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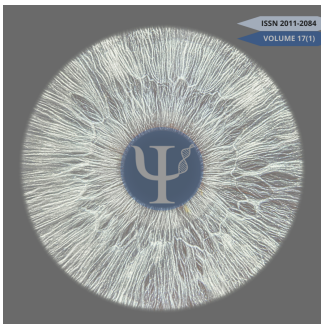

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Validity and Internal Consistency of a Spanish Version of the Cognitive Flexibility Scale (CFS)

Validez y consistencia interna de la versión en español de Cognitive Flexibility Scale (CFS)

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Abstract.
Objective. This study presents a Spanish version of the Cognitive Flexibility Scale (CFS), a subjective and brief instrument to measure Cognitive Flexibility (CF), and analyzes its psychometric characteristics. **Method.** The items of the scale's original version were adapted to Spanish. An interview containing the adapted version of the CFS, the Adult Executive Functioning Inventory (ADEXI), the Interpersonal Reactivity Index (IRI), and sociodemographic data, was administered to an intentional sample of 369 Argentine adults, aged between 18 and 60, through an online platform. **Results.** The CFS's internal consistency was high ($\alpha = .813$). A two-factor model, Strengths and Difficulties in CF, showed the best fit for the data. The CFS shows a negative correlation with the executive deficit and a positive correlations with empathy dimensions. **Discussion.** The Spanish-adapted version of the CFS shows satisfactory psychometric properties in the Argentine adult population.

Resumen.
Objetivo. Este estudio presenta una versión en español de la Cognitive Flexibility Scale (CFS), un instrumento subjetivo y breve para medir la Flexibilidad Cognitiva (FC), y analiza sus características psicométricas. **Método.** Los ítems de la versión original de la escala fueron adaptados al español. Se administró una entrevista estructurada conteniendo la versión adaptada de la CFS, el Adult Executive Functioning Inventory (ADEXI), el Interpersonal Reactivity Index (IRI) y datos sociodemográficos, a una muestra intencional de 369 adultos argentinos de entre 18 y 60 años, a través de una plataforma en línea. **Resultados.** La consistencia interna de la CFS fue alta ($\alpha = .813$). Un modelo de dos factores, Fortalezas y Dificultades en la CF, mostró el mejor ajuste a los datos. La CFS mostró una correlación negativa con el déficit ejecutivo y una correlación positiva con diferentes dimensiones de la empatía. **Discusión.** La versión adaptada al español de la CFS muestra propiedades psicométricas satisfactorias en población adulta argentina.

Keywords.
Cognitive Flexibility, Adaptation, Reliability, Validity.
Palabras Clave.
Flexibilidad cognitiva, adaptación, confiabilidad, validez.

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1. Introduction

Cognitive Flexibility (CF) is the ability to alternate between different approaches or perspectives when analyzing a problem or situation. This ability is based on the basic understanding that such alternatives exist, which means that it is possible to link the same set of aspects in different ways. In general, it has been conceived as a dimension within the broader concept of executive functions, a construct that refers to a set of cognitive processes that allow to regulate the individual's own behavior, including emotions and thoughts, and orient it towards the goals (Luria, 1966; Stuss & Benson, 1986). However, several authors have proposed that it is, actually, an epiphenomenon of more basic executive functions, the Working Memory (WM) and the Inhibition (INH) (Arán Filippetti & Krumm, 2020; Carroll et al., 2016; Dajani & Uddin, 2015). In this direction, the decline in the amount of information that can be held (hold) and processed in WM has been linked to the decline in CF (Hartman et al., 2001). WM also conditions the ability to maintain a certain rule, organization or perspective, when the environment does not require alternation. Meanwhile, inhibition allows to deactivate irrelevant stimuli when considering alternatives or behavioral changes (Miyake et al., 2000).

Allowing flexible adaptation in diverse contexts and situations, CF is linked to important aspects of social functioning such as communication and empathy. Regarding communication, adaptation of the individual's own behavior in a communicational interaction concerning contextual keys requires, firstly, acknowledging these keys and, secondly, acknowledging action options. As for empathy, understanding others implies defocusing on one's own experience, to be able to consider different experiences, ideas, perceptions, and feelings (López et al., 2014). In fact, subjective measures of CF assessment include items intended to assess these specific skills and dispositions. For example, items of the Cognitive Flexibility Inventory evaluate the willingness to "think about things from another person's point of view" or the ability to "putting oneself in others' shoes" (Dennis & Vander Wal, 2010, p. 252); and the Cognitive Flexibility Scale explores the ability to "... communicate an idea in many different ways" and the motivation to "[...] listen and consider alternatives for handling a problem" (Martin & Rubin, 1995, p. 624).

The relevance of CF as a basic process to understand both individual functioning and social performance in different contexts has driven its study. On this background, different measures have been developed for its evaluation, both objective (i.e., performance-based measures) and subjective (i.e., self-ratings). The objective measures are numerous. Among the best known and used globally are the Wisconsin Card Sorting Test (Heaton et al., 1993), and the Trail Making Test (TMT, Reitan & Wolfson, 1993) as measures of reactive cognitive flexibility, and the verbal fluency test FAS (FAS animals and verbs; Benton & Hamsher, 1989) and nonverbal fluency test Five Point Test (FPT; Regard et al., 1982), as measurements of spontaneous cognitive flexibility. Being performance measurements, this type of evaluation instruments is less sensitive to conscious attempts to manipulate the results. However, it has been criticized due to its lack of ecological validity (i.e., its poor relationship with performance in everyday contexts) and its sensitivity to practical effects (Barkley & Fischer, 2011; Barkley & Murphy, 2011). In addition, it requires interaction with a qualified administrator, and its administration and interpretation are time-consuming (Dennis & Vander Wal, 2010; López et al., 2021).

Subjective measurements of CF, shorter and easier to administer and score, are, in contrast, scarce. Among those measures, are the Cognitive Flexibility Inventory (Dennis & Vandel Wal, 2010), the Bilgin Cognitive Flexibility Scale (Bilgin, 2009), and the Martin and Rubin Cognitive Flexibility Scale (Martin & Rubin, 1995).

Focused on clinical research, the Cognitive Flexibility Inventory (CFI) was created as a brief, 20-item instrument, to assess the cognitive flexibility needed to successfully defy and modify irrational or maladaptive ideas or thoughts. Depressed people are characterized by having extremely rigid thoughts. The CFI was developed to measure the aspects of CF that allow people to think in a more adaptive way in the face of stressful events, and to scrutinize their ideas, a cognitive intervention strategy in different types of mental disorders. Three aspects of the CF construct were considered necessary by the authors of this inventory for these tasks: a) the tendency to perceive difficult situations as controllable, (b) the ability to identify multiple alternative explanations for vital events and human behavior, and c) the ability to generate multiple alternative solutions in the face of difficult situations. The CFI assesses these dimensions of the CF through a 7-point Likert scale. Recently, a Spanish adaptation of this instrument for the Colombian population has been published (Navarro et al., 2022).

The Bilgin Cognitive Flexibility Scale (Bilgin, 2009) was developed as a brief, 19-item instrument, with the aim of assessing cognitive flexibility in the adolescent population. More specifically, it is aimed at assessing how flexible adolescents are about themselves, concerning others and concerning their environment. Another peculiarity of this instrument is that, as a measuring instrument, it uses semantic differentials, considering its three dimensions (Osgood et al., 1957).

The Martin and Rubin Cognitive Flexibility Scale (CFS; Martin & Rubin, 1995) is an even shorter instrument than the instruments described above. It contains 12 items, which are answered through a 6-point Likert scale that goes from *Strongly Disagree* (1) *to Strongly Agree* (6). This instrument is not designed for a spe-

cific population, as is the case of the Bilgin scale, nor is it created for specific use in the clinical field, as the CFI. It assesses the CF in a more general way, as a basic function that modulates the intrapsychic and interpersonal response in the face of difficult situations, and the individual performance in different social situations. Therefore, it is useful to evaluate CF for different purposes and in different contexts, such as the evaluation of educational strengths and needs in school and academic contexts, or management and selection of personnel in the workplace. Also, given its simplicity, brevity, and availability, it is attractive for use in basic research.

According to Martin and Rubin (1995), CF is a prerequisite for behavioral flexibility in complex situations and contexts. Being flexible in these contexts requires, first, acknowledging alternatives. Two additional cognitive components which condition flexible behavior are motivation to adapt and confidence concerning the individual's own abilities to achieve it. Any adaptation or change requires, besides acknowledging alternatives, a reason or motive that promotes it. Besides, a person's flexible adaptation could be prevented due to the lack of self-efficacy, which means the lack of confidence concerning the individual's own ability to perform a specific action, even when the person has acknowledged that there are alternative behavioral options. For this reason, motivation and self-efficacy to be flexible have been conceptualized as components or aspects that integrate the concept of CF (Martin & Rubin, 1995).

The CFS (Martin & Rubin, 1995) has been widely used internationally, as a brief instrument to assess CF, including therefore: a) the awareness that, in a given situation, there are options or behavioral alternatives, (b) the willingness to be flexible or adapt to different situations, and (c) feelings of self-efficacy concerning the individual's own ability to be flexible. Although the CFI contains some items that assess self-efficacy, it focuses exclusively on self-efficacy in solving difficult problems. In addition, while the CFI only assesses attitudes, the CFS includes items to assess both attitudes (e.g., "I am willing to listen and consider alternatives for handling a problem") and behaviors (e.g., "I avoid new and unusual situations"), exploring a more comprehensive perspective of the assessed person's functioning.

Even though the CFS was developed to measure the three aspects of CF described above, it is unclear if this scale was designed to have a multifactorial structure. The authors of the CFS have reported evidence of adequate internal consistency in different studies (α = .76–.77; Martin & Rubin, 1995; .72; Martin & Anderson, 1995), while test-retest reliability is high (.83; Martin & Rubin, 1995). Some others studies have shown high internal consistency ($\alpha = .85$) and good predictive and convergent validity (Johnco et al., 2014). Previous studies have failed to support a multifactorial structure for the English version of this scale (Dennis, 2007).

The self-report CFS is particularly popular for use with English speakers; however, some linguistic adaptations have been presented during the last decade. For example, the Japanese (Oshiro et al., 2016) and the Turkish (Çelikkaleli, 2014) versions of the scale,which have shown adequate internal consistency ($\alpha = .85$; $\alpha = .74$), and adjust for a one-factor structure model (Çelikkaleli, 2014; Oshiro et al., 2016). Currently, no Spanish CFS version is available.

Considering the importance of the CF, the scarce development of subjective evaluation measurements, and the lack of availability of Spanish version of non-clinic CF measurements, in the present study we aimed to: 1) present an adaptation to Spanish of the Cognitive Flexibility Scale (Martin & Rubin, 1995); 2) analyze the internal consistency of the adapted version of the CFS, considering the contribution of the independent items; 3) analyze the factorial structure of the Spanish version of the CFS; and 4) analyze the convergent and divergent validity of this assessment instrument when compared to empathy and executive functioning measurements.

2. Method

An instrumental, cross-sectional descriptive study was carried out (Montero & León, 2007).

2.1 Participants

An intentional sample of 369 adults aged 18 to 60 years was interviewed ($M = 31.2$; $SD = 9.7$). The inclusion/exclusion criteria were: 1) to be able to consent; 2) not having a diagnosis of neurodevelopmental disorders: and 3) not having a diagnosis of learning disorders. Sixty five percent of the participants were women. The educational level of the sample was high, considering that 46% were studying a university career, 26.8% had completed university studies, and 18.4% had completed postgraduate studies.

2.2 Instruments

2.2.1 Spanish Adaptation of Cognitive Flexibility Scales (CFS)

The CFS (Martin & Rubin, 1995) was cultural and linguistic adapted to Spanish considering the international test commission guidelines for test translation and adaptation (Hernández et al., 2020). First, Matthew M. Martin was contacted through a professional social network, and permission for Spanish adaptation was received. Then, the adaptation process followed 3 steps. 1) The items from the original version of the scale were adapted to Spanish by study researchers. 2) Based on a brief theoretical description of the CF construct and the aspects of the construct contemplated by the scale, two experts in the field and one official English translator were asked to evaluate the clarity and adequacy of the adapted items. The experts in the field were also asked to judge if the adapted items clearly represented an aspect of CF describe by Martin and Rubin

(i.e. ability to recognize alternatives, wish to be flexible and self-efficacy regarding flexibility). All the adapted items were judged as clear and adequate to assess the different aspects of CF by the judges summoned. 3) Pilot study: the translated inventory was administered to a pilot sample of 20 adults aged 30 to 50 years. Participants were asked to provide feedback regarding the clarity of the items or any problems with interpretation (see the Spanish adaptation in Table 1).

Subsequently, a structured interview was designed containing:

1) An informed consent. The informed consent included data concerning the study, such as its aims and the institutional framework. Besides, it was specified that the information obtained would be treated confidentially and exclusively for research purposes. Finally, contact data of the researcher in charge of the study were included.

2) A sociodemographic data questionnaire designed ad-hoc. It included questions on socio-demographic data and on clinical personal and family history regarding specific learning disabilities (i.e., dyslexia, dyscalculia, etc.) and neurodevelopment disorders (i.e., specific learning disorders, autism spectrum disorders, ADHD, Intellectual Disability and Mental Retardation or Disruptive, Impulse-Control, and Conduct Disorders).

3) The adapted to Spanish version of the Cognitive Flexibility Scale (CFS; Martin & Rubin, 1995). The CFS is a 12-items self-report scale that measures cognitive flexibility, understood as the ability to recognize alternatives and options in any given situation, the wish to be flexible and to adapt to different contexts, and the feelings of self-efficacy regarding the ability to be flexible, through a 6-point Likert scale (strongly disagree to strongly agree). It was developed in a student sample, showing high internal consistency ($\alpha = .76 - -.77$), good concurrent and construct validity with measures of interaction and communication flexibility, and high testretest reliability ($r = .83$) over two weeks (Martin & Rubin, 1995).

4) The Spanish version of the Interpersonal Reactivity Index (IRI; Mestre Escrivá et al., 2004). The IRI is a 28-items self-report measurement of empathy that evaluates four dimensions including emotional and cognitive aspects of the construct: Fantasy and Perspective Taking (Cognitive Aspects) and Empathic Concern and Personal Distress (Emotional Aspects), through a 5-points Likert scale. Its Spanish version has shown validity to evaluate these different components of the empathy construct, and adequate internal consistency, with values ranging between 0.56 for the Perspective Taking (PT) scale and .70 for the Fantasy (FS).

5) The Spanish version of ADEXI (Holst & Thorell, 2018; López et al., 2021). The ADEXI is a brief inventory (14 items) to assess Executive Functioning considering two dimensions: Inhibition and Working Memory. Its Spanish adaptation has shown construct validity, adjusting to a two-factor model as the original version, and high internal consistency ($\alpha = .87$) (López et al., 2014).

2.3 Procedure

Following the Declaration of Helsinki, participation in the study was voluntary and all participants were required to provide informed consent to participate. As previously described and in accordance with the aforementioned standard, the document had relevant information on the objectives and methods of the study, benefits and harms that participation could entail, personal data and institutional affiliations of the researchers, etc. Participants were invited to participate in the study through social and institutional networks (internal networks of public and privately managed universities). Interviews were performed through an online platform. Before starting the interview, participants had to digitally provide their informed consent by clicking on a button that indicated "I agree to participate".

2.4 Data Analysis

To analyze the internal consistency of the adapted instrument, the Cronbach α index was calculated, and the Cronbach α index if each element was removed. Also, the McDonald's ω was calculated (Hayes & Coutts, 2020). To analyze the factorial structure of the Spanish version of the CFS, firstly, Exploratory Factor Analysis (EFA) was performed, using the Unweighted Least Squares as the extraction method, and extracting eigenvalues greater than 1 (maximum number of iterations: 25). The Oblimin rotation type was used, since it is the most adequate for instruments with a Likert-type scale. Subsequently, Confirmatory Factor Analysis (CFA) was used through AMOS 16.0 program (Arbuckle, 2007) to compare a one-dimensional model of the scale, with a two-factor model based on the EFA. In the bifactorial model, items were grouped according to whether they represented strengths or difficulties in CF. The level of the models' Goodness-of-fit was estimated through the χ^2, and the Bentler-Bonett's Normed Fit Index (NFI); Bollen's Relative Fit Index (RFI); Bollen's Incremental Fit Index (IFI); Tucker-Lewis Coefficient (TLI), also known as the Bentler-Bonett's Non-Normed Fit Index (NNFI); and Comparative Fit Index (CFI; Bentler & Bonett, 1980; Bentler, 1990; Bollen, 1989). The values of these indices can range between 0 and 1, becoming indicators of a good adjustment in the values above .9. The Akaike Information Criterion (Akaike, 1973; Akaike, 1987) was also calculated. In addition, the Root Mean Square Error of Approximation (RMSEA) for each model was calculated. The acceptable value of this index is .08 or lower (Hu & Bentler, 1995, 1999). Finally, to study the convergent and divergent construct validity, the correlation (Pearson's r) of the adapted scale with the IRI and ADEXI scores was analyzed.

Table 1

Internal Consistency of the Cognitive Flexibility Scale's Adapted to Spanish Version

Items	Alpha without element[a]
1. I can communicate an idea in many...[1]	
Puedo comunicar una idea de muchas maneras diferentes.	.789
2. I avoid new and usual...	
Evito las situaciones nuevas y poco habituales.	.818
3. I feel like I never get to...	
Siento que nunca consigo tomar decisiones.	.803
4. I can find workable solutions...	
Puedo encontrar soluciones viables para problemas que parecían imposibles de resolver.	.786
5. I seldom have choices when deciding...	
Me cuesta pensar alternativas para decidir cómo enfrentar una situación.	.805
6. I am willing to work at creative...	
Me gusta trabajar para encontrar soluciones creativas a los problemas.	.794
7. In any given situation, I am able to...	
Puedo actuar de modo apropiado en distintos tipos de situaciones.	.799
8. My behavior is a result of conscious...	
Mi comportamiento es el resultado de decisiones que tomo conscientemente.	.793
9. I have many possible ways of behaving...	
Frente a una situación dada, analizo maneras diferentes de comportarme.	.802
10. I have difficulties using may knowledge on...	
Tengo dificultades para usar mi conocimiento sobre un tema en situaciones de la vida real.	.813
11. I am willing to listen and consider alternatives...	
Me gusta escuchar y considerar alternativas para decidir cómo manejar un problema.	.808
12. I have the self-confidence necessary to try...	
Tengo la autoconfianza necesaria para probar diferentes alternativas al enfrentar una situación difícil.	.782

Note. Cronbach's α of the total scale (12 elements): .813 / McDonald's ω of the total scale: .817.
[a]Cronbac's α if the element is eliminated.
[1]To access the full original items, please refer to the work of Martin and Rubin (1995).

3. Results

3.1 Internal Consistency

The internal consistency of the adapted version of the CFS was high ($\alpha = .813$). The contribution of the particular items to the internal consistency of the instrument was significant in all cases. Table 1 presents the full data. The McDonald's Omega was also high ($\omega = .817$).

3.2 Analysis of the Factorial Structure

3.2.1 Exploratory Factor Analysis (EFA)

The Kaiser-Meyer-Olkin measure of sampling adequacy was .853, indicating that the matrix is factorizable. Bartlett's Sphericity Test was significant ($\chi^2 = 1214.605$; $df = 66$; $p < .001$).

Two self-values above 1 were extracted, which explained in total 39.15% of the variance. In Table 2, the items weights by factor are presented, ordered by size.

3.2.2 Confirmatory Factor Analysis: Model Comparison

Firstly, a one-dimensional model of the scale was evaluated. In this model, the correlations between the particular items and the overall factor ranged from .22 to .71. Subsequently, from the EFA and the study of the correlations between the items and between the measurement errors of the unifactorial model, an alternative bifactorial model was evaluated, grouping the items according to whether they represented Strengths (S) or Difficulties (D) in CF. For this model, the correlations of items with the S factor ranged from .44 to .69, while the correlations between items with the D factor ranged from .48 to .69. Table 3 shows the adjustment indices of each model. As can be seen, the model that showed a better fit to the data was the one with two factors (see Figure 1). This model obtained values of $\chi^2/df < 5$, higher values of NFI, RFI, IFI, TLI and CFI, lower error values, and a lower value in the AIC index.

3.2.3 Convergent and Divergent Construct Validity

The CF assessed with the adapted version of the CFS correlated negatively with the executive deficit evaluated with ADEXI ($r = -.38$). The correlation was stronger with the Working Memory dimension ($r = -.44$) than with the Inhibition dimension of the ADEXI ($r = -.20$). In addition, the score in the CFS showed positive corre-

Figure 1

Confirmatory Factor Analysis: Difficulties and Strengths in CF

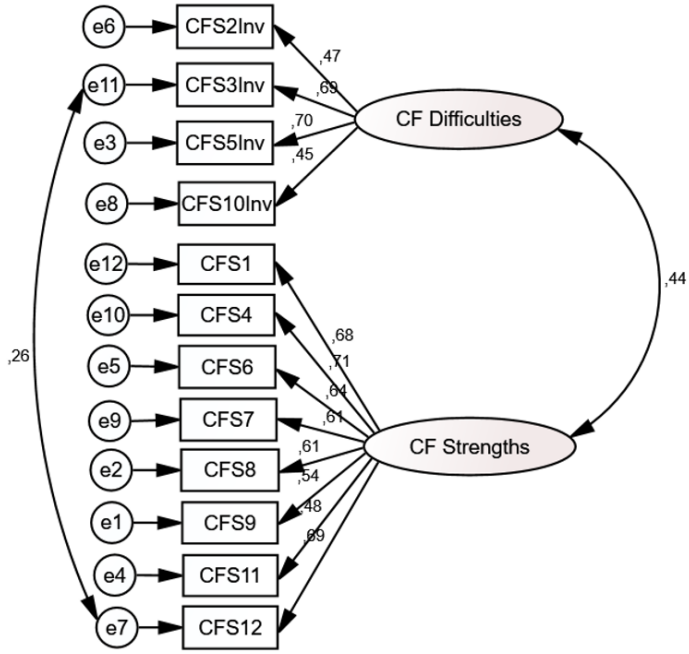

Table 2

Exploratory Factor Analysis of the CFS in Spanish

Items	Factors	
	1	2
Puedo actuar de modo apropiado en distintos tipos de situaciones	.693	
Puedo encontrar soluciones viables para problemas que parecían imposibles de resolver	.619	
Mi comportamiento es el resultado de decisiones que tomo conscientemente	.617	
Puedo comunicar una idea de muchas maneras diferentes	.616	
Me gusta trabajar para encontrar soluciones creativas a los problemas	.601	
Me gusta escuchar y considerar alternativas para decidir cómo manejar un problema	.571	
Frente a una situación dada, analizo maneras diferentes de comportarme	.564	
Tengo la autoconfianza necesaria para probar diferentes alternativas al enfrentar una situación difícil	.555	.304
Siento que nunca consigo tomar decisiones		.701
Me cuesta pensar alternativas para decidir cómo enfrentar una situación		.649
Evito las situaciones nuevas y poco habituales		.550
Tengo dificultades para usar mi conocimiento sobre un tema en situaciones de la vida real		.408

Note. Extraction method: unweighted least squares. Rotation method: Oblimin with Kaiser normalization. a. The rotation has converged in 4 iterations. Factorial weights higher than .3 are included in the table.

Table 3

Model Comparison

Models	χ^2/df	NFI	RFI	IFI	TLI	CFI	AIC	RMSEA
1	5.862	.743	.686	.777	.724	.775	388.571	.115
2	2.834	.880	.848	.919	.896	.918	237.302	.075

Note. [1]Model 1: 1 factor, CF; Model 2: 2 factors; S and W. [2]CFI and IFI values above .90, low AIC values, and RMSEA values below .08 are indicators of a good fit.

lations with the dimensions Perspective Taking ($r = .40$) and Empathic Concern ($r = .22$) of the IRI, and negative with the Personal Distress dimension ($r = -.40$). The full data is presented in Table 4.

4. Discussion

The aims of the present study were to present a Spanish adaptation of the CFS (Martin & Rubin, 1995) and to analyze its psychometric characteristics. Specifically, the internal consistency of the adapted instrument, its factorial structure, and its convergent and divergent validity were studied.

The internal consistency of the adapted instrument was high, somewhat higher than the one reported by the authors of the original instrument ($\alpha = .81$ and $\omega = .82$ vs. $\alpha = .76$, .77 and .72; Martin & Rubin, 1995; Martin & Anderson, 1998), similar to that reported for the Japanese's version ($\alpha = .85$ and $\omega = .87$; Oshiro et al., 2016), and more recently for the English version ($\alpha = .85$; Johnco et al., 2014). This state the stability of the responses concerning the psychological domain measured, that is, that the items of the scale correspond to the same latent construct. In principle, this high internal consistency score does not suggest a multidimensional structure. However, unlike what was suggested in an analysis of the English version (Dennis, 2007), the EFA suggested a two-factor structure, which in the model comparison through CFA showed a better fit than the one-dimensional model.

In the two-factor model, items were grouped according to whether they represented Strengths (S) or Difficulties (D) in CF. Therefore, in the Strengths dimension, items such as "*Puedo comunicar una idea de muchas maneras diferentes*" (I can communicate an idea in many different ways), "*Puedo encontrar soluciones viables para problemas que parecían imposibles de resolver*" (I can find viable solutions to problems that seemed impossible to solve), o "*Puedo actuar de modo apropiado en distintos tipos de situaciones*" (I can act in a proper way in different types of situations), were included, while the Difficulties dimension included items such as "*Siento que nunca consigo tomar decisiones*" (I feel like I can never get to make decisions), "*Me cuesta pensar alternativas para decidir cómo enfrentar una situación*" (It is not easy to think of alternatives to decide how to deal with a situation), o "*Tengo dificultades para usar mi conocimiento sobre un tema en situaciones de la vida real*" (I find it difficult to use my knowledge concerning a topic in real-life situations).

All items on the scale weighed heavily (with loadings greater than .4), in one or another factor, alternately. The only item that could be considered as complex because it had a greater loading than .3 in the secondary factor, was item number 12: "*Tengo la autoconfianza necesaria para probar diferentes alternativas al enfrentar una situación difícil*" (I have the necessary self-confidence to try different alternatives when facing a difficult situation). Although the load was clearly higher in factor 1 (.555 vs. .304), its weight in factor two (i.e., Difficulties) is striking. When conducting the CFA, a relationship was also observed between the measurement errors of this item (number 12) and the item number 3: "*Siento que nunca consigo tomar decisiones*" (I feel I can never get to make decisions). These results suggest that the need to "try alternatives" to face difficult situations appears as linked in the answers of the participants with the difficulty to "make decisions", and, therefore, entails a certain negative connotation. Despite this complexity of the item, its strong load on factor 1 and its contribution to the internal consistency of the instrument make its conservation on the scale valuable.

When assessing convergent and divergent construct validity, a positive relationship was observed between the scores in the CFS and the scores of the dimensions Perspective Taking and Empathic Concern of the IRI. As we mentioned before, CF is linked to empathy because being empathetic requires the ability to defocus from the individual's own experience to consider the ideas, perceptions, and feelings of others. Therefore, it requires the ability to acknowledge alternatives to the person's own experience, as well as the willingness to adjust to them, and the feelings of self-efficacy to achieve it. The strongest relationship was observed with Perspective Taking, a cognitive dimension of empathy that refers to the ability to temporarily adopt others' perspective (.40), while a smaller relationship was found with Empathic Concern (.22), the emotional dimension of empathy that refers to the ability to experience emotions in tune with those of others. Although the emotional aspects of empathy are, at their base, automatic processes, they are informed or regulated by cognitive processes that modulate them.

A negative relationship was observed between the CFS scores and the IRI Personal Distress dimension scores ($r = -.40$). The Personal Distress dimension of the IRI is an emotional dimension, which refers to the experience of strong distress in the face of other people's suffering. This experience has its origins in the difficulty to establish a cognitive distance from the other, implying a certain level of cognitive dysregulation. In this sense, it is a dimension that is usually negatively linked to executive functioning (López et al., 2021), and its negative relationship with CFS scores is proof of the instrument's construct validity.

In the same direction, the CFS scores were negatively linked to the ADEXI scores, which assesses executive dysfunction. The relationship was higher with the WM dimension ($-.44$) than with the INH dimension ($-.20$), highlighting the importance of the ability to retain and manipulate information in the memory to recognize and analyze alternative ideas, perspectives, and behaviors. As we have mentioned before, CF has been considered as a dimension

Table 4

Pearson correlations between the scores of the Cognitive Flexibility Scale's Spanish-adapted version, the Adult Executive Functioning Inventory, and the Interpersonal Reactivity Index

	ADEXI[a]	**ADEXI Working Memory**	**ADEXI Inhibition**	**Perspective Taking**	**Fantasy**	**Empathic Concern**	**Personal Distress**
Cognitive Flexibility Scale (adapted version)	−.383**	−.445**	−.196**	.396**	.013	.219**	−.405**
ADEXI	1	.933**	.849**	.165**	−.164**	.089	−.348**
ADEXI Working Memory		1	.603**	.161**	−.151**	.048	−.398**
ADEXI Inhibition			1	.130*	−.141**	.128*	−.188**
Perspective Taking				1	.265**	.454**	−.067
Fantasy					1	.388**	.307**
Empathic Concern						1	.083

Note. **The correlation is significant at level .01 (2 tails). *The correlation is significant at level .05 (2 tails). [a] Higher value represents higher executive dysfunction.

of EF (Luria, 1966; Stuss & Benson, 1986), or an executive function more advanced than others more basic such as INH and WM (Arán Filippetti & Krumm, 2020), and its particular relationship with WM (Hartman et al., 2001) has been described. Therefore, the negative correlation of CFS with ADEXI constitutes further evidence of construct validity.

Finally, we highlight some limitations of this research. Firstly, this study was conducted with adults who did not have a clinical diagnosis, therefore, the utility of the Spanish version of the CFS to assess CF in the clinical population should be evaluated in future studies. Studies with clinical population could be useful as additional evidence of the instrument's construct validity. Future studies on convergent validity of the Spanish version of the CFS in this population could benefit from the use of the CFI, whose adaptation has recently been published (Navarro et al., 2022), and which has been specifically designed for use in the clinical field. Furthermore, also in relation with the study sample, it had a wide age rage and was characterized by a relatively high level of education. Therefore, caution should be exercised when generalizing these results, particularly to populations with lower and lower-middle levels of education. Secondly, this study only assesses one aspect of the reliability of the instrument, the internal consistency. Although adequate test-retest reliability has been reported for the original version of the scale (Martin & Rubin, 1995), it is suggested for further studies to study the temporary stability of the Spanish-adapted version of the CFS. Finally, limitations linked to the sampling strategy (evaluation through an online platform) can be considered. This type of sampling excludes people without access to technology, who, in the context of the present study, could constitute a significant percentage of the adult population. For this reason, it is suggested to report validity and reliability data when using this instrument in future studies that use alternative sampling strategies.

5. Conclusions

Despite these limitations, our results confirm that the Spanish-adapted version of the CFS shows satisfactory psychometric properties. Specifically, the scale shows good internal consistency and construct validity, and reasonable convergent and divergent validity, as a measure of CF in non-clinical adult population.

Considering the relevance of the CF construct to understand both individual performance and complex social processes such as communication and empathy, and in view of the scarce development of subjective evaluation measures of CF for the Spanish population, this instrument constitutes a relevant contribution that could be extremely useful in different evaluation contexts (i.e., educational, clinical, forensic) as well as for basic research in cognitive processes.

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