

Brief Report

Changes in Students' Achievement Motivation in the Context of the COVID-19 Pandemic: A Function of Extraversion/Introversion?

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Abstract: Students' mental health has been an increased concern since the outbreak of the COVID-19 pandemic. However, academic outcomes have received very little attention. In this study, changes in students' achievement motivation are investigated using an expectancy–value framework. Participants ($n = 90$) were high school students (grades 9 and 10) who reported on their expectancy and value perceptions in regard to learning before and during the pandemic (i.e., January and November 2020). Changes over time and as a function of extraversion/introversion were analyzed using repeated measures multivariate analyses of variance (MANOVAs). Most perceptions were found to be stable with the exception of interest in learning, which increased as a function of extraversion. Results are discussed in light of relevant pre-pandemic evidence.

Keywords: COVID-19 pandemic; achievement motivation; expectancy–value; extraversion/introversion; high school students



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1. Introduction

The pandemic of the coronavirus (COVID-19) is an unprecedented public health threat. In the months that followed the outbreak in Hubei province in China (in December 2019), most countries adopted precautionary measures to prevent the spread of the infection over their territory [1]. These measures included lockdown restrictions, school closures, and stay-at-home orders.

As these measures affected daily social interactions, researchers, educators, and clinicians became increasingly concerned about children and adolescents' mental health [2]. Indeed, recent international studies showed an alarming increase in mental health symptoms in youth such as anxiety and depression [3]. In light of such evidence, it is reasonable to suspect that academic outcomes and, more precisely, students' achievement motivation, could also have deteriorated. In fact, some research findings suggest that when individuals are struggling with mental health symptoms, they tend to also exhibit poor motivation toward learning [4].

Many studies support the notion that social interactions can serve as a protective factor in crisis situations as the actual pandemic [5]. Indeed, these interactions may alleviate some of COVID-19 induced distress, in which case, motivation could be somewhat protected from an eventual decline [5,6]. Unfortunately, students seemed to have limited interactions with their peers and teachers since the pandemic outbreak, and there are, consequently, reasons to believe that their motivation declined. To our knowledge, empirical evidence has, to date, been quite limited concerning this topic. It is, therefore, difficult to estimate

which effects the COVID-19 pandemic had and is still having on students' motivation. This brief report aims to address this gap in the literature.

2. Theoretical Framework

Which components or dimensions are likely to inform us about students' achievement motivation? According to researchers like Pintrich and Schrauben [7], a combination of beliefs, attitudes, and intentions students hold about themselves (e.g., their chances of success) and situations (e.g., the value) would act as mediators of their achievement-related behaviors. Therefore, expectancies of success are reflected by the level of confidence students have in their capacity to succeed. A major component influencing these expectancies is how students evaluate their abilities or *general competence beliefs*. In fact, students constantly assess their ability to act effectively, and when they come to positive conclusions, they tend to approach learning with more enthusiasm and to attach more value to it [8]. This assessment of the value of learning relies on multiple dimensions. One of them is the *interest in learning*, which refers to a state of attention and concentration that is triggered by a learning content or a situation, which may be accompanied by positive affects [9]. Another relevant dimension is the perceived usefulness of learning or the *utility value*. This dimension refers to the importance and the personal meaning that is given to learning and to the adoption of behaviors that will contribute to learning [10]. Goal orientations are another important indicator (and dimension) of the value given to learning. These orientations can be conscious or not, but they always indicate the reasons for engaging in learning situations. Pintrich and Schrauben's [7] approach allows for the examination of two distinct orientations: a *mastery orientation*, which reflects a desire to master learning material and, therefore, to acquire new knowledge and abilities, and a *performance orientation*, which reflects a desire to demonstrate knowledge and abilities and/or to stand out in a given group. It is important to highlight that these goals are not mutually exclusive and that certain learners may seek ways to both increase and exhibit their knowledge and abilities.

The aforementioned motivational dimensions are all related to a broader social cognitive perspective [11]. Expectancies and values are cognitions or representations of the students' mind. They are widely influenced by the context students develop and learn in. Of course, this context consists of educational resources, but is mainly made up of the social interactions it provides. During COVID-19 stay-at-home orders, many questions could be asked: Was the context facilitating the learning experience or putting it at risk? Was it sustaining students' motivation or undermining it? And more interestingly, was the context acting similarly or differently on these motivational dimensions depending on the personality of the learners?

There is a wide range of personality traits that can be examined. One personality trait that often receive particular attention is the tendency to extraversion, which may reflect, in some way, the social needs of an individual. Typically, a student with a tendency to *extraversion* may be externally focused and interested in its social environment and could be characterized as outgoing, talkative, assertive, and energetic. As for a student with a tendency to *introversion*, he/she may be considered as being internally focused, somewhat calm, reserved, and displaying a more reflective nature [12]. Studies suggest that these tendencies are quite stable throughout time [13], and some evidence indicates that they could influence the level of motivation (their expectancies and values) that students may exhibit in different situations or contexts [14,15], but this relationship remains unclear.

In light of the above, the goals of this study were therefore to examine if the motivational dimensions competence, beliefs, interest in learning, utility value of learning, mastery goal orientation, and performance goal orientation have undergone changes since the beginning of the COVID-19 pandemic and if these changes were similar amongst introvert and extrovert students.

3. Method

3.1. Design and Sample

Participants were recruited by researchers with the help of a high school teacher. Our sample is therefore of convenience. More precisely, our sample included 90 adolescents attending two high schools in an urban setting in the province of Quebec, Canada. In total, 51 were 9th graders (8 boys, 43 girls, $M_{age} = 14.69$, $SD = 0.34$), and 39 were 10th graders (13 boys, 26 girls, $M_{age} = 15.79$, $SD = 0.26$). The vast majority of them (93.3%) were Canadian with both parents born in Canada.

The first data collection procedure (time 1) took place in January 2020, prior to the implementation of COVID-19-related health regulations. The second data collection procedure (time 2) took place ten months later, at the beginning of November 2020, when students reintegrated school after staying at home for two months and pursuing their learning remotely.

Students completed the same questionnaire twice, where they indicated their level of agreement with several statements pertaining to their expectancy of success (their general competence beliefs) and the value they place on learning (their interest in learning, utility value, and mastery and performance goal orientations) as well as their tendency for extraversion.

3.2. Measures

3.2.1. General Competence Beliefs

Participants rated their school competence using a four items subscale adapted from the work of Ntamakiliro et al. [16]. Items (“I am proud of my grades at school”, “I’m as good as others at school”, “I am not very good at school”, and “I’m not as good as others at school”) were rated on a scale ranging from 1 (strongly disagree) to 6 (strongly agree). The last two items were reverse coded. All item scores were averaged to generate a global score reflecting the sense of competence ($\alpha = 0.85$).

3.2.2. Interest in Learning

Participants also rated their interest in learning using a four items subscale adapted from the work of Ntamakiliro et al. [16]. Items (“I’m interested in what we learn at school”, “I like going to school”, “What we do in class is interesting”, and “I’m often bored in class”) were rated on a scale ranging from 1 (strongly disagree) to 6 (strongly agree). The last item was reverse coded and item scores were averaged to generate a global score reflecting interest in learning ($\alpha = 0.82$).

3.2.3. Utility Value of Learning

Participants also rated the utility value of learning using a four items subscale adapted from the work of Ntamakiliro et al. [16]. Items (“What we learn in school will be useful in life”, “What we learn in school will be helpful in the future”, “What we learn in school is useful”, and “What we learn in school is not useful”) were rated on a scale ranging from 1 (strongly disagree) to 6 (strongly agree). The last item was reverse coded and item scores were averaged to generate a global score reflecting utility value of learning ($\alpha = 0.87$).

3.2.4. Mastery Goal Orientation

Participants rated their mastery goal orientation using a three items subscale elaborated by Bouffard and al. [17]. Items (“It’s important for me to understand what we’re learning at school”, “Understanding as much as possible is the most important thing for me at school”, and “I want to learn as much as possible at school”) were rated on a scale ranging from 1 (strongly disagree) to 6 (strongly agree). Item scores were averaged to generate a global score reflecting mastery goal orientation ($\alpha = 0.81$).

3.2.5. Performance Goal Orientation

Participants also rated their performance goal orientation using a four items subscale elaborated by Bouffard and al. [17]. Items (“My main goal in school is to be the best”, “It’s important to me to be one of the best in my class”, “My main goal in school is to get good grades”, and “It’s important to me to be better than other students”) were rated on a scale ranging from 1 (strongly disagree) to 6 (strongly agree). Item scores were averaged to generate a global score reflecting performance goal orientation ($\alpha = 0.86$).

3.2.6. Extraversion/Introversion

Participants assessed their tendency to extraversion with a ten items subscale elaborated by Morizot [18]: “I see myself as someone who ... “likes to talk and express their opinions”, ... “is reserved or timid, and has difficulty reaching out to others”, ... “is full of energy and likes to always be active”, ... “is a leader capable of convincing others”, ... “is rather calm and doesn’t talk much”, ... “shows confidence and is able to assert himself/herself”, ... “is timid and shy”, ... “is extraverted and sociable”, ... “likes exciting activities that provide thrills”, and ... “tends to laugh and have fun easily”. Each statement was rated on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). All items were averaged to generate a global score of extraversion/introversion, where a higher score represents higher levels of extraversion and where a lower score represents higher levels of introversion ($\alpha = 0.86$).

3.3. Data Analytic Strategy

Statistical Package for Social Sciences (SPSS) software v.25 was used to perform all analyses. As a preliminary test, patterns of missing data were examined. It appeared that all participants provided complete or near-complete responses. An average of 0.25% (range = 0–1.1%) of the data were missing for the variables included in the study. An MCAR (Missing Completely at Random) test indicated that the data were missing completely at random, $\chi^2(567) = 581.21, p = 0.33$.

The main analyses were performed in two steps. First, K-means cluster were executed on the standardized extraversion trait variables measured at time 1 and at time 2 to determine if there were distinct subgroups of students sharing a similar profile of extraversion. Considering the small sample size, only two- and three- cluster solutions were tested. Following this analysis, two multivariate analyses of variance (MANOVAs) with repeated measures were conducted to assess changes in achievement-related expectancy (competence beliefs) and value perceptions (interest, utility value as well as mastery and performance goal orientations) as a function of (a) time, (b) extraversion/introversion, and (c) the interaction between time and extraversion/introversion.

4. Results

The K-means clustering test allowed to distinguish two subgroups of students, the first one displaying a *tendency to introversion* and the second one displaying a *tendency to extraversion*. The two-cluster solution was chosen as it allowed us to partition the data into subgroups that included enough participants when compared to the three-cluster solution.

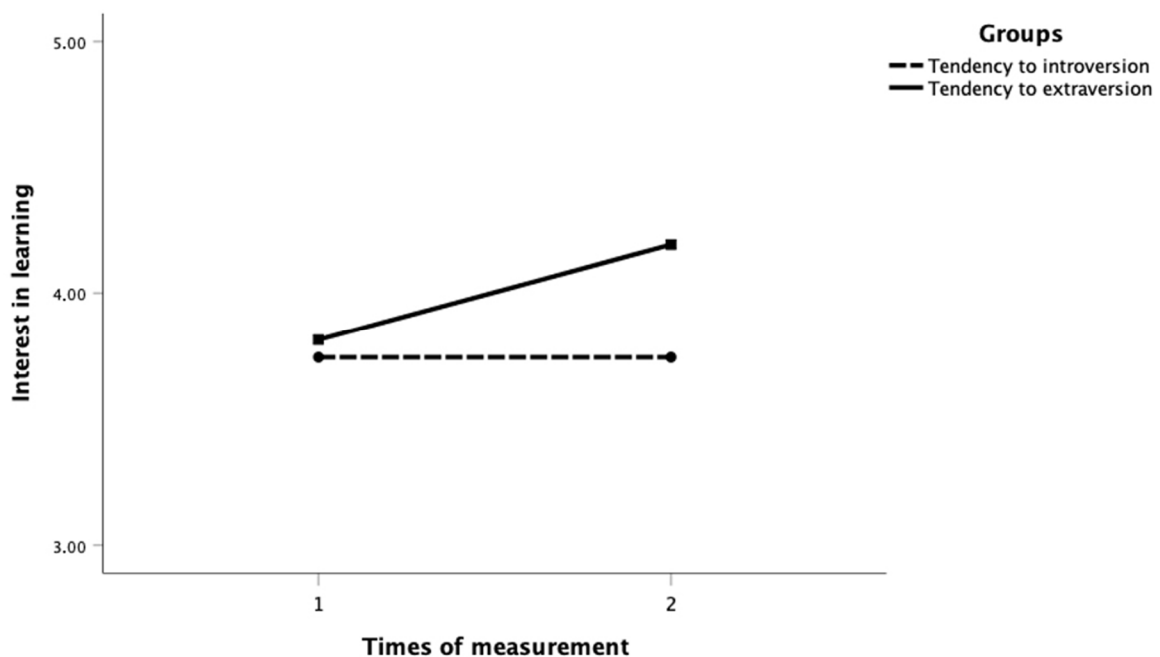
The first repeated-measure MANOVA revealed a marginal significant effect of time, $F(5,85) = 2.04, p = 0.08$. As can be seen in Table 1, interest in learning significantly increased between time 1 ($M = 3.78, SD = 0.94$) and time 2 ($M = 4.01, SD = 0.85$). The effect size, using the partial eta squared value, was 0.07, indicating a moderate effect [19].

Table 1. Results of means, standard deviations, and repeated-measure multivariate analyses of variance (MANOVAs).

Variable	M (SD)				F (Effect Size)		
	Tendency to Introversion		Tendency to Extraversion		Extraversion/Introversion	Time	Extraversion/Introversion * Time
	T1	T2	T1	T2			
Competence beliefs	4.39 (0.99)	4.51 (0.87)	4.76 (0.89)	4.75 (0.94)	2.91 (0.03)	0.48 (0.01)	0.53 (0.01)
Interest in learning	3.74 (0.91)	3.74 (0.95)	3.81 (0.81)	4.19 (0.71)	2.55 (0.03)	6.48 * (0.07)	6.48 * (0.07)
Utility value of learning	4.29 (0.83)	4.34 (0.78)	4.31 (0.92)	4.44 (0.86)	0.13 (0.00)	1.15 (0.01)	0.25 (0.00)
Mastery goal orientation	4.68 (0.93)	4.92 (0.74)	4.81 (0.82)	4.86 (0.86)	0.06 (0.00)	2.97 (0.03)	1.28 (0.01)
Performance goal orientation	3.51 (1.36)	3.45 (1.33)	3.38 (1.21)	3.28 (1.10)	0.37 (0.00)	0.74 (0.01)	0.04 (0.00)

Notes. $n = 90$, * $p < 0.05$.

As can be seen in Table 1, the second repeated-measure MANOVA did not reveal a statistically significant effect of time ($F(5,84) = 1.65$, $p = 0.16$) or extraversion/introversion ($F(5,84) = 1.08$, $p = 0.38$). However, there was a statistically significant interaction between these factors (time * extraversion/introversion; $F(5,84) = 2.44$, $p = 0.04$). As can be seen in Figure 1, interest in learning increased from time 1 ($M = 3.81$, $SD = 0.81$) to time 2 ($M = 4.19$, $SD = 0.71$) among students with a tendency to extraversion. In comparison, for students with a tendency to introversion, their interest in learning remained stable from time 1 ($M = 3.74$, $SD = 0.91$) to time 2 ($M = 3.74$, $SD = 0.95$). The effect size, using the partial eta squared value, was 0.07, indicating a moderate effect [19].

**Figure 1.** Changes in students' interest in learning as a function of time and extraversion/introversion.

5. Discussion

This study assessed changes in motivational perceptions (i.e., competence beliefs, interest in learning, utility value of learning, mastery goal orientation and performance goal orientation) over time and as a function of extraversion and introversion in the context of the COVID-19 pandemic. The results are interpreted in light of the existing longitudinal results available before the pandemic outbreak.

Most of motivational dimensions remained relatively stable over time. Indeed, competence beliefs, utility value of learning, mastery goal orientation, and performance goal orientation did not fluctuate during the pandemic in our sample. Interest in learning showed, however, a distinct evolution and increased over time. These results do not coincide with the trends typically observed prior to the pandemic as these dimensions usually deteriorate over time [20–23]. One plausible explanation for these contradictory findings is that students were enthusiastic about reintegrating school after months of remote learning. Indeed, after such an unusual experience, it is reasonable to think that they were more favorable to the value of learning that they would have been under regular circumstances. It is legitimate to think that they missed interactions with their peers and teachers and that they expressed such an enthusiasm because they were provided a renewed opportunity to experience in-class learning situations involving face-to-face dynamic interactions [24].

The results also showed that students with a tendency for extraversion reported an increase in learning interest when they reintegrated school, while this interest remained stable for students with a tendency to introversion. It should be highlighted that these two subgroups showed almost identical interest in learning at the first time point. This result coincides with the recent observations made by Iterbeke and De Witte [25], where students with a tendency for extraversion had a harder time adjusting to the pandemic precautionary measures since they prevent them from maintaining social interactions. For these students, reintegration to school might have been perceived as a relief from a challenging situation. Hence, it is possible that these students expressed more enthusiasm than others simply because they had a renewed opportunity to engage in situations that allowed much needed social interactions. It is well known that individuals with a tendency to extraversion have greater needs to interact with others than individuals with a tendency to introversion [13], which can translate in their interest in learning in an in-person school environment.

6. Strengths, Limitations, and Conclusions

This study is the first, to our knowledge, to investigate the impact of the COVID-19 pandemic on students' academic motivation. The results should, however, be interpreted with caution because of the study limitations. First, the use of a small sample reduces the generalizability of the findings. Second, gender and age-level differences were not examined because of the small sample size. Third, the results are correlational in nature and should not be interpreted as cause to effect relation. Further investigations are needed to better understand the meaning of the results. Despite these limitations, this study assessed changes in students' expectancy and value beliefs using validated instruments, from a couple of weeks prior to the pandemic outbreak to the end of first wave in Canada.

The results highlighted that students, after the first wave of COVID-19 home confinement, reintegrated school with stable perceptions, and even improved interest in learning for the extrovert ones. The findings can serve as a reminder that students are very sensitive to the educational opportunities and the social support that is available to them.

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