Educational Measurement and Evaluation Review (2018), Vol. 9 Issue 1

Assessing the Construct Validity of the Locus-of-Hope Scale

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Abstract

The Locus-of-Hope Scale (Bernardo, 2010) was developed as a measure of the locus-of-hope constructs (internal locus, external locus-parent, external locus-peer, external locus-spiritual). This study aimed to examine the construct validity of the Locus-of-Hope Scale using alternative approaches in establishing convergent and discriminant validity. A sample of 1, 214 Filipino university students participated in the study and their responses on the Locus-of-Hope Scale were analysed using confirmatory factor analysis. Results indicated that the correlated four-factor structure of the Locus-of-Hope Scale is valid based on acceptable fit indices. Results also indicated strong support for the discriminant validity of the Locus-of-Hope Scale, but three of the four subscales were found to have convergent validity issues related to their average variance extracted (AVE). Implications of the findings and recommendations for future research are discussed.

Keywords: locus-of-hope, Locus-of-Hope Scale, construct validity, convergent validity, discriminant validity

Introduction

Snyder's hope theory (1994; 2000) describes hope as a cognitive motivational system that allows a person to engage in goal-directed behaviour even when facing impediments. The research literature on hope indicates that hope is associated with a number of adaptive psychological outcomes. For

instance, it has been reported that hopeful people are more likely to have more positive adaptation to stress (Ong, Edwards, & Bergeman, 2006), stronger well-being (Shorey, Little, Snyder, Kluck, & Robitschek, 2007), and more positive affect (Steffen & Smith, 2013). In the educational domain, hopeful persons are more likely to have better academic performance (Rand, Martin, & Shea, 2011; Snyder et al., 2002). It has also been reported that hope-based interventions are effective in promoting positive psychological outcomes (Cheavens, Feldman, Gum, Michael, & Synder, 2006; Feldman & Dreher, 2012). These findings provide strong evidence that hopeful thinking is a desirable disposition for people to have. Therefore, the assessment of hope and the use of self-report instruments to facilitate assessment are essential.

The Locus-of-Hope Scale (Bernardo, 2010) is a recently developed self-report measure of hope that is based on the locus-of-hope model (Bernardo, 2010; Bernardo, 2014) which conceptualizes trait hope as having an internal or external locus. Bernardo (2010) extended Snyders's hope theory by proposing that hope may also be grounded on persons or agents outside of the individual. Bernardo (2014) explained that the notion of external loci of hope is consistent with the argument that a conjoint model of agency may exist in collectivist cultures that highlight the roles of other people in a person's goal attainment. Bernardo (2010) elaborated that in the internal locus-of-hope, the agent of goal-attainment cognitions is the individual, whereas in the external locus-of-hope, the agents of goal-attainment cognitions are significant people or forces external to the individual. Bernardo (2010) further proposed that the external locus-of-hope has three sub-dimensions: external locus-family (hope placed on one's family), external locus-peer (hope placed on peers or friends), and external locus-spiritual (hope placed on God or a superior spiritual being). Bernardo (2010; 2016) also argued that external loci- of- hope may even be more important for people in collectivist cultures. Thus, the LHS was developed with four subscales corresponding to the four locus-of-hope constructs (Bernardo, 2010). The validity of the Locus-of-Hope Scale was first examined through confirmatory factor analyses (CFA) of data from Filipino university students in the Philippines, wherein results supported a four-factor structure consistent with the proposed locus-of-hope dimensions (Bernardo, 2010). In the same study, the four-factor structure was also supported by the differential relations of the internal and external loci-of-hope on individual-level individualism and collectivism. The four-factor structure of the Locus-of-Hope Scale was further validated among young Filipino adolescents (Bernardo, 2014), and the results also supported the four-factor structure. In the same study, the Locus-of-Hope

Scale was also found to have measurement invariance across sex. The four-factor structure was also confirmed in the Chinese version (Du, Bernardo, &Yeung, 2015) and in the short-form and Filipino version (Bernardo & Estrellado, 2014) of the Locus-of-Hope Scale.

Construct validity pertains to the extent to which a set of measured indicators or items truly represent the theoretical latent construct those indicators are supposed to measure and has four components: convergent validity, discriminant validity, nomological validity, and face validity (Hair, Black, Babin, & Anderson, 2010). While a number of studies reported acceptable psychometric properties for the Locus-of-Hope Scale (e.g. Bernardo, 2010; 2014; Gadiana & David, 2015), the scale can still benefit from additional psychometric analysis of construct validity. First, the reliability for some of the subscales seems to be inadequate as indicated by marginal Cronbach's alpha values. For example, Bernardo (2014) reported that the internal locus subscale has an alpha value of .62 and Du and King (2013) reported that external locus-peer subscale has an alpha value of .71. Moreover, the use of Cronbach's alpha to determine reliability has been criticized because it can underestimate reliability (Sijtsma 2009) and may not be compatible with multi-dimensional scales (Teo & Fan, 2013). It is important that the reliability of the subscales be examined using alternative measures like composite reliability which is a better measure of reliability compared to Cronbach's alpha (Wong & Lo, 2012). Second, none of the studies that used the Locus-of-Hope Scale examined the average variance extracted (AVE) of the subscales. The AVE represents "a summary measure of convergence of the set of variables as a whole that represents a latent construct" (Wong & Lo, 2012, p. 403). Since the AVE is a more conservative indicator of validity (Teo & Jarupunphol, 2015), it is also important that the validity of the Locus-of-Hope Scale be assessed using AVE.

The present study reports the results of an assessment of the construct validity of the Locus-of-Hope Scale (LHS) using a Philippine sample. The goal of the study is to investigate the construct validity of the LHS through the use of more conservative approaches like using composite reliability and average variance extracted (AVE) values in order to provide stronger evidence for the convergent and discriminant validity of the LHS. The focus on convergent and discriminant validity is grounded on the argument that convergent and divergent validity are the most essential components of construct validity (Wong & Lo, 2012). Establishing reliability through composite reliability coefficients may also provide a more accurate picture of the reliability of the LHS.

Method

Measure

The Locus-of-Hope Scale (LHS). The original English version of the Locus-of-Hope Scale (Bernardo, 2010) was used in the study. Each of the locus-of-hope construct is measured by a corresponding subscale with eight (8) items. Utilizing a 4-point Likert-type scale, the LHS requires respondents to indicate the extent to which an item describes them using a scale from 1 (*definitely false*) to 4 (*definitely true*). Aside from the 32 locus-of-hope items, the LHS contains eight filler items. The following are sample items: "I can think of many ways to get the things in life that are important to me" (internal locus), "My parents have lots of ways of helping me attain my goals." (external locus-parent),"With the help of my friends, I am confident that I can reach my goals in life" (external locus-peer), and "God has many different ways of letting me attain my goals" (external locus-spiritual). All items are positively stated and stronger agreement with an item indicates higher level on the locus-of-hope construct that the item represents. Subscale scores were obtained by computing the mean scores of the participants' responses across the items in each subscale.

Participants

The present study used a convenience sample of 1, 214 undergraduate students from a university in the National Capital Region (NCR) of the Philippines. The language of instruction used in the aforementioned university is English. Since English is the medium of instruction in Philippine schools from secondary education to college, it was assumed that the participants of the study can read and undertand the items of the LHS. Furthermore, the initial validation of the English version of the LHS was also done with Filipino university students (Bernardo, 2010). There were 819 (67.46%) female participants and 395 (32.54%) male participants. The participants' ages ranged from 16 to 22 years (M = 18.69 years; SD = 0.90). In terms of religion, 963 (79.32%) of the participants reported that they are Catholic. The participants came from various educational majors and participating classes were selected in coordination with academic offices and faculty. All participants responded to the LHS during class hours. The participants were informed of the purpose of the study and informed consent was sought from the participants prior to administration of the LHS.

Data Analysis

A series of statistical analysis was performed on the data of the participants' responses on the LHS. First, descriptive statistics of the items were computed using SPSS 20. Second, the factorial structure of the LHS was examined as a measurement model through CFA. In the CFA, the covariance matrix of the data was analyzed through Maximum Likelihood Estimation (MLE) using the software AMOS 20. The four-factor structure of the LHS was assessed by determining whether an item loaded on its hypothesized latent factor, and whether the correlated four-factor structure of the locus-of-hope dimensions obtained a good fit with the data. To evaluate the fit of the model tested, a number of goodness-of-fit indices were considered: Chi square ($\chi 2$), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and root mean square error of approximation (RMSEA). Model fit was evaluated using the following criteria: the $\chi 2$ should not be significant, CFI and TLI should at least be .90 and RMSEA should not be higher than .08 (David, 2012). Convergent validity was assessed by examining the item factor loadings as indicated by standardized parameter estimates (SE), construct reliability as measured by composite reliability coefficient (CR), and the average variance extracted (AVE) of each of the locus-of-hope subscales. Discriminant validity was assessed by comparing the square root of the AVE for a construct with all the bivariate correlations of that construct with each of the other constructs. Moreover, the maximum shared variance (MSV) and average shared variance (AVS) of each construct was also computed. The CR, AVE, MSV, and AVS values were computed from CFA outputs using Microsoft Excel 2010.

Results

Table 1
Descriptive statistics for the items of the LHS subscales

Items	M	SD	Skewness	Kurtosis
Internal Locus				
Item 1	3.13	.59	-.21	.47
Item 6	3.22	.64	-.32	-.23
Item 14	3.19	.62	-.21	-.28

Item 20	3.32	.58	-.28	-.22
Item 23	3.20	.64	-.27	.29
Item 27	3.23	.58	-.16	-.04
Item 30	3.30	.64	-.49	-.15
Item 40	3.09	.63	-.31	.37
External Locus-Parent				
Item 3	3.60	.56	-1.02	.04
Item 7	3.38	.64	-.58	-.33
Item 11	3.40	.64	-.63	-.41
Item 16	3.33	.64	-.45	-.61
Item 21	3.37	.60	-.46	-.28
Item 24	3.31	.60	-.26	-.63
Item 32	3.35	.60	-.36	-.54
Item 39	3.26	.64	-.31	-.61
External Locus-Peer				
Item 5	2.76	.78	-.23	-.32
Item 10	3.25	.61	-.29	-.15
Item 13	3.13	.65	-.35	.19
Item 19	3.03	.62	-.19	.24
Item 26	2.91	.63	-.29	.43
Item 33	3.04	.63	-.27	.36
Item 35	3.04	.63	-.33	.57
Item 38	2.94	.65	-.18	.01
External Locus-Spiritual				
Item 2	3.68	.53	-1.38	.95
Item 9	3.64	.54	-1.13	.27
Item 15	3.72	.50	-1.50	1.29

Item 17	3.58	.58	-1.03	.07
Item 22	3.67	.52	-1.30	.70
Item 28	3.65	.52	-1.07	.02
Item 34	3.64	.53	-1.06	.06
Item 36	3.62	.55	-1.09	.17

Descriptive Statistics

The descriptive statistics of the items in the four subscales of the LHS are presented in Table 1. The mean scores of all 32 items were above the midpoint value of 2.5, indicating that the participants positively endorse the items. The standard deviation scores indicate a narrow spread of the scores around the mean. Based on Kline's (2005) recommendations that skewness and kurtosis values should be within | 3 |and | 10 | respectively, the data were assumed to have univariate normality. Since the use of the MLE approach in CFA requires data to have multivariate normality, the Mardia's normalized multivariate kurtosis value was also examined. Following the approach applied by Teo and Noyes (2014), the data was assumed to have multivariate normality since the obtained Mardia's coefficient of 176.08 is lower than the value of 1, 088 computed from the formula $p\ (p + 2)$ where p equals the number of observed variables

Factor Structure

The obtained Hoelter's (1983) Critical *N* for the data is 391 (.01) which is lower than the total number of participants in the study. This suggests that the sample size used in the study is sufficiently large for testing the measurement model. The CFA of the correlated four-factor structure of the LHS showed that all items loaded significantly on their hypothesized latent factors and yielded the following fit indices: χ^2 [(458, N= 1,214) = 1, 649, p< 0.001]; CFI = .93, TLI = .93, RMSEA= .046 (CI: .044; .049), SRMR = .050. All fit indices met the criteria for a good fitting model, except for the χ^2 value. Since a significant χ^2 value is expected for a model with a sample size greater than 250 and at least 30 observed variables (Hair et al., 2010), it can be said that the correlated four-factor structure achieved a relatively good fit with the data.

Table 2
Item standardized estimates (SE), composite reliability (CR), and AVE of the LHS

Subscale Items	SE	CR	AVE
Internal Locus		.79	.32
Item 1	.51		
Item 6	.58		
Item 14	.56		
Item 20	.61		
Item 23	.55		
Item 27	.61		
Item 30	.48		
Item 40	.60		
External Locus-Parent		.88	.49
Item 3	.61		
Item 7	.73		
Item 11	.72		
Item 16	.73		
Item 21	.60		
Item 24	.74		
Item 32	.72		
Item 39	.71		
External Locus-Peer		.88	.48
Item 5	.52		
Item 10	.58		
Item 13	.72		
Item 19	.67		
Item 26	.76		
Item 33	.74		
Item 35	.71		
Item 38	.76		
External Locus-Spiritual		.92	.60
Item 2	.76		
Item 9	.77		
Item 15	.83		
Item 17	.72		
Item 22	.78		

Item 28	.80
Item 34	.75
Item 36	.79

Convergent and Discriminant Validity

There are three ways to examine the convergent validity of a measure (Hair et al., 2010). First is the size of the *factor loadings*, wherein high factor loadings indicate convergence of the items on the latent construct that they are supposed to measure. Second is *reliability*, wherein the internal consistency of a set of items indicates convergence of those items on the latent construct. Third is the AVE which measures the amount of variance captured by a construct in relation to the amount of variance attributed to measurement error (Teo & Jarupunphol, 2015). Convergent validity is deemed adequate if item factor loadings as indicated by standardized parameter estimates is at least 0.50, the composite reliability is at least .70, and the AVE is at least .50. Table 2 shows the results of the three measures of convergent validity used in this study. The results indicate that the parameter estimates for all items are at 0.50 or higher, except for one item in the internal locus construct. This means that the LHS has adequate convergent validity at the item level. The composite reliability coefficients were all above .70, indicative of good reliability and convergent validity at the construct level. However, the AVE values were less than satisfactory as only the AVE of the external locus-spiritual subscale met the cut-off score of 0.50. While the AVE values of the external locus-parent and external locus-peer subscales were also unsatisfactory as they were below the recommended guideline, the AVE of the internal locus subscale was very low. To explore the low AVE of the internal locus construct, the R^2 values of all the items in this construct were obtained and results showed that the percent of variance explained ranges from .26 to .37. This is problematic as no single item has an R^2 value of at least .50. In contrast, some items in the external locus-family and external locus-peer have R^2 values of at least .50. Nevertheless, the acceptable values of the item parameter estimates and construct reliability coefficients of the internal locus, external locus-family, and external locus-peer subscales suggest sufficient convergent validity. This means that the four-factor structure of the LHS has acceptable convergent validity, but with weaker AVE values.

The discriminant validity of a measure can be assessed by examining the

correlation between its latent constructs (Hair et al., 2010). A very high correlation between constructs suggests lack of discriminant validity, while low to moderate correlation is indicative of good discriminant validity. Inter-scale correlations of the four subscales yielded correlation scores ranging from .27 to .52, indicating sufficient discriminant validity. This serves as evidence that the four locus-of-hope constructs are conceptually unique and distinct dimensions of locus-of-hope. An alternative approach to assessing discriminant validity is comparing the square root of the AVE for a construct with all the bivariate correlations of that construct with all the other constructs (Teo & Noyes, 2014). If the square root of the AVE of the construct is higher than all of the bivariate correlations of that construct, then the construct is deemed to have discriminant validity. Table 3 presents the square roots of the AVE of the locus-of-hope subscales in parenthesis. The square root of the AVE for a construct was compared with the correlations of that construct with each of the other three locus-of-hope constructs. Results indicated that all constructs appear to have satisfactory discriminant validity. There is also discriminant validity if the AVE of a subscale is higher than the computed maximum shared variance (MSV) and average shared variance (ASV) of all subscales. The results yielded MSV and AVS scores that were lower than the respective AVE of each subscale. In summary, it appears that the LHS has strong discriminant validity.

Table 3
Inter-scale correlations, square roots of the AVEs, maximum shared variance (MSV), and average shared variance (ASV) of the LHS

Subscale	1	2	3	4	AVE	MSV	ASV
1 Internal Locus	(.56)				.32	.27	.21
2 External Locus-Parent	.52	(.70)			.49	.27	.24
3 External Locus-Peer	.51	.50	(.69)		.48	.26	.19
4 External Locus-Spiritual	.32	.45	.27	(.77)	.60	.20	.13

Discussion

The present study performed psychometric analysis on the Locus-of-Hope Scale in order to obtain additional evidence on its construct validity. In terms of factorial structure, results are consistent with previous research documenting the structural validity of the four-factor structure of the English version of the LHS (e.g. Bernardo, 2010; 2014). This indicates that the four locus-of-hope constructs can be differentiated from the students' responses to the LHS. More importantly, the results of the study provide strong support for the discriminant validity of LHS. Interestingly, evidence for the separation and distinctiveness of the locus-of-hope constructs was strengthened by using the alternative approach of analyzing the AVE of a measure.

The analysis of the convergent validity of the LHS got mixed results. Adequate convergent validity is evident based on obtained item standardized estimates where only one of the 32 locus-of-hope items did not meet the minimum criteria for acceptable factor loading. Convergent validity is also evident in the obtained composite reliability coefficients. The composite reliability coefficients for the LHS were all satisfactory and exceeded the reliability estimates based on Cronbach's alpha that were reported in previous studies (Bernardo, 2014; Bernardo et al., 2015). Taken together, the factor loadings and reliability estimates indicate convergence of items on the locus-of-hope construct that the items are supposed to measure. However, the LHS demonstrated low AVE for three locus-of-hope subscales. Low AVE is a validity problem because it indicates that measurement errors explain more variance in the items than the latent construct to which the items are loaded. As the study is the first to examine the AVE of the LHS subscales, this validity problem of the LHS items and subscales was not detected in previous studies that relied primarily on factor loadings and model fit to validate the LHS. The convergent validity problem observed on some of the subscales of the LHS seems to suggest the need to review the items of these subscales to determine if item revision or item construction would be necessary to improve the scale and obtain stronger convergent validity. Another plausible strategy is to develop a short-form of the LHS by removing problematic items and retaining items that contribute strongly to convergent validity. Previously, a short form of the Filipino version of LOH was developed (Bernardo & Estrellado, 2014).

In general, the construct validation approach used in this study provides adequate support for the construct validity of the LHS and its usefulness as a measure of hope. The LHS is particularly useful for researchers who are

interested in determining the role of internal and external loci of hope in the educational and psychological experiences of students. The LHS may also be a useful tool for school counsellors in assessing the hopeful cognitions of university students which can provide inputs to school counselling and career development programs. Nevertheless, more research on the psychometric properties of the LHS is warranted especially on how the convergence of the items in each subscale can be improved. Cross-cultural validation of the English version of the LHS is also needed and it is imperative to determine its validity in more individualist cultures in order to expand its utility as a measure of dispositional hope.

A major limitation of this study was that only Filipino students from one university served as respondents. Future research could sample a wider range and more diverse group of respondents for stronger generalization of the findings. Moreover, no information was sought on whether the participants have current or prior psychopathology. Thus, the results do not offer support for the utility of the LHS in clinical samples. The utility of the LHS on assessing the hopeful cognitions of clinical samples must be explored in future studies. The present study also did not take into account the nomological validity of the Locus-of-Hope Scale. While the nomological validity of the Locus-of-Hope Scale can be inferred from the results of studies that show the differential relations of the locus-of-hope constructs with adaptive outcomes like life satisfaction (Du et al., 2015; Du & King, 2013), use of learning strategies (Bernardo, Salanga, Khan, & Yeung, 2015), and future goals (Gavilano, Nalipay, & David, 2018), there is still a need to investigate how the locus-of-hope constructs relate with other psychological constructs. An important line of inquiry is determining the association of the locus-of-hope constructs with students' academic outcomes While the association of academic achievement and hope drawn from within oneself has been examined (e.g. Rand et al., 2011; Synder et al., 2002), there is a dearth of studies on how the three external locus-of-hope dimensions relate to academic success. One exemption is the study of Lucas and Ouano (2018) who examined the predictive influence of the locus-of-hope dimensions on the academic achievement among Filipino college indigent students.

In spite of the aforementioned limitations, the present study contributes to the literature on locus-of-hope by providing additional evidence for the construct validity of the LOH. In future research involving the use of self-report instruments like the LHS, the construct validity of the measurement model should be established beyond factor loadings and fit indices. This can be done

by obtaining evidence of convergent and discriminant validity, which are considered as the most essential components of construct validity (Wong & Lo, 2012). By establishing the construct validity of an assessment tool or instrument, one can be more certain that the instrument is really measuring what it is supposed to measure.

References

Batara, J. B. (2015). Overlap of religiosity and spirituality among Filipinos and its implications towards religious prosociality. *International Journal of Research Studies in Psychology, 4*(3), 3-21.

Bernardo, A. B. (2010). Extending hope theory: Internal and external locus of trait hope. *Personality and Individual Differences*, *49*, 944–949.

Bernardo, A. B. I. (2010). Exploring Filipino adolescents' perceptions of the legitimacy of parental authority over academic behaviors. *Journal of Applied Developmental Psychology*, *31*, 271–280.

Bernardo, A. B. (2014). Hope in early adolescence: Measuring internal and external locus-of-hope. *Child Indicators Research*, *8 (3),* 699-715.

Bernardo, A. B., & Estrellado, A. F. (2014). Measuring hope in the Philippines: Validating the short version of the Locus-of-Hope Scale in Filipino. *Social Indicators Research*, *119* (3), 1649-1661.

Bernardo, A. B., Salanga, M.G., Khan, A., & Yeung, S. (2015). Internal and external loci-of-hope predict use of individual and collaborative learning strategies: Evidence from university students in four Asian cities. *The Asia-Pacific Education Researcher.* doi:10.1007/s40299-015-0249-y.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J.S. Long (Eds.), *Testing structural equation models* (pp.136-162). Beverly Hills, CA: Sage.

Curry, L., Snyder, C. R., Cook, D., Ruby, B., & Rehm, M. (1997). Role of hope in academic and sports achievement, *Journal of Personality and Social Psychology, 73* (6), 1257-1267.

Cheavens, J. S., Feldman, D. B., Gum, A., Michael, S. T., & Snyder, C. R. (2006). Hope therapy in a community sample: A pilot investigation. *Social Indicators Research, 77(1),* 61–78.

David, A.P. (2012). Structural validation of the 3 x 2 achievement goal model. *Educational Measurement and Evaluation Review*, *3*, 50-59.

Day, L., Hanson, K., Maltby, J., Proctor, C., & Wood, A. (2010). Hope uniquely

predicts objective academic achievement above intelligence, personality, and previous academic achievement. *Journal of Research in Personality, 44,* 550-553.

Drach-Zahavy, A., & Somech, A. (2002). Coping with health problems: The distinctive relationships of hope sub-scales with constructive thinking and resource allocation. *Personality and Individual Differences, 33,* 103-117.

Du, H., Bernardo, A. B. I., & Yeung, S. (2015). Locus-of-hope and life satisfaction: The mediating roles of personal self-esteem and relational self-esteem. *Personality and Individual Differences*, *83*, 228–233.

Du, H., & King, R. B. (2013). Placing hope in self and others: Exploring the relationships among self-construals, locus of hope, and adjustment. *Personality and Individual Differences*, *54*, 332–337.

Feldman, D. B., & Dreher, D. E. (2012). Can hope be changed in 90 minutes? Testing the efficacy of a single-session goal-pursuit intervention for college students. *Journal of Happiness Studies, 13*, 745–759.

Gadiana, L.**,** & David, A.P. (2015). Rasch analysis of the Locus-of-Hope Scale. *Educational Measurement and Evaluation Review, 6,* 32-37.

Gavilano, V., Nalipay, M., & David, A.P. The role of hope in promoting society-oriented future goal. *The Normal Lights*, *12* (1), 185-198.

Gerbing, D., & Anderson, J. (1984). On the meaning of within-factor correlated measurement errors. *Journal of Consumer Research, 11*, 572-580.

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.). Englewood Cliffs, NJ: Prentice-Hall International.

Hoe, S.L. (2008). Issues and procedures in adopting structural equation modelling technique. *Journal of Applied Quantitative Methods, 3,* 76-83.

Hoelter, J. (1983). The analysis of covariance structures: Goodness-of-fit indices. *Sociological Methods and Research, 11,* 325-344.

King, R., & Ganotice, F. (2014). The social underpinnings of motivation and achievement: Investigating the role of parents, teachers, and peers on academic outcomes. *The Asia-Pacific Education Researcher, 23* (3), 745-756.

King, R., & Ganotice, F., & Watkins, D. (2014). A cross-cultural analysis of achievement and social goals among Chinese and Filipino students. *Social psychology of education,17,* 439-455.

Kline, R.B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: Guilford Press.

Lucas, R.I., & Ouano, J. (2018). Hope and academic achievement among young Filipino college indigent students. *Asia-Pacific Social Science Review, 17* (3), 1-14.

McDonald, R. P., & Ho, M. H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods,7,* 64–82.

Ong, A., Edwards, L., & Bergeman, C.S. (2006). Hope as a source of resilience in later adulthood. *Personality and Individual Differences*, *41*, 1263-1273.

Rand, K., Martin, A., & Shea, A. A. (2011). Hope, but not optimism, predicts academic performance of law students beyond previous academic achievement. *Journal of Research in Personality, 45,* 683-686.

Shorey, H., Little, T., Snyder, C. R., Kluck, B., & Robitschek, C. (2007). Hope and personal growth initiative: A comparison of positive, future-oriented constructs. *Personality and Individual Differences*, *43*, 1917-1926.

Sijtsma, K. (2009). On the use, misuse, and the very limited usefulness of Cronbach's α. *Psychometrika, 74,*107-120.

Snyder, C. R. (1994). *The psychology of hope.* New York: Free Press.

Snyder, C. R. (1995). Conceptualizing, measuring, and nurturing hope. *Journal of Counseling and Development, 73,* 355–360.

Snyder, C. R. (Ed.). (2000). *Handbook of hope: Theory, measures, and applications.* San Diego, CA: Academic Press.

Snyder, C. R., Harris, C., Anderson, J. R., Holleran, S. A., Irving, L. M., Sigmon, S. T., et al. (1991). The will and the ways: Development and validation of an individual differences measure of hope. *Journal of Personality and Social Psychology*, *60*, 570–585.

Snyder, C. R., Shorey, H. S., Cheavens, J., Pulvers, K. M., Adams, V. H., & Wiklund, C.(2002). Hope and achievement success in college. *Journal of Educational Psychology*, *94,* 820–826.

Steffen, L., & Smith, B. (2013). The influence of between and within-person hope among emergency responders on daily affect in a stress and coping model. *Journal of Research in Personality, 47,* 738-747.

Teo, T., & Fan, X. (2013). Coefficient alpha and beyond: Issues and alternatives for educational research. *The Asia-Pacific Education Researcher, 22* (2), 209-213.

Teo, T., & Jarupunphol, P. (2015). Dhammic technology acceptance model: Extending the TAM using a condition of attachment in Buddhism. *Journal of Educational Computing Research, 52* (1), 136-151.

Teo, T., & Noyes, J. (2014). Explaining the intention to use technology among pre-service teachers: A multi-group analysis of the unified theory of acceptance and use of technology. *Interactive Learning Environments, 22 (1),* 51-66.

Wong, A. K., & Lo, E. S. (2012). Assessing the construct validity of the

Conceptions for Teaching and Learning Questionnaire (CTLQ) for Chinese university students in Hong Kong: Going beyond the use of goodness of fit indices. *The Asia-Pacific Education Researcher, 21(2),* 402-413.