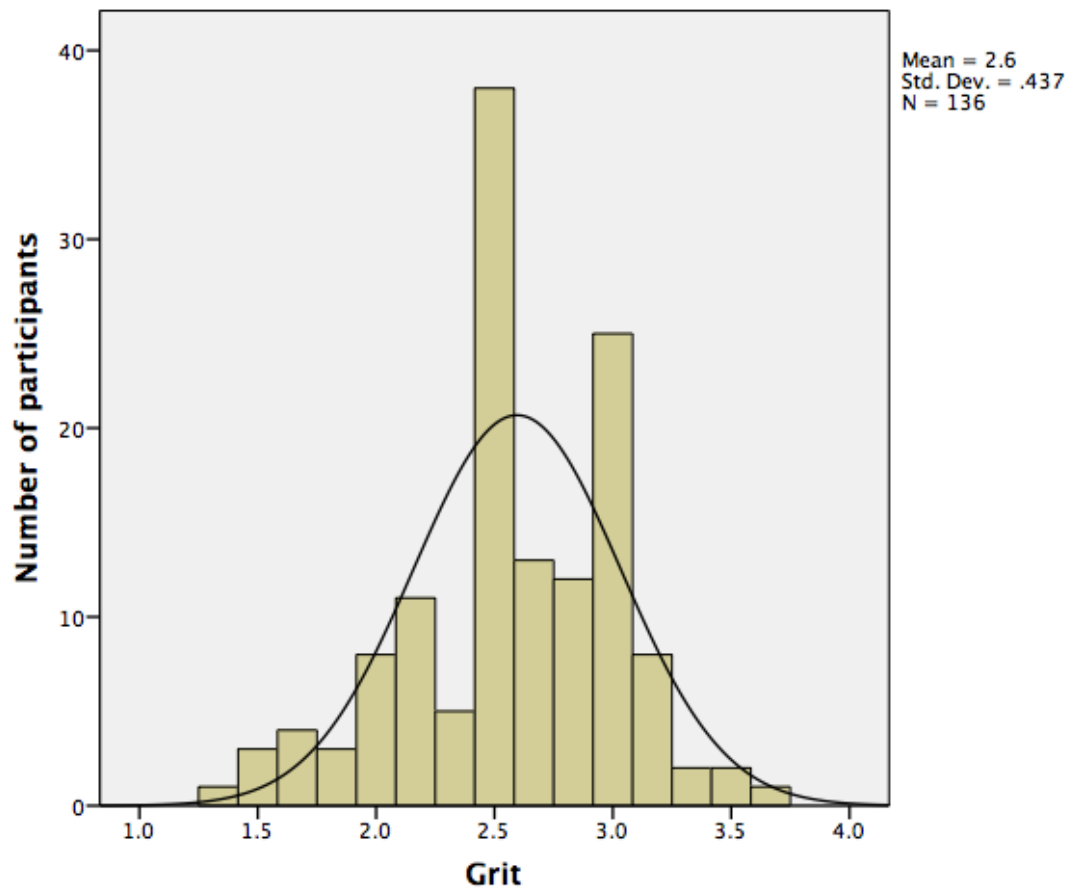


Figure 2. Histogram displaying the distribution of values for grit.

The criterion variable stress mindset had a mean score of 2.03 (SD = .31). Higher scores on the Stress Mindset Measure-General (Crum, Salovey, & Achor, 2013) indicate that the respondent has a stress is enhancing mindset, whereas lower scores represent that the respondent has a stress is debilitating mindset. The data reflects that the majority of participants in this sample scored close to 2 on the scale suggesting that most participants have a moderate mindset when it comes to stress, ie. in some instances participants would recognise that stress can be enhancing. Figure 3 is a histogram displaying the distribution of values for the variable stress mindset among participants of this research.

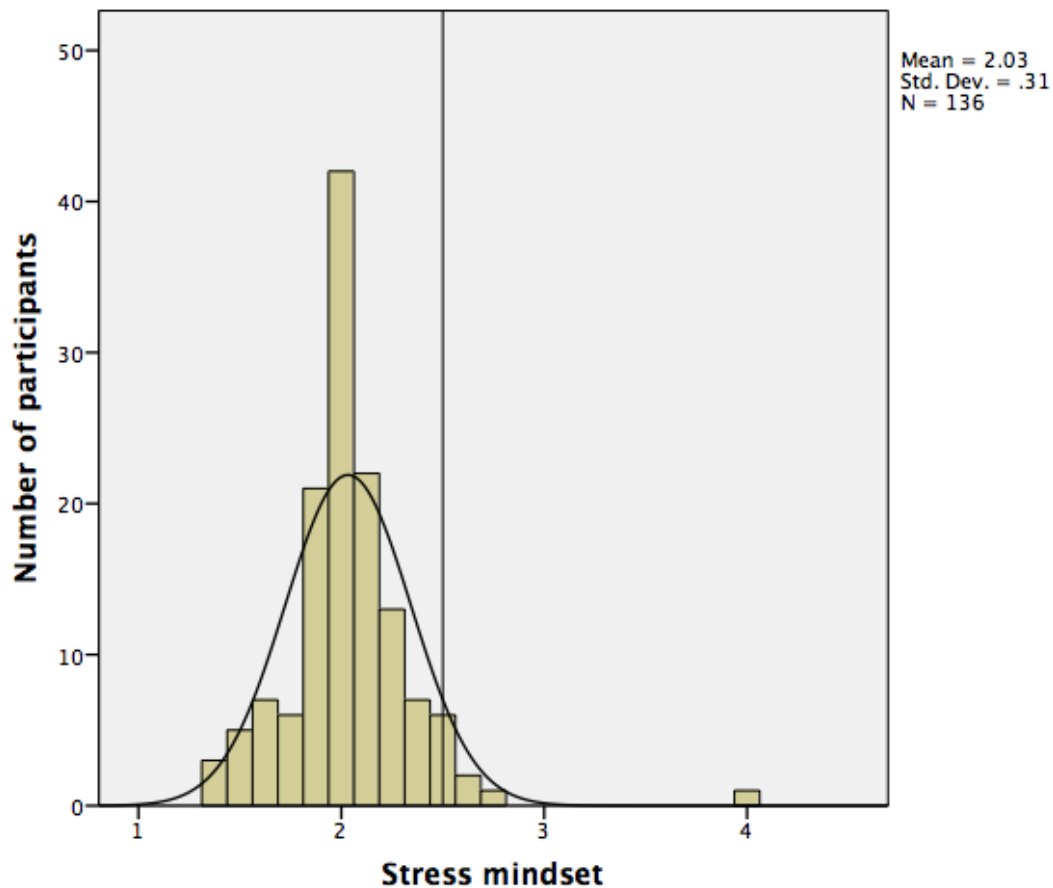


Figure 3. Histogram displaying the distribution of values for stress mindset.

The criterion variable maximization had a mean score of 54.64 (SD = 8.764).

Respondents who score above the median on the Maximization Scale (Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, 2002) are classified as maximizers, whereas respondents who score below the median are described as satisficers. The data indicates that the majority of participants in this sample scored above the median on this scale suggesting that most participants would be defined as maximizers. Figure 4 displays the distribution of values for the variable maximization among participants of this research.

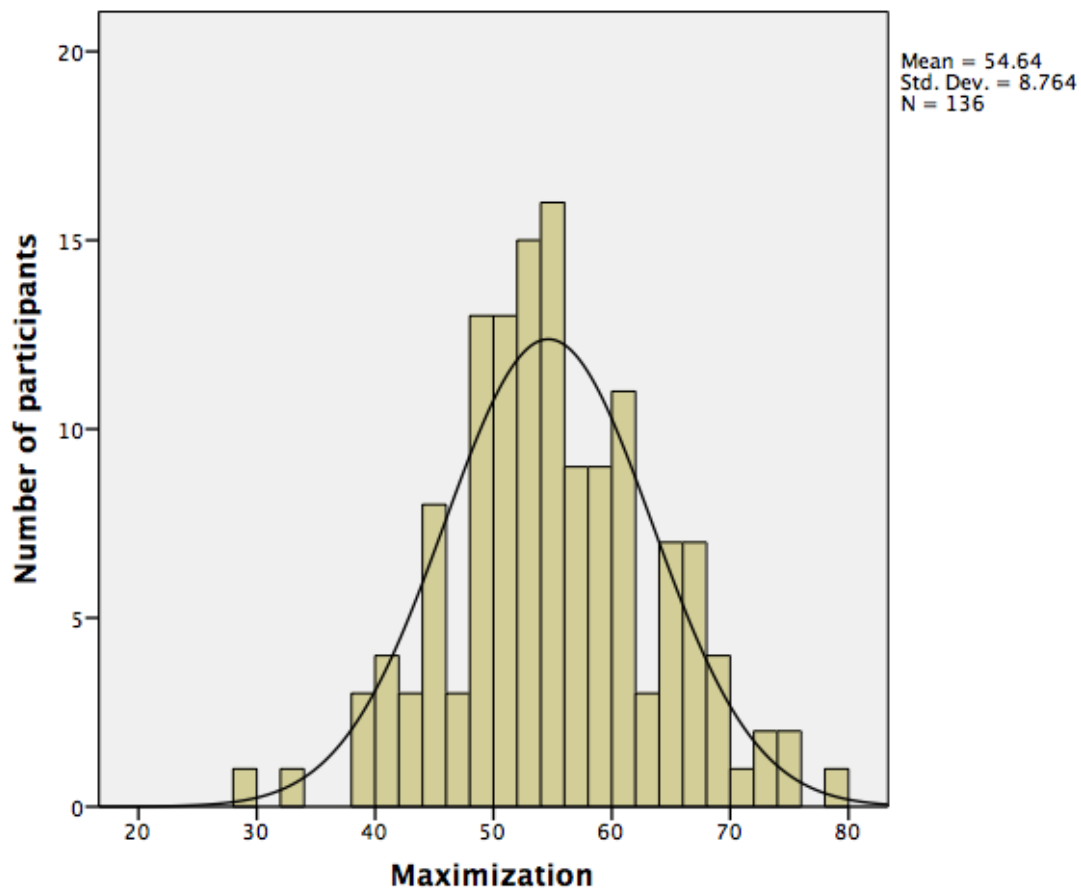


Figure 4. Histogram displaying the distribution of values for maximization.

The pie chart in figure 5 illustrates that 52.94% of respondents to the Maximization measure were maximizers and 47.07% of participants were satisficers.

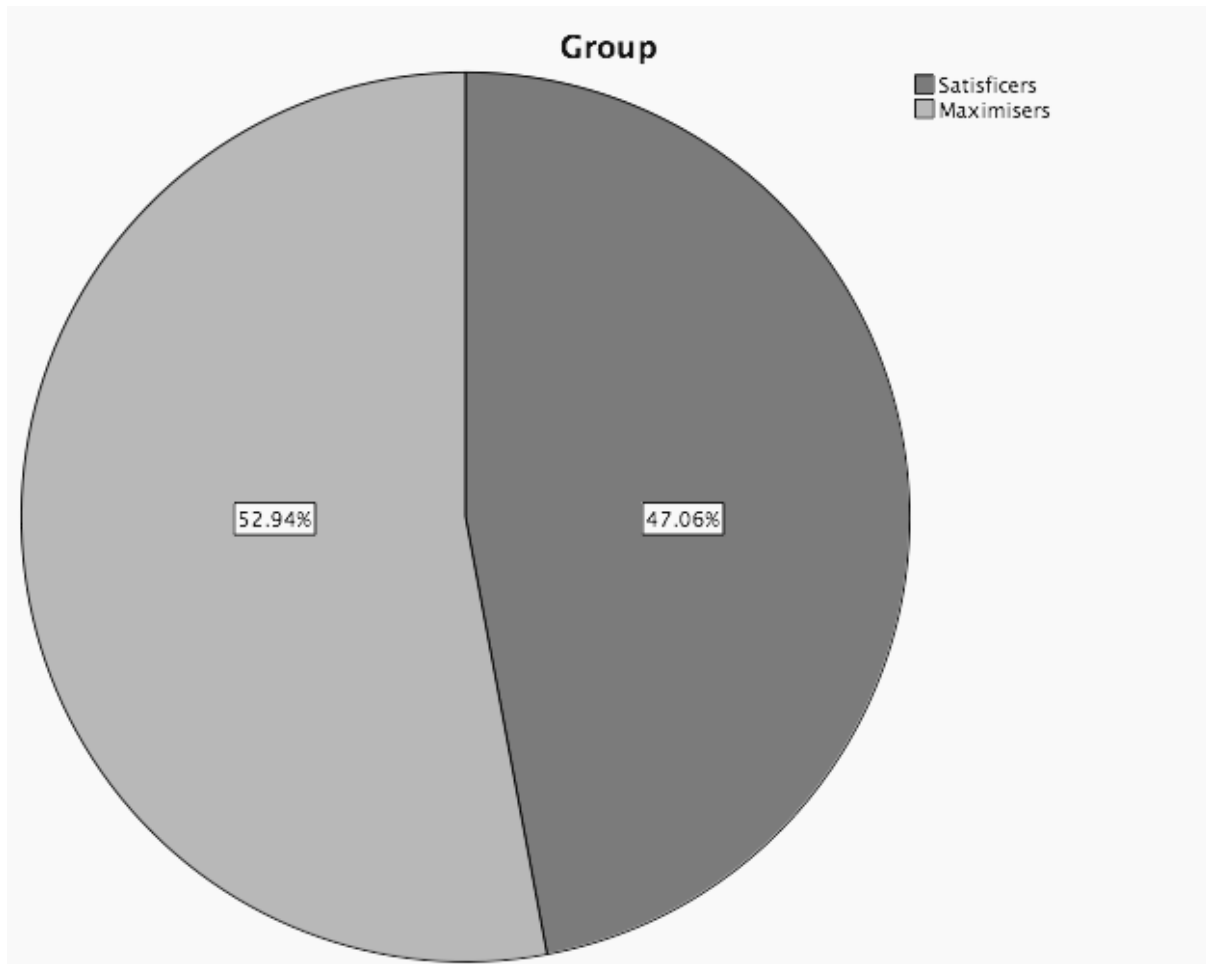


Figure 5. Pie chart displaying percentages of satisficers and maximizers.

Table 3. Descriptive Statistics of Psychological Measures

Variable	Mean	Standard Deviation
Grit	2.6	0.437
Stress mindset	2.03	0.31
Maximization	54.64	8.764

Inferential statistics

Scatterplots and Pearson's r Correlation

Hypothesis One

Hypothesis one: it was predicted that there would be a significant positive correlation between high levels of grit and stress mindset.

To test hypothesis one which predicted that there would be a significant positive relationship between the predictor variable grit and the criterion variable stress mindset, a scatterplot was conducted. See figure 6 for scatterplot conducted to test hypothesis one. Figure 6 depicts a scatterplot with the predictor variable grit represented on the x axis and the criterion variable stress mindset represented on the y axis. The scatterplot reveals that there is moderate clustering around the line, suggesting moderate correlation. R^2 Linear is 0.009. The higher the value of the R^2 , the stronger the predictor is of the criterion. As there is moderate clustering around the line on the scatterplot in figure 6, suggesting a positive correlation, it was decided to conduct further analysis by way of Pearson's r Correlation, the results of which revealed

that there was non-significant relationship between grit (M = 2.595, SD = .4371) and stress mindset (M = 2.033, SD = .3096) ($r(136) = 0.093$, $p < .280$).

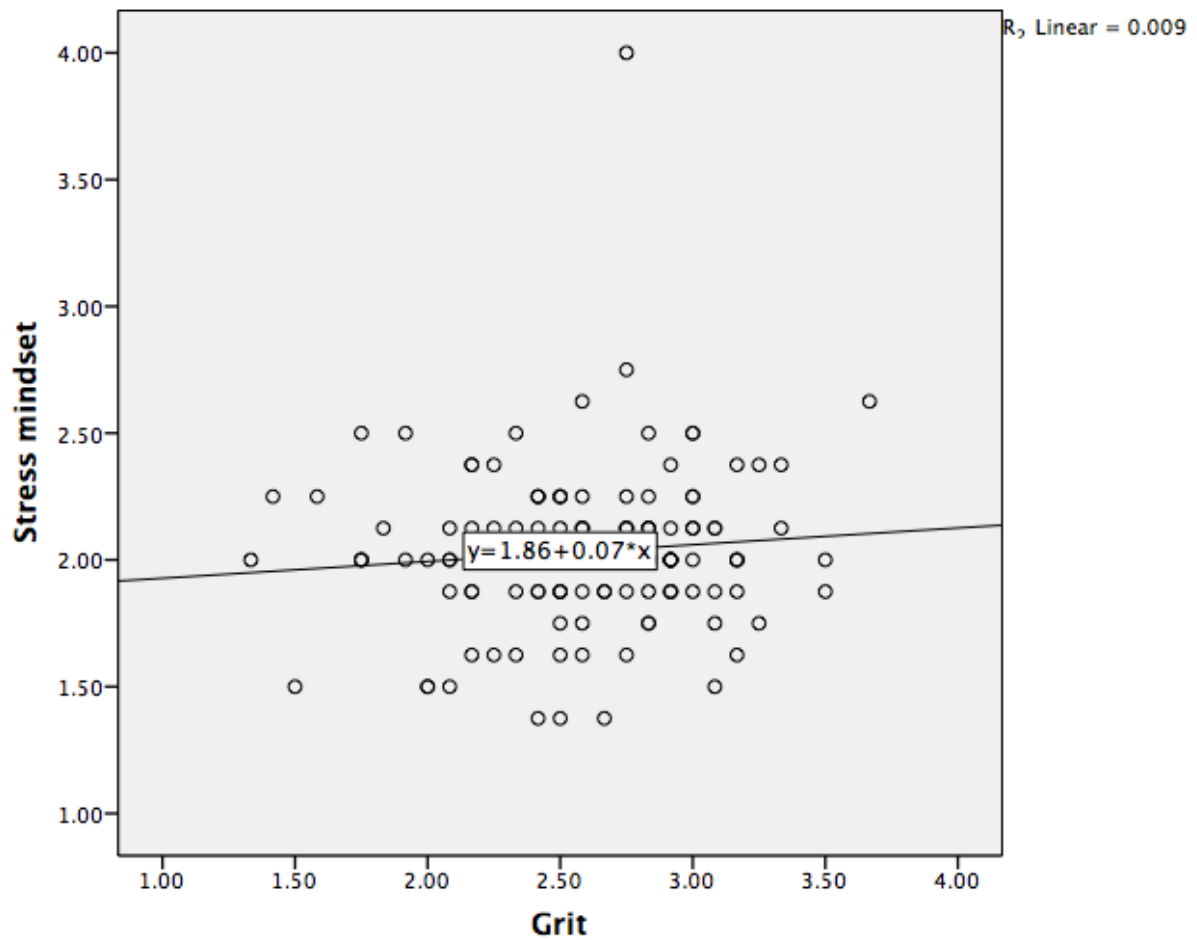


Figure 6. Scatterplot displaying the relationship between grit and stress mindset.

Hypothesis Two

Hypothesis two: It was predicted that there would be a significant correlation between high levels of grit and a satisficing style of decision making.

To test hypothesis two, which predicted that there would be a significant correlation between high levels of grit and maximization a scatterplot was conducted, with the predictor variable grit on the x axis and the criterion variable maximization on the y variable. See table 7 for scatterplot in relation to hypothesis two. The scatterplot revealed a significantly negative relationship between the variables in that the data set is going in a downward sloping direction along the line. As the values for grit depicted on the x axis increase, the values for maximization represented on the y axis are decreasing. The grittier participants score on the grit measure the lower they score on the maximization scale indicating a significant correlation between high levels of grit and a satisficing style of decision making. Further analysis was conducted in the form of a Pearson's r Correlation, the results of which revealed that there was a significant negative relationship between grit ($M = 2.595$, $SD = .4371$), and maximization ($M = 54.63$, $SD, 8.764$) ($r(136) = -.193$, $p < .024$). Correlation is significant at the 0.05 level (2-tailed). $(-.193)^2 = .0372 = 3.72\%$ variance explained. The null hypothesis is rejected: it can be assumed that the null hypothesis is not true. The findings are statistically significant and support the hypothesis.

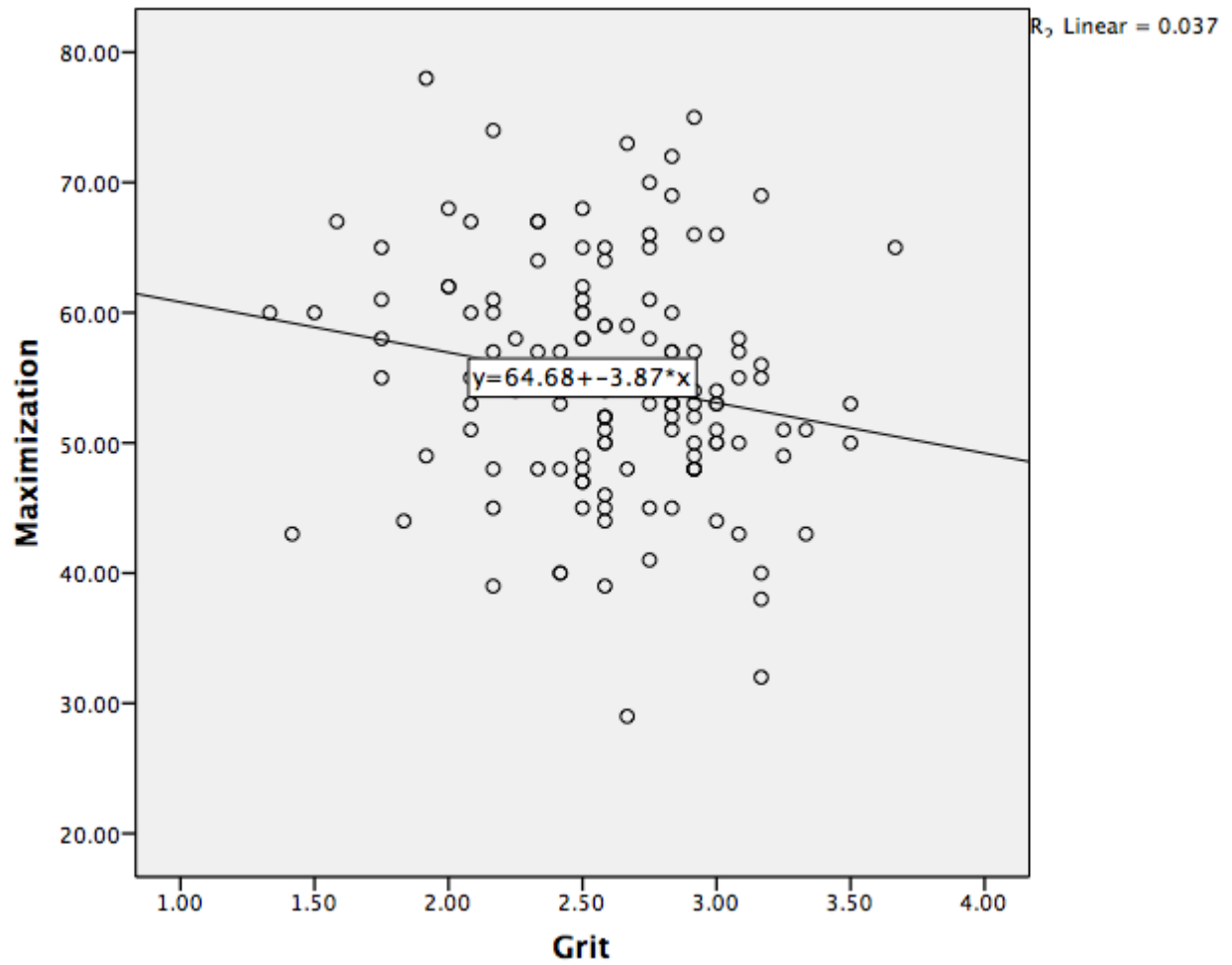


Figure 7. Scatterplot illustrating the relationship between grit and maximization.

Hypothesis Three

Hypothesis three: It was predicted that there would be a significant positive correlation between a stress-is-enhancing mindset and a satisficing style of decision making.

To test hypothesis three, which predicted that there would be a significant positive correlation between a stress-is-enhancing mindset and a satisficing style of decision making measured on the maximization scale, a scatterplot was conducted. The predictor variable stress mindset was placed on the x axis and the criterion variable maximization was placed on the y axis. See figure 8 for scatterplot in relation to hypothesis three. As can be observed in figure 8 the central line slopes slightly in an upward direction on the scatterplot indicating a moderately positive relationship. It was decided to conduct further analysis of the data in the form of Pearson's r Correlation, the results of which revealed that there was a non-significant relationship between stress mindset ($M = 2.033$, $SD = .3096$) and maximization ($M = 54.63$, $SD = 8.764$) ($r(136) = 0.032$, $p < .71$).

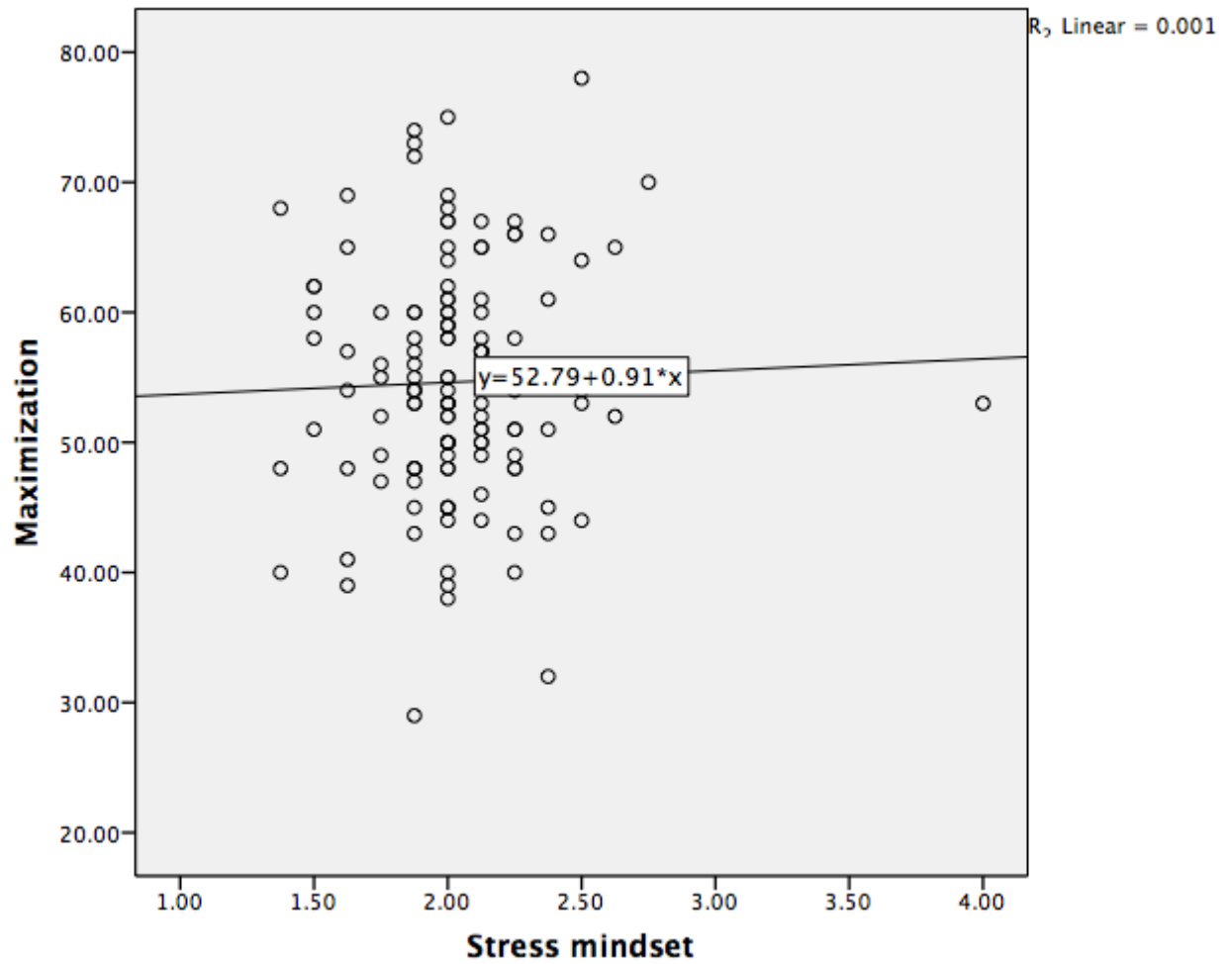


Figure 8. Scatterplot illustrating the relationship between stress mindset and maximization.

Multiple Regression

Hypothesis four

Hypothesis four: It was predicted that grit and maximization would significantly predict stress mindset.

Further statistical analysis of the data was conducted in the form of multiple regression, which is used to uncover the various relationships several variables have with one another.

The analysis was used to test hypothesis four, to examine how the predictor variables grit and maximization related to the criterion variable stress mindset to establish if grit and maximization can predict stress mindset. There are occasions where neither predictor variable on it's own will predict the criterion variable, however when more than one predictor variable is used they may produce a prediction (McQueen & Knussen, 2006, p. 234-235).

Multiple regression was used to test whether grit and maximization were predictors of stress mindset. The results of the regression indicated that two predictors: grit and maximization explained 4% of the variance ($R^2 = .004$, $F(2,133) = .761$, $p < .469$). It was found that the predictor variable grit failed to significantly predict stress mindset ($\beta = .103$, $p = .242$, 95% CI = $-.05 - .196$) and maximization failed to significantly predict stress mindset ($\beta = .052$, $p < .555$, 95% CI = $.004 - .008$) ($\beta = \text{beta}$). In terms of output for multiple regression of stress mindset as criterion variable and grit and maximization as predictor variables, the following graphs were created: histogram, normal P-P Plot of Regression Standardized Residual, scatterplot for criterion variable stress mindset and predictor variable maximization, and lastly scatterplot for criterion variable stress mindset and predictor variable grit.

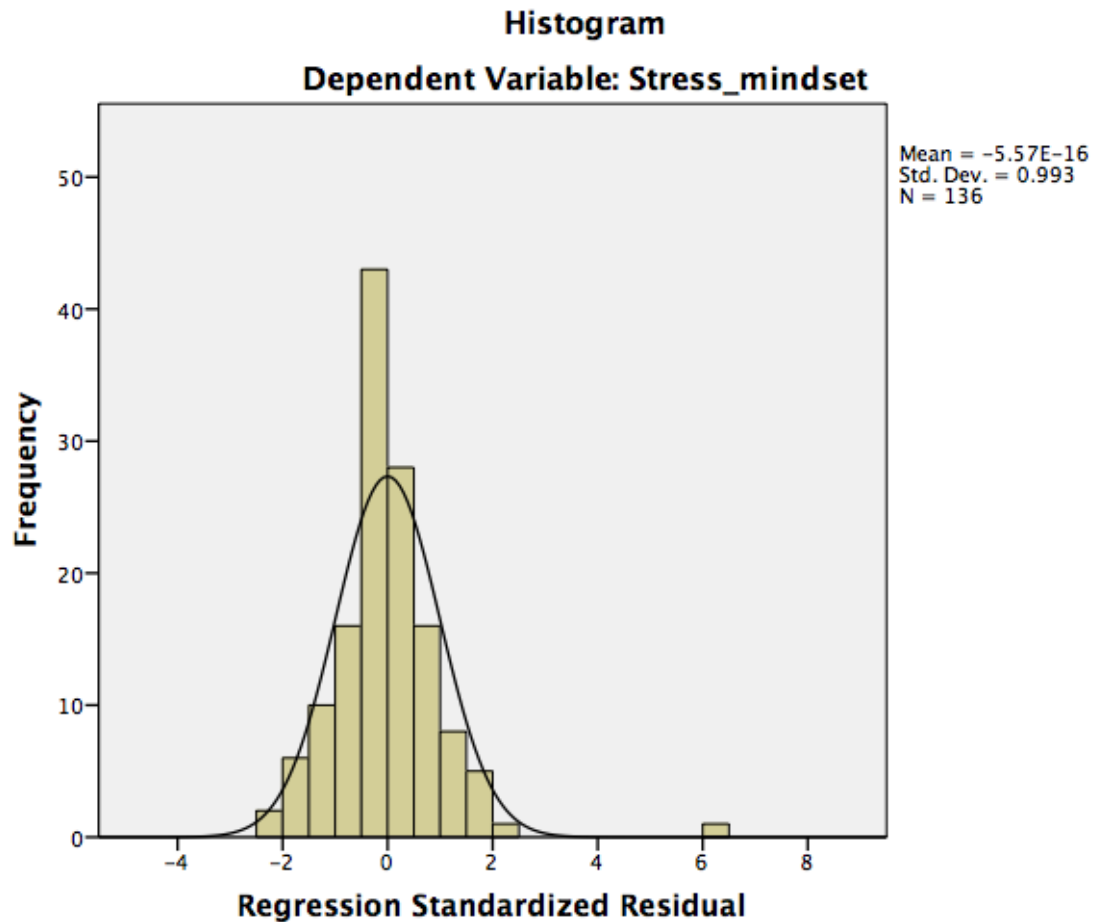


Figure 9. Histogram of criterion variable stress mindset and predictor variables grit and maximization.

The histogram illustrating the relationship between the criterion variable stress mindset and the predictor variables grit and maximization is in figure 9. The histogram looks somewhat normal but appears to be somewhat skewed.

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Stress_mindset

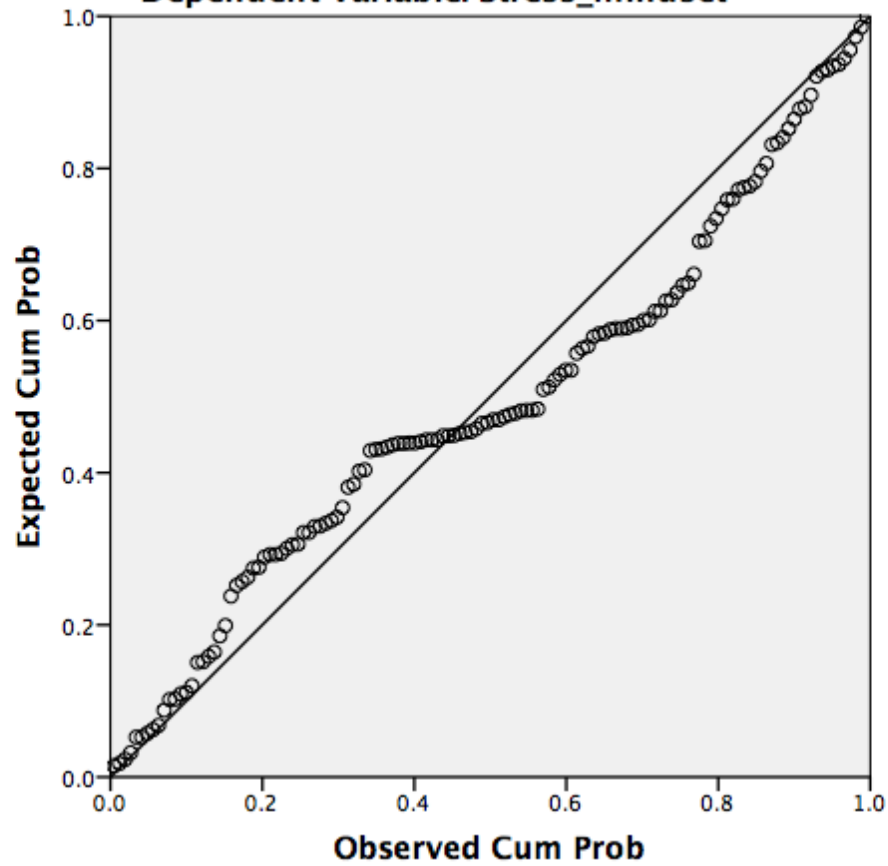


Figure 10. Normal P-P Plot of Regression Standardized Residual, DV Stress Mindset.

The Normal P-P Plot of Regression Standardized Residual seen in figure 10 looks somewhat normal, in that the data is not too far away from the line, however, there does appear to be some deviation.

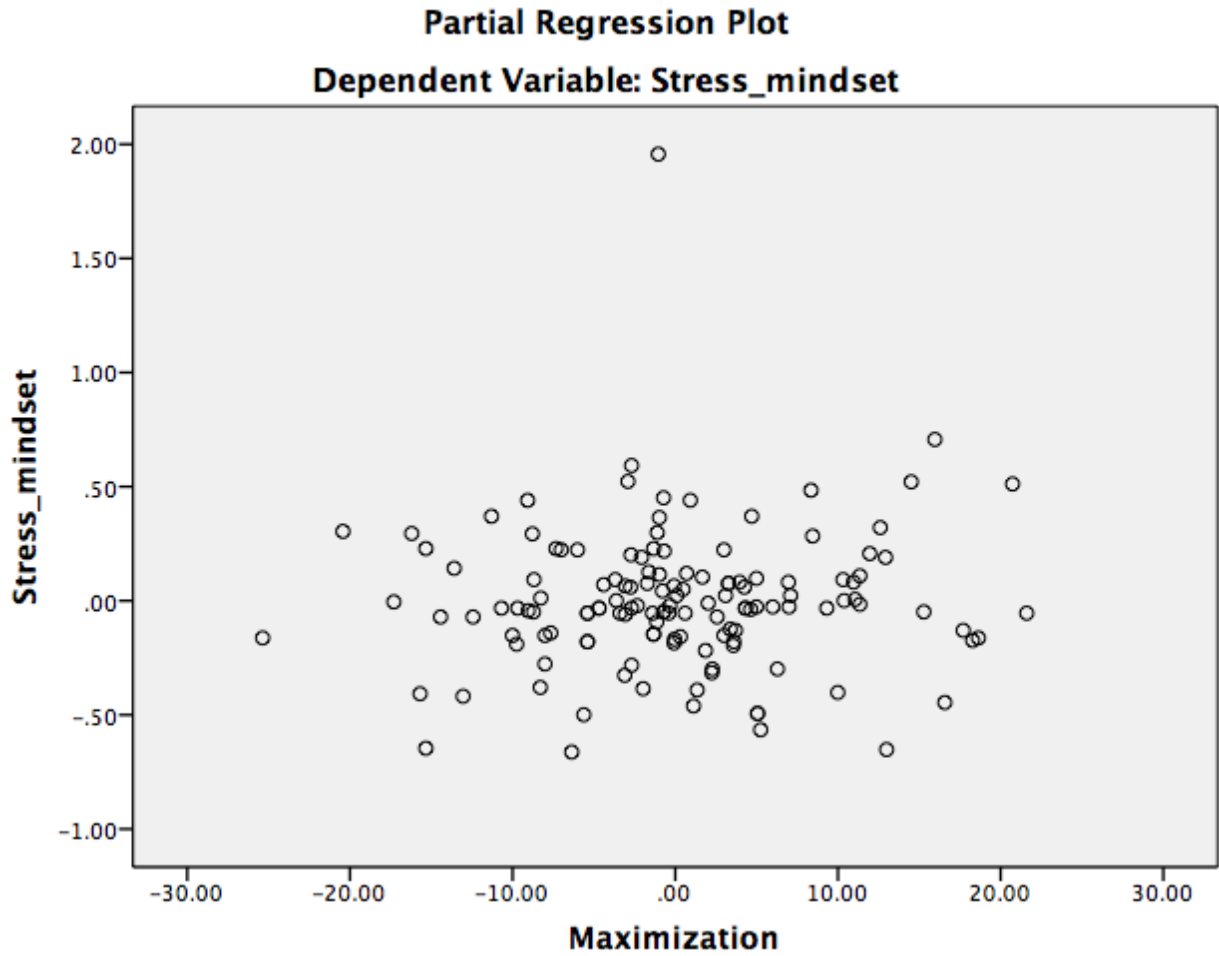


Figure 11. Scatterplot for criterion variable stress mindset and predictor variable maximization.

The scatterplot in figure 11 for criterion variable stress mindset and predictor variable maximization does appear to indicate a linear relationship.

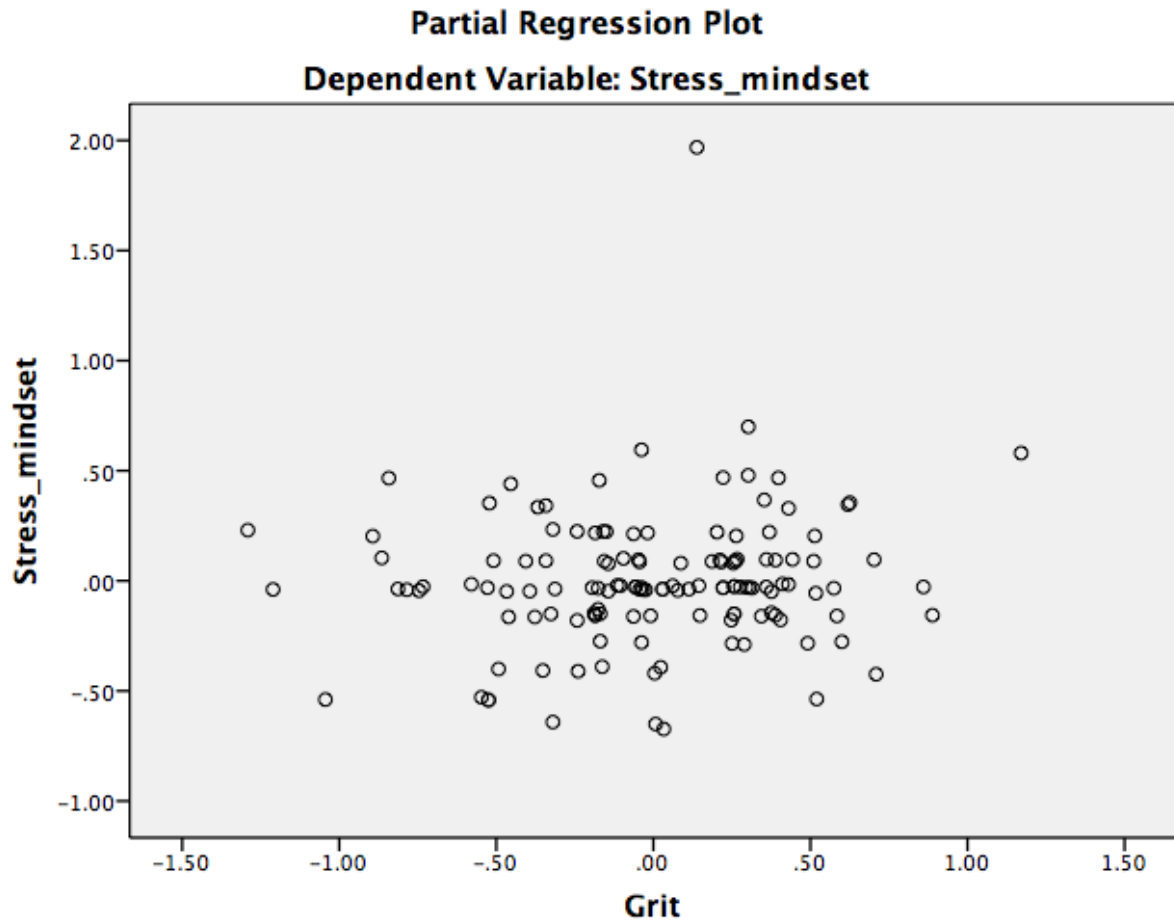


Figure 12. Scatterplot for criterion variable stress mindset and predictor variable grit.

The scatterplot in figure 12 for criterion variable stress mindset and predictor variable grit does appear to illustrate a linear relationship.

Hypothesis five

Hypothesis five: It was predicted that stress mindset and maximization would significantly predict grit.

To test hypothesis five further multiple regression analysis was conducted with to examine how the predictor variables stress mindset and maximization related to the criterion variable stress mindset to establish if stress mindset and maximization can predict grit. Multiple regression was used to test whether stress mindset and maximization were predictors of grit. The results of the regression indicated that two predictors: stress mindset and maximization explained 3% of the variance ($R^2 = .003$, $F(2, 133) = .3291$, $p < .04$). It was found that the predictor variable stress mindset failed to significantly predict grit ($\beta = .1$, $p = .242$, 95% CI = $-.096 - .37$) and maximization significantly predicted grit ($\beta = .196$, $p < .022$, 95% CI = $.018 - .001$) ($\beta = \text{beta}$). In terms of output for multiple regression of grit as criterion variable and stress mindset and maximization as predictor variables, the following graphs were created: histogram, normal P-P Plot of Regression Standardized Residual, scatterplot for criterion variable grit and predictor variable stress mindset, and lastly scatterplot for criterion variable grit and predictor variable maximization. The results were statistically significant and support the hypothesis. The null hypothesis was rejected based on the findings.

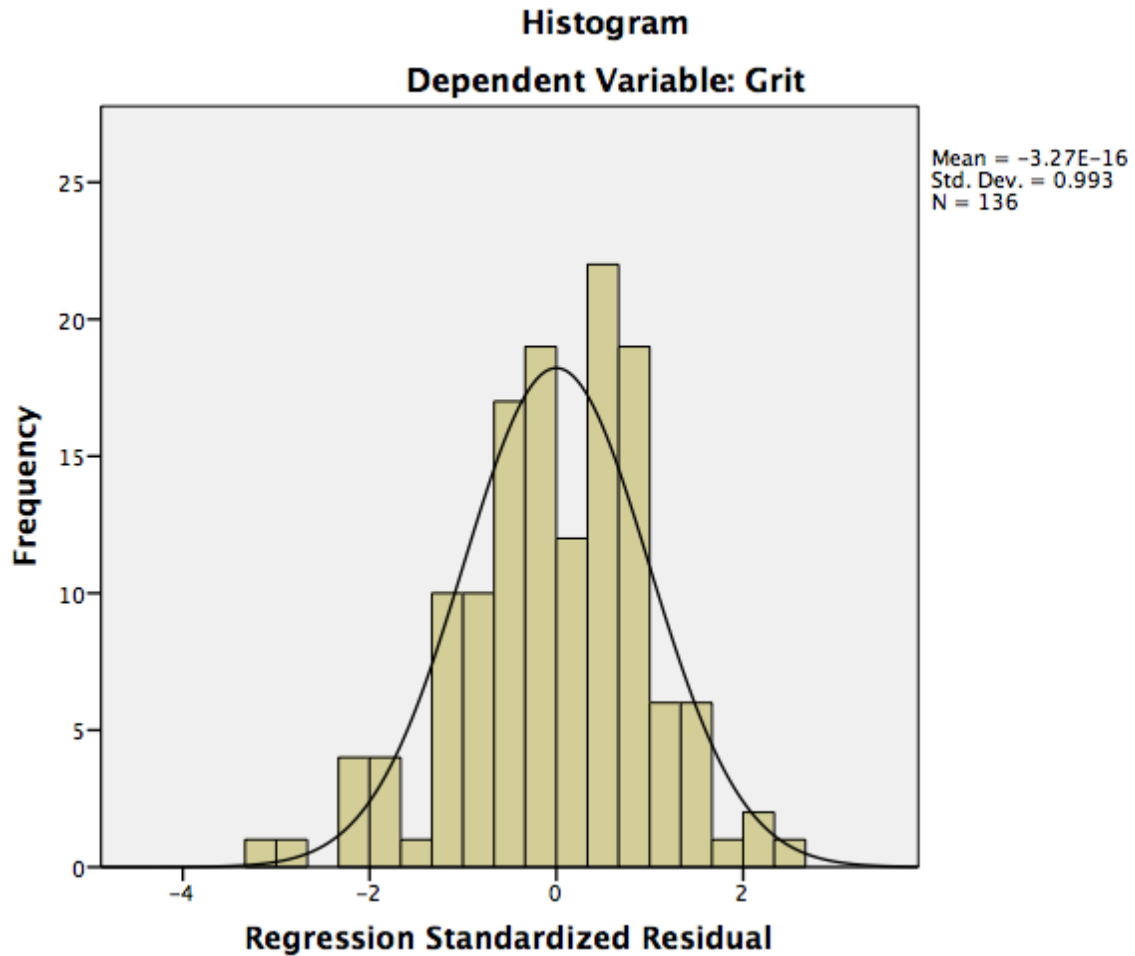


Figure 13. Histogram of criterion variable grit and predictor variables stress mindset and maximization.

The histogram illustrating the relationship between the criterion variable grit and the predictor variables stress mindset and maximization is in figure 13. The histogram looks relatively normal and does not appear to be skewed.

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Grit

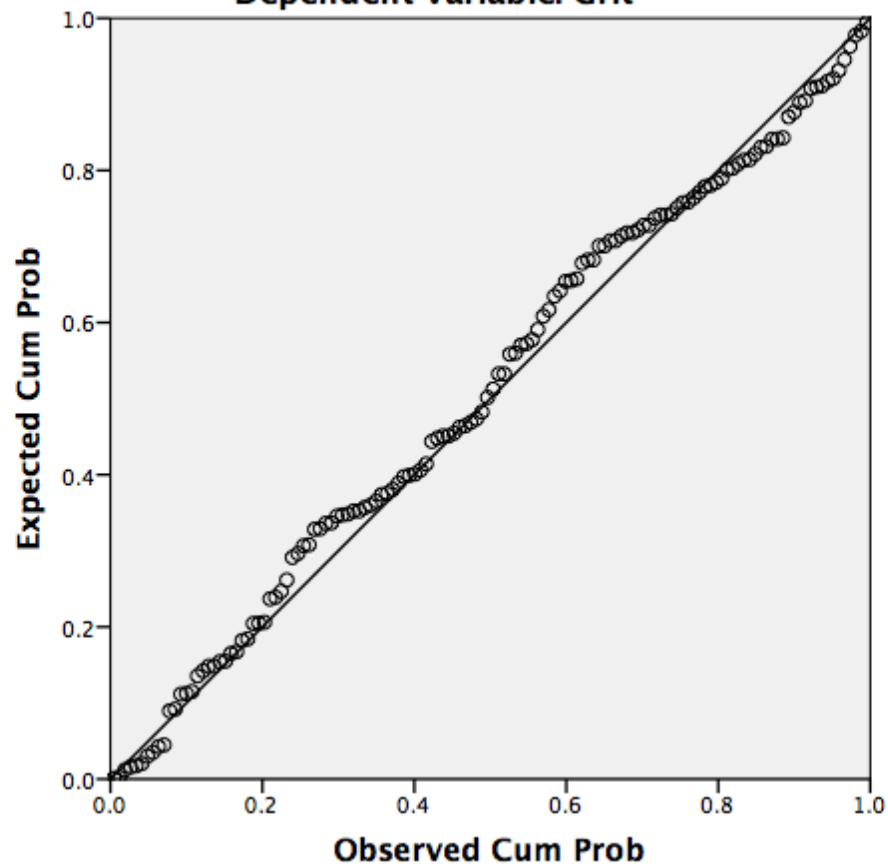


Figure 14. Normal P-P Plot of Regression Standardized Residual, DV Grit.

The Normal P-P Plot of Regression Standardized Residual as seen in figure 14 looks normal, in that the data is not too far away from the line, and there appears to be very little deviation.

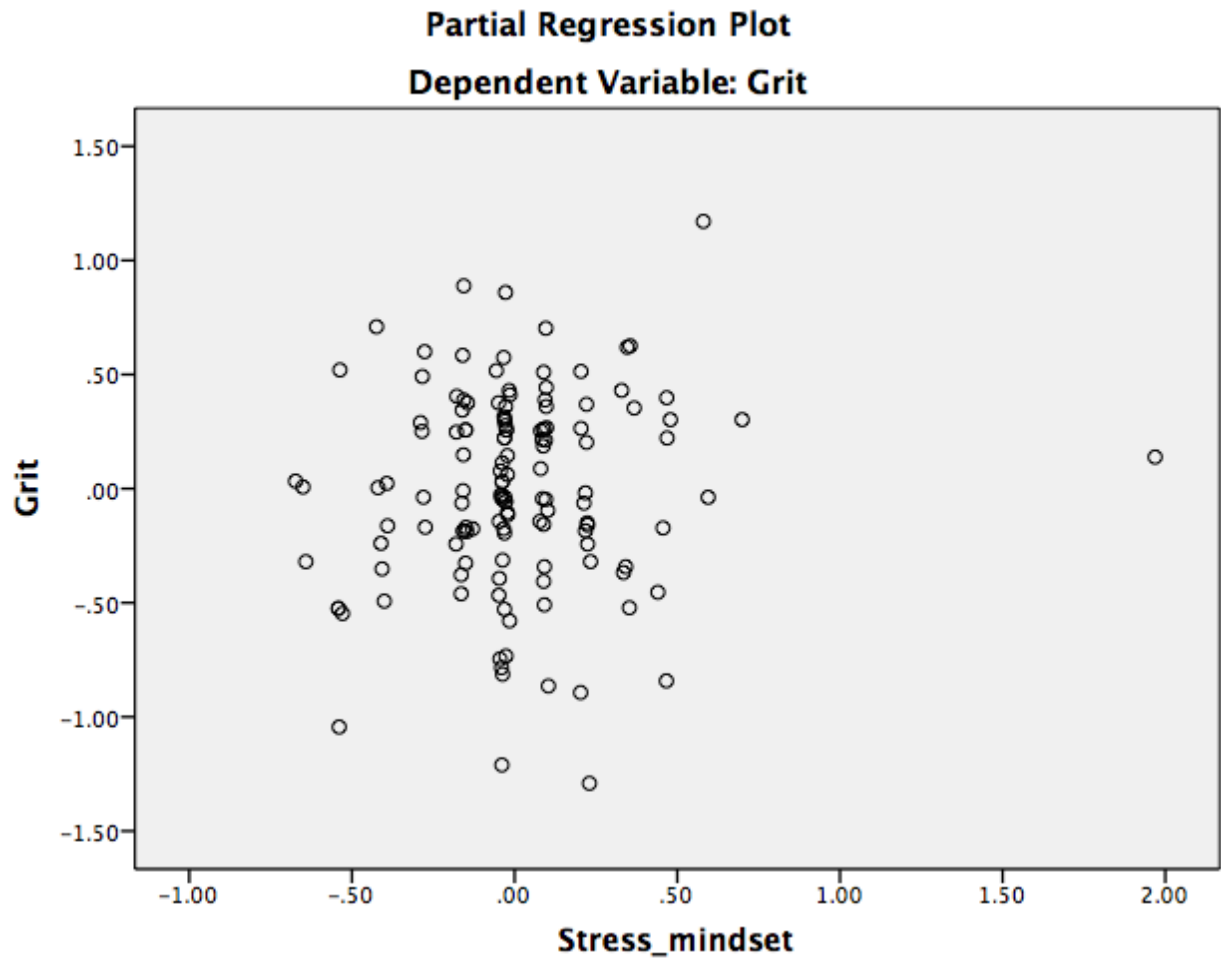


Figure 15. Scatterplot for criterion variable grit and predictor variable stress mindset.

The scatterplot in figure 15 for criterion variable grit and predictor variable stress mindset does not appear to indicate a strong linear relationship.

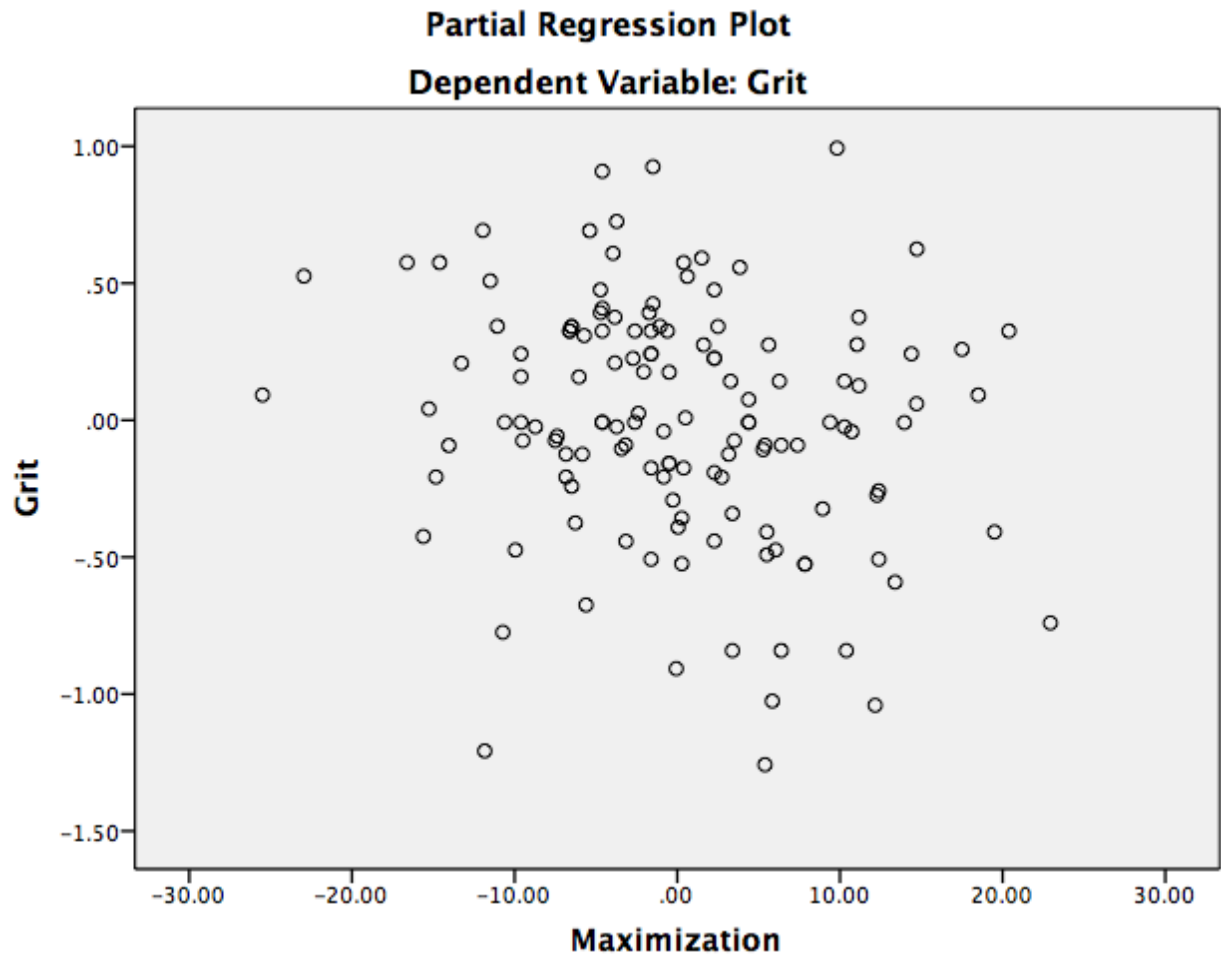


Figure 16. Scatterplot for criterion variable grit and predictor variable maximization.

The scatterplot in figure 16 for criterion variable grit and predictor variable maximization does not appear to illustrate a linear relationship.

Discussion

Research aim and summary of findings

The aim of the research was to examine the correlation between the psychological variables grit, using the 12-item Grit Scale (Duckworth, Peterson, Matthews & Kelly, 2007), stress mindset, using the Stress Mindset Measure-General (SMM-G) (Crum, Salovey & Achor, 2013), and decision making style using the Maximization Scale (Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, 2002). Each of these variables have been linked to success and wellbeing.

Hypothesis one predicted that there would be a significant correlation between high levels of grit and stress mindset. After conducting inferential analysis in the form of a scatterplot and a Person's r Correlation it could not be concluded that variables are or are not related. The findings do not support the hypothesis however this may be due to the fact that the sample size was insufficient: the power of the statistics could increase with an increase of individuals contributing to the data (McQueen & Knussen, 2006, p. 336). Hypothesis two predicted that there would be a significant correlation between high levels of grit and a satisficing style of decision. A scatterplot was conducted in addition to Pearson's r Correlation. The findings were that the null hypothesis was rejected: it can be assumed that the null hypothesis is not true based on the analysis. The findings are statistically significant and support the hypothesis. Hypothesis three predicted that there would be a significant positive correlation between a stress-is-enhancing mindset and a satisficing style of decision making. A scatterplot was conducted in addition to Pearson's r Correlation which resulted in non significant findings – the null hypothesis could not be rejected, based on the findings there is a possibility the null hypothesis is true however further research would need to be

conducted with a larger sample size which would increase the power of the statistics. The findings fail to support the hypothesis.

Hypothesis four predicted that grit and maximization would significantly predict stress mindset. Multiple regression was conducted and the results revealed non-significant findings – the null hypothesis could not be rejected, based on the findings the probability does not conclude that the null hypothesis is true, however, further analysis of the variables using a larger sample size to increase the power of the statistics would be advisable. Hypothesis five predicted that stress mindset and maximization would significantly predict grit. Multiple regression was conducted and the results were statistically significant and support the hypothesis. The null hypothesis was rejected based on the findings.

Hypothesis one, hypothesis three and hypothesis four were not supported by the results in this study, however, it cannot be fully concluded that the variables contained in these hypotheses are not related. It is important to note that the sample size was relatively small compared to previous research – a larger sample size would increase the power of the statistics in any future study. In addition to this point, the previous research discussed did not correlate these variables directly so the results are not necessarily inconsistent with previous research.

Hypothesis two and hypothesis five were supported by the results in this study. The results suggest that as predicted in hypothesis two there is a significant negative correlation between high levels of grit and a satisficing style of decision making and as predicted in hypothesis five: stress mindset and maximization significantly predict grit. It must be noted that although some of the results are not statistically significant in this study that is not to say they are not psychologically significant (Harris, 2008, p. 185). In any case the results suggest further research in this area would be valuable.

Strengths and limitations

The strengths of the study include the bringing together of three different areas of research and three different variables that have been shown to be related to both success and wellbeing. Analysis of these three variables has not been conducted in previous research so in effect is a gap in the literature. In terms of limitations, a correlational study is never capable of revealing too much – there is always a limit to its potential, however, there is value in attempting to uncover links between areas of psychology that have not previously been explored together. A further limitation would be sample size; with more time and resources a larger sample could be useful for future studies to increase the statistical power. The fact that the research was limited to a correlational design was also a limitation in itself. However, of interest is that the results in the case of two of the hypotheses were significant suggesting further more complex analyses would be warranted.

Future research ideas

As the results for hypothesis two suggest a significant positive correlation between high levels of grit and a satisficing style of decision making it would be interesting to carry out further analysis in this area, in particular to examine if low levels of grit are significantly correlated with a maximizing style of decision making. In addition to this research could be conducted to examine how variables that have been negatively correlated with maximization such as self-esteem and life satisfaction correlate with grit (Schwartz et al, 2002, p. 1178).

As the results of hypothesis five indicate that stress mindset and maximization significantly predict grit it would be valuable to expand this research to include other variables that have been highly positively correlated with grit for example conscientiousness (Duckworth et al, 2007, p. 1087) and examine how this correlates with stress mindset and maximization.

As the research conducted in this study was limited in its nature there is a limit to the implications of the results and indeed potential for application of the research. However the results do raise questions about the correlation between high levels of grit and a satisficing style of decision making, such as examining what other variables are correlated with these results. Also it would of interest to conduct further more extensive research in terms of the predictive nature of stress mindset and maximization on grit.

Conclusion

The main findings were that there is a significant positive correlation between high levels of grit and a satisficing style of decision making and that stress mindset and maximization significantly predict grit. These results warrant further research in the area of success and wellbeing to add further to the rich literature that already exists.

References

- Cervone, D., & Pervin, L. A. (2014). *Personality Psychology* (12th ed.). Hoboken, N. J.: John Wiley and Sons Incorporated.
- Clifford, G. (2015). Why we can't get enough of self-help books. [Web log post]. Retrieved from <http://www.independent.ie>
- Crum, A. J., Salovey, P., & Achor, S. (2013). Rethinking Stress: The Role of Mindsets in Determining the Stress Response. *Journal of Personality and Social Psychology*, *104*, (4), 716-733.
- Crum, A. J., Salovey, P., & Achor, S. (2013). Stress Mindset Measure-General (SMM-G). *Journal of Personality and Social Psychology*, *104*, (4), 732.
- 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*, *92*, (6), 1087-1101.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). 12-item Grit Scale. *Journal of Personality and Social Psychology*, *92*, (6), 1090.
- Dweck, C. S. (2012). Mindsets and Human Nature: Promoting Change in the Middle East, the Schoolyard, the Racial Divide, and Willpower. *American Psychologist*, *67*(8), p. 614-622.
- Harris, P. (2008). *Designing and Reporting Experiments in Psychology* (3rd ed.). NY: Open University Press.
- Kaufman, S. B. (2013). *The Complexity of Greatness: Beyond Talent or Practice*. NY: Oxford University Press.

- Johnson, W. (2013). Greatness as a Manifestation of Experience-Producing Drives. In S. B. Kaufman (Ed.) *The Complexity of Greatness: Beyond Talent or Practice*. NY: Oxford University Press.
- Lyubomirsky, S., King, L., & Diener, E. (2005). The Benefit of Frequent Positive Affect: Does Happiness Lead to Success? *Psychological Bulletin*, (131), 6, 803-855.
- Mangels, J. A., Butterfield, B., Lamb, J., Good, C. & Dweck, C. (2006). Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. *Social Cognitive and Affective Neuroscience*, 1, (2), 75-86.
- McQueen, R. A. & Knussen, C. (2006). *Research Methods and Statistics in Psychology*. England: Pearson Education Limited.
- Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximization Scale. *Journal of Personality and Social Psychology*, (83), 5, 1182.
- Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing Versus Satisficing: Happiness Is a Matter of Choice. *Journal of Personality and Social Psychology*, (83), 5, 1178-1197.
- Sternberg, R. J. (2005). The Theory of Successful Intelligence. *Journal of Psychology*, 39 (2), 189-202.
- Tough, P. (2013). *How Children Succeed: Grit, Curiosity, and the Hidden Power of Character*. NY: Mariner Books.

Appendices

Appendix 1 – Information sheet and informed consent

My name is Niamh Dalton and I am carrying out research as part of my studies with the Department of Psychology, Dublin Business School. This research examines 21st century skills and will be assessed to form part of my overall grade. With this in mind you are invited to take part in this study. Taking part involves: reading this information page, consenting to participate, answering a series of questions and reading the final page. Participating should take no longer than fifteen minutes of your time. Your consent to participate in this research will be obtained when you click the continue button at the end of this page. Participation is completely voluntary and anonymous: when your response is collected there is no way to connect it to you. As there will be no way to identify you from your response you will be unable to withdraw from this study once you have completed and submitted your questionnaire. The responses to this survey will be stored on a password protected computer.

The questions you will be asked have been used in previous research and there will be information at the end of the survey on the ideas behind this research. You must be over 18 years of age to participate. The research results may be presented at Student Congress, conferences or developmental training events or be published in a journal article.

You are reminded that by proceeding to the next page, completing and submitting your response to this survey you are consenting to take part in this research.

Many thanks for your time.

Appendix 2 – Demographic questions

Please select your gender:

- Male
- Female

Please select your age range:

- Less than 18 years old
- Age 18 – 29
- Age 30 – 39
- Age 40 – 49
- Age 50 – 59
- Age 60 – 69
- Age 70 and above

Appendix 3 – 12-item Grit Scale, Duckworth, Peterson, Matthews, and Kelly (2007).

Please respond to the following 12 items. Be honest – there are no right or wrong answers!

1. I have overcome setbacks to conquer an important challenge.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

2. 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

3. My interests change from year to year.*

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

4. Setbacks don't discourage me.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

5. 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

6. I am a hard worker.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

7. 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

8. 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

9. I finish whatever I begin.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

10. I have achieved a goal that took years of work.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

11. I become interested in new pursuits every few months.*

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

12. I am diligent.

Very much like me

Mostly like me

Somewhat like me

Not much like me

Not like me at all

Appendix 4 - Stress Mindset Measure-General (SMM-G), Crum, Salovey, and Achor (2013).

Please rate the extent to which you agree or disagree with the following statements.

1. The effects of stress are negative and should be avoided.

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

2. Experiencing stress facilitates my learning and growth.

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

3. Experiencing stress depletes my health and vitality.

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

4. Experiencing stress enhances my performance and productivity.

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

5. Experiencing stress inhibits my learning and growth.

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

6. Experiencing stress improves my health and vitality.

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

7. Experiencing stress debilitates my performance and productivity.

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

8. The effects of stress are positive and should be utilized.

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Appendix 5 – Maximization Scale, Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, (2002).

Indicate how much you agree with each of the following statements:

1. No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

2. When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I am relatively satisfied with what I'm listening to.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

3. When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

4. I treat relationships like clothing: I expect to try a lot on before finding the perfect fit.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

5. I often find it difficult to shop for a gift for a friend

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

6. Renting videos is really difficult. I'm always struggling to pick the best one.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

7. When shopping, I have a hard time finding clothing that I really love.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

8. I'm a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc.).

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

9. I find that writing is very difficult, even if it's just writing a letter to a friend, because it's so hard to word things just right. I often do several drafts of even simple things.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

10. I never settle for second best.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

11. Whenever I'm faced with a choice, I try to imagine what all the other possibilities are, even ones that aren't present at the moment.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

12. I often fantasize about living in ways that are quite different from my actual life.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree

13. No matter what I do, I have the highest standards for myself.

Completely disagree

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

Completely agree