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Development of an internal locus of control scale for at-risk adolescents

Annisa Dianesti Dewi[1], Nadia Puti Dianesti[2], Dian Erhan Saputra[3], Andre[4]

[1] Department of Psychology, Faculty of Medicine and Health Sciences, Universitas Jambi, Jambi, 36361, Indonesia
[2] Department of Psychology, Faculty of Psychology, Universitas Gadjah Mada, Yogyakarta, 55281, Indonesia
[3] Center of Competency Assessment, Universitas Islam Negeri Mahmud Yunus Batusangkar, Batusangkar, 27211, Indonesia
[4] Dinas Psikologi Tentara Nasional Indonesia Angkatan Udara, Jakarta Timur, 13610, Indonesia

*Coressponding Authors: annisadianestidewi@unja.ac.id

Abstract

Background: Locus of control is a key psychological construct that plays an important role in adolescents' self-regulation and resilience, especially among at-risk groups who experience vulnerabilities in family, social, and academic domains. However, valid and reliable instruments to measure this construct remain limited in the Indonesian context. **Objective:** This study aims to develop and validate an Internal Locus of control Scale specifically designed for at-risk adolescents. **Methods:** A quantitative research design was employed with 260 participants identified as at-risk based on school counselor and parental recommendations. The initial pool of 29 items was subjected to content validity testing by seven raters, resulting in 14 items meeting the Aiken's V ≥ 0.75 criterion. Subsequent Confirmatory Factor Analysis (CFA) supported the removal of two items with weak factor loadings, yielding a final 12-item unidimensional model. The scale demonstrated significant item-total correlations ranging from r = 0.447 to r = 0.639 ($p < 0.001$). CFA results indicated a good model fit (CFI = 0.959; TLI = 0.942; RMSEA = 0.0466, 90% CI [0.0242–0.0664]). Reliability analysis showed Cronbach's Alpha of 0.805, reflecting high internal consistency. **Results:** These findings confirm that the Internal Locus of control Scale is psychometrically sound and suitable for assessing internal locus of control among at-risk adolescents. **Conclusion:** The scale can be used by researchers, psychologists, and counselors to support interventions aimed at strengthening adolescents' self-regulation and adaptive coping in challenging environments.

Keywords: Locus of control; at-risk adolescents; scale development; validity; reliability

Cite This Article

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INTRODUCTION

The concept of locus of control (LoC) was first introduced by Rotter (1) in the framework of social learning theory. LoC refers to an individual's belief about the extent to which life outcomes are determined by personal effort (internal) or by external factors, such as luck, fate, or the influence of others. Individuals with an internal LoC believe that their achievements are the result of effort, hard work, and careful planning, while individuals with an external LoC are more likely to attribute success or failure to forces beyond their personal control (1–3). Based on the perspective of developmental and educational psychology, LoC is one of the important personality variables. Adolescents with internal LoC are better able to manage academic pressure, have higher academic achievement, and demonstrate more adaptive coping strategies compared to adolescents with external orientation (4). LoC also influences achievement motivation (Sihkabuden in Syatriadin, 4) and the performance of educators. Teachers with internal LoC tend to be more motivated and able to handle tasks effectively (5). LoC plays a role not only in students' academic achievement but also in the professional effectiveness of educators.

The contribution of LoC is also evident in the economic, social, and health spheres. A study by Caliendo et al. (6) shows that individuals with internal LoC prefer agency or direct control in decision-making, especially in situations of uncertainty. Hendryadi (7) asserts that individuals with internal LoC are more oriented towards effort and self-control. Other studies have also found that LoC is closely related to various aspects of life, ranging from investment and economic behavior (6,8), mental health (9) to adaptation in the world of work (10). Geographical and socio-cultural variations also have an influence, as shown by Indriasari and Angreany (11), that the environmental conditions of students' places of residence can shape different LoC orientations.

Research on LoC in Indonesia has developed in various contexts, such as its influence on teacher performance (5) or the development of instruments in the field of organization (7). However, instruments specifically designed for adolescents, especially at-risk adolescents, are still limited. In fact, this group faces more complex psychosocial challenges, such as peer pressure, family disharmony, and the risk of involvement in deviant behavior. Dewi and Purwandari (12) found that LoC is related to the psychological well-being of children in conflict with the law, although it does not directly moderate the influence of environmental factors such as family harmony and social integration. These findings indicate the need for more specific measurement tools to map how LoC plays a role in at-risk adolescents.

Existing LoC instruments are generally developed for the general population or adults, such as the Internal Control Index (13), Levenson's IPC Scale (14), Work Locus of control Scale (15), and a short version of the LoC scale with eight items validated by Hendryadi (7). This fact shows that although the concept of LoC is theoretically well-established, the development of contextual instruments is still needed to suit specific populations, including at-risk adolescents.

Internal LoC is seen as a protective factor associated with several positive aspects, such as self-efficacy (16), creativity (17), and entrepreneurial intention (18). The relevance of developing this instrument is even stronger when linked to research on vulnerable groups, such as the glass child phenomenon, which tends to have external LoC and is therefore more prone to depression and stress (19). Based on the above explanation, this study focuses on developing a valid and reliable internal LoC scale for at-risk adolescents. This scale is expected to be a culturally relevant instrument that is

useful in psychological assessments and educational and psychosocial interventions for adolescents facing social vulnerability.

METHODS

Study design and setting

This study uses a quantitative approach with the aim of developing an internal locus of control (LoC) scale that is suitable for at-risk adolescents. The stages of the study include item development based on theory, content validation through expert assessment, and confirmatory factor analysis (CFA) to test construct validity.

Partisipants

Research participants consisted of adolescents categorized as at risk due to psychosocial pressures, such as family disharmony, negative peer influence, or involvement in deviant behavior. The sample was obtained through purposive sampling, with a total of 260 at-risk adolescents participating. Respondents' demographic data, such as age, gender, and educational background, were also recorded to describe the profile of the research participants.

Instruments and criteria

The initial scale items were developed based on Rotter's social learning theory (1) and internal LoC indicators, including belief in personal effort, responsibility for results, planning and strategy, problem-solving skills, and resistance to external attribution. The initial draft consisted of 29 items formulated in the form of simple statements so that they could be easily understood by adolescents from diverse social backgrounds. Content validity was tested by involving a panel of experts using Aiken's V index (20). Items with an Aiken's V coefficient ≥ 0.70 were retained, while items below the criteria were deleted or revised. The expert validation resulted in 14 items that were deemed content-appropriate.

Statistical analysis

The data were analyzed using confirmatory factor analysis (CFA) to ensure the suitability of the factor structure with the theoretical construct. The criterion used was a factor loading ≥ 0.30 as an indicator of the significant contribution of the item to the internal LoC construct. Items that did not meet the criteria were excluded from the model.

*Ethical concideration*s

This study adhered to the principles of psychological research ethics, including participant consent, data confidentiality, and the use of research results solely for academic purposes and the development of interventions that benefit at-risk adolescents.

RESULTS

Content validity of the internal locus of control scake

The internal locus of control (LoC) scale was developed based on Rotter's theory (1), which distinguishes between internal and external dimensions. Content validity testing was conducted by involving seven raters on 29 initial items. The results showed that 14 items had Aiken's V coefficients in the range of 0.82 to 1.00, while the other 15 items were below 0.75. Based on Aiken's (20) standard table with five rating categories and

seven raters, the minimum acceptable Aiken's V value is 0.75. Thus, the 14 items that passed the criteria were declared valid.

This scale is designed as a unidimensional instrument, which means that all items measure one latent construct, namely, internal locus of control. However, the items are still grouped based on substantive indicators to represent relevant aspects of beliefs and behavior. Internal indicators include personal effort, responsibility, planning, and problem-solving strategies, which are represented through favorable statements. Conversely, external indicators related to beliefs about fate, luck, or the dominance of others are represented through unfavorable statements. This grouping is not intended to distinguish factors, but rather to strengthen content validity, encourage response variation, and ensure a more sensitive and comprehensive measurement of the construct. The following is the distribution of the LOC scale.

The scale uses a multiple-choice response format with five categories, namely strongly disagree, disagree, unsure, agree, and strongly agree. Each response is scored 1–5. For favorable statements, scoring is done directly, so that the higher the respondent's agreement, the higher the internal locus of control score. Conversely, for unfavorable statements, reverse scoring is used, where the "very agree" option is scored 1 and "very disagree" is scored 5. This process ensures that the higher the total score, the stronger the individual's tendency toward an internal locus of control.

Table 1. Distribution of the unidimensional internal LOC scale after content validity

Indicator	Item number	
	Favorable	Unfavorable
Believe that results are determined by personal effort and responsibility	1, 9, 11, 13	14
Plan and control actions before acting	7	8
Solving problems by actively seeking solutions	4, 12	6
Believing that luck, fate, or other people greatly influence outcomes		2, 3, 5, 10

Construct validity

Construct validity was tested using Confirmatory Factor Analysis (CFA) on 14 items that passed the content validity stage. The analysis results showed that all items had significant factor loadings ($p < 0.05$), with most above the threshold of 0.30. The item contribution values to the locus of control construct ranged from 0.214 to 0.457, indicating that most items were able to represent the construct well.

Two items were found to have low loading factors, namely LOC2 (0.130) and LOC6 (0.214). Although significant, both were well below the threshold commonly used in CFA (≥ 0.30), so their contribution to the construct was considered weak. These two items were then removed to improve the quality of the construct and clarify the factor structure, while maintaining a balance between favorable and unfavorable items. Further CFA analysis of the remaining 12 items showed loading factor values between 0.245 and 0.465, all of which were significant at the $p < 0.001$ level. Items with strong contributions included LOC14 (0.465), LOC9 (0.451), LOC12 (0.427), and LOC11 (0.422), while LOC3 (0.245), LOC8 (0.316), and LOC13 (0.317), although lower, were retained due to their theoretical relevance.

The CFA model also identified six pairs of items with high residual covariance, for example, LOC10 with LOC12, and LOC4 with LOC7. This indicates content overlap or semantic similarity; for example, both are related to problem-solving strategies. The

existence of residual covariance does not necessarily mean that the model is flawed, but it does provide material for evaluation for item revision or separation into subdimensions if the theory supports it. A comparison of model fit before and after revision is shown in Table 3. The initial model (14 items) met the fit criteria with CFI = 0.925, TLI = 0.900, and RMSEA = 0.0557. After removing two items with weak contributions, the 12-item model showed a significant improvement, with CFI = 0.959, TLI = 0.942, and RMSEA = 0.0466. These results confirm that the scale revision produced a more stable, parsimonious, and representative model for measuring the internal locus of control. The results of the construct validity analysis, which examined the strength of each item's relationship with internal LOC can be seen in the table 2.

Table 2. Construct validiy test results

Item Code	Factor Loading	z-Value	p-value	Interpretation
LOC1	0,410	8,51	< 0,001	Strong
LOC3	0,245	4,48	< 0,001	Sufficient (lower limit)
LOC4	0,352	7,76	< 0,001	Sufficient
LOC7	0,345	7,60	< 0,001	Sufficient
LOC8	0,316	6,70	< 0,001	Sufficient
LOC9	0,451	10,55	< 0,001	Strong
LOC11	0,422	8,93	< 0,001	Strong
LOC12	0,427	8,22	< 0,001	Strong
LOC13	0,317	7,07	< 0,001	Moderate
LOC14	0,465	9,23	< 0,001	Strong
LOC5	0,333	7,65	< 0,001	Moderate
LOC10	0,350	6,71	< 0,001	Sufficient

Remarks: The number after the LOC code = item number; Significance level <0.05

The results of the construct validity test through CFA show that all items in the scale have significant factor loadings ($p < .001$), ranging from 0.245 to 0.465. Several items (e.g., LOC14, LOC9, and LOC12) contribute strongly to the construct, while other items, such as LOC3, are retained due to their theoretical relevance despite being at the lower limit. Details of the factor loading values are presented in Table 2. The last column in the table classifies the strength of each item's contribution to the construct. Loadings ≥0.40 are interpreted as "strong" between 0.30–0.39 as "moderate," and <0.30 as "moderate but approaching the lower limit." Overall, this table shows that the unidimensional LOC scale model has met the construct validity requirements, with items contributing evenly and consistently to the measured construct. The removal of the two previous items (LOC2 and LOC6) also helped improve the factor structure and increase the accuracy of the model. An evaluation of the overall model fit can be seen in the following table 3.

A comparison of the models before and after revision shows an improvement in model fit quality. The initial model with 14 items showed a fairly good level of fit, but after removing two items with low contributions (LOC2 and LOC6), the 12-item model produced higher CFI and TLI values and a lower RMSEA. These results indicate that the factor structure of the scale has become more parsimonious and representative (see Table 3). After revision by removing these two items, the 12-item CFA model showed a significant improvement in model fit quality. The CFI value increased to 0.959, and the TLI increased to 0.942, indicating a more accurate representation of the factor

structure. The RMSEA value also decreased to 0.0466, with a 90% CI range of 0.0242-0.0664, indicating a decrease in model specification error and an increase in parameter estimation stability. In other words, the removal of two items with weak contributions improved the model structure, making it more parsimonious, stable, and overall, more capable of validly and efficiently representing the locus of control construct. These results emphasize the importance of evaluating indicators in structural modelling to obtain an optimal measurement model.

Table 3. Comparison of CFA model fit measures before and after revision

Model	χ^2 (df)	CFI	TLI	RMSEA (90% CI)	Interpretation
LOC internal 14 item	123 (df = 68)	0,925	0,900	0,0557 (0,0396 - 0,0713)	Fit is adequate, out the model is somewhat heavy
LOC internal 12 item	73.5 (df = 47)	0,959	0,942	0,0466 (0,0242 - 0,0664)	Good fit

Criterion validity

Criterion validity was tested by examining the relationship between the 12 final items and the total scale score using Pearson's correlation. The results of the analysis showed that all items were positively and significantly correlated at a level of $p < .001$, with r values ranging from 0.447 to 0.639. Items LOC1 (r = 0.639) and LOC11 (r = 0.622) had the highest correlations, while LOC3 (r = 0.447) showed the lowest correlation but was still within the acceptable range. These findings confirm that all items contribute significantly to the construct being measured (see Table 4).

Table 4. Item correlations with total scores – internal locus of control

No.	Item Code	Correlation (r)	Significance (p)
1	LOC1	0,639	< 0,001
2	LOC3	0,447	< 0,001
3	LOC4	0,599	< 0,001
4	LOC5	0,525	< 0,001
5	LOC7	0,571	< 0,001
6	LOC8	0,522	< 0,001
7	LOC9	0,589	< 0,001
8	LOC10	0,533	< 0,001
9	LOC11	0,622	< 0,001
10	LOC12	0,601	< 0,001
11	LOC13	0,522	< 0,001
12	LOC14	0,607	< 0,001

Reliability

The scale shows good internal reliability with a Cronbach's Alpha value of 0.805. All items have positive and significant item-total correlations. The highest value is shown by LOC1 (r = 0.534) and the lowest by LOC3 (r = 0.302), which is still above the minimum threshold of 0.30. No items could be removed to significantly improve reliability, so all items were retained. These results confirm that the scale has adequate internal consistency to measure the internal locus of control in research respondents.

Internal locus of control scale

The distribution of items on the valid and reliable internal locus of control scale consists of 12 items divided into several main indicators. Favorable items reflect internal control, while unfavorable items reflect external orientation and are analyzed using reverse scoring. The following table presents the distribution of items based on the theoretical indicators they represent table 5. The internal locus of control scale used consists of 12 statements. Respondents were asked to rate each statement using a 5-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). High scores on favorable items reflect a strong internal locus of control, while scores on unfavorable items are reversed to maintain total score consistency.

Table 5. Distribution of valid and reliable internal locus of control scales

Indicator	Item Number	
	Favorable	Unfavorable
Believe that outcomes are determined by personal effort and responsibility	1, 7, 9, 11	12
Planning and controlling actions before acting	5	6
Solving problems by actively seeking solutions	3, 10	-
Believing that luck, fate, or other people greatly influence outcomes	-	2, 4, 8

Table 6. Valid and reliable internal locus of control scale

No	Statement	Response Options				
		1	2	3	4	5
1	*Saya sering dimintai nasehat oleh teman.*					
2	*Kesempatan atau keberuntungan tidak berperan penting dalam kehidupan saya*					
3	*Saya akan mencari penyebab masalah yang saya hadapi, sebelum menyelesaikannya*					
4	*Keberuntungan lebih menjamin kesuksesan dibandingkan dengan kemampuan yang saya miliki*					
5	*Saya membuat rencana terlebih dahulu, sebelum memutuskan untuk bertindak*					
6	*Ketika menyelesaikan masalah, saya memilih langsung bertindak tanpa membuat rencana*					
7	*Terdapat hubungan yang sangat kuat antara seberapa giat saya berusaha dengan hasil yang saya raih*					
8	*Sekeras apapun usaha yang kita lakukan, jika keberuntungan sedang tidak berpihak, maka hasilnya nihil*					
9	*Saya tetap berusaha mencapai apa yang saya inginkan, meski banyak hambatan*					
10	*Saya merasa lebih mudah menyelesaikan suatu masalah jika mengetahui informasi mengenai masalah tersebut*					
11	*Ide-ide saya seringkali menjadi inspirasi untuk orang lain*					
12	*Saya tidak yakin cita-cita saya akan tercapai*					

Remarks: questions in Indonesian

DISCUSSION

This study shows that the internal locus of control (LoC) scale developed for at-risk adolescents meets the criteria for content and construct validity. Of the 29 initial items, only 12 items were deemed statistically and theoretically feasible. This selection process emphasizes the importance of developing instruments with strict procedures, in line with Aiken's (20) recommendations for testing content validity through Aiken's V index. These findings also support the view that simplifying scales is often necessary to make instruments more suitable for the characteristics of the target population, especially adolescent groups facing psychosocial risks (21,22).

The results of this study are consistent with Rotter's theory (1), which emphasizes that LoC is a personality variable that influences individuals' expectations of the results of their behavior. The scale items retained in this study reflect the main aspects of internal LoC, such as belief in personal effort, responsibility, and problem-solving ability. These findings are also in line with previous studies showing that individuals with internal LoC are more oriented towards effort, self-control, and solutions (7).

The results of this study also support Syatriadin's (4) findings, which confirm that students with internal LoC have higher academic achievement and are better able to overcome academic difficulties than those with external LoC. The belief that success is determined by personal effort encourages adolescents to be more persistent in learning and seeking problem-solving strategies. Research by Jumiati and Kartiko (5) also shows that teachers with internal LoC perform better, indicating that internal LoC plays an important role in the effectiveness of the educational process, both from the perspective of students and educators.

This study supports the findings of Caliendo et al. (6), which show that individuals with internal LoC prefer agency or control in decision-making. These findings are important for at-risk adolescents, as they allow them to view themselves as active agents in their lives, rather than mere victims of external circumstances. In line with this, internal LoC has also been shown to correlate with various other positive aspects, such as academic success (23), interest in entrepreneurship (18,24), and independence in decision-making (25).

However, several studies also highlight that external LoC can increase vulnerability to stress and depression, as demonstrated by Hanvey et al. (19)in the glass child group. Additionally, economic studies have found that LoC is associated with risky behaviors, such as speculative investment and alcohol consumption (6). This indicates that a strong internal LoC still requires the support of environmental factors, such as family support (18) and a supportive social network (16), to be more effective in protecting adolescents from negative risks.

Overall, the results of this study make an important contribution in addressing the limitations of LoC instruments relevant to at-risk youth groups. The newly developed scale not only has a strong theoretical basis but has also been proven to be empirically valid, so that it can be used in psychosocial assessments and interventions focused on strengthening personal responsibility, adaptive coping strategies, and resilience.

Several limitations should be noted in this study. First, the sample size was relatively small, so the findings should be generalized with caution. Second, the instrument developed focused only on the internal dimension of locus of control (LoC), while the external dimension has not been explored in depth. Based on these considerations, further research is recommended to test this instrument on a more diverse population, assess its predictive validity for various outcomes such as academic achievement, psychological well-being, and risky behavior tendencies, and develop a

scale that also includes the external dimension of LoC to provide a more comprehensive overview.

CONCLUSIONS

The study successfully developed an internal locus of control scale specifically designed for at-risk adolescents. From the initial 29 items compiled based on Rotter's theory, through content validity testing using Aiken's V and construct validity testing with Confirmatory Factor Analysis (CFA), 12 final items were obtained that were proven to be valid and reliable. This instrument was developed with consideration for the developmental context of adolescents to better align with their daily experiences, while also being reliable for measuring internal LoC tendencies in populations facing social vulnerability. The contribution is twofold: theoretically, it expands the study of LoC by providing an instrument that is relevant to age groups and contexts that have been under-explored; practically, it provides a measuring tool for educators, counselors, and psychologists to identify the level of self-control in adolescents and design interventions that emphasize strengthening personal responsibility, adaptive coping strategies, and resilience.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE

It is hereby confirmed that no artificial intelligence (AI) tools or methodologies were used in the design, data collection, analysis, or interpretation stages of this study. AI-assisted translation tools were employed solely to assist in translating the manuscript from Indonesian to English. All scientific content, data handling, and presentation were fully conducted and verified manually by the authors.

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