



Psychological Capital, Well-being, and Distress of International Students

Priscilla Rose Prasath¹ · Yiyong Xiong² · Qiyang Zhang² · Lieny Jeon²

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Abstract

International students continue to experience myriad of challenges, some of which further transpired disproportionately during the COVID-19 pandemic era. To this effect, this study investigated psychological capital (PsyCap), psychological distress, and well-being among 188 international students attending U.S universities. Results using Hayes PROCESS indicated that well-being mediated the relationship between PsyCap and psychological distress and in particular moderated the relationship between PsyCap and depression. When higher education institutions are considering steps to mitigate psychological distress experienced by international students during the COVID-19 pandemic and beyond, based on the findings of our study, we suggest investing efforts and resources into two aspects: (a) promotion of positive mental health and well-being and (b) identification and development of positive psychological capital. We further discuss these results and implications for mental health promotion of international students in light of its limitations and recommendations for future research.

Keywords International students · Psychological capital · Well-being · Psychological distress · Depression · Anxiety · Stress

The mental health of international students is recognized as a growing concern among universities globally (Poyrazli, 2015). The increased numbers of foreign students of color pursuing education in the U.S make conversations regarding the health and well-being of international students essential because while the United States (U.S) has a culture that celebrates diversity, it maintains uncomfortable silence regarding race (Jiang, 2020). In the climate of sudden and unprecedented

✉ Priscilla Rose Prasath
priscilla.prasath@utsa.edu

¹ Department of Counseling, University of Texas at San Antonio (UTSA), 501 W. Cesar E. Chavez Boulevard, Durango Building, San Antonio, TX 78207, USA

² School of Education, Johns Hopkins University, Baltimore, MD, USA

change brought about by the COVID-19 pandemic, international students at universities experienced heightened psychological distress as they continued to fulfill their academic, social, and immigration obligations. Based on theoretical and empirical underpinnings, we examine predictors of international students' psychological distress during the COVID-19 pandemic. In particular, because of the unprecedented emotional challenges international students experience (Zabin, 2021), we expect that psychological strengths and general well-being would play an important role in dealing with psychological distress. Foremost, we examine the direct associations between international students' inherent positive psychological strengths and the degree of psychological distress they experience. In addition, we explore whether the international students' well-being mediates or moderates the association between psychological strengths and psychological distress. The mediation analysis investigates to what extent psychological strengths are related to well-being status, which in turn is related to psychological distress. The moderation analysis aims to investigate the well-being conditions at which international students' psychological strengths are more effective in attenuating their experiences with psychological distress. Given the context of the COVID-19 global health crisis and its compounding challenges specific to international students such as increased discrimination and hate crimes, our current study has implications for mental health professionals and the higher education institutions in general for ensuring the well-being of the students.

Psychological Distress among International Students

International students face many struggles including adaptation to new social and academic norms, culture shock, difficulties in communication, insecurities about finances and accommodation, loss of established support and social networks, the experience of alienation, stereotyping and prejudice, social isolation, and homesickness (Hendrickson et al., 2011; Hirai et al., 2015; Mori, 2000). Such excessive exposure to stress may lead to experiencing higher levels of negative affect, irritability, agitation, depression, anxiety, difficulty relaxing, and a persistent state of overarousal and low frustration tolerance (Mori, 2000). During the COVID-19 pandemic, at both individual and communal levels, international students experienced increased psychological distress. For example, with campus closures, quarantine, and lockdown enforcements within the U.S and beyond, psychological distress such as depression, anxiety, and stress, worsened among international students due to exacerbated feelings of loneliness (Y. Xiong et al., 2022). Also, due to the travel ban and closure of the U.S embassy in many countries (Corporate Immigration Partners, 2021), there were delays in immigration and visa-related processes for many international students (U.S. Visa News, 2020). Moreover, stress and panic skyrocketed when the U.S. Department of Homeland Security announced that in Fall 2020 current international students in the U.S whose programs remain entirely online will have to depart the country (U.S. Immigration and Customs Enforcement, 2020). The

resulting uncertainty and stress might have caused increased anxiety and depression (Elemo et al., 2021; Litam, 2020).

Overall, the higher prevalence of such mental health concerns among international students compared to other sub-groups of university students makes them a vulnerable, at-risk population (Brown & Brown, 2013; Jung et al., 2007; Paralkar, 2020; Stallman, 2010). Despite their higher risk compared to domestic students, evidence consistently shows lower help-seeking attitudes and utility rates for international students (Poyrazli, 2015; Xiong & Pillay, 2022). Unrecognized and untreated mental illness may impair international students' academic functioning (Schuchman, 2007). Understanding predictors of international students' psychological distress, such as anxiety, depression, and stress is important.

Psychological Capital (PsyCap) of International Students

Although anxiety, depression, and stress are all indicators of poor psychological health, positive psychological resources such as optimism, hope, self-efficacy, and grit are found to reduce anxiety (Sheridan et al., 2015), enhance greater academic performance (Carmona-Halty et al., 2019), and facilitate better overall well-being (Hammond, 2004). International students adapt in different ways to their host environment, with some encountering high levels of stress, anxiety, and depression, while others construct a positive sense of self to reduce their psychological distress (Russell et al., 2010). To some degree, this may be attributed to the internal, personal positive psychological resources or strengths possessed by individuals, such as hope, self-efficacy, resilience, and optimism. In positive psychology (Seligman, 2011), this is conceptualized by a positive psychological term called, Psychological Capital (PsyCap) (F. Luthans et al., 2007). Developing PsyCap enables persevering toward goals and redirecting paths when necessary (*hope*), making a positive attribution about now and the future (*optimism*), sustaining and bouncing back and even beyond when beset by problems and adversity (*resilience*), and having the confidence to engage in the necessary effort to succeed at challenging tasks (*efficacy*) (F. Luthans & Youssef-Morgan, 2017). Studies show that developing PsyCap of individuals impacts their attitudes, satisfaction, behaviors, and performance (Avey et al., 2011; Luthans et al., 2007; Luthans & Youssef-Morgan, 2017). Especially, during COVID-19, positive psychological strengths such as resilience and hope may help individuals to cope with emerging challenges and foster mental health and well-being (Arslan et al., 2020; Prasath et al., 2021; Yıldırım & Arslan, 2020).

PsyCap of individuals may be viewed as a significant facilitator in offering resistance to psychological distress. Previous studies suggest that individuals who possess high self-efficacy and optimism are less likely to report anxiety or depression (Schweizer & Schneider 1997). Hope negatively correlates with negative emotions, such as helplessness, anxiety, depression, and loneliness (Seligman, 2011). Similarly, resilience serves as a pivotal protective factor for individual mental health (Tugade et al., 2004). Furthermore, numerous studies highlight PsyCap as a protective resource to combat psychological distress, such as depressive symptoms anxiety, and stress (Avey et al., 2011; Liu et al., 2012; Shen et al., 2014).

In a higher education context, students who maintained higher PsyCap were found to report feelings of less distress (Nafees & Jahan, 2017). Also, during the COVID-19 pandemic, Alat et al.'s (2021) study indicated that individuals who possess high PsyCap experienced less psychological distress. Researchers examined PsyCap in the context of education (Luthans et al., 2012), particularly among international students (Jo Ching et al., 2019; Prasath et al., 2022), and found that PsyCap is associated with student engagement (Barratt & Duran, 2021), academic performance (Luthans et al., 2012), academic adjustment (Hazan Liran & Miller, 2019), leadership (Prasath & Bhat, 2022) and overall well-being (Prasath et al., 2021; Riolli et al., 2012; Selvaraj & Bhat, 2018). In particular, students with higher levels of PsyCap reported experiencing lower levels of academic stress and higher levels of positive mental health (Javaheri, 2017). Therefore, this indicates that understanding the role of positive psychological strengths would be beneficial as we conceptualize its role in mitigating the experiences of psychological distress in an international student's life in the U.S. during and beyond the COVID-19 pandemic.

Well-being: PERMA Model

Compared to their domestic peers, international students report significantly lower well-being (Paralkar, 2020). However, for international students, while there is a body of literature related to issues they face, the role of well-being related to their psychological capital and psychological distress are known less (McKenna et al., 2017). Dodge et al. (2012) define well-being as the equilibrium or balance between psychosocial challenges faced by individuals and their psychosocial resource pool. As such, well-being is a multidimensional construct that includes various aspects that are important to pursue their own sake and that which can be defined and measured independently of one another (Seligman, 2011).

Seligman (2011) developed the Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment (PERMA) model that may be useful in the conceptualization of well-being among international students. To flourish, individuals must possess an optimal level of functioning in all five core elements (Huppert & So, 2013; Seligman, 2011). Seligman (2011) describes *positive emotions* to denote hedonic feelings of happiness, *engagement* to the psychological connection to activities, and *positive relationships* to include feelings of social integration, care, support, and satisfaction with social connections. Furthermore, *meaning* indicates the state of being of an individual where life is seen as valuable and connected to something greater than oneself as well as *accomplishment* to describe progress one makes toward their goals, with a feeling of capability and a sense of achievement (Kern et al., 2015; Seligman, 2011). Optimal well-being is not viewed simply as the lack of negative psychological states, but something greater that falls onto the positive side of the mental health spectrum. Understanding the well-being of college students is a primary determinant of their capacity to persist in postsecondary programs, so facilitating student adjustment to college life helps lead to student graduation and

the ability to pursue jobs in career fields in which they demonstrate interest (Tansey et al., 2018).

Well-being as a Mediator

Empirical studies indicate PsyCap's positive association with PERMA well-being (Culbertson et al., 2010; Riolli et al., 2012; Selvaraj & Bhat, 2018). This notion suggests building upon existing resources and strengths that individuals possess such as optimism, hope, resilience, or self-efficacy, that can help to sustain an optimal level of mental health and well-being (Luthans et al., 2006). Controlling for age and gender, Bazargan-Hejazi et al. (2021) found a positive association between high levels of hope and optimism and PERMA well-being. Previous research shows that PERMA well-being can be, in turn, negatively associated with psychological distress, especially among college students (Butler & Kern, 2016). Though the COVID-19 pandemic continues to pose a serious threat to individuals' well-being (Arslan et al., 2020; Xiong et al., 2020; Yıldırım & Arslan, 2020), there is growing evidence of severe mental health problems worldwide (Arslan et al., 2020; Qiu et al., 2020; Xiong et al., 2020). There is some evidence in support of well-being as a mediator (Choi, 2021; Lai et al., 2018; Wąsowicz et al., 2021). After controlling for demographic variables, PERMA well-being negatively predicted psychological distress in a multinational study during the COVID-19 pandemic (Carreno et al., 2021). As such, empirical studies support that PERMA well-being elements could be associated with psychological distress (Butler & Kern, 2016).

Well-being as a Moderator

While international students' well-being can be seen as a potential mechanism explaining the associations between PsyCap and psychological distress, their overall well-being may also serve as a moderator against psychological distress. For example, when the students' levels of well-being are high, the association between PsyCap and psychological distress can be strengthened because when they function from an optimal state of mental health, they would have better psychological capacity to fully take advantage of psychological capital to reduce their anxiety, depression, and stress (Carreno et al., 2021; Xanthopoulos et al., 2007). Especially during the COVID-19 pandemic, although positive psychological resources may offer promising potential in reducing psychological distress, this may only work for individuals who is functioning from a high level of well-being (Snyder, 2000). When the students have low levels of well-being, there might be difficulty for them to maximize the benefits of psychological capital in dealing with psychological distress because of their inability to access and apply their strengths reserves (Huber et al., 2021). Thus, the association between psychological capital and distress could be attenuated when they have lower levels of well-being. Despite the potential protective role well-being could play, there is limited available literature that examines well-being as

a moderating variable in the relationship between strengths and distress. Maintaining higher levels of well-being can be challenging during the COVID-19 pandemic (Prasath et al., 2021). In such cases, positive psychological resources may offer promising potential in reducing psychological distress while an individual is functioning from a higher level of well-being (Snyder, 2000).

The Current Study

Taken together, we suggest that well-being would be related to both psychological capital (PsyCap) and psychological distress. We sought to expand on previous research by investigating the role of well-being as a potential mediator and moderator in promoting psychological capital (PsyCap) and mitigating psychological distress during the COVID-19 among international students. Well-being may not only serve as a mediator that explains the association between PsyCap and psychological distress, but may also have a moderator role which strengthens or attenuates the effect of PsyCap on psychological distress experienced by international students. To our knowledge, no study has examined the mediating and moderating effect of well-being on the relationship between PsyCap and psychological distress among international students in the U.S. Therefore, this current study was designed to address the gap by examining the relationship between psychological capital (PsyCap), psychological distress (i.e., depression, anxiety, and stress), and PERMA well-being among international students attending U.S universities. The following research questions guided our work:

1. To what extent PsyCap is directly associated with distress after controlling for international students' demographics?
2. To what extent PsyCap is indirectly associated with distress via PERMA well-being after controlling for international students' demographics? In other words, is PsyCap associated with PERMA well-being, which in turn is associated with distress after controlling for international students' demographics?
3. To what extent PERMA well-being moderates the association between PsyCap and distress after controlling for international students' demographics? In other words, depending on PERMA well-being, is the association between PsyCap and distress strengthened or attenuated after controlling for international students' demographics?

First, we hypothesize that when international students have higher levels of PsyCap, they would report lower levels of psychological distress, measured by anxiety, depression, and stress. Second, we hypothesize that higher levels of PsyCap will be significantly relate to higher levels of PERMA well-being, which in turn will be associated with lower levels of psychological distress. Finally, we hypothesized that as well-being increases, the positive effect of PsyCap on psychological distress increases. On the other hand, as well-being decreases, the association between PsyCap and psychological distress will also decrease.

Method

Participants and Procedure

After obtaining approval from the Institutional Review Board, participation was solicited from authors' respective universities via emails to students at two large universities (one public and one private) in the northeast and the southwest regions of the USA. A convenient snowball sampling method was employed in order to reach diverse groups of international students. The selection criteria included 1) being an international student with a temporary visa and 2) being above 18 years old. Participants who were willing to respond completed the informed consent form and the online survey comprising a demographic form and a series of standardized questionnaires. Those who completed the survey were eligible to join a raffle to win \$10 gift cards. The final sample consisted of 188 participants. Table 1 presents demographic information. Among the 188 survey participants, 99 (57.89%) students identified as

Table 1 Demographic information

Variable	Category	<i>N</i>	Means (SD) or Frequency (%)
Gender	Male	71	41.52%
	Female	99	57.89%
	Other	1	0.58%
Country	China	33	20.37%
	Mexico	22	13.58%
	India	18	11.11%
	Other	89	53.29%
South Asian	Yes	33	17.55%
	No	155	82.45%
First semester US	Yes	46	26.90%
	No	125	73.10%
University	University 1	91	51.60%
	University 2	97	48.40%
Stay	USA	151	88.30%
	Home Country	20	11.70%
Education Level	Undergraduate	69	41.07%
	Master	44	26.19%
	Doc & Post-doc	55	32.74%
Self diagnosed with COVID-19	Yes	13	8.28%
	No	144	91.72%
Self tested with COVID-19	Yes	99	63.06%
	No	58	36.94%
Months in the US		167	29.44 (29.25)

Note. SD refers to standard deviation. East Asian refers to students from China, South Korea, and Vietnam. South Asian refers to students from India, Nepal, and Pakistan

female, 71 (41.52%) students identified as male, and 1 (0.58%) student identified as non-binary. Participants' age ranged from 18 to 56 ($M=25.05$, $SD=5.50$). Students reported their country of origin to be People's Republic of China ($n=33$, 20.37%), Mexico ($n=22$, 13.58%), India ($n=18$, 11.11%), and others (such as Bangladesh=8, Nepal=5, Egypt=4, and South Korea=4). We grouped students from India, Bangladesh, Pakistan, and Nepal as South Asians. There were 69 (41.07%) undergraduate students, 44 (26.19%) masters students, and 55 (32.74%) doctoral or postdoctoral degrees. 40.59% participants reported fall 2020 as their first semester studying in the U.S and the majority (59.41%) reported otherwise. All participants were enrolled as full-time students, although due to the travel restrictions, border closures, and lockdown resulting from the COVID-19 pandemic, some participants were residing in their home countries at the time of the survey ($n=20$, 11.7%).

Measures

Demographic Questionnaire

The demographic questionnaire consisted of eight questions. These questions included basic personal qualities: age, gender, nationality, whether it is their first semester in the U.S., educational level, and residency. Additional questions included a focus on whether they have been tested or diagnosed with the COVID-19.

Depression, Anxiety, and Stress Scale-21 (DASS-21)

Psychological distress, namely, depression (DASS-D), anxiety (DASS-A), and stress (DASS-S) among the sample was measured using the Depression, Anxiety, and Stress Scale-21 (Lovibond & Lovibond, 1995). Depression refers to low levels of positive affect (e.g., dysphoria, hopelessness, lack of energy, and anhedonia), while anxiety refers to a mixture of general distress such as irritability, agitation, difficulty relaxing, and impatience. Stress is the persistent state of overarousal and low frustration tolerance. The 21 items are scored on a 4-point Likert-type scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). Higher scores indicate more frequent symptomatology. Seven items comprise each of three scales: Depression, Anxiety, and Stress. Studies show that the DASS-21 is psychometrically sound, with Cronbach's alphas scores ranging within 0.761 to 0.906 (Bibi et al., 2020; Le et al., 2017). Similar to their finding, Cronbach's alpha in the current sample was 0.89 for stress, 0.84 for anxiety, and 0.91 for depression.

Psychological Capital Questionnaire – Short Version (PCQ-12)

The PCQ-12 consists of 12 items that measure four positive psychological strength dimensions: hope (PCQ-H), self-efficacy (PCQ-E), resilience (PCQ-R) and optimism (PCQ-O), together forming the construct of psychological capital (PsyCap) (Luthans et al., 2007). The overall PsyCap score was calculated by the mean of all the items. The PCQ-12 utilizes a 6-point Likert-type scale ranging from 1 (strongly

disagree) to 6 (strongly agree). Higher the score, higher the measure of PsyCap and its dimensions within individuals. Strong psychometric properties of PCQ-12 are established (Wernsing, 2014). In previous studies, the Cronbach's alpha scores of PCQ-12, depending on the population, ranged from 0.68 (Luthans et al., 2008) to 0.90 (Rus et al., 2012). In this study, Cronbach's alpha was 0.88 for self-efficacy, 0.84 for hope, and 0.70 for resilience, 0.83 for optimism, and 0.86 for overall PsyCap.

PERMA Profiler-21

PERMA Profiler-21 (Butler & Kern, 2016) is a 21-item scale designed to measure Seligman's five pillars of well-being including Positive emotions (PERMA-P), Engagement (PERMA-E), Relationships (PERMA-R), Meaning (PERMA-M), and Accomplishment (PERMA-A). The five PERMA elements are measured with three items per subscale. The overall PERMA score was calculated by the average of all items. Higher scores indicate higher levels of well-being with regard to each of the components of PERMA. In addition to these 15 items, there are eight filler items that are not included in this analysis. The Cronbach's alpha scores of the PERMA Profiler ranged from 0.80 to 0.93 for all subscales except engagement ($\alpha = 0.66$) (Ryan et al., 2019), similar to our study where alpha score for overall PERMA was 0.93 and five PERMA sub-scales were within the range of 0.57 and 0.88.

Data Analysis Procedure

We conducted an a priori power analysis using G*Power (Version 3.1.9.3) to determine the sample size needed for the analyses. The minimum sample size was 185 to detect a medium effect size ($\text{power} = 0.80$; Cohen, 1992) using a 0.05 alpha level. We used SPSS (Version 27) to analyze the data. We first screened the data for missing values and excluded participants ($n = 463$) whose responses indicated fraud. Those 463 participants consistently identified themselves as coming from Guinea-Bissau, which was not consistent with the international student profile at either university. Moreover, given that all 463 responses were recorded on the same day with approximately 5-min intervals in between, we decided to drop these entries. We calculated descriptive statistics for all variables as well as the demographic questions, and conducted preliminary analyses (e.g., assessing normality, linearity, and multicollinearity and checking for outliers). We also used *t*-test and *F*-test to examine whether differences existed among international students with regard to their psychological distress, PERMA well-being, and PsyCap.

We utilized the SPSS macro PROCESS 3.3 (Hayes, 2018) to conduct the mediation and moderation analyses. In Model 4 of PROCESS (Hayes, 2018), overall PsyCap, overall PERMA, and psychological distress were entered as an independent variable, mediator, and dependent variable, respectively. The demographic factors were entered as the control variables. Separate analyses were run for each dependent variable: DASS-A, DASS-S, and DASS-D. All variables were observed variables. We tested the proposed models by performing 5,000 bootstrap resamples and

accelerating at a 95% confidence interval (CI). Indirect associations were calculated by multiplying the coefficient of the association between overall PsyCap (independent variable) and overall PERMA (mediator) by the coefficient of the association between overall PERMA (mediator) and psychological distress subscales (dependent variables) (MacKinnon, 2012). For the moderation model, we used Model 1 of PROCESS (Hayes, 2018). The independent variable was the overall PsyCap, the moderator was the overall PERMA, and the dependent variables were DASS-S, DASS-D, and DASS-A. Separate models were run with each dependent variable. We also controlled the demographic variables. Model 1 of PROCESS reported unstandardized coefficients (Hayes, 2018).

Results

Descriptive and Initial Analysis

On average, students reported a sub-optimal functioning level across all five sub-domains of the PERMA-Profiler scale. Additionally, the overall psychological distress ranges from normal to mild levels. In evaluating these constructs with regard to the demographic variables, *t*-test and *F*-test revealed more detailed comparisons between different groups but no significant differences were found (see Table 2). To examine the nature of the relationship of international students' well-being to their psychological strengths and mental distress, Pearson correlation was carried out and the results indicated that PERMA and all of the constituting five PERMA domains as well as the overall PERMA score were all significantly positively associated with overall PsyCap and its four dimensions. The associations ranged from 0.39 to 0.68. Additionally, PERMA was found to be significantly negatively related to DASS-S, DASS-A, and DAS-D ($r = -0.68 \sim -0.19$). Similarly, the PsyCap subscales and their overall scores with stress, anxiety, and depression were significant negative correlated ranging between -0.26 and -0.44.

Mediation and Moderation Results

To examine whether PERMA well-being served as a mediating or as a moderating variable, mediation analysis as well as moderation analyses were conducted. First, results from the mediation analyses indicated the role of PERMA well-being as a mediator in the relationship between PsyCap and psychological distress. As shown in Fig. 1, PsyCap was directly associated with PERMA well-being ($a = 1.32$, $p < 0.001$) but was not directly associated with DASS-S, DASS-A, or DASS-D. Additionally, PERMA well-being was directly associated with DASS-S ($b = 2.99$, $p < 0.001$), DASS-A ($b = 2.04$, $p < 0.001$), and DASS-D ($b = 4.21$, $p < 0.001$). The indirect association between PsyCap and DASS-S (CI [-5.75, -2.27]), DASS-A (CI [-4.07, -1.31]), and DASS-D (CI [-7.39, -3.68]) via PERMA were also significant as their CIs did not include 0, which indicated the mediation effect of PERMA in the relationship between PsyCap and psychological distress.

Table 2 Difference tests for PERMA well-being, PsyCap, and psychological distress based on demographic variables

Variable	Outcome Category	PERMA overall	PsyCap overall	Anxiety	Stress	Depression
Mean (SD)		6.162 (1.603)	4.211 (0.823)	8.04 (8.63)	12.04 (10.94)	9.88 (10.55)
Gender	Female	6.18 (0.17)	4.13 (0.09)	8.66 (0.89)	13.11 (1.15)	10.46 (1.10)
	Male	6.20 (0.19)	4.33 (0.10)	8.82 (0.96)	12.98 (1.14)	10.86 (1.17)
	<i>df</i>	159	156	168	168	168
	<i>t</i>	-0.10	-1.47	-0.12	0.08	-0.25
First semester in the USA	Yes	6.13 (0.20)	4.19 (0.12)	8.61 (1.08)	10.75 (1.26)	8.67 (1.31)
	No	6.20 (0.15)	4.22 (0.08)	8.93 (0.81)	14.09 (1.02)	11.51 (0.99)
	<i>df</i>	160	156	169	169	169
	<i>t</i>	0.28	0.21	0.21	1.80	1.56
Education Level	UG	6.36 (1.44)	4.33 (0.69)	7.82 (7.04)	11.41 (9.18)	8.95 (9.08)
	Mas	6.15 (1.65)	4.21 (0.90)	8.05 (9.86)	12.41 (10.67)	9.53 (10.02)
	D/PhD	5.97 (1.73)	4.08 (0.92)	10.18 (9.01)	15.54 (12.17)	13.21 (11.84)
	<i>df</i>	158	154	167	167	167
	<i>F</i>	0.87	1.32	1.33	2.41	2.89
South Asian	Yes	5.74 (0.31)	4.17 (0.17)	10.18 (1.70)	16.18 (2.05)	14.47 (2.15)
	No	6.26 (0.14)	4.22 (0.07)	7.58 (0.67)	11.16 (0.85)	8.90 (0.79)
	<i>df</i>	161	157	186	186	186
	<i>t</i>	1.65	0.30	-1.58	-2.43	-2.80
Self diagnosed with COVID-19	Yes	6.24 (0.50)	4.00 (0.23)	12 (2.74)	17.38 (3.73)	14.62 (2.98)
	No	6.15 (0.13)	4.23 (0.07)	8.84 (0.71)	13.14 (0.86)	11.00 (0.87)
	<i>df</i>	155	155	155	155	155
	<i>t</i>	-0.19	0.94	-1.27	-1.39	-1.19

Table 2 (continued)

Variable	Outcome Category	PERMA overall	PsyCap overall	Anxiety	Stress	Depression
Self test with COVID-19	Yes	6.16 (0.16)	4.00 (0.23)	9.77 (0.91)	12.84 (1.03)	10.37 (0.98)
	No	6.14 (0.22)	4.23 (0.07)	7.97 (1.02)	14.60 (1.47)	12.90 (1.53)
	<i>df</i>	155	155	155	155	155
	<i>t</i>	-0.07	0.94	-1.27	1.01	1.45

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; *UG*, Undergraduate; *Mas*, Master's; *D/PhD*, Doctoral and post-graduates; South Asian refers to students from India, Nepal, and Pakistan; SD refers to standard deviation

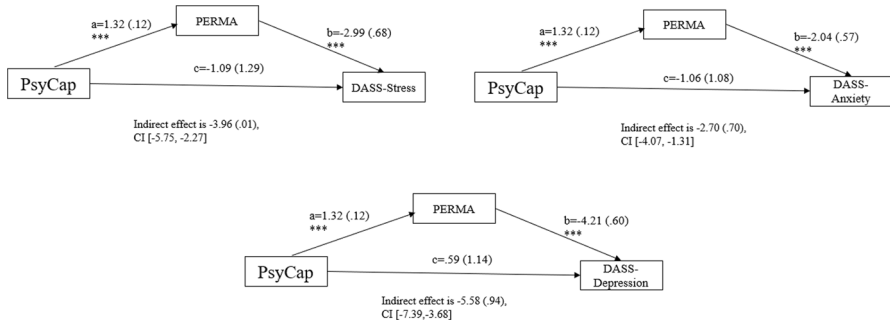


Fig. 1 PERMA as a mediator in the relationship between PsyCap and psychological distress. *Note.* *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. The coefficients were unstandardized. PsyCap refers to the overall PsyCap score; PERMA refers to the overall PERMA score

Next, in evaluating the moderation effect of PERMA well-being on the relationship between PsyCap and psychological distress, PERMA well-being was found to moderate the relationship between PsyCap and DASS-D, but not the relationship between PsyCap and DASS-A or DASS-S (see Table 3). The model of DASS-D was significant ($F = 11.90 (10,135)$, $p < 0.001$) and accounted for 47% of the overall variance in depression. Both PsyCap ($b = -6.08$, $p = 0.02$) and PERMA well-being ($b = -9.10$, $p < 0.001$) were significantly associated with DASS-depression. The

Table 3 Regression testing PERMA as a moderator in the relationship between PsyCap and Psychological distress

	Stress	Anxiety	Depression	
PsyCap	-2.69 (3.09)	-2.65 (2.58)	-6.08 (2.66)*	
PERMA	-4.16 (2.17)	-3.20 (1.80)	-9.10 (1.87)***	
PsyCap*PERMA	.28 (.50)	.28 (.42)	1.18 (.43)**	
Age	.09 (.19)	.12 (.15)	-.17 (.16)	
First-semester in the U.S	-2.26 (1.94)	-.32 (1.62)	-1.93 (1.67)	
Self diagnosed with COVID-19	3.85 (2.79)	1.84 (2.33)	4.86 (2.41)*	
Self tested with COVID-19	.47 (1.79)	3.81 (1.49)*	-1.43 (1.54)	
South Asian	1.29 (2.18)	.89 (1.82)	1.36 (1.89)	
Gender	.94 (1.60)	.65 (1.33)	1.36 (1.37)	
Education level	.57 (1.27)	.73 (1.06)	.87 (.80)	
R^2	.31	.27	.47	
F	6.12 (10,135)***	5.07 (10,135)***	11.90 (10,135)***	
Conditional effect for DASS-depression	Effect	SE	t	Confidence interval
Low level PERMA	-.74	1.21	-.61	[-3.14, 1.66]
Middle level PERMA	1.25	1.14	1.09	[-1.01, 3.50]
High level PERMA	3.10	1.44	2.15*	[.25, 5.94]

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; SE, Standard error

interaction between PsyCap and PERMA was significant ($\beta = 1.18, p = 0.007$). Simple slopes analyses found that PsyCap was significantly associated with DASS-D when PERMA was high ($b = 3.09, SE = 1.44, p = 0.03$), but not when PERMA was low ($b = 1.25, SE = 1.14, p = 0.28$) or in the middle ($b = -0.74, SE = 1.21, p = 0.54$) (see Fig. 2).

Discussion

This study aimed to gather data on the overall state of mental health of international students using a diverse sample attending U.S. universities. This study provides several significant findings. First, PsyCap was found to be positively associated with PERMA well-being. This is in line with previous studies where a strong positive relationship exists between PsyCap and well-being (Avey et al., 2011; Carreno et al., 2021; Prasath et al., 2021; Selvaraj & Bhat, 2018). Also, as we hypothesized,

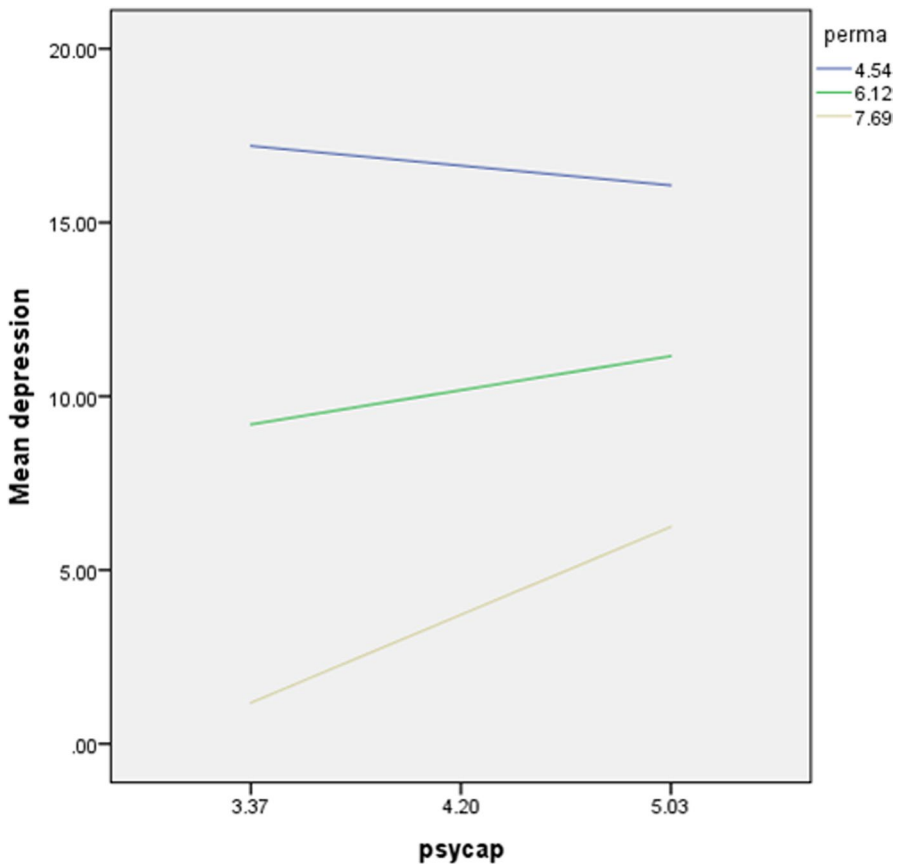


Fig. 2 PERMA as a moderator in the relationship between PsyCap and DASS depression

PsyCap, as well as PERMA well-being, were found to be negatively associated with psychological distress, which was likewise consistent with the literature (Butler & Kern, 2016; Liu et al., 2012; Riolli et al., 2012; Shen et al., 2014). This suggests that when international students have higher levels of PsyCap, they might report higher levels of PERMA well-being and at the same time also report lower levels of psychological distress, measured by anxiety, depression, and stress.

Second, our hypothesis on mediation was supported. PsyCap was associated with PERMA well-being, which in turn was associated with psychological distress after controlling for international students' demographics. This is in line with previous studies. PsyCap was shown to be associated with PERMA well-being and at the same time through increased flourishing could decrease levels of anxiety, stress, and depression symptoms, consistent with Finch et al. (2020) study. Also, the mediating role of PERMA well-being supported the function of well-being in the extant literature (Choi, 2021; Lai et al., 2018; Wąsowicz et al., 2021).

Furthermore, as hypothesized, PERMA well-being moderated the association between PsyCap and psychological distress after controlling for international students' demographics. In particular, the association between PsyCap and depression was stronger for international students with high rather than low well-being. In other words, when well-being is higher among international students, their higher levels of PsyCap were more strongly related to lower levels of depressive symptoms, thus confirming our hypothesis that well-being could boost the effects of PsyCap on psychological distress, particularly depressive symptoms. This is aligned with the findings from recently published studies during COVID-19 where PERMA well-being moderated between psychological capital and depression (Carreno et al., 2021). Finally, examining the covariates, our findings indicated an increase in anxiety when tested for COVID-19 and depression while infected with the COVID-19 virus (Table 3), which was also consistent with previous studies (Mazza et al., 2020; Zhang et al., 2020).

Implications for International Students' Mental Health Promotion

International students are at a greater risk of developing various mental health problems during the COVID-19 pandemic. There appear to be several protective factors that lower the risk of experiencing depression, anxiety, and stress. However, identifying those protective factors that prevent psychological illness symptoms plays a crucial role in improving overall student well-being during such difficult times. When considering steps to mitigate psychological distress experienced by international students during the COVID-19 pandemic and beyond, based on the findings of our study, we suggest investing efforts and resources into two aspects: (a) promotion of positive mental health and well-being and (b) identification and development of positive psychological capital.

First, numerous studies have indicated the benefits of focusing on well-being initiatives among students (Prasath et al., 2022; Riolli et al., 2012), particularly among diverse minority college students (Jung et al., 2007; Kern et al., 2015; Tansey et al., 2018). Assessing well-being and applying interventions early may be especially

beneficial for promoting the well-being of international students, as it is during this period that they experience the highest level of distress (Hirai et al., 2015). So, incorporating them effectively during orientation and support programs may help with the acculturation and transition process (Cemalcilar & Falbo, 2008). Moreover, engaging in efforts that promote positive emotions, engagement, relationship, meaning, and student accomplishments can lead to greater levels of happiness, well-being, health, and positive emotions (Diener & Seligman, 2002). For example, universities could create programs that foster meaningful social relationships and connections (Seligman, 2011) and encourage the daily practice of meditation (Pedrotti et al., 2008) among international students through campus engagement initiatives. Additionally, counselors working with international students may introduce various simple strategies that aim to foster well-being during their sessions such as gratitude exercises, mindfulness and mediative practices, hope and goal-setting activities, character strengths development interventions, and self-compassion meditations (Waters et al., 2021). Furthermore, during the pandemic, counselors may also offer these positive psychology interventions via mobile applications and gamifications as well, given their emerging evidence in promoting overall well-being (Parks & Boucher, 2020; Waters et al., 2021).

Secondly, these findings indicate that positive psychological strengths, namely the psychological capital, are essential facets of well-being and need to be taken into consideration in planning programs for international students. Especially during stressful times such as the COVID-19 pandemic and beyond, psychological strengths like resilience and hope may significantly promote mental health (Arslan et al., 2020; Yıldırım & Arslan, 2020). As all the four dimensions of PsyCap are deemed relatively malleable and open to development (Luthans et al., 2006), university policymakers need to give high priority to fully exploiting its potential to facilitate international students' effective adjustment and acculturation within the United States when implementing program initiatives. Furthermore, micro online PsyCap interventions lasting up to three hours (F. Luthans et al., 2006) and short positive psychology-focused interventions such as gratitude exercises, vicarious learning, and physical and mental well-being training (Luthans et al., 2014) increase individuals' PsyCap. Therefore, as suggested by Riolli et al. (2012), universities need to implement PsyCap training programs to augment student health for long-term health outcomes. While adopting a strength-based approach, counselors working with international students at college counseling centers and communities could teach PsyCap development strategies through workshops, training, coaching, advising, retreats, seminars, specialized freshmen courses, group counseling sessions, and programming geared to helping students with their specific individual strengths and career goals (Prasath et al., 2021, 2022; Selvaraj & Bhat, 2018). This will particularly facilitate the mental health outcome of international students who may not seek psychological assistance in college counseling centers.

Limitations and Directions for Future Research

There are several areas to explore based on the limitations of the study. First, our international student sample was limited to two universities, therefore, we recommend caution while generalizing our findings. Future researchers may expand their

study to include samples that may be demographically representative of the general U.S. international student population. Second, we relied solely on cross-sectional, self-reported data in our analyses. Therefore, we cannot make any causal interpretation of the findings. Longitudinal research is necessary to gain an accurate picture of the course of mental health problems and well-being of international students throughout their course of study in the U.S. Next, although the instruments used in this study showed strong psychometric properties with regard to reliability scores in the present study as well as in prior studies with diverse samples, there is a need for these measures to be normed with international student populations in the U.S. in particular. In the same vein, we also acknowledge the limitations that the assessment language (in this case, English) could have played in the level of comprehension and self-reported disclosure of the participants in this study. Future researchers may take necessary steps to evaluate and mitigate the influence that language of the scales may impose on the participating international students. Additionally, we recommend researchers to extend their scope of exploration to foreign-born student experiences in countries outside of U.S. We believe in doing so, international students' experiences with regard to mental health and well-being may be brought to the attention of the psychological service providers and policy makers globally. Finally, we suggest researchers design interventions and use experimental research methods to validate the findings of this study. For example, support groups may be offered for international students with a focus to develop well-being and their psychological strengths, and thereafter measure the change in the psychological distress as a result of the group process. In conclusion, this study presents insights into the associations between psychological strengths, well-being, and distress among international students attending in the U.S. during the COVID-19 pandemic.

Author Contribution All authors contributed to the study's conception and design. Material preparation, data collection, and analysis were performed by all authors. All authors contributed to different sections of the manuscript and together drafted this version of the manuscript. All authors read and approved the final manuscript.

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