

# Generalized Self-Efficacy Shields on the Negative Effect of Academic Anxiety on Academic Self-Efficacy During COVID-19 Over Time: A Mixed-Method Study

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## Abstract

This two-wave longitudinal study demonstrates the important role of generalized self-efficacy in enhancing online education for Pakistan's university students during COVID-19. Four hundred and two students participated in the study at both Time 1 and Time 2. Generalized self-efficacy and academic anxiety based on online classes was assessed at Time 1, whereas academic self-efficacy at Time 2. Results indicated that moderate and high levels of generalized self-efficacy shield the negative effects of higher levels of academic anxiety on academic self-efficacy over time. Results suggest that generalized self-efficacy—as a positive resistance resource factor—may gradually coalesce into academic self-efficacy (domain-specific self-efficacy), which at first may be underdeveloped in students in the face of academic anxiety emanating from their online classes during COVID-19 (novel challenging situation). Further, students' coded responses revealed ten major sources of academic anxiety emanating from their online classes including internet connectivity issues, increased academic demands, lack of active engagement in online classes, inability to understand difficult topics, and ambiguous internal assessment criteria. Findings suggest implementing interventions for students focusing on instilling internal resources embodied in generalized self-efficacy, conducting active and engaging online classes based on emotionalized learning experiences, and increasing the overall efficacy of teaching and learning during the pandemic through the implementation of a meaningful blended learning approach—based on an online learning mode and an offline personal and collaborative learning mode.

**Keywords:** COVID-19, academic anxiety based on online classes, generalized self-efficacy, academic self-efficacy, Pakistan's university students

## Introduction

Online learning has ensured the continuity of teaching and learning during the COVID-19 pandemic. Previous research has mainly focused on the challenges and/or positive aspects associated with online learning (e.g., Abbasi et al., 2020; Aguilera-Hermida, 2020; Arslan, Yildirim & Zangeneh, 2021). Studies conducted in different countries report their experience with online learning amid the pandemic (e.g., Abbasi et al., 2020; Aguilera-Hermida, 2020; Hashemi, 2021). In Pakistan, research conducted by Abbasi et al. (2020) indicates that students have been disappointed with online classes mainly because of the reduced student-teacher interaction. Similarly, a study from India by Mohalik and Sahoo (2020) suggests that although online classes have presented a good option for teaching and learning during the pandemic; however, they cannot be used as a substitute for face-to-face learning. Further, research conducted in the Philippines reveals that as students were not familiar with the online technology, therefore, they had problems studying via the online platform (Baticulon et al., 2020). Additionally, a study conducted by Green et al. (2021a) indicates that emotional support received acts as a buffer between academic stress emanating from online learning and mental well-being. Several studies have also indicated a decline in students' academic performance during the pandemic (e.g., Elhadary et al., 2020; Green et al., 2021b; Hashemi, 2021; Realvázquez-Vargas et al., 2020).

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It is much pertinent to note that research has yet to focus on delineating a mechanism for enhancing university students' online learning experience during the pandemic. Considering this gap, this longitudinal study aims at augmenting university students' academic self-efficacy amidst the academic anxiety experienced by them. To this end, this contribution explores the role of generalized self-efficacy in alleviating university students' academic anxiety to advance their academic self-efficacy. To the best of the researcher's knowledge these constructs have not been studied in the context of improving online education during the pandemic and also otherwise. Academic anxiety occurs when students encounter stressors in the academic setting that they consider as a threat (Cassady et al., 2019). In this study, academic anxiety is conceptualized as the anxiety that emanates from the stressors encountered in online classes (academic setting). Furthermore, academic self-efficacy reflects students' confidence in their capacity to perform successfully in their academic activities (Hodges, 2008) pertaining to the online mode of education. In addition, generalized self-efficacy reflects people's global confidence in their ability to cope with a range of challenging or novel situations (Skinner et al., 1988), such as those stemming from the precipitous shift to online learning during the pandemic. Of note is that self-efficacy is a critical factor associated with the acceptance and successful use of online learning within the context of the pandemic (Aguilera-Hermida, 2020; Murphy, 2020). Many researchers assert that self-efficacy is a vital component of academic success in online learning (Hodges, 2008; Yıldırım, 2020). It helps students in effectively adapting to online learning environments and consequently performing well in them (Alivernini & Lucidi, 2011).

### This study

This study is perhaps the first to consider the role of generalized self-efficacy in shielding the negative effect of academic anxiety on academic self-efficacy over time. The first objective of this study is therefore to analyze the moderating effect of generalized self-efficacy on the relationship between academic anxiety at Time 1 and academic self-efficacy at Time 2. The dependent variable is separated in time from the moderator and the independent variable (cf. Figure 1) and is assessed again in a follow-up survey six months after the first measurement (Time 2). Furthermore, the second objective of this study is to identify the sources of academic anxiety emanating from online classes based on university students' perceptions. This is in all likelihood the first study to explore the sources of university students' academic anxiety to propose solutions for addressing it.

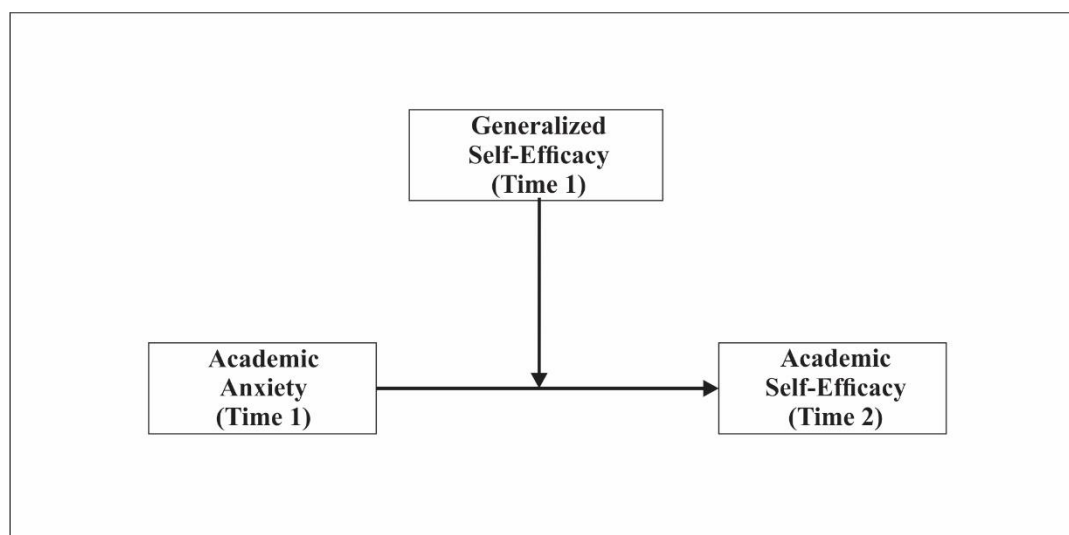


Figure 1. The moderation model

### Theoretical framework

#### *Academic anxiety*

This is a broad construct that encompasses a more generalized set of anxieties pertaining to typical academic activities (e.g., experiencing a sense of dread while attending classes, fretting over lower performance than one's classmates, worrying about managing academic responsibilities, and feeling stressed about schoolwork). Academic anxiety is considered as a generalized form of specific types of anxiety (e.g., test or evaluation anxiety, foreign language anxiety, and math anxiety) in the school context (Cassady, 2010). Prior research has predominantly focused on the ill effects of the specific forms of anxiety (Arslan, Yıldırım & Aytaç, 2022;

Rehman et al., 2022) and has paid less attention to academic anxiety (Cassady et al., 2019) and practically none on academic anxiety based on online classes. Academic anxiety is considered as a generalized representation of perceived threat imposed by a stressor encountered within an academic task, setting, or context (Cassady, 2010; Beck & Bredemeier, 2016). Research suggests that students experience some sort of anxiety because of online learning (Ajmal & Ahmed, 2019; Saadé et al., 2017), which may adversely influence their online learning experience and satisfaction (Liaw & Huang, 2013). However, academic anxiety may be higher for all those students who have still not been able to fully adjust to the online mode of education. Research indicates that academic anxiety is negatively related to academic achievement or GPA (Cassady et al., 2019; Shakir, 2014). Also, study anxiety is negatively related to academic performance (Vitasari et al., 2010), which is influenced by personal efforts, peer interaction, completion of assignments, class attendance, and study groups (Sansgiry et al., 2006). Academic anxiety may also impair students' concentration during studies and create memory problems leading to feelings of helplessness and failure (Jain, 2012; Shakir, 2014). Thus, high levels of academic anxiety could negatively influence students' academic self-efficacy for attaining the desired levels of academic performance.

### ***Self-efficacy***

Lower levels of self-efficacy may be attributed to students' academic anxiety in the context of their online classes. Self-efficacy is considered as an important psychological construct that can change students' perceptions about their study environment (Pajares, 1996), which in this study is the online learning environment. Self-efficacy is the self-assurance and the strength of a person's belief in his/her capabilities to achieve meaningful results, address issues, and complete tasks successfully (Ormrod, 2006). The concept of self-efficacy was originally introduced by Bandura (1997) as a component of his Social Cognitive Theory. According to the theory, how individuals feel or behave (i.e., students' experiencing academic anxiety based on their online classes) can often be better predicted by the beliefs they hold about their capabilities (i.e., knowledge and skills to successfully study online) to complete tasks (Pajares, 1996). In essence, these beliefs are an important indicator of people's capacities to perform stressful tasks that they have never performed before (Bandura, 1997), that is, students' capabilities to shift to the online mode of education for the first time in their lives as well as to adapt to it. The theory also suggests that students are able to strengthen their self-efficacy beliefs based on four sources of self-efficacy information (mastery experiences, vicarious experiences, verbal or social persuasion, and physiological and affective states), which may influence their task choice, effort, persistence, resilience, and academic performance (Bandura, 1997). Researchers have conceptualized self-efficacy as domain-specific self-efficacy and generalized self-efficacy. Domain-or-task-specific self-efficacy beliefs are dynamic and are linked to specific domains of activities, tasks, and performance (Lent, 2005), such as academic self-efficacy (Byrne et al., 2014). Generalized self-efficacy reflects an optimistic self-belief enabling individuals to manage unexpected situations, perform novel or challenging tasks, address problems, and achieve their goals in diverse life domains (Schwarzer, 1992).

### ***Academic self-efficacy***

Based on the conceptualization of Byrne et al. (2014), academic self-efficacy represents students' confidence in their ability to perform such academic activities as: (1) asking questions, (2) responding to questions, (3) approaching teachers for help, (4) engaging in academic discussions, (5) following and making sense of material covered in class, (6) meeting assignment and project deadlines, (7) consulting friends for help, (8) producing best work in exams, (9) making sense of feedback from teachers on assignments, (10) being able to study independently, and (11) passing the semester in the first attempt. Note, that these academic activities are also appropriate for determining academic self-efficacy in the context of online classes, as the conceptualization of academic self-efficacy by Byrne et al. (2014) represents the construct more adequately than other academic self-efficacy scales (e.g., Alegre, 2014; Ansong et al., 2016; Dullas, 2018). Research indicates that academic self-efficacy has a direct effect on academic achievement (Hayat et al., 2020). Further, as compared to students with lower academic self-efficacy, those with higher academic self-efficacy have a greater intrinsic inclination towards academic activities (Phan, 2010), view arduous tasks as challenges to be addressed rather than threats to be avoided (Chemers et al., 2001), are able to recover their confidence soon after failures (Pajares & Schunk, 2002),

and interact with faculty as well as participate in social activities (Gore et al., 2006). University students may have low academic self-efficacy with regard to online learning during the pandemic because of the difficulty in adjusting to this mode of education that has brought with it a host of new criteria for covering the subjects/courses and assessing their performance. These in all likelihood increase students' academic demands and create ambiguous course expectations (Friedman, 2020).

### **Generalized self-efficacy as a moderator**

As a positive resistance resource factor against negativities generalized self-efficacy embodies positive emotions (cf. Figure 2)—as reflected in the items of its scale—that instil pertinent internal resources in individuals to face life's challenges without detrimental consequences (Jerusalem & Schwarzer, 1992). Based on the conceptualization of the construct by Jerusalem and Schwarzer (1992), these internal resources (e.g., self-reliance, effort investment, self-confidence, persistence, composure, commitment, ingenuity, solution-orientation, goal-orientation, and recovery from setback; Green, 2020a) are competence-based, prospective, and action-oriented (Bandura, 1997; Schwarzer et al., 2005). These resources may therefore act as a buffer against the academic anxiety experienced by university students. This is because each internal resource represents successful coping and implies an internal-stable attribution of success (Schwarzer, 1992), which most likely decreases the negative influence of academic anxiety on academic self-efficacy. Also, research indicates that generalized self-efficacy is negatively related to state anxiety (i.e., one's present level of anxiety; Endler et al., 2001) and positively related to academic self-efficacy (Holmquist & Gable, 2016) and academic achievement (Green, 2019a; Schwarzer & Jerusalem, 1995).

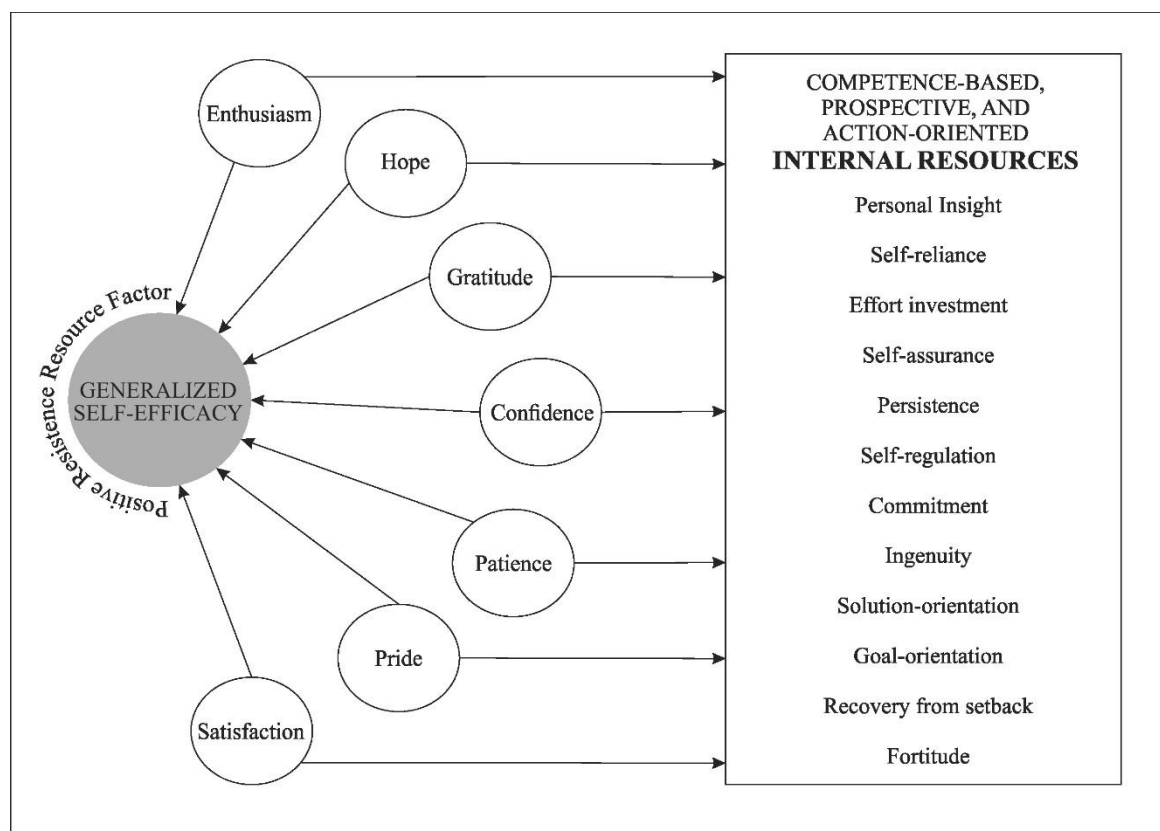


Figure 2. Positive emotions and internal resources pertaining to generalized self-efficacy

### **Research questions and hypotheses**

*Research question 1:* Does generalized self-efficacy shield the negative effects of academic anxiety (emanating from online classes) on academic self-efficacy?

*Hypothesis 1:* Generalized self-efficacy will moderate the relationship between academic anxiety and academic self-efficacy.

The following research question was more exploratory in nature for which no specific hypothesis was formulated:

*Research question 2:* What are the different sources of academic anxiety emanating from university students' online classes?

## Method

### Participants

Nine hundred and thirty-seven undergraduate (52%), graduate (35%), and postgraduate students (13%) participated in the study by completing the online survey at Time 1. The 412 (44%) men and 525 (56%) women were studying at three private and four public universities located in Rawalpindi, Islamabad, and Peshawar. The average age of the participants was 25.31 years ( $SD = 3.23$ ) and 71% of them reported being single. Further, 57% were public university students and 43% private university students. Seventy-four percent (693) of these participants agreed to be contacted again for a follow-up survey. After six months (Time 2), they were contacted to complete another online survey, which once again comprised the academic self-efficacy measure. The response rate was 58%, resulting in a sample size of 402 participants for the longitudinal analysis, that is, 193 (48%) men and 209 (52%) women. The average age of these participants was 24.06 years ( $SD = 2.63$ ).

### Measures

The measures were administered in the English language (cf. Green et al., 2021b). Pilot testing conducted for this study determined the validity (through confirmatory factor analysis; CFA) and reliability (based on the value of Cronbach's alpha) of the measures. These assessed the appropriateness of administering the English version of the scales to the study participants.

#### Academic anxiety based on online classes

This was measured through the 11-item Academic Anxiety Scale (AAS) developed by Cassady et al. (2019). We substituted the words, "school" and "classrooms" with "online classes" wherever applicable to reflect the essence of academic anxiety based on online classes. The scale uses a 4-point Likert type scale (1 = not at all typical for me; 4 = very typical of me). A sample item in the scale is: "I often worry that I am not doing my assignments properly." The authors reported excellent internal consistency ( $\alpha = .90$ ) of the scale. Further, CFA indicated a good model fit,  $\chi^2$  (33,  $N = 260$ ) = 70.02,  $p < .001$ ;  $\chi^2/df = 2.12$ ; RMSEA = .059; RMSEA 90% CI [.04; .08]; CFI = 0.97; TLI = 0.96; NFI = 0.96; SRMR = 0.037. Cronbach's alpha indicated a good internal consistency of the scale ( $\alpha = .88$ ). Factor loadings ranged from 0.66 to 0.88. Higher scores on the AAS indicate greater academic anxiety experienced.

#### Generalized self-efficacy

The 10-item General Self-Efficacy Scale (GSES) developed by Schwarzer and Jerusalem (1995) was used. According to the authors, the internal consistency of the scale in samples from 23 nations ranged between 0.76 and 0.90. A sample item in the scale is: "I can remain calm when facing difficulties because I can rely on my coping abilities." The GSES uses a four-point Likert-type scale (1 = not at all true; 4 = exactly true). In addition, CFA indicated a good model fit,  $\chi^2$  (27,  $N = 260$ ) = 62.56,  $p < .001$ ;  $\chi^2/df = 2.31$ ; RMSEA = .071; RMSEA 90% CI [.05; .09]; CFI = 0.95; TLI = 0.94; NFI = 0.95; SRMR = 0.047. Cronbach's alpha indicated a high internal consistency of the scale ( $\alpha = .92$ ). Factor loadings ranged from 0.51 to 0.78. Higher scores on the scale suggest a stronger sense of generalized self-efficacy.

#### Academic self-efficacy

The 11 academic activities mentioned before were taken from the 26-item Academic Self-Efficacy Scale (ASES) by Byrne et al. (2014), as these were most relevant for measuring academic self-efficacy in the context of online classes. The word "lectures" was substituted with "online classes" and the words "through electronic means" were added in a few items to reflect the true spirit of online learning. Following the stem (i.e., I feel confident in my ability that I can), a sample item in the scale is: "Follow and make sense of material covered in online classes." The ASES uses a seven-point Likert-type scale (1 = not confident at all; 7 = completely confident). However, for this study, a four-point Likert-type scale (1 = not confident at all; 4 = completely confident) was used. Furthermore, CFA was a good model fit, that is,  $\chi^2$  (33,  $N = 260$ ) = 73.66,  $p < .001$ ;  $\chi^2/df = 2.23$ ; RMSEA = .061; RMSEA 90%

CI [.04; .08]; CFI = 0.96; TLI = 0.95; NFI = 0.95; SRMR = 0.049. Cronbach's alpha indicated a high internal consistency of the scale ( $\alpha = .90$ ). Factor loadings ranged from 0.53 to 0.82. Higher scores on the scale suggest higher levels of academic self-efficacy. This scale was administered at Time 1 and Time 2.

### **Academic sources of academic anxiety**

At Time 2, the online survey also required the participants to answer an open-ended question, that is, "What issues or problems still make you anxious/worried about your online studies/academic activities?"

### **Procedure**

As part of the project, COVID-19 and the New Normal, this study was conducted under the Contemporary Research Initiative (CRI) at the Preston University. The CRI formally contacted 15 universities to seek their approval for the study. As a result, seven universities consented to participate in the study. An online survey was developed using Google Forms. The link to the survey was posted on each university's e-noticeboard. Additionally, the relevant program officers and the student affairs professionals at each university forwarded the link to various student groups on WhatsApp and Facebook. The researcher also e-mailed the link to the online survey to faculty members in his professional contacts at the seven universities to request them to forward it to their students. Participation in the study was anonymous and voluntary. The study participants were clearly explained the objectives of the study and assured of the confidentiality of their responses through a webpage preceding the survey. This page also requested their consent to participate in the study. They could only complete the survey if they chose the "I agree" option. In addition, participants had to complete all the items/questions in the online survey in order for it to be submitted. Data collection at Time 1 took place during January 2021 and that at Time 2 during July 2021.

### **Data analysis**

#### ***Quantitative data analysis***

Preliminary analyses entailed reporting the descriptive statistics, reliability estimates, and correlation between the study variables. The assumption of normal distribution was explored using the skewness and kurtosis statistics. According to Field (2009), the values between + 2 and - 2 for the statistics are considered acceptable for proving univariate normal distribution. Further, the Cronbach's alpha coefficient was used as a measure of the internal consistency reliability of the three scales. In addition, Pearson correlation coefficient was computed to assess the relationship between the study variables. Finally, Model 1 of the PROCESS macro version 3.5 (Hayes, 2018) was used to examine the hypothesized moderation model. All analyses were carried out in SPSS 24.

#### ***Analysis of participants' responses to the open-ended question***

Students' responses to the open-ended question regarding their sources of academic anxiety collected at Time 2 were hand-coded by a Psychology Lecturer. Ten sources were identified in this regard. The author independently checked the coding. The degree of Interrater agreement was determined based on Cohen's Kappa (Cohen, 1960). Disagreements were addressed based on conservatively coding each conflicting response as relating to a particular source of academic anxiety.

## **Results**

### **Preliminary analyses**

Table 1 presents the descriptive statistics pertaining to the study variables. In this regard, skewness and kurtosis demonstrated appropriate normality for the three variables, as their values were between + 2 and - 2. Furthermore, generalized self-efficacy at Time 1 was negatively related to academic anxiety at Time 1 and was positively related to academic self-efficacy at Time 2. In addition, academic anxiety at Time 1 was negatively related to academic self-efficacy at Time 2. Thus, the three variables were appropriate for testing the moderation model.

### **Generalized self-efficacy moderates between academic anxiety and academic self-efficacy**

Results of the moderation analysis indicated that the effect of academic anxiety at Time 1 on academic self-efficacy at Time 2 was negative and significant ( $b = -.37$ ,  $SE = .03$ ,  $t = -8.57$ ,  $p < .001$ ), conditional on generalized

self-efficacy at Time 1 = 0. The conditional effect of generalized self-efficacy at Time 1 was positive and significant ( $b = .61$ ,  $SE = .05$ ,  $t = 11.78$ ,  $p < .001$ ), conditional on academic self-efficacy at Time 2 = 0.

Furthermore, the interaction term was statistically significant ( $b = -.41$ ,  $SE = .06$ ,  $t = -6.28$ ,  $p < .001$ ) in the model, indicating that generalized self-efficacy at Time 1 was a significant moderator of the effect of academic anxiety at Time 1 on academic self-efficacy at Time 2. The interaction effect accounted for 5.6% of the overall variance of academic self-efficacy [ $F(1,398) = 39.47$ ,  $p < .001$ ]. The interaction was therefore probed to better interpret the nature of the moderated relationship between academic anxiety and academic self-efficacy over time. In this regard, tests of simple slopes were used to test the longitudinal relationship between academic anxiety and academic self-efficacy at the three levels of the moderator, generalized self-efficacy (Time 1). Examination of simple slopes demonstrated that at  $-1$   $SD$  (i.e., at  $-.66$ ) on the centered generalized self-efficacy variable (representing low generalized self-efficacy at Time 1), the relationship between academic anxiety at Time 1 and academic self-efficacy at Time 2 was negative, but non-significant ( $b = -.10$ ,  $SE = .06$ ,  $t = -1.65$ ,  $p = .1004$ ). Further, at the mean (i.e., at 0) on the centered generalized self-efficacy variable (representing moderate generalized self-efficacy at Time 1), the relationship was negative and significant ( $b = -.37$ ,  $SE = .04$ ,  $t = -8.57$ ,  $p < .001$ ). Finally, at  $+1$   $SD$  (i.e.,  $+.66$ ) on the centered generalized self-efficacy variable (representing high generalized self-efficacy at Time 1), the relationship was negative and significant ( $b = -.65$ ,  $SE = .06$ ,  $t = -10.14$ ,  $p < .001$ ). As such, moderate and high levels of generalized self-efficacy may shield the negative effects of higher levels of academic anxiety on academic self-efficacy over time. Results therefore support *Hypothesis 1*. Figure 3 presents the effect of academic anxiety at Time 1 on academic self-efficacy at Time 2 at the three levels of generalized self-efficacy assessed at Time 1.

Table 1. Descriptive statistics and correlations

| Variable                              | Descriptive Statistics |     |      |      |       |       |          | Correlations |      |      |
|---------------------------------------|------------------------|-----|------|------|-------|-------|----------|--------------|------|------|
|                                       | Min                    | Max | Mean | SD   | Skew  | Kurt  | $\alpha$ | 1.           | 2.   | 3.   |
| 1. Academic anxiety (Time 1)          | 1                      | 4   | 1.93 | 0.79 | 0.16  | -1.30 | 0.95     | —            | -.24 | -.43 |
| 2. Generalized self-efficacy (Time 1) | 1                      | 4   | 2.54 | 0.66 | -0.92 | 0.01  | 0.88     |              | —    | .53  |
| 3. Academic self-efficacy (Time 2)    | 1                      | 4   | 1.94 | 0.88 | 0.46  | -0.81 | 0.96     |              |      | —    |

Note. All correlations are significant at  $p < .001$

### Sources of academic anxiety emanating from online classes

Students' coded responses are presented from more to less mentioned sources of academic anxiety in the ensuing paragraphs. The major source of academic anxiety mentioned by students was the *issue of Internet connectivity* (85%;  $\kappa = 0.89$ ). Here are two thoughts: "Due to the poor internet connection, video teaching sessions are not possible and so we have to learn through audio sessions..." and "As the internet connection keeps dropping, I have to sign off from class and miss the lecture..."

*Lengthy assignments, projects, and examinations causing mental and physical exhaustion* formed the second major source of academic anxiety mentioned by them (76%;  $\kappa = 0.86$ ). Here are two pertinent thoughts: "As the full course cannot be covered in online classes, therefore, we are overburdened with assignments and projects" and "While attempting the online final exam I was very worried, as the paper was very lengthy and couldn't be completed within the allotted time."

*Lack of active engagement in online classes* was the third source of academic anxiety mentioned more often by students (70%;  $\kappa = 0.81$ ). Students reported, "There are no class activities and as such there is low involvement in online classes. This causes boredom and frustration..." and "Audio-based teaching makes

online classes even duller. I usually loose interest within a few minutes and hence my academic performance suffers.”

The fourth source of academic anxiety repeatedly reported by participants was the *inability to understand complex topics in online classes* (62%;  $\kappa = 0.70$ ). Here are two representative quotes: “Most of the time, teachers just read the slides aloud and don’t spend time explaining the topics. They ask random questions from students... I cannot understand the complicated topics to answer questions related to them” and “Usually the time for questions and answers is so short that many students are unable to ask questions to seek clarification about complicated topics...”

*Ambiguous internal assessment criteria* formed the fifth major source of academic anxiety reported by students (51%;  $\kappa = 0.67$ ) as reflected in these quotes: “Whenever we submitted our assignments and project the only feedback, we received was that our marks would be added to our final grade...” and “The whole process of internal assessment seems pretty vague.”

*Lack of student discipline in online classes* was reported as the sixth major source of academic anxiety (36%;  $\kappa = 0.85$ ). As a student remarked: “It is difficult for me to communicate and interact effectively with teachers because of the non-serious students...”

Students also identified other sources of academic anxiety. For instance: (a) *hectic timetable of online classes* (31%;  $\kappa = 0.61$ ), (b) *lack of motivation on the part of some teachers to teach online* (12%;  $\kappa = 0.69$ ), (c) *uncovered chapters assigned as self-study by teachers* (9%;  $\kappa = 0.71$ ), and (d) *no concrete measures implemented by teachers to control cheating in assignments and quizzes* (6%;  $\kappa = 0.74$ ).

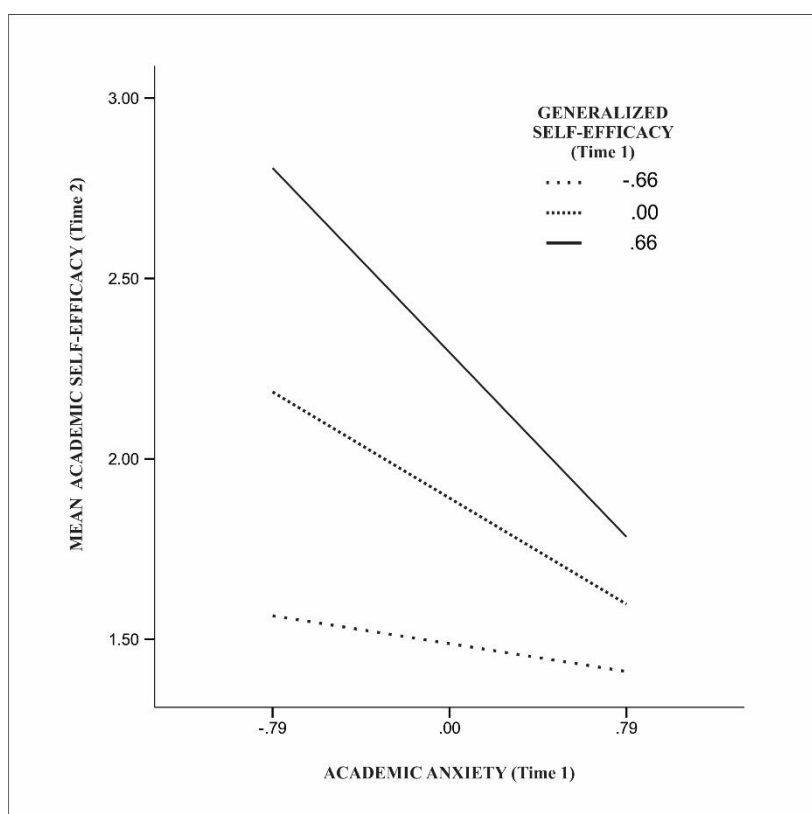


Figure 3. *Effect of academic anxiety on academic self-efficacy at different levels of generalised self-efficacy*

## Discussion

Results indicate that the longitudinal relationship between levels of academic anxiety and academic self-efficacy changes as the value of generalized self-efficacy changes. Generalized self-efficacy assessed at Time 1 is therefore a significant moderator variable, which likely acts as a shield against the negative effects of higher levels of academic anxiety at Time 1 on academic self-efficacy at Time 2. The study demonstrates a modus operandi for



enhancing online education for Pakistan's university students during COVID-19. Additionally, students' coded responses revealed ten major types of academic anxiety emanating from their online classes. These findings have important theoretical and practical implications.

### **Theoretical implications**

First, by separating the dependent variable in time from the moderator and the independent variable, this study presents a more rigorous test of moderation than a cross-sectional design. Second, this study is perhaps the first to consider the role of generalized self-efficacy in enhancing university students' online learning over time during COVID-19. As embodied in its scale, generalized self-efficacy instills such internal resources as self-reliance, self-confidence, ingenuity, solution-orientation, and persistence (Green, 2020a; Jerusalem & Schwarzer, 1992), which may be essential for reducing the negative effect of academic anxiety on academic self-efficacy over time. Further, the positive emotions (e.g., gratitude, pride, hope, and confidence) embodied in the items of GSES may induce novel and creative thoughts (Broaden-and-Build theory; Fredrickson, 2013) to address challenging or novel situations (Skinner et al., 1988) for students to attain their goals (Schwarzer & Jerusalem, 1995), that is, addressing academic anxiety to attain academic self-efficacy over time. Also, in line with the Broaden-and-Build theory, positive emotions are essential for mitigating the persistent negative influence of academic anxiety.

Third, the longitudinal analysis also lends credibility to the assertion that in novel or challenging situations, generalized self-efficacy may serve as a foundation for bolstering or awakening domain-specific self-efficacy over time (Green, 2019a; 2020a). These beliefs may still be dormant or underdeveloped in individuals while facing a novel or challenging situation (Lightsey et al., 2006). Relevant to note here is that because of the academic anxiety based on online classes (novel and challenging situation); students' academic self-efficacy (domain-specific self-efficacy) may have been dormant or underdeveloped at first. It may have developed/awakened gradually during Time 1 and Time 2 based on the feelings of competence brought about by a general sense of perceived self-efficacy (i.e., "I can usually handle whatever comes my way" and "I can solve most problems if I invest the necessary effort"; Schwarzer and Jerusalem 1995). In essence, these feelings of competence or strong self-efficacy beliefs may have served as a foundation for bolstering students' academic self-efficacy against their academic anxiety.

Lastly, students' responses to the open-ended question reveal several sources of academic anxiety emanating from their online classes than those included in the academic anxiety scale. For instance: internet connectivity issues; lack of active engagement; lengthy assignments, projects, and examinations; difficulty in understanding complex course topics; and ambiguous internal assessment criteria. These findings suggest that the academic anxiety scale may be extended to incorporate items based on the sources of academic anxiety identified from university students' coded responses. This may permit a more comprehensive assessment of academic anxiety experienced by students during the pandemic and at the same time provide better insights into improving their online learning experience.

### **Practical implications**

#### *Addressing internet connectivity issues*

The availability of pre-recorded lectures/sessions may be of great help to those who are unable to attend classes due to internet issues. Mobile companies may launch special student packages offering faster internet access at discounted rates. Also, hostel accommodation provided by the universities may offer internet services to students at discounted rates so that they are able to attend their online classes without fail. This may help several students who come from remote areas where internet services and support are limited.

#### *Motivational sessions for faculty*

Education administrators may organize online motivational sessions for faculty members highlighting the role of exemplary teaching (cf. Green, 2021a) in enriching students' online learning experiences. These sessions may permit faculty members to reflect on their online teaching methodology to identify, share, and adapt strategies for addressing students' academic anxiety and nurturing their academic self-efficacy.

### *Online learning and offline personal and collaborative learning modes*

Based on a series of online workshops organized by education administrators, online teaching development specialists may guide and motivate faculty members to enhance the efficacy of teaching and learning during the pandemic based on an intelligent mix of online learning (e.g., interactive lecturettes, question and answer sessions, feedback/guidance sessions, collaborative learning sessions, and sessions requiring students to present their findings of experiential activities) as well as offline personal learning and collaborative learning modes (cf. Bao, 2020; Green, 2021a, 2022; Green et al., 2021b). The online workshops may provide useful guidelines to faculty members with regard to configuring their courses for various online sessions and offline personal and collaborative learning activities.

In the context of personal learning, it is recommended to task students with short research papers and reading assignments (Bao, 2020) rather than lengthy, time-consuming assignments that are more of a burden than a source of learning. Also, collaborative learning may be based on interesting experiential learning activities tasked as assignments covering fundamental topics/concepts based on the pair and small group formats (cf. Green, 2021b). Students may complete the collaborative tasks/assignments by using Whatsapp, Zoom, Skype, and/or Microsoft Teams. Furthermore, quizzes and examinations may comprise short conceptual/application questions requiring students to use their higher-order thinking skills (analyze, synthesize, and evaluate).

Additionally, these online workshops may focus on the challenges of online and offline learning and finding appropriate solutions to address them. For instance, they may help faculty members in determining the criteria for assessing their students' online and offline learning. It may also be crucial for teachers to clearly explain the percentage of marks allocated to different components of the internal assessment, such as assignments (including individual or group experiential learning activities), class activities, presentations, quizzes, midterm, and project.

### *Dimensions of emotionalized learning experiences*

Education administrators in collaboration with teaching development specialists may also launch a series of online workshops for faculty members to build their capacities with regard to conducting active and engaging online classes based on the four dimensions of emotionalized learning experiences, that is, the cognitive setting for learning, the emotional setting for learning, the social setting for learning, and teaching and learning resources (cf. Egle, 2007; Green et al., 2020a, 2021b; Hu et al., 2022).). The cognitive setting focuses on the development of students' higher-order thinking skills. The emotional setting aims at securing affective connections with students by making them feel valued and appreciated, providing them productive feedback, encouraging active involvement, and most importantly addressing their fears of not doing well in online classes. The social setting fosters collaborative learning and offers a positive learning environment to ensure healthier levels of interaction among students during online classes. Finally, the teaching and learning resources focus on the attainment of learning outcomes based on the teaching content imparted through experiential learning activities and appropriate teaching aids/resources (Green, 2019b, 2021a, 2022). To promote student engagement, a host of interesting experiential learning activities may be adapted for online classes, such as alternative explanations to a scenario, movie application, detectives, real world, pro and con grid, and sorting right from wrong (cf. Green, 2021b; Green & Batool, 2017; Green et al., 2020b; Yildirim, & Tanriverdi, 2021).

### *Planning the segments of an online class*

This may be crucial for improving how online classes are conducted. For instance, the interactive lecturette segment, the discussion segment, and the Q&A segment need to be properly planned and implemented for conducting the online class smoothly and in an organized manner. It is recommended that separate Q&A sessions are scheduled to aptly address students' academic anxiety as well as further their academic self-efficacy.

### *Covering complex topics*

All fundamental concepts/topics may be properly explained to students through practical examples, activities, and/or videos. It may also be imperative for faculty members to select the most suitable teaching strategies (e.g., individual, pair, or small group tasks; short research papers; and reading assignments) for covering the prescribed curriculum. Faculty may also forward links to important web resources to enable students to gain a much fuller

understanding of the topics taught. Also, faculty may need to schedule virtual working hours more often to help students with their study-related problems.

### *Bolstering students generalized self-efficacy*

Educational interventions organized by student affairs professionals in collaboration with university counsellors and training specialists may focus on the development of internal resources that generalized self-efficacy—as a positive resistance resource factor—seeks to instil in individuals. For instance, the intervention content (i.e., real-life stories, brief cases, and situations depicted in video clips) and related experiential activities may elucidate the significance of: (1) dealing with obstacles and unexpected events independently (self-reliance), (2) striving hard to adjust to new environments (effort investment), (3) identifying several solutions when confronted with a problem (solution-orientation), (4) staying motivated to accomplish one's life goals (goal-orientation), (5) finding creative ways to deal with pressing problems (ingenuity), and (6) being committed to complete the most difficult of tasks with positive attitude (commitment). Also, these topics may be pertinent for explaining the essence of the six internal resources for furthering generalized self-efficacy: stimulating personal growth and proactivity, building inner strength and fortitude, unlocking the winner within, enhancing personal insight, achieving environmental mastery, seeking well-being, becoming a better version of oneself, and cultivating a positive outlook on life (cf. Green, 2020a, 2020b, 2021c, 2021d; Green et al., 2015a, 2015b, 2015c, 2015d; 2020b; Yıldırım, 2021; Yıldırım & Özaslan, 2022).

### **Limitations and future research**

This study has some limitations that need to be mentioned. The use of self-reported measures may have introduced some bias on account of social desirability. Nevertheless, students' personal perceptions and views about their academic anxiety may help in devising meaningful strategies for enhancing their online learning experience during the pandemic. Future research may focus on developing a comprehensive scale for assessing academic anxiety based on items developed from the sources of academic anxiety identified by students in this research. Next, the psychometric integrity of the new academic anxiety scale may be determined. Also, it may be interesting to conduct an online intervention for enhancing students generalized self-efficacy based on a three-wave longitudinal design (cf. Green, 2021a, 2022). Also, this research is based on an online survey and as such those having Internet connectivity issues may not have been able to participate. Future research may focus on intervention studies for faculty members to develop their capacities for enhancing university students generalized self-efficacy, curbing their academic anxiety, and boosting their academic self-efficacy.

### **Conclusion**

Overall, this contribution provides valuable insights into augmenting Pakistani university students' online learning during the coronavirus pandemic. It demonstrates that moderate and high levels of generalized self-efficacy may shield the negative effects of higher levels of academic anxiety on academic self-efficacy over time. Furthermore, based on participants' responses to the open-ended question, the study explores the sources of academic anxiety among university students as well as proposes meaningful strategies for alleviating their academic anxiety and furthering their academic self-efficacy. This study may also be of value to countries seeking to enrich university students' online learning during the COVID-19 crisis.

### **Compliance with Ethical Standards**

#### **Competing interests**

The author states that there is no conflict of interest.

#### **Ethical standards**

All procedures performed in the study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

#### **Informed consent**

Informed consent was obtained from all individual participants included in the study.

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## Data availability statement

The data that support the findings of this study are available on reasonable request from the author. The data are not publicly available due to information that could compromise the privacy of research participants.

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