



Cross-Validation of the Psychological Antifragility Scale (PAS) in Filipino College Students: Examining Factor Structure and Construct Validity

Joshua S. Taruc^{1*}, Christhoffer P. Lelis²

San Pedro College, Davao City, Davao Del Sur, Philippines

*Corresponding Author

DOI: <https://doi.org/10.47772/IJRISS.2026.100500804>

Received: 14 May 2026; Accepted: 19 May 2026; Published: 15 June 2026

ABSTRACT

Psychological antifragility, defined as the capacity to grow, strengthen, and undergo positive transformation through adversity, uncertainty, and stress, is a relatively new construct in psychology. Although the Psychological Antifragility Scale (PAS) was recently developed, no study to date has cross-validated its psychometric properties. Thus, the present study aimed to provide the first cross-validation of the PAS among Filipino college students by examining its reliability, factor structure, and construct validity within a normative stress context. A total of 326 Filipino college students participated in the study. Internal consistency reliability was assessed using Cronbach's alpha, while Confirmatory Factor Analysis (CFA) using maximum likelihood estimation was conducted to evaluate the hypothesized three-factor structure. Cross-validation was performed by randomly dividing the sample into two sub-samples. Lastly, convergent and discriminant validity were examined through correlations with resilience, post-traumatic growth, anxiety, and depression measures. Results showed that the PAS demonstrated good internal consistency reliability ($\alpha = .820$). Initial CFA findings indicated that the original three-factor model did not adequately fit the data. However, after model refinement, the revised model demonstrated acceptable fit across both sub-samples (Sample 1: RMSEA = .061, SRMR = .055, CFI = .953, TLI = .934; Sample 2: RMSEA = .065, SRMR = .055, CFI = .931, TLI = .903). Evidence for convergent validity was supported through significant positive correlations with resilience ($r = .193, p < .001$) and post-traumatic growth ($r = .421, p < .001$). Discriminant validity was only partially supported due to positive correlations with depression ($r = .144, p = .009$) and anxiety ($r = .122, p = .028$). Overall, the findings provide preliminary support for the PAS as a potentially useful measure of psychological antifragility among Filipino college students while highlighting the need for further theoretical and psychometric refinement.

Keywords: Psychological Antifragility Scale (PAS), CFA, Construct Validity, Filipino college students

INTRODUCTION

Antifragility was conceptualized by Nassim Taleb in 2012. He described antifragility as not merely the ability to withstand or recover from adversity, but the capacity to learn, adapt, and become better because of stressors and uncertainty (Taleb, 2012). Since its conceptualization, antifragility has been applied across different disciplines such as engineering, biology, healthcare systems, and risk analysis (Aven 2014, Axenie et al., 2024, Becker et al., 2024, Pineda et al., 2019, Taleb, 2018). However, its application to psychological measurement at the individual level is limited. After more than a decade, only two instruments have been developed and undergone validation to measure this construct on an individual level based on Taleb's conceptualization (Bajaba et al., 2024; Tsai, 2024). Thus, the construct has only recently been examined in its current form (Tsai, 2024). Nevertheless, these initial studies represent significant steps in translating the construct into measurable individual differences. Among these developments, the Psychological Antifragility Scale (PAS) developed by Tsai (2024) is of particular relevance, as it directly operationalizes antifragility consistent with Taleb's theoretical framework. The scale demonstrated promising psychometric properties and proposed a three-factor structure: (1) Benefit from Difficulty, (2) Benefit from Ambiguity, and (3) Benefit from Stress. However, the primary validation sample consisted largely of military veterans, a population likely exposed to traumatic experiences, which differs from Taleb's broader conceptualization of antifragility as improvement emerging

from normative stress, everyday uncertainty, and manageable life challenges rather than exclusively from trauma. Distinguishing between trauma-based growth and adaptive strengthening through ordinary stress is conceptually important, as normative stress exposure differs qualitatively from extreme adversity (Taleb, 2012; Tedeschi & Calhoun, 2004). In the Philippines, a nation frequently exposed to a myriad of stressors such as natural disasters and socioeconomic complexities, the mental well-being of its youth, especially those in higher education, is a significant concern (Alejandria et al., 2022; Gonzalo & Alibudbud, 2024). Empirical evidence also suggests that Filipino university students report notable levels of stress in a normative academic context (Calaguas, 2025; Austria-Cruz, 2019; Simon & Bernardo, 2023). This underscores the need for psychometrically sound measures that can accurately assess protective factors, such as psychological antifragility, within this specific demographic.

Therefore, cross-validation of the Psychological Antifragility Scale (PAS) in Filipino college students is warranted to ensure its applicability across diverse cultural and educational contexts, given the variable factor structures often observed in psychological instruments within the Philippines (Aruta et al., 2024; Batiancila et al., 2023). Such an evaluation is particularly timely given that existing resilience-focused assessments in this region often rely on Western-derived models that may not fully encapsulate the nuances of thriving amid chronic environmental or academic stressors (Klainin-Yobas et al., 2021; Pangngay, 2024). By situating this construct within the Filipino collegiate experience, this study aims to determine if the proposed three-factor structure remains invariant when applied to students navigating normative stress brought by academic environments, rather than the extreme conditions characterizing initial validation efforts (Tsai, 2024). Moreover, this research will also determine whether PAS will demonstrate convergent and discriminant validity among Filipino college students. By cross-validating the PAS, this research provides empirical evidence regarding its applicability in the Filipino context, helping address a gap in local frameworks and offering a nuanced understanding of how Filipino students thrive beyond simple recovery. In addition, this can also aid in addressing scarcity in local mental health resources; a validated tool for Antifragility provides practitioners with a reliable means to identify and measure such traits.

LITERATURE REVIEW

Psychological Antifragility

The concept of antifragility was first introduced by Nassim Nicholas Taleb in 2012 to describe a category of things that do not merely resist shock but actually improve because of it (Tsai, 2024). Taleb (2012) argued that while language has words for the opposite of "fragile" (e.g., robust, resilient), these terms do not capture the true functional opposite of fragility (Pincus et al., 2017). In his "Triad" framework, he categorizes systems based on their response to stressors, volatility, and disorder along a harm-gain dimension: the fragile, which suffers from disorder; the robust, which remains neutral; and the antifragile, which thrives under conditions of volatility (Taleb, 2012). Psychological antifragility, therefore, is defined as a capacity beyond resilience where an individual becomes "better" as a result of experiencing stressors (Tsai, 2024). This conceptualization is particularly relevant in human systems, as biological and psychological entities often require a certain level of volatility and "hormetic" stress to develop and optimize their functioning (Holton et al., 2026; Pincus et al., 2017). However, the concept of antifragility had just been recently articulated in its contemporary form and was just starting to be recognized as a distinct psychological construct.

Theoretical and Conceptual Distinction of Psychological Antifragility

To establish antifragility as a distinct psychological construct, it must be differentiated from established terms such as resilience, post-traumatic growth, and grit. While resilience is often used interchangeably with psychological strength, its classical definition reflects an individual's ability to "bounce back" or return quickly to a baseline state of functioning after a stressful event (Klainin-Yobas et al., 2021; Maresch & Kampman, 2022). Resilience and robustness focus on stability and the avoidance of dysfunction; however, they do not inherently involve a gain in functional capacity (Pincus et al., 2017). In contrast, antifragility necessitates an additive process where the individual experiences growth in skill or disposition due to these perturbations, effectively moving beyond mere restoration (Orines et al., 2023; "Psychological Applications and Trends 2021," 2021). Consequently, this growth-oriented trajectory aligns more closely with contemporary theories of thriving, which

prioritize the acquisition of benefits from stressful events rather than simple recovery (Bajaba et al., 2024; Smith et al., 2023).

Furthermore, empirical discourse distinguishes this mechanism from post-traumatic growth, as antifragility specifically accounts for the systemic integration of random stressors and volatility as catalysts for self-optimization (Jaffe et al., 2023; Sandal, 2021). Unlike resilience, which emphasizes the maintenance of a stable state or "bouncing back" (Munoz et al., 2022), antifragility implies a dynamical capacity to derive benefit from volatility, positioning the individual as a system that gains functional complexity through interaction with environmental stressors (Axenie et al., 2024; Frimousse & Gaillard, 2021). Moreover, Grit is defined as passion and sustained persistence applied toward long-term goals (Maresch & Kampman, 2022). While grit emphasizes the ability to endure and stay the course despite obstacles, it is primarily a measure of "perseverance" and "consistency" (Roslan et al., 2022). Antifragility, however, focuses on the structural benefit derived from the volatility itself, where a "gritty" person might persist through a storm, and an "antifragile" person uses the wind from that storm to propel themselves further. This shift toward viewing the individual as an adaptive system mirrors broader transitions in psychological science, where health is no longer defined merely by homeostasis but by the capacity to reorganize following systemic perturbations (Hasselman, 2023).

Psychometric Challenges in assessing Psychological Strength among Filipino students.

Despite the proliferation of resilience research, the assessment of psychological strength in the Philippines faces significant psychometric and conceptual challenges. Most instruments currently utilized are Western-derived and often fail to capture the socio-cultural nuances of the Filipino experience (Pangngay, 2024). A primary issue is the instability of factor structures when these scales are applied to the local population. For example, studies validating the Mental Health Literacy Scale and the Depression Anxiety Stress Scale among Filipino students have frequently found that original one-factor or multi-factor models do not provide a good fit (Aruta et al., 2024; Batiancila et al., 2023). Research has indicated a lack of "configural invariance" in resilience scales across different cultural groups, suggesting that the very internal factors of resilience (such as self-efficacy or self-confidence) may overlap or manifest differently in Filipino samples compared to Western ones (Dai et al., 2024). Furthermore, existing local frameworks, such as the Katatagan Resilience Framework, highlight the need for culturally adapted tools that go beyond simple recovery (Pangngay, 2024). There is a substantial gap in having a local framework that understands how students navigate the specific socio-cultural stressors inherent in the Philippine educational system (Alejandria et al., 2022). The current reliance on resilience measures that prioritize "bouncing back" may overlook the potential for students to achieve "antifragile" growth amid chronic academic and socioeconomic pressures (Klainin-Yobas et al., 2021; Tsai, 2024).

In this regard, psychological antifragility offers a promising alternative by focusing on the capacity to derive benefit and development from adversity. Therefore, the cross-validation of the Psychological Antifragility Scale is necessary to establish a psychometrically sound and relevant instrument that can assess how Filipino college students thrive within a normative stress context.

Research Objectives

1. To determine if the PAS demonstrates adequate internal consistency reliability among Filipino College Students.
2. To examine if the three-factor structure of the PAS (Benefit from Difficulty, Benefit from Ambiguity, and Benefit from Stress) demonstrate acceptable model fit among Filipino college Students.
3. To determine if the PAS exhibits appropriate convergent validity in relation to theoretically related constructs (e.g., resilience & post-traumatic growth).
4. To determine if the PAS demonstrates discriminant validity from conceptually distinct constructs (e.g., anxiety and depression).

THEORETICAL FRAMEWORK

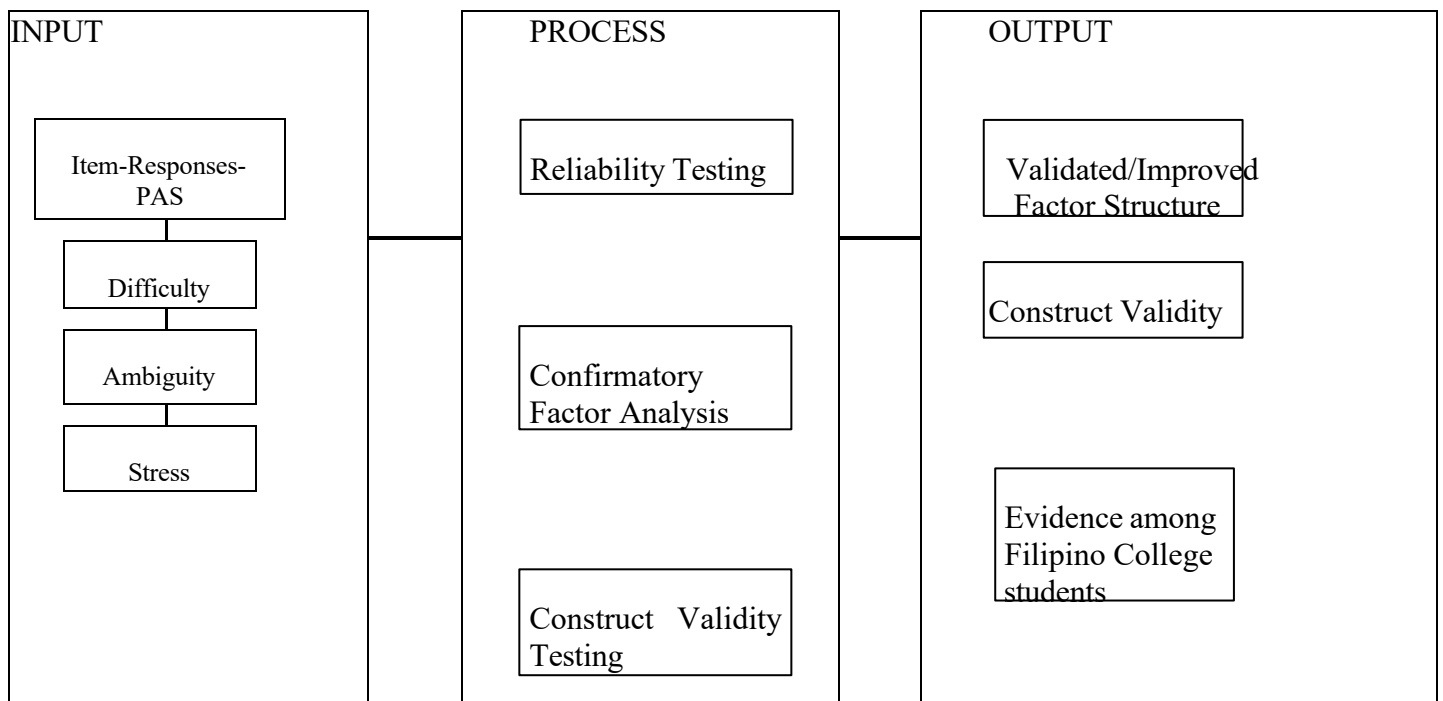
This study was anchored on the concept of antifragility, which was introduced by Nassim Nicholas Taleb in his seminal work *Antifragile: Things That Gain from Disorder* (2012). Antifragility is founded on the belief that some people not only withstand stress, volatility, and uncertainty but actually develop adaptive capacities that enable them to benefit and improve from them. Antifragility can therefore be conceptualized as a latent construct reflecting individuals' tendencies to benefit from normative stressors encountered in everyday life.

Drawing on Taleb's framework, Jack Tsai (2024) developed and validated an instrument to measure this latent construct. This instrument involves three factors: (1) Benefit from Difficulty, (2) Benefit from Ambiguity, and (3) Benefit from Stress. This has been the first measure of Antifragility developed; thus, further refinement and validation on other samples are warranted (Tsai, 2024).

On the other hand, Filipinos are widely recognized for their resilience, a characteristic shaped by cultural values and strengthened through repeated exposure to various social and environmental challenges (Chong et al., 2025).

Conceptual Framework

Figure 1. Conceptual framework that illustrates the Input–Process–Output model guiding the cross-validation process of the Psychological Antifragility Scale (PAS) among Filipino college students.



MATERIALS AND METHODS

This section describes the research design, sampling method, respondents, instruments, data gathering procedures, and statistical treatments used to examine the reliability, factor structure, and construct validity of the Psychological Antifragility Scale among Filipino college students.

Research Design

The study employed a quantitative cross-sectional design and utilized a cross-validation approach to evaluate the scale's psychometric properties within a normative stress context. Cross-validation is commonly used in scale development and validation research to determine whether a factor structure identified in one sample can



be replicated in an independent sample, thereby strengthening the generalizability and stability of the measurement model (DeVellis, 2017).

Sampling Method

Respondents were recruited using a non-probability convenience sampling technique. This method is deemed appropriate since respondents were already specified, and researchers invited respondents who had met the inclusion criteria and who were readily accessible during the data collection period. Moreover, the sample size was determined based on established recommendations for factor analysis and structural equation modeling used in scale validation research. Methodological guidelines suggest that factor analytic studies require five to ten participants per item to obtain stable factor solutions (DeVellis, 2017; Hair et al., 2019). Given that the Psychological Antifragility Scale consists of 12 items, this recommendation suggests a minimum sample ranging from 60 to 120 participants. To ensure reliable parameter estimation and adequate statistical power, approximately 200 participants are often considered sufficient for confirmatory factor analysis models of moderate complexity (Kline, 2016). Furthermore, because the present study employed a cross-validation approach, the total sample was divided into two independent subsamples to test the stability and replicability of factor structure. Based on these suggestions, the study targeted a minimum of 240 respondents, allowing each subsample to meet the recommended requirements for confirmatory factor analysis.

Respondents

The respondents of the study were Filipino college students enrolled in higher education institutions in the city of General Santos, Philippines. Participants were selected based on the following inclusion criteria. 1. Currently enrolled in any higher education institution within the city. 2. Filipino nationality, 3. Willing to voluntarily participate in the study as provided with the informed consent. Participants who submit incomplete questionnaires or fail to provide sufficient responses will be excluded from the final dataset used for statistical analysis.

Instruments

The primary instrument used in this study is the Psychological Antifragility Scale (PAS), which measures an individual's tendency to benefit, grow, or improve when exposed to stress, uncertainty, and difficult experiences. The scale conceptualizes psychological antifragility as a latent construct reflecting adaptive responses to challenging situations and consists of 12 items representing three proposed dimensions: benefit from difficulty, benefit from ambiguity, and benefit from stress. Items were rated using a Likert-type response scale from 0-not true at all to 4-true nearly all the time, with higher scores indicating greater levels of psychological antifragility. To examine the construct validity of the PAS, the following instruments were also administered. The Brief Resilience Scale (BRS) assesses individuals' ability to recover from stress (Smith et al., 2008). Post-Traumatic Growth Inventory–Short Form (PTGI-SF), which measures positive psychological growth following challenging life experiences (Cann et al., 2010). Both scales were used to examine convergent validity. In contrast, the Generalized Anxiety Disorder Scale (GAD-7), which assesses symptoms of anxiety (Spitzer et al., 2006). And the Patient Health Questionnaire–Depression (PHQ-9), which measures depressive symptoms (Kroenke et al., 2001). They were used to examine discriminant validity, as psychological antifragility is theoretically expected to show weaker or negative associations with psychological distress.

Data Gathering Procedures

Prior to the data collection process, permission was obtained from relevant school authorities. Participants were recruited through appropriate communication channels, class announcements, and online survey distribution platforms. Responses were collected using a self-administered questionnaire, which was distributed electronically through online survey platforms (Google Forms) during scheduled data collection sessions. Before completing the questionnaire, participants were provided with an informed consent form explaining the purpose of the study, the voluntary nature of participation, the procedures involved, and their rights as research participants, including the right to decline or withdraw from the study at any time without penalty. Participants were assured that their responses would remain confidential and would be used solely for research purposes.



Only those who provide informed consent will proceed to answer the questionnaire. After the completion of data collection, the responses were carefully screened to identify missing data and incomplete questionnaires. Responses that do not meet the inclusion criteria or contain substantial missing information will be excluded from the dataset. Only valid and complete responses were retained for analysis. The cleaned dataset was then randomly divided into two subsamples for the cross-validation procedure and subsequently subjected to confirmatory factor analysis and construct validity testing using appropriate statistical software.

Statistical Treatment

Percentages, reliability analysis, confirmatory factor analysis, and correlation analysis were employed to address the objectives of the study. The percentages were used to compute the proportion of the total sample that showed psychological antifragility. Cronbach's alpha was utilized to assess the internal consistency reliability of PAS. CFA was conducted to examine the factor loadings and factor structure of the PAS. A threshold of $\geq .5$ for factor loadings was set to consider if an item appropriately loaded to its intended factor, and multiple model-fit indices using recommended criteria were the bases to check the stability of factor structure (Hair et al., 2019). Finally, Pearson's r correlation analysis was performed to examine the relationships between the PAS and other psychological constructs included in the study.

Ethical Considerations

This adhered to established ethical principles in psychological research to ensure the protection of participants' rights and welfare. The principles of anonymity, confidentiality, beneficence, and non-maleficence guide the conduct of the research. Anonymity was maintained by ensuring that no personally identifiable information was collected from participants in the questionnaire. In addition, confidentiality was strictly observed by ensuring that all collected data would be stored securely and would only be accessed by the researchers for academic purposes. The results of the study were reported only in aggregate form so that individual responses cannot be traced back to specific participants. The principle of beneficence was upheld by ensuring that the study contributes to the advancement of knowledge in psychological measurement and well-being among college students. At the same time, the principle of non-maleficence was observed by ensuring that participation in the study was not exposed to harm or significant psychological distress. Participants were informed that their participation is voluntary and that they may decline or withdraw from the study at any time without penalty.

RESULTS

Reliability

Table 1. PAS internal consistency of the original 12 items

	Scale Mean if deleted	Item-Total Correlation	If item is <u>removed</u> Cronbach's α
Item 1	24.38	0.50	0.806
Item 2	23.96	0.48	0.807
Item 3	24.66	0.47	0.807
Item 4	24.77	0.51	0.804
Item 5	25.24	0.48	0.806
Item 6	24.94	0.45	0.809
Item 7	24.15	0.48	0.807
Item 8	23.94	0.51	0.804
Item 9	24.70	0.37	0.817
Item 10	23.97	0.52	0.803
Item 11	23.30	0.47	0.808
Item 12	24.33	0.46	0.809
TOTAL	26.58	N/A	0.820

N/A =not applicable



Table 1 shows the internal consistency of the 12-item Psychological Antifragility Scale (PAS) based on the whole study sample ($N = 326$). The overall reliability coefficient is .82, indicating a good internal consistency among items. There was no substantial deviation from the total alpha when any one item was removed (.80-.81). The scale mean of all items is 26.58, which did not also change much with the removal of any one item (23.30-25.24). All item-total correlations were $\geq .40$, indicating acceptable discrimination, except for item “9,” which shows a lower item-total correlation. However, its removal did not improve the overall reliability of the scale.

Factor Analysis

Table 2. Confirmatory Factor Analysis

Factor	Item	β	P-value
Benefit from Difficulty	Q1	.650	<.001
	Q2	.612	<.001
	Q3	.598	<.001
	Q4	.575	<.001
	Q5	.477	<.001
	Q10	.609	<.001
Benefit from Ambiguity	Q7	.696	<.001
	Q8	.812	<.001
	Q11	.578	<.001
Benefit from Stress	Q6	.430	<.001
	Q9	.324	<.001
	Q12	.650	<.001

Note: β =Standardized factor loading. All items loaded significantly for their intended factor ($p<.001$).

Confirmatory factor analysis using maximum likelihood estimation was conducted to check the instrument's factor loadings. A threshold of $\geq .50$ was set as a criterion to consider whether an item is strongly loaded to its intended factor. As shown in Table 2, most items met the criterion, with a standardized factor loading of .575-

.812, except for items “5,” “6” and “9” which are below .50. Notably, all of the indicators under “benefit from ambiguity” exhibited strong factor loadings, which indicates that each item contributed meaningfully to this factor. Nevertheless, all items loaded significantly $p<.001$, to each intended factor.

Cross-Validation

Table 3. Model fit indices across 2 samples

Sub-samples	$\chi^2(df)$	RMSEA	SRMR	CFI	TLI
Sample 1 (After refinement of the model)	63.30 (39)	.061	.055	.953	.934
Sample 2 (Cross- Validation)	66.40 (39)	.065	.055	.931	.903

Note: χ^2 =chi-square; df= degrees of freedom; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual; CFI=Comparative Fit Index; TLI=Tucker Lewis Index

To examine if the hypothesized three-factor structure (benefit from difficulty, benefit from ambiguity, and benefit from stress) fits well among Filipino college students, the whole sample ($N=326$) was randomly split into two equal sub-samples ($n=163$) using a random number generation procedure in Microsoft Excel. Sample 1 was used to initially check if the original 12-item PAS would demonstrate a good fit of the data. On the other hand, sample 2 was used to cross-validate the model to test its stability. Modification indices check revealed that there are two pairs of indicators that were highly correlated (Q3-Q4, Q6-Q9); therefore, error terms of these items within the same factor were allowed to covary. Initial check of the model did not fit the data: χ^2 102, $df = 49$, p

<.001, RMSEA = .081, SRMR = .066, CFI = .908, TLI = .876. Although residuals from two pairs of items were already correlated, the model still did not meet the recommended threshold.



Upon further investigation, Q5 was eventually eliminated from the final model because of low factor loading and substantial cross-loadings to unintended factors, which contributed to model misfit. As shown in Table 3, the refined model was tested, demonstrating acceptable model fit of the data: χ^2 63.3, df = 39, p = .008, RMSEA = .061, SRMR = .055, CFI = .953, TLI = .934. Moreover, when the model was cross-validated to sub-sample 2, it's still demonstrated a good fit of the data: χ^2 66.4, df = 39, p = .004, RMSEA = .065, SRMR = .055, CFI = .931, TLI = .903. Thus, this shows that the model was improved after refinement.

Convergent and Discriminant validity

Table 4. Construct and discriminant validity between Antifragility Scale and scales for resilience, post- traumatic growth, anxiety and depression.

Convergent Validity	Pearson r	P-value
Brief Resilience Scale (BRS)	.193	<.001
Post-Traumatic Growth Inventory Short Form (PTGI-SF)	.421	<.001
Discriminant Validity	Pearson r	P-value
Patient-Health Questionnaire-9 (PHQ-9)	.144	.009
Generalized Anxiety Disorder-7 (GAD-7)	.122	.028

Note: All Pearson Product moment coefficients were significant

As shown in Table 4, the convergent and discriminant validity of PAS was examined using Pearson product-moment correlation. Results revealed that PAS was significantly associated with resilience r (326) = .193, p =

<.001, and post-traumatic growth r (324) = .421, p = <.001. These positive correlations suggest that individuals who report a high level of psychological antifragility are more likely to develop adaptive functioning and positive psychological changes following adversities. Moreover, weak to moderate correlation coefficients were in the expected direction since PAS is conceptually different from resilience and post-traumatic growth. Thus, providing evidence for convergent validity. However, when examining for discriminant validity, PAS scores demonstrated significant positive correlations with anxiety r (324) = .122, p = .028, and depressive symptoms r

(324) = .144, p = .009. This direction, although not expected, indicates that individuals who are antifragile are more prone to experiencing anxiety and depressive symptoms, although the magnitude of these relationships was quite small. Overall, these findings provide support for the construct validity of PAS, especially its relationship with other related but conceptually different scales. PAS only shows partial support for its discriminant validity among Filipino college students.

DISCUSSION

This study presents evidence of a cross-validated Psychological Antifragility Scale (PAS), which assesses the ability to benefit from difficulty, benefit from ambiguity, and benefit from stress among Filipino college students. It examines the instrument's internal consistency, factor structure, and construct validity. The original 12-item PAS demonstrated good internal consistency, which indicates that the items of the instrument are consistently measuring a common underlying construct. Confirmatory factor analysis revealed that most of the items demonstrated moderate to strong factor loadings, particularly the "Benefit from ambiguity" factor, which showed relatively strong loadings. However, there are some items that did not meet the set threshold for factor loadings, especially items under "Benefit from stress". This suggests that this dimension may have been conceptually different for Filipino college students, who often viewed stress as not beneficial but rather harmful and closely associated with psychological burden rather than opportunity for growth.

Initially, the original 12-item model did not demonstrate adequate fit of the data. This suggests that the original factor structure may not be directly generalizable to Filipino college students without modification. Model refinements involve correlated residuals of two pairs of items and item elimination. The revised model showed



acceptable fit indices across two sub-samples. More importantly, the cross-validation sub-sample showed that the model remained stable in an independent sample. These findings supported the idea that psychological antifragility is measurable among Filipino college students, but the construct may still require contextual adaptation and further psychometric clarification.

Furthermore, PAS demonstrated significant positive correlations with resilience and post-traumatic growth, which provide evidence for its convergent validity. The positive relationship with post-traumatic growth is noteworthy because these two instruments emphasize psychological changes resulting from adversity.

Although the magnitude of the relationships is weak to moderate, this direction is expected since resiliency and post-traumatic growth are conceptually different, and their significant relationship signals that individuals who are antifragile are also more likely to become resilient and will experience positive psychological change; these instruments share some elements with each other.

However, contrary to expectation, PAS scores were found to be significantly related to anxiety and depressive symptoms, which is quite more intriguing. This suggests that antifragility does not automatically imply the absence of distress. Individuals who are actively engaged with challenges and uncertainty may simultaneously experience heightened emotional arousal, anxiety, or stress while becoming more adaptive and better because of adversities. Thus, distress and growth may co-exist rather than function as opposite experiences.

Notably, as well, in this sample of Filipino college students, a relatively small portion of respondents demonstrated a high level of psychological antifragility. Only 48 (14.72%) out of 326 respondents were classified as antifragile based on the set criteria. These findings corroborate the result found by Jack Tsai (2024), highlighting that antifragility is rare compared to the prevalence of being resilient and post-traumatic growth (Tsai et al., 2017; Isaac et al., 2017).

Overall, the findings suggest that psychological antifragility is still conceptually adjacent to both positive and negative psychological experience, highlighting the need for a clearer definition of the construct and more accurate ways of measuring it. Moreover, the findings also emphasize the need for culturally sensitive psychometric evaluation, particularly when measuring for a new construct derived from Western frameworks.

LIMITATIONS AND RECOMMENDATIONS

Although this study has a clear contribution, it is not without limitations. To increase the generalizability of the study, future researchers may aim at targeting a large and more diverse sample of respondents. Prior to model refinement, the PAS in this sample of Filipino college students did not demonstrate a good fit of the data. Most especially, items under the factor benefit from stress, which elicit further examination to see how the items can be improved. Researchers may also check whether a one-factor model is more suitable than a three-factor model measuring antifragility.

Lastly, researchers may conduct a qualitative study, specifically delving into the cultural influences of antifragility among Filipinos. This may help in exploring how Filipinos understand adapting and growing through stress and uncertainty, therefore developing a more contextualized model of antifragility relevant to Filipino experiences.

CONCLUSION

The present study provides preliminary evidence that PAS exhibited acceptable reliability, factor structure, and partial construct validity among Filipino college students. However, concerns regarding item performance, model refinement, and discriminant validity suggest that the construct and its measurement still lend themselves to further theoretical clarification and psychometric improvements. Overall, the study contributes to the growing literature on psychological antifragility and provides a foundation for future research within the Filipino context.

REFERENCES

1. Alejandria, M. C., Casimiro, K. M., Gibe, J. A. L., Fernandez, N. S. F., Tumaneng, D., Sandoval, E. C.



- A., Hernandez, P. J. S., Quan-Nalus, M. A., Alipao, F. A., & Alejandria, M. A. C. P. (2022). Attaining well-being beyond the home: A socio-cultural framing of mental health among university students in the Philippines. *Health Education Journal*, 82(2), 143–156. <https://doi.org/10.1177/00178969221141547>
2. Aruta, J. J. B. R., Mateo, N. J., Resurreccion, R. R., Galanza, M. A. M. C., & Bernardo, A. B. I. (2024). Screening psychological symptoms in Filipino university students during the COVID-19 pandemic: Translation and structural validation of the Filipino version of the DASS-21. *Psychology in the Schools*, 61(8), 3243–3262. <https://doi.org/10.1002/pits.23214>
 3. Aven, T. (2014). The concept of antifragility and its implications for the practice of risk analysis. *Risk Analysis*, 35(3), 476–483. <https://doi.org/10.1111/risa.12279>
 4. Austria-Cruz, M. C. A. (2019). Academic stress and coping strategies of Filipino college students in private and public universities in Central Luzon. *International Journal of Advanced Engineering, Management and Science*, 5(11), 603–607. <https://doi.org/10.22161/ijaems.511.6>
 5. Axenie, C., López-Corona, O., Makridis, M. A., Akbarzadeh, M., Saveriano, M., Stancu, A., & West, J. (2024). Antifragility in complex dynamical systems. *npj Complexity*, 1(1), 1–8. <https://doi.org/10.1038/s44260-024-00014-y>
 6. Bajaba, A., Bajaba, S., & Simmering, M. J. (2024). When resilience is not enough: Theoretical development and validation of the antifragility at work scale. *Personality and Individual Differences*, 231, 112818. <https://doi.org/10.1016/j.paid.2024.112818>
 7. Batiandila, M. J. Q., Batuyong, M. J. V., Bautista, A. J. P., & Elnar, R. D. (2023). Validating the psychometric properties of the Mental Health Literacy Scale among Filipino college students. *Asian Journal of Education and Social Studies*, 49(2), 91–102. <https://doi.org/10.9734/ajess/2023/v49i21122>
 8. Becker, M., Kasproicz, D., Kurkina, T., Davari, M. D., Gipperich, M., Gramelsberger, G., Bergs, T., Schwaneberg, U., & Trauth, D. (2024). Toward antifragile manufacturing: Concepts from nature and complex human-made systems to gain from stressors and volatility. In P. Letmathe, S. Houy, S. Pickl, S. Schaltegger, &
 9. E. A. von der Gracht (Eds.), *Transformation towards sustainability* (pp. 425–448). Springer. https://doi.org/10.1007/978-3-031-54700-3_16
 10. Calaguas, G. (2025). Depression, anxiety, and stress among female undergraduate students: Physical health concerns as influencing determinants. *Mental Health: Global Challenges Journal*, 8(1), 207–221. <https://doi.org/10.56508/mhgcj.v8i1.316>
 11. Cann, A., Calhoun, L. G., Tedeschi, R. G., Taku, K., Vishnevsky, T., Triplett, K. N., & Danhauer, S. C. (2010). A short form of the Posttraumatic Growth Inventory. *Journal of Traumatic Stress*, 23(1), 127–137. <https://doi.org/10.1002/jts.20513>
 12. Chong, R. M. B., et al. (2025). Evolving disaster resilience in the Philippines: Insights from the 2021 and 2023 World Risk Poll. *International Journal of Disaster Risk Reduction*. <https://doi.org/10.1016/j.ijdr.2025.105415>
 13. DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.). Sage Publications.
 14. Frimousse, S., & Gaillard, H. (2021). Monde chaotique : Au-delà de la résilience, vers l'antifragilité [Chaotic world: Beyond resilience toward antifragility]. *Recherches en Sciences de Gestion*, 142, 271–307. <https://doi.org/10.3917/resg.142.0271>
 15. Gonzalo, R. P., & Alibudbud, R. (2024). Advancing education-based mental health in low-resource settings during health crises: The mental health initiative of the University of the Philippines during the COVID-19 pandemic. *Frontiers in Education*, 9. <https://doi.org/10.3389/feduc.2024.1428237>
 16. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
 17. Hasselman, F. (2023). Understanding the complexity of individual developmental pathways: A primer on metaphors, models, and methods to study resilience in development. *Development and Psychopathology*, 35(5), 2186–2202. <https://doi.org/10.1017/S0954579423001281>
 18. Holton, N., Cottin, M., Wright, A., Mannino, M. V., Antonio, D. S., & Bigliassi, M. (2026). Antifragility and growth through adversity: A scoping review. *Psychological Reports*. <https://doi.org/10.1177/00332941261416041>
 19. Isaacs, K., Mota, N. P., Tsai, J., Harpaz-Rotem, I., Cook, J. M., Kirwin, P. D., & Pietrzak, R. H. (2017). Psychological resilience in U.S. military veterans: A 2-year, nationally representative prospective cohort



- study. *Journal of Psychiatric Research*, 84, 301–309. <https://doi.org/10.1016/j.jpsychires.2016.10.017>
20. Jaffe, Y., Caramanica, A., & Price, M. (2023). Towards an antifragility framework in past human–environment dynamics. *Humanities and Social Sciences Communications*, 10(1). <https://doi.org/10.1057/s41599-023-02413-3>
21. Klainin-Yobas, P., Vongsirimas, N., Ramirez, D., Sarmiento, J., & Fernandez, Z. (2021). Evaluating the relationships among stress, resilience and psychological well-being among young adults: A structural equation modelling approach. *BMC Nursing*, 20(1). <https://doi.org/10.1186/s12912-021-00645-9>
22. Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
23. Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606–613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
24. Maresch, I., & Kampman, H. (2022). Playing for resilience in a pandemic: Exploring the role of an online board game in recognizing resources. *International Journal of Applied Positive Psychology*, 8, 45–63. <https://doi.org/10.1007/s41042-022-00069-z>
25. Munoz, A., Billsberry, J., & Ambrosini, V. (2022). Resilience, robustness, and antifragility: Towards an appreciation of distinct organizational responses to adversity. *International Journal of Management Reviews*, 24(2), 181–203. <https://doi.org/10.1111/ijmr.12289>
26. Orines, R. D., Cabana, J. M., Carlos, J. M., Fernandez, P. N., Medel, P., & Suing, M. T. (2023). Grit and resilience as predictors of subjective well-being among university student-athletes. *International Journal of Physical Education, Sports and Health*, 10(4), 7–12.
27. Pangngay, J. J. (2024). Culturally-adapted online psychoeducation for resilience in distressed Filipino college students: A randomized controlled trial. *Philippine Social Science Journal*, 7(1), 30–40. <https://doi.org/10.52006/main.v7i1.865>
28. Pincus, D., Kiefer, A. W., & Beyer, J. I. (2017). Nonlinear dynamical systems and humanistic psychology. *Journal of Humanistic Psychology*, 58(3), 343–366. <https://doi.org/10.1177/0022167817741784>
30. Pineda, O. K., Kim, H., & Gershenson, C. (2019). A novel antifragility measure based on satisfaction and its application to random and biological Boolean networks. *Complexity*, 2019, 3728621. <https://doi.org/10.1155/2019/3728621>
31. Psychological Applications and Trends 2021. (2021). *Psychological Applications and Trends 2021 proceedings*. <https://doi.org/10.36315/inpact-2021-proceedings>
32. Roslan, N. S., Yusoff, M. S. B., Morgan, K., Razak, A. A., & Shauki, N. I. A. (2022). Evolution of resilience construct, its distinction with hardiness, mental toughness, work engagement and grit, and implications to future healthcare research. *Education in Medicine Journal*, 14(1), 99–112. <https://doi.org/10.21315/eimj2022.14.1.9>
33. Sandal, O. (2021). Psychotraumatic events as a factor of traumatic experience of personality. *Scientific Bulletin of Kherson State University Series Psychological Sciences*, 2, 49–54. <https://doi.org/10.32999/ksu2312-3206/2021-2-6>
34. Simon, P., & Bernardo, A. (2023). Longitudinal measurement invariance of the Depression Anxiety Stress Scale (DASS-21) in Filipino adolescents. *Transactions of the National Academy of Science and Technology*, 44, 1–7. <https://doi.org/10.57043/transnastphl.2022.2557>
35. Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine*, 15(3), 194–200. <https://doi.org/10.1080/10705500802222972>
36. Smith, B. W., Albonico, K., deCruz-Dixon, N., Phan, A., Guzman, A., & Schodt, K. (2023). The brief thriving scale: Assessing the ability to learn, grow, and find benefits in stressful events. *International Journal of Wellbeing*, 13(3), 134–150. <https://doi.org/10.5502/ijw.v13i3.2801>
37. Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, 166(10), 1092–1097. <https://doi.org/10.1001/archinte.166.10.1092>
38. Taleb, N. N. (2012). *Antifragile: Things that gain from disorder*. Random House.
39. Taleb, N. N. (2013). Antifragility as a mathematical idea. *Nature*, 494(7438), 430. <https://doi.org/10.1038/494430e>
40. Taleb, N. N. (2018). (Anti)fragility and convex responses in medicine. arXiv.



<https://arxiv.org/abs/1808.00065>

41. Tsai, J. (2024). A measure of psychological antifragility: Development and replication. *Journal of Positive Psychology*. <https://doi.org/10.1080/17439760.2024.2394466>
42. Tsai, J., Harpaz-Rotem, I., Pietrzak, R. H., & Southwick, S. M. (2017). Trauma resiliency and posttraumatic growth. In S. N. Gold (Ed.), *APA handbook of trauma psychology* (pp. 89–113). American Psychological Association. <https://doi.org/10.1037/0000020-005>