




Overcoming academic procrastination: The effectiveness of psychological resilience in primary school pupils post COVID-19

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ABSTRACT

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The rapid transition to online learning has exacerbated procrastination behavior, further complicated by students' mental health challenges, such as depression, anxiety, and stress, which lead to delayed educational tasks and diminished academic performance. This study investigates the efficacy of a resilience intervention program based on the three-factor model of personal resilience in reducing academic procrastination among Egyptian primary school students during the COVID-19 pandemic. This quasi-experimental research involved a sample of 100 fourth-grade students who demonstrated high levels of procrastination, indicated by scores above 70% on the Pure Procrastination Scale. Students were randomly divided into two groups—an experimental group, which received resilience training, and a control group, which did not—to assess the intervention's impact on academic procrastination. Qualitative analyses of the feedback from students, teachers, and parents, coupled with pre- and post-intervention questionnaires, were utilized to evaluate the program's effectiveness. Initial findings revealed no significant differences between the groups before the intervention. However, significant improvements in the experimental group's procrastination levels were observed immediately and one month after the intervention, suggesting the potential ability of resilience training to enhance students' academic performance and well-being. Results advocate for the inclusion of resilience-building activities within educational curricula to effectively address academic procrastination. The purpose of this study is to propose suggestions to reduce academic procrastination in primary school students. These results have implications for educators and professionals working with children, emphasizing the value of fostering resilience skills to support academic achievement and well-being.

Contribution/Originality: This study confirms the effectiveness of three-factor model in enhancing learning quality by using academic resilience to reduce academic procrastination, which enhances students' psychological well-being and confidence in their abilities. Resilience-building interventions can be used at schools or universities to reduce procrastination and elevate the learners' academic outcomes. This approach represents a significant shift toward empowering student psychosocial development, offering a comprehensive strategy to address the multifaceted challenges associated with academic procrastination.

1. INTRODUCTION

The unexpected COVID-19 pandemic profoundly affected every sphere of life (Mollborn, Mercer, & Edwards-Capen, 2021), and the sudden shift from conventional face-to-face learning to online learning caused disturbances

among pupils worldwide. More than 23.5 million Egyptian pupils were adversely affected both physically and psychologically by the shutdown in 2020 (United Nations Children's Fund (UNICEF), 2020) as pupils were suddenly required to be self-disciplined and self-motivated in their new mode of online learning with little to no preparation time (Hoque et al., 2021; Ma, Li, Wang, Qiu, & Wang, 2022). Furthermore, school pupils experienced confusion, depression, parental loss, chronic disinfection, inner isolation, stress, and negative coping (Holmes et al., 2020), which are significant predictors of procrastination and lead to a visible loss of intrinsic motivation (Hong, Lee, & Ye, 2021; Melgaard, Monir, Lasrado, & Fagerström, 2022; Pelikan et al., 2021). In addition, these challenges were compounded by the lack of social interaction and support, which is essential for pupils' well-being and motivation. Mahfouz, Elabd, and El-Shaheed (2022) observed that school support or intervention programs stopped during the pandemic in Egypt, which could have negatively impacted the pupils' well-being. This in turn leads to learners being impacted by online learning. Many studies indicate that, due to the pandemic, pupils were less focused and more anxious and fatigued, which may have adversely affected their perception of online learning (Cheng & Xie, 2021; Curelaru, Curelaru, & Cristea, 2022). Due to this perception, online learning is perceived to increase the risk of academic procrastination (Ma et al., 2022; Melgaard et al., 2022). Academic procrastination is a specific form of procrastination that occurs in academic settings. It involves knowing that one needs to carry out an academic task, such as writing a term paper, studying for examinations, finishing a school-related project, or undertaking weekly reading assignments, but for one reason or another, failing to motivate oneself to do so within the expected time frame (Ackerman & Gross, 2005). It is a situational form of procrastination that involves a deliberate avoidance of achieving tasks, resulting in diverse psychological issues caused by a lack of self-efficacy and poor time management (Hong et al., 2021) while also having difficulty with self-regulation (Pelikan et al., 2021). Conditions such as these pose a challenge to the improvement of academic procrastination among school pupils.

Previous studies have investigated the correlation between academic resilience in reducing academic procrastination during the COVID-19 pandemic (Öksüz & Güven, 2014; Ragusa et al., 2023). Despite facing challenges, studies have highlighted that learners are able to improve their academic performance through academic resilience (Ambelu, Mulu, Seyoum, Ayalew, & Hildrew, 2019; Ko & Chang, 2019). In order to reduce academic procrastination, resilience intervention programs have been tested as a means of improving it, such as Brunwasser, Gillham, and Kim (2009) who developed the Pennsylvania Resiliency Program to enhance individuals' ability to overcome adversity by equipping them with a set of practical skills. Ma et al. (2022) concurred that there is a need to develop an intervention and prevention strategy of academic procrastination in college students who are participating in online learning. This should identify ways to reduce and mitigate the negative impacts of this behavior on the online learning process. Furthermore, this process is also required for primary school pupils in Egypt. The shift to online education during the pandemic has intensified procrastination among students, highlighting the need for innovative interventions. This research aims to assess the impact of a resilience training program, grounded in the Prince-Embury (2006C); Prince-Embury (2007) and Prince-Embury (2014) three-factor model, on academic procrastination in Egyptian primary school students post COVID-19. It seeks to explore how enhancing psychological and academic resilience can counteract procrastination tendencies and offer new strategies for educators and psychologists in the post-pandemic educational landscape.

2. LITERATURE REVIEW

2.1. Academic Procrastination

Procrastination can be defined as a voluntary change in a predetermined plan with no justification (Sirois, 2023). Academic procrastination, on the other hand is defined as realizing that one needs to complete an academic task within a particular timeframe but failing to complete it within that timeframe (Hong et al., 2021). Several studies have indicated that the COVID-19 pandemic negatively affected pupils' academic performance and psychological well-being, as online learning was proposed as the main learning medium to temporarily replace face-

to-face learning interaction (Hayat, Kojuri, & Amini, 2020; Valieva, Fomina, & Nilova, 2021). Melgaard et al. (2022) also concurred that online learning with reduced learning interaction lowers academic achievement, which results in procrastination. Academic procrastination is often accompanied by weak learning commitment, inefficient learning performance, and difficulty achieving learning objectives (Tian et al., 2021). Studies have been conducted to examine intervention strategies for improving academic procrastination for example, Wang, Liu, Wang, and Wang (2023) observed that pupils can benefit from classroom intervention programs that address different aspects of procrastination, such as improving their personalities. Cognitive behavioral therapy (CBT) is another method used to improve procrastination by controlling thoughts and emotions (Rozenal et al., 2018). Ma et al. (2022) discerned that online learning can cause academic procrastination and it can be reduced through online peer support.

The proliferation of online learning modalities during the pandemic has exacerbated pupils' procrastination problems (Mahfouz et al., 2022), and to address this issue, a new perspective to investigate an intervention program that can reduce academic procrastination among Egyptian primary school pupils during the pandemic is needed. Accordingly, the objective of this study is to examine the effectiveness a resilience training intervention program developed based on Prince-Embury (2006C), Prince-Embury (2007) and Prince-Embury and Courville (2008a) and a three-factor model Prince-Embury (2014) to reduce procrastination and improve pupils' academic performance in the post-COVID-19 period.

2.2. Resilience and Academic Resilience

Resilience refers to the inner adaptive capacity that, when nurtured, facilitated, and supported by others, empowers pupils and teachers to thrive and meet life's challenges with a sense of self-determination, mastery, self-regulation, and well-being (Gibbs & Miller, 2014; Hascher, Beltman, & Mansfield, 2021).

Resilience involves cognitive, attitudinal, and behavioral aspects that can be learned by adopting resilience from one's surroundings. Therefore, resilience capacity can be enhanced through strategies that help develop these aspects and avoid failure (American Psychological Association, 2019).

Masten and Barnes (2018) observed that more remarkable brain plasticity and learning capacity exists in childhood than in other stages of life; it is not a character trait that pupils are born with, but a developmental process mainly influenced by pupils' experiences and relationships. This finding implies that psychological resilience can be learned and developed.

Academic resilience refers to learners' ability to improve their academic performance despite facing challenges as it fluctuates at different developmental stages and according to individual contextual factors (Wagnild, 2009). During stressful periods, such as a pandemic, resilience can be a key resource for dealing with uncertainty and change (Brites, Brandão, Hipólito, Ros, & Nunes, 2023).

Resilient students are those who, despite disadvantageous conditions, can perform beyond expectations and easily adapt to new circumstances (Troy et al., 2023). The ability to develop academic resilience will be useful in dealing with the learning challenges posed by pandemics.

Ragusa et al. (2023) concluded that academic procrastination is lower among people with high social support and academic resilience. Academic resilience has been researched extensively from various perspectives. This study is based on the Prince-Embury and Courville (2008a) three-factor model of personal resiliency (see Figure 1). This model was used to develop a resilience training intervention program aimed at reducing procrastination among Egyptian primary school pupils.



Figure 1. The three-factor model of personal resiliency.

In this model, the three personal resiliency attributes reflect three core developmental constructs: sense of mastery, which focuses on pupils' optimism through positive self-expectations and self-determination; self-efficacy, with significant self-praise and a sense of relatedness, and which reflects a pupil's resilient growth mindset and positive relational ability through enhancing social skills and empathy with tolerance of others; and emotional reactivity, which demonstrates that a pupil's emotional awareness, self-control, and self-regulation, as well as the relationship between these factors, are interrelated (Prince-Embury & Courville, 2008a). This model assumes that a pupil's experience mediates the relationship between external protective factors and positive behavioral outcomes by focusing on psychological processes rather than physical ones (Prince-Embury & Courville, 2008a). Resiliency and a sense of mastery can help develop self-efficacy, which is essential for young pupils and allows them to interact with and enjoy their environment. They develop a competent mindset, and their curiosity leads them to adopt a problem-solving approach, which motivates them to develop a positive attitude and overcome obstacles in their lives, ultimately helping them learn from their own mistakes and avoid repeating them (Prince-Embury & Courville, 2008a).

2.3. Correlation between Academic Procrastination and Academic Resilience

Several studies have investigated the relationship between academic procrastination and academic resilience and found that the relationship is negative (Öksüz & Güven, 2014; Ragusa et al., 2023). Researchers agree that developing high resilience correlates with low procrastination rates, with resilience indirectly affecting procrastination (Ambelu et al., 2019; Ko & Chang, 2019). Consequently, pupils with strong academic resilience will avoid academic procrastination.

Researchers have explored resilience intervention techniques for improving academic procrastination, such as Brunwasser et al. (2009) who developed the Pennsylvania Resiliency Program to enhance individuals' ability to overcome adversity by equipping them with a set of practical skills. It is noteworthy that few studies have explored resilience interventions as a method of improving procrastination in academic settings (Ma et al., 2022).

According to the literature (Ambelu et al., 2019; Ko & Chang, 2019) if pupils' resilience increases, they are also likely to succeed academically and cope with the stress brought about by challenging conditions. Thus, when pupils with high resilience face severe problems in their schools—which, despite having academic challenges, must be successfully overcome for students to develop important qualities such as a sense of responsibility—they can still motivate themselves and achieve optimal academic performance. Simultaneously, those with low resilience tend to perceive their problems as burdens that cannot be overcome. Under these conditions, pupils postpone the completion of academic assignments. These actions cause pupils to feel threatened and frustrated (Milne, Creedy, & West, 2016; Ragusa et al., 2023) hence, given the challenges faced by primary school pupils during the COVID-19 pandemic, it is imperative to test the effectiveness of interventions that should aid them in overcoming academic

procrastination and developing academic resilience. To this end, two research questions were explored, which are discussed in the following section.

2.4. Research Questions

For this study, an intervention program was developed based on the Prince-Embury (2006C); Prince-Embury (2007); Prince-Embury and Courville (2008a) and Prince-Embury (2014) three-factor model. This program was developed to build cognitive, emotional, and motivational factors to reduce procrastination among primary school pupils, especially after the COVID-19 pandemic. As a part of the program, participants engaged in activities and exercises designed to enhance feelings of mastery, relatedness, and emotional reactivity; goal-setting techniques, social skills training, and strategies to cope with emotion were included. The goal was to improve primary school pupils' academic achievement and psychological well-being by targeting these factors.

To achieve the study goals, two research questions were investigated:

1. How effective was the resilience intervention based on the Prince-Embury (2006C); Prince-Embury (2007); Prince-Embury and Courville (2008a) and Prince-Embury (2014) three-factor model framework in reducing achievement procrastination among Egyptian primary school pupils after the COVID-19 pandemic?
2. What were the experiences and perceptions of the Egyptian primary school pupils who participated in the resilience intervention?

3. METHOD

3.1. Research Design

This quasi-experimental study, utilizing a mixed-methods approach, investigates the effectiveness of a resilience intervention program in reducing academic procrastination among fourth-grade pupils in Egypt during the post COVID-19 pandemic era. The study integrated quantitative measures using the Pure Procrastination Scale (PPS) (Steel, 2010) to track changes in procrastination, with qualitative insights into the intervention's impact from the perspectives of pupils, teachers, and parents.

3.2. Participants and Procedures

The study was conducted with fourth-grade students from three experimental language schools in the Giza area, characterized by lower-middle-class socio-economic backgrounds, during the 2021–2022 academic year. A total of 100 participants (55 girls and 45 boys) who scored above 70% on the PPS were divided into experimental and control groups. The detailed participant demographics are provided in Table 2, which presents a thorough comparison of demographic variables between the groups, highlighting a balanced representation in terms of parental education, employment status, and other relevant factors.

The intervention spanned from October 2021 to February 2022, with participants undergoing resilience training, while the control group did not. The effectiveness of the intervention was assessed through pre- and post-tests, as well as follow-up evaluations using both quantitative and qualitative analyses to gauge changes in academic procrastination and gather feedback on the program's influence on pupil resilience and procrastination behaviors.

The quantitative data was analyzed using paired samples t-tests and repeated measures analysis of variance (ANOVA) to identify significant changes in procrastination scorers, while the qualitative data from session summaries and feedback provided insights into the intervention's components that most effectively fostered resilience and reduced procrastination among participants.

3.3. Measures

A quantitative analysis was conducted to determine the effectiveness of the resiliency intervention model in reducing academic procrastination. The data collected from the PPS were analyzed using a paired samples t-test to determine whether there was a significant difference in academic procrastination scores before and after the

intervention. A repeated measures ANOVA was used at the follow-up session to determine whether any changes in academic procrastination scores were maintained after one month. An analysis of demographic variables collected through self-report questionnaires was conducted using descriptive statistics; several variables were considered, including age, sex, grade level, and academic performance.

Further, qualitative analyses were conducted to determine how the intervention program impacted participants' growth and development. Participants provided summaries after each intervention session; a qualitative analysis was conducted on the general feedback they provided after each session. In addition, teachers were required to report that participants completed their reflective summaries accurately and in a timely manner. The qualitative data collected from the participants provided insights into the specific components of the program that were most beneficial for reducing procrastination and enhancing psychological resilience. Further, the effectiveness of the resiliency intervention was measured through qualitative and quantitative methods and by identifying areas for improvement going forward.

3.4. Ethics Approval and Participant Consent

The study was approved by the Egyptian Ministry of Education and Technical Education ethical committee for implementation in three public primary schools, and approval was obtained from three experimental schools in the Giza district. Pupils and parents were provided with a written consent form that outlined the various study phases and the duration and time required for each phase. Table 1 describes the topics covered in each session and the activities used to engage pupils in the intervention program. All 100 participants signed the consent forms and completed the questionnaires, answering all the questions in detail. Parental support and encouragement were provided to the pupils to enhance their academic performance.

3.5. Data Collection Strategy

3.5.1. Pure Procrastination Scale (PPS)

The Pure Procrastination Scale (Steel, 2010) is a short scale assessing dysfunctional delay. The PPS measuring tool used for testing was adjusted and verified for the Egyptian culture and was confirmed as valid and reliable. The scale was adapted and translated into Arabic by the researcher and authenticated by a certified translator. The Arabized scale was then verified by a distinguished committee of Egyptian psychologists, who approved the PPS to be used on Egyptian primary school pupils. The scale comprises 12 items that evaluate general procrastination using a Likert scale (Likert, 1932) that ranges from 1 (*very rarely or does not represent me*) to 5 (*very often or always represents me*). Higher scores indicate higher levels of procrastination. In the original version, the scale presents three factors that measure delays in the decision and implementation stages and difficulties related to timeliness or lateness. The alpha coefficients of the scale were calculated, and the validity and reliability of the PPS were observed through decisional procrastination and delays in implementation, timeliness, or lateness. The scale had an internal consistency of 0.73 and reliability of 0.85. Participants were administered the PPS before and after the intervention, along with a follow-up session a month after the intervention program. The program was explained in detail to both the pupils and their parents in Arabic prior to the pupils taking part in the program. The participants were also informed that withdrawing from the program at any stage would not have any adverse consequences on their academic study. Demographic variables were collected through a self-report questionnaire (see Table 2). The participants and their parents were assured that their identities would remain confidential. In addition, prior to the start of the investigation program, the invigilators (teachers from the schools) were trained on registration, checking questionnaire completion, and conducting the research according to the ethical tenants.

3.6. Psych Education Sessions

An intervention program based on the three-factor model of personal resilience by Prince-Embury (2006C); Prince-Embury (2007); Prince-Embury and Courville (2008a) and Prince-Embury (2014) was implemented using both online and classroom settings and a blended learning approach. It focused on creating change, raising emotional awareness of procrastination dysfunction, and developing a resilience-coping framework to help pupils face adversities. Further, the program aimed to improve pupils' attention and commitment to learning objectives; it provided them with an orientation to improve and reflect upon future actions, followed by a review of pupils' development over time. The program consisted of 11 sessions spanning nine weeks. Each session focused on a specific topic, such as goal setting, time management, and problem solving, and included activities such as group discussion, role-play, and goal setting exercises (see Table 1). During the post-COVID-19 pandemic period, the intervention program was designed to reduce achievement procrastination and improve academic achievement. Several strategies in the intervention program were adapted to meet the needs of the Egyptian primary school pupils, including visual goal setting and casual attribution. In their first meeting, the participants were given intervention guidelines, which highlighted the importance of confidentiality and personal responsibility during the session. The program was held in Jigsaw groups; pupils studied a specific text, mastered it, and then shared the material with other groups of pupils. While developing collaboration skills, this strategy helped pupils understand and retain information. The task is intended to provide joint support to peers having similar experiences and benefit from other group members' feedback. Each pupil then wrote a reflective report on the tasks and their role in them using concept maps. For the qualitative evaluation and tracking of actual procrastination behavior, the assessment process continued outside the session, noting response times after the completion and submission of the assessment activities. Parents' unequivocal support given to their children outside the sessions was crucial in recognizing their achievements and progress toward their goals. Parents acknowledged the pupils' success through rewards, while also applying positive reinforcement and encouraging their children to adapt their learning strategies to meet the desired outcomes. This intervention developed pupils' abilities and skills related to goal setting, problem solving, and self-regulation, which are necessary for academic success and psychological resilience (see Table 1).

Table 1. Summary of resilience training sessions.

Session	Duration	Aim	Content
1	45 mins	Orientation	After introducing herself and explaining the program to the pupils, the researcher emphasized the value of completing tasks promptly after each session. An interactive and engaging pre-test was conducted. Resilience and academic procrastination skills were introduced via video clips and storytelling.
2	60 mins	Self-emotional awareness	Video clips were used to emphasize the negative effects of procrastination on academic performance and stress levels. A worksheet was administered, and an open group discussion was conducted in which students were encouraged to talk about their experiences with achievement procrastination. Strength and weakness concepts were highlighted to build upon the strengths. Extension activities were followed by feedback.
3	60 mins	Elevate optimism, self-efficacy, and positive expectations	Adaptability, problem solving, and a positive growth mindset were discussed, and video clips were shown. Pupils were taught practical strategies to reduce procrastination and empower themselves to accomplish their goals through the procrastination buster activity. Extension activities were followed by feedback.

Session	Duration	Aim	Content
4	60 mins	Improve adaptability, problem-solving, and collaboration	Video clips were shown on problem solving, projects, and the importance of a positive learning environment that encouraged shared responsibilities, teamwork, and creativity. The students were divided into groups, given challenging tasks (which were broken down and simplified to ensure achievability) and goals, and encouraged to maintain a positive attitude. Brainstorming, listening, and observing were emphasized, and class discussions on their experiences were conducted, followed by extension activities and feedback.
5	30 mins	Enhance extensive functioning and decision making	A template was provided to create daily/Weekly schedules showing homework, breaks, and activities based on the ABC method to assign high, medium, and low priorities to tasks. Decision making was taught through the STOP method (Stop, Think, Option, Pick).
6	45 mins	Personal commitment contracts for self-regulation	A SMART goal was emphasized with written agreements to highlight personal commitments. An activity relating rewards to actions and a class discussion were facilitated to emphasize the diversity of goals and strategies to maintain focus and motivation. Feedback and assessment: observe engagement, gather feedback through reflection.
7	60 mins	Emphasize a sense of relatedness	A video clip was shown on active listening and its use for teamwork and communication. Positive sharing and trust-building activities were discussed to achieve pupils' academic goals. Video clips were provided, followed by students' role-playing exercises to discuss empathy. Extension activities and feedback.
8	45 mins	Understand emotions and self-control	Video clips were shown on emotions and self-control, followed by a discussion on personal emotions and what causes them. Role-play on emotional self-control, including demonstrations such as taking deep breaths when upset. Reflection on points learned while keeping a journal and noting the progress were encouraged.
9	30 mins	Explain the role of positive thinking and creativity	A video clip was shown on positive thinking and creativity and the ways to apply them. Role-play was used to show that positive thinking is compared to air and water in terms of its impact on learners. Pupils reflect on their beliefs and strength, with ways to improve.
10	45 mins	Visual goal setting	Promoting the use of posters/charts to help pupils write and track their goals. The pupils were required to keep journals to individually reflect on their goals. Constructive peer feedback was encouraged.
11	45 mins	Casual attribution	Video clips were shown to clarify the factors contributing to success or failure, highlighting both internal and external factors. Role-play activities were performed to share different stories of overcoming goal-related challenges, as well as highlighting the effort required to overcome those challenges. The pupils were encouraged to brainstorm various strategies to overcome challenges and develop problem-solving skills.

4. RESULTS

The results of the questionnaire showed that the experimental and control groups had no significant differences in demographic variables, such as parental education level, occupation, number of children, and birth order (see Table 2). In addition, the Kolmogorov–Smirnov test was employed to assess data normality; the results revealed a significance level of 0.198 for academic procrastination, indicating that there is no significant difference and that the distribution is normal, thus highlighting that academic procrastination is non-significant and has a normal distribution.

Table 2. Differences between the experimental and control groups based on demographic variables.

Variable		Experimental		Control		Test [†]	p-value
		N	%	N	%		
Mother’s education	Illiterate	16	32%	15	30%	0.19	0.82
	Educated	34	68%	35	70%		
Father’s education	Illiterate	20	40%	22	44%	2.1	0.80
	Educated	30	60%	28	56%		
Mother’s job	Employed	35	70%	37	74%	0.13	0.75
	Stay-at-home	15	30%	13	26%		
Father’s job	Employed	43	86%	42	84%	0.70	0.72
	Unemployed	7	14	8	16%		
Number of children	One	15	30%	17	34%	1.4%	0.78
	Two	10	20%	9	18%		
	Three or more	25	50%	24	48%		
Birth order	First	19	38%	15	30%	1.7	0.98
	Second	30	60%	33	66%		
	Third or later	1	2%	2	4%		

Note: [†]Chi-square test.

According to the results, the experimental group’s mean level of academic procrastination was 51.62 ± 2.968 , 21.60 ± 4.19 , and 19.72 ± 3.36 before, immediately, and a month after the intervention, respectively. The intervention resulted in a decrease in academic procrastination. The average values for academic procrastination in the control group were 0.7 ± 5.6 , 46.86 ± 7.2 , and 44.58 ± 6.06 , respectively; these results were not significant (see Table 3).

Table 3. Analysis of the academic procrastination scores of the experimental and control groups.

Variable	Experimental		Control		
	M	SD	M	SD	
Before	51.62	2.968	47.7	5.61	
Immediately	21.60	4.199	46.86	7.22	
After	19.72	3.36	44.58	6.067	
Source of change group	Sum of squares	df	F	p-value	Eta ²
Time	32,266.56	1	97.66	< 0.001	0.995
Time	14,396.41	1	71.76	< 0.001	0.995
Group-time interaction	13,216.50	1	64.94	< 0.001	0.92
Error	1.738.68	49	25.2	< 0.001	0.90

Based on the repeated measures ANOVA using the general linear model, the group-time variable contributed significantly to the differences in the mean scores of academic procrastination. According to the results of the Bonferroni post-hoc test, the experimental group showed academic procrastination before the intervention, but it significantly decreased immediately and a month after the intervention compared with that of the control group (see Table 4).

Table 4. Comparison of academic procrastination scores between the experimental and control groups over time (Follow-up Bonferroni test).

Time	Group I	Group J	(I-J)	SE	P-value
Before	Experimental	Control	30	0.75	< 0.001
Immediately	Experimental	Control	3.12	0.67	0.10
One month after	Experimental	Control	0.82	0.68	< 0.001

Further, a significant decrease in academic procrastination was observed in the experimental group immediately after the intervention. Within the month after the intervention, the mean score of academic procrastination reduced significantly; however, it did not change substantially immediately after the intervention. Thus, the effects of the intervention lasted up to one month after its completion (see Table 5).

Table 5. Comparison of changes in academic procrastination scores at different time points within each group (Follow-up Bonferroni test).

Group	Time (I)	Time (J)	(I-J)	SE	P-value
Experimental	After the intervention	Immediately after the intervention	1.88	0.67	< 0.08
		Before the intervention	-31.9	0.59	< 0.001
	Immediately after the intervention	Before the intervention	-30.02	0.75	< 0.001
Control	After the intervention	Immediately after the intervention	2.28	1.49	0.12
		Before the intervention	-3.12	1.16	0.15
	Immediately after the intervention	Before the intervention	-0.840	1.27	0.23

Figure 2 highlights the differences between the experimental and control groups in academic procrastination. It reinforces the variation between the two groups highlighted in Table 5.

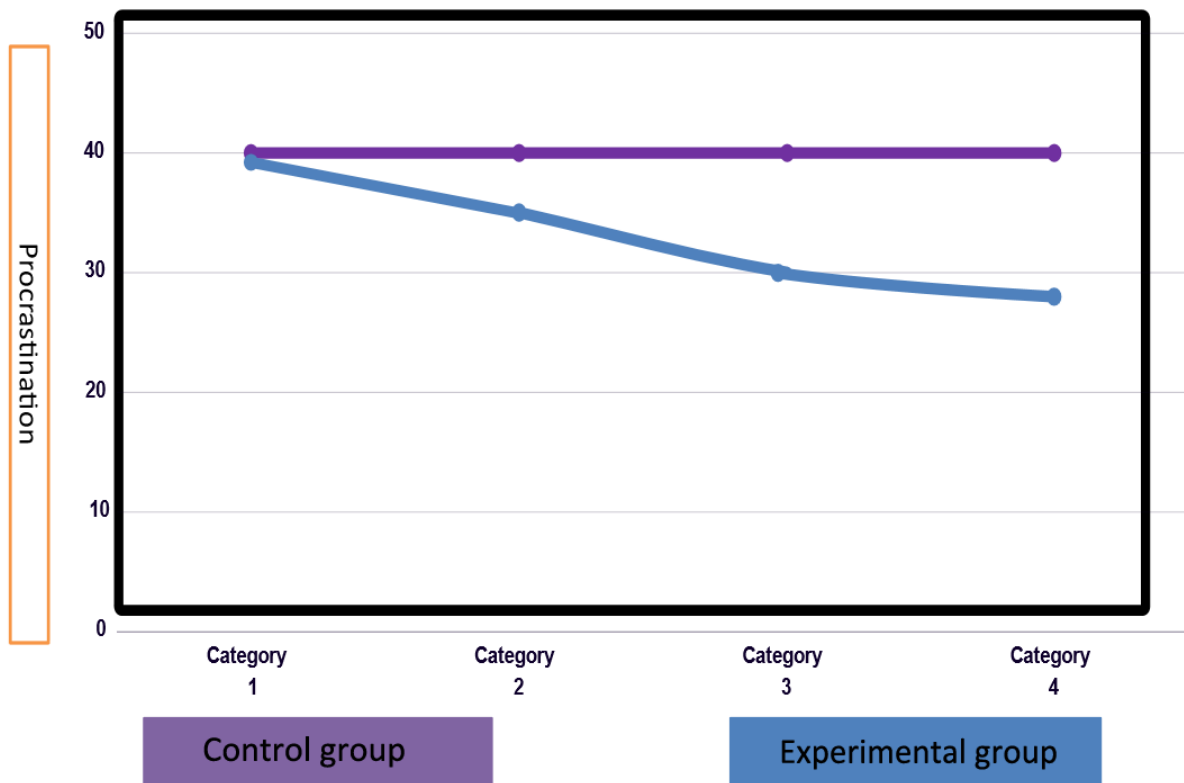


Figure 2. Difference between the experimental and control groups.

4.1. Qualitative Analysis

After each intervention session, summaries were collated, and a qualitative analysis was conducted. Participants provided reflective summaries, which highlighted their experiences and key issues. A qualitative analysis was also conducted on the general feedback provided by the participants at the end of the intervention period. The summaries were analyzed by carefully examining participant narratives and identifying key themes or patterns in their responses. Participants' submission responses were also monitored to gauge their motivation and engagement. The data was coded, analyzed, and organized to identify and collate recurring themes and ideas, while the teachers rated the submission dates of individual session summaries. The qualitative data collected from the pupils who participated in the program provided valuable insights into the specific features of the program that were most helpful in reducing procrastination and enhancing psychological resilience. Both qualitative and quantitative methods were used to gauge the effectiveness of a resiliency intervention and identify areas for improvement in future interventions.

4.2. Participants' Experiences during Sessions

Over the course of nine weeks, 11 sessions were conducted as part of the intervention program (see [Table 1](#)). The pupils were required to write a reflective critique of their experiences after the completion of each session. The critique process helped the participants gain greater insight into the effectiveness and impact of the intervention. Two categories were examined in the analysis. The first category comprised the following sections:

Understanding procrastination: The pupils were encouraged to become more self-aware and adopt a positive approach to managing tasks. This feedback offered insight into whether the concepts were grasped and how they planned to apply them. One pupil said, "I didn't know that leaving homework until the last minute would make it harder to finish, and I liked the training."

Sense of mastery: Using strategies such as positive affirmations, creative problem-solving scenarios, visual schedules, guided imagery exercises, commitment contracts, and vision boards, the pupils developed their skills in optimism, self-efficacy, adaptability, positive expectations, problem solving, executive functioning, decision making, and self-regulation. One pupil said: "I loved the role-play, as I understood how to solve an exercise and how to think in a good way when I get upset."

Sense of relatedness and belonging to a group: The fourth-grade pupils participated in the jigsaw puzzle challenge to improve communication skills, teamwork, social skills, active listening, empathy, and the ability to take on others' roles. One pupil said, "I loved the idea as it made me want to learn about my topic to be able to explain it to others and also to listen to others."

Positive mindset and emotional coping: Pupils were taught emotional coping strategies and how to promote positive thinking during sessions by addressing anxiety, fear of failure, fear of negative evaluation, and difficulty controlling emotions. One pupil said, "I need to understand and help myself."

Reflect, monitor, adapt: The pupils were empowered to reflect on their goals, monitor their own performance, determine causal attributions, and adapt strategies. One learner stated, "I realized that having SMART goals would help me with learning."

The second category of analysis examined the personal and social processes resulting from the acquisition of knowledge and tools. Based on the participants' reflections, this category explored how the intervention program impacted their personal growth and development. The purpose was to capture any changes or insights gained by the participants during the program. Several participants had increased self-awareness (e.g., "After I finished the training, I became more aware of my strong and weak points"). One participant considered improved goal setting a vital tool: "The training helped me understand how to set SMART goals and how to achieve them." Another reported, "I learned how to track my improvement before tests." One pupil stated, "I am able to adapt to difficulties and know how to overcome them, while I wasn't able to do so before the training." Two pupils also felt they could

think positively, “even if things go wrong,” as well as “how to motivate myself when things are not going according to plan.” Reflective thinking and enhanced problem solving were noted by two other pupils: “I am thinking more about what I am learning and trying to find the best solution to a problem.” Another participant highlighted that the program increased their confidence: “I believe in myself now,” and it has also improved their mindset: “I now believe I can become better.”

5. DISCUSSION

The current research emphasizes the pivotal role of academic resilience in reducing academic procrastination among primary school pupils, especially in the context of the COVID-19 pandemic and its aftermath. This study aimed to evaluate the efficacy of a resilience intervention program based on the three-factor model of personal resilience developed by Prince-Embury (2006C); Prince-Embury (2007); Prince-Embury and Courville (2008a) and Prince-Embury (2014) assessing its impact on Egyptian primary school pupils’ procrastination levels using the Pure Procrastination Scale (PPS) (Steel, 2010). The findings revealed significant improvements in the participants’ academic resilience and a corresponding decrease in procrastination levels, highlighting the effectiveness of the intervention.

The significance of online learning during the pandemic has brought to light the importance of various intervention strategies to combat academic procrastination. Cognitive behavioral therapy (CBT) has been identified as a beneficial approach to managing procrastination by influencing thoughts and emotions (Rozental et al., 2018). Classroom interventions focusing on personality development have also been found to be beneficial (Wang et al., 2023), while online peer support has been shown to mitigate procrastination induced by online learning environments (Ma et al., 2022). The Pennsylvania Resiliency Program, developed by Brunwasser et al. (2009) further emphasizes the importance of practical skills in overcoming adversity, despite the noted scarcity of research on resilience interventions in academic contexts (Ma et al., 2022).

The relationship between academic procrastination and resilience was explored, revealing a negative correlation between high resilience and low procrastination rates (Ambelu et al., 2019; Ko & Chang, 2019; Öksüz & Güven, 2014; Ragusa et al., 2023). The application of the Prince-Embury (2014) model to Egyptian primary school students demonstrated that strong academic resilience could prevent procrastination, with students showing greater persistence and a proactive stance toward academic tasks. Those with enhanced resilience perceived challenges as manageable rather than burdensome, which facilitated task completion and reduced feelings of frustration and overwhelm.

The intervention program targeted various aspects of resilience, such as emotional awareness, sense of mastery, relatedness, emotional reactivity, and perseverance, leading to significant improvements in resilience and a reduction in procrastination. The qualitative analysis of the participants’ responses indicated a shift toward more positive attitudes regarding academic tasks, increased independence, and enjoyment of group activities. The experimental group showed a marked decrease in procrastination levels before, immediately after, and one month after the intervention, demonstrating the program’s long-term effectiveness.

This research aligns with previous findings on the relationships among psychological resilience, academic achievement, and procrastination (Kim & Seo, 2015; Milienos et al., 2021; Wu et al., 2020). The findings emphasize the importance of fostering resilience in students to enhance their well-being and academic performance, particularly during challenging times. Psycho-educational interventions that build resilience, thereby overcoming challenges and maintaining motivation, are crucial for academic success and addressing the long-term negative effects of academic procrastination.

In conclusion, the study highlights the critical role of psychological resilience in mitigating academic procrastination among primary school pupils, especially during and after the COVID-19 pandemic. The success of the resilience-focused psycho-educational program in enhancing pupils’ psychological resilience and reducing

academic procrastination supports the need for incorporating resilience strategies into education settings to empower students to thrive academically.

5.1. Implications for Practice

This research has significant methodological, theoretical, and practical significance for the improvement of academic procrastination among primary school students. The purpose of this study was to propose suggestions for reducing academic procrastination in primary school students. The results have implications for educators and professionals working with children, emphasizing the value of fostering resilience skills to support academic achievement and psychosocial well-being. To enable education authorities to reduce academic procrastination, a comprehensive approach is needed. Developing reasonable education plans will reduce the incidence of academic procrastination among primary school students. The study emphasizes the importance of the three-factor model of personal resilience developed by Prince-Embury (2006C); Prince-Embury (2007); Prince-Embury and Courville (2008a) and Prince-Embury (2014), which could bring about valuable outcomes if integrated into primary school curriculum design. For primary school educators, the first step is using cooperative group activities to help them understand and retain information, listening to other group members' feedback while reflecting on their learning. Intervention sessions that target multiple aspects of resilience, including emotional awareness, sense of mastery, relatedness, emotional reactivity, and perseverance should then be used. Educators would be able to equip students with the necessary skills and strategies to overcome challenges, manage their emotions, set goals, and maintain positive perseverance. Finally, educators would be able to guide students to carry out constructive self-reflection and self-awareness while improving.

6. LIMITATIONS

The study investigated the implementation of the three-factor intervention model of personal resilience to reduce academic procrastination among Egyptian primary school pupils during and after the COVID-19 pandemic. There is a possibility that the COVID-19 period could have altered the psychological state of the participants, leading to further academic failure. Additionally, this study involved a small sample of 100 nine-year-old primary school pupils and assessed the conditions before, directly after, and one month after the intervention. Therefore, caution is necessary when generalizing the results. A larger and more diverse sample would strengthen and validate the findings in future research. Moreover, the intervention's effects were not assessed over time to ascertain its sustainability. Further research should be conducted during a regular face-to-face school teaching session to verify the findings. Further investigation would be beneficial to determine whether the reduction in procrastination and improvements in psychological resilience observed during a prolonged intervention period are maintained.

7. CONCLUSION

The COVID-19 pandemic has adversely affected students' subjective well-being, causing psychological problems, including depression, anxiety, low self-confidence, and stress. These psychological issues are significant predictors of academic procrastination behaviors that negatively impact students' efficacy, self-regulation skills, and educational outcomes. The results showed a considerable decrease in procrastination behavior among students in the intervention group. Students with low resilience tended to perceive problems as burdens if they could not overcome them. As a result of the program, the participants improved their cognitive and behavioral engagement by changing their motivations, values, and goals; therefore, students should engage in activities that promote positive coping with adversity, competence, and resilience.

In the face of challenging circumstances, such as the COVID-19 pandemic, and adapting to changes in the post-COVID-19 period, psychological resilience is essential for addressing achievement procrastination among primary school pupils. The intervention described in this study can eventually become an essential part of the curriculum for

overcoming procrastination. Finally, linking participants' changed motivations, values, and goals to resilience outcomes is recommended, thus improving cognitive and behavioral engagement and observing the long-term impact of resilience training.

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