Research article

Assessment and correlates of aloneliness among Indonesian adolescents

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A B S T R A C T

Introduction: The goals of this study were to: (1) adapt and validate a measure of aloneliness (*Solitude and Aloneliness Scale;* SolAS) for use among Indonesian adolescents; (2) examine the associations between aloneliness and indices of well-being in this unique developmental and cultural context; and (3) explore possible grade and gender effects.
Methods: Participants were Indonesian adolescents aged 11–18 years (*M* = 14.13 years, *SD* = 1.62; 58.51% girls) who completed self-report assessments of the adapted SolAS (newly created Indonesian translation), as well as indices of adjustment (e.g., well-being, basic psychological need satisfaction).
Results: Among the results, the Indonesian version of the SolAS demonstrated good psychometric properties (e.g., factor structure, good internal reliability) and initial evidence of validity (e.g., significant negative correlations with measures of psychological well-being and basic psychological needs satisfaction). Girls reported higher levels of aloneliness than boys, but no significant grade differences emerged.
Conclusions: The SolAS evidenced good psychometric properties and evidence of validity in a sample of Indonesian adolescents, suggesting it is desirable for cross-cultural research.

1. Introduction

Social affiliation is a fundamental human desire that persists throughout life, and its absence may negatively impact one's well-being [1]. For example, loneliness and social isolation are considered primary risk factors for mental and physical health difficulties [2]. In childhood and adolescence, a persistent lack of age-normative peer interaction is associated with a wide range of social, emotional, and academic difficulties [3]. Nevertheless, many theorists have also espoused the potential advantages of spending time alone [4], particularly during adolescence [5]. Indeed, there is growing recent empirical support for these postulations, suggesting that solitude is an important context for emotional regulation [6], creativity [7], and self-renewal [8].

Previous research has predominantly examined the consequences of too much solitude, which can lead to experiences of loneliness [9]. Loneliness is conceptualized as a sense of dissatisfaction with the quantity/quality of one's social interactions [10]. Recently, Coplan et al. [11] introduced the novel construct of *aloneliness*, which encompasses the negative affective state that arises from the perception of insufficient time spent alone. This 'mirror image' of loneliness highlights the incongruity between the actual and ideal amount of time individuals spend in solitude.

To assess aloneliness, Coplan et al. [11] developed and validated the *Solitude and Aloneliness Scale* (SolAS). Among samples of adolescents and emerging adults, the SolAS has demonstrated a single-factor solution, evidence of construct validity (e.g., associations with a preference for solitude and positive attitudes toward solitude, and associations with negative outcomes including stress, negative affect, and symptoms of depression [11,12]. Most recently, aloneliness was also predictive of feelings of anger and aggression expressed toward a romantic partner [13].

Developmental stages should also be considered when considering the implications of solitude. For example, as children transition into adolescence and adulthood, their perspective on solitude becomes more positive, and there is a greater desire to spend time alone regularly [14]. Solitude can offer adolescents an environment conducive to processing the intense emotions commonly experienced during this life stage. As well, time alone offers a refuge from social demands, pressure to conform, and the stresses of self-monitoring and adhering to social roles, which tend to increase during this life stage [5]. Conversely, excessive solitude has been recognized as a potential concern for adolescents, as it deprives them of the developmental advantages of peer interactions, such as acquiring social skills and learning about conflict resolution and compromise [9].

Although previous research on solitude has predominantly focused on Western cultures, it is now recognized that the implications of solitary experiences may vary significantly across cultures [15]. Building on this perspective, Yang et al. [16] conducted a study investigating the psychometric properties of the SolAS among children and early adolescents in mainland China. The findings revealed that the Chinese version of SolAS demonstrated a unidimensional factor structure with sound psychometric properties and was linked to various negative psychological outcomes.

Indonesia, a country situated in Southeast Asia, shares relatively collectivist cultural values with China in contrast to individualistic Western values [17]. In collectivist cultures such as Indonesia child-rearing practices emphasize the development of harmonious interpersonal relationships and emotional control, particularly in the upbringing of young children [18]. Parents in Indonesia are known to place great importance on honor and compliance from their children, and as such, adolescent dissent with parental authority is not encouraged [19]. This cultural context has led to the development of interdependent values, with a reliance on close relationships with others being a normative experience for Indonesian adolescents. Furthermore, Indonesia has a high power-distance index, with children often occupying a less powerful position within the family and broader social groups, thus accepting the exercise of control from those who hold more power [20].

1.1. The present study

There have only been a handful of previous studies of aloneliness - and all but one has been conducted in Western countries, which tend to emphasize individualism and value autonomy. Given that the construct of aloneliness and its measurement are relatively novel, adapting the SolAS could serve as an initial step to expand research involving non-Western cultures. The adaptation of SolAS in the Indonesian context also ensures that the tool meets the necessary psychometric requirements for assessing the construct. To date, we know little about aloneliness in countries with collectivist cultures prioritizing interdependence. To bridge this research gap, the primary aim of the present study was to validate the *Solitude and Aloneliness Scale (*SolAS) in an Indonesian adolescent sample. It was hypothesized that the Indonesian version of the SolAS would evidence the previously demonstrated one-factor structure and strong internal reliability.

We also sought to explore associations between aloneliness and indices of well-being in this unique cultural context. Coplan et al. found that an optimal level of well-being linked with a moderate duration of solitary time [11]. Aloneliness arising from the inability to satisfy the need for solitude leads to adverse implications for well-being. Aloneliness is expected to be specifically associated with lower levels of well-being because it signifies dissatisfaction with a specific aspect of one's life. Furthermore, aloneliness reflects the failure to meet the expectation of individuals to be alone, indicating unmet autonomous needs and basic needs satisfaction [21]. Thus, we hypothesized that aloneliness would also be negatively correlated with basic psychological needs satisfaction.

Finally, we also sought to examine possible gender and grade effects. Results of the few previous studies of aloneliness have reported mixed results in terms of gender, with some studies reporting no significant differences [14,22] and others reporting girls as scoring significantly higher in loneliness than boys [16]. As such, no specific hypotheses were forwarded in this regard. The two different studies of loneliness with childhood and adolescent samples that varied in age reported that older children and adolescents tended to report higher loneliness than younger children [16,23]. In this regard, we hypothesized a similar pattern of higher scores across grades in the present sample. As well, previous studies have suggested that solitude becomes viewed more positively and is an increasingly important context for positive development as children transition from late childhood to adolescence [14]. There is also at least some evidence to suggest that a preference for solitude carries more negative implications for boys than for girls because it violates gender stereotypes regarding male assertion and dominance [24]. As such, on a more exploratory basis, we examine the possible moderating effects of gender and grade in the links between aloneliness and indices of adjustment.

2. Materials and methods

2.1. Procedure and participants

The adaptation of SolAS for use in Indonesia adhered to established international guidelines for the translation and adaptation of tests, as outlined by the International Test Commission [25]. This process followed several procedures. First, it commenced with forward and backward translation from English to Indonesian language (Bahasa Indonesia), executed by certified translators with a background in psychology. Subsequently, an expert review was conducted to evaluate the content validity of the scale. This approach aligns with the recommended standards for ensuring the linguistic and conceptual equivalence of the adapted instrument. Following these initial phases, the current study focused on examining the construct validity and reliability of the Indonesian version of SolAS.

Permission to conduct this research was obtained from the local school board and principal, and written consent was obtained from parents and students. The questionnaires were then administered to all participants in the classroom under the guidance of the researchers. The data collection procedures were registered and approved by the Research Ethics Committee of the Universitas Padjadjaran (No. 477/UN6.KEP/EC/2023, 2023, April 10).

The participants were $N = 323$ students aged 11 to 18 ($M = 14.13$ years, $SD = 1.62$; 58.51% girls, 41.49% boys) attending a private school in Bandung, an urban center located in the province of West Java in Indonesia. Subsamples were randomly selected from students in grades 7 ($n = 62$), 8 ($n = 69$), 9 ($n = 48$), 10 ($n = 64$), 11 ($n = 47$), and 12 ($n = 33$).

2.2. Measures

Participants completed the newly developed Indonesian version of the *Solitude and Aloneliness Scale* (SolAS) [11], designed to measure feelings of dissatisfaction that may arise when an individual perceives they are not spending enough time alone. The original scale is comprised of 12 items (e.g., "It would be nice if I could spend more time alone each day") rated on a 5-point Likert scale (from 1 = "strongly disagree" to 5 = "strongly agree''). The instrument was adapted from the English version into Indonesian by implementing several steps of forward and backward translation, following guidance from the *International Test Commission* [25].

This measure has previously demonstrated a one-factor solution, with strong psychometric properties and high internal reliability, in samples of North American emerging adults [11] and older adolescents [12]. Most recently, the SolAS was successfully adapted for use in a sample of primary and middle school children from mainland China [16]. The psychometric properties of the Indonesian version of this measure are reported in the Results section.

Participants also completed the Indonesian version of the *Brief Scale of Psychological Well-Being for Adolescents* (BSPWB-A) [26]. The BSPWB-A is a 20-item self-report questionnaire that measures aspects of adolescent psychological well-being and includes four dimensions: self-acceptance (5 items, e.g., "I like most aspects of my personality"); positive interpersonal relationships (5 items, e.g., "I know that I can trust my friends and they know that they can trust me"); autonomy (6 items, e.g., "If I had the opportunity, there are many things about myself that I would change"); and life development (4 items, e.g., "I think it is important to have new experiences that challenge me"), all assessed on a 6-point Likert scale. The Indonesian version of the BSPWB-A has demonstrated good psychometric properties, including support for its 4-factor structure (CFI = 0.951, GFI = 0.943, SRMR = 0.060, RMSEA = 0.053) and strong internal consistency for all sub-scale (α self-acceptance = 0.855, α positive interpersonal relationships = 0.745, α autonomy = 0.788, α life development = 0.820) [26].

In addition, participants completed the basic psychological need satisfaction dimensions of the Indonesian version of the *Basic Psychological Need Satisfaction and Frustration Scale* (BPNSFS) [27]. It includes autonomy satisfaction (4 items, e.g., "I feel that my decision reflects what I really want"), relatedness satisfaction (4 items, e.g., "I feel that the people I care about also care about me"), and competence satisfaction (4 items, e.g., "I feel confident that I can do things well"), all rated on a 5-point Likert scale. Higher ratings imply that basic psychological needs have been satisfied. The Indonesian version of the BPNSFS measure has demonstrated good construct validity (CFI = 0.960, GFI = 0.950, NFI = 0.940, IFI = 0.960, RMSEA = 0.006) and strong internal consistency (α = 0.80) [27].

2.3. Data analyses

A confirmatory factor analysis (CFA) was conducted to examine the structure of the newly adapted Indonesian version of the SolAS. According to the previous studies [11,12,16], a one-factor solution comprised of 12 items was expected. To justify the goodness of fit of the model, several model fit indices were reported as follows: Chi-square (χ^2), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square residual (SRMR). Several recommended values of the indices were applied: the CFI and GFI values > 0.90, RMSEA and SRMR ≤0.08 indicate a good fit of the model [28]. Due to the unachieved standard goodness of fit of the original model, several modifications were conducted by correlating the residual variances between items. In addition, we examined the standard solution of factor loadings for each item and the discrimination index. Factor loadings >0.50 were categorized as good, and between 0.31 and 0.49 were categorized as acceptable [29]. An item discrimination index surpassing 0.20 is indicative of the ability to differentiate individuals who possess more or less the characteristics being measured [30]. For the evaluation of the measurement invariance within a multigroup CFA framework, the criteria encompassed a non-significant χ^2 difference (p > 0.01) and discrepancies in the Comparative Fit Index (CFI) (ΔCFI) and Root Mean Square Error of Approximation (RMSEA) (ΔRMSEA) below 0.01 [31]. The One-way ANOVA test was employed to compare means among grade groups, while a non-parametric Mann-Whitney U test was used to assess mean differences between gender groups, since it did not meet the normal distribution

assumption (Boys D = 0.95, p = 0.005; Girls D = 0.59, p = 0.200). Finally, we used the SPSS plug-in PROCESS Macro [32] to explore the moderating roles of gender and grade in the relations between aloneliness and indices of well-being.

3. Results

A CFA was calculated based on the one-factor model in which all 12 items (i.e., observed variables) measure a latent variable representing the construct of aloneliness. The initial results revealed a partial fit to the expected model with regard to fit indices. First, as expected, given the large sample size, the Chi-Square value was significant, $\chi^2(54) = 196.98$, $p < 0.001$. Other indices of fit were mixed, with some suggesting a good fit (CFI = 0.933, GFI = 0.910, SRMR = 0.04) and others indicating a poorer fit (RMSEA = 0.09). All standardized factor loadings were significant and ranged from 0.160 to 0.856. However, the item, "I spend too much time around others", was lower than the expected value of 0.30, meaning that the item was a weak measuring construct of aloneliness. As a result, we decided to remove the item and implemented several modifications to the model in an effort to increase the goodness of fit (see Fig. 1). After the modification, the goodness of fit indices increased to acceptable levels: $\chi^2(38) = 72.380$, $p < 0.001$; CFI = 0.984; GFI = 0.962; SRMR = 0.027; and RMSEA = 0.053 (90% CI [0.034, 0.071]).

An analysis of the final SolAS items (11 items) indicated excellent internal consistency ($\alpha = 0.918$). The items also displayed high discrimination indexes (0.375 - 0.800) (see Table 1). Finally, the composite reliability (CR) of the newly adapted SolAS scale was 0.918, indicating that the scale has excellent reliability due to higher than recommended values of 0.70 [33]. The Average Variance Extracted (AVE) of the scale was 0.517, which is higher than the recommended value of 0.50 [33].

A multigroup CFA was performed to evaluate the measurement invariance across gender and grade groups. As indicated in Table 2, both the configural and metric models met the acceptable criteria, with non-statistically significant χ^2 values and minimal changes in CFI and RMSEA (below 0.01). Consequently, this implies that adolescents of both genders across diverse grade levels conceptualized the aloneliness construct in a consistent manner.

Descriptive statistics and inter-correlations among all study variables are displayed in Table 3. In support of the construct validity of the SolAS, aloneliness was significantly and negatively associated with basic psychological need satisfaction and indices of psychological well-being, including self-acceptance, positive interpersonal relationships, autonomy, and life development.

Aloneliness differed significantly between gender, with girls ($M = 3.16$, $SD = 1.22$) reporting higher levels of aloneliness than boys ($M = 2.74$, $SD = 1.16$; $z = -4.42$, $p = 0.01$.) There is no significant difference in aloneliness based on school grades ($F = 1.082$, $p = 0.363$). Finally, results from moderation analyses indicated no significant interactions between aloneliness and gender in the prediction of psychological well-being ($\beta = -0.13$, $p = 0.27$) or basic psychological need satisfaction ($\beta = -0.14$, $p = 0.06$). Similarly, there were no significant interactions between aloneliness and grade in the prediction of psychological well-being ($\beta = 0.04$, $p = 0.24$) or basic psychological need satisfaction ($\beta = 0.01$, $p = 0.68$).

4. Discussion and conclusion

The goals of this study were to: (1) adapt and validate a measure of aloneliness (*Solitude and Aloneliness Scale;* SolAS) for use among Indonesian adolescents; (2) examine the associations between aloneliness and indices of well-being; and (3) explore possible gender and grade effects. The results of our study confirmed the single-factor model previously validated in samples of Chinese children [16] and Canadian adolescents and emerging adults [11,12].

The Indonesian translated items of SolAS items demonstrated significant loadings on a latent variable representing aloneliness,
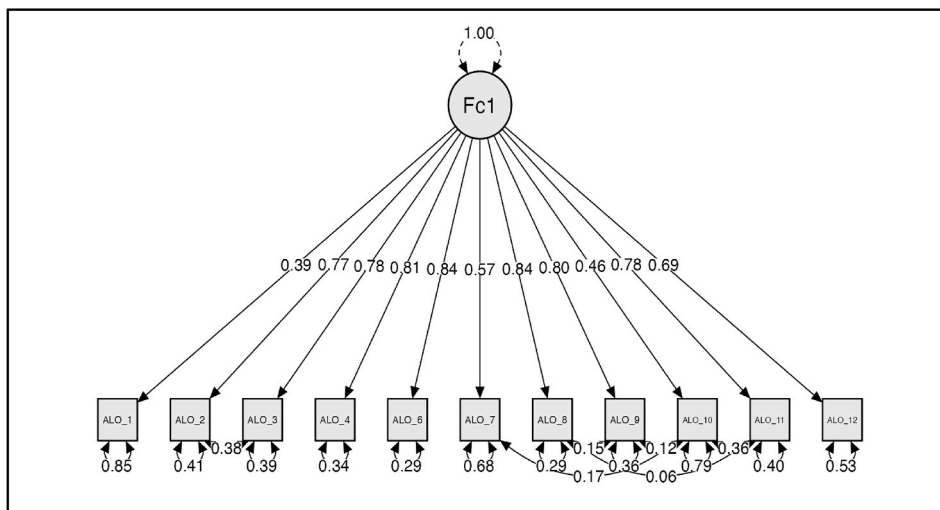

Fig. 1. Modification model of solitude and aloneliness scale.

Table 1
Item discrimination index and CFA's factor loading.

Item Description	M (SD)	12 items		Modification (11 items)	
		ID	FL	ID	FL
1. I never seem to have enough time by myself.	2.90 (1.16)	0.38	0.39	0.38	0.39
2. I am always craving more time alone.	3.26 (1.27)	0.74	0.76	0.75	0.77
3. I miss spending time alone.	3.17 (1.28)	0.74	0.76	0.75	0.78
4. It would be nice if I could spend more time alone each day.	2.70 (1.22)	0.75	0.80	0.76	0.81
5. I spend too much time around others.	3.07 (1.07)	0.18	0.16	**deleted**	**deleted**
6. I wish I could just be by myself more often.	3.05 (1.18)	0.79	0.83	0.79	0.84
7. I need to make it more of a priority to do things alone each week.	3.03 (1.08)	0.56	0.58	0.55	0.57
8. If given the choice, I would like to be alone more often.	2.83 (1.18)	0.79	0.86	0.80	0.84
9. I wish I had more time to just be alone with my thoughts.	3.15 (1.21)	0.77	0.82	0.78	0.80
10. If it were possible, I would go out by myself more often.	2.89 (1.27)	0.49	0.49	0.48	0.46
11. I would be happier if I could get more time to myself.	2.83 (1.13)	0.75	0.78	0.76	0.78
12. Other demands too often take away chances for me to just be alone.	3.09 (1.27)	0.67	0.69	0.66	0.69

Note: ID = item discrimination index; FL = factor loading.

Table 2
Measurement invariance across gender and grade.

Group	Model	χ^2	df	RMSEA	CFI	ΔRMSEA	ΔCFI
Gender	Configural	135.22	76	0.069	0.971		
	Metric	141.89	86	0.063	0.973	0.006	0.002
	Structural	155.02	96	0.062	0.971	0.002	0.002
	Residual	172.06**	97	0.069	0.964	0.008	0.008
Grade	Configural	403.08	228	0.119	0.925		
	Metric	447.89	278	0.107	0.927	0.013	0.002
	Structural	520.80*	328	0.104	0.917	0.001	0.002
	Residual	525.82*	333	0.104	0.917	0.000	0.001

Note: *p < 0.05, **p < 0.01.

Table 3
Descriptive statistics and intercorrelations among study variables.

Variable	Mean (SD)	1	2	3	4	5	6
1. Aloneliness	3.00 (1.22)						
2. Psychological Well-Being (PWB)	3.88 (0.58)	−0.505**					
3. PWB_Self-acceptance	4.09 (0.79)	−0.246**	0.751**				
4. PWB_Positive Interpersonal Relationship	3.88 (0.97)	−0.494**	0.747**	0.335**			
5. PWB_Autonomy	2.91 (0.79)	−0.411**	0.698**	0.344**	0.379**		
6. PWB_Life Development	5.04 (0.77)	−0.158**	0.522**	0.470**	0.200**	0.027	
7. Basic Psychological Need Satisfaction	3.56 (0.98)	−0.165**	0.559*	0.587**	0.314**	0.219**	0.506**

Note: *p < 0.05, **p < 0.01.

except for one item ("I spend too much time around others"). One plausible interpretation for this observation is that the limited variation in the data may have hindered the exploration of item functioning. Alternatively, the lack of significant loading for this specific item could be linked to the cultural context of Indonesia, characterized by its collectivist societal values. In collectivist cultures, individuals are often expected to participate in numerous social activities and maintain close connections with peers and relatives [34]. Consequently, spending a significant amount of time with others may not necessarily indicate aloneliness among Indonesian adolescents. It is important to recognize that aloneliness can manifest differently in various cultural contexts. Although spending excessive time with others may not be a significant indicator of aloneliness among Indonesian adolescents, other indicators of aloneliness may still be present and relevant. Of note, the final revised 11-item Indonesian version of the SolAS demonstrated satisfactory internal consistency.

Results also indicated negative associations between well-being indices, including a general measure of well-being, and several dimensions of psychological needs satisfaction. These findings are consistent with previous research demonstrating that solitude is a fundamental need - and that a perceived lack of enough time alone can have detrimental effects on well-being in childhood and adolescence, including negative affect, symptoms of depression, and life dissatisfaction [12,16]. The results of our study expand this preliminary existing literature by establishing negative associations with psychological well-being and basic psychological needs satisfaction, further emphasizing the importance of satisfying our need for solitude as a crucial aspect of an individual's well-being.

In terms of gender differences, girls reported higher levels of aloneliness compared to boys, which aligns with previous results among Chinese children and adolescents [16]. From a cultural perspective, the finding that girls tend to experience a more negative affective state arising from the perception of insufficient time spent alone than boys also corresponds with previous results suggesting

that Indonesian girls are more susceptible to various psychological distress than boys [35]. Such gender differences in aloneliness and psychological distress may be attributed to a combination of biological predispositions and high social demands, such as social expectations based on gender roles [36,37].

In terms of grade effects, contrary to expectations, no significant differences in aloneliness were found between children in 7th through 12th grades. Yang et al. [16] previously found that greater aloneliness was reported among middle school children compared to primary school children. The discrepancy in findings between our study and Yang's study could be influenced by the different stages of development experienced by the participants. In our study, although students were in different grades, they were all categorized as adolescents.

This is the first study validating the SolAS in Indonesian adolescents. This study provides a broader cross-cultural understanding of the concept of aloneliness in collectivistic cultures such as Indonesia, where close connections with others are viewed as important. Our finding suggests that specifically in Indonesian culture, spending excessive time with others does not automatically indicate aloneliness among Indonesian adolescents, unlike in the Western cultures where the construct is developed. The identification of this cultural nuance holds broader implications for both research and practical interventions. Researchers in the field of aloneliness should be attentive to cultural factors, recognizing that its interpretation can vary across different cultural contexts. Practitioners, likewise, should consider these cultural nuances when developing assessments or intervention related to aloneliness.

In conclusion, our findings demonstrated that the SolAS evidenced good psychometric properties and evidence of validity in a sample of Indonesian adolescents, suggesting it is desirable for cross-cultural research. Future research should replicate and extend these results in larger, more representative samples.

Data availability statement

All data analyzed in this study can be accessed at https://osf.io/qnsa7.

CRediT authorship contribution statement

Fitri Ariyanti Abidin: Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology, Conceptualization. **Grace Natasha Sunardy:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Whisnu Yudiana:** Methodology, Formal analysis, Data curation. **Yohana Alverina:** Writing – review & editing, Writing – original draft, Data curation. **Robert J. Coplan:** Writing – review & editing, Validation, Methodology.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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