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INTERNAL STRUCTURE AND EXTERNAL RELATIONS EVIDENCE OF THE UCLA LONELINESS SCALE FOR APPLICATION TO INDONESIAN YOUNG WOMEN

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Abstract

Evaluating one's loneliness can yield significant benefits as it has been linked to numerous physical and mental health concerns. However, assessing loneliness faces difficulties due to inconsistent findings regarding its factorial structure. This study aims to investigate the internal structure evidence of the UCLA Loneliness Scale among Indonesian unmarried young adult women. A total of 318 participants completed the loneliness, well-being, extraversion, and neuroticism trait scales. Confirmatory factor analysis and bi-partial correlation were conducted to evaluate the validity evidence based on internal structure and relations to external variables. The results suggested that Model 2 (two correlated factors) is the best fit, χ^2 (151, n = 318) = 363.33, p = .000; CFI = .87, TLI = .85, RMSEA = .06, compared to other models tested (unidimensional & three factors). Also, UCLA-LS has two orthogonal structures consisting of favorable and unfavorable items (r = .83, p = .000; r = .72, p = .000, respectively) and negative correlations with well-being (r = -.42, p = .000) and extraversion (r = -.43, p = .000). Conversely, it correlates positively with the neuroticism subscale (r = .22, p = .000). This implies that perceived loneliness is unique among unmarried young adult women in Indonesia, and this scale may become a valuable tool to predict other widespread public health problems associated with loneliness.

Keywords: loneliness; UCLA Loneliness Scale; validation; well-being

INTRODUCTION

The global survey results of Barreto et al. (2020) showed that loneliness is more prominent in individuals at a young age than in older age groups. Loneliness is currently getting more attention in various research studies on individuals, one of which is in late adolescence, such as university students. Kaligis et al. (2021) conducted a survey of 393 Indonesian young people aged 16-24 years and found that 358 participants experienced loneliness. In addition, the results of the WHO Global School-based Student Health Survey of 4993 female students aged 13-17 years in Indonesia showed that 6.5% of participants experienced loneliness all the time (Marthoenis & Nassimbwa, 2022). Furthermore, Afdal et al. (2021) found that 186 out of 504 Indonesian students surveyed during the Covid-19 pandemic experienced high to very high levels of loneliness.

By definition, loneliness is a condition of solitude (Tiwari, 2013). Furthermore, loneliness is a psychologically distressing condition resulting from a perceived lack of relationships and is constructed from the subjective perceptions of each individual. A person can go through life accustomed to being alone and not feel lonely, or conversely can have many social relationships and still feel lonely. As such, loneliness is strongly related to the perceived quality rather than quantity of social relationships.

Studies show that loneliness peaks during early adolescence, declining during young adulthood and middle age (Sundqvist & Hemberg, 2021). Loneliness has been found to occur most frequently, and tends to be more prevalent, in young people (Barreto et al., 2020). Young adults who separate from their families to begin their studies at university, experience a higher risk of loneliness during

the transition period, which can be expected to put them at risk of mental health problems and a number of health issues. This is understandable because perhaps during early adolescence, when individuals have not yet found their social place, they are particularly at risk of loneliness. During the process of social reorientation and distance from parents, peers become more important. Likewise, intimate relationships also become more important during young adolescence. Therefore, if friendship and intimate relationships cannot be achieved, this may increase the risk of experiencing loneliness.

Specifically, in this study, we are particularly interested in examining the loneliness experienced by young single women in urban settings in Indonesia. Marthoenis and Nassimbwa (2022) found that Indonesian female adolescents have a lower rate of loneliness. However, female adolescents who reported a higher rate of loneliness also reported elevated occurrences of health-risk behaviors, lack of close friends, and being victims of bullying. Peltzer and Pengpid (2019) also reported that Indonesian adolescents and older adults have a higher rate of loneliness compared to other age groups. However, loneliness was measured with a single item, such as "*In the past 12 months, how often have you felt lonely?*" (Marthoenis & Nassimbwa, 2022), which we identify as a gap that may be addressed by using a loneliness scale that can capture response variability and its association with other important outcomes.

The experience of loneliness can be a serious problem due to its impact on various aspects of human life. Rico-Uribe et al. (2018) conducted a meta-analysis of 35 studies involving 77220 samples and found that loneliness is a risk factor for mortality. In young people, Achterbergh et al. (2020) also synthesized that experiences of loneliness and levels of depression are related to each other. As another piece of evidence, German adolescents who are extroverted and experience loneliness experienced higher levels of depression during the Covid-19 pandemic in 2020 (Alt et al., 2021). These findings suggest that the experience of loneliness can have a detrimental adverse impact on individuals and young people in particular.

To understand the experience of loneliness in Indonesian adolescents or young people, accurate measurement of loneliness can help achieve reliable and accurate research or surveys. Previous research has utilized a number of different measurement tools. For example, Kaligis et al. (2021) used a dichotomous category (Yes/No) by asking whether participants experienced loneliness. Meanwhile, Afdal et al. (2021) used a loneliness scale specifically designed for the pandemic context. The differences in the way loneliness are measured encourage this study to examine loneliness measurement tools that are widely used in research contexts and formulate recommendations for the use of loneliness measurement tools in the context of Indonesian adolescents or young people.

One measure of loneliness that is very commonly used in various studies is the UCLA Loneliness Scale (UCLA-LS). The UCLA-LS was originally constructed as a unidimensional measure of loneliness (Russell et al., 1978). The UCLA-LS was later developed in various versions and version 3 is the most widely used version (Russell D., 1996). In a study of the revised version of the UCLA-LS, McWhirter (1990) found that the UCLA-LS measure has three factors namely: a) "intimate others," b) "social others," and c) the "affiliative environment." Russell (1996) instead found that the UCLA-LS consists of two factors that are orthogonal or have two different directions. In contrast, Hawkley et al. (2005) found that UCLA-LS consists of three factors: isolation, relational connectedness, and collective connectedness. Finally, Durak and Senol-Durak (2010) found that the UCLA-LS consists of three factors called loneliness, non-loneliness, and global loneliness factors.

In general, Ausín et al. (2019) summarized that studies of the UCLA-LS constituent

factors in different contexts produce different findings. Thus, a contextualized study of the UCLA-LS constituent factors is needed to understand the experience of loneliness experienced by individuals in that particular context. The research objective of this study is to provide empirical evidence on the UCLA-LS, a prominent loneliness scale, for use in the context of Indonesian women. This is particularly important due to evidence indicating elevated risks of experiencing loneliness and its associated health-risk behaviors among this demographic. Therefore, this study focuses on the context of the loneliness experience of Indonesian adolescents or young people and formulates the following research questions: 1) what is the evidence for the internal structure of the UCLA-LS, 2) what is the evidence of reliability of the UCLA-LS, and 3) what is the evidence of content validity and relationship with external variables of the UCLA-LS? By answering these research questions, the ultimate goal of this study is to formulate recommendations for the use of the UCLA-LS as one of the reference measuring instruments to reveal the loneliness experience of Indonesian adolescents or young people.

METHOD

Participant and procedure

This research was divided into two stages. The first stage involved expert assessment of the UCLA-LS and the second stage involved data collection using the UCLA-LS as the main instrument. The following is a further explanation of the research procedures and participants.

First Stage. This stage was an expert assessment to test the suitability of the UCLA-LS items to measure loneliness and obtain a source of content validity evidence. The author involved ten experts with varied expertise from clinical, social, developmental, and educational psychology. All ten experts were university lecturers and practicing as psychologists. They were aged 32 years - 59 years, with 4 males and 6 females. They were asked to rate the translated UCLA-LS items as to whether they needed improvement. The experts provided suggestions for improvements for the items that were judged to need adjustments. The time taken to complete the assessment ranged from 3 - 7 days. The experts mostly gave judgements that the items did not need improvement. The results of the content validity testing are described further in the Result section.

Second Stage. This stage is data collection to support further data analysis, namely factor analysis and correlation tests. The total subjects in this study were 318 female students of the Faculty of Psychology of universities in Surabaya from various generations who were not married. 75.7% of the subjects were female students from 2015 and 2016 batches. Data collection was conducted in lecture classes with the permission of the lecturer in charge of the lecture in the odd semester 2017/2018. The age of the subjects varied from 17 years to 22 years, and the largest composition was in the age range of 19-20 years. From a total of 318 subjects, it is known that 269 of them have dated, even 169 people are currently in a dating relationship. Only 49 of the subjects claimed to have never dated.

Instrument

UCLA Loneliness Scale. The loneliness scale used in this study is the development of a loneliness scale by Russell et al. (1978) designed to measure a person's subjective feelings of loneliness and feelings of social isolation. The development of this loneliness scale was carried out at the University of California, Los Angeles so it is called the UCLA loneliness Scale (UCLA-LS). This scale consists of 20 items. Initial validation of this scale resulted in a Cronbach's alpha = .96 (Russell et al., 1978). Participants expressed their responses by making choices on a Likert scale range of 1 (Strongly Disagree) to 5 (Strongly Agree). For this study, the primary author translated the scale into Bahasa Indonesia. The translated scale was then evaluated by the committee, as explained in

the previous section. The following are examples of items on this scale: *Saya merasa terisolasi dari orang lain* [I feel isolated from other people]. Low loneliness is indicated by lower UCLA scale scores. Likewise, high loneliness is indicated by a high UCLA scale score. Cronbach's alpha of the UCLA Loneliness measure (Bahasa Indonesia version) based on the current research data is .84 and McDonald's omega = .88.

Psychological Well-being (PWB) was chosen as the external criterion as loneliness has been found negatively associated with low well-being among adolescents (Goodfellow et al., 2022). Ryff's Psychological Well-being Scale (Abbott et al., 2006) was used to measure psychological well-being. This scale consists of 42 items and consists of six aspects, namely autonomy, environment, personal growth, relation with others, purpose in life, and self-acceptance. Participants expressed their responses by providing choices on a Likert scale range of 1 (Strongly Disagree) to 5 (Strongly Agree). The following is an example of an item on this scale in Bahasa Indonesia: *Jika dipikir kembali, saya belum benar-benar mengembangkan diri sebagai seorang pribadi dalam beberapa tahun terakhir* [When I think about it, I haven't really improved much as a person over the years]. Low psychological well-being is indicated by higher PWB scores. Likewise, high psychological well-being is indicated by low PWB scores. In the context of this study, psychological well-being was measured based on the total score of the PWB measurement tool. Reliability measurement with McDonald's omega has been conducted in order to ensure that this scale can be interpreted unidimensionally. The total reliability score was .92 and Cronbach's alpha of each aspect of the scale was greater than .70.

Big Five Inventory—BFI (John & Srivastava, 1999) was used to measure the personality characteristics of openness, conscientiousness, extraversion, agreeableness, and neuroticism (OCEAN). In the context of this study, only two aspects are measured, namely neuroticism and conscientiousness. Similar to well-being, personality traits were chosen as external criteria as previous studies found association between traits and loneliness. For example, Buecker et al. (2020) synthesized that neuroticism was positively correlated with loneliness. On the other hand, conscientiousness was negatively correlated with loneliness (Buecker et al., 2020). Each personality dimension in this instrument consists of six items. Participants were asked to state their responses by selecting from a Likert scale range of 1 (Strongly Disagree) to 5 (Strongly Agree). Cronbach's alpha on conscientiousness was .66 and on neuroticism was .65. The higher the BFI score on a dimension indicates the higher personality characteristics experienced on that dimension and vice versa. Furthermore, the more prominent personality type experienced by participants with the higher score of a dimension on this scale.

Data analyses

Descriptive statistics were performed using basic functions available in R (R Core Team, 2022). Meanwhile, bi-partial correlation used the "Hmisc" package in R (Harrell Jr., 2021).

Content Validity. The content validity ratio (CVR) was measured per item using the 'Cvratio' function of the 'psychometric' package in R (Fletcher, 2022). The content validity index was obtained by calculating the mean CVR of the 20 items of the UCLA Loneliness scale. Items that were appropriate (essential) were coded '2' while items that were not fully appropriate were coded '1' and accompanied by suggestions for improvement. Items that were not appropriate at all were coded '0'.

Relations with external variables. To find sources of evidence for correlations with external variables, the UCLA-LS was tested for correlations with well-being and personality scales. Park et al. (2020) found that the effect size of loneliness on general mental health was r = -.489. Meanwhile, a

meta-analysis of correlations between loneliness and the big five personality factors found that loneliness was negatively correlated with extraversion (r = -.370) and positively correlated with neuroticism, r = .358 (Buecker et al., 2020). The magnitude of this correlation guides decision-making to determine the presence of correlations with external variables.

Internal structure. The evidence for the internal structure was determined by conducting a confirmatory factor analysis. This analysis is done with the 'cfa' function in the R package 'lavaan' (Rosseel, 2012). We tested various internal structure models: unidimensional (Model 1), two correlated factors (Model 2), and three factors (Model 3). The testing criteria indices used CFI and TLI values close to .900 and RMSEA close to .06 (Hu & Bentler, 1999). Finally, we tested the robustness of the findings of this test by comparing the results with exploratory factor analysis. Exploratory factor analysis was conducted with the R package 'psych' (Revelle, 2023).

RESULT AND DISCUSSION

The initial stage of data analysis was to calculate descriptive statistics and partial correlations. As a brief overview in Table 1, participants had a mean loneliness level of M = 2.13, SD = 0.39 based on the 20-item UCLA-LS and participants' psychological well-being was M = 3.87, SD = 0.46. The loneliness total score was positively correlated with the UCLA-LS total score of favorable (r = .83, p = .000) and non-favorable (r = .72, p = .000) items. Furthermore, the UCLA-LS total score was negatively correlated with psychological well-being (r = -.42, p = .000) and extraversion personality type (r = -.43, p = .000), but positively correlated with neuroticism personality type (r = .22, p = .000).

Table 1.
Descriptive Statistics and Simple Correlations

	Mean (*SD*)	Range	1	2	3	4	5	6
1. UCLA-LS	2.13 (0.39)	1-4		.83**	.72**	-.42**	-.43**	.22**
2. UCLA-F	2.70 (0.55)	1-4			.21**	-.38**	-.30**	.21**
3. UCLA-NF	1.57 (0.44)	1-4				-.26**	-.39**	.13**
4. Well-being	3.87 (0.46)	1-5					.47**	-.37**
5. BFI-E	4.44 (0.86)	1-5						-.29**
6. BFI-N	3.58 (0.70)	1-5						

Note. UCLA-LS = UCLA Loneliness Scale; UCLA-F = UCLA Favorable; UCLA-NF = UCLA Non-favorable; BFI-E = BFI Extraversion; BFI-N = BFI Neuroticism.
**p < .01.

These correlations are the evidence for relationships with external variables. Both total scores and scores from each aspect of the UCLA-LS were negatively correlated with psychological well-being and extraversion personality type. In contrast, all three types of UCLA-LS scores were positively correlated with neuroticism personality type. These findings are similar to another study conducted in the context of Indonesian adolescents, where significant negative correlations of the loneliness or social isolation scale with the measure of psychological well-being were found (Abidin et al., 2024). These findings are also in line with previous research or review results (Richard, et al., 2017; Mushtaq et al., 2014). This further confirms the utility of this measure for determining an individual's level of loneliness and its ability to predict other outcomes of this loneliness experience.

Along with the findings of this study, a further implication is the opportunity to test other sources of evidence for the UCLA-LS. Firstly, the positive correlations of the favorable and non-favorable items suggest that the measure does indeed measure loneliness. However, the

favorable and non-favorable items measure different constructs. Thus, the interpretation of non-favorable items is not limited to reversed scoring. Source evidence of response processes (Padilla-García & Benítez, 2014) is needed to understand non-favorable items.

Secondly, empirical evidence suggests that the UCLA-LS correlates with psychological well-being scales and thus may be a useful diagnostic measure. This diagnostic measure is a potential source of evidence of measurement consequences (Lane, 2014). For instance, Mushtaq et al. (2014) concluded that loneliness predicts various health problems such as depression, coronary heart disease, addiction, and Alzheimer's disease. Therefore, the UCLA-LS can serve as an early detection tool for preventive measures of broader public health problems.

For reliability evidence, Cronbach's alpha of the UCLA-LS based on the current research data was .84 and McDonald's omega = .88. Afterwards, content validity testing showed that items 3, 16, and 20 had negative CVR values. The initial content validity index (CVI) of this scale was .52. The researcher then made improvements according to suggestions from experts for each item so that each item had a CVR and CVI value of the measuring instrument of 1.00.

Next, we conducted a confirmatory factor analysis test to examine the internal structure of the UCLA-LS (see Table 2). We tested three different models and found that Model 2 (bi-factors) with two correlated factors had the best fit, χ^2 (151, n = 318) = 363.33, p = .000; CFI = .87, TLI = .85, RMSEA = .06. However, to test the robustness of the finding, we compared these results with the exploratory factor analysis result. This additional step was crucial in confirming the consistency and stability of the factor structure identified through the confirmatory factor analysis, thereby reinforcing the credibility of our findings.

Table 2.
Criterion Indices for the Model Fit Analysis

Model	χ^2 (df, n)	p	CFI	TLI	RMSEA	95% CI [LL, UL]
Model 1 – unidimensional	706.03 (170, n = 318)	.000	.68	.64	.10	[.09, .10]
Model 2 – 2 Correlated Factors	363.33 (151, n = 318)	.000	.87	.85	.06	[.05, .07]
Model 3 – 3 Factors[a]	372.62 (167, n = 318)	.000	.87	.86	.06	[.05, .07]

Note.
[a]Hawkley et al. (2005)

To determine the most valid model, we randomly drew data from 150 participants. Then, the data from these 150 participants were analyzed using exploratory factor analysis (EFA). Considering the changes in Eigen values (see Figure 1) and the two- and three-factor component structures, the EFA results showed that the two-factor structure had the best composition. Therefore, the two-factor model was selected as the best model to explain the internal structure of the UCLA-LS (see Table 3).

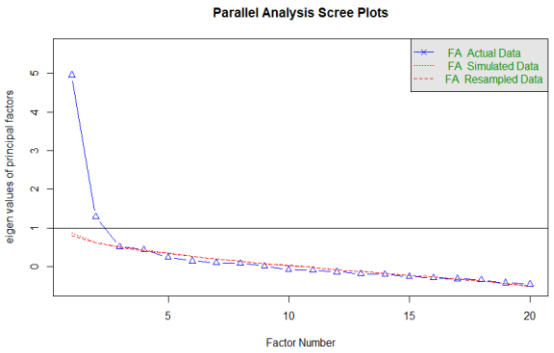

Figure 1. Changes in Eigen Values after the EFA with Data from 150 Participants

Table 3.
Unstandardized Loading (Standard Error) for 2 Correlated Factors Model (n = 318)

Item No.	Loneliness	Non-Loneliness
2	1.00 (-)	
3	1.12 (0.18)	
7	1.18 (0.20)	
8	1.02 (0.18)	
11	1.63 (0.23)	
12	1.32 (0.20)	
13	1.42 (0.21)	
14	1.58 (0.22)	
18	1.18 (0.18)	
1R		1.00 (-)
4R		0.88 (0.16)
5R		1.24 (0.13)
6R		1.28 (0.15)
9R		1.11 (0.15)
10R		1.01 (0.13)
15R		1.08 (0.16)
16R		1.44 (0.14)
19R		1.24 (0.13)
20R		1.37 (0.14)

The results from the factor analyses become the main finding of this study. The key evidence for the internal structure of the UCLA-LS scale suggests that the scale consists of two orthogonal factors that are correlated with each other. The first factor consists of favorable items and the second factor consists of non-favorable items. This result is similar to previous research which found that the UCLA-LS is composed of positive and negative aspects (Knight et al., 1988). These results also show differences with previous factor analysis research on the UCLA-LS measure in Indonesia (Nurdiani, 2013). Nurdiani (2013) encouraged evidence that the constituent items of the UCLA-LS measured one dimension of loneliness only. Furthermore, Nurdiani's (2013) study was conducted on 170 adolescents aged 13-18 years, which is different from the demographics of the participants in this study.

The implication of the findings of this study is a deeper understanding of the experience of loneliness experienced by unmarried women in Indonesia. More specifically, the participants were Indonesian women in their late teens/early adulthood living in Surabaya with varied romantic relationship experiences. With respect to gender differences, Pagan (2020) found that German men reported lower UCLA-LS scores when compared to women. Boehlen et al. (2022) also found that loneliness determined decreased mental and physical health in German women. However, in the male sample, loneliness only predicted mental health decline.

The findings from the German context encourage further discussion that the experience of loneliness is a complex mental experience. The previous paragraphs suggest the experience of loneliness needs to be understood based on the gender or sex of the individual. Therefore, the UCLA-LS measure in this study is supported by empirical evidence sources as an accurate measure of loneliness in the context of unmarried

Indonesian women. Future research could explore the differences in loneliness experiences between Indonesian male and female samples.

One other implication of this study is that the UCLA-LS measure can serve as a useful tool for cross-cultural loneliness research. Heu et al. (2021) found, qualitatively, that the definitions, perceived causes, and ways of coping with loneliness in Austria, Bulgaria, Israel, Egypt, and India did not differ. Meanwhile, previous research has shown that the constituent factors of the UCLA-LS measurement tool vary. Therefore, future research could examine the use of this measure in other regions of Indonesia, as well as compare measurement variance with the UCLA-LS measure in different languages.

In the Indonesian context, a cross-sectional study on loneliness found that it was associated with poorer health outcomes (Susanty et al., 2022). Susanty et al. (2022) used a single-item loneliness measure (i.e., "How often do you feel lonely?"). Our current study may have broader implications beyond the initially targeted population. For instance, the Bahasa Indonesia version of the UCLA-LS can be used to assess loneliness resulting from feelings of isolation ("I feel isolated from others") or lack of quality friendships ("My social relationships are superficial"), in addition to the frequency of feeling lonely, as demonstrated by Susanty et al. (2022).

Despite the fact that we show such broad potential implications, this study has several weaknesses. Firstly, the research sample was obtained by convenience. Future research can improve the quality of the sample by obtaining a more representative sample based on the target population or weighting. Second, the reliability test is only based on the alpha coefficient. Test-retest method or repeated data collection can be an important source of evidence for this measuring instrument.

CONCLUSION

This study provides an empirical evidence base for the UCLA-LS loneliness measurement tool. The main contribution of this study is the availability of a loneliness measurement tool that can be used by scientists to measure the level of loneliness, especially in the context of Indonesian women. The meaning of loneliness is based on two orthogonal aspects, namely favorable and non-favorable items. This measurement tool encourages further research to understand the differences between the two aspects. This research also encourages the study that measuring loneliness has consequences such as anticipating broader public health issues. Finally, this paper serves as an invitation for other researchers to use this measure and its constituent structures to understand the experience of loneliness among young Indonesians more broadly.

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