Online Impulsive Buying Behavior and its Relationship with Personality Traits in Dartmouth College Students

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DARTMOUTH

1 Introduction, Purpose, and Objectives

The purpose of this study is to understand how college students tend to spend their money online, and if their personality affects how they make purchasing decisions. This study involves a crossover between behavioral psychology, consumer behavior, and marketing. This research may be able to be used to reduce individuals' impulsive buying behaviors which may help their financial future.

Considering social media tends to shorten individuals' attention spans (Ventola, 2014) and 88% of individuals aged 18-29 report using social media (compared to 78% to 37% of older age groups), and young adults spend more time (averaging over 3 hours daily) on social media than older adults (Hruska & Maresova, 2020), I hypothesize that college-aged students may be key targets when marketing to individuals on social media.

Secondly, the earlier individuals start to invest their money, the higher the likelihood they will make more money throughout their lives and be able to retire comfortably (Cannon et al., 2018). Unfortunately, with the outbreak of COVID-19, shoppers have become more comfortable buying more goods and services online and thus the perceived ease of using websites to buy online has increased (Goel et al., 2022; Eri et al., 2011). Lastly, according to the social cognitive theory of self-regulation (Goel et al., 2022), the lack of self-regulation, ease of buying online, shorter attention spans, and high use of social media could make college students more susceptible to impulse buying online that may negatively impact their financial future.

Individuals' impulsive buying behavior may be able to be predicted through their personality traits, which may allow them to understand their tendencies and work on reducing their impulsive buying behaviors to improve their future.

2 Literature Review

In *The Effects of Personality Traits and Website Quality on Online Impulse Buying,* the authors sought to examine the effects of personality traits and website quality on online impulse buying (Turkyilmaz et al., 2015). The goal of the study was to improve the small amount of research done specifically on online impulse buying. One issue in previous studies was the oversimplification of behavior as they only focused on one issue, either one aspect concerning the state of mind created by a shopping environment or one aspect concerning one personality trait inherent to a customer.

This study used a 50-question version of McCrae & Costa's (1990) Big Five Personality Traits Hierarchy. Website quality was measured with 36 questions adapted from Lociancono et al. (2002)'s Webqual Scale and impulsive buying w\as measured with 9 questions adapted from Rook & Fisher (1995). All questions were scored using a 5-point Likert scale. The authors found that website quality is very important for consumer's online buying impulsiveness, with website ease of use being the most important variable in term of the effect on online impulse buying. They also found that extraversion, openness to change and agreeableness have positive effects while neuroticism and conscientiousness

have negative effects on impulse buying. The authors suggest that website designers can consider personality traits to segment and target certain consumers.

In a 2018 study titled *Analysis of College students' consumption behavior based on Virtual variable regression*, Li and Chen looked at the impact of advertising and people around individuals on consumer spending behaviors. They had 64 college students fill out a survey asking about their monthly consumption on food, clothing, and necessities of life. While the sample size was small, they were about to find a few meaningful conclusions. Students were split into three groupings based on their monthly consumption.

Li and Chen found that monthly consumption was a key factor influencing consumption decision, whereby the lower the monthly consumption, a higher percentage of consumption was spent on full and a lower percentage on necessities and clothing (Li & Chen, 2018). This finding follows the structure of consumption laid out by the German statistician Engel, who found that the smaller the household income, the larger the share of the total household spending on food, and as the household income increases, the share of total household spending on the purchase of services falls. This study shows that individuals consume in a similar way as households. They also found that about 75% of college students' spending behaviors were affected by people around them while 50% of college students' spending behaviors were affected by advertising (Li & Chen, 2018).

They found that 80% of college students' income was spent on consumption, consumer consumption is greatly affected by living income, and college students are influenced both by advertising and people around them (Li & Chen, 2018).

In the 2003 article *College Students' Apparel Impulse Buying Behaviors in Relation to Visual Merchandising,* Jiyeon Kim used a survey to collect responses from 269 college students from multiple universities in South Korea. 201 (85%) of participants were female, and 30 (13%) of participants were male. Kim points out that since the major purchasers of soft goods are women, this demographic limitation is not considered to affect the results negatively. The survey included 31 questions on demographics, shopping behavior, visual merchandising, and impulsive buying behavior. I used the impulsive buying behavior questions from this study, as they all have empirical support. The survey used a 5-point Likert scale for each question.

Kim found the mean impulse buying score to be 3.32, meaning college students' tend to purchase on impulse. He also found visual merchandising practices influence college students' impulse buying behavior. Unfortunately, he was not able to determine the type of influence/response to this visual stimuli. He also suggest that impulsive buying behaviors are strongly related to emotional/affective reactions and internal motivators such as personality.

Eri et al (2011) studies the factors that influence buying intentions online in their 2011 paper. They surveyed 417 randomly selected students in Indonesia who were in programs studying e-retailing. The purpose of this study was to provide insights into the online shopping behaviors of customers to

help businesses develop strategies for attracting and retaining online customers. They found that the four most important factors influencing customers' buying intensions when online shopping were trust, perceived value, website quality, and customer satisfaction. They did not find demographics such as gender and age to significantly influence customers' buying intentions (Eri et al., 2011).

In a 2004 paper titled *Factors Influencing Impulse Buying During an Online Purchase Transaction,* Jeffery and Hodge looked to contribute to the literature on impulsive buying behavior by examining the effect situational and individual factors have on impulse purchasing. They surveyed 299 individuals in Taiwan using an online questionnaire. The questionnaire included demographic characteristics, online shopping behavior questions, and internal and external factors. Situational factors including website design, promotional messages, and time pressure were found to be significant predictors of impulsive buying. Personality traits including extraversion and neuroticism were also found to be significant predictors.

3 Gaps in Research

Currently, there are very few papers on the relationship between external factors such as website design, discounts, etc, internal factors such as personality traits, and impulsive buying behaviors online. There are even fewer papers on this topic that uses subjects specifically from a well-known educational institute such as Dartmouth College. As COVID-19 has moved a lot of business online, it is crucial for college students to understand their purchasing tendencies in order to plan for their future financially as well as know how to mitigate potential negative behaviors such as buying items solely for social desirability, or spending too much to the point where they accumulate debt. Therefore, I intend to look at the relationship between external and internal factors and impulsive buying behaviors in order for students to understand the way they shop online and make responsible spending decisions.

4 Research Question

How much of a college student's purchasing behavior can be explained by their personality traits?

5 Hypotheses

H1: College students that are more extroverted and open-minded will have a higher impulse-buying behavior score.

H2: College students that are more conscientious will have a lower impulse-buying behavior score.

H3: College students that have more negative emotionality will tend to use impulse purchasing to improve their mood (Q2.1_1), will have more difficulty controlling the urge to spend when seeing a good offer online (Q2.1_4), and will have more internal conflict after making impulse purchases (Q2.1_3).

H4: Women will have a higher impulse-buying behavior score than men.

6 Experiment

6.1 Participants

I asked students at Dartmouth College to complete a ~5-minute survey on their purchasing behaviors, personality traits, and demographics. The survey was distributed by sending out an email to all Dartmouth College undergraduate students on Friday, March 10 at 8:30am EST. All students who had not completed the survey were sent a second email on Sunday, March 12 at 8:30am EST. The survey was open for responses from Thursday, March 9 until Monday, March 13. My goal was to have at least 100 usable responses from each class, for a total of 400 usable responses. Useable responses were responses that answered all questions, did not have extreme outlier answers, and were not duplicate responses. The actual survey responses were very close to my goal, with 547 total responses, and of those 547 responses, 396 were usable. Useable responses by class included 117 responses from seniors(23's) {29.5% of total}, 88 juniors (24's) {22.2% of total}, 107 sophomores (25's) {27.0% of total}, and 84 freshmen (26's) {21.2% of total}.

6.2 Materials and Equipment

After receiving the link to the survey (Here is the link to the survey: https://dartmouth.co1.qualtrics.com/jfe/form/SV_8wvq0BqW9jItCJ0), students could take the survey on a mobile phone, tablet, or computer.

6.3 Design

6.3.1 Dependent Variable

The dependent variable is the participants' impulsive buying tendencies and behaviors. A participant's impulsive buying behavior score will be calculated by averaging the score of the 5 questions asked about their impulsive buying behavior. The 5 questions were adapted from Jiyeon Kim's paper on impulse buying and visual merchandising (Kim, 2003). Each question is scored on a 5-point Likert scale: 1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree. The 5 questions are: 1. I go online shopping to change my mood or take my mind off of other things. 2. I feel a sense of excitement when I make an impulse purchase online. 3. After I make an online impulse purchase, I feel regret. 4. I have difficulty controlling my urge to buy when I see a good offer online. 5. When I see a good deal online, I tend to buy more than that I intended to buy. Question 1, 2, 4, and 5 had regular scales, while question 3 had an inverted scale. This was done as the score for each question and the mean impulsive buying score reflects the respondent's attitude toward impulsive buying. A higher impulsive buying score means that the respondent likely makes impulse purchase more frequently than others.

6.3.2 Independent Variables

The independent variables are the participants' personality traits (extraversion, agreeableness, conscientiousness, negative emotionality, and open-mindedness). Participants' personality traits will be calculated through the BFI-2-S (Soto & John, 2017), where participants answer 30 short questions asking about their personality. An example question is: Here are a number of characteristics that may or

may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Indicate the extent to which you agree or disagree with that statement on a scale of 1 to 5, with 1 being "disagree strongly", and 5 being "agree strongly". Is compassionate, has a soft heart. Each personality trait is calculated by taking the average score of the 5 questions that pertain to that trait. Each question is scored on a 5-point Likert scale: 1. Disagree Strongly 2. Disagree a little 3. Neutral; No Opinion 4. Agree a little 5. Agree Strongly.

6.3.3 Controls

Controls are the participants' disposable income, importance of the quality of items bought online, whether they are on financial aid, whether or not they are given an allowance, class year, age, gender, racial identity, and current employment status. The importance of quality of items bought online is measured using 8 questions, scored on the same 5-point Likert scale used to score the BFI-2-S. The questions are: Rate the importance of each quality of items bought online. 1. Website reputation/safeness of website 2. Cost of item 3. Discount of Item on website (% off on that particular website) 4. Discount of item compared to other buying websites (% off only compared to other websites) 5. Shipping Cost 6. Shipping Time 7. Origin/Country of website 8. Whether website is a "brand name".

6.4 Procedure

Students will be sent the survey via email and will be able to complete the survey either on a computer or mobile device. Data will be collected automatically via Qualtrics, then exported into RStudio where data cleaning, recoding, manipulation, and regression analysis will be performed.

6.5 Method of Analysis

Multivariable linear regression analysis will be used to determine the relationship between personality traits and impulsive buying behavior. Regression analysis was run in a mixed selection fashion, starting with a null model, then a model with only personality traits, then adding in control variables such as gender, class year, disposable income, etc. I will continue to add in variables until there are no variables left with significantly low enough p-values, then I will take the model with the lowest AIC value and choose only the variables with $p < 0.1$. Below is baseline model for this multivariable linear regression.

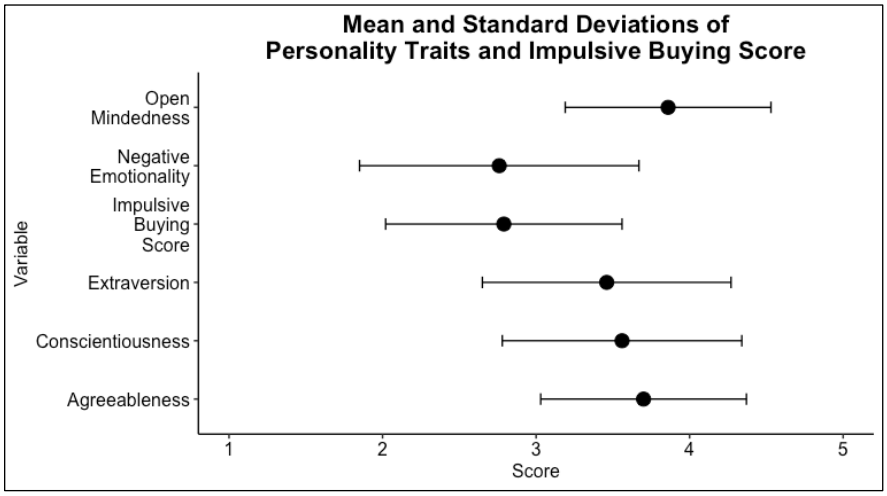
$$Impulse\ Buy\ =\ \beta_0 + \beta_1(extraversion) + \beta_2(agreeableness) + \beta_3(conscientiousness)$$

$$+ \beta_4(negative\ emotionality) + \beta_5(openmindedness) + \beta_6(controls) + \epsilon$$

7 Analysis

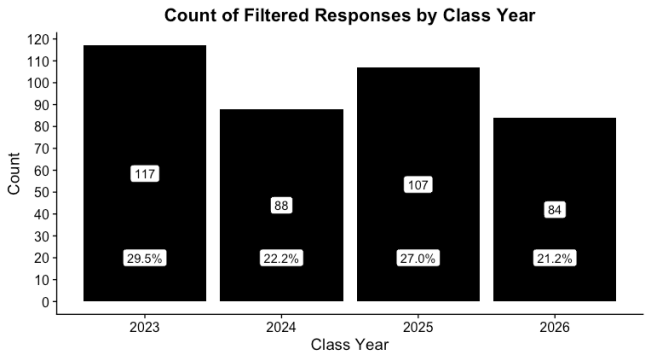
7.1 Descriptive Statistics

	count	mean	sd
Extraversion	396	3.46	0.81
Agreeableness	396	3.70	0.67
Conscientiousness	396	3.56	0.78
Negative Emotionality	396	2.76	0.91
Open-Mindedness	396	3.86	0.67
Impulsive Buying Score	396	2.79	0.77



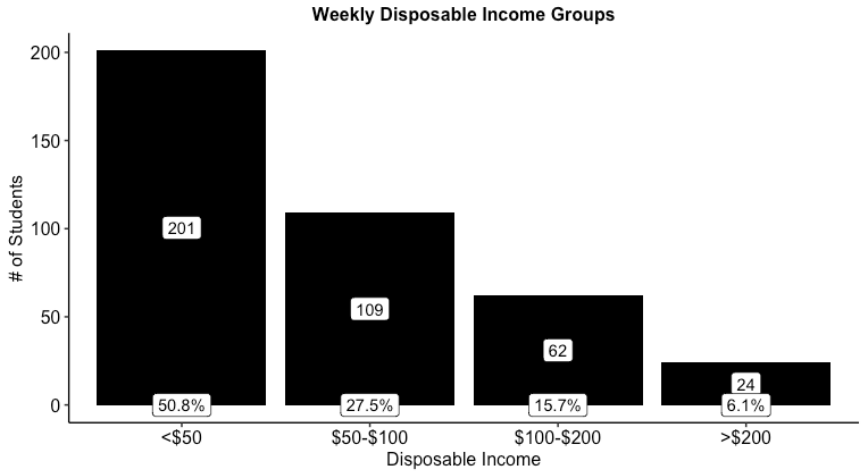
Not Surprisingly, open-mindedness and agreeableness had the highest mean scores, while negative emotionality and impulse buying score had the lowest mean scores. There are multiple reasons for this, but it is likely that the individuals that took this survey answered more in a way that they would like themselves to be, rather than an unbiased, factual analysis of their personality and spending behaviors.

Class Year	# Useable Responses
2023	117
2024	88
2025	107
2026	84



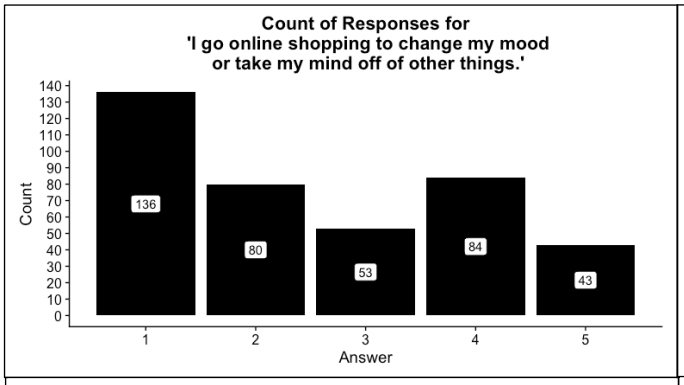
There was a relatively even split of useable responses from each class year. This provided sufficient data and also allowed age and class year to be used in regression analysis to determine whether impulsive purchasing behaviors differ between ages and class years at Dartmouth.

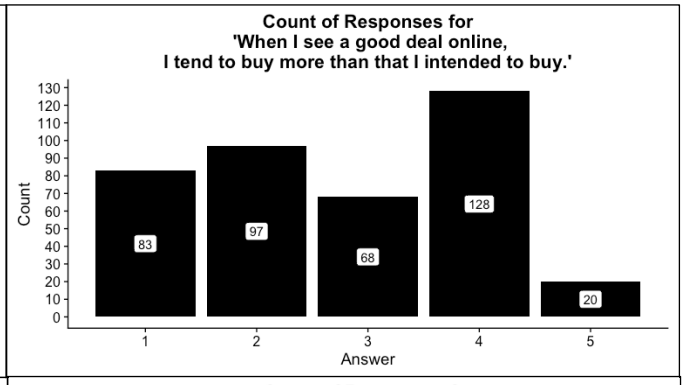
Disposable Income	# Students
less than $ 50	201
$ 50-$ 100	109
$ 100-$ 200	62
more than $ 200	24

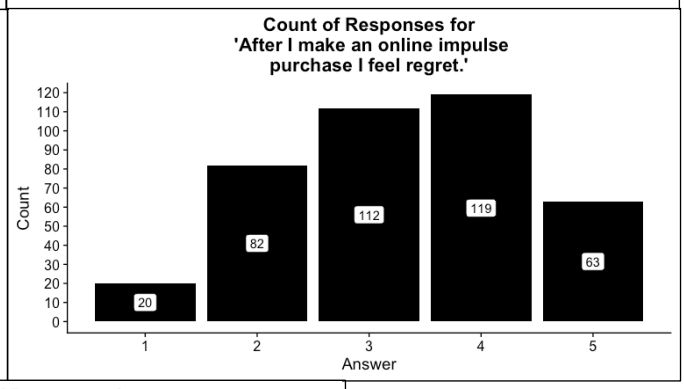


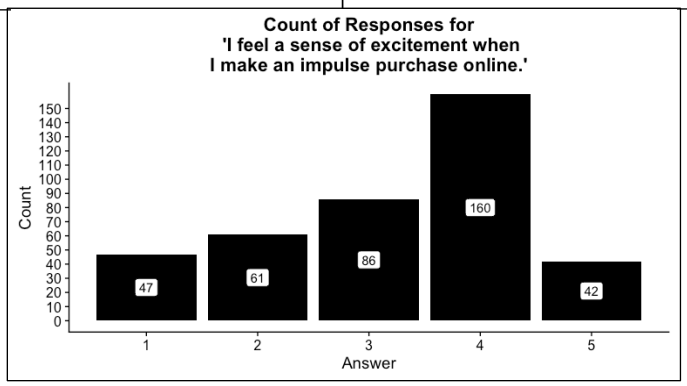
About half of the useable responses had weekly disposable incomes of less than $50, while only 6% of useable responses had weekly disposable incomes of more than $200. This shows that Dartmouth College students are on a relatively tight budget, and thus impulsive spending likely reduces the amount of disposable income that goes toward investments.

7.2 Impulse Buying Behavior Questions









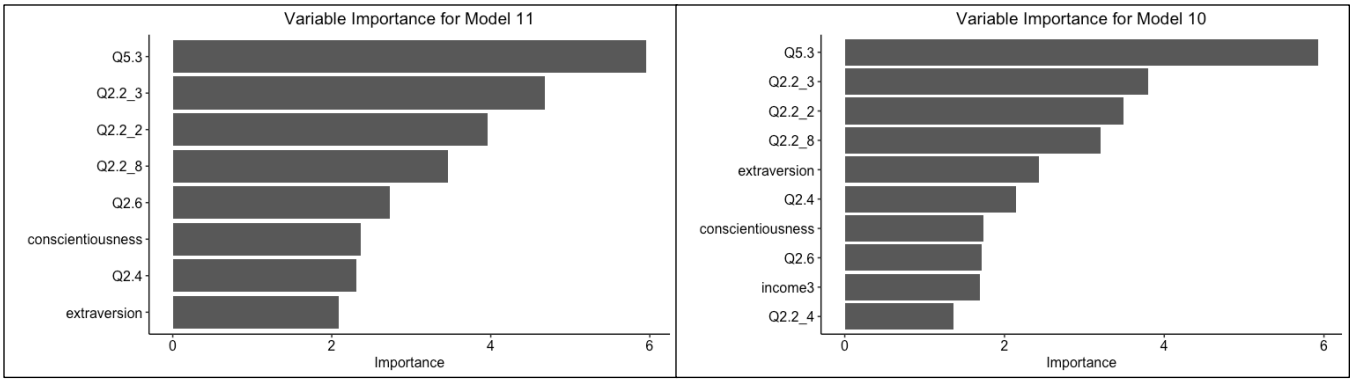
8 Results

8.1 Regression Output

Table 1:

	Dependent variable:										
	impulse_buy_score										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
extraversion		0.133***	0.153***	0.136***	0.128***	0.155***	0.151***	0.143***	0.142***	0.118**	0.099**
		(0.051)	(0.049)	(0.049)	(0.049)	(0.050)	(0.050)	(0.048)	(0.048)	(0.048)	(0.046)
agreeableness		0.013	−0.026	0.004	−0.0001	0.002	0.004	−0.019	−0.014	−0.010	
		(0.058)	(0.056)	(0.056)	(0.056)	(0.056)	(0.055)	(0.054)	(0.054)	(0.053)	
conscientiousness		−0.063	−0.099*	−0.097*	−0.096*	−0.091*	−0.093*	−0.091*	−0.090*	−0.083*	−0.103**
		(0.053)	(0.051)	(0.050)	(0.050)	(0.050)	(0.049)	(0.048)	(0.048)	(0.048)	(0.045)
neg_emotionality		0.130***	0.081*	0.081*	0.079*	0.083*	0.067	0.058	0.058	0.050	
		(0.046)	(0.045)	(0.045)	(0.045)	(0.044)	(0.044)	(0.043)	(0.043)	(0.043)	
open_mindedness		−0.074	−0.078	−0.065	−0.070	−0.059	−0.048	−0.051	−0.056	−0.038	
		(0.058)	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)	(0.053)	(0.053)	(0.053)	
Q5.3			0.481***	0.494***	0.496***	0.485***	0.482***	0.410***	0.426***	0.438***	0.432***
			(0.076)	(0.075)	(0.075)	(0.075)	(0.074)	(0.074)	(0.075)	(0.074)	(0.072)
income2				0.115	0.097	0.111	0.093	0.052	0.057	0.046	0.036
				(0.086)	(0.086)	(0.086)	(0.086)	(0.084)	(0.084)	(0.083)	(0.082)
income3				0.270**	0.215**	0.232**	0.196*	0.189*	0.186*	0.177*	0.185*
				(0.104)	(0.109)	(0.109)	(0.108)	(0.106)	(0.106)	(0.104)	(0.104)
income4				0.424***	0.281	0.288	0.192	0.199	0.209	0.161	0.159
				(0.159)	(0.179)	(0.178)	(0.180)	(0.175)	(0.175)	(0.174)	(0.171)
Q2.6					0.001*	0.001**	0.001**	0.001*	0.001*	0.001*	0.001*
					(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Q2.4						0.071**	0.075**	0.067**	0.062*	0.069**	0.075**
						(0.033)	(0.033)	(0.032)	(0.032)	(0.032)	(0.031)
Q2.2_2							−0.149***	−0.194***	−0.199***	−0.184***	−0.188***
							(0.053)	(0.053)	(0.053)	(0.053)	(0.052)
Q2.2_3								0.168***	0.149***	0.147***	0.167***
								(0.036)	(0.039)	(0.039)	(0.036)
Q2.2_4									0.044	0.045	
									(0.034)	(0.033)	
Q2.2_8										0.096***	0.100***
										(0.030)	(0.030)
Constant	2.789***	2.431***	2.020***	1.792***	1.845***	1.606***	2.321***	2.182***	2.102***	1.730***	1.913***
	(0.039)	(0.409)	(0.396)	(0.400)	(0.400)	(0.414)	(0.484)	(0.473)	(0.476)	(0.484)	(0.357)
Observations	396	396	396	396	396	396	396	396	396	396	396
Log Likelihood	−457.265	−449.518	−429.979	−423.956	−422.454	−420.120	−416.153	−405.335	−404.435	−399.174	−401.144
Akaike Inf. Crit.	916.530	911.035	873.958	867.913	866.907	864.239	858.305	838.671	838.870	830.347	826.288
Note:											*p<0.1; **p<0.05; ***p<0.01

Note: See Survey in the Survey section of the appendix for each question's description in the table above.



The coefficients in a multivariable linear regression model represent the amount of change that can be attributed to a unit change in the independent variable while holding all other variables constant. Therefore, the coefficients in Table 1 represent the amount of change that can be attributed to each variable, holding all other variables constant, in the impulse buying score which was scored on a 5-point Likert scale. It is important to note that for each model, deviance residuals of the model appear to be normally distributed with a mean around 0, indicating linear regression is a good fit for the data. Looking at the Log Likelihood and AIC coefficients of each model, as I added more variables to each model, the model became more accurate. Therefore, I will focus on model 10, which has all variables included and is the most comprehensive model.

Model 10 had an R^2 value of 0.2542 and an adjusted R^2 value of 0.2248, meaning model 10 explains 25.4% of the variability in our independent variable, impulse buy score. Model 10 had the highest R^2 value, while model 11 had the highest adjusted R^2 value. Model 11 had an R^2 value of 0.2468 and an adjusted R^2 value of 0.2252, meaning model 11 explains 24.7% of the variability in our independent variable, impulse buy score.

In terms of demographic factors, gender was the most important and statistically significant variable contributing to impulse buy score. In terms of external factors, the discount of an item on a particular website was the most important and statistically significant variable contributing to impulse buy score. In terms of internal factors, extraversion was the most important and statistically significant variable contributing to impulse buy score.

I will first look at demographic variables, then external variables, then internal variables.

8.2 Demographic Variables

The most notable variable across models was Q5.3, which represents gender. For question 5.3, males were coded as "1", while females were coded as "2". Therefore, in model 10, being a female account for a higher impulse buy score by 0.433-points, meaning on average, females had an 8.66% higher impulse buy score compared to men, holding all other variables constant (0.433/5 = 0.0866). This variable had a p-value <0.01 for each model it was included in and was also ranked #1 in variable importance in model 10.

Q2.4 had a counterintuitive result. Q2.4 asked whether respondents were on financial aid or not. "No" was coded as 0, "Yes, <50% financial aid" was coded as 1, "Yes, 50-<100% financial aid" was

coded as 2, and "Yes, 100% financial aid" was coded as 3. Therefore, the coefficient for Q2.4, 0.065, means that for each financial aid grouping increase was associated with a 0.065-point increase in impulse buy score. This also means that students with more financial aid had higher impulse buying scores holding all other variables constant. This variable had a p-value < 0.05 for models 10 and 11.

Weekly disposable income had unpredicted results. Income was divided into four groups. Group 1 was 0- <=$50 of weekly disposable income, group 2 was <$50- <=$100, group 3 was <$100 - <=$200, and group 4 was >$200. Surprisingly, only disposable income group had significantly significant coefficients, and even so they were weakly significant with a p-value between 0.05 – 0.1. Being in income group 3 resulted in a 0.177-point higher impulse buy score, meaning that compared to individuals who had less than $50 of weekly disposable income, individuals with weekly disposable incomes in the $100 to $200 range had an average impulse buy score 0.177 points higher. Disposable income groups 2 and 4 did not have significantly different impulse buy scores that group 1 which seem counterintuitive as well.

Q2.6 represented weekly allowance amounts. This was a continuous variable with a range of $0 - $500. In model 10, this variable was weakly significant with a p-value of 0.088, and a p-value of 0.08 in model 11. In both models, a $1 increase in allowance was associated with a 0.001-point increase in impulse buy score. This also means that students with $100 allowance per week had an impulse buy score 0.1 points higher than students with no allowance.

8.3 External Variables

The second most notable variable was Q2.2_3, which represents the discount of an item on a given website. In model 10, Q2.2_3 had a coefficient of 0.147, meaning that for every 1-point increase in a respondents' view on the importance of the discount of an item on a particular website was associated with a 0.147-point increase in impulse buy score. This variable had a p-value <0.01 for each model it was included in and was the second most important variable in models 10 and 11.

Q2.2_2, which represents the cost of an item, was also an important variable in all models it was included in. In model 10, Q2.2_2 had a coefficient of -0.197, meaning that for every 1-point increase in a respondents' view on the importance of the cost of an item was associated with a 0.197-point decrease in impulse buy score. This variable had a p-value <0.01 for each model it was included in and was the third most important variable in models 10 and 11.

The importance of Q2.2_8 helps the theory of social desirability bias. Q2.2_8 represents the importance of whether an item is a "brand name", such as Apple or Nike. This variable was ranked as being the fourth most important variable in both models 10 and 11. A 1-point increase in Q2.2_8 was associated with a 0.098-point increase in impulse buy score. Q2.2_8 had a p-value <0.01 in models 10 and 11.

Q2.2_4, representing the discount of the item on a particular website compared to other websites was not statistically significant. This suggests that when individuals are buying items online, it is rare that they check other websites for price differences.

8.4 Internal Variables

Of the five personality trait variables included in model 10, only extraversion and consciousness were statistically significant. Agreeableness, negative emotionality, and open-mindedness had p-values nowhere near 0.1, meaning that they did not come even close to being statistically significant.

Extraversion was the personality trait that was the most important personality variable in model 10 and was significant with a p-value of 0.015. The coefficient for extraversion was 0.118, meaning that every 1-point increase in extraversion was associated with a 0.118-point increase in impulse buy score. This may also help the social desirability bias as those who like to be social accepted by being extraverted also tend to be influenced by others around them when purchasing items.

Consciousness had a p-value of 0.082 in model 10, and had a coefficient of -0.083, meaning that every 1-point increase in consciousness was associated with a 0.083-point decrease in impulse buy score. This makes logical sense as people who are more conscious of their actions are less likely to act on impulse.

9 Conclusion

In conclusion, the most important variables in determining a person's impulsive buying behaviors in decreasing order were gender, importance of the discount of an item on a particular website, the importance of the cost of an item, the importance of whether an item was from a "brand name", the weekly allowance of the student, their extraversion score, their weekly disposable income, and their consciousness score.

This suggests that student females should be especially aware of their impulsive buying behaviors, and for businesses, targeting females with time-sensitive advertisements may increase their sales relating to impulse purchasing. The cost and discount of an item are very important as well. If a student tends to be very extraverted and often influenced by others, they should try to be especially conscious of their buying behaviors as to not over-spend.

H1, College students that are more extroverted and open-minded will have a higher impulse-buying behavior score, was partially supported, as more extroverted students had a higher impulse buy score but open-mindedness was not statistically significant.

H2, College students that are more conscientious will have a lower impulse-buying behavior score, was supported, as students that were more conscientious had a lower impulse buy score.

H3, College students that have more negative emotionality will tend to use impulse purchasing to improve their mood (Q2.1_1), will have more difficulty controlling the urge to spend when seeing a good offer online (Q2.1_4), and will have more internal conflict after making impulse purchases (Q2.1_3), was not supported as negative emotionality was not statistically significant.

H4, Women will have a higher impulse-buying behavior score than men, was supported as gender was the most important variable in the regression analysis, and females had a 0.433-point higher impulse buy score than men.

10 Limitations and Error

There are multiple limitations of this survey, including self-selection bias, social desirability bias, lack of a comprehensive scale to capture the complexity of personality traits and purchasing behavior, reliance on email for distribution, and high response exclusion rate.

First, self-selection bias likely occurred, whereby only students who are interested and motivated completed the survey, as there were no negative repercussions of not starting, completing, or accurately answering the survey. Considering the survey had a total of 52 questions and had an average response time of 5 minutes and 49 seconds excluding outliers, this survey may have been too long for most students. Also, this survey was sent out right at the beginning of reading period before finals and was only open during reading period and finals period, so most students were very busy with their own work, meaning students that had a lighter finals period in terms of amount of work were more likely to take this survey. This self-selection bias may lead to a non-representative sample where the respondents are not reflective of the entire Dartmouth College student body.

Second, the use of a self-reported survey on personality traits and purchasing behaviors taken in an uncontrolled environment may result in social desirability bias, where participants may unintentionally or intentionally answer the survey in a way that they believe is socially desirable or acceptable, rather than answering honestly and accurately. This may be emphasized even more if groups of students took the survey together, as Li & Chen (2018) showed that college students are highly influenced by others around them.

Third, using a 5-point Likert scale to assess personality traits and buying behaviors may not capture the complexity of each variable. A person's beliefs about their own personality are complex and constantly changing and often extremely difficult to pinpoint the correct choice on a 5-point Likert scale. Purchasing behaviors are complex as well and are influenced by many things including situational cues, cognitive processes, and emotions. This survey did not provide context for the impulsive buying behavior questions, leaving the situation up to the imagination of the respondent.

Fourth, relying solely on email distribution may result in a lower response rate, as many students do not check their email often, and are often barraged with many emails all day. The timing of when the survey was sent out and open, as discussed earlier, also may cause even lower response rates with sole reliance on email distribution, as students check their email even less during reading and finals period.

Lastly, while there were 547 responses, only 396 responses were usable. Useable responses were responses that answered all questions, did not have extreme outlier answers, and were not duplicate responses. The exclusion of 151 responses (27.6% of all responses) is high and may suggest that students were trying to take this survey multiple times, were trying to enter unrealistic responses, or did not want to answer all questions in the survey. This may have led to lower accuracy and reflectiveness of the entire Dartmouth College student body.

11 References

Cannon, J. S., Kilburn, M. R., Karoly, L. A., Mattox, T., Muchow, A. N., & Buenaventura, M. (2018). Investing Early. *Rand Health Quarterly*, *7*(4), 6.

Eri, Y., Aminul Islam, Md., & Ku Daud, K. A. (2011). Factors that Influence Customers' Buying Intention on Shopping Online. *International Journal of Marketing Studies*, *3*(1), p128. https://doi.org/10.5539/ijms.v3n1p128

Goel, P., Parayitam, S., Sharma, A., Rana, N. P., & Dwivedi, Y. K. (2022). A moderated mediation model for e-impulse buying tendency, customer satisfaction and intention to continue e-shopping. *Journal of Business Research*, *142*, 1–16. https://doi.org/10.1016/j.jbusres.2021.12.041

Hruska, J., & Maresova, P. (2020). Use of Social Media Platforms among Adults in the United States—Behavior on Social Media. *Societies*, *10*(1), Article 1. https://doi.org/10.3390/soc10010027

Iconaru, C. (2013). The Moderating Role of Perceived Self-efficacy in the Context of Online Buying Adoption. *BRAND. Broad Research in Accounting, Negotiation, and Distribution*, *4*(1), Article 1.

Jeffrey, S. A., & Hodge, R. (2007). Factors influencing impulse buying during an online purchase. *Electronic Commerce Research*, *7*(3–4), 367–379. https://doi.org/10.1007/s10660-007-9011-8

Jeffrey, S., & Hodge, R. (2007, November). *(PDF) Factors influencing impulse buying during an online purchase*. ResearchGate. https://www.researchgate.net/publication/220480760_Factors_influencing_impulse_buying_during_an_online_purchase

Khatri, J., Marín-Morales, J., Moghaddasi, M., Guixeres, J., Giglioli, I. A. C., & Alcañiz, M. (2022). Recognizing Personality Traits Using Consumer Behavior Patterns in a Virtual Retail Store. *Frontiers in Psychology*, *13*. https://www.frontiersin.org/articles/10.3389/fpsyg.2022.752073

Kim, J. (2003). *COLLEGE STUDENTS' APPAREL IMPULSE BUYING BEHAVIORS IN RELATION TO VISUAL MERCHANDISING*.

LaRose, R. (2001). On the Negative Effects of E-Commerce: A Sociocognitive Exploration of Unregulated on-line Buying. *Journal of Computer-Mediated Communication*, *6*(3), JCMC631. https://doi.org/10.1111/j.1083-6101.2001.tb00120.x

Li, J., & Chen, F. (2018). *Analysis of College students' consumption behavior based on Virtual variable regression*. *04*(03).

Loiacono, E., Watson, R., & Goodhue, D. (2002, January). *(PDF) WebQual^{TM}: A Measure of Web Site Quality*. ResearchGate. https://www.researchgate.net/publication/248412208_WebQual_A_Measure_of_Web_Site_Quality

Psychological tests. Online assessment. (n.d.). Retrieved January 30, 2023, from https://psytests.org/en.html

Rook, D. W., & Fisher, R. J. (1995). Normative Influences on Impulsive Buying Behavior. *Journal of Consumer Research*, *22*(3), 305–313. https://doi.org/10.1086/209452

Schulreich, S., Gerhardt, H., Meshi, D., & Heekeren, H. R. (2020). Fear-induced increases in loss aversion are linked to increased neural negative-value coding. *Social Cognitive and Affective Neuroscience*, *15*(6), 661–670. https://doi.org/10.1093/scan/nsaa091

Soto, C. J., & John, O. P. (2017). Short and extra-short forms of the Big Five Inventory–2: The BFI-2-S and BFI-2-XS. *Journal of Research in Personality*, *68*, 69–81. https://doi.org/10.1016/j.jrp.2017.02.004

Turkyilmaz, C. A., Erdem, S., & Uslu, A. (2015). The Effects of Personality Traits and Website Quality on Online Impulse Buying. *Procedia - Social and Behavioral Sciences*, *175*, 98–105. https://doi.org/10.1016/j.sbspro.2015.01.1179

Ventola, C. L. (2014). Social Media and Health Care Professionals: Benefits, Risks, and Best Practices. *Pharmacy and Therapeutics*, *39*(7), 491–520.

Wang, Y., Wang, Q.-W., Tao, Y.-Y., & Xie, W.-W. (2021). Empirical Study of Consumption Behavior of College Students under the Influence of Internet-based Financing Services. *Procedia Computer Science*, *187*, 152–157. https://doi.org/10.1016/j.procs.2021.04.046

12 Appendix

12.1 GitHub, Replication Files, and Survey Raw Data

Go to: https://github.com/amcb02/cogs_50.08/tree/main to download all data, replication files, and other information related to this project.

12.2 Survey

Start of Block: Intro

Q1.1 Thank you for agreeing to participate in my survey! This survey will ask you about yourself and your purchasing behaviors. All answers are anonymous. Please answer each question to the best of your ability, and please pay attention to the directions for inputting your answers.

Q46 If you would like an email with your results, provide your email below.

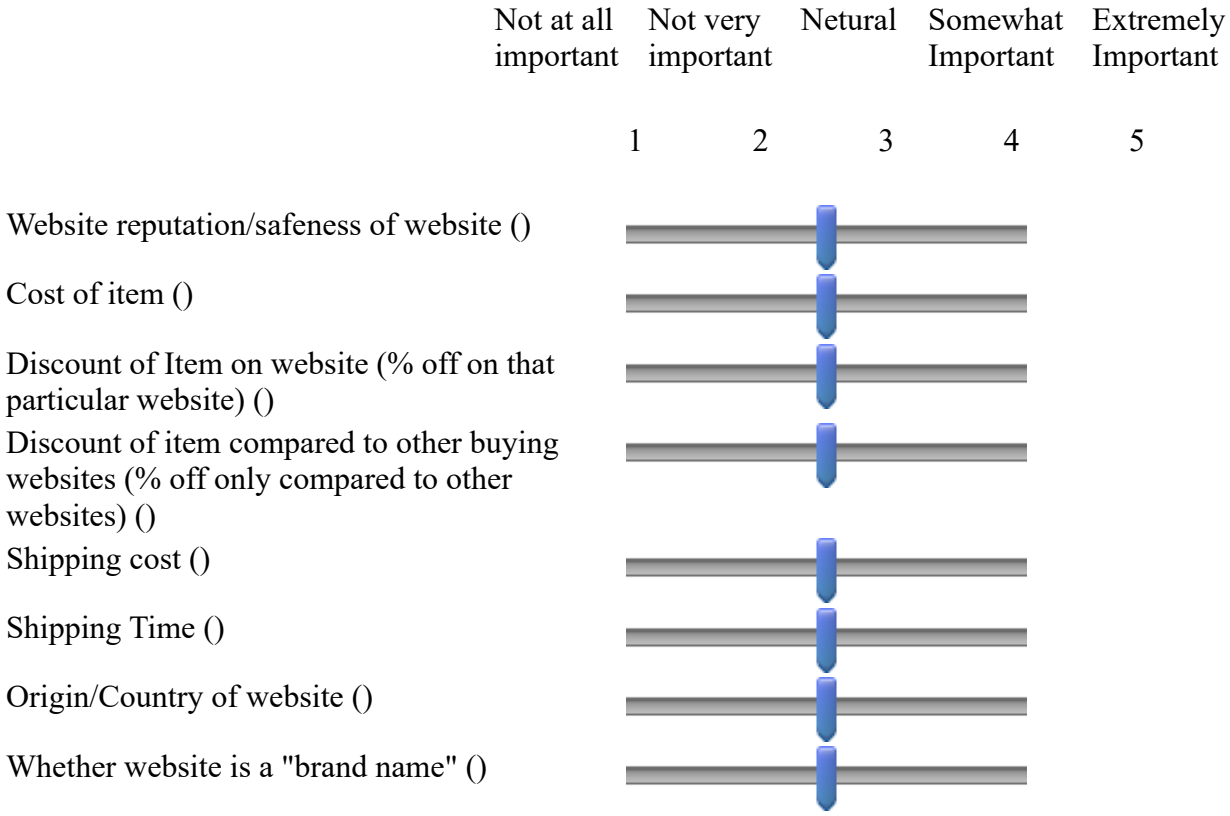
_____

End of Block: Intro

Q2.1 Respond to each statement below depending on how you relate to it.

	Strongly Disagree	Disagree	Neutral	Agree	Agree Strongly
	1	2	3	4	5
I go online shopping to change my mood or take my mind off of other things. ()					
I feel a sense of excitement when I make an impulse purchase online. ()					
After I make an online impulse purchase I feel regret. ()					
I have difficulty controlling my urge to buy when I see a good offer online. ()					
When I see a good deal online, I tend to buy more than that I intended to buy. ()					

Q2.2 Rank the importance of each quality of items bought online



Q2.3 Approximately how much disposable income do you typically have available to spend per week while at Dartmouth? (This doesn't include tuition, meal plan, fraternity/sorority dues, etc)

Only respond with a numerical value, do not use the "$" symbol or any letters or words.

Q2.5 Are you given an allowance by your parents or legal guardian?
Yes (1)
No (0)
Prefer not to answer (99)

Q2.6 Approximately how much of an allowance are you given per week at Dartmouth?
(Please only type in a number. Do not use the "$" symbol or any words.)
(If allowance is monthly, divide that amount by 4.)

Q2.4 Are you on financial aid?
Yes, 100% financial aid (3)
Yes, 50-<100% financial aid (2)
Yes, <50$ financial aid (1)
No (0)

Prefer not to answer (99)

End of Block: Impulse Buying Survey

Start of Block: Block 4

Q3.1 Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Indicate the extent to which you agree or disagree with that statement on a scale of 1 to 5, with 1 being "disagree strongly", and 5 being "agree strongly".

End of Block: Block 4

Start of Block: BFI-2-S

Q4.1 Tends to be quiet. (In social situations)
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.2 Is compassionate, has a soft heart.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.3 Tends to be disorganized.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (5)

Q4.4 Worries a lot.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)

5: Agree Strongly (5)

Q4.5 Is fascinated by art, music, or literature.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.6 Is dominant, acts as a leader.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.7 Is sometimes rude to others.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.8 Has difficulty getting started on tasks.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.9 Tends to feel depressed, blue.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.10 Has little interest in abstract ideas.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)

4: Agree A Little (2)
5: Agree Strongly (1)

Q4.11 Is full of energy.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.12 Assumes the best about people.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.13 Is reliable, can always be counted on.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.14 Is emotionally stable, not easily upset.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.15 Is original, comes up with new ideas.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.16 Is outgoing, sociable.
1: Disagree Strongly (1)
2: Disagree A Little (2)

3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.17 Can be cold and uncaring.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.18 Keeps things neat and tidy.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.19 Is relaxed, handles stress well.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.20 Has few artistic interests.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.21 Prefers to have others take charge.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.22 Is respectful, treats others with respect.
1: Disagree Strongly (1)

2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.23 Is persistent, works until the task is finished.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.24 Feels secure, comfortable with self.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.25 Is complex, a deep thinker.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.26 Is less active than other people.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.27 Tends to find fault with others.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.28 Can be somewhat careless.

1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

Q4.29 Is temperamental, gets emotional easily.
1: Disagree Strongly (1)
2: Disagree A Little (2)
3: Neutral; No Opinon (3)
4: Agree A Little (4)
5: Agree Strongly (5)

Q4.30 Has little creativity.
1: Disagree Strongly (5)
2: Disagree A Little (4)
3: Neutral; No Opinon (3)
4: Agree A Little (2)
5: Agree Strongly (1)

End of Block: BFI-2-S

Start of Block: Demographics

Q5.1 What class year are you?
2022 or Older (2022)
2023 (2023)
2024 (2024)
2025 (2025)
2026 (2026)
Grad Student (2021)

Q5.2 What is your age?
Under 18 (17)
18 (18)
19 (19)
20 (20)
21 (21)
22 (22)
23 (23)
24 or older (24)

Q5.3 What is your gender?
Male (1)
Female (2)
Other (99)

Q5.4 Are you of Hispanic, Latino, or Spanish origin?
Yes (1)
No (0)

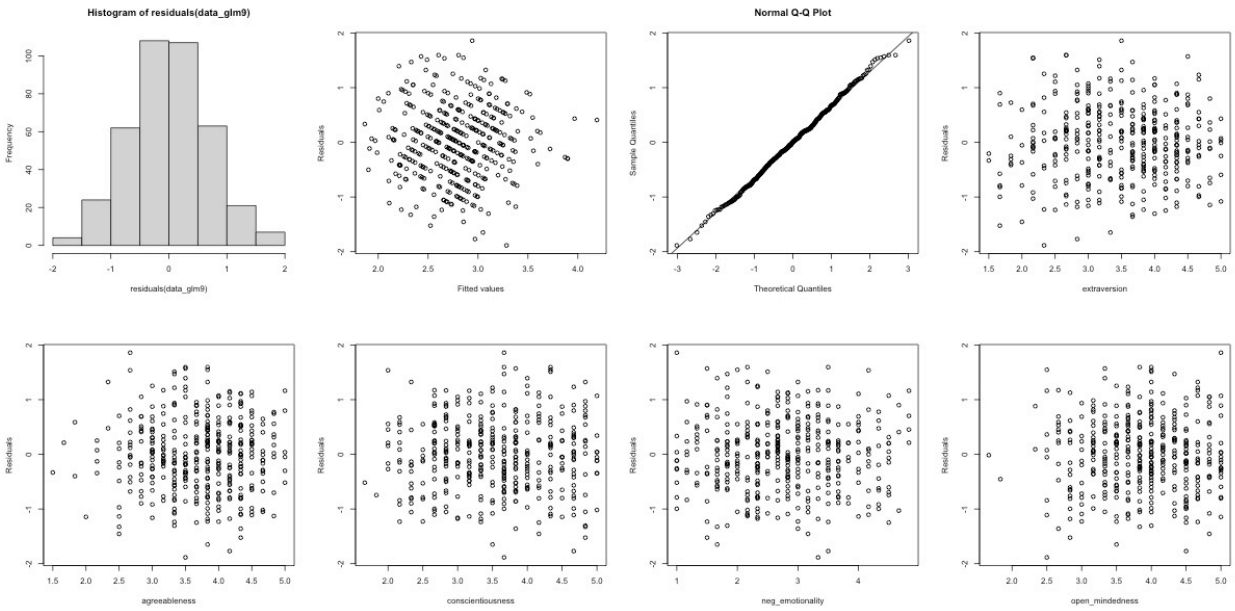
Q5.5 How would you describe yourself? Please select all that apply.
White (1)
Black or African American (2)
American Indian or Alaska Native (3)
Asian (4)
Native Hawaiian or Pacific Islander (5)
Other (6) _____

Q5.6 What is your current employment status?
Employed full time by Dartmouth (40 or more hours per week) (1)
Employed full time NOT by Dartmouth (40 or more hours per week) (2)
Employed part time by Dartmouth (20 to 39 hours per week) (3)
Employed full time NOT by Dartmouth (20 to 39 hours per week) (4)
Employed part time by Dartmouth (less than 20 hours per week) (5)
Employed part time NOT by Dartmouth (less than 20 hours per week) (6)
Unemployed and currently looking for work (7)
Unemployed and not currently looking for work (8)

End of Block: Demographics

Start of Block: Block 5

12.3 Linear Regression Test Results



12.4 Personality Trait Descriptions (*Psychological Tests. Online Assessment*, n.d.)

Extraversion

High scorers tend to be talkative and energetic. They like being around people, and are comfortable asserting themselves in a group. High scorers tend to have more friends and dating partners, and are seen as more popular. They generally prefer, and are successful in, social and enterprising occupations. They are more likely to serve in community leadership roles, and to do volunteer work. They tend to prefer energetic music such as hip-hop, rock, and heavy metal, exercise more frequently, and are more likely to play a sport. They experience more frequent positive emotions, and react more strongly to positive events. Women tend to score higher than men.

Low scorers tend to be socially and emotionally reserved. They generally prefer to be alone or with a few close friends, and keep their opinions and feelings to themselves. Low scorers tend to pursue, and do better in, jobs that involve independent work rather than social interaction. They are less likely to engage in thrill-seeking or risky behaviors, such as smoking, alcohol consumption, and risky sexual activity.

Agreeableness

High scorers tend to be considerate and polite in social interactions, and enjoy cooperating. They find it easy to trust people, and feel compassion for those in need. High scorers tend to be well liked by their peers, and establish satisfying and stable close relationships. They generally prefer, and do better in, social occupations. They are more likely to be religious, to serve in community leadership roles, and to do volunteer work. They tend to prefer pop, country, and religious music. Women tend to score higher than men, and older adults tend to score higher than younger adults.

Low scorers express themselves directly and bluntly, even at the risk of starting an argument. They enjoy competition, and tend to be skeptical of other people's intentions. Low scorers tend to earn higher salaries, and are more likely to engage in some risky behaviors, such as smoking and aggressive driving.

Conscientiousness

High scorers tend to be organized and responsible. They work hard to achieve their goals, and see tasks through to completion. High scorers tend to earn higher grades in school, and perform better in many occupations. They are more likely to be religious and hold conservative political attitudes. They tend to exercise more, have better physical health, and live longer. Women tend to score higher than men, and older adults tend to score higher than younger adults.

Low scorers tend to act spontaneously rather than making plans, and find it easier to look at the big picture than pay attention to details. They prefer to jump between tasks, instead of finishing one at a time. Low scorers are more likely to hold liberal political attitudes. They tend to engage in more risky behaviors, such as smoking, alcohol consumption, drug use, and risky sexual activity.

Negative Emotionality

High scorers tend to be emotionally sensitive, and have up-and-down mood swings. They experience more frequent negative emotions, and react more strongly to negative events. Women tend to score higher than men, and younger adults tend to score higher than older adults.

Low scorers tend to be emotionally stable and resilient. They usually stay calm, even in stressful situations, and can quickly bounce back from negative events. Low scorers tend to feel a greater sense of well-being.

Open-Mindedness

High scorers are generally open to new activities and new ideas. They tend to be creative, intellectually curious, and sensitive to art and beauty. High scorers tend to prefer, and do better in, scientific and artistic occupations. They are more likely to hold liberal political attitudes, prefer classical, jazz, blues, and rock music, and engage in drug use.

Low scorers tend to be traditional, down-to-earth, and stick with tried-and-true ways of doing things. They prefer the familiar over the new, and the concrete over the abstract. Low scorers tend to prefer, and do better in, conventional and practical occupations. They are more likely to hold conservative political attitudes.