International Journal of Evaluation and Research in Education (IJERE)
Vol. 14, No. 1, February 2025, pp. 1~9
ISSN: 2252-8822, DOI: 10.11591/ijere.v14i1.30920

Development and validation of doctoral student social support perception scale

Xiaohan Yang[1], Kee Jiar Yeo[1], Shih-Hui Lee[1], Boon Yew Wong[1], Lina Handayani[2]
[1]Faculty of Social Sciences and Humanities, School of Education, Universiti Teknologi Malaysia, Skudai, Malaysia
[2]Faculty of Public Health, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

Article Info

Article history:

Received Apr 22, 2024
Revised Aug 1, 2024
Accepted Sep 20, 2024

Keywords:

Doctoral students
Family support
Multidimensional assessment
Peer support
Social support
Supervisor support

ABSTRACT

The perception of social support is crucial for doctoral students' academic careers, yet there is a notable absence of scales specifically designed to measure the social support that doctoral students receive. Consequently, there is a clear need for an effective tool to assess the level and nature of support perceived by these students. The Doctoral Students Social Support Perception Scale (DSSPS) is a multidimensional instrument developed to evaluate social support received by doctoral students from supervisors, family, and peers/friends. This scale operates in two phases: the first phase uses exploratory factor analysis to identify three potential dimensions of perceived social support: resource provision, emotional inspiration, and appropriate attention. The second phase employs confirmatory factor analysis to demonstrate the scale's robust overall fit. The results also indicate high internal consistency as well as convergent and discriminant validity. These findings suggest that the DSSPS is both an effective and reliable measure to assess the extent and nature of social support perceived by doctoral students.

Corresponding Author:

Xiaohan Yang
Faculty of Social Sciences and Humanities, School of Education, Universiti Teknologi Malaysia
81310 Skudai, Johor, Malaysia
Email: yangxiaohan1997@gmail.com

1. INTRODUCTION

The academic journey of a doctoral student, rife with unique challenges, necessitates a multidimensional support system. Academic success at this level is significantly influenced by the support network comprising family, friends, and academic supervisors. The Doctoral Student Social Support Perception Scale (DSSPS) has been developed to specifically measure this intricate support system, tailored to the unique needs of doctoral students.

Historically, the importance of social support in academic environments has been extensively recognized. Hassan *et al.* [1] highlights that perceived social support significantly influences academic adjustment and success. Furthermore, another study by Chen *et al.* [2] also illustrates that social support is a significant positive predictor of academic engagement. However, existing social support scales do not entirely address the unique challenges encountered by doctoral students.

One of the scales used by researchers is Duke Social Support Index [3] which is a comprehensive tool for assessing social support. It includes elements such as social interaction, emotional support, and tangible support. However, due to its rather generic approach, it may not fully encompass the unique academic and professional support systems relevant to doctoral students' learning experiences, thus potentially limiting its applicability to them. Besides this scale, Sarason's Social Support Questionnaire [4] is used to evaluate the perceived availability and satisfaction with social support. While this questionnaire can

provide deep insights into interpersonal relationships, its focus might not align closely with the specific academic and professional support dynamics that are crucial to the experiences of doctoral students.

Additionally, the Oslo Social Support Scale [5] is a brief measurement tool focusing on the number of close confidants, perceived interest and concern from others, and the availability of practical help. Although it is useful in general contexts, it may not capture the nuanced support structures present in academic environments, particularly those encountered by doctoral students. The Multidimensional Scale of Perceived Social Support [6] assesses perceived support from family, friends, and significant others. While comprehensive, this scale primarily focuses on personal rather than academic or professional support systems. This could limit its applicability to doctoral students, who require more specific forms of support on their academic journey.

In addition to the instruments, DSSPS is designed to bridge these gaps by focusing on the specific context of doctoral students. It evaluates the nuanced forms of support from key individuals in both academic and personal life (family, friends, and supervisors). In DSSPS, these supports are categorized into resource provision (RP), emotional inspiration (EI), and appropriate attention (AA), which reflects the doctoral students' own attitudes towards their support needs.

Generally, social support can be classified into two categories: structural support and functional support [7], [8]. Functional support refers to the experience of receiving support from family, friends, and neighbors when needed [9], while structural support primarily pertains to the size, type, and frequency of contact within one's social network [8]. Two components of functional support are often associated with psychological health. They are instrumental support and emotional support [9], [10]. Instrumental support is inherently more tangible, such as financial assistance and practical help [11], whereas emotional support involves providing companionship and intimate relationships, as well as offering care and sympathy [9], [10]. Studies have shown that perceived social support is considered a sensitive indicator for coping with mental health challenges [12]. Therefore, in the DSSPS, resource provision and emotional inspiration are used to represent instrumental and emotional support from family, friends, and supervisors.

However, while social support is generally a positive factor, its impact can be subtle and dependent on various individual and environmental factors [13]. Maisel and Gable [14] indicated that support is not always positive and can sometimes be associated with negative outcomes, such as increased distress or reduced self-esteem [15], [16]. One reason for these different effects has to do with the support gap, which refers to the difference between the amount of support people desire and the amount of support they receive [17]. Research by McLaren and High [18] also showed that an imbalance, such as being over-benefited in informational support but under-benefited in emotional support or esteem, can have negative effects. For doctoral students, excessive support might actually hinder their academic journey [19]. Research indicates that a significant portion of doctoral students feel their achievements are undeserved and live like impostors in others' expectations [20], [21]. Therefore, in the DSSPS, appropriate attention is used to assess the appropriateness of the support doctoral students receive.

This research aims to develop and validate the DSSPS, specifically designed to measure the unique support systems of doctoral students. Existing scales do not fully address the specific academic and professional challenges faced by doctoral students [3]–[6]. The DSSPS categorizes support into resource provision, emotional inspiration, and appropriate attention, reflecting both instrumental and emotional support. This new scale aims to capture the nuanced forms of support from family, friends, and academic supervisors, providing a tailored and accurate measure of the social support perceived by doctoral students. This comprehensive understanding will facilitate better interventions to enhance their academic and professional journeys.

2. METHOD

2.1. Item development and validation

The initial items of DSSPS were established using a deductive method, involving an extensive literature review and critical analysis of existing scales. This approach allowed for a systematic derivation of items that are specifically aligned with the conceptual definitions of the three identified dimensions of social support: resource provision, emotional inspiration, and appropriate attention. Each item is measured using a five-point Likert scale, with higher scores indicating stronger agreement, thereby providing a quantitative assessment of the perceived support. The content validity of these items was further enhanced by reviews from multiple experts in educational psychology, ensuring that the items accurately measure the intended constructs.

In the "resource provision" category, researchers designed three items informed to evaluate the instrumental support doctoral students receive from supervisors, family, and friends. For example, one item reads: "During my doctoral studies, my supervisor provides me with essential academic resources and

research guidance." Furthermore, the "emotional inspiration" dimension captures the emotional support perceived by doctoral students from family, friends, and supervisors. An illustrative item from this category states: "During my doctoral studies, my family offers reassurance, aiding me in managing stress and other adverse emotions."

In designing the dimensions of "resource provision" and "emotional inspiration," researchers created six items based on existing scales and literature. For instance, in the "emotional inspiration" dimension, the item "During my doctoral studies, my family provides reassurance, helping me overcome stress and other negative emotions" was inspired and adapted from "I can talk about my problems with my family" [6]. Both instrumental and emotional support represent types of direct aid that are perceptible to doctoral students and form essential elements of the scale. These supports significantly contribute to the students' academic success and overall well-being during their doctoral journey.

Distinct from existing scales, the DSSPS incorporates a unique focus on "appropriate attention" to support, recognizing the significance of the proper degree of support. Research suggests that excessive support can paradoxically increase perceived stress and trigger a backlash among recipients [19]. To measure this, four items were crafted, such as during my doctoral studies, "the support from my peers/friends is just right for me and does not become a burden," and "I am able to obtain the right support from different sources according to my needs."

The items within the tool were refined following discussions on face and content validity with experts in these areas. The wording of the items was also revised and enhanced based on expert recommendations. Subsequently, these items were translated into Chinese, with further validation by linguistic experts to identify and amend any discrepancies in phrasing, thus ensuring the accuracy of the items. This meticulous process guarantees that the scale is both precise and culturally sensitive in its measurement of support dynamics.

2.2. Participants and procedure

This study was conducted to develop a scale specifically for measuring social support among doctoral students. The sample size for this research was determined using G*Power, ensuring sufficient power to detect significant effects across the three constructs measured by the DSSPS: resource provision, emotional inspiration, and appropriate attention. A power analysis was conducted with an expected effect size of 0.30, a significance level of 0.05, and a desired power of 0.80. The analysis indicated that a minimum sample size of 200 participants was necessary to achieve reliable and valid results. In this study, a total of 298 doctoral students participated, exceeding the required sample size and providing a robust representation of the target population. The reliability of the DSSPS was confirmed with Cronbach's alpha values of 0.816 for resource provision, 0.758 for emotional inspiration, and 0.848 for appropriate attention, indicating strong internal consistency for each construct. These high values demonstrate that the items within each construct are reliably measuring the intended dimensions of social support.

To validate the scale, both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted. The EFA results identified the underlying structure of the constructs, while the CFA confirmed the construct validity with high factor loadings for all items. These analyses collectively support the DSSPS as a reliable and valid instrument for assessing the social support perceived by doctoral students, adequately capturing the nuanced support systems relevant to their academic and professional experiences. Detailed results are provided in the next section. During data preprocessing, to ensure the quality of our analysis, discarded 10 data points with an SDV less than 0.5, as their low variability may not adequately reflect the overall characteristics of the sample. The final dataset comprised 288 valid entries, including 178 females, 108 males, and 2 individuals who identified as non-binary. To ensure the breadth and diversity of the data, the research team deliberately recruited doctoral students from various countries, with Chinese doctoral students representing the highest proportion at 31% of the total. The age range of participants was primarily between 24 to 33 years old. This diverse participant pool enhances the generalizability and applicability of the scale across different cultural and academic contexts.

Initially, the researchers extended invitations to potential participants via email and social media platforms. After obtaining informed consent from the participants, they were asked to complete an online questionnaire that included questions on personal background information and a social support scale tailored for doctoral students. The design of the questionnaire was aimed at assessing the level of social support that doctoral students receive in both academic and personal aspects of their lives. All data were collected anonymously to ensure the privacy and confidentiality of the participants.

Furthermore, the researchers paid special attention to ensuring that the content of the questionnaire was culturally sensitive and appropriate, reflecting the authentic experiences of doctoral students from diverse national and cultural backgrounds. Ultimately, the data collected were used in a 1:5 ratio for exploratory factor analysis and confirmatory factor analysis [22]–[24], to evaluate the validity and reliability

of the scale. This methodology not only reinforced the robustness of the findings but also ensured that the scale was applicable across different demographic and cultural settings.

3. RESULTS

3.1. Item analysis

Item analysis is intended to ascertain the effectiveness and appropriateness of items within a questionnaire or scale [25], aims to examine student responses to individual test items in order to assess the quality of those items and of the test as a whole. This process involves calculating the sum of scores for each item, dividing respondents into high and low scoring groups based on the 27th and 73rd percentiles, and then using T-tests to compare the differences between these groups. A significant difference indicates that an item is effectively designed to discriminate between varying levels of the construct being measured, and thus should be retained. Conversely, a lack of significant difference suggests that the item fails to distinguish effectively and may need to be removed. In the case of DSSPS, which consists of 10 items, the analysis revealed significant differences ($p<0.05$) between the high and low groups across all items, indicating good discriminative power and validating their retention in the scale without the need for removal.

3.2. Exploratory factor analysis

Exploratory factor analysis is employed to explore the number of factors influencing variables and to analyze the shared variance among them [26]. Prior to conducting factor analysis, it is crucial to assess whether the research data are suitable for such analysis. According to Table 1, the Kaiser-Meyer-Olkin (KMO) measure is 0.790, which exceeds the threshold of 0.6, meeting the prerequisite for factor analysis. Furthermore, the data have passed the Bartlett's Test of Sphericity ($p<0.05$), confirming that the dataset is appropriate for factor analysis. This preparatory evaluation ensures that the factor analysis conducted is robust and valid for identifying underlying dimensions within the data.

The Shapiro-Wilk test was conducted to assess the normality of the dataset, and the results indicated a significant deviation from a normal distribution. Consequently, principal axis factoring was chosen as the extraction method for the EFA. Based on the results of parallel analysis and Velicer's minimum average partial (MAP) test, the tool was validated to measure three distinct dimensions. Given the assumption that the factors are interrelated, an oblique rotation method was employed to potentially yield more insightful information. The EFA successfully extracted three factors with eigenvalues greater than 1, as depicted in Figure 1. After rotation, these factors explained variances of 41.788%, 18.421%, and 13.605%, respectively, with a cumulative variance explanation of 73.814%. These three factors measure the perceived instrumental and emotional support from supervisors, family, and friends, as well as the appropriateness of the support received by doctoral students.

Table 1. KMO and Bartlett tests

Kaiser-Meyer-Olkin measure of sampling adequacy		0.790
Bartlett's Test of Sphericity	Approx. Chi-square	305.471
	df	45
	Sig.	0.000

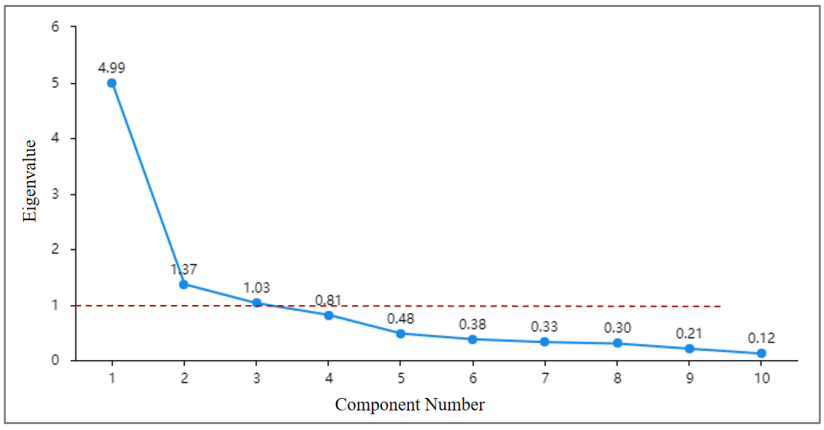

Figure 1. Scree plots

3.3. Confirmatory factor analysis

Confirmatory factor analysis is often employed as a powerful tool to develop and refine measurement instruments by examining the properties and interrelationships of latent structures. Additionally, CFA offers invaluable insights into construct validity, method effects, and the assessment of cross-group factorial invariance [27]. For this study, the CFA sample selected using a multi-stage sampling method, with analyses conducted using IBM SPSS Amos 24.

An important prerequisite for conducting CFA is the assumption of data normality. The evaluation of multivariate outliers was performed by examining Mahalanobis distances between observations to identify cases significantly deviating from the rest of the data set. The output identified these outliers. Normality testing indicated that all variables exhibited kurtosis less than 7, which meets the univariate normality criterion. However, the multivariate kurtosis value of 344.954 exceeds the recommended standardized estimate of 5.00, suggesting non-normal distribution of data [28].

To address the issue of non-normality, the Bootstrapping method was applied [29]. Bootstrapping results indicated that the model fit improved with a larger sample size, suggesting that the model's null hypothesis is accepted, and the use of CFA is appropriate under these conditions. This approach helps in affirmatively establishing the scale's validity and reliability despite the challenges posed by non-normal data distributions.

3.3.1. Convergent validity

In CFA, convergent validity can be evaluated by examining composite reliability (CR) and average variance extracted (AVE). CR represents the consistency of the construct, and values greater than the threshold of 0.60 are considered ideal [30]. AVE measures the variance attributed to the construct in relation to the measurement error. The Fornell-Larcker criterion for convergent validity sets a minimum threshold for AVE at 0.50. However, past literature has also suggested that convergent validity can be considered adequate if the CR value is greater than 0.60, even if the AVE is below 0.50 [31].

In the current study, CFA was conducted for three factors and ten items. According to Table 2, the AVE values for all three factors are above 0.50, and the CR values are all above 0.70, indicating that the data exhibit good convergent validity. This demonstrates that the constructs are reliably measured and that the scale effectively captures the dimensions it purports to measure.

Table 2. Square root of average variance extracted and composite reliability between the constructs

Factor	AVE	CR
RP	0.615	0.827
EI	0.518	0.763
AA	0.583	0.848

3.3.2. Discriminant validity

Discriminant validity focuses on the extent to which a construct is truly distinct from other constructs, as demonstrated by low correlations with measurements of different constructs [32], [33]. In this study, discriminant validity was assessed by comparing the square root of the AVE of related constructs against the absolute values of their inter-construct correlations. Discriminant validity is confirmed if the square root of the AVE for each factor is greater than the absolute values of its correlations with other factors, and if this condition holds for all factors.

As shown in Table 3, the analysis revealed that the square roots of the AVE for the three factors: resource provision (RP), emotional inspiration (EI), and appropriate attention (AA) are 0.784, 0.720, and 0.763 respectively. These values all exceed the highest absolute values of the inter-factor correlations: 0.715 for RP, 0.715 for EI, and 0.619 for AA. This demonstrates that RP, EI, and AA each possess good discriminant validity, clearly distinguishing these factors from one another within the framework of the study. This finding underscores the robustness of the scale in differentiating between the constructs it is designed to measure.

Table 3. Pearson correlation and square root of average variance extracted

	RP	EI	AA
RP	0.784		
EI	0.715	0.720	
AA	0.619	0.388	0.763

3.3.3. Goodness of fit

In evaluating the fit of a model, multiple fit indices are used, including root mean square error of approximation (RMSEA), goodness of fit index (GFI), standardized root mean square residual (SRMR), comparative fit index (CFI), incremental fit index (IFI), Chi-square to degrees of freedom ratio ($\chi 2/df$), parsimonious comparative fit index (PCFI), and parsimonious normed fit index (PNFI). RMSEA is recognized as one of the most informative criteria in covariance modeling because it emphasizes the approximation error in the population and represents the discrepancy between the proposed model and the population's covariance matrix.

On the other hand, past literature suggests using CFI as an alternative to normed fit index (NFI), especially since NFI can underestimate good fit in small samples [28]. Table 4 highlights the acceptable cutoff values for these fit indices, with all indices demonstrating satisfactory levels. This implies that the model shows a good overall fit, indicating that it reliably represents the relationships and structure hypothesized in the study. These fit indices collectively affirm the model's validity, making it a robust tool for further research and application in the field.

Table 4. Confirmatory factor analysis and goodness of fit statistics

Name of category	Fit indices	Recommended value	Value
Absolute fit	RMSEA	<0.080	0.077
	GFI	>0.900	0.936
	SRMR	<0.080	0.059
Incremental fit	CFI	>0.900	0.960
	IFI	>0.900	0.960
Parsimonious fit	χ^2/df	<3.000	2.376
	PCFI	>0.500	0.682
	PNFI	>0.500	0.663

Default model: $\chi 2(45)=1133.126$, $p=1.000$

4. DISCUSSION

The social support received by students and its impact on their academic outcomes has been a subject of interest among many researchers [34]–[36]. Although there are several social support scales available in this field, most are not specifically tailored for students, particularly doctoral students. The widely used Multidimensional Scale of Perceived Social Support (MSPSS) focuses on support perceived from family, friends, and significant others; however, for doctoral students, support from their supervisors is crucial. Thus, incorporating mentor support into the social support scales for doctoral students is essential.

Furthermore, previous scales have rarely considered whether the level of support received could have negative impacts. For instance, research by Roberts and Bandlow [19] suggests that excessive support might actually hinder the academic journey of doctoral students. Therefore, the appropriateness of support has also been integrated into this new scale.

The reliability of the DSSPS was confirmed with Cronbach's alpha values of 0.816 for resource provision, 0.758 for emotional inspiration, and 0.848 for appropriate attention, indicating strong internal consistency for each construct. These high values demonstrate that the items within each construct reliably measure the intended dimensions of social support. According to the CFA, the proposed model demonstrated a good fit to the data. Additionally, convergent and discriminant validity, which are crucial components of structural validity, were satisfactorily established. This indicates that the designed items accurately measured the intended latent structures. The constructs did not exhibit any issues with multicollinearity and achieved strong discriminant validity, with inter-construct correlations remaining below 0.85.

Findings of this study align with and expand upon previous research in several ways. The inclusion of supervisor support in the DSSPS, unlike the MSPSS and other scales, addresses a critical gap identified by several studies [3]–[6]. The identification of three distinct factors-resource provision, emotional inspiration, and appropriate attention-aligns with the multidimensional nature of social support described by previous research [37], [38].

The study corroborates earlier research that perceived social support positively affects academic engagement and success [2], [39], [40]. Consistent with previous study [40], this research highlights the crucial role of family and friends in offering emotional and practical support. Additionally, the incorporation of the appropriateness of support into the DSSPS addresses the issue of potential mismatches between needed and received support [41]. These insights contribute to a more nuanced understanding of social support in academic settings and provide a foundation for targeted interventions to enhance doctoral students' well-being and academic performance.

5. CONCLUSION

The results of this study underscore the importance of tailored social support scales for doctoral students, highlighting the critical role of supervisor support in their academic journey. The development and validation of the DSSPS fill a significant gap in existing measurement tools by incorporating the appropriateness of support and its potential negative impacts. The findings have practical implications for educational practice and policy. Higher education institutions can utilize the DSSPS to assess and enhance the social support structures available to doctoral students. By understanding the specific types of support that are most beneficial, institutions can provide targeted interventions to improve doctoral students' psychological well-being and academic performance.

Additionally, the study's insights into the differential effects of support from supervisors, peers/friends, and family can inform policies aimed at fostering a supportive academic environment. Implementing strategic recommendations based on these findings can help institutions create an optimal educational setting that addresses the unique needs of doctoral students. Future research could further investigate the long-term effects of social support and its applicability in cross-cultural settings to enhance the overall well-being and academic achievements of doctoral students. By continuing to refine and expand the DSSPS, researchers and practitioners can better support the academic and professional success of doctoral students worldwide.

REFERENCES

[1] M. Hassan, S. Fang, A. A. Malik, T. A. Lak, and M. Rizwan, "Impact of perceived social support and psychological capital on university students' academic success: testing the role of academic adjustment as a moderator," *BMC Psychology*, vol. 11, no. 1, p. 340, Oct. 2023, doi: 10.1186/s40359-023-01385-y.

[2] C. Chen, F. Bian, and Y. Zhu, "The relationship between social support and academic engagement among university students: the chain mediating effects of life satisfaction and academic motivation," *BMC Public Health*, vol. 23, no. 1, p. 2368, Nov. 2023, doi: 10.1186/s12889-023-17301-3.

[3] Koenig *et al.*, "Abbreviating the duke social support index for use in chronically ill elderly individuals," *Psychosomatics*, vol. 34, no. 1, pp. 61–69, 1993.

[4] I. G. Sarason, H. M. Levine, R. B. Basham, and B. R. Sarason, "Assessing social support: the social support questionnaire," *Journal of Personality and Social Psychology*, vol. 44, no. 1, pp. 127–139, 1983, doi: 10.1037//0022-3514.44.1.127.

[5] H. Meltzer, "Development of a common instrument for mental health," in *EUROHIS: Developing common instruments for health surveys*, Amsterdam: IOS Press, 2003.

[6] G. D Zimet, N. W Dahlem, S. G Zimet, and G. K Farley, "The multidimensional scale of perceived social support," *Journal of Personality Assessment*, vol. 52, no. 1, pp. 30–41, Mar. 1988, doi: 10.1207/s15327752jpa5201_2.

[7] S. Cohen, "Stress, social support, and the buffering hypothesis," *Psychological Bulletin*, vol. 98, pp. 310–357, 1992.

[8] H. S. Lett *et al.*, "Dimensions of social support and depression in patients at increased psychosocial risk recovering from myocardial infarction," *International Journal of Behavioral Medicine*, vol. 16, no. 3, pp. 248–258, 2009, doi: 10.1007/s12529-009-9040-x.

[9] S. Grav, O. Hellzèn, U. Romild, and E. Stordal, "Association between social support and depression in the general population: the hunt study, a cross-sectional survey," *Journal of Clinical Nursing*, vol. 21, no. 1–2, pp. 111–120, 2012, doi: 10.1111/j.1365-2702.2011.03868.x.

[10] J. I. Manuel, M. L. Martinson, S. E. Bledsoe-Mansori, and J. L. Bellamy, "The influence of stress and social support on depressive symptoms in mothers with young children," *Social Science and Medicine*, vol. 75, no. 11, pp. 2013–2020, 2012.

[11] U. Schulz and R. Schwarzer, "Long-term effects of spousal support on coping with cancer after surgery," *Journal of Social and Clinical Psychology*, vol. 23, no. 5, pp. 716–732, 2004, doi: 10.1521/jscp.23.5.716.50746.

[12] Z. B. Moak and A. Agrawal, "The association between perceived interpersonal social support and physical and mental health: results from the national epidemiological survey on alcohol and related conditions," *Journal of Public Health*, vol. 32, no. 2, pp. 191–201, 2010, doi: 10.1093/pubmed/fdp093.

[13] F. Li *et al.*, "Effects of sources of social support and resilience on the mental health of different age groups during the covid-19 pandemic," *BMC Psychiatry*, vol. 21, no. 1, p. 16, Dec. 2021, doi: 10.1186/s12888-020-03012-1.

[14] N. C. Maisel and S. L. Gable, "The paradox of received social support," *Psychological Science*, vol. 20, no. 8, pp. 928–932, Aug. 2009, doi: 10.1111/j.1467-9280.2009.02388.x.

[15] N. Bolger, A. Zuckerman, and R. C. Kessler, "Invisible support and adjustment to stress.," *Journal of Personality and Social Psychology*, vol. 79, no. 6, pp. 953–961, 2000, doi: 10.1037/0022-3514.79.6.953.

[16] D. R. Lehman and K. J. Hemphill, "Recipients' perceptions of support attempts and attributions for support attempts that fail," *Journal of Social and Personal Relationships*, vol. 7, no. 4, pp. 563–574, Nov. 1990, doi: 10.1177/0265407590074012.

[17] Y. Xu, "Effects of sex, culture, and support type on perceptions of spousal social support: an assessment of the 'support gap' hypothesis in early marriage," *Human Communication Research*, vol. 27, no. 4, pp. 535–566, 2001, doi: 10.1093/hcr/27.4.535.

[18] R. M. McLaren and A. C. High, "The effect of under- and over-benefited support gaps on hurt feelings, esteem, and relationships," *Communication Research*, vol. 46, no. 6, pp. 785–810, Aug. 2019, doi: 10.1177/0093650215605155.

[19] L. A. Roberts and R. Bandlow, "The goldilocks phenomenon: are we helping doctoral students too much, too little, or just right?" *Journal of Higher Education Management*, vol. 32, no. 2, pp. 62–80, 2018.

[20] D. Chakraverty, J. E. Cavazos, and D. B. Jeffe, "Exploring reasons for MD-PhD trainees' experiences of impostor phenomenon," *BMC Medical Education*, vol. 22, no. 1, p. 333, Dec. 2022, doi: 10.1186/s12909-022-03396-6.

[21] H. Nori and M. Vanttaja, "Too stupid for PhD? doctoral impostor syndrome among Finnish PhD students," *Higher Education*, vol. 86, no. 3, pp. 675–691, 2023, doi: 10.1007/s10734-022-00921-w.

[22] R. L. Gorsuch, *Factor analysis*, 2nd ed. Hillsdale, NJ: Lawrence Erlbaum, 1983.

[23] N. O'Rourke and L. Hatcher, *A step-by-step approach to using the SAS system for factor analysis and structural equation modeling*. SAS Institute, 1995. doi: 10.5860/choice.33-0366.

[24] D. D. Suhr, *Exploratory or confirmatory factor analysis*. SAS Institute Inc., 2006.
[25] B. Thompson and J. E. Levitov, "Using microcomputers to score and evaluate items," *Collegiate Microcomputer*, vol. 3, no. 2, pp. 163–68, 1984.
[26] J. W. Osborne and A. B. Costello, "Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis," *Practical Assessment, Research and Evaluation*, vol. 10, pp. 1–9, 2005.
[27] B. M. Byrne, *Structural equation modeling with Amos: basic concepts, applications, and programming*, 3rd ed. New York: Routledge, 2016.
[28] P.M. Bentler, *EQS structural equations program manual*. Multivariate Software, 1995.
[29] R. B. Kline, *Principles and practice of structural equation modeling*, 4th ed. The Guilford Press, 2016.
[30] P. Bagozzi, Richard and Y. Youjae, "On the evaluation of structural equation models," *Journal of the Academy of Marketing Science*, vol. 16, no. Spring, pp. 74–94, 1988.
[31] C. Fornell and D. F. Larcker, "Structural equation models with unobservable variables and measurement error: algebra and statistics," *Communication Education*, vol. 18, no. 3, p. 382, Aug. 1981, doi: 10.2307/3150980.
[32] A. K. Goodboy, M. M. Martin, and S. Bolkan, "The development and validation of the student communication satisfaction scale," *Communication Education*, vol. 58, no. 3, pp. 372–396, 2009.
[33] A. M. Hubley, "Discriminant validity," in *Encyclopedia of Quality of Life and Well-Being Research*, Dordrecht: Springer Netherlands, 2014, pp. 1664–1667. doi: 10.1007/978-94-007-0753-5_751.
[34] Y. Ye, X. Huang, and Y. Liu, "Social support and academic burnout among university students: a moderated mediation model," *Psychology Research and Behavior Management*, vol. 12, pp. 335–344, 2021, doi: 10.2147/PRBM.S300797.
[35] L. F. Vargas-Madriz and C. Konishi, "The relationship between social support and student academic involvement: the mediating role of school belonging," *Canadian Journal of School Psychology*, vol. 36, no. 4, pp. 290–303, 2021, doi: 10.1177/08295735211034713.
[36] A. Ahmadi, A. Ziapour, J. Y. Lebni, and N. Mehedi, "Prediction of academic motivation based on variables of personality traits, academic self-efficacy, academic alienation and social support in paramedical students," *Community Health Equity Research and Policy*, vol. 43, no. 2, pp. 195–201, 2023, doi: 10.1177/0272684X211004948.
[37] E. F. Acoba, "Social support and mental health: the mediating role of perceived stress," *Frontiers in Psychology*, vol. 15, 2024, doi: 10.3389/fpsyg.2024.1330720.
[38] P. Mecha, N. Martin-Romero, and A. Sanchez-Lopez, "Associations between social support dimensions and resilience: factors and pathways of influence in depression and anxiety rates in young adults," *Spanish Journal of Psychology*, vol. 26, no. 2, 2023, doi: 10.1017/SJP.2023.11.
[39] Z. Xin, "Perceived social support and college student engagement: moderating effects of a grateful disposition on the satisfaction of basic psychological needs as a mediator," *BMC Psychology*, vol. 10, no. 1, 2022, doi: 10.1186/s40359-022-01015-z.
[40] A. Martínez-Corral, M. I. Solaz-Portolés, and J. C. Moliner, "Affective, social, and academic self-efficacy beliefs of secondary school students," *Revista de Psicodidáctica*, vol. 24, no. 1, pp. 44–50, 2019.
[41] J. A. Rankin, C. A. Paisley, M. M. Mulla, and T. S. Tomeny, "Unmet social support needs among college students: relations between social support discrepancy and depressive and anxiety symptoms," *Journal of Counseling Psychology*, vol. 65, no. 4, pp. 474–489, 2018, doi: 10.1037/cou0000269.

BIOGRAPHIES OF AUTHORS

Xiaohan Yang is a Ph.D student at Universiti Teknologi Malaysia. Her current research focuses on prevalent psychological issues in higher education, particularly impostor syndrome and academic anxiety. The main subjects of her study are female and Ph.D students. She can be contacted at email: yangxiaohan1997@gmail.com.

Kee Jiar Yeo is a Professor of Educational Psychology attached to the School of Education, Universiti Teknologi Malaysia. She has over 30 years of experience as an academic in various educational institutions. Her expertise and interest in research include educational psychology, early childhood education, educational assessment, and special education. Her involvement in conferences, publication and consultations centered on these disciplines. She can be contacted at email: kjyeo@utm.my.

Shih-Hui Lee is a senior lecturer of Educational Psychology attached to the School of Education, Universiti Teknologi Malaysia. Her research expertise and interests primarily focus on sexual education. She has developed a scale to assess the level of sexual and reproductive health knowledge among Malaysian primary school students. She can be contacted at email: shihhuilee@utm.my.

Boon Yew Wong is a fresh PhD graduate from Universiti Teknologi Malaysia. His current research focuses on educational psychology, cyberpsychology, and addictive behavior. He can be contacted at email: boonyew1234@gmail.com.

Lina Handayani is an associate professor attached to the Master Program of Public Health Department, Faculty of Public Health, Universitas Ahmad Dahlan. She graduated her Ph.D of Educational Psychology from Universiti Teknologi Malaysia. She is interested in area of Health Education and Promotion. She can be contacted at email: lina.handayani@ikm.uad.ac.id.