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Cognitive Flexibility Scale for Indonesian Adolescents: Reliability and Validity

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Article history: Received: 11 February 2025 Received in revised form: 01 April 2025 Accepted: 07 May 2025 Published online: 31 October 2025

Abstract

Cognitive flexibility is the ability to perceive alternatives in various situations, facilitating adaptation and resilience. Given developmental challenges many groups of adolescents face, it is important to ensure the availability of practical, reliable, and valid assessments to measure cognitive flexibility in this population. This study aims to evaluate the psychometric properties of the self-report Cognitive Flexibility Scale (CFS) Indonesian Version for the Indonesian adolescent population. Through convenience sampling approach, 644 adolescents, aged 12 to 18, living in Jabodetabek, completed the Indonesian version of the CFS in a classroom setting. Confirmatory factor analysis tested both unidimensional and two-factor models, revealing superior fit for the two-factor structure. Internal reliability was evaluated using Cronbach's alpha and McDonald's Omega, demonstrating adequate reliability ($\alpha = 0.72$, $\omega = 0.70$). In the second phase, criterion validity was assessed using Spearman's correlation with the Difficulties in Emotion Regulation Scale - Short Form (DERS-SF) completed by a subsample of 151 adolescents, revealing a significant negative correlation between cognitive flexibility and emotional dysregulation. This correlation underscores the importance of cognitive flexibility in emotion regulation, highlighting its relevance in the context of providing psychological support. Overall, this study supports the CFS Indonesian version as a practical, reliable, and valid instrument for cognitive flexibility assessment among Indonesian adolescents. Future research should focus on more diverse samples to validate the scale further and explore its applicability across different subgroups within Indonesia, especially communities with high social vulnerability.

Keywords: Cognitive flexibility, adolescents, validity, reliability, emotion dysregulation

1.0 INTRODUCTION

Cognitive flexibility, broadly defined as the ability to switch cognitive sets and consider various alternatives and options in any given situation, is a key facet of executive function and essential for adaptation (Martin & Rubin, 1995; Cañas et al., 2006; Dennis & Wal, 2010; Hamtiaux & Houssemand, 2012; Ionescu, 2012; Dajani & Uddin, 2015). According to Martin and Rubin (1995), cognitive flexibility refers to an individual's awareness that there are multiple options and alternatives for responding to situations, a willingness to adapt and evaluate these alternatives, and a belief in one's capacity to behave accordingly. This definition highlights the multifaceted nature of cognitive flexibility, encompassing cognitive, attitudinal, and behavioral dimensions, making it particularly relevant for adolescent populations. Adolescence is a period marked by rapid cognitive, emotional, and social changes (Steinberg, 2005), and well-developed cognitive flexibility can help adolescents learn and navigate the various developmental tasks and challenges they face (Peters & Crone, 2014). Research has consistently shown that cognitive flexibility is linked to positive outcomes in adolescent development, such as enhanced problem-solving skills, emotional regulation, communication, and adaptability to new social environments (Chesebro & Martin, 2003; Steinberg, 2005; Moore, 2013; Peters & Crone, 2014; Santander, 2024). Meanwhile, impaired cognitive flexibility is associated with difficulties in managing emotions, increased anxiety and stress, reduced social competence, and higher susceptibility to psychopathology. (Stange et al., 2016; Gottwald, et al., 2018; Cobos-Sanchez, 2022; MacPherson, et al., 2022) Looking closer to adolescents in challenging contexts, such as those affected by disasters, they often face complex emotional and social dynamics, thus creating higher demands to think flexibly in terms of emotional coping, problem-solving in uncertain conditions, and effectively adjusting social interactions and roles (Fu & Chow, 2017; Kuriansky & Nemeth, 2020; Bonanno et al., 2024). Therefore, assessing cognitive flexibility across adolescent populations is critical for understanding their capacity to adapt, access helpful resources, and maintain well-being.

Despite the recognized importance of cognitive flexibility in adolescent development, there is a notable scarcity of validated instruments for measuring cognitive flexibility in adolescents, particularly in non-Western settings like Indonesia (Kusi-Mensah, et al., 2022). A systematic review by Ardra and Hendrawan (2024) found that executive function measures, including cognitive flexibility, for Indonesian adolescents are limited, highlighting the need to develop or adapt existing tools with sound psychometric properties and cultural sensitivity, given the diversity of Indonesia. Indonesian adolescents, especially those living in disaster-prone area, frequently encounter stressors such as displacement, disruption of daily living including education, and loss of social support, increasing the demand

for cognitive flexibility in adapting to these challenges (Rahmadian, et al., 2016; Widiawati, 2017; Anika, 2019). Thus, ensuring valid, reliable assessments specifically adapted to the Indonesian context is important to accurately identify adolescents' needs and develop appropriate interventions.

The present study focuses on adapting the Cognitive Flexibility Scale (CFS), originally developed by Martin and Rubin (1995), for Indonesian adolescents. The CFS was designed as a self-report measure to assess individuals' perceptions of their ability to adapt their thinking and behavior, particularly in social and communication contexts, making it highly relevant for adolescent populations. While the CFS has demonstrated robust psychometric properties in adult populations across various cultural contexts (Martin & Anderson, 1998; Oshiro, et al., 2016; Lopez et al., 2024), its applicability and validity for adolescents, especially in non-Western settings like Indonesia, need to be evaluated. Given these gaps, the current study aims to adapt and validate the Indonesian version of the Cognitive Flexibility Scale (CFS), evaluating its psychometric properties, including factor structure, internal reliability, and criterion validity. By addressing these measurement gaps and the importance of cognitive flexibility in adolescence, this research aims to provide a practical and effective tool for academic research and psychological practitioners working with adolescent populations in Indonesia.

■2.0 LITERATURE REVIEW

2.1 Cognitive Flexibility

Cognitive flexibility, defined as the ability to shift cognitive frameworks, adjust thinking in response to changing situations, and generate alternative strategies, is a critical aspect of executive functioning (Cañas et al., 2006; Ionescu, 2012; Dajani & Uddin, 2015). Martin and Rubin (1995) conceptualized cognitive flexibility as having three components: (1) awareness of multiple possible responses in any situation, (2) willingness to consider and adopt different approaches, and (3) belief in one's ability to execute flexible behavior. These components make cognitive flexibility especially relevant during adolescence as it encompasses cognitive skills, attitudes, and behaviors that facilitate adaptability.

In these past few decades, research has shown the importance of cognitive flexibility in adolescent development, particularly in relation to social-emotional functioning (Martin & Rubin, 1995; 1998; Chesebro & Martin, 2003; Steinberg, 2005; Moore, 2013; Peters & Crone, 2014; Santander, 2024). Adolescents must navigate increasingly complex social environments as they transition toward adulthood, requiring greater autonomy, responsibility, and social competence (Steinberg, 2005). Cognitive flexibility helps adolescents manage shifting peer dynamics, cope with emotional variability, and adapt to evolving social roles (Peters & Crone, 2014). Studies have demonstrated a positive association between cognitive flexibility and emotional regulation, where flexible thinkers are better able to manage conflicting emotions and respond adaptively to social stressors such as peer rejection or academic pressure (Moore, 2013). Conversely, lower cognitive flexibility has been linked to heightened emotional dysregulation, social withdrawal, and problem behaviors (Santander, 2024).

Cognitive flexibility plays a central role in social communication, enabling individuals to comprehend different point of views, resolve conflicts, and collaborate effectively (Chesebro & Martin, 2003). Thus, adolescents with higher cognitive flexibility are better equipped to adjust their behavior in response to social feedback, making them more adept at managing disagreements, negotiating social roles, and sustaining relationships. This adaptability is critical not only in daily interactions but also in responding to more complex social challenges, such as those presented by traumatic events like disasters. Cognitive flexibility fosters adaptive social behavior, allowing adolescents to evaluate multiple social cues and adjust their responses accordingly (Hauser et al., 2015). Adolescents who demonstrate cognitive flexibility are more likely to engage in emotionally regulated behavior and adaptive problem-solving strategies, particularly in stressful situations (Morrish, et al., 2018). As emotional dysregulation, characterized by difficulties in managing emotional responses, is linked to a range of mental health challenges such as anxiety and depression (Gratz & Roemer, 2004), therefore cognitive flexibility serves as a protective factor that helps mitigate these risks.

In the aftermath of disasters, cognitive flexibility becomes a crucial resource for adaptation and recovery (Fu & Chow, 2017; Kuriansky & Nemeth, 2020; Bonanno et al., 2024). Disasters, by disrupting normal life patterns and introducing uncertainty, demand an elevated capacity to adjust to new realities. Adolescents in disaster-affected regions face unique challenges, including displacement from homes and schools, loss of loved ones, and disruptions to social support systems (Kuriansky & Nemeth, 2020). Cognitive flexibility allows individuals, especially adolescents, to reframe traumatic experiences, generate coping strategies, and adapt to rapidly changing environments (Bonnano et al., 2024). Cognitive flexibility also plays a vital role in emotional regulation during post-disaster recovery. Research indicates that flexible thinkers are better able to manage intense emotions such as fear, sadness, and frustration (Morrish, et al., 2018; Uddin, 2021; Chung et al., 2024), which often accompany the aftermath of traumatic events. Adolescents with higher levels of cognitive flexibility show better psychological resilience, evidenced by lower levels of psychological distress and more adaptive coping strategies (Fu & Chow, 2017). Conversely, those with lower cognitive flexibility may struggle to regulate their emotions, increasing their vulnerability to post-traumatic stress symptoms and other mental health difficulties.

Cognitive flexibility also facilitates the rebuilding of social relationships in post-disaster contexts. Adolescents must often adapt to altered family dynamics, changing peer relationships, and shifts in community structures (Widiawati, 2017; Anika, 2019). Cognitive flexibility helps them reinterpret social roles and re-engage with their social environment in the face of such changes (Rubin et al., 2014; Uddin, 2021). This adaptability is particularly crucial in collectivist societies like Indonesia, where social cohesion and communal support are essential to recovery (Setyaningrum et al., 2022). Given the disaster-prone nature of Indonesia and their profound impact on adolescents, assessing cognitive flexibility in this population is essential for understanding their resilience and capacity for recovery (Juth et al., 2015; Hall et al., 2022). Tools such as the Cognitive Flexibility Scale (CFS) can provide practicality, accessibility, and valuable insights into how adolescents are coping with post-disaster challenges, offering guidance for targeted interventions that enhance psychological well-being and social adjustment.

2.2 Cognitive Flexibility Measurements

Globally, cognitive flexibility measures typically fall into two categories: performance-based and inventories. According to a systematic review done by Kusi-Mensah and colleagues (2022), the Behavior Rating Inventory of Executive Function (BRIEF) and the Wisconsin Card Sorting Test (WCST) are among the most validated cognitive flexibility assessments globally. However, evidence of psychometric properties such as content validity and cross-cultural evaluation remains limited, particularly within low- and middle-income countries like Indonesia (Kusi-Mensah, et al., 2022). While performance-based measures effectively capture cognitive processes objectively, they typically require considerably more resources, including extensive time, professional expertise, and higher financial costs. In contrast, inventory-based measures provide substantial advantages for large-scale screenings due to lower resource demands related to time, cost, and professional involvement. Additionally, these measures typically offer higher ecological validity as they capture perceived cognitive flexibility in everyday contexts (Claro et al., 2022; Holochwost et al., 2022).

Several inventory based instruments to measure cognitive flexibility have been developed and validated, including the Cognitive Flexibility Inventory (CFI) by Dennis and Vander Wal (2010) and the Cognitive Flexibility Scale (CFS) by Martin and Rubin (1995). These instruments have demonstrated robust psychometric properties across diverse populations, predominantly among adults in Western cultural contexts (Çelikkaleli, 2014; Johnco et al., 2014; Kurginyan & Osavolyuk, 2018). The CFI also has been adapted into Bahasa Indonesia but primarily targets adult populations (Rahayu et al., 2022). Despite these developments, Ardra and Hendrawan's (2024) systematic review highlighted the ongoing scarcity of validated executive function measures, including those assessing cognitive flexibility specifically for Indonesian adolescents. Existing assessments such as the Behavior Rating Inventory of Executive Function (BRIEF), Executive Skills Questionnaire-Revised (ESQ-R), and Executive Function Questionnaire (EFQ) often have limitations concerning high costs and limited psychometric validation for Indonesian contexts (Ardra & Hendrawan, 2024).

Given the critical role cognitive flexibility plays in adolescent development and well-being, particularly in challenging situations like the context of disaster, the present study seeks to adapt and assess the psychometric properties of Cognitive Flexibility Scale (CFS), a self-report inventory measuring cognitive flexibility, for Indonesian adolescents. The primary aim is to assess its content validity, construct validity, internal reliability, and criterion validity. By doing so, this study contributes to the growing body of literature on cognitive flexibility in adolescence and offers a practical, accessible, and culturally relevant tool for cognitive flexibility inventory tools in Indonesia.

■3.0 METHODOLOGY

3.1 Participants

The study involved a total of 765 adolescents, aged 12 to 18, living in the Greater Jakarta area (Jabodetabek). The sample was drawn from various schools using convenience sampling. Participation was voluntary, with parental consent and adolescent assent obtained before data collection. For the second phase of the study, a subsample of 175 adolescents from the original 765 participants also completed the Difficulties in Emotion Regulation Scale - Short Form (DERS-SF) to examine the correlation between cognitive flexibility and emotional dysregulation.

3.2 Instruments

3.2.1 Cognitive Flexibility Scale (CFS)

The Cognitive Flexibility Scale (CFS), originally developed by Martin and Rubin (1995), was translated accordingly for Indonesian adolescents. The CFS is a self-report measure consisting of 12 items designed to assess individuals perceived cognitive flexibility. The items evaluate awareness of alternative strategies, willingness to adapt, and perceived efficacy in coping with various situations. The scale employs a 6-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree."

3.3 Difficulties in Emotion Regulation Scale - Short Form (DERS-SF)

The DERS-SF (Kaufman et al., 2016) is a widely used self-report instrument for assessing emotion dysregulation in adolescents and adults. It consists of 18 items designed to measure different aspects of emotional regulation difficulties, such as lack of emotional awareness, clarity, and impulse control. The DERS-SF has shown good psychometric properties in various populations, including adolescents (Kaufman et al., 2016).

3.4 Procedure

Prior to the adaptation process, formal permission to translate and validate the Cognitive Flexibility Scale (CFS) into Bahasa Indonesia was obtained from the original developers via email correspondence. The study was conducted in two phases. In the first phase, the Indonesian version of the CFS was given to the full sample of 765 adolescents. In the second phase, the DERS-SF was administered to a subsample of 175 adolescents to assess the relationship between cognitive flexibility and emotional dysregulation. The samples completed the online questionnaires in classroom settings, with research team members present to brief, supervise, and provide assistance if needed, and debrief by the end of the session. The data were then analyzed using R Studio 2022.07.1+554 for confirmatory factor analysis (CFA), omega reliability, and Cronbach's alpha, while Spearman's correlation was computed using IBM SPSS Statistics 22.

3.5 Content Validity

To ensure the content validity of the Indonesian version of the CFS, the Lawshe method (1975) was employed. A panel of five subject matter experts in psychology and adolescent development reviewed the adapted items. Each expert rated the relevance of each item on a 3-point scale: "Essential," "Useful but not essential," and "Not necessary." Each item needed to be evaluated as “Essential” by more than half of the panelists. Items that did not meet this threshold were revised to improve the scale's validity. Then, the content validity index (CVI) was calculated with a minimum acceptable CVI of 0.78 (Lawshe, 1975; Gilbert & Prion, 2016; Baghestani et al., 2019). The final version of the CFS used in this study reflected these adjustments.

3.6 Data Analysis

3.6.1 Construct Validity with Confirmatory Factor Analysis

To examine the factor structure of the CFS, confirmatory factor analysis (CFA) was conducted. Two models were tested: an unidimensional model, representing cognitive flexibility as a single construct, and a two-factor model, representing cognitive flexibility as two dimensions. In the Spanish version of the Cognitive Flexibility Scale (CFS) by López et al. (2024), a two-factor model was found to offer a better fit for the data compared to a one-factor model. These two factors were identified as Strengths (8 items) and Difficulties (4 items) related to cognitive flexibility. Model fit was assessed using standard fit indices, including the chi-square test, the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). A CFI above 0.90 and an RMSEA below 0.08 were considered indicative of a good model fit (Kyndt & Onghena, 2014).

3.7 Internal Reliability with Cronbach’s Alpha and McDonald’s Omega

Internal consistency for the Indonesian version of the CFS was assessed using Cronbach’s alpha and McDonald’s Omega. Cronbach’s alpha provides an estimate of the average correlation among items, while McDonald’s Omega offers an estimate of internal reliability by accounting for multidimensionality in the data. A Cronbach’s alpha of 0.70 or higher and an Omega of 0.60 or higher were considered acceptable thresholds for internal reliability (Morera & Stokes, 2016; Hayes & Coutts, 2020; Roche et al., 2024).

3.8 Criterion Validity by Correlation Analysis with DERS-SF

Spearman’s rank-order correlation was used to test the relationship between cognitive flexibility and emotional dysregulation, as the data did not follow a normal distribution. A significant negative correlation was hypothesized, with higher levels of cognitive flexibility expected to be associated with lower levels of emotion regulation.

■4.0 RESULTS

4.1 Content Validity

The content validity of the Cognitive Flexibility Scale (CFS) Indonesian version for adolescents was assessed using Lawshe's method (Lawshe, 1975) which employs expert judgment to evaluate the relevance of test items. An expert panel consisting of five professionals specializing in child-adolescent psychology, including academicians, researchers, and practitioners examined each item on the inventory. These experts categorized the items as either "essential," "useful, but not essential," or "not necessary." The results indicated that more than half of the panel members rated each item as essential, generating a Content Validity Index (CVI) of 0.86. According to established research on Lawshe method, a CVI score exceeding 0.80 is preferred and indicative of strong content validity (Lawshe, 1975; Gilbert & Prion, 2016; Baghestani et al., 2019). Thus, the obtained CVI score supports the conclusion that the adapted CFS has strong content validity, affirming its relevance and appropriateness for assessing cognitive flexibility among Indonesian adolescents.

4.2 Participant Demographic

After data cleaning due to informed consent and adolescent assent, the final participants of this study were 644 participants, consisting of 43.2% are males and 56.8% are females (Table 1). All participants were adolescents in range from 12 to 18 years and were recruited through convenience sampling from various schools in the Greater Jakarta area (Jabodetabek). This demographic selection from an urban setting was chosen to provide a relevant and diverse representation of Indonesian adolescents for assessing cognitive flexibility.

Table 1 Participants Demographic

Characters	n	%
Sex		
Male	278	43.2
Female	366	56.8
City		
Jakarta	166	25.8
Bogor	202	31.4
Depok	80	12.4
Tangerang	132	20.5
Bekasi	64	9.9

4.3 Confirmatory Factor Analysis

The Confirmatory Factor Analysis (CFA) conducted on the Cognitive Flexibility Scale (CFS) indicated that a two-factor model offered a better fit for the data compared to a one-factor model (Table 2). This two-factor structure identified items are "Strengths" (8 items) and "Difficulties" (4 items) related to cognitive flexibility. This model reflects a good approach by capturing both positive and challenging aspects related to cognitive flexibility. The fit indices for this model align with established cutoffs for good model fit as in prior research (Kyndt & Onghena, 2014).

Table 2 Confirmatory Factor Analysis Results

	One Factor	Two Factor	Cut-off for good fit (Kyndt & Onghena, 2014)
CFI	0.640	0.842	>0.90
TLI	0.560	0.803	>0.95
RMSEA	0.120	0.080	<0.08
SRMR	0.100	0.062	<0.08
GFI	0.851	0.929	>0.95
AGFI	0.781	0.895	>0.90

4.4 Internal Reliability

The internal reliability of the CFS Scale and its subscales were assessed using Cronbach's alpha and McDonald's omega coefficients (Table 3). The results indicated adequate reliability for the total CFS ($\alpha = 0.72$, $\omega = 0.70$). Specifically, the CFS Strength subscale demonstrated good internal reliability ($\alpha = 0.75$, $\omega = 0.76$), whereas the CFS Difficulties subscale showed slightly lower but still acceptable reliability ($\alpha = 0.65$, $\omega = 0.65$). These findings are consistent with prior studies suggesting that internal reliability coefficients exceeding 0.60 may be considered acceptable, especially when scales have relatively few items (Morera & Stokes, 2016; Hayes & Coutts, 2020; Roche et al., 2024). These results suggest that while the overall CFS and the Strength subscale reliably measure cognitive flexibility, the Difficulties subscale might benefit from further refinement to improve internal consistency.

Table 3 Cronbach's Alpha and McDonald's Omega

Indices	CFS	CFS Subtest Strength	CFS Subtest Difficulties
Alpha	0.72	0.75	0.65
Omega	0.70	0.76	0.65

4.5 Criterion Validity

Criterion validity was assessed using Spearman's correlation analysis between Cognitive Flexibility Scale (CFS) scores and emotional dysregulation measured by the Difficulties in Emotion Regulation Scale - Short Form (DERS-SF) from 151 participants. Results (Table 4) revealed significant correlations consistent with theoretical expectations. The CFS total score showed a strong positive correlation with the Strength subscale ($r = 0.765$, $p < .01$) and a strong negative correlation with the Difficulties subscale ($r = -0.654$, $p < .01$), indicating consistent alignment between the total score and its subscales. Regarding emotional dysregulation, the CFS total score had a significant negative correlation with the DERS-SF total score ($r = -0.205$, $p < .05$), confirming that adolescents with higher cognitive flexibility experience lower emotional dysregulation. In line with this, the CFS Difficulties subscale positively and significantly correlated with emotional dysregulation ($r = 0.519$, $p < .01$), meaning adolescents reporting greater cognitive flexibility difficulties also reported higher emotional dysregulation. Interestingly, the correlation between the CFS Strength subscale and emotional dysregulation was not statistically significant and exhibited a positive direction.

Table 4 Spearman Correlation CFS and DERS-SF

	n	M	SD	1	2	3	4
1.Cognitive Flexibility (CFS) Total Score	151	3.99	.49	-	.765**	-.654**	-.205*
2.Cognitive Flexibility (CFS) Strength	151	4.31	.55		-	-.066	.143
3.Cognitive Flexibility (CFS) Difficulties	151	3.64	.84			-	..519**
4.Emotion Dysregulation (DERS-SF)-Total Score	151	2.92	.66				-

■5.0 DISCUSSION AND RECOMMENDATION

The results of this study provide significant insights into the adaptation of the Cognitive Flexibility Scale (CFS) for Indonesian adolescents. First, our panel of experts perceived the items in the adapted CFS as highly relevant, demonstrating strong content validity with a high Content Validity Index (CVI) of 0.86, which exceeds the common threshold of 0.80 (Lawshe, 1975; Gilbert & Prion, 2016; Baghestani et al., 2019). This indicates that the content of the adapted scale is well-aligned with the construct of cognitive flexibility in adolescents. Almanasreh and colleagues (2019) highlighted the importance of content validity as it ensures that a measurement tool comprehensively represent the contruct, as well as relevant to the targeted population. Thus, content validity is key to ensuring that the items are both theoretically sound and practically relevant.

Our confirmatory factor analysis (CFA) results suggest that a two-factor model provided a better fit for the data compared to an unidimensional structure. Specifically, the two-factor model improved fit indices (CFI = 0.842, RMSEA = 0.080, SRMR = 0.062) over the one-factor model. Although these indices did not meet ideal thresholds for excellent model fit, they were within acceptable limits (Kyndt & Onghena, 2014), indicating the proposed factor structure captures meaningful dimensions of cognitive flexibility among adolescents. These results align with previous findings that cognitive flexibility may be a more complex, multidimensional construct in adolescents compared to younger children (Best & Miller, 2010; Doebel, 2020). The two-factor model (Strength and Difficulties) may offer richer diagnostic insights than a total score alone, allowing practitioners to distinguish between adolescents with low perceived strengths versus those facing specific barriers.

In terms of internal reliability, the CFS as a whole scale and the CFS Strength subscale demonstrated good reliability. Meanwhile, the CFS Difficulties subscale suggests slightly lower reliability, indicating that while the scale holds promise, it may need further improvements. The low internal reliability of the CFS Difficulties dimension may result from the limited number of items (four), which can restrict the scale's ability to fully capture the variance within the construct (Tavakol & Dennick, 2011). Reliability tends to be sensitive to the number of items, and scales with fewer items may display lower internal consistency as they are less capable of covering the breadth of the intended dimension (Cortina, 1993).

Furthermore, the significant negative correlation between cognitive flexibility and emotional dysregulation, as measured by the Difficulties in Emotion Regulation Scale - Short Form (DERS-SF), supports the criterion validity of the adapted CFS. The result implies that adolescents who displayed greater cognitive flexibility were better able to regulate their emotions. This finding underscores the role of cognitive flexibility in fostering emotional well-being, particularly in stressful contexts such as post-disaster settings (Fu & Chow, 2017; Kuriansky & Nemeth, 2020; Bonanno et al., 2024). Additionally, the Difficulties subscale positively correlated with emotional dysregulation, suggesting that adolescents who experience greater challenges with flexible thinking are more likely to experience emotional difficulties. This aligns with research showing that cognitive rigidity is a risk factor for emotional dysregulation and mental health problems (Cobos-Sanchez, 2022; MacPherson, et al., 2022).

However, the absence of a significant correlation between the Strength subscale and emotional dysregulation, and the unexpected positive direction of the correlation, urges further research. One interpretation is that perceived strengths in flexible thinking do not directly translate into emotion regulation, possibly because emotion regulation may depend more heavily on inhibition, another aspect of executive function. It is also possible that adolescents with higher self-perceived flexibility strengths are more cognitively engaged in complex emotional or social environments, which paradoxically exposes them to higher emotional demands or dysregulation—a hypothesis worth exploring in future studies. Another possibility is that self-perceived strengths in flexibility might reflect confidence rather than actual behavioral regulation, which may not always align with emotional outcomes. Future research could explore potential moderators such as self-awareness, impulsivity, or metacognition to clarify this unexpected result.

The Cognitive Flexibility Scale (CFS), in its 12-item self-report format, is an ideal instrument for assessing cognitive flexibility among adolescents, offering a practical, streamlined tool that is easy to administer and score. This makes it particularly suited for research and applied settings focused on post-disaster contexts, where quick yet reliable assessments are critical. By providing insights into adolescents' adaptive thinking and behavioral flexibility, the CFS can be used in studies evaluating the effectiveness of counseling and psychological support interventions, helping to identify areas where such programs are most impactful. Additionally, it serves as a valuable tool for needs assessment in post-disaster situations: adolescents with lower cognitive flexibility scores may face challenges in expressing their needs, seeking help, or managing emotions effectively. Identifying these individuals can allow mental health practitioners to prioritize them for targeted interventions aimed at enhancing resilience and social functioning. By addressing specific cognitive and emotional needs, tailored support can facilitate better outcomes in coping, adaptation, and overall well-being for adolescents in vulnerable post-disaster settings.

One important implication from these findings is that the CFS, designed for adults, may need further adaptation to fit the adolescent. Cognitive flexibility, as a component of executive function, changes as adolescents grow. These developmental differences could explain some of the weaker psychometric results observed in this study. Adolescents are in a critical stage of developing skills essential for cognitive flexibility, such as shifting cognitive sets, adapting to new social roles, and managing emotions. Research indicates that executive function structure varies with age, beginning as a more unidimensional construct in childhood and evolving into specific dimensions such as working memory, cognitive flexibility, and inhibitory control in adolescence and adulthood (Miyake & Friedman, 2000). These changes highlighted the need for age-appropriate revisions reflecting adolescents unique cognitive and socio-emotional challenges.

Further, adapting tools such as the CFS for Indonesian adolescents requires cultural sensitivity. This highlighted the requirements not only in language translation, but also in ensuring that the instructions, scales, and items that resonate with the daily realities and social environment. Future refinements could include rephrasing items, adjusting instructions, and modifying scales to fit better with the diverse experiences of Indonesian adolescents, particularly those in rural or post-disaster settings. These modifications would contribute to creating a psychometric tool that is both sound and culturally valuable. This also enhances its utility in assessing cognitive flexibility and understanding the adaptive processes that are central to adolescent development.

■6.0 CONCLUSION

This study supports the Cognitive Flexibility Scale (CFS) as a promising tool for assessing cognitive flexibility in Indonesian adolescents, particularly in urban settings. The high content validity and acceptable internal reliability suggest that the adapted CFS is relevant and appropriate for this population. Although the confirmatory factor analysis supports a two-factor model, the fit indices indicate that further refinement is needed to optimize its structure. Importantly, the significant negative correlation between cognitive flexibility and emotional dysregulation highlights the CFS's potential utility in assessing psychological resilience, especially in high-stress environments such as post-disaster contexts. Overall, while the CFS holds promise, its adaptation for adolescents requires further exploration to fully capture the developmental perspective of cognitive flexibility.

This study has several limitations. First, the sample consisted solely of school students from an urban setting, which limits the generalizability of the findings. Adolescents in rural or marginalized communities, who may face different cognitive and emotional challenges, were not included. Additionally, the sample was relatively homogeneous in terms of socioeconomic background, which may have influenced the results, particularly in terms of how cognitive flexibility is expressed in different cultural or socioeconomic contexts. Another limitation is the use of self-report measures, which may introduce bias, particularly in adolescents who may not yet have fully developed self-awareness regarding their cognitive and emotional functioning. Furthermore, the adapted CFS, while showing acceptable psychometric properties, may not fully capture the complexity of cognitive flexibility in adolescents, as indicated by the fit indices in the confirmatory factor analysis. This suggests that a more nuanced measure, specifically tailored for this age group, may be necessary.

Based on these limitations, future research should focus on adapting or developing the measurement of cognitive flexibility tailored for adolescents, with items that better reflect the developmental challenges faced by this group. It would also be valuable to test the scale in more diverse settings, including rural and post-disaster contexts, where cognitive flexibility may play a critical role in resilience and emotional regulation. Another potential direction for future research also involves testing the measurement invariance of the CFS across different adolescent stages, such as early and late adolescence. Research indicates that the structure of executive function, which includes cognitive flexibility, tends to be more unidimensional in early childhood, evolving into a multidimensional construct by adolescence and adulthood. Thus, examining measurement invariance could help us understand whether the CFS captures these developmental shifts accurately and consistently.

To strengthen the robustness of our findings, it is essential to verify that our instrument measures cognitive flexibility consistently across different age groups of adolescents. Understanding cognitive flexibility across the different stages of adolescence is particularly crucial to giving broad insights into cognitive and emotional development. This approach would not only affirm the reliability of the CFS but also facilitate its refinement, which potentially increases its utility in various psychological assessments.

Furthermore, expanding the sample to include adolescents from diverse socioeconomic and cultural backgrounds would significantly enhance the generalizability of our findings. By incorporating a wider range of experiences, the CFS could potentially become more relevant and applicable to diverse populations. Additionally, employing a mixed-methods approach, which integrating qualitative measures with self-report scales, could provide a more holistic understanding of how adolescents perceive and utilize cognitive flexibility in their daily lives. This multifaceted perspective would enrich insights and further validate the effectiveness of the CFS in capturing the complexities of cognitive flexibility during adolescence.

Acknowledgement

The authors would like to extend gratitude to the esteemed colleagues from Universiti Teknologi Malaysia, Prof. Tan Joo Siang and her team, who made this study possible. This article was fully funded by Riset UI-UTM Bilateral Strategic Alliance Matching Grant from Universitas Indonesia. (No: NKB-1183/UN2.RST/HKP.05.00/2023).

Conflicts of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper

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