

# Mediating effects of protective factors on COVID-19 anxiety and academic performance of K to 12 Filipino Learners: A PLS-SEM analysis with WarpPLS

Kevin D. Caratiquit

Lal-lo National High School, Centro, Lal-lo, Cagayan, Philippines

[kevin.caratiquit@deped.gov.ph](mailto:kevin.caratiquit@deped.gov.ph)



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## Abstract

**Purpose:** This study investigates the interrelationship among COVID-19 anxiety, mindfulness, COVID-19 information avoidance, preventive behavior, and academic performance.

**Research methodology:** The study assessed protective factors as mediators of COVID-19 anxiety and academic performance using WarpPLS. The study participants were K-12 Filipino students from a secondary school in Cagayan, Philippines, identified through convenience sampling.

**Results:** COVID-19 anxiety, mindfulness, information avoidance, and preventive behavior were found to be negatively correlated. Preventive behavior is associated with improved academic performance. Conversely, there was a negative correlation between mindfulness, COVID-19 information avoidance, and academic performance. The association between COVID-19 anxiety and academic achievement is only mediated by mindfulness and preventive behavior.

**Limitations:** Preventive factors that may affect COVID-19 anxiety and academic achievement are only considered. Also, the participants are limited to a secondary school in Cagayan, Philippines.

**Contribution:** With the pandemic having a substantial influence on the municipality, the study would be helpful to manage and control the effect of the outbreak on the academic performance of the learners.

**Keywords:** *Academic performance, COVID-19 Anxiety, PLS-SEM, Protective Factors, WarpPLS*

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## 1. Introduction

In December 2019, it was determined that a seafood distribution firm in Wuhan, China, was responsible for a virus outbreak in the city (Zhu et al., 2020). Unfortunately, the impact of the virus infection worldwide is destructive to physical and mental health, and the consequences of cognitive impairment are further extensive and permanent than those of physical damage (Khan et al., 2020). Due to the enormous surge of COVID-19 cases, many individuals, including learners, may already be afflicted and will continue to be affected by psychiatric diseases like anxiety disorder. With that, greater attention is given to COVID-19's potential psychological consequences, as this understanding can aid in its prevention and management (Xiang et al., 2020).

Fear of infection by the virus contributed to increased depressive symptoms among school learners (Xie et al., 2020) and emotional issues among teens and young people during the COVID-19 pandemic (Li, Wang, Yang, Lei, & Yang, 2020). Uddin and Uddin (2021) discovered that during a pandemic, students endure greater mental stress than in prior times. Similarly, for kids and adolescents who are quarantined at home due to institute closures in the COVID-19 outbreak, their insight into the problem of home confinement is expected to have a substantial influence on their mental well-being and academic performance (Caratiquit & Pablo, 2021; Singh et al., 2020; Zhang, Dimitriou, & Halstead, 2021).

Additionally, the association between learners' academic performance and their anxiety level is inversely proportionate. Further, psychological health issues and their underlying causes, such as depression, anxiety, and stress, are highlighted for their association with academic performance. (Moreira de Sousa, Moreira, & Telles Correia, 2018). However, parents and learners can support and communicate in their own homes. It is strongly recommended that parents pacify their children's anxieties about COVID-19 by instructing them on different preventive factors, and coping techniques and providing them with a better understanding of the virus (Organization, 2020). Thus, dialogue between parents and children may be good for the mental health of youngsters (Dejongh, 2021).

Based on the related works of literature, stress and anxiety influenced the learners' mental well-being and educational achievement. Numerous research conducted across multiple countries has demonstrated how to cope with the negative influence of students' COVID-19 anxiety and academic success. Learners engaged in various coping strategies that helped them acquire continued learning and relieve anxiety due to the outbreak. According to related studies, students tried to deal with the adversative effects of the present global infection by doing preventive behaviors, avoidance of social media, and mindfulness like mediation, and distracting themselves from tediousness and horrible thoughts (Chandra, 2020; Polizzi, Lynn, & Perry, 2020; Sweeny & Howell, 2017). The researcher would consider these to explore further by conducting a Structural Equation Model to investigate the mediators that learners should give more attention to in coping with their COVID-19 anxiety. Accordingly, the purpose of this research was to examine the interrelationship among COVID-19 anxiety, mindfulness, COVID-19 information avoidance, preventive behavior, and learners' academic performance. Further, the study also investigated protective factors as mediators of COVID-19 anxiety and learners' academic performance using Partial Least Squares – Structural Equation Modeling.

## **2. Literature review and hypothesis development**

The study is predicated on Erik Erikson's psychosocial development theory of adolescent anxiety. Besides, it is also founded on Strongman's anxiety theories stressed as a pain-inducing agent (Garcia Lara, García Osma, & Penalva, 2009). They assert that anxiety will never come to an end. Also, they claim that psychoanalytical concepts, behavioral principles, physiological principles, phenomenological principles, and uncertainty principles underpin anxiety theories.

### ***COVID-19 anxiety***

The emotional anxiety due to the COVID-19 outbreak has been felt since the outbreak's inception. Its growth and spread are a source of significant concern, with anxiety levels rising as a result (Roy et al., 2020). Also, the pandemic has influenced the Philippine educational scheme. Because of the lockdown, face-to-face classes were canceled. With that, virtual learning is currently a widespread issue in most educational institutions and universities (Talidad & Toquero, 2020). Schools and universities are encouraged to employ pandemic coping strategies to maintain healthy student behavior and fight their COVID-19 anxiety (Akan et al., 2010).

### ***Protective factors***

Learners engaged in a variety of protective factors that assisted them in acquiring continuing learning while also alleviating worry. While dealing with the negative impacts of the current global pandemic, students attempted to perform various coping tactics by mindfulness, controlling media exposure, and engaging in preventative behaviors like following the health protocol (Chandra, 2020; Polizzi et al., 2020).

### ***Mindfulness***

The use of widespread quarantine has assisted in limiting the global spread of COVID-19, but it has its risks and advantages. Psychological conditions like COVID-19 anxiety have been discovered to be aggravated by isolation (Hawryluck et al., 2004). With this, broad public participation is required to meet future difficulties as a result. Mindfulness is a meditation technique that can alleviate stress, anxiety, and sadness (Khoury, Sharma, Rush, & Fournier, 2015). Likewise, it is vital to consider the interaction of coping mechanisms, especially during a pandemic. Mindfulness is cultivated through relaxation-promoting activities such as meditation, sports, exercise, and music. According to a detailed study, meditation and prayer can also help learners manage their anxiety. Additionally, seeking support from family, friends, and loved ones is a form of mindfulness. The effect of mindfulness meditation in the COVID-19 environment may assist in preventing aggressive or violent behaviors that are aggravated by increased irritability and impulsivity produced by strict social isolation measures such as lockdown or quarantine (Antonova, Schlosser, Pandey, & Kumari, 2021).

### ***COVID-19 information avoidance***

The fast proliferation of media and social networking sites makes it simpler for tragedies to spread like COVID-19. Anxiety and grief are intensified after unintended suffering caused by information in media (Neria & Sullivan, 2011). Nevertheless, information avoidance is also a great way to cope with stress and anxiety (Bernstein, Bernat, Davis, & Layne, 2008). In the past, following the terrorist incidents on September 11, 2001, certain studies in the United States found that information exposure through media influences the frequency of anxiety and post-traumatic stress disorder (PTSD) (Ahern et al., 2002; Schlenger et al., 2002). On the other hand, due to too much exposure to news reports and information, it was predicted that anxiety symptoms would appear two to three years later. Adults who avoided traumatic information about terrorism six months later reported less anxiety (Silver et al., 2013). Furthermore, it was discovered that students who avoid information regarding pandemic outbreaks from media outlets have a lower COVID-19 anxiety level. Thus, academic performance was impacted by the COVID-19 pandemic (Jiang, 2021).

### ***Preventive behavior***

The pandemic resulted in significant adjustments to daily life in the Philippines. It was one of the deadliest pandemics globally, with approximately 2.5 million Filipino people becoming ill based on Worldometers (2021). Based on scientific data, national and international agencies have responded by promoting COVID-19 preventative behaviors (Centers for Disease Control and Prevention, 2021). These preventive behaviors include staying at home unless for essential activities, keeping a minimum of six feet between yourself and others in the community, and being dressed in a face mask when in society. On the other hand, insufficient space and an inappropriate mask can considerably reduce the efficiency of physical separation (Organization, 2020), as cited in (Firouzbakht, Omidvar, Firouzbakht, & Asadi-Amoli, 2021).

According to Health OIC-Undersecretary Maria Rosario Singh-Vergeire, the community must keep on being cautious and exercise preventive behavior and control actions, such as proper use of personal protective equipment (PPE), physical distancing, and appropriate sanitarianess, to support and limit the spread of the virus. In the case of COVID-19, preventive behavior continues to be the most effective measure. "*Prevention is still the most effective intervention against COVID-19. Huwag po tayong maging kampante. Sa halip, patuloy po tayong maging responsable. Alagaan po natin ang ating mga sarili, ang ating mga mahal sa buhay, at ang iba pang myembro ng ating komunidad.*" said Vergeire, emphasizing the importance of each individual (Departemen of Health Philippines, 2020a). As a result, the government has adopted these efficient preventative behaviors by the Department of Health Philippines (2020b) in a consistent manner.

### ***Academic performance***

Academic performance is a result of receiving a sufficient education. The climax of an institution's head of school or a student's efforts to achieve education is success in learning (Ward, Stoker, & Murray-Ward, 1996), as cited in Catingub (2020).

Crede, Wirthwein, McElvany, and Steinmayr (2015) defined academic performance as the intellectual accomplishment by General Average (GA) reported on students' most recent report cards. Because the school distributed report cards to all students, there was no missing data for this variable. Academic performance among young people is still critical to the development of society. The grades were totaled and averaged as measures of academic competency in these domains based on the marks received in each course within that category (Crede et al., 2015).

### ***Hypothesis development***

A large body of literature and research supports the interrelationship of COVID-19 anxiety, student academic performance, and protective factors. Odriozola-González, Planchuelo-Gómez, Irurtia, and de Luis-García (2020) examined the psychological influence of COVID-19 pandemic on the college community during the first weeks of incarceration. Anxiety, depression, and tension were experienced by 21.34 percent, 34.19 percent, and 28.14 percent of respondents, respectively. The study found that students suffered more psychologically than university officials during the early weeks of the COVID-19 outage.

Another study conducted in the Philippines had the same result. Tus (2021) employed the DASS-21, a 21-item Depression, Anxiety, and Stress Scale. The study reported that nearly half of the respondents felt unhappy, stressed, or anxious due to this pandemic. As a result, no statistically significant association between emotional problems and academic performance was discovered.

In another study, students at the Philippines' Rizal Technological University participated in a recent study in which the researchers attempted to demonstrate a link between anxiety and academic achievement. In the study, anxiety was classified as either a state or a characteristic. A person's perception of fearful conditions was classified as state anxiety, while their interpretation and response to those situations were considered trait anxiety. According to the study's findings, there is a negative relationship between student anxiety and academic achievement. Thus, students with a higher academic performance were expected to have fewer symptoms and forms of anxiety disorders, according to the researchers (Basco & Olea, 2013).

Anxiety has been reported to be widespread among children who have difficulty in school. According to Hafezi and Etemadi (2022), anxiety hinders enthusiasm for learning, promotes errors and mistakes, and leads students to contemplate fake responses. With these, teachers and parents should support learners with their academics to reduce stress and anxiety (Dobson, 2012). In light of the large number of COVID-19 cases reported in the study's geographic area, the following hypothesis was still being considered.

### ***Hypothesis 1.*** COVID-19 anxiety is negatively related to academic performance.

Anila and Dhanalakshmi (2016) evaluated the effects of Mindfulness-Based Stress Reduction (MBSR) on anxiety reduction, self-control improvement, and academic performance improvement in teenage pupils. According to the evidence, mindfulness can greatly help adolescents reduce anxiety, increase self-control, and improve intellectual accomplishment.

Moreover, stressors impair teens' attention, concentration, memory, problem-solving skills, and academic performance (Rains, 2004). Anxiety and academic performance affect students' self-control and mindfulness. Irresponsible behavior can lead to poor academic achievement. Anxiety, worry, and tension cause students to lose focus on their studies, resulting in poor academic performance and the inability to regulate their emotions and feelings, resulting in poor self-control and mindfulness (Anila & Dhanalakshmi, 2016). Concerning these, COVID-19 anxiety may affect mindfulness to improve social lives, academic progress, and future competency of the learners.

Mindfulness has been revealed to be associated with improved academic achievement. Using mindfulness, Chang and Hiebert (1989) discovered that the academic performance of primary school children improved significantly. On the other hand, university students who engaged in mindfulness

twice daily improved their grade point average (Cranson et al., 1991; Franco, Mañas, Cangas, & Gallego, 2011). A study conducted by del Barco (2008) found a link between mindfulness and academic performance among secondary school pupils. Beauchemin, Hutchins, and Patterson (2008) also conducted a study in which they found that mindful persons with learning challenges improved academic achievement, social skills, and trait anxiety. Thus, the research hypotheses were built based on the associated literature and studies.

**Hypothesis 2.** COVID-19 anxiety is negatively related to mindfulness.

**Hypothesis 3.** Mindfulness is positively related to academic performance.

**Hypothesis 4.** Mindfulness mediates the negative relationship between COVID-19 anxiety and academic performance.

The quick spread of the COVID-19 outbreak and the high mortality rate caused significant concern and fear. People primarily rely on the media, including socially isolated learners, to get their news and updates. Numerous studies have discovered that too much exposure to COVID-19-related information may exacerbate psychological trauma and anxiety. In connection with this, Mwesigwa (2021) highlighted the importance of social media in the dissemination of information about natural catastrophes and public health emergencies. Besides, high information exposure to COVID-19 was found associated with an increase in COVID-19-specific anxiety (Bendau et al., 2021). Similarly, more significant anxiety was related to COVID-19 news reporting in the media environment among younger adult college students in the United States (Huckins et al., 2020). Also, Liu and Liu (2020) discovered that COVID-19 news and updates impact COVID-19 anxiety and are mediated by vicarious traumatization. The same is true with the results of the study by Olayemi (2020). Likewise, during the 2004 Ebola outbreak, the media focused more on the disease's negative characteristics, such as anxiety, sadness, and physical function impairment (Silver et al., 2013). As a result, people who saw more trauma-related news were more frightened of catching Ebola than those who did not (Hadjistavropoulos, Craig, & Hadjistavropoulos, 1998).

On the other hand, according to Raganta, Vargas, and Raganta (2021), students' avoidance of COVID-19 news in media outlets reveals success in their academics. Both genders' use of social media has detrimental and beneficial effects on academic performance in the areas studied. They also discovered that learners perform better in their themes when less exposed to COVID-19 trauma-related updates and information. Another study found that academic success had a significant negative impact on the health practices of school-aged children during the COVID-19 pandemic, including increased screen and media exposure and inconsistent sleeping patterns (Guo et al., 2021).

With these, it is hypothesized that avoidance of COVID-19-related information will affect learners' COVID-19 anxiety. As a result, greater exposure to COVID-19-related information was associated with a higher level of anxiety and poor academic achievement. Thus, the research hypotheses were built based on the related literature and studies.

**Hypothesis 5.** COVID-19 anxiety is negatively related to COVID-19 information avoidance.

**Hypothesis 6.** COVID-19 information avoidance is positively related to academic performance.

**Hypothesis 7.** COVID-19 information avoidance mediates the negative relationship between COVID-19 anxiety and academic performance.

When exposed to uncertainty anxiety, people are more likely to avoid rather than pursue adaptive solutions to deal with the challenges they might detect in their environment. Mental and behavioral diseases may develop if uncertainty-induced stressors are not adequately treated. People's desire to learn about and participate in COVID-19 preventative behavior techniques may be altered when confronted with the possibility of a COVID-19 pandemic. The COVID-19 outbreak, according to some specialists, has made it more challenging to prevent and control sickness (Pettersson, Westfall, & Miller, 2020).

According to Zhu et al. (2020), stress and anxiety were favorably associated with illness fear and adversely associated with self-efficacy and preventive behavior in healthy adults. According to the

findings, policy reforms and public education are required to reduce the detrimental effects of stress and anxiety in the COVID-19 disease prevention effort to a minimum. Also, Ren, Yang, Huang, Zhang, and Shi (2021) evaluated the effects of psychological adaptation on preventative behavior, risk cognition as a mediator, and stress coping as a moderator. Risk cognition mediates the impact of psychological transformation on preventive action. In contrast, reduced risk cognition enhances college students' preventive behavior.

Further, students are particularly vulnerable to psychosocial difficulties, particularly anxiety, during this pandemic. Educational institutions and authorities should collaborate to promote students' mental health and academic performance through preventive behaviors (El-Monshed, El-Adl, Ali, & Loutfy, 2021). As a result, the hypothesized relationships were established using pertinent pieces of literature and studies.

**Hypothesis 8** COVID-19 anxiety is negatively related to preventive behavior.

**Hypothesis 9.** Preventive behavior is positively related to academic performance.

**Hypothesis 10.** Preventive behavior mediates the negative relationship between COVID-19 anxiety and academic performance.

The following research Structural Equation Model was developed according to the various related literature and studies analyzed.

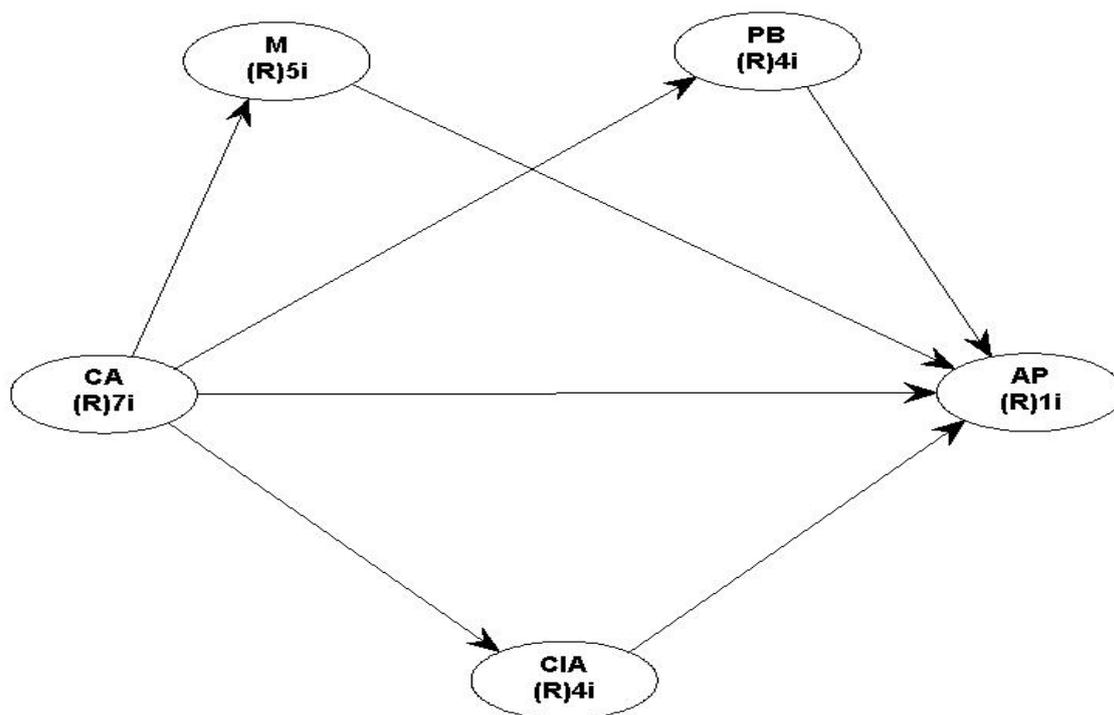


Figure 1. Structural Equation Model  
Source: Processed image by Caratiquit, 2022

### 3. Research methodology

#### Participants

The respondents of the study were K to 12 Filipino learners in an outstanding secondary school in the Division of Cagayan located at Lal-lo, Cagayan, Philippines. A convenience sampling approach was applied in selecting the participants of the study. The collection of data was started in September 2021 and ended in December 2021.

Table 1 demonstrates that most respondents were female (60.3%). Additionally, 62.2% of the respondents were 16-below years old in terms of age group. In terms of track, most of the respondents belong to the academic track with 74.9%. Furthermore, in terms of class sections, the majority of the respondents were in STEM 1 (18.1%) and STEM 2 (16.2%).

Table 1. Demographic characteristics of the respondents

Levels	Frequency	Percent	Levels	Frequency	Percent
<b>Sex</b>			<b>Class Section</b>		
Female	190	60.3	ABM	43	13.7
Male	125	39.7	Arts and Design	5	1.6
<b>Age</b>			HUMSS 1	47	14.9
16-below	196	62.2	HUMSS 2	37	11.7
17-18	99	31.4	STEM 1	57	18.1
19-20	10	3.2	STEM 2	51	16.2
21-above	10	3.2	TVL - BNC	6	1.9
<b>Track</b>			TVL - Bread and Pastry	1	0.3
Academic Track	236	74.9	TVL - CSS	19	6.0
Arts and Design Track	5	1.6	TVL - Cookery	37	11.7
TVL Track	74	23.5	TVL - Dressmaking	4	1.3
			TVL - EIM	8	2.5

Source: Processed data by Caratiquit, 2022

### Research instrument

**COVID-19 anxiety.** The anxiety of learners of COVID-19 was measured utilizing the COVID-19 Anxiety Scale (CAS) of Silva, de Sampaio Brito, and Pereira (2020), which was composed of 7 statements (e.g., "I have trouble relaxing when I think about COVID-19."). It utilized a 5-point Likert scale, which was rated from 5 (Always), 4 (Often), 3 (Sometimes), 2 (Rarely), and 1 (Never).

**Protective factors.** A COVID-19 Protective Factors Scale (CPF-S) was developed by the researcher to measure the protective factors of the learners in the pandemic outbreak (Conversano et al., 2020; Firouzbakht et al., 2021; Siebenhaar, Köther, & Alpers, 2020). The scale consists of three subdomains, namely: *Mindfulness* (e.g., "I engage in activities that promote relaxation, such as meditation, sports, exercise, and music."), *COVID-19 Information Avoidance* (e.g., "I stay away from news regarding COVID-19 updates and related deaths in the media.") and *Preventive Behavior* (e.g., "I use personal protection measures like masks, handwashing, and a face shield."). Further, it was adapted from the study of Baloran (2020) and utilized a 5-point Likert scale, which was rated from 5 (Always), 4 (Often), 3 (Sometimes), 2 (Rarely), and 1 (Never).

**Academic performance.** The learners' academic performance was taken from the GA of the learners in the First Quarter of the school year 2021-2022.

To ensure the instruments are acceptable and trustworthy, reliability and validity tests were done using WarpPLS.

### **Data analysis**

The study was quantitative, and it employed a causal research approach to investigate the critical connections between COVID-19 anxiety, mindfulness, COVID-19 information avoidance, preventive behavior, and learner's academic performance. And to estimate the parameters of the mediation model, the Partial Least Squares – Structural Equation Modeling (PLS-SEM) method was employed in conjunction with the WapPLS 7 software package. The tool was established by Kock (2017). WarpPLS software is also a reliability and validity assessment tool used to evaluate the structural equation models applying the Partial Least Squares approach.

The PLS-SEM technique has been used in various applications, including behavioral analysis, management, social science, and strategic planning. Partial Least Squares retains the second generation of multivariate statistical analysis to establish relationships between many variables, including latent constructs (Chin, Marcolin, & Newsted, 2003; Haenlein & Kaplan, 2004; Statsoft, 2013), as cited in Oluyinka, Endozo, and Cusipag (2021). PLS-SEM was defined as a variance-based estimation to establish the reliability and validity of constructs while also quantifying the correlations between them (Reinartz, Haenlein, & Henseler, 2009), as cited in Lacap (2019). Moreover, PLS-SEM has proven to be an incredibly effective method for determining causal relationships between variables (J. F. Hair, Ringle, & Sarstedt, 2011; J. F. Hair, Sarstedt, Ringle, & Mena, 2012). It is a strategy for creating variance-based structural equation models that rapidly gain popularity in the social sciences (Issa & Hamm, 2017)

## **4. Results and discussions**

### **Model Fit and Quality Indices**

In order to evaluate the structural equation model, the Goodness of Fit Model can be utilized. The model's value is determined by comparing it to a standard deviation. When doing the WarpPLS analysis, a number of different measures were employed to determine the model's Goodness of Fit (Wardhani, Nugroho, Fernandes, & Solimun, 2020). Table 2 shows that the structural equation model is fit, and the quality index requirements were met based on the criteria provided. In light of these findings, it is possible to conclude that the model's Goodness of Fit was satisfactorily acceptable. The model produced can be utilized to conduct hypothesis testing.

Table 2. Model Fit and Quality Indices Results

<b>Model Fit and Quality Indices</b>	<b>Criteria</b>	<b>Value</b>	<b>Interpretation</b>
Average Path coefficient (APC)	Accepted if $p < 0.05$	0.264, $p < 0.001$	Acceptable
Average R-squared (ARS)	Accepted if $p < 0.05$	0.226, $p < 0.001$	Acceptable
Average adjusted R-squared	Accepted if $p < 0.05$	0.221, $p < 0.001$	Acceptable
Average block VIF (AVIF)	Accepted if $\leq 5$	1.417	Acceptable
Average full collinearity VIF	Accepted if $\leq 5$	1.738	Acceptable
Tenenhaus GoF (GoF)	Small $> 0.1$ , Medium $> 0.25$ , Large $> 0.36$	0.375	Large

Source: Processed data by Caratiquit, 2022

### **Reliability and validity measurements**

Convergent validity and discriminant validity are two types of validity assessment that are often used in PLS-based data analysis. These are referred to as convergent validity and discriminant validity, respectively. As Barclay, Higgins, and Thompson (1995) defined, discriminant validity is the degree to which constructs inside a model differ. The variation described by the construct should be more significant than that explained by other constructs, while the variance explained by measurement error should be more minimal (Fornell & Larcker, 1981). AVE square roots and cross-loadings tests are frequently used to determine a PLS model's discriminant validity.

Internal consistency is a term used to assess the convergent validity of a hypothesis. Simple correlations (loadings) between items and their associated variables indicate item reliability (Barclay et al., 1995).

A factor loading of 0.5 is acceptable as long as other factors in the same construct have a high loading (W. W. Chin, 1998; Keil et al., 2000). Further, it raises concerns about item reliability and constructs reliability when many observed variables are used in a latent variable. Composite reliability is commonly documented as a measure of build dependability in structural equation modeling (Fornell & Larcker, 1981). The Average Variation Extracted (AVE) statistic, in addition, contrasts the variance explained by items with the variance caused by measurement error (W. Chin, 1998). It has been demonstrated by Fornell and Larcker (1981) that convergent validity can be guaranteed even when the AVE is less than 0.5 if the composite reliability is more significant than 0.6. As a result, the AVE is still acceptable in 0.4. The WarpPLS was used to determine composite reliability and AVE. In accordance with the findings in Table 3, the results demonstrate that the measures used in the study exhibit discriminant validity, which is a positive finding. Also, Table 4 indicates that the variables fall within the acceptable ranges for convergent validity.

Table 3. Square Roots of AVE Coefficients and Correlation Coefficients

	<b>AP</b>	<b>CA</b>	<b>M</b>	<b>CIA</b>	<b>PB</b>
<b>AP</b>	<b>-1</b>				
<b>CA</b>	-0.16	<b>-0.725</b>			
<b>M</b>	0.083	-0.58	<b>-0.707</b>		
<b>CIA</b>	-0.102	-0.101	0.216	<b>-0.732</b>	
<b>PB</b>	0.191	-0.713	0.653	0.086	<b>-0.748</b>

Source: Processed data by Caratiquit, 2022

*Non-diagonal elements represent the correlation between constructs, while diagonal elements are the square roots of the AVEs.*

Table 4. Item Loadings, Average Variation Extracted, and Reliability of the Variables

<b>Constructs/Items</b>	<b>Item Loading</b>	<b>AVE</b>	<b>CR</b>	<b>Cronbach Alpha</b>
<b><i>COVID-19 Anxiety (CA)</i></b>				
1. I feel bad when thinking about COVID-19	0.634	0.526	0.886	0.849
2. I feel my heart racing when I read about COVID-19	0.745			
3. I feel anxious about COVID-19	0.724			
4. I feel uneasy when reading news about COVID-19	0.772			
5. I have trouble relaxing when I think about COVID-19	0.716			
6. I feel like I may panic when I update myself about COVID-19	0.740			
7. I am afraid of being infected with COVID-19	0.735			
<b><i>Mindfulness (M)</i></b>				
1. I engage in activities that promote relaxation, such as meditation and exercise.	0.639	0.500	0.833	0.749
2. I do worship, prayer, and Bible study.	0.680			
3. I keep connected with my family and friends.	0.764			
4. I am listening to music that promotes mindfulness.	0.736			
5. I'm paying attention to what's happening at the moment.	0.712			

***COVID-19 Information Avoidance (CIA)***

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1. I limit my screen time on social media to avoid exposure to COVID-19 information.	0.651	0.536	0.821	0.709
2. I stay away from news regarding COVID-19 updates and related deaths in the media.	0.780			
3. I do not follow or like any COVID-19-related social media pages.	0.758			
4. I keep away from reading COVID-19 survivors' stories and situations on media.	0.733			

***Preventive Behavior (PB)***

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1. I use personal protection measures like masks and face shields.	0.771	0.560	0.834	0.733
2. I'm learning about COVID-19, prevention, and transmission.	0.832			
3. I avoid crowded areas and spaces with poor ventilation.	0.774			
4. I keep my hands clean.	0.595			

***Academic Performance (AP)***

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GA First Quarter	1.000	1.000	1.000	1.000
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Source: Processed data by Caratiquit, 2022

Each item has a significant loading of 0.001 ( $p < .001$ ). AVE stands for average variance extracted, and CR stands for composite reliability

***Mediation Model Results***

The structural model is evaluated by determining its path coefficients, coefficient of determination ( $R^2$ ), and effect sizes. The PLS path model is depicted in Figure 2. The beta coefficients ( $\beta$ ) represent the mediation model's path coefficients.

The beta coefficient of the direct relationship between COVID-19 anxiety and academic performance is negative and not significant ( $\beta = -0.07$ , NS). The beta coefficient of the relationship between COVID-19 anxiety and mindfulness is negative and significant ( $\beta = -0.58$ ,  $p < 0.01$ ). Also, COVID-19 anxiety and preventive behavior ( $\beta = -0.72$ ,  $p < 0.01$ ) and COVID-19 anxiety and COVID-19 information avoidance ( $\beta = -0.13$ ,  $p < 0.01$ ). On the other hand, the mindfulness and academic performance beta coefficient are also negative and significant ( $\beta = -0.11$ ,  $p = 0.03$ ). The same is true with COVID-19 information avoidance and academic performance ( $\beta = -0.12$ ,  $p = 0.01$ ). The relationship between preventive behavior and academic performance is positive and significant ( $\beta = 0.11$ ,  $p = 0.02$ ).

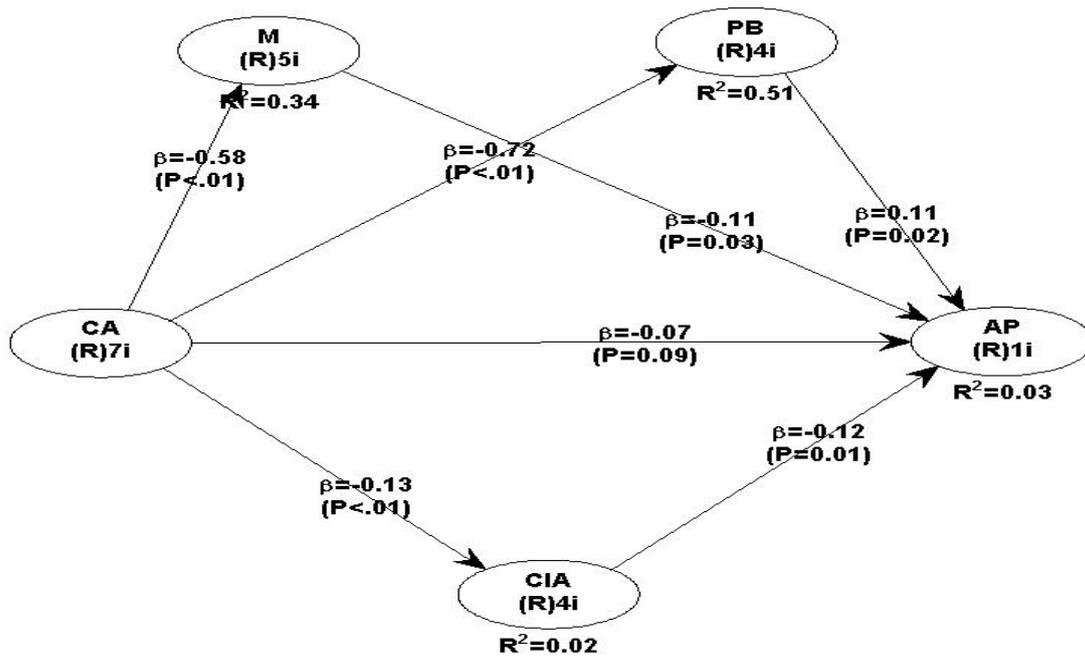


Figure 2. COVID-19 Anxiety – Academic Performance Mediated by Protective Factors  
Source: Processed image by Caratiquit, 2022

**Full Collinearity VIFs Assessment**

In statistics, a high multicollinearity multiple regression models makes it difficult to evaluate the relationship between independent and dependent variables. Derivative coefficients on independent variables can be affected by small changes in the data or model equation structure. According to a rule of thumb derived from the extensive use of this software for SEM analyses in the past, full collinearity variance inflation factors (VIFs) of 3.3 or less indicate the absence of multicollinearity in the model and no common method bias (Kock, 2015; Kock & Lynn, 2012). On the other hand, the multivariate analysis literature recommends two distinct criteria for VIFs: one that is more conservative and one that is more relaxed. They may also be applicable in this situation; however, they may be more appropriate in path studies when all latent variables are quantified using a single indicator. VIFs should be less than 5; a more permissive criterion is less than 10 (J. Hair, Anderson, Black, & Babin, 1987); (Kline, 1998); (Kock, 2014). According to the findings in Table 5, the variables' VIFs fall within the acceptable ranges. It implies that the model has no multicollinearity and no common method bias.

Table 5. Full collinearity VIFs Results

AP	CA	M	CIA	PB
1.057	2.140	1.910	1.068	2.516

Source: Processed data by Caratiquit, 2022

AP stands for Academic Performance; CA stands for COVID-19 Anxiety; M stands for Mindfulness; CIA stands for COVID-19 Information Avoidance; and PB stands for Preventive Behavior

**Direct and indirect effects**

Table 6 shows the direct and indirect effects of the PLS path model. In terms of the direct effect, the analyses show that COVID-19 anxiety and academic performance have no direct effect ( $\beta = -0.074$ , NS) with the effect size of small (Cohen's  $f^2 = 0.013$ ). Hence, H1 is not supported. Also, the analyses reveal that COVID-19 anxiety negatively influences mindfulness ( $\beta = -0.584$ ,  $p < 0.01$ ). The path coefficient shows that lower COVID-19 anxiety increases the mindfulness of the learners. The effect size of path CA  $\Rightarrow$  M is medium (Cohen's  $f^2 = 0.342$ ). Thus, the results support H2. Unexpectedly, the analyses show that mindfulness is significantly related to academic performance but in the opposite direction of the hypothesis ( $\beta = -0.109$ ,  $p = 0.025$ ). The beta coefficient indicates that a high level of

mindfulness may trigger overthinking, leading to the low academic performance of the learners. The effect size of path  $M \Rightarrow AP$  is small (Cohen's  $f^2 = 0.019$ ). Consequently, H3 is not supported. Besides, the indirect effect of COVID-19 anxiety and academic performance mediated by mindfulness is significant ( $\beta = 0.078$ ,  $p=0.025$ ). The effect size of path  $CA \Rightarrow M \Rightarrow AP$  is small (Cohen's  $f^2 = 0.014$ ). This implies that mindfulness mediates the relationship between COVID-19 anxiety and academic performance. Thus, H4 is supported.

Regarding the relationship between COVID-19 anxiety and COVID-19 information avoidance, a negative and significant association exists between the two constructs ( $\beta = -0.132$ ,  $p=0.009$ ). The effect size of path  $CA \Rightarrow CIA$  is medium (Cohen's  $f^2 = 0.017$ ). Hence, H5 is supported. Surprisingly, the analyses reveal that COVID-19 information avoidance is negatively related to academic performance with a medium effect size ( $\beta = -0.123$ ,  $p=0.013$ , Cohen's  $f^2 = 0.015$ ). The beta coefficient suggests that avoiding information about the outbreak may lead to learning management difficulties for the learners. Thus, H6 is not supported. Furthermore, there is no indirect effect in the relationship between COVID-19 anxiety and academic performance mediated by COVID-19 information avoidance size ( $\beta = 0.017$ , NS, Cohen's  $f^2 = 0.003$ ). Consequently, H7 is not supported.

In terms of the relationship between COVID-19 anxiety and preventive behavior, the analyses signify a negative and significant relationship between these two components ( $\beta = -0.717$ ,  $p<0.001$ ). The effect size of path  $CA \Rightarrow PB$  is large (Cohen's  $f^2 = 0.514$ ). Thus, H8 is supported. Additionally, preventive behavior is significantly and positively related to academic performance ( $\beta = 0.110$ ,  $p=0.024$ ). The effect size of path  $PB \Rightarrow AP$  is small (Cohen's  $f^2 = 0.022$ ). Hence, H9 is supported. The analyses also reveal that preventive behavior mediates the relationship between COVID-19 anxiety and academic performance ( $\beta = -0.106$ ,  $p=0.004$ , Cohen's  $f^2 = 0.018$ ). Therefore, H10 is supported.

**Table 6.** Direct and indirect effects of the Model

Type	Effect	$\beta$	SE	p-value	$f^2$
Indirect	$CA \Rightarrow M \Rightarrow AP$	0.078	0.039	0.025	0.014
	$CA \Rightarrow CIA \Rightarrow AP$	0.017	0.040	0.335	0.003
	$CA \Rightarrow PB \Rightarrow AP$	-0.106	0.004	0.004	0.018
Component	$CA \Rightarrow M$	-0.584	0.052	<0.001	0.342
	$M \Rightarrow AP$	-0.109	0.055	0.025	0.019
	$CA \Rightarrow CIA$	-0.132	0.055	0.009	0.017
	$CIA \Rightarrow AP$	-0.123	0.055	0.013	0.015
	$CA \Rightarrow PB$	-0.717	0.050	<0.001	0.514
	$PB \Rightarrow AP$	0.110	0.055	0.024	0.022
	Direct	$CA \Rightarrow AP$	-0.074	0.056	0.094

Source: Processed data by Caratiquit, 2022

*AP stands for Academic Performance; CA stands for COVID-19 Anxiety; M stands for Mindfulness; CIA stands for COVID-19 Information Avoidance; and PB stands for Preventive Behavior;  $F^2$  is the Cohen's (1988) effect size: 0.02 = small, 0.15 = medium, 0.35 = large; SE = standard error;  $\beta$  = standardized path coefficient.*

### Discussion

The study proved that COVID-19 anxiety is negatively related to mindfulness. This signifies the COVID-19 anxiety of learners in these trying times, and they are trying to cope with it through mindfulness. Thus, mindfulness practices such as meditation boost positive effects on learners while simultaneously protecting against the negative impact of COVID-19 on emotional health. Prior studies also suggested that COVID-19 anxiety and mindfulness are negatively correlated (Antonova et al.,

2021; Behan, 2020; Simonsson, Bazin, Fisher, & Goldberg, 2021). Unexpectedly, the results also revealed that mindfulness is negatively related to students' academic performance. The findings suggest that too much mindfulness might lead to overthinking; thus, academic performance decreases. Adolescent learners tend to overthink and become more uncomfortable with their emotions, both of which have a negative impact on their academic progress, particularly in the face of the currently underway pandemic. The findings can explain the effect of mindfulness on academic performance depending on the level of students' psychological discomfort and other factors during this pandemic. Additionally, relevant studies have been conducted (Bóo et al., 2020); (Corti & Gelati, 2020; Lu, Huang, & Rios, 2017).

Additionally, the study found that COVID-19 anxiety is negatively related to COVID-19 information avoidance. As learners avoid COVID-19 related news and updates, their COVID-19 anxiety decreases. The findings are consistent with previous endeavors (Kecojevic, Basch, Sullivan, & Davi, 2020; Ni et al., 2020; Wong, Hung, Alias, & Lee, 2020). Unexpectedly, the results revealed that COVID-19 information avoidance of learners negatively affects their academic achievement. Adolescent learners may experience academic stress and sleep disruptions if forced to homeschool or confine themselves to their homes due to a pandemic. As more students avoid knowing about the outbreak, regulating their learning, and conducting their studies with prudence will become more challenging. The findings are relevant to previous research (Akulwar-Tajane, Shah, Naik, & Parmar, 2020; Gilbert & Weaver, 2010; Lepore & Kliever, 2013; Scotta, Cortez, & Miranda, 2021); (Åkerstedt, Nilsson, & Kecklund, 2009); (Gomes, Tavares, & de Azevedo, 2011).

The findings also revealed that COVID-19 anxiety is negatively related to preventive behavior. This means that learners' COVID-19 anxiety diminishes as they adhere to preventative health measures and safety standards. The results align with earlier research (Alrubaiee, Al-Qalah, & Al-Aawar, 2020; Ejeh, Owoicho, Saleh, Madukaji, & Okon, 2021; Stickle, Matsubayashi, Sueki, & Ueda, 2020). Additionally, as preventive behavior among learners becomes more prevalent, their academic performance tends to follow in the same direction. The results are related to previous endeavors (Toquero, 2020);(Hu, 2021).

Likewise, the results revealed that mindfulness and preventive behavior mediate the negative relationship between COVID-19 anxiety and academic performance. This implies that mindfulness and preventive behavior significantly influence the strength of the relationship between COVID-19 anxiety and academic performance. This also suggests that mindfulness and preventive behavior are good protective factors that help learners cope with their COVID-19 anxiety while also influencing their academic performance. These findings corroborate other studies (Barocas et al., 2021; Pungpapong & Kalayasiri, 2020; Rettie & Daniels, 2021).

## **5. Conclusion**

The undertaking discovered a link between COVID-19 anxiety and mindfulness. Students are utilizing mindfulness to address their COVID-19 anxiety. Also, the undertaking revealed a relationship between mindfulness and academic performance. Excessive mindfulness can result in overthinking, which can negatively affect academic achievement. Adolescent students tend to overthink and get uneasy with their emotions in the light of the current pandemic. Differences in students' level of anxiety to COVID-19 may result in varied effects of mindfulness on academic achievement.

The mediation model also discovered a correlation between COVID-19 anxiety and avoidance of information. When students ignore COVID-19 news and updates, their anxiety about the virus diminishes. Meanwhile, the current study also showed that learners' avoidance of COVID-19 information negatively affects their academic development. If compelled to homeschool or remain at home due to a pandemic, adolescent students may experience academic stress and sleep difficulties. As more students become oblivious of the spread, it becomes increasingly difficult to manage their learning and study. Likewise, anxiety about COVID-19 is associated with preventative behavior. When students adhere to safety and health procedures, their COVID-19 anxiety diminishes. It has also been noted that when students' preventive behavior improves, their academic achievement generally improves.

Additionally, only mindfulness and preventive behavior mediate the negative link between COVID-19 anxiety and academic achievement. It has been noted that mindfulness and preventive behavior play a significant role in the relationship between COVID-19 anxiety and academic performance.

### **Limitations and study forward**

With the pandemic having a substantial influence on the municipality, the researcher performed this study by examining the relationship between COVID-19 anxiety, information avoidance, mindfulness, preventive behavior, and academic performance among learners. Nevertheless, the current study has a number of limitations. It only considers preventive factors that may affect COVID-19 anxiety and academic performance. Future researchers may explore further factors that influence COVID-19 anxiety and academic performance. Thus, parents and schools must orient the learners properly with different protective factors for this pandemic, particularly mindfulness and pandemic information avoidance. A similar study with a bigger sample size, including elementary and college students, may be done in the future. Future researchers are also encouraged to reinvestigate the study's unanticipated correlational directions.

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