

**Perceptions of Online Learning: Relationships with Personality, Learning Strategies,  
Adaptability, and Academic Performance**

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### **Abstract**

During the spring of 2020, the abrupt transition to online learning required by the COVID-19 pandemic led to overwhelmingly negative perceptions of online learning amongst students. Today the world has adjusted to a 'new normal' given COVID-19 vaccination options, yet many university courses are still taught online. The purpose of the present study was to: (1) determine students' current perceptions of online learning, given that they have now had almost two years of experience with the online learning environment, (2) examine the differences between students who prefer learning online, students who prefer learning in-person, and students who have no preference, and (3) to discover which variables of interest would predict perceptions of online learning and academic performance. A total of 143 university students completed an online questionnaire assessing perceptions of online learning, personality traits, learning strategies, (pandemic) adaptability and academic performance. The results revealed that perception of online learning was significantly, positively related to adaptability, computer skills, openness, extraversion, self-efficacy, intrinsic value, cognitive strategy use and self-regulation, and significantly, negatively related to neuroticism. In addition, students who preferred learning online had significantly higher perceptions of online learning, academic self-efficacy, and adaptability scores, whereas students who had no preference had significantly lower openness scores. Perception of online learning was predicted by adaptability, self-regulation, and intrinsic value of learning. The only predictor of academic performance was self-regulation while learning. These results imply that (pandemic) adaptability is perhaps the most important factor determining students' perceptions of online learning at this point in time. Since the majority of students reported positive perceptions of online learning, this suggests that most students have coped well with the pandemic and have made the most out of their online learning experience.

## **Perceptions of Online Learning: Relationships with Personality, Learning Strategies, Adaptability, and Academic Performance**

In 2020, the COVID-19 pandemic implemented a range of public health measures that altered all aspects of life, including education. Seemingly overnight, students and teachers transitioned from in-person classes to online learning. With no time to prepare, it is unsurprising that during the subsequent academic year perceptions of online learning were overwhelmingly negative (Garris & Fleck, 2020). This year the world is adjusting to a ‘new normal’ given COVID-19 vaccination options, yet many university courses are still being taught online. Today, students have had almost two years of experience with the online learning environment and so their perceptions of online learning may have changed. The purpose of this study was to determine students’ current perceptions of online learning. Specifically, this study was designed to examine how personality traits, learning strategies, (pandemic) adaptability, and academic performance relate to perceptions of online learning.

### **Personality, Learning & Adaptability: Research Prior to the Pandemic**

Personality refers to individual differences in the way we think, feel, and behave (Vedel & Poropat, 2017). According to Horwood, et al. (2019), most researchers agree that personality can be measured using the ‘Big Five’. This five-factor model includes: openness to experience (i.e., imaginative, witty, original, artistic), conscientiousness (i.e., cautious, dependable, persevering, organized, responsible), extroversion (i.e., energetic, enthusiastic, dominant, sociable, talkative), agreeableness (i.e., friendly, cooperative, trusting, and warm), and neuroticism (i.e., nervous, high-strung, tense, volatile, moody, worrying) (McCrae & Costa, 1987).

Due to individual differences, every student learns differently. Bidjerano and Dai (2007) conducted a study that examined the relationships between the Big Five personality traits, the use of self-regulated learning strategies (i.e., rehearsal, organization, elaboration, critical thinking, metacognition, effort regulation, time and environment management, help seeking, and peer learning), and academic achievement. From a sample of undergraduates, the results revealed that individuals high in conscientiousness reported more critical thinking, metacognition, effort regulation, time management, and elaboration. Individuals high in agreeableness reported more time management and effort regulation, whereas individuals high in extraversion reported more help seeking and rehearsal. Furthermore, academic achievement was positively related to agreeableness, conscientiousness, metacognition, elaboration, critical thinking, time management, and effort regulation, and negatively related to neuroticism, rehearsal, and peer learning. Bidjerano and Dai (2007) concluded that personality traits correlate with learning strategies and learning outcomes. Different personalities prefer different learning strategies.

In a similar study, Komarraju, et al. (2011) questioned whether preferred learning strategies (i.e., synthesis-analysis, elaborative processing, fact retention, and methodical study) were related to personality and academic achievement. A total of 308 undergraduate college students completed measures of the Big Five personality traits, learning strategies, and reported their current grade point average (GPA). The authors found that agreeableness and conscientiousness were positively related to all learning strategies, whereas neuroticism was negatively related to all learning strategies. Furthermore, openness, agreeableness, conscientiousness, and all learning strategies were positively correlated with GPA. Komarraju, et al. (2011) concluded that there is a dynamic relationship between personality, preferred learning strategies, and academic achievement. From these two studies, it is clear that personality and

how students learn are related to each other and to academic performance. The question is whether the transition from in-person to online learning may have affected the relationships between these variables.

Prior to the pandemic, students were able to choose whether they wanted to take a class in-person or online based on preference. Personality traits play a role in our preferences, for example whether you prefer to spend time with others or alone is related to a tendency to be extraverted or introverted. This relationship between personality and preference carries over into the learning environment. To determine why students preferred learning online or in-person, Harrington and Loffredo (2010) examined personality traits and variables such as convenience, enjoyment of technology, and expectation of enhanced learning. A total of 166 university students were surveyed, all of whom had previously taken both online and in-person classes. The authors found that the majority of students who scored high on introversion preferred learning online, whereas the majority of students who scored high on extraversion preferred learning in-person. The authors reasoned that students who reported greater introversion preferred learning online due to their desire to work alone and their inward focus, and students who reported greater extraversion preferred learning in-person due to their desire for social contact and their outward focus. Furthermore, students indicated that they preferred learning online because of convenience, the enjoyment of computer technology, and a desire for innovation. Students indicated that they preferred learning in-person because the class structure appealed to their need to learn through listening and their desire to better gauge the emotional reactions of others. Harrington and Loffredo (2010) concluded that personality type plays a significant role in learning format preferences.

Several researchers focused on the relationship between personality and preference for online learning prior to the pandemic. Keller and Karau (2013) and Bhagat, et al. (2019) both measured Big Five personality traits and positive perceptions of online learning using online surveys. The results of these studies revealed that conscientiousness, openness, and agreeableness were all positively correlated with positive perceptions of online learning, while neuroticism was negatively correlated with positive perceptions of online learning (Keller & Karau, 2013; Bhagat, et al., 2019). Contrary to their expectations, neither Keller and Karau (2013) nor Bhagat, et al. (2019) found a significant relationship between extraversion and perceptions of online learning. Both studies concluded that perception of online learning is dictated by personality. These results (Harrington & Loffredo, 2010; Keller & Karau, 2013; Bhagat, et al., 2019) indicate that the Big Five personality traits are related to learning environment preference and satisfaction. When students are not able to choose their preferred learning environment, it is more likely that they will be unsatisfied with their experience.

If personality is related to learning strategies and learning preferences, then it is more than likely related to learning outcomes. The relationship between personality and academic performance has been studied thoroughly and the results consistently show that conscientiousness and openness predict academic outcomes. Nofle and Robins (2007) examined the relationship between the Big Five personality traits and college GPA and Scholastic Aptitude Test (SAT) scores. To increase generalizability, four samples of college students completed four different personality tests and reported their SAT scores and their high school and college GPA. Across all four samples, Nofle and Robins (2007) found that conscientiousness was the strongest predictor of both high school and college GPA. Moreover, conscientiousness predicted college GPA even after controlling for high school GPA and SAT scores. Conscientiousness was

so influential perhaps because it is associated with greater academic effort and perceived academic ability. In addition, openness to experience was the strongest predictor of SAT verbal scores perhaps because it is positively associated with perceived verbal intelligence.

In another study, Poropat (2009) conducted a meta-analysis to determine the relationship between the Big Five personality traits and academic performance. Poropat (2009) found that academic performance was consistently positively correlated with conscientiousness, openness, and agreeableness. He noted that conscientiousness was always the most strongly correlated with academic performance and that the association was largely independent of intelligence. Poropat (2009) concluded that these three personality traits are particularly relevant to academic performance in a typical learning environment, but the question arises how these relationships are affected given the unique learning circumstances created by the pandemic.

When changes occur in our lives, personality traits influence how well we adapt. Schnuck and Handal (2011) investigated the relationship between personality traits and adaption to college in freshmen. They focused specifically on four different areas of adjustment: academic adjustment, personal-emotional adjustment, social adjustment, and attachment to the institution. A total of 190 freshmen completed a self-report questionnaire, the analysis revealed that agreeableness, extraversion, and conscientiousness were positively related to college adaption while neuroticism was negatively related to college adaption. Schnuck and Handal (2011) concluded that how well freshmen adapt to college is related to their ability to tolerate changes, to form social connections, and to stay calm in new situations.

In a different study (Abood, et al., 2020) a group of university students completed measures of personality traits, academic self-efficacy, and academic adaptation. In examining the relationships between these variables, the results revealed that extroversion and openness were

positively related to both academic self-efficacy and academic adaptation, whereas neuroticism and conscientiousness were negatively related to both academic self-efficacy and academic adaptation. Agreeableness was not significantly be related to either. The authors argued that it may be the case that conscientious individuals are very self-disciplined and spend little time engaging in university activities which may hinder their adaptation, whereas agreeable individuals' high tolerance and selflessness is not as influential. Abood, et al. (2020) concluded that high extroversion, high openness, and low neuroticism aid adaptation to university. The COVID-19 pandemic has created unprecedented conditions of isolation. Knowing the relationship between personality traits and adaptability it is safe to assume that some personality traits may be more strongly associated with coping during the pandemic.

#### **Personality, Learning & Adaptability: Research Post-Pandemic**

Last year, the impact of the global pandemic meant that in the academic world there was an unexpected and wholesale shift to online learning. Early into the pandemic, research revealed that perceptions of this change in instruction were overwhelmingly negative. For example, Garris and Fleck (2020) conducted a study to investigate students' perceptions of courses that transitioned from face-to-face to online learning during the COVID-19 pandemic. For this study student participants evaluated their transitioned-online courses on seven dimensions: enjoyment, interest, learning, attention, effort, the presence of cultural content, and course flexibility. The results of an online survey of 435 undergraduate students showed that there was no difference in academic performance between students in fully online courses and students in transitioned-online courses. However, students in transitioned-online courses perceived that they could have learned more given ideal instruction. In general, students reported that the courses became less enjoyable, less interesting, decreased in learning value, facilitated less attention and effort, and

incorporated less cultural content after transitioning online, though they did perceive courses as more flexible to their needs. Importantly, students' evaluations of transitioned-online courses were predicted by a range of factors including their emotional well-being, experience with online instruction, online engagement, self-efficacy, and computer anxiety. This study demonstrates the range of negative perceptions associated with transitioned-online learning, despite the general finding that academic performance was not different from fully online courses.

Torres Martín, et al. (2021) also conducted research at the time of the original transition to online learning due to COVID-19 restrictions. In their study, 398 university students completed an online questionnaire to evaluate teaching methods related to technology for the COVID-19 created virtual learning environment. The authors found that students felt that professors had good knowledge regarding the use of essential technologies for instruction including email, learning platforms, videoconferences, and network tools for collaborative work. But students felt that professors lacked knowledge regarding the use of technologies such as image and video editors, real-time response systems, and tools for anti-plagiarism. Furthermore, students reported low satisfaction with the amount of support given to them by professors and with the amount of organization and course planning done by professors. The results of this study indicate how students felt about the teaching methods used in their transitioned-online courses. It is important to note that these courses were not designed to be taught online and that professors were given a limited amount of time to prepare for the transition.

In a recent study, Prodanović and Gavranović (2021) investigated how satisfied university students were with online teaching and learning during the COVID-19 pandemic. In particular, the authors wished to determine which aspects of the virtual teaching and learning environment students were satisfied with, to what extent, and what areas need to be improved.

After learning online for six months, a total of 87 university students completed an online questionnaire. Prodanović and Gavranović (2021) found that overall students were satisfied with their experience of online teaching and learning, and, in particular, with the teaching-learning dynamics, the availability of needed information, teaching methods, teachers' feedback, the organization and delivery of lectures and tests, and their personal development. The results also showed primarily positive attitudes towards the online learning experience, such that very few students expressed negative attitudes. Although Garris and Fleck's (2020) research from last year showed perceptions of online learning to be overwhelmingly negative, this more recent research indicates that students' perceptions may have improved since online learning is no longer 'new.'

In research prior to the pandemic, the positive relationships between personality traits (particularly conscientiousness and openness) and academic performance were found consistently, but it makes sense that changes in the learning environment due to COVID-19 may have affected these relationships. For example, Yu (2021) conducted a study to identify the relationship between particular personality traits and online learning outcomes during the COVID-19 pandemic. Yu (2021) reasoned that individuals perform better in their preferred environments. For example, individuals scoring higher on extraversion may prefer in-person learning because it fosters interactions with peers and teachers, but the online learning format may actually inhibit their social interactions. Similarly, individuals scoring high on neuroticism, perceiving the online format as inconsistent with typical instructional format, may experience uncertainty and stress. Given these ideas, Yu hypothesized that personality, as well as gender and education level, would be related to online learning outcomes. More specifically, he expected that extraversion and neuroticism would be negatively related to online learning outcomes, and that conscientiousness, agreeableness, and openness would be positively related to online

learning outcomes. The results revealed that postgraduates outperformed undergraduates in online learning, and as expected, conscientiousness, agreeableness, and openness were positively correlated with online learning outcomes and that extraversion was negatively correlated with online learning outcomes. The relationship between personality traits and academic performance appears to be consistent pre and post pandemic, though one should also consider how well students have adapted to the pandemic.

Like any major stressor, it makes sense that individuals' responses to the challenges of COVID-19 will vary. Besser, et al. (2020) conducted a study to document students' adaptability to the sudden transition to online learning during the COVID-19 pandemic. They focused on students' perceptions of the transition, and the impact of individual differences and personality traits on students' perceived adaptability. Besser, et al. (2020) hypothesized that students with greater reported adaptability would respond more positively to online learning, and that adaptability would be significantly related to personality traits and reactions to the pandemic. A total of 1217 college students, all of whom had transitioned to synchronous online learning due to the pandemic, completed an online questionnaire. The results indicated that students' perceptions of online learning were significantly less positive than their perceptions of in-person learning. Students reported feeling more stress, isolation, and negative mood, and less concentration, motivation, relatedness, and positive mood. In addition, conscientiousness, openness, agreeableness, and extraversion were positively related to adaptability and positive perceptions of online learning, whereas neuroticism was negatively related to adaptability and positive perceptions of online learning.

In the fall of 2020, Audet, et al. (2021) conducted a longitudinal study to examine the relationship between the Big Five personality traits and university students' adjustment to online

learning. The authors expected openness to be positively related to adjustment given its relationship with exploring new things and adapting to change. They also expected conscientiousness to be positively related to adjustment given its relevance to academic performance. In contrast, they expected extraversion and neuroticism to be negatively related to adjustment given that the social isolation brought on by the pandemic has been particularly limiting for social interactions and supports. From the results of an online survey of 350 university students in both September and December, Audet, et al. (2021) found that openness and conscientiousness were positively related to adjustment, whereas extraversion and agreeableness were not significantly related to adjustment. The authors concluded that openness may be the most important trait for students' transition or adaptation to online learning given that individuals endorsing this trait will be more likely to be receptive to new ways of learning and take more interest in unfamiliar experiences. Though the results of these studies are inconsistent, it is clear that personality traits are associated with the ability and willingness to adjust to online learning during the pandemic.

### **The Present Study**

In contrast to the spring of 2020, during which students and teachers abruptly transitioned from in-person classes to online learning, this year the world is adjusting to a 'new normal' given COVID-19 vaccination options. Despite this positive shift in circumstances, many university courses were still taught online for the 2021 – 2022 academic year. The purpose of the present study was to determine students' current perceptions of online learning, given that they have now had almost two years of experience with the online learning environment. Specifically, this study was designed to examine how personality traits, learning strategies, (pandemic) adaptability, and academic performance relate to perceptions of online learning at this unique moment in time. In

addition, this study was designed to examine the relationships between these variables to determine if the results remain consistent with research conducted pre- and post-pandemic. Given the inconsistent relationships with learning preferences found pre- and post-pandemic, a second purpose of this study was to examine the differences between students who prefer learning online, compared to those who prefer learning in-person, and students with no learning format preference. A third purpose of this study was to discover which variables of interest (i.e., perception of online learning, personality traits, learning strategies, (pandemic) adaptability, and academic performance) would predict perceptions of online learning and academic performance. Previous research has yet to examine this combination of variables, particularly in the context of university instruction during this stage in the COVID-19 pandemic. Understanding how personality traits, learning strategies, (pandemic) adaptability, and academic performance relate to perceptions of online learning will add to the literature and give us a better understanding of some of the factors that are associated with students' learning environment preferences.

Given the literature conducted pre- and post-pandemic, it is expected that students' perceptions of online learning will be mostly positive given that they now have almost two years of experience with the online learning environment. In addition, a number of students may now prefer learning online.

Based on previous findings surrounding the Big Five personality traits, it is expected that conscientiousness, openness, and agreeableness will be positively related to positive perceptions of online learning, and extraversion and neuroticism will be negatively related to positive perceptions of online learning. Furthermore, this same pattern of results should be associated with learning strategies and academic performance.

Given previous literature on adaptability, it is expected that openness, agreeableness, and extraversion will be positively related to (pandemic) adaptability, and neuroticism will be negatively related to (pandemic) adaptability. Furthermore, adaptability will be positively related to perceptions of online learning.

In addition, perceptions of online learning should be predicted by adaptability, self-regulation, and cognitive strategy use. Whereas academic performance should be predicted by perceptions of online learning, perceived adjustment, self-regulation, cognitive strategy use, and test anxiety.

## **Methods**

### **Participants**

A total of 143 undergraduate students from Brandon University participated in this study. During the winter semester, students were recruited from Introductory Psychology courses and given an incentive of 1% added to their final grade for their participation. In order to participate, students had to be at least 18 years old and enrolled in at least one online course. Overall, participants were approximately 22 years old (Mean=21.5; SD=5.68) and enrolled in approximately 4 online courses (Mean=3.8; SD=1.09) and few in-person courses (Mean=0.5; SD=0.87) during the current semester.

During the previous semester, participants were enrolled in approximately 3 online courses (Mean=3.4; SD=1.25) and approximately 1 in-person course (Mean=0.6; SD=0.89). The majority of participants (67.1%) attended online courses during the previous school year.

The majority of participants (79.7%) were female, (66.4%) were in their first year of university, and (65%) were of Caucasian ethnicity.

## Measures

Perception of online learning was measured using the Perception of Online Courses Scale (POCS) (Huang, 2000). The POCS is a self-report inventory that uses questions on interactions (between learners, instructors, and class materials), structure, autonomy, and social comfort to assess online course perceptions. A total of 27 items are rated using a seven-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree). Higher scores indicate more positive course perceptions. A sample item is “I like to actively participate in group discussions online.” The POCS is a highly reliable measure, for the present study found an internal consistency value of 0.91 was found, consistent with previous research (e.g., 0.98, Huang, 2000).

Personality was measured using the Big Five Inventory (BFI) (John & Srivastava, 1999). The BFI is a self-report inventory that is designed to measure the Big Five personality dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism. A total of 44 items are rated using a five-point Likert scale (1 = Disagree Strongly, 5 = Agree Strongly). Scores arise for all five traits; higher scores indicate higher trait demonstration. A sample item is “I see myself as someone who is talkative.” The BFI is a reliable measure that uses reverse-scoring to interrupt response sets. The present study found internal consistency values of: 0.72 for openness, 0.76 for conscientiousness, 0.85 for extraversion, 0.74 for agreeableness, and 0.82 for neuroticism.

Learning strategies were measured using the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich & DeGroot, 1990). The MSLQ is a self-report inventory that uses five subscales to measure students’ self-regulated learning motivations and strategies. The first three subscales (academic self-efficacy, perceived intrinsic value of learning, and test anxiety) assess participants’ self-regulation strategies. The remaining two subscales (i.e.,

cognitive strategy use and self-regulation) assess students' strategies. A total of 44 items are rated using a seven-point Likert scale (1 = not at all true of me, 7 = very true of me), higher scores reflect greater tendencies to demonstrate the particular self-regulation motive or strategy. A sample item is "I prefer class work that is challenging so I can learn new things." The present study found internal consistency values of: 0.88 for academic self-efficacy, 0.86 for perceived intrinsic value of learning, 0.86 for test anxiety, 0.74 for cognitive strategy use, and 0.69 for self-regulation.

Adaptability was measured using a modified version of the Adaptability Scale (Martin et al., 2012) that was reworded by Besser, et al. (2020) to reflect the COVID-19 pandemic. The Adaptability Scale is a self-report inventory that measures appropriate cognitive, behavioral, and affective adjustment in response to uncertainty and/or novelty (Besser, et al., 2020). A total of 9 items are rated using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree), higher scores indicate greater adjustment. The results provide an overall score of perceived adjustment to the COVID-19 pandemic. A sample item is "I am able to revise the way I think about this situation to help me through it." The Adaptability Scale is a highly reliable measure, for the present study an internal consistency value of 0.83 was found, consistent with previous research (e.g., 0.92, Besser, et al., 2020).

Academic performance was measured using self-reported GPA. Participants were asked to provide their sessional GPA for the semester they had just completed and were reminded that their answer should be a number between 0.00 and 4.30.

Learning preference was measured using one multiple choice question that asked participants to indicate whether they preferred to learn online, in-person, or either.

General computer skills were measured using questions that asked participants to indicate their skills in Microsoft Office (ex. Word, Excel, PowerPoint), course platforms (ex. Moodle, Teams, Top Hat), and the internet.

Participants were asked to report how many online and in-person courses they were enrolled in during the previous and current semesters. Participants were reminded that their answer should be a number.

### **Procedure**

Following ethics approval from the Brandon University Research Ethics Committee (BUREC), Introduction to Psychology professors were contacted via email to request permission to recruit participants from their class. With professor approval, the author presented each class with a brief overview of the present study and informed students of the 1% incentive that would be added to their final grade in Introduction to Psychology if they chose to participate. After recruitment, the consent form and survey link document was posted online for interested students to access. Each class was given a different survey link that presented the measures, listed above, in a different order (apart from demographic information which was always presented first). Participants indicated their consent by clicking the survey link and proceeding to the online measures. After completing all measures, participants were asked to provide their student number in order to receive the 1% incentive. To promote anonymity, participants were not asked to provide their name and the data were analyzed without student numbers attached. On average, participants took 25 minutes to complete all measures. After data collection, IBM SPSS statistical software was used to analyze the data.

## Results

First, subscale scores were determined for each participant for all variables of interest. Then z-scores were calculated and used to identify outliers; any z-scores greater (less) than (-) 3.00 were removed from the data set. After removing the outliers, all variables of interest passed a skewness check and a normality test.

Next, a one-way analysis of variance (ANOVA) was used to determine whether there were any statistically significant differences for the different orders of the measures. The results showed that there were no consistent differences in scores based on the order in which the measures were presented.

Next, basic descriptive statistics were calculated to describe the sample. In general, participants were enrolled in approximately 4 online courses (Mean=3.8; SD=1.09) and no in-person courses (Mean=0.5; SD=0.87) during the current semester. During the previous semester, participants were enrolled in approximately 3 online courses (Mean=3.4; SD=1.25) and approximately 1 in-person course (Mean=0.6; SD=0.89). Participants' learning preferences were divided, 41 participants (28.7%) preferred learning online, 53 participants (37.1%) preferred learning in-person, and 49 participants (34.3%) were fine with either learning format. Using a five-point scale, participants indicated strong computer skills on Microsoft Office (Mean=4.0, SD=0.85), on course platforms (Mean=4.1, SD=0.67), and on the internet (Mean=4.5, SD=0.54). In addition, GPA scores were approximately 3.4 (Mean=3.4, SD=0.62) on a 4.30 scale which is equivalent to a B+ grade. Furthermore, descriptive statistics were calculated to describe the variables of interest (see Table 1).

Next, correlations were calculated to determine the nature of the relationships between the variables of interest across all participants. As indicated in Table 2, many significant

correlations were found; perception of online learning was significantly, positively related to adaptability, computer skills, openness, extraversion, self-efficacy, intrinsic value, cognitive strategy use, and self-regulation, and significantly, negatively related to neuroticism. The correlation between perception of online learning and adaptability was the strongest overall. Moreover, adaptability was significantly, positively related to computer skills, openness, extraversion, agreeableness, self-efficacy, intrinsic value, cognitive strategy use, and self-regulation, and significantly, negatively related to neuroticism. As expected, learning strategies were significantly correlated with personality traits. The strongest positive correlations were found between conscientiousness and self-efficacy, intrinsic value, cognitive strategy use, and self-regulation, and between test anxiety and neuroticism. Whereas, the strongest negative correlations were found between neuroticism and self-efficacy, intrinsic value, cognitive strategy use, and self-regulation, and between test anxiety and conscientiousness. Furthermore, academic performance (i.e., GPA) was found to be positively related to self-regulation and negatively related to test anxiety. Surprisingly, academic performance was not significantly related to perception of online learning, adaptability, nor to any personality traits.

In order to examine the differences between individuals who preferred online learning compared to those who preferred in person or either format, a one-way ANOVA was conducted (see Figure 1). The results showed that there were significant differences in four variables: adaptability ( $p < .05$ ), perception of online learning ( $p < .001$ ), openness ( $p < .05$ ), and self-efficacy ( $p < .05$ ). To find which specific groups differed a multiple-comparison post hoc test was conducted. The post hoc tests revealed that students who preferred learning online had significantly higher adaptability scores, perceptions of online learning, and self-efficacy than students who preferred learning in-person and students who preferred either. In contrast, students

who preferred either learning format had significantly lower openness scores than students who preferred learning online and/or students who preferred learning in-person. The three groups did not differ on academic performance (i.e., GPA).

Next, a hierarchical regression analysis was conducted to determine which variables predicted perception of online learning. On step 1, the variables that were hypothesized to predict perception of online learning (i.e., adaptability, cognitive strategy use, and self-regulation) were entered. On step 2, the additional variables that were found to be significantly related to perception of online learning (i.e., adaptability, cognitive strategy use, self-regulation, self-efficacy, intrinsic value, extraversion, openness, and neuroticism) were entered. As Table 3 indicates, 41.6% of the variance was accounted for on step 1, with adaptability and self-regulation as statistically significant predictors. On step 2, with additional predictors added, 46.9% of the variance was accounted for. With these additions, adaptability remained a significant predictor, intrinsic value became a significant predictor, and self-regulation was no longer a significant predictor. Specifically, this analysis showed that positive perceptions of online learning were predicted by greater adaptability, greater self-regulation, and greater intrinsic value associated with learning.

Finally, a second hierarchical regression analysis was conducted to predict academic performance (i.e., GPA). On step 1, the variables that were hypothesized to predict academic performance (i.e., perception of online learning, adaptability, self-regulation, and cognitive strategy) use were entered. On step 2, test anxiety was added to the model because of its statistical significance. Although self-regulation was a significant predictor of academic performance on step 1, neither model 1 or 2 resulted in a significant proportion of variance accounted for for GPA.

## Discussion

The purpose of this study was to determine students' current perceptions of online learning, given that they now have had almost two years of experience with the online learning environment. Specifically, this study was designed to examine how personality traits, learning strategies, (pandemic) adaptability, and academic performance relate to perceptions of online learning. The results revealed that perception of online learning was significantly positively related to adaptability, computer skills, openness, extraversion, self-efficacy, intrinsic value, cognitive strategy use, and self-regulation. It also revealed that perception of online learning was significantly negatively related to neuroticism. These results are consistent with previous research findings (e.g., Keller & Karau, 2013; Bhagat, et al., 2019; Besser, et al., 2020) that examined perceptions of online learning with similar variables with the exception that the present study did not find perception of online learning to be significantly related to agreeableness and/or conscientiousness.

The present study found numerous statistically significant relationships between the variables of interest (i.e., perception of online learning, personality traits, learning strategies, (pandemic) adaptability and academic performance). As hypothesized, learning strategies were significantly related to personality traits. Specifically, self-efficacy was positively related to openness, conscientiousness and extraversion, and negatively related to neuroticism. Intrinsic value was positively related to openness and conscientiousness, and negatively related to neuroticism. Test anxiety was positively related to neuroticism, and negatively related to conscientiousness. Cognitive strategy use was positively related to openness, conscientiousness, extraversion, and agreeableness, and negatively related to neuroticism. Lastly, self-regulation was positively related to conscientiousness, extraversion, and agreeableness, and negatively

related to neuroticism. These results were similar to previous studies (e.g., Bidjerano & Dai, 2007; Komarraju, et al., 2011) even though they used different scales to measure learning strategies. This supports the theory that every student learns differently, as different personalities prefer different learning strategies.

Unexpectedly, academic performance (i.e., GPA) was only correlated with two variables, positively with self-regulation and negatively with test anxiety. This indicates that students who plan and set goals, monitor their attention and effort, and regulate their behaviours (i.e., score high on self-regulation) are more likely to perform well academically. Whereas students who worry and feel emotionally anxious during tests (i.e., score high on test anxiety) are more likely to perform poorly academically. Although these two correlations were consistent with previous research, the lack of significant relationships with academic performance found was not consistent with previous research. Furthermore, of the five hypothesized predictors of academic performance (i.e., perceptions of online learning, perceived adjustment, self-regulation, cognitive strategy use, and test anxiety) only self-regulation was statistically significant which was also an atypical result. It is possible that these results occurred because the present study used self-reported GPA, which may not be as accurate as obtaining official GPA. Some participants may not have understood what “sessional GPA” meant as they were first year university students who are presumably less familiar with academic terminology. This indicates a possible problem with the wording of the self-report GPA question. Furthermore, it is possible that academic performance findings were skewed because online Introductory Psychology exams were open book. As students can get good grades on open book exams without necessarily needing to use all their cognitive strengths.

As hypothesized, students' current perceptions of online learning were relatively positive as the majority of participants (62.4%) indicated that they either preferred online learning or that they liked both learning formats. Only 53 participants (37.1%) indicated that they preferred learning in-person. These results are consistent with recent research (e.g., Prodanović & Gavranović, 2021) that indicates that students' perceptions of online learning may be improving as the online learning environment is no longer 'new.' However, it is important to consider that participants in the present study were mostly (66.4%) first year students who had quite possibly never experienced in-person, university, courses before. On average participants were enrolled in no in-person courses (Mean=0.46; SD=0.87) during the current semester, and only 1 in-person course (Mean=0.59; SD=0.887) during the previous semester. A more diverse sample in terms of year of university may have given the present study a more accurate representation of students' learning preferences.

The present study found numerous statistically significant relationships between the variables of interest (i.e., perception of online learning, personality traits, learning strategies, and academic performance) and adaptability to the COVID-19 pandemic. As hypothesized, openness, agreeableness, and extraversion were positively related to adaptability, and neuroticism was negatively related to adaptability. These results are consistent with previous research (Schnuck & Handal, 2011; Abood, et al., 2020; Besser, et al., 2020; Audet, et al., 2021). This indicates that adaptability is stronger in individuals who enjoy new experiences (i.e., score high on openness), who are highly tolerant and selfless (i.e., score high on agreeableness), and who are positive and tend to reach out to others (i.e., score high on extraversion). While adaptability is weaker in individuals who are emotionally unstable and feel anxious in new situations (i.e., score high on neuroticism). Furthermore, adaptability was significantly positively

related to perception of online learning as expected. It is important to note that of all the variables of interest, adaptability had the strongest relationship with perception of online learning (0.599). This seems to indicate that students who are highly adapted to the COVID-19 pandemic are the most likely to have positive perceptions of online learning at this point in time. Students with high levels of adaptability can adjust their way of thinking and change their way of doing things all while staying calm. This helps explain why they handled the transition to online learning well and have positive perceptions of online learning.

The present study examined the differences between students who prefer learning online, students who prefer learning in-person, and students who are fine with either learning format. The results revealed that students who preferred learning online had significantly higher perceptions of online learning, self-efficacy, and adaptability scores than students who preferred learning in-person and/or students who had no preference. This seems to indicate that students prefer learning online when they enjoy learning online, when they feel confident in their ability to accomplish new things, and when they adapt well to changes (brought on by the pandemic). Surprisingly, students who reported having no preference had significantly lower openness scores than students who preferred learning online and/or students who preferred learning in-person. It would seem like students who are open to either learning style would have high openness scores. Perhaps these students are not overly excited by, or interested in, either online or in-person learning and therefore have no preference.

Perceptions of online learning were hypothesized to be predicted by adaptability, self-regulation, and cognitive strategy use. The results revealed that adaptability, self-regulation, and intrinsic value were statistically significant predictors of perception of online learning, but cognitive strategy use was not. This implies that students will view online learning positively

when they adapt well to transitioned online courses, monitor their attention and behaviours when learning online, and view online assignments as curiosity provoking challenges.

There are a few limitations to the present study that should be acknowledged. First, the present study relied exclusively on self-report measures. Participants may have answered questions dishonestly due social desirability bias and/or inaccurate self-assessment. Furthermore, participants may have misinterpreted questions. Second, the incentive given for participation may have created a response bias within the present study as some participants may have rushed through the online questionnaire just to receive the incentive. Third, the studied sample lacked diversity as participants were predominantly females (79.7%), first year university students (66.4%), and Caucasians (65%). Furthermore, all participants were enrolled in university which usually signifies enough academic achievement to be granted acceptance and enough financial wealth to attend. Participants of this calibre typically have access to technology which increases their likelihood of having computer skills and online knowledge. Consequently, the results of the present study cannot be generalized beyond the studied sample and similar ones. Fourth, the present study took place during the COVID-19 pandemic, so the online learning studied here was not the same online learning that was studied before the pandemic. COVID-19 online learning was an unprecedented, involuntary situation. Meaning that the results of the present study cannot be generalized outside of COVID-19. Last, perhaps the most significant limitation of the present study was that online Introductory Psychology exams were open book which may have skewed findings on academic performance, learning strategies, and learning preferences. As students can get good grades on open book exams without necessarily needing to use all their cognitive strengths. And students may have preferred online learning because open book exams were

“easier.” Despite these limitations the results of the present study were generally consistent with the previous literature and as hypothesized.

Future studies could investigate students’ perceptions of online learning at different points in time to see if perceptions improve as time progresses (and online learning experience increases). Another idea could be to investigate students’ perceptions of online learning across different universities to see if there are significant differences. If a future study was to replicate the present study, they should use a more diverse sample to be able to generalize their results and they should use students’ official GPA rather than their self-reported GPA to help avoid the correlation issues that arose in the present study. Furthermore, it would be interesting to investigate teachers’ perceptions of online learning to understand the opinions of all parties involved in online learning.

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**Table 1.** *Descriptive Statistics for Variables of Interest for All Participants*

Variable	N	Mean	SD	Max. Value	Min. Value
Perception of Online Learning	143	5.5	0.80	7	1
Openness	142	3.4	0.54	5	1
Conscientiousness	142	3.6	0.56	5	1
Extraversion	142	3.0	0.77	5	1
Agreeableness	142	3.9	0.51	5	1
Neuroticism	143	3.2	0.74	5	1
Self-Efficacy	141	5.3	0.79	7	1
Intrinsic Value	141	5.6	0.72	7	1
Test Anxiety	142	5.1	1.42	7	1
Cognitive Strategy Use	143	5.5	0.66	7	1
Self-Regulation	142	4.9	0.79	7	1
Adaptability	142	3.7	0.53	5	1
GPA	132	3.4	0.62	4.30	0.00
Computer Skills	141	4.3	0.55	5	1

**Table 2.** *Correlations Between Variables of Interest for All Participants (n=143)*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Perception of Online Learning	-													
2. Openness	.281**	-												
3. Conscientiousness	.165	.059	-											
4. Extraversion	.264**	.088	.250**	-										
5. Agreeableness	.162	.210*	.231**	.187*	-									
6. Neuroticism	-.293**	-.122	-.321**	-.407**	-.221**	-								
7. Self-Efficacy	.470**	.194*	.401**	.261**	.031	-.292**	-							
8. Intrinsic Value	.531**	.304**	.270**	.138	.157	-.169*	.643**	-						
9. Text Anxiety	-.030	-.028	-.271**	-.070	-.008	.527**	-.216*	-.074	-					
10. Cognitive Strategy Use	.436**	.302**	.324**	.277**	.251**	-.201*	.419**	.414**	-.027	-				
11. Self-Regulation	.431**	.153	.562**	.221**	.197*	-.298**	.546**	.522**	-.282**	.582**	-			
12. Adaptability	.599**	.320**	.074	.200*	.172*	-.393**	.386**	.408**	.002	.329**	.280**	-		
13. GPA	.042	-.168	.068	-.002	-.092	-.039	.118	.023	-.223*	.093	.224**	-.020	-	
14. Computer Skills	.227**	.068	.037	.082	.040	-.005	.217*	.236**	.063	-.004	.010	.217**	-.015	-

NOTES: \*0.05 significance level (2-tailed). \*\*0.01 significance (2-tailed).



**Table 3.** *Hierarchical Regression Analysis Predicting Perception of Online Learning (n=143)*

Model	Variable(s) entered	$R^2$	$R^2$ Change	Beta	p value
1	Adaptability	0.416	0.416	.462	.000*
	Cognitive Strategy Use			.105	.209
	Self-Regulation			.250	.002*
2	Adaptability	0.469	0.053	.364	.000*
	Cognitive Strategy Use			.068	.430
	Self-Regulation			.123	.178
	Self-Efficacy			.084	.353
	Intrinsic Value			.206	.029*
	Openness			.029	.686
	Extraversion			.095	.187
	Neuroticism			-.002	.976

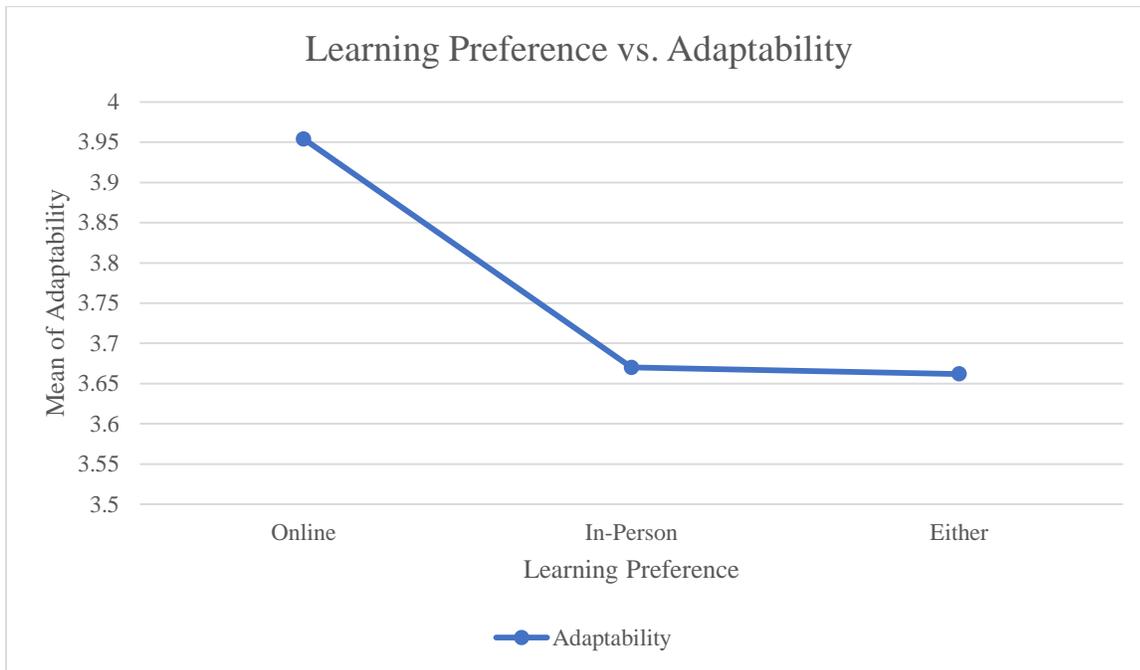
NOTE: \*.05 significance level

**Table 4.** Hierarchical Regression Analysis Predicting Academic Achievement (n=132)

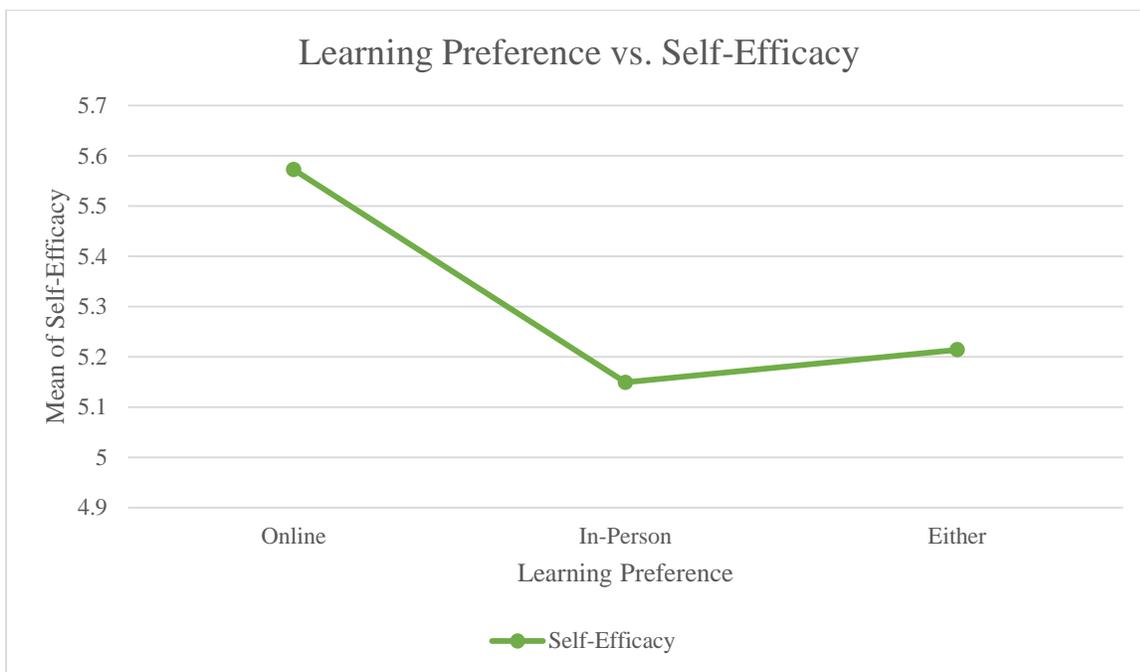
Model	Variable(s) entered	$R^2$	$R^2$ Change	Beta	p value
1	Perception of Online Learning	.057	.057	-.030	.788
	Adaptability			-.018	.869
	Cognitive Strategy Use			-.083	.446
	Self-Regulation			.284	.010*
2	Perception of Online Learning	.076	.019	-.005	.965
	Adaptability			-.024	.822
	Cognitive Strategy Use			-.031	.781
	Self-Regulation			.208	.080
	Test Anxiety			-.152	.114

NOTE: \*.05 significance level

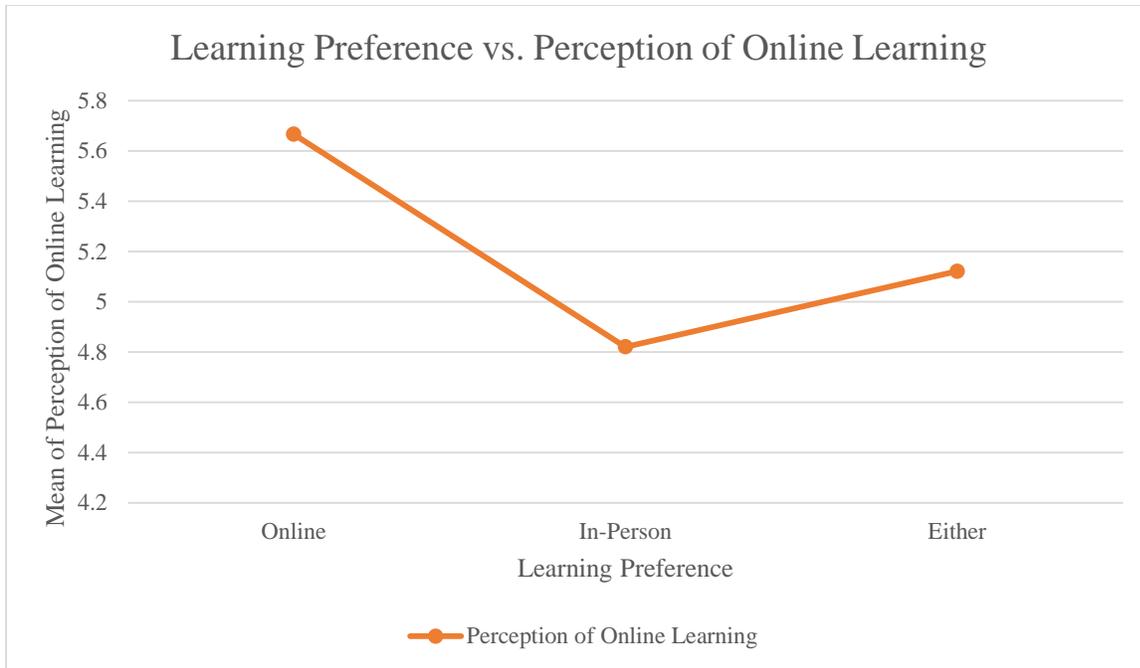
**Figure 1.** Mean Plots of Significant Differences Between Students Who Prefer Learning Online, Prefer Learning In-Person, or Prefer Either



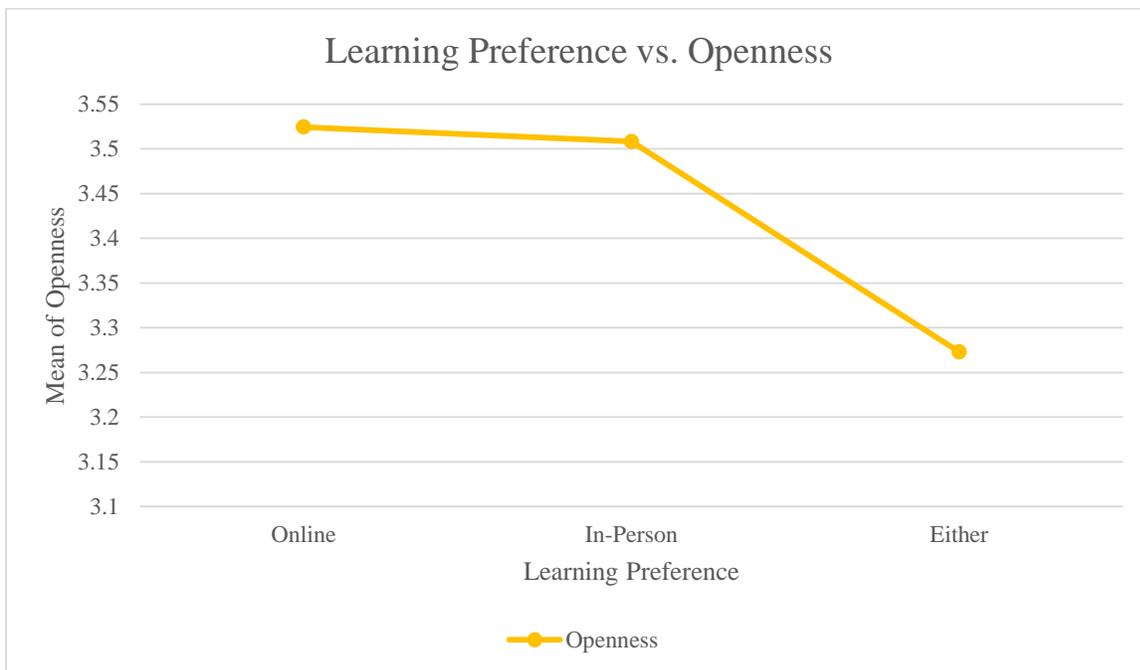
NOTE: Students who preferred learning online had significantly higher adaptability scores.



NOTE: Students who preferred learning online had significantly higher self-efficacy scores.



NOTE: Students who preferred learning online had significantly higher perception of online learning scores.



NOTE: Students who preferred either learning format had significantly lower openness scores.