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Original Article



# Validation of the translated instrument measuring discrimination distress among racial and ethnic minority adolescents

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## ABSTRACT

**Background:** Racial and ethnic adolescents in South Korea increasingly encounter discrimination in diverse aspects of their everyday lives. However, there is a lack of psychometrically validated tools to appropriately assess related psychological distress in the Korean setting targeting this population. To validate the Korean version of the Adolescent Discrimination Distress Index (K-ADDI), a culturally adapted instrument to assess discrimination-related distress among adolescents.

**Methods:** A sequential mixed-methods design was employed following the COnsensus-based Standards for the selection of health Measurement INstruments checklist. In Phase 1, cognitive interviews with 6 racial and ethnic middle school students evaluated content validity, focusing on item clarity, cultural relevance, and semantic equivalence. In Phase 2, a cross-sectional survey of 200 adolescents assessed structural validity, convergent validity, and internal consistency. Exploratory factor analysis with oblimin rotation was conducted, and convergent validity was examined via Pearson's correlation with acculturative stress. Cronbach's alpha assessed internal consistency.

**Results:** Cognitive interviews supported content validity. Factor analysis identified a 4-factor structure—community, institutional, peer, and educational—based on 13 items, excluding 2 with low-loadings. The K-ADDI showed a moderate positive correlation with acculturative stress and acceptable internal consistency.

**Conclusion:** The 13-item K-ADDI is a psychometrically sound and culturally relevant instrument for measuring discrimination distress in Korean adolescents. While further validation through successive studies is warranted, the revised factor structure—adapted to the sociocultural context of Korean adolescents—introduces community as an additional domain to the 3 identified in the original instrument.

**Keywords:** Adolescent; Discrimination, psychological; Minority groups; Psychometrics; Validation study; Korea

## INTRODUCTION

Discrimination is a cumulative risk factor for adverse health outcomes, gradually increasing disease burden among racial and ethnic adolescents compared to their non-

**Conflict of Interest**

The authors declare that they have no competing interests.

**Author Contributions**

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discriminated peers.[1,2] A growing body of evidence has demonstrated strong associations between discrimination and mental health problems such as depression[2] and externalizing behaviors,[3] alongside risky health behaviors like substance use.[4] These findings have prompted increasing scholarly and policy attention to how racial and ethnic adolescents perceive and experience discrimination. In countries such as the United States[5] and Australia,[6] approximately 40% of racial and ethnic adolescents report experiencing significant discrimination. Although the prevalence remains lower in South Korea[7]—reported at 1.9% as of 2022—the growing number of racial and ethnic adolescents and their families suggests a potential upward trend. Furthermore, a recent national survey reported that nearly 70% of the general public in South Korea acknowledges the existence of racial and ethnic prejudice,[8] underscoring public concern over the intensification of discrimination in Korean society.

Capturing adolescents' experiences of discrimination within their daily sociocultural contexts—such as peer interactions, school environments, and neighborhood settings—is essential for understanding its full psychological impact. Yet, many widely used instruments often lack sensitivity to the specific sociocultural contexts in which adolescent discrimination occurs. The Everyday Discrimination Scale[9] and the Racial/Ethnic Discrimination Index (REDI),[10] though frequently employed, lack context-specific sensitivity to adolescent experiences, particularly those occurring in peer and school settings. In contrast, the Adolescents Discrimination Distress Index (ADDI) was specifically developed to assess perceived discrimination distress among youth from diverse racial and ethnic backgrounds, including African American, Latino, and Asian adolescents.[11] The ADDI not only captures the frequency of discriminatory events but also evaluates the emotional intensity of distress caused by these events, making it particularly useful in understanding adolescents' subjective psychological burden. However, the original instrument was grounded in the developers' work with African American adults, and subsequent research has revealed limited consensus on its factor structure across ethnic groups.[5] Moreover, the psychometric properties of the ADDI have not been rigorously evaluated among Asian adolescents.[12]

As discussed above, recent research highlights the cumulative impact of discrimination on the health and well-being of racial and ethnic adolescents. Addressing health disparities and promoting equity in adolescent populations requires careful attention to the sociocultural factors that contribute to discrimination and the development of culturally responsive interventions. In South Korea, however, a comprehensive understanding of the nature, extent, and perceived contexts of discrimination experienced by racial and ethnic adolescents remains limited, despite increasing national concern about multicultural integration and growing ethnic diversity.[7,8] Moreover, the forms of discrimination experienced by racial and ethnic adolescents in South Korea often reflect unique sociocultural dynamics—such as assumptions about language proficiency, cultural unfamiliarity, or differential treatment in school[13]—which may not be adequately captured by instruments developed in Western contexts. Compounding this issue is the scarcity of psychometrically validated tools that can accurately assess these experiences in the Korean context. While the ADDI has demonstrated utility in multicultural youth populations in the United States,[5,12] few studies have examined its psychometric properties across non-Western cultural contexts, highlighting the need for cross-cultural validation and generalizability. This study, therefore, aimed to translate the ADDI into Korean and to evaluate its structural validity and internal consistency for use among racial and ethnic adolescents in South Korea.

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# METHODS

## Study design

This study employed an exploratory sequential mixed-methods design to evaluate the psychometric properties of the Korean version of the ADDI (K-ADDI). The study proceeded in 2 phases: Phase 1 (Qualitative phase) assessed content validity through cognitive interviews, and Phase 2 (Quantitative phase) evaluated structural validity, convergent validity, and internal consistency via a cross-sectional survey. This study adhered to the COnsensus-based Standards for the selection of health Measurement INstruments checklist.[14] A summary of the research design is presented in **Fig. 1**.

## Instrument and translation process

The ADDI, originally developed by Fisher et al.,[11] consists of 15 items designed to measure the extent of distress experienced by adolescents (aged 13–19 years) in response to racial or ethnic discrimination. The scale comprises 3 subscales: institutional (6 items), peer (5 items), and educational (4 items). For each item, respondents are first asked whether they have experienced a particular type of discrimination because of their race or ethnicity (Yes/No). If they respond "Yes," they rate how upsetting the experience was on a 5-point Likert scale ranging from 1 ("not at all") to 5 ("extremely"), resulting in a final item score ranging from 0 to 5. A score of 0 was given to the response of "No". Scores can be interpreted based on the sum of all items or subscales, with higher scores indicating greater distress.

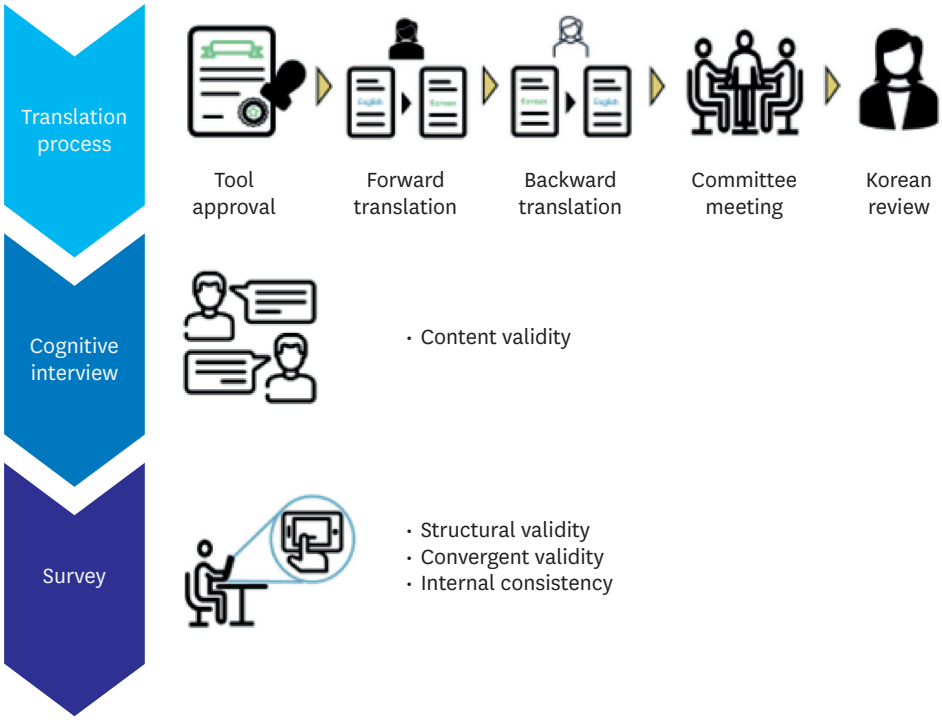


**Fig. 1.** Research design outline. This image presents the research design encompassing the translation, cognitive interview, and survey phases. The translation process includes tool approval, forward and backward translation, committee review, and Korean linguistic validation. Content validity is evaluated through cognitive interviews, while the survey phase assesses structural validity, convergent validity, and internal consistency to ensure psychometric robustness.


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The translation followed a committee-based approach, including both forward and backward translation. The corresponding author and a bilingual nursing professor—both with expertise in adolescent health and racial and ethnic minority populations—independently conducted the translation. The translations were reviewed and harmonized through consensus meetings involving the translators and the second author. Then, a bilingual expert in Korean language education for foreigners further assessed the semantic equivalence and cultural appropriateness of the translated items for the target population.

## Participants

*Phase 1: Cognitive interviews*

The cognitive interviews were conducted with 6 racial and ethnic adolescents aged 14 to 16. Initially, 7 adolescents were recruited through purposive sampling based on referrals from schoolteachers or parents of multicultural families in the community. However, one participant withdrew consent prior to data analysis, resulting in a final sample of 6 participants. The inclusion criteria were: (1) adolescents from racial and ethnic families who are either Koran nationals or immigrants to Korea; (2) currently enrolled in middle school (grades 1–3); and (3) sufficient proficiency in reading, writing, listening, and speaking in Korean. Adolescents with cognitive impairment, communication problems, or without parental consent were excluded.

*Phase 2: Survey*

This cross-sectional survey was administered to a convenience sample of 200 racial and ethnic adolescents aged 14 to 16. The sample size met the commonly recommended item-to-respondent ratio of 10–20 participants per item and the minimum recommended total of 200 participants, in line with established guidelines for factor analysis.[14,15] Recruitment was carried out through online and offline notices posted at middle schools and community centers located in metropolitan areas with large multicultural populations. The inclusion and exclusion criteria were identical to those used in Phase 1. Prior to participation, adolescents completed a Korean language proficiency screening item from the Korean Language Proficiency Test,[16] which assessed their ability to conduct basic daily conversation. Only those who correctly answered the screening item proceeded to the main survey.

## Measures

*Phase 1: Cognitive interviews*

Cognitive interviews were conducted to evaluate the translated items' relevance, comprehensibility, and comprehensiveness. A verbal-concurrent probing method was employed in accordance with established cognitive interviewing guidelines.[17] Participants were asked to read each item aloud and provide feedback on the clarity of the wording, appropriateness of response options, and comprehensibility of the instructions. Both anticipated probes ("Was that easy or hard to answer?") and spontaneous probes ("Can you repeat the question I just asked in your own words?" or "I noticed that you hesitated when reading this item. Please tell me what you were thinking?") were used to identify areas of potential misunderstanding.

*Phase 2: Survey*

Acculturative stress was assessed using a modified version of the Social, Attitudinal, Familial, and Environmental Acculturative Stress scale, developed for the Multicultural Adolescents Panel Survey (MAPS) 1st panel.[18] The scale includes 9 items that assess adolescents' perceived stress in relation to social, attitudinal, familial, and environmental factors associated with

acculturation. Responses were recorded on a 4-point Likert scale ranging from 1 ("not at all") to 5 ("very much"), with higher scores indicating greater levels of acculturative stress. The Cronbach's alpha reliability coefficient for the scale was reported as 0.89 in Yang et al.,[18] and in the present study, it was found to be 0.86.

Sociodemographic characteristics collected included sex, age, grade, residential area, birthplace (Korea or abroad), length of stay in Korea after entering the country, and self-reported Korean language proficiency in speaking, reading, writing, and listening.

## Data collection

The present study protocol was reviewed and approved by the Yonsei University Institutional Review Board (IRB-4-2023-0268). Informed consent was submitted by all participants and their parents when they were enrolled.

*Phase 1: Cognitive interviews*

Cognitive interviews were conducted in May 2023 by a trained qualitative researcher. All interviews were held face-to-face in a quiet and private setting to ensure participant comfort and confidentiality. Each session lasted approximately 30 to 60 minutes using semi-structured probing questions. The participants read each item aloud and responded to probing questions. All interviews were audio-recorded with the participants' consent and were transcribed verbatim for analysis.

*Phase 2: Survey*

The survey was conducted between September and October 2023. The survey was administered between September and October 2023. Participants who expressed interest in the study first completed a Korean language screening item. Those who passed the screening proceeded to complete the full questionnaire independently. The survey was self-administered, required approximately 20 minutes to complete, and data collection concluded after responses were obtained from 200 participants.

## Data analysis

*Phase 1: Cognitive interviews*

Data from the cognitive interviews were analyzed using qualitative content analysis. Two independent researchers coded the interview transcripts for item relevance, comprehensibility, and comprehensiveness. Discrepancies between coders were discussed and resolved through consensus meetings with the research team. Based on the results of the analysis, no modifications were made to the preliminary K-ADDI.

*Phase 2: Survey*

Quantitative analyses were conducted using IBM SPSS Statistics version 26 (IBM Corp., Armonk, NY, USA). Exploratory factor analysis (EFA) was performed using common factor extraction with oblimin rotation to assess the structural validity of the K-ADDI.[19] Sampling adequacy was evaluated using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. Convergent validity was assessed by examining Pearson's correlation coefficients between K-ADDI scores and acculturative stress scores. The analysis evaluated whether the correlation was in the expected positive direction and met the minimum criterion of an absolute value greater than 0.30 ($r > 0.30$), indicating at least a moderate level of association. Internal consistency reliability was evaluated using Cronbach's alpha coefficients and corrected item-total correlations.

# RESULTS

## Participants' characteristics

The general characteristics of participants are presented in **Table 1**. Slightly more participants identified as male (51.5%) than female, with a mean age of 12.84 years (standard deviation [SD], 0.84) and an even distribution across first to third year of middle school. The majority resided in Gyeonggi-do (57.5%) or Seoul (40.0%). The average length of stay in Korea was 11.07 years (SD, 2.00), and 173 participants (86.5%) were born in Korea. Most participants rated their Korean language proficiency as "good" or "very good" in speaking (97.5%), writing (90.5%), reading (96.0%), and listening (96.0%).

## Content validity

No items were identified as difficult to comprehend by participants, nor did they suggest alternative wording for any of the 15 items. However, one respondent indicated unfamiliarity with the phrase "advanced level classes." In this case, the interviewer provided clarification to ensure comprehension, and the respondent reported no further difficulty in understanding the item. Given that access to advanced-level classes may vary by schools, the original wording was retained. Additionally, participants reported no difficulty understanding the questionnaire instructions or response categories.

**Table 1.** General characteristics of participants

| Characteristics | Category | No. (%) or mean ± SD |
|---|---|---|
| Sex | Male | 103 (51.5) |
| | Female | 97 (48.5) |
| Age (yr) | | 12.84 ± 0.84 |
| Grade | Middle school 1st | 67 (33.5) |
| | Middle school 2nd | 77 (38.5) |
| | Middle school 3rd | 56 (28.0) |
| Residential area | Seoul | 80 (40.0) |
| | Gyeonggi-do | 115 (57.5) |
| | Incheon | 5 (2.5) |
| Length of stay in Korea (yr) | | 11.07 ± 2.00 |
| Birth in Korea or abroad | Korea | 173 (86.5) |
| | Abroad | 27 (13.5) |
| Korean speaking proficiency | Not at all | 0 (0.0) |
| | Not very well | 5 (2.5) |
| | Quite well | 58 (29.0) |
| | Very well | 137 (68.5) |
| Korean writing proficiency | Not at all | 1 (0.5) |
| | Not very well | 18 (9.0) |
| | Quite well | 68 (34.0) |
| | Very well | 113 (56.5) |
| Korean reading proficiency | Not at all | 0 (0.0) |
| | Not very well | 8 (4.0) |
| | Quite well | 71 (35.5) |
| | Very well | 121 (60.5) |
| Korean listening proficiency | Not at all | 0 (0.0) |
| | Not very well | 8 (4.0) |
| | Quite well | 48 (24.0) |
| | Very well | 144 (72.0) |

SD = standard deviation.


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## Structural validity

*Factor structure*

EFA was performed to examine the underlying structure of the K-ADDI items.

The KMO measure was 0.614, indicating acceptable sampling adequacy, and Barlett's test of sphericity was significant ($\chi^2$ = 536.220, $P$ < 0.001), supporting the suitability of the data for factor analysis.

The number of factors were determined using scree plot inspection and Kaiser criterion (eigenvalues > 1.0). A 4-factor solution was selected based on the point of inflection on the scree plot (**Supplementary Fig. 1**), with all 4 retained factors having eigenvalues greater than 1.0.

*Factor loading*

Items with factor loadings ≥ 0.40 were retained. Two items were excluded due to low loadings: Item #4 "you were discouraged from joining a club" and Item #7 "people expected less of you than they expected of others your age." The final 4-factor model showed acceptable factor loadings ranging from 0.39 to 0.87. The 2 excluded items were evaluated for theoretical adequacy and removed to improve construct clarity. The model fit was confirmed via common factor analysis with oblimin rotation ($X^2$ = 56.42, $df$ = 32, $P$ = 0.005). The final EFA yielded 4 factors across 13 items.

One emergent factor, newly labeled the community context factor (eigenvalue = 2.63; 20.2% variance), included 4 items: 2 originally from the institutional domain (#10, #13), one from the peer domain (#8), and one from the educational domain (#6). The remaining items were grouped into 3 additional factors: the institutional context (4 times; eigenvalue = 2.00; 15.4% variance), the peer context (2 times; eigenvalue = 1.42; 10.9% variance), and the educational context (3 items; eigenvalue = 1.30; 10.0% variance, including item #15 reassigned from institutional). The 4 factors together accounted for 56.5% of the total variance (**Table 2**).

**Table 2.** Explanatory factor analysis of Korean version of the Adolescent Discrimination Distress Index

| Characteristics | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|
| Community | | | | |
| 13. People acted as if they thought you were not smart. | **0.870** | 0.183 | 0.187 | −0.176 |
| 8. People assumed your Korean was poor. | **0.482** | 0.158 | 0.417 | −0.198 |
| 6. People expected more of you than they expected of others your age. | **0.413** | 0.183 | −0.085 | 0.198 |
| 10. You were hassled by a store clerk or store guard. | **0.393** | 0.166 | −0.034 | −0.022 |
| Institutional | | | | |
| 15. You were threatened. | 0.058 | **0.735** | 0.101 | 0.076 |
| 14. People acted as if they were afraid of you. | 0.319 | **0.614** | 0.066 | 0.033 |
| 12. You received poor service at a restaurant or store. | 0.279 | **0.598** | −0.110 | 0.202 |
| 9. You were hassled by police. | 0.153 | **0.473** | −0.031 | 0.137 |
| Peer | | | | |
| 11. You were called racially insulting names. | 0.242 | 0.102 | **0.720** | −0.187 |
| 5. Others your age did not include you in their activities. | −0.127 | −0.034 | **0.594** | 0.031 |
| Educational | | | | |
| 2. You were wrongly disciplined or given after-school detention. | −0.068 | −0.045 | −0.008 | **0.550** |
| 3. You were given a lower grade than you deserved. | −0.033 | 0.302 | −0.067 | **0.520** |
| 1. You were discouraged from joining an advanced level class. | 0.057 | 0.178 | −0.134 | **0.473** |
| Eigenvalues | 2.63 | 2.00 | 1.42 | 1.30 |
| % variance | 20.2 | 15.4 | 10.9 | 10.0 |
| Cumulative % | 20.2 | 35.5 | 46.5 | **56.5** |

Bold values indicate the primary factor loadings for each item.

### Convergent validity

The K-ADDI total score demonstrated a significant positive correlation with acculturative stress ($r = 0.44$, $P < .001$), indicating a moderate relationship between the 2 constructs. Among the K-ADDI subscales, the community and peer factors showed significant positive correlations with acculturative stress ($r = 0.40$ and $r = 0.35$, respectively). The institutional and educational subscales were not significantly correlated with acculturative stress (**Supplementary Table 1**).

### Internal consistency

Cronbach's alpha for the total scale was 0.62. Subscale reliability coefficients ranged from 0.51 to 0.69. These results explain that the K-ADDI showed acceptable internal consistency (**Supplementary Table 2**).

## DISCUSSION

The original developers of the ADDI emphasized contextual nature of adolescents' experiences with discrimination—specifically, peer-based discrimination, school-based discrimination from adults, and institutional discrimination from broader societal systems.[11] However, previous research has shown limited consensus regarding the factor structure of racial and ethnic discrimination experiences, as these are shaped by sociocultural contexts that vary across racial and ethnic groups and national settings.[5] Accordingly, generalization without contextual consideration is problematic. In South Korea, most existing instruments have not adequately captured the lived experiences of discrimination among adolescents in a culturally sensitive manner or have demonstrated limited psychometric validity. Nationally representative surveys (e.g., MAPS) have similarly fallen short in adequately measuring both the occurrence of discrimination and the psychological distress that results.[18] Against this backdrop, this study provides a meaningful contribution to the field of racial and ethnic population health by validating the structural properties and reliability of the ADDI within the Korean adolescent context.

Cognitive interviewing was a key methodological strength of this study, offering evidence for content validity by examining the salience, clarity, and cultural appropriateness of each item.[20] As recommended in cross-cultural instrument adaptation frameworks,[21] cognitive interviewing was used in this study prior to psychometric testing to assess the cultural appropriateness of the translated instrument. Specifically, the method helped ensure content equivalence by evaluating whether each item was culturally relevant and meaningful to Korean adolescents. Furthermore, the process allowed the research team to verify semantic equivalence, that is, whether the translated items retained their original meaning in the Korean sociocultural context.[22] This method also contributed to the instrument's reliability by identifying potential comprehension and interpretation issues prior to statistical validation. Nevertheless, although the reliability of this instrument can be considered acceptable in early-phase validation studies,[23] its relatively low reliability warrants attention. The lower consistency observed in the education and peer sub-scales may reflect the situational and context-specific nature of discrimination in these subscales, as well as cultural variation in how Korean adolescents perceive and report such experiences. These findings underscore the need to refine item quality, adjust response formats, and incorporate culturally grounded approaches to enhance measurement reliability in future research.

Structural validity, a key form of psychometric evidence, had not previously been established for the original ADDI. In this study, factor analysis supported a 4-factor structure based on 13 items identified during content validation. While the total explained variance and factor loadings were acceptable, the structure differed slightly from the original model. Specifically, in addition to the original 3 factors—institutional, peer, and educational—a new factor, community, has emerged. This new factor included items originally classified under different domains, underscoring the context-specific nature of perceived discrimination. For example, the term "people" in the peer domain, when interpreted in Korean, may include not only friends but also a wide range of individuals encountered within the community. This aligns with the original instrument's intent to capture discrimination from community members beyond peers. In addition, because the original subscale classification is not entirely consistent—being largely based on the location of discriminatory incidents—experiences not perceived as tied directly to friends, school, or formal institutions may be construed collectively as community-level discrimination. Moreover, some items may hold relevance across multiple domains, requiring further clarification. Although certain items were classified under the peer domain—for example, "called racially insulting names"—the source of the discriminatory behavior was not explicitly specified in the item. As a result, such experiences could plausibly occur in interactions with individuals outside the peer group, such as teachers or neighbors. This highlights the need to clarify the agent of discrimination in future revisions of the scale and use confirmatory factor analysis to further review the quality of the test.

The nature of discriminatory experiences is dynamic and continues to evolve alongside changes in social and technological environments. Emerging evidence highlights the psychological consequences of online racial discrimination, such as exposure to racially offensive symbols, text, or images on social media, which have been associated with elevated posttraumatic stress symptoms.[24] In addition, cyberbullying has been identified as a significant risk factor for mental health problems among racial and ethnic adolescents.[25] Beyond the digital sphere, prior research underscores that health disparities often reflect broader social hierarchies—including both racial and socioeconomic stratification.[26] Within this context, discriminatory social norms may be directed at certain ethnic groups based on the perceived economic status of their countries of origin, reinforcing multilayered disadvantage across both national and ethnic lines. These structural and symbolic forms of discrimination interact with personal experiences, amplifying their psychological impact. To more fully capture this complexity, future studies should consider incorporating in-depth interviews that explore not only the specific experiences of discrimination, but also the psychological and social challenges these adolescents face as a result.

In summary, this study offers preliminary evidence of the psychometric adequacy of the K-ADDI and its utility in assessing discrimination-related distress in Korea's increasingly diverse adolescent population. However, the sample's concentration in multicultural-dense regions may have limited the sensitivity of the scale to capture experiences more common in ethnically homogenous settings. Racial and ethnic individuals residing in neighborhoods with higher racial and ethnic minority density are less likely to experience discrimination,[27] which could in turn influence the observed factor structure and reliability estimates. Future research should seek to validate the scale in broader geographical contexts, particularly among adolescents residing in areas predominantly inhabited by native Koreans, to capture a wider range of discrimination experiences and thereby enhance both the generalizability and reliability of the findings.

This study translated and psychometrically validated the 13-item ADDI into Korean for use among racial and ethnic adolescents in South Korea. The K-ADDI demonstrated acceptable reliability and structural validity across 4 domains: community, institutional, peer, and educational. Cognitive interviewing confirmed cultural and semantic equivalence, while EFA supported a revised factor structure that reflects the sociocultural realities of Korean adolescents. Given the evolving nature of discriminatory experiences, including those emerging in digital and socioeconomic context, future research should refine and expand the instrument to ensure continued relevance and applicability across diverse settings.

## SUPPLEMENTARY MATERIALS

### Supplementary Table 1

Convergent validity (n = 200)

### Supplementary Table 2

Internal consistency (n = 200)

### Supplementary Fig. 1

Scree plot. This image shows the scree plot for determining the optimal number of factors, highlighting the inflection point to identify factors to retain.

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