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# Mindfulness Contributing to Publication Anxiety Reduction: A Random Controlled Trial Analysis

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**Abstract**
Graduate research students face unprecedented challenges due to the increased demand for publications as a graduation requirement in today's institutions of higher learning, leading to anxiety. Some people seem unfazed by this phenomenon and cope with it better than others. Using the random controlled trial method, a direct effect between mindfulness and publication anxiety was tested and mediated by psychological capital using 605 samples divided into control group (297) and intervention group (308). The intervention group was asked to listen to self-guided mindfulness audio for four weeks. The aim was to examine the impact of mindfulness practice in reducing publication anxiety among graduate research students. The findings showed that mindfulness is negatively associated with publication anxiety, and PsyCap acts as a mediator between mindfulness and publication anxiety in both control and intervention groups. The study concludes with a discussion of the study's limitations, future research, and practical applications.
**Keywords:** Mindfulness, PsyCap, Publication Anxiety, Random Controlled Trial, Graduate research Students
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## 1. Introduction

Williams & Kabat-Zinn (2011) defined mindfulness as peoples' propensity to maintain awareness of everyday life, attentively focusing on the current situation with open-mindedness and acceptance without being judgmental about individual's cognitive, affective, and behavioral responses. Mindfulness positively promotes a higher good sense of well-being (Schultz et al., 2015). A meta-analysis proves that mindfulness reduces anxiety, fear, emotional instability, and depression (Khoury et al., 2015). Practically, Mindfulness methods are found to be helpful in daily socio-economic activities, including marketing (Jang et al., 2020), tourism (Loureiro et al., 2019), and human relations (Montani et al., 2020; Teye, 2019).

According to Kabat-Zinn (2003), mindfulness originates from ancient Theravada Buddhist philosophy and Indian yoga traditions of samadhi to know the true meaning of life, the true nature of existence, and achieve long-lasting happiness. Therefore, mindfulness identifies an individual's inner consciousness embedded in one's immediate environment.

This research demonstrates that mindfulness and psychological capital negatively influence the influence anxiety of graduate research students. Psychological capital, subsequently referred to as PsyCap, is defined as "a kind of positive psychological state of individuals, "consisting of resilience, hope, self-efficacy, and optimism (Avey et al., 2010; Gonlepa et al., 2022). Malinowski & Lim (2015) investigated mindfulness and PsyCap as a multifaceted concept and found PsyCap mediating the relationship between mindfulness and employees' work engagement. Previous studies have focused on the mediation role of PsyCap on job burnout (Ding et al., 2015a) and mental health (Estiri et al., 2016). Another study showed that PsyCap reduced symptoms of employment anxiety among graduate students (Belle et al., 2021). Avey, Luthans, Smith, et al. (2010) found that PsyCap is a factor that increases productivity and emotional well-being after conducting a meta-analysis of 51 investigations. Although PsyCap is known for its effect on reducing anxiety symptoms, a few pieces of research addressed it as a possible mediator of the association between mindfulness and anxiety (Malinowski & Lim, 2015). Belle et al. (2021) state that the PsyCap of graduate students is a significant factor in reducing their job anxiety after graduation.

Meanwhile, the anxiety they exhibit before graduation due to delay or lack of publication is another factor. Finding a mitigation strategy is a crucial decision for graduate students. Therefore, this study proposes that

PsyCap will mediate the relationship between mindfulness and publication anxiety of graduate research students.

Based on the self-determination theory (SDT) (Ataşalar & Michou, 2019; Deci & Ryan, 2008), researchers have dedicated substantial interests to the unique role of mindfulness in cultivating individual emotional responses to external factors, i.e., stressors (Ashu et al., 2020; Deci et al., 2017). They have postulated an abundance of empirical substantiations for the relationship between mindfulness and individual growth, well-being, integrated self-regulation, and need satisfaction motivators (Cordeiro et al., 2018; Sayibu et al., 2022). In this view, some studies show that among factors promoting well-being and reduces anxiety, the PsyCap should exhibit a significant influencer (Chang et al., 2015; Teye et al., 2018). But empirical study mitigating graduate research student publication anxiety is tremendously rare. Indeed, a few studies have been empirically conducted to explore the combined role of mindfulness and PsyCap on graduate research students' publication anxiety.

To explain the relationship between graduate students' mindfulness practice, PsyCap, and publication anxiety, we posit that mindfulness practice exposes students to the conscious mindset of acknowledging the knowledge of their scientific or laboratory research outcomes (Rufai et al., 2021), which may yield novel ideas. This hypothesis will be tested by analyzing the beneficial effects of mindfulness on publication anxiety.

## 2. The Theoretical Perspective of Self-Determination Theory (SDT)

SDT is a comprehensive theory that explains factors influencing individual motivation (Deci & Ryan, 2008). It focuses on people's perceived behavioral actions. Individuals' willpower reflects whether they are motivated to act independently or have integrated the benefits and value associated with external pull. The primary idea is that the factors that encourage and assist these behaviors contribute to one's sense of well-being and contentment. These characteristics include goal achievement orientation (competence), ability to connect (relatedness), and willingness of one's action (autonomy). We illustrate that research publication is a strong motivator in graduate students' life because it demonstrates research competency, accomplishment, and the capacity for career autonomy. Thus, the precise role of research publication for integrity, development, and overall life satisfaction is substantial and has been widely internalized (Ivcevic & Brackett, 2014; Sayibu et al., 2021). As a result, the anticipation of receiving adverse research outcomes can be distressing. Lack of publication throughout graduate school might undermine a student's feeling of competence and academic self-esteem.

Mindfulness substantially impacts how an individual responds to life situations (Alademomi et al., 2019; Schultz et al., 2015), for example, the emotional distress of article rejection in academic research settings. In SDT, Ryan & Deci (2020) conceptualize mindfulness as an essential notion that bolsters an individual's determination to achieve fundamental relatedness, autonomy, and competence. The authors refer to them as individuals' ability to regulate their attitude towards self-determination and personal development. This research aims to examine the mindfulness impact in motivation and self-determination as embedded in SDT. We argue that an individual's accomplishments influence their fundamental orientation. García-Suaza et al. (2020) view research publication in general as a goal-directed, motivated, and achievement-oriented activity.

Accordingly, a graduate research student may have a positive or negative response based on the fluctuation of results in the research process. Also, pressure from the supervisor may undermine mental health, aggravating anxiety (Amosun et al., 2023; Tian et al., 2016). On the other hand, positive results elevate personal resources such as student PsyCap, leading to positive behaviors toward achievement (Ding et al., 2015b; Muhideen et al., 2021) and alleviating negative emotions and anxiety (Edwards et al., 2015). Therefore, this study adopts SDT to investigate the effect of mindfulness practice on the publication anxiety of graduate research students.

### *2.1 Mindfulness and Publication Anxiety Relation*

Mindfulness is connected with reducing negative bias in cognition and ruminative behavior (Bamber & Kraenzle Schneider, 2016). A probable explanation for this association is that mindful persons are more adept at releasing anxiety and negative thoughts in their memory. By practicing mindfulness, releases mental stress and enables one to focus on the task at hand. Edwards et al. (2015) revealed that less mindful undergraduate students' memory declined in a high-stress environment. Meanwhile, another study shows that individuals who got mindfulness training and frequently practiced encountered less severe negative effects (Schanche et al., 2020).
Lack of publication may exacerbate graduate research students' anxieties and negative emotions. The benefits of mindfulness may also apply in high-stress academic environments, in particular, by encouraging graduate research students to be receptive to novel ideas. While there is a possibility that the results students generate during their scientific research will be helpful, students may be unaware of the value of the current output of their research due to pre-assumed expectations of results, which may trigger anxiety and stress, thereby negatively affecting mental health.

In the context of this study, when the thought of not graduating or delay in graduation period without publication occur in the mindset of graduate research student, the practice of mindfulness meditation will aid in removing the scary scenario from the student's mind while giving them hope. Mindfulness has been primarily used to examine students' academic performance, particularly undergraduate (Bennett et al., 2018) and clinical

 

students (Schanche et al., 2020). However, no study has explored the effect of mindfulness on the publication anxiety of graduate research students. To the best of the authors' knowledge, this is the first study to investigate the relationship between mindfulness and publication anxiety of graduate research students. As a result, the following hypothesis was put forward:

**Hypothesis 1:** There is a negative relationship between mindfulness and publication anxiety.

*2.2 PsyCap Mediate Mindfulness and Publication Anxiety Relation*

Besides mindfulness and publication anxiety study, we investigate the role of PsyCap as mediation in the relationship. The previous research has shown that PsyCap as a positive psychological and organizational behavior concept is negatively significant with negative affect (Kotzé, 2018). When individuals are consciously aware of what is happening in their environment, they tend to exhibit confidence (efficacy). Being positive and anticipating a better future (optimism), perseverance toward one's goals (hope), and bouncing back from challenges (resilience) (F. Luthans & Youssef-Morgan, 2017).

Additionally, studies on the association between PsyCap and mindfulness in various contexts have been investigated, including the following: Malinowski & Lim (2015) investigated mindfulness and PsyCap as a multifaceted concept and found that PsyCap acts as a mediator between mindfulness and employee work engagement. Kotzé (2018) revealed that self-leadership has a more significant effect on PsyCap than mindfulness, and Barry et al. (2019) observed that mindfulness effectively improves the PsyCap of doctors. PsyCap is developed as an individual's capacity to influence cognitive value (K. W. Luthans et al., 2016). For example, the four components of PsyCap (resilience, efficacy, hope, and optimism) are all grounded by a positive appraisal of circumstances and the likelihood of academic success based on motivated effort and perseverance. Thus, mindfulness may facilitate the timely connection of the positive mental processes required for PsyCap. As a result, we propose that an increase in an individual's PsyCap personality trait may enhance the effectiveness of mindfulness practice in reducing publication anxiety. Therefore, this context leads to the formulation of the following hypothesis:

**Hypothesis 2:** The PsyCap of graduate research students acts as a mediator between mindfulness and publication anxiety.

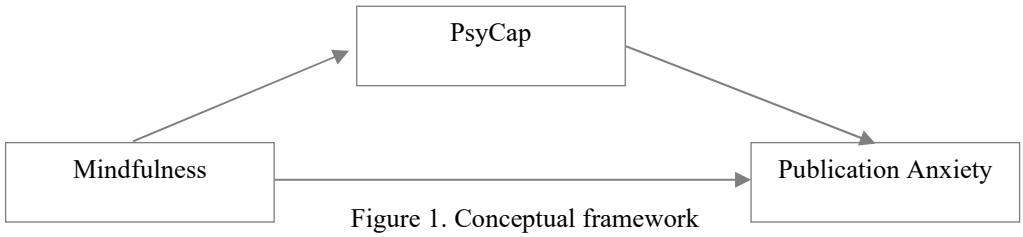


Figure 1. Conceptual framework

## 3. Methodology

*3.1 Study context*

Due to research publication graduation requirements, increased academic stress and anxiety among young research students (postgraduate students) have recently drawn experts' and researchers' attention (Bazrafkan et al., 2016; Virtanen et al., 2017). Graduate research students deal with high pressure because of the academic phrases of "publish or perish" (Tian et al., 2016; van Dalen, 2021; Wang et al., 2019) and the complementary slogan of "Do it yourself." One of the major factors causing this is a delay in generating targeted results, thereby not sending their research for publication early. Meanwhile, these students experience anxiety and fear in the process. As a mitigating mechanism, this study adopted a randomized controlled trial involving a single-blinded 30-min mindfulness practice to investigate the relevance of the mindfulness practice as an anxiety reduction technique for graduate research students.

*3.2 Participants and procedure*

Following research approval by the Chinese Academy of Sciences Research Ethics Committee, we invited graduate research students in China to participate in the study. Graduate research students refer to masters and Ph.D. students engaged in scientific, experiment, or laboratory research. The participants were recruited from various public universities in China and CAS research institutes in June 2021. The universities selected are under the 211 and 985 projects institutions in China. Participants were informed on the purpose of the research and the confidentiality of their response before asking them to scan a WeChat (a social media platform) QR code to sign up if they consented to participate. The QR code invited them into the WeChat groups (control and intervention), and we ensured them with the utmost confidentiality of their information. To ensure a single-blinded of the participants, the intervention group was assigned to a separate WeChat group. The trial was hosted and deployed on a WJX cloud-based survey platform that provides versatile online, experimental, and behavioral research

 

tools. The control group participants were asked to fill a questionnaire without any stimulus.

In contrast, the intervention group participants were instructed to listen to a 30-minute mindfulness training audio for four weeks before answering the questions in the survey. Two links were sent to the intervention group—a link containing an audio mindfulness instruction and training and another consisting of the survey. Though the questionnaire was formed in English, we translated it to Chinese using double-back translation to ensure that the items in English and Chinese conveyed the same information (Li et al., 2018). Meanwhile, participants allocated to the control group were sent the link to the mindfulness audio after the entire trial for their personal use.

### *3.3 Intervention*

The intervention group participants received a link to recorded mindfulness practice. Emma Warnecke recorded this spoken mindfulness exercise of breath awareness (available at www.utas.edu.au/health/students/medicine/stress-management) adapted from (Barry et al., 2019). They received a guide regarding safe use and were instructed to listen to the audio daily for four weeks before completing the survey. The audio involves five sections explaining the relevance of mindfulness in reducing anxiety, such as breath awareness and relaxation techniques. Because the intervention was intended as an "intention to treat" experiment, adhering to the practice every day for the trial duration was not required. The control group received no mindfulness instructed audio within the period. Meanwhile, the control and intervention groups completed the same measurement items in the survey.

### *3.4 Measurements*

Mindfulness

Mindfulness measurement was adapted using (Brown & Ryan, 2003) 15-item Mindfulness Attention Awareness Scale (MAAS) on a 5-point Likert scale ranging from almost always to almost never. It assesses participants' consciousness trait towards paying attention and awareness to the present situation in their life. For this study, the authors have selected 5 items relevant to the research objective. For example, "I tend not to let feelings of physical attention or discomfort affect my concentration" and "I find myself preoccupied with the future or the past." The internal consistency indicator Cronbach alpha was obtained as 0.93 for the scale.

PsyCap

This study adapted (F. Luthans & Youssef-Morgan, 2017) PsyCap measurements comprising of 4 components: resilience (e.g., I can stay calm during a challenging period in my research work), optimism (i.e., I am optimistic about the future, even if my future development is unpredictable), self-efficacy (e.g., I am confident in resolving problems that arise during my research), and hope (e.g., there are multiple solutions to problems). The PsyCap contains 24 measurement items, with 6 items for each component assessed on a 5-point Likert-type scale (1 strongly disagree to 5 strongly agree) with acceptable reliability of 0.90.

Publication Anxiety

Publication anxiety was assessed using suitable items from the Chinese Depression, Anxiety, and Stress Scale (DASS) (Jun, Johnston, Kim, & O'Leary, 2018). The study used a 5-item anxiety subscale on a 5-point Likert-type scale (1 = never to 5 = always). The items described several anxiety symptoms and asked participants to rate the frequency they experienced these sensations within the 4 weeks. Examples are "when I think about my study progress, my heartbeat very fast" and "I am worried about situations that can cause me to panic." Cronbach's alpha, a measure of internal consistency, was 0.91 for the scale.

### *3.5 Data Analysis*

Prior to the analysis, we first evaluate our data for normality and variance homogeneity. Furthermore, the square root transformation was adopted to normalize the variables that did not meet the analysis of variance criteria (ANOVA). We employed a t-test to compare control and intervention groups variables, and the one-way ANOVA was used to compare treatments. We use the Duncan multiple range analysis to compare the means of the constructs, and Pearson correlation coefficients were employed to analyze the relationship between variables.

## 4. Results

### *4.1 Participants retention*

The participation development during the study is depicted in Figure 2. The total participants contacted for the study involved 618 masters and Ph.D. students. Among them, 13 participants were removed because they were neither masters nor Ph.D. students. Participants were assigned to control (297), and intervention group (308), and they were all students engaged in scientific, laboratory, or experimental research. As a result, 605 participants completed the entire process.

 

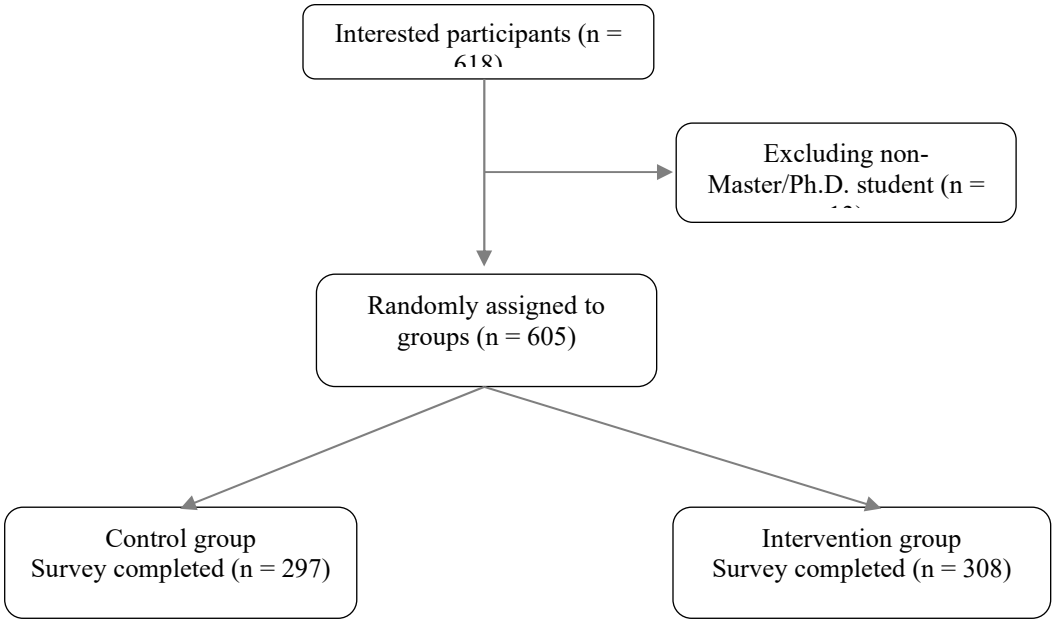


Figure 2. Study participation procedure

*4.2 Baseline characteristics*

Table 1 depicts participants' socio-demographic statistics. The result shows that most participants were male (n =367; 60.7%), and most of the participants were aged between 29 and 33 years (n = 242; 40%). More than half of the total participants are Ph.D. students (n = 332; 54.9). Furthermore, their various academic major is depicted in Table 1 below.

Table 1. Demographic statistics (frequency and percentage)

| | Control group (n = 297) | | Intervention group (n = 308) | |
|---|---|---|---|---|
| Variable | Masters (%) | Ph.D. (%) | Masters (%) | Ph.D. (%) |
| Gender | | | | |
| Male | 74 (56.1) | 114 (69.1) | 79 (56.0) | 115 (68.9) |
| Female | 58 (43.9) | 51 (30.9) | 62 (44.0) | 52 (31.1) |
| Age | | | | |
| Less than 24 | 7 (5.3) | 17 (10.3) | 9 (6.4) | 15 (9.0) |
| 24 – 28 | 56 (42.4) | 52 (31.5) | 45 (31.9) | 30 (18.0) |
| 29 – 33 | 41 (31.1) | 45 (27.3) | 64 (45.4) | 64 (38.3) |
| More than 33 | 28 (21.2) | 51 (30.9) | 23 (16.3) | 58 (34.7) |
| Student major | | | | |
| Physical science | 24 (18.2) | 36 (21.8) | 29 (20.6) | 20 (12.0) |
| Life science | 18 (13.6) | 25 (15.2) | 19 (13.5) | 34 (20.4) |
| Engineering | 25 (18.9) | 33 (20.0) | 29 (20.6) | 35 (21.0) |
| Medical science | 23 (17.4) | 26 (15.8) | 25 (17.7) | 30 (18.0) |
| Space science | 23 (17.4) | 20 (12.1) | 23 (16.3) | 25 (15.0) |
| Management | 19 (14.4) | 25 (15.2) | 16 (11.3) | 23 (13.8) |

*4.3 Descriptive Analysis and Evaluation of Structural and Measurement Model*

Mindfulness, PsyCap, and publication anxiety were analyzed using descriptive and bivariate correlation analyses. CFA results indicated a good fit, $x^2$ (3319) = 1,156, $x^2$-*to-df* 2.69 index, SRMR =.02, CFI =.94, TLI =.97, and RMSEA =.04. High values of average variance explained (AVE) greater than maximum shared variance values demonstrated discriminant validity for the constructs. The observed AVE values were more than .50, and the square roots of the observed AVEs were larger than the inter factor correlation coefficients, signifying that the constructs satisfied the standard of convergent validity (Shahani et al., 2022). As indicated by Hair et al. (2012), we assessed the CRs of constructs and the internal reliabilities of measurement items (α) within the standard cutoff of .70. The correlation analysis revealed a significant and negative relationship between mindfulness and publication anxiety ($p$ < .001). Additionally, PsyCap is also significantly and negatively correlated with publication anxiety ($p$ < .001). Meanwhile, mindfulness is positively associated with PsyCap scores of graduate research students ($p$ < .01; see Table 2).

 

Table 2. *Correlation Analysis*

| Construct | CR/a | AVE(b)/MSV | Mindfulness | PsyCap | Publ. Anxiety |
|---|---|---|---|---|---|
| Mindfulness | .95/.93 | .85 (.90)/.10 | 1 | | |
| PsyCap | .91/.90 | .78 (.86)/.11 | 0.36*** | 1 | |
| Publ. anxiety | .93/.91 | .69 (.80)/.11 | -0.16** | -0.38*** | 1 |
| Skewness | | | 0.01 | -0.13 | 0.49 |
| Kurtosis | | | 1.02 | 1.11 | -0.56 |

Note. PsyCap = Psychological capital; Publ. anxiety = Publication anxiety; CR = composite reliability; a = Cronbach's α for items internal consistency; AVE = average variance explained; MSV = maximum shared variance; b = square root of AVE.
*$p$ < .05. **$p$ < .01. ***$p$ < .001.

The data for the control and intervention groups were evaluated, followed by the mean difference for both control and intervention groups, to ascertain the impact of the mindfulness practice on publication anxiety in graduate research students (Table 3). The analysis indicated that the intervention group had considerably lower anxiety ($p$ = .035) than the control group. By comparing the intervention group with the control group, it was reported that the intervention group had higher self-efficacy ($p$ = .002), hope ($p$ = .000), resilience ($p$ = .001), optimism ($p$ = .005), and total PsyCap ($p$ = .000).

The findings show that using HAYES PROCESS with 5000 bootstrapped, PsyCap acts as a mediator between mindfulness and publication anxiety.

Table 3. Mean and Standard Deviation of Self-guided mindfulness for control and intervention groups

| | Control group | | | Intervention group | | | Control – Intervention | |
|---|---|---|---|---|---|---|---|---|
| Variables | Pre-survey Mean (SD) | Post-survey Mean (SD) | Change Mean (SD) | Pre-survey Mean (SD) | Post-survey Mean (SD) | Change Mean (SD) | Difference in change (Mean) | p-value (t-test) * |
| Mindfulness | 22.25 (2.5) | 22.81 (3.7) | 0.56 (2.6) | 21.64 (4.3) | 23.81 (2.9) | 2.17 (3.5) | 1.61 | **.003** |
| Publication anxiety | 7.24 (6.8) | 8.93 (9.3) | 1.69 (6.1) | 5.18 (4.0) | 4.02 (4.2) | -1.16 (3.5) | -2.85 | **.035** |
| Self-efficacy | 14.79 (2.0) | 14.26 (2.0) | -0.53 (8.6) | 14.35 (4.2) | 15.58 (2.3) | 1.23 (3.5) | 1.76 | **.002** |
| Hope | 18.05 (4.1) | 16.59 (5.4) | -1.46 (3.1) | 17.63 (2.4) | 19.09 (3.0) | 1.46 (2.0) | 2.92 | **.000** |
| Resilience | 13.02 (2.1) | 13.06 (2.2) | 0.04 (1.8) | 12.55 (2.7) | 13.88 (2.7) | 1.33 (2.4) | 1.29 | **.001** |
| Optimism | 9.02 (2.0) | 9.37 (2.3) | 0.35 (1.5) | 9.31 (3.5) | 9.98 (2.6) | 0.67 (3.0) | 0.32 | **.005** |
| Total PsyCap | 53.2 (10.7) | 52.0 (11.4) | -1.2 (6.9) | 52.4 (8.1) | 56.7 (7.4) | 4.3 (5.8) | 5.50 | **.000** |

Note= p < .05; SD = standard deviation. *two-tail T-test for independent samples.

### *4.4 Mediation analysis*

Direct Effects

To begin, the connections between (i) mindfulness and publication anxiety, (ii) mindfulness and PsyCap, and (iii) PsyCap and publication anxiety were examined using SEM. $x^2$ = 30.310, $df$ = 16, $p$ < .01, $x^2/df$ = 2.124, RMSEA =.058, SRMR =.051, and CFI/TLI =.91/.85. According to the model, mindfulness has a significant negative relationship on publication anxiety ($b$ = -0.17, $t$ = -3.02, $p$ < .05), and a significant positive effect on PsyCap ($b$ = 0.36, $t$ = 7.48, $p$ < .001). Additionally, PsyCap demonstrated a statistically significant negative impact on publication anxiety ($b$ = -0.30, $t$ = -6.51, $p$ < .001). We found a 34% prediction variance in publication anxiety (the dependent variable).

Indirect effect

Second, the indirect effect of mindfulness on publication anxiety was examined through PsyCap components as a mediator. We employed a biased-corrected bootstrapped approach with a 95% confidence interval (CI). The fit indices for the mediation model are as follows: $x^2$ = 11.389, $df$ = 7, $p$ >.05, $x^2$ /$df$ = 1.816, NFI =.93, TLI =.91, RMSEA =.046, SRMR =.046, and CFI =.96. It was found that PsyCap is portrayed as a significant mediator in the relationship between mindfulness and publication anxiety (β = -.043, $SE$ = -.032, CI [-.038, -.006], $p$ < .05). Following the mediation, the direct path of mindfulness to publication anxiety was evaluated to ascertain the

nature of mediation. The analysis indicates that the path retained its significance, implying that the mediation is partial.

## 5. Discussion and Conclusion

Graduate research students are students cohort who are confronted with various academic challenges such as balancing academic, personal, and family life (Virtanen et al., 2017). As a result, they require specific psychological well-being and self-care mechanism for reducing anxiety and increasing psychological capability (Amosun, Jianxun, et al., 2022). An example of such is mindfulness training which has been demonstrated to significantly lower psychological anxiety among university students in different ways (Barry et al., 2019; Bellinger et al., 2015; Charoensukmongkol, 2019). The current study established that mindfulness is a valuable technique for reducing anxiety among graduate research students. The reduction was observed by comparing the mean difference of the participants in the control group and intervention group. The intervention group reported significantly lesser anxiety in the experiment, which is in line with the previous DASS study (Amosun, Chu, et al., 2022; Barry et al., 2019). The intervention group also reported a tremendous increase in PsyCap levels during the experiment, suggesting that mindfulness significantly influences PsyCap (Kotzé, 2018).

Our findings that mindfulness practice boosted participants' self-efficacy, hope, resilience, and optimism are noteworthy and broadly applicable to tertiary education. Previous studies have only examined mindfulness's role in impacting undergraduate and clinical student academic performance (Bóo et al., 2020; Schanche et al., 2020; Stephen & Mehta, 2019). Since mindfulness is a vital contributor in enhancing students' positive affect and reducing negative affect, this study argues that mindfulness practice would be beneficial in lowering graduate research students' publication anxiety. Meanwhile, Samouei & Ghasemi (2015) found no significant effect on mindfulness education and college students' PsyCap. Ataşalar & Michou (2019) and Roeser (2016) study revealed that mindfulness-based learning boosted adolescents' optimism and self-esteem in pre-teen school. Most reports of impactful mindfulness interventions support attributes that develop an individual's psychological well-being. This study suggests it may be more appealing to communicate the importance of mindfulness techniques to individuals experiencing negative stressors such as anxiety and depression, particularly to a diverse group of university research students.

Mindfulness training should be adopted to complement other self-care strategies for graduate research students and necessary for higher institution learning to establish a center that teaches and allows students to practice mindfulness to mitigate academic stress. Graduate research students experience different types of challenges: the threat of publishing or perish or academic supervisor pressure for results, and the pressure of research publication, which should be addressed institutionally, not by expecting individuals to manage the anxiety they generate. Individual mental well-being and good work practice are crucial for maintaining and sustaining study progress. Therefore, paying attention to graduate research students' cognitive and psychological well-being is vital in the education system.

### *5.1 Theoretical effects*

The outcome of this investigation has illuminating implications for both theory and variables the study adopted. First, the new rediscovery of mindfulness suggests that it may complement graduate research students' psychological protective mechanisms and be positive and proactive to their mental well-being. SDT has previously indicated that mindfulness is a crucial intraindividual component that fosters autonomous activity, mental health and helps people be less sensitive to negative affect (Deci et al., 2017). However, evidence for this has been sparse to date. The current findings demonstrate that mindfulness is positively connected with autonomous psychological capital and adversely associated with anxiety.

Second, the study demonstrates PsyCap as a motivating factor that acts as a mediating channel in influencing an individual's well-being. The findings support the SDT's premise that an individual's psychological motivating competency and an act of autonomy determine their well-being. Mensah & Amponsah-Tawiah (2016) demonstrated that PsyCap resources are a motivating factor protecting against mental distress, such as anxiety, in the case of graduate research students. When viewed through the lens of SDT, these characteristics strengthen the theoretical tenet of SDT that positive affect is essential for achieving psychological well-being in humans. It does, however, corroborate with past research that mindfulness generates positive emotion, which is beneficial to individual mental well-being (Deci & Ryan, 2008).

### *5.2 Practical effects*

The study's findings provide necessary guidance on managing publication anxiety, particularly during the COVID-19 pandemic. To begin, COVID-19 has been recognized as putting students' psychological well-being in an unstable condition (Mosanya, 2021). These conditions are detrimental to the affected individuals' well-being. So, it is a necessity to generate a coping strategy to mitigate stressors among students. Thus, proof that mindfulness improves PsyCap and reduces publication anxiety in graduate research students serves as an

 

appropriate signal to university, research institution administrators, and career counselors to make a decisive action. In times of uncertainty, such as the COVID-19 pandemic, people's inherent strengths may be the deciding factor (Rufai et al., 2023). Therefore, this study suggests administrators of the tertiary education system and research institutes take an active role in cultivating the positive psychology of research students. i.e., establishing on-campus positive psychology labs or centers for mindfulness practice in partnership with positive psychologists. The labs or centers will help students develop coping mechanisms, improve PsyCap, and buffer graduate research students against anxiety.

### *5.3 Future Direction and Research Limitations*

While this study gives an in-depth examination of the subject and provides relevant insights, the following shortcomings have been identified. To begin, the data were collected quantitatively by questionnaire. Qualitative research involving an in-depth interview with participants could result in more objective and thorough investigations. Additionally, future research may evaluate the self-coping techniques adopted by graduate research students, which would provide more contextual information, considering cultural, economic, and socio-demographic variations.

### *5.4 Conclusions*

This study provides a significant contribution that can be implemented realistically in higher education settings. The findings demonstrate the efficacy of guided mindfulness meditation on graduate research students' psychological well-being, validating the potent of mindfulness reducing publication anxiety and enhancing components of PsyCap. Promoting mindfulness training and practice to graduate research students is strongly recommended emphasizing the cognitive benefit it provides. In other words, this strategy fosters self-efficacy, hope, resilience, and optimism, all of which are necessary for successful graduate program completion. This study contributes to identifying practices that increase psychological well-being and alleviate anxiety in graduate research students, an area of study where mindfulness research is sparse.

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