

Validity and Reliability of the Need for Cognition Scale-6 Items in a Mexican Sample and its Association with Big Five Personality Factors

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ABSTRACT

This study addressed the lack of research on the Need for Cognition-6 items (NCS-6) in a Mexican sample, aiming to provide evidence of its psychometric properties. It examined convergent, divergent, and factorial validity, test-retest reliability, and internal consistency. Additionally, it explored the scale's potential contribution to predicting quality of life in multivariate regression along with the Big Five Factor Model (BFFM). The study consisted of 1,366 adult participants at baseline and 120 at follow-up three years later, recruited through snowball sampling. Besides the NCS-6, other utilized measures were the Big Five Inventory-2 and the Quality-of-Life Enjoyment and Satisfaction Questionnaire Short Form. Analyses showed high positive correlations between NFC-6 and extraversion and open-mindedness, moderate correlations with conscientiousness and negative emotionality, and a weak correlation with agreeableness. A one-factor structure model, and test-retest reliability were also assessed, with results slightly below the ones reported in the literature. Internal consistency was satisfactory overall. Lastly, no evidence was found of higher explained variance when adding NFC along the BFFM in a linear regression model for prediction of quality of life. This is the first study of its kind to evaluate the psychometric properties of the NCS-6 in a Mexican sample. We suggest its use as an individual scale independent of the measurement of the BFFM, especially by using individual items.

KEYWORDS

need for cognition
big five personality factors
reliability
validity
Mexican

Need for Cognition

Personality traits are very important constructs in the field of psychology since they are useful for the prediction of different life outcomes, such as academic achievement, work performance, relationship stability, or risk of psychopathology, to name a few. Along with emotional and behavioral traits, cognitive features are also components of personality, referring to the different tendencies of information processing in an individual. One of these traits is the need for cognition (NFC), which is understood as the “tendency to enjoy and engage in effortful cognitive endeavors [and] to seek, acquire, think about, and reflect back on information to make sense of stimuli relationships and events in their world” (Cacioppo et al., 1996, pp. 197–198). People with a high need for cognition are cognitively curious, active problem solvers, open-minded, and motivated learners (Loose et al., 2022).

As the personality trait that it is, NFC has also been tested in its capacity to predict different outcomes. For academic achievement, it is expected that individuals with higher NFC will show more motivation and enjoyment towards academic activities which in turn may result in better performance. In a recent meta-analysis (Liu & Nesbit, 2024), it was found that NFC mildly predicts academic achievement, and that

this prediction is moderated by some contextual variables such as grade level and age (NFC may be more related to academic performance as students grow older and encounter more difficult cognitive tasks at school). Concerning work performance, a study by Wu et al. (2014) found that innovative behavior within organizations is positively correlated with NFC, even independently of other personality traits related to creativity, such as openness. Moreover, another study by Nowlin et al. (2018) found that, along with affective orientation, NFC predicted sales performance by positively impacting motivation to work.

Outside the academic and occupational dimensions, for which the construct of NFC was originally thought, it has even been studied as a predictor of other variables not directly linked to cognitive performance. Within mental health research, for example, a recent 10-year longitudinal study (Zainal & Newman, 2022) reported that NFC tends to diminish symptoms of depression and anxiety and that this reduction also increases NFC. Also related to health practices, in the context

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of the recent COVID-19 pandemic, higher levels of NFC have been observed as a factor that increased the likelihood to practice protective behaviors such as following mask-wearing mandates and recognizing the importance of social distancing (Xu & Cheng, 2021). These studies suggest that overall, NFC is related to well-being through positive affect and the promotion of adaptive behaviors such as health protective practices, as has been evidenced by a recent meta-analysis (Lua et al., 2024) indicating small-to-medium positive correlations.

NFC SIX-ITEM SCALE

The original Need for Cognition Scale (NCS) consists of 34 items (Cacioppo et al., 1984). Several studies have attempted to reduce it to increase its efficiency, including a six-item version, the NCS-6 (Coelho et al., 2020), the shortest one to date. This version of the scale has shown satisfactory psychometric properties, such as convergent validity with related constructs in comparison with a larger version of the scale (e.g., differences in magnitudes equal or below .01 for 7 out of 20 compared constructs), discriminant validity with a measure of political orientation ($r = -.05$), satisfactory unidimensional structure according to confirmatory factor analysis (e.g., CFI = .97, TLI = .95, RMSEA = .08 [.063, .097]), and good internal consistency (e.g. McDonald's ω and Cronbach's $\alpha = .90$; Coelho et al., 2020).

Developing shorter versions of tests comes with several advantages: (a) in scientific research, they allow for the reduction of time and effort needed to answer a research protocol, promoting the motivation of individuals to participate and to complete it, (b) in clinical settings, they allow for the screening of psychological features in an individual, helping determine whether a more comprehensive assessment is needed, and (c) in both settings, as these short scales reduce time, they allow for the use of other psychometric measures to assess other important variables. One of these may be personality traits.

NFC AND PERSONALITY

Personality refers to an individual's pattern of cognitive, affective, and behavioral response that is mostly consistent across time and situations (Soto & John, 2017). The most commonly used model of personality is the Big Five Factor Model (BFFM), which clusters behavioral traits into the following dimensions: open-mindedness (creativity, aesthetic sensibility, and intellectual curiosity), conscientiousness (industriousness, organization and responsibility), extraversion (enthusiasm, sociability, and assertiveness), agreeableness (compassion, trust, and respect), and negative emotionality (sadness, anxiety, and emotional volatility; Soto & John, 2017).

NFC may be related to personality in at least two ways. The first is that as a trait, it may already be described in the BFFM through factors such as open-mindedness and conscientiousness, since NFC implies the goal-directed motivation towards cognitively stimulating endeavors that might be provided by creative or intellectual activities. The second is as a complementary trait for the BFFM that explores very specific behavioral expressions that are not described by the aforementioned factors. For example, NFC involves the individual's motivation towards solving complex problems, a feature that is not explicitly considered within both

open-mindedness or conscientiousness, since an individual may be goal-oriented towards intellectual activities that are not necessarily challenging or effortful. Evidence of this relation was reported by Lombardi et al. (2023), who found significant positive mild-to-moderate correlations between NFC and open-mindedness and conscientiousness, which are consistent with those reported by Hu (2022), who found that these two constructs are strong predictors of NFC.

Besides these two dimensions, NFC seems to have a less clear relationship with extraversion and negative emotionality. In the case of the former, engaging in effortful cognitive activities might be a more prominent feature of introverted personalities. However, a positive correlation might also be the case, since socialization itself might demand mental effort and provide opportunities for intellectual exchanges, and many mentally challenging tasks involve teamwork. Regarding the latter, high levels of negative emotionality might diminish motivation towards complex tasks that generate anxiety in the individual. Moreover, the tendency towards sadness itself might manifest as generalized abulia, including avoidance of cognitively demanding activities. Concerning agreeableness, it seems to have no relation with NFC, since traits such as compassion or trust do not require any involvement with mental effortfulness. Evidence for these interrelations has already been reported (Fleischhauer et al., 2010; Lombardi et al., 2023).

The Current Study

We addressed two main problems in our study. First, the lack of a validated brief measure of NFC for the Mexican population. To our knowledge, only one study has been published addressing the validation of the NCS-6 in two Uruguayan independent samples, finding satisfactory psychometric properties (Loose et al., 2022). Having this scale can encourage research around NFC in Mexican and other culturally related Latin American populations, and can serve as a tool for measuring an important predictor variable of academic, work, and overall well-being outcomes. For this purpose, we sought to provide evidence of validity and reliability of the NCS-6 in a Mexican sample, specifically: (a) convergent validity of the NCS-6 with theoretically BFFM-related factors (open-mindedness, extraversion, negative emotionality, and conscientiousness) and quality of life (a common variable for testing the NCS-6's predictive value, and a proxy of well-being), (b) divergent validity with agreeableness, (c) construct validity of the one-factor model, (d) test-retest reliability, and (e) internal consistency.

The second problem to address was whether the construct of NFC can provide additional information to the one already given by the BFFM, considering that, although included in some degree within open-mindedness and conscientiousness, NFC addresses some other behavioral expressions such as motivation for solving complex problems. For this purpose, we aimed to test the predictive value of NFC along with the BFFM in a regression model with quality of life as the outcome variable. This multivariate approach has been tested for the prediction of the construct of scientific interest, finding that NFC does provide additional information above the BFFM (Feist, 2012). Following this approach within our study may eventually serve

as justification for the complementary use of NFC in professional and research settings when assessing personality.

METHOD

Participants

The baseline data was gathered from March 4th to November 30th, 2020, and the follow up was conducted from March 1st to August 1st, 2023. The participants were Mexican men and women from across the Mexican Republic who were required to answer an online survey through Google Forms, using a nonprobabilistic snowball sampling technique. To be eligible for the study, participants had to be born in Mexico, be at least 18 years old, and had to agree to the informed consent (see Table 1 for description of participants' characteristics).

Measures

DEMOGRAPHIC QUESTIONNAIRE

This questionnaire included items on age (ranging from 18 to 60 years or higher, divided into six ordinal groups), sex (female, male), academic achievement (from no studies to doctorate degree, divided into seven ordinal groups), and self-reported social rank (low, middle, or high). Each question included an "I prefer not to answer" option.

NCS-6

This instrument is an abbreviation of the original scale developed by Cacioppo et al. (1996), with the goal of briefly measuring the tendency of individuals to engage and enjoy cognitive activities (Coelho et al., 2020). The six items are (for the Spanish-translated version, see Supplementary Table 1):

1. I would prefer complex to simple problems.
2. I like to have the responsibility of handling a situation that requires a lot of thinking.
3. Thinking is not my idea of fun. (Reverse coded)
4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities. (Reverse coded)
5. I really enjoy a task that involves coming up with new solutions to problems.
6. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.

These items are answered on a 5-point Likert scale, ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). The average of the responses is computed and used to determine the level of NFC, with higher scores indicating a higher level of NFC. For this study, we used the Spanish translation of the NCS-18 items version, by Falces et al. (2001).

Regarding the psychometric properties of the NCS-6, Coelho et al. (2020) reported a good one-factor model fit after performing con-

TABLE 1.

Descriptive Analysis of Demographics, Personality Factors, and Need for Cognition

	Baseline (N = 1366)		Follow up (N = 120)	
	Frequency or mean	Percentage or SD	Frequency or mean	Percentage or SD
Demographics				
Sex				
Female	1045	76.50	99	82.50
Male	306	22.40	21	17.50
Age				
18–24	514	37.62	20	16.60
25–30	253	18.52	29	24.16
31–40	342	25.03	37	30.80
41–50	149	11.22	21	17.50
51 or more	70	5.27	13	10.80
Education				
None-middle school	48	3.50	1	.83
High school	432	31.62	12	10.00
College	668	48.90	68	56.60
Postgraduate	218	15.95	39	32.50
Need for Cognition Scale 6	3.73	.73	3.63	.78
Personality				
Extraversion	3.43	.70	--	--
Agreeableness	3.81	.59	--	--
Conscientiousness	3.55	.71	--	--
Negative emotionality	3.05	.79	--	--
Open-mindedness	3.91	.59	--	--
Quality of life				
1-14 items score	59.2	18.26	--	--
Overall satisfaction (item 15)	3.48	1.06	--	--

firmatory factor analysis. These fit indices were better than the ones for the NCS-18 (the shortest version prior to the NCS-6). As for its reliability, it presented a Cronbach's $\alpha = .90$ in the US, and for the UK, it showed a Cronbach's $\alpha = .89$, indicating a better reliability than the 18-item version. Another more recent study (Loose et al., 2022) from two independent Uruguayan samples reported good psychometric properties of a Spanish translation, namely, acceptable fit for a one-factor model in both samples (Sample 1: CFI = .94, TLI = .89, RMSEA = .08 [90% CI .05, .12]; Sample 2: CFI = .98, TLI = .97, RMSEA = .05 [90% CI .00, .12]), evidence of construct validity via association with theoretically related constructs such as personality (e.g. extraversion $r = .34$, openness $r = .35$, and conscientiousness $r = .23$) and academic motivation (e.g., $r = .39$) and performance ($r = .13$), and acceptable Cronbach's α s, ranging from .76 to .85.

BIG FIVE INVENTORY-2 (BFI-2)

This 60-item inventory measures self-reported personality based on the BFFM, using short statements (e.g., "I'm a person who is talkative") and a five-point response scale (going from *strongly disagree* to *strongly agree*). Average scores are computed for each of the traits of the BFFM, each one composed of 12 distinct items. Also, three sub-scores corresponding to the facets of each factor can also be calculated using four items for each facet. Higher scores on either the factors or the facets indicate a stronger tendency towards that specific trait (e.g., higher scores on agreeableness indicate greater propensity towards compassion, respectfulness and trust).

The original validation of the BFI-2, by Soto and John (2017), demonstrated satisfactory psychometric properties, including: goodness-of-fit values for each factor correspondent with expected models, self-peer agreement (correlations averaging .56 and .32 for factors and facets levels, respectively), discriminant validity (correlations averaging .11 for factors), test-retest reliability (average correlation of .80 of factors), and consistent nomological network with other classical measures of the BFFM.

Another recent study conducted in a Mexican sample (Toledo-Fernández et al., 2022), reported evidence of satisfactory goodness-of-fit for the factor models of the BFI-2, satisfactory values of internal consistency for the general factors of the BFI-2 (Cronbach's α s ranging from .79 to .86), and acceptable test-retest values when comparing with an extra short version (correlations averaging .71 for factors).

QUALITY OF LIFE ENJOYMENT AND SATISFACTION QUESTIONNAIRE-SHORT FORM (Q-LES-Q-SF)

In this study, the Q-LES-Q-SF was used only during the baseline measurement to test the validity of the NCS-6, as there is evidence of association of these two constructs, because a good quality of life tends to include involvement in cognitively stimulating activities that produce enjoyment. The Q-LES-Q-SF is a self-reported scale with 15 items that evaluates quality of life in the following domains: physical health, subject feelings, leisure activities, social relationships, general activities, and life satisfaction. The responses are measured on a 5-point scale (*not at all* or *never to frequently* or *all the time*), and two primary outcomes

are assessed: the overall score obtained by summing items 1 through 14, and the response to item 15, which measures overall life satisfaction. Higher values in both outcomes indicate a better quality of life. The initial validation of this instrument reported a mean global score of 37.27, and it has been suggested that a change of at least 6.34 points is needed to detect significant difference in follow-up comparisons. This last value will be used to evaluate and interpret the average reported quality of life within our study sample.

We used a Spanish-adapted version previously employed in the Mexican population (Toledo-Fernández et al., 2022).

Procedure

To gather baseline data, an online survey was created using Google Forms, with three versions differing only in the order of the tests, to control between-measures effects. The survey was distributed through a combination of social networking and snowball sampling, including Facebook, manual advertisement on social networks and WhatsApp (by links to the survey). Participants were instructed to share the invitation with their social networks. The invitation message was the same for all links and included information about informed consent, mandatory responses to questions, and the options to receive a summary of the results and to participate in a follow-up survey.

The follow-up was performed with a three-year gap between measures (this because it was decided a posteriori of the initial protocol). Considering that NFC is a personality trait, and thus, with restricted variability across time specially at the beginning of adulthood (Caspi et al., 2005), we considered that the test-retest procedure was potentially informative. An invitation, including the link to the survey, was sent via email to the participants from the previous investigation. This survey included informed consent, demographics, the NCS-6, and the BFI-2. On this occasion, a summary of the results was not provided.

Ethical considerations were followed, including obtaining consent from participants after providing detailed information about the study's objectives, activities, confidentiality, and contact information for the main researcher. Since this was an observational study with minimal risk to participants, approval from an ethics committee was not obtained.

Statistical Analysis

For descriptive purposes, for both waves of data collection, means and standard deviations were used for numerical data, and frequencies and percentages for categorical ones. Pearson's product-moment correlation was utilized to test bivariate associations between the NCS-6, personality factors and facets, and quality of life. Afterwards, a stepwise linear regression model was employed to test the capacity of each of the personality factors along with the NCS-6 total score to predict variation in quality of life, using only the baseline data. A p-value of less than .05 was considered statistically significant.

To test factorial validity, a confirmatory factor analysis of the original model by Coelho et al., (2020) was performed using the maximum likelihood estimator. The following criteria were used to determine

goodness-of-fit of the model: CFI > .95; TLI > .95; and RMSEA < .05, following commonly used cut-off criteria (Hu & Bentler, 1999).

Finally, test-retest reliability of the NCS-6 was assessed with Pearson's correlation with three-year gap between measurements, and internal consistency was tested using McDonald's ω .

All the statistical analyses were performed using JASP 0.16.0.0 version.

RESULTS

Concerning the flow of participants, for the baseline a total of 1,351 individuals responded to the survey with no missing data for the main variables. For the follow-up, 168 individuals responded to the survey but only 120 remained for analysis after excluding those whose emails did not match with the one in the baseline. From this final sample, no missing data was found for the NCS-6.

With regards to the demographic characteristics of the baseline sample (see Table 1), most of the participants were young adults 18-30 years old (56.14%), with a college degree (48.9%), and female (76.5%). As for the follow up sample, these tendencies remained consistent: young adults (40%), college degree (56.6%), and female (82%). As to the personality traits, most of them scored between 3.05 to 3.91, indicating asymmetry of the distributions, with a tendency for higher scores, especially for open-mindedness and agreeableness. The same tendency was observed for the NCS-6 total score, though it was lower in the follow up, $t(119) = 2.603$, $p = .01$.

Concerning Table 2, which shows the results for convergent validity, it is noticeable that all comparisons between NFC, BFFM, and qual-

ity of life showed significant correlations. Among the highest positive correlations (r s between .407 and .488) were assertiveness, intellectual curiosity, and open-mindedness. Mild correlations were found with negative emotionality ($r = -.279$) and quality of life ($r = .275$). A weak association was found between NFC and agreeableness, providing evidence for divergent validity.

In relation to reliability, a moderate ($r = .66$, $p < .001$) test-retest correlation was found with a three-year gap between measurements. As for internal consistency, we found a McDonald's $\omega = .73$ for the baseline, and .80 for the follow-up.

Concerning the factorial validity of the NCS-6, a one-factor solution proved values just below the common cut-off criteria (CFI = .91; TLI = .85), and above for the RMSEA criterion (RMSEA = .11 [90% CI .09, .12]; Hu & Bentler, 1999). The items that contributed the most (estimates from .76 to .79) to the variance of the NFC factor were Items 1, 2 and 6. The fifth item, which asks about motivation towards finding creative solutions, showed lesser effect on the factor variance (estimate = .69). Items 3 and 4, which are reverse coded, displayed the lowest parameter estimates (.27 and .48, respectively).

As an exploratory analysis, aiming to test improvement of the model, we added covariances between Items 3 and 4 of the NCS-6, since they are both written in a negative form, finding better goodness-of-fit values: CFI = .95, TLI = .91 and RMSEA = .08 [90% CI .07, .10].

Regarding the linear regression model with the BFFM and NFC as predictors of quality of life, 39.8% of the explained variance was provided by the personality factors, but no significant association was found with NFC, meaning that it does not provide further explanation on the variance of quality of life than the one given by the BFFM (see Table 3).

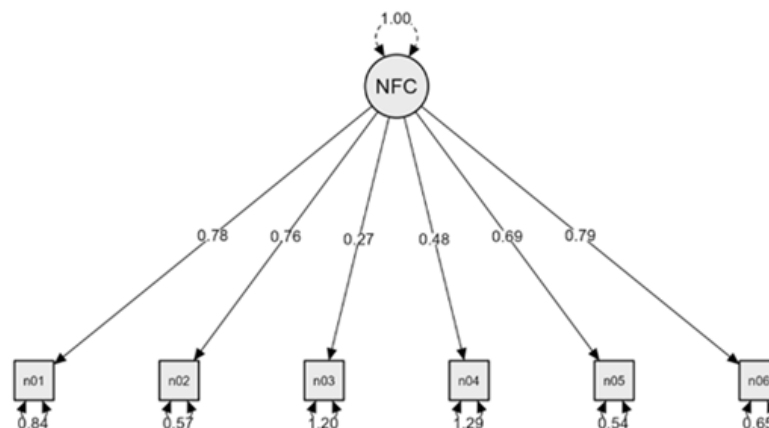


FIGURE 1.

Confirmatory factor analysis of the Need for Cognition Scale-6 items.

TABLE 2.

Pearson's Correlation Between NCS-6 Total Score, Big Five Personality Factors and Facets, and Quality of Life

Open-mindedness = .40***	Conscientiousness = .30***	Extraversion = .37***	Agreeableness = .12***	Negative emotionality = -.27***	
Intellectual curiosity = .43***	Organization = .15***	Sociability = .15***	Compassion = .05	Anxiety = -.18***	Quality of life = .27***
Aesthetic sensitivity = .19***	Productivity = .35***	Assertiveness = .48***	Respectfulness = .10***	Depression = -.28***	
Creative imagination = .36***	Responsibility = .28***	Energy level = .30***	Trust = .14***	Emotional volatility = -.23***	

*** $p < .001$

TABLE 3.

Hierarchical Regression for BFFM and Need for Cognition as Predictors of Quality of Life

	B	SE	β	R ²
Step 1				.32**
Constant	75.02	.97		
Negative emotionality	-7.96	.30	-.57**	
Step 2				.37**
Constant	56.64	2.00		
Negative emotionality	-6.35	.33	-.45**	
Extraversion	3.91	.37	.25**	
Step 3				.39**
Constant	49.45	2.29		
Negative emotionality	-5.84	.34	-.42**	
Extraversion	3.18	.39	.20**	
Conscientiousness	2.29	.37	.14**	
Step 4				.39*
Constant	46.79	2.52		
Negative emotionality	-5.90	.34	-.42**	
Extraversion	2.90	.40	.18**	
Conscientiousness	2.22	.37	.14**	
Open-mindedness	1.03	.41	.05*	
Step 5 ^a				.39
Constant	44.01	2.8		
Negative emotionality	-5.73	.35	-.41**	
Extraversion	2.86	.40	.18**	
Conscientiousness	2.05	.38	.13**	
Open-mindedness	.90	.41	.04*	
Agreeableness	.91	.44	.44*	

Note. a = The total score of the Need for Cognition Scale-6 items is considered but not included in the model since it did not prove statistical significance. BFFM = Big Five Factor Model.

DISCUSSION

The objective of this study was to test the psychometric properties of the NCS-6 in a Mexican sample. In terms of reliability, we found evidence of satisfactory internal consistency in both the baseline ($\omega = .73$) and the follow-up ($\omega = .80$), with values close to the ones found by Coelho et al. (2020) and Loose et al. (2022). Also, we found a moderate test-retest correlation ($r = .66$) with a three-year gap between measures. Although the magnitude of the association was conditioned by the time gap, the results suggest that the test was moderately stable over time, which may reflect the stability of the personality trait that is NFC.

Regarding factorial validity, overall, the goodness-of-fit indices were slightly below the ones reported by Coelho et al. (2020) in the original validation of the study. Additionally, contrary to their findings, we observed low parameter estimates for Items 3 and 4. To address this, we tested an alternative model by adding covariance between these two items, which resulted in improved goodness-of-fit values, though still not meeting the recommended thresholds (Hu & Bentler, 1999), except for the CFI, which showed an adequate value. These discrepancies may suggest the need for a further revision of the translation of these items. In general, our findings in this matter suggest that the total score of the Spanish-translated NCS-6 should be used with caution as a broad measure, and that particular items should be observed when assessing an individual.

With regards to construct validity, we found evidence of moderate convergence of the NCS-6 with open-mindedness and extraversion, a mild one with conscientiousness and negative emotionality, and divergence with agreeableness. In general, this evidence aligns with what has been found in the literature concerning the relationship between BFFM and NFC (Fleischhauer et al., 2010; Hu, 2022; Loose et al., 2022). In the case of open-mindedness, this association is explained by the traits of creativity and intellectual curiosity that characterized this factor, which are in turn traits that are also associated with NFC (Items 1, 4, 5 and 6 of the NCS-6). However, both constructs can differ in the sense that NFC also considers mental effort towards this type of activities (e.g., a person can be motivated towards intellectual activities that do not demand such effort). The moderate correlation with extraversion could be explained by the fact that some social interactions may demand cognitive effort by themselves or that some cognitively demanding activities are often social in nature (e.g., school). This association might also be somewhat related to the enthusiasm facet of extraversion (the energy level facet of the BFI-2), as individuals high in this trait might be motivated towards several activities including cognitively demanding ones.

The mild association of the NCS-6 with conscientiousness was expected since individuals with higher levels of this trait are typically more goal-directed and effort-oriented, often engaging in activities

that require perseverance, which could sometimes include cognitively challenging tasks (e.g., an athlete high in conscientiousness might be motivated towards physically demanding activities but not cognitive ones). Concerning negative emotionality, the mild association was also anticipated, as individuals high in this trait may experience anxiety or lack motivation for demanding tasks, or, due to emotional instability, may abandon activities that require sustained effort such as those that are cognitively demanding.

As for agreeableness, only a weak positive correlation was found with NFC, which is theoretically expected, because NFC does not encompass traits such as altruism and empathy, which are central to this factor. This provides evidence of divergent validity of the NCS-6. The literature concerning the relationship between the BFFM and NFC is consistent in this regard, noting a lack of meaningful association of the latter with agreeableness (Fleischhauer et al., 2010; Loose et al., 2022).

The final objective of the study was to test whether NFC could serve as a complementary variable to the BFFM when assessing personality and predicting important outcomes such as quality of life. The assumption was that NFC includes certain behavioral traits not fully captured by factors such as open-mindedness and conscientiousness. However, based on the results of our linear regression model, we found no evidence supporting this assumption. This contrasts with the results reported by Feist (2012), who did find a 3% increase in explained variance when adding NFC (measured with the NCS-18) along the BFFM for the prediction of attitude towards science. It is worth noting that, even though the outcome reported by Feist (2012) is more closely related to NFC than quality of life, and that they used a more comprehensive measure of NFC, they still found a poor increase in the predictive capacity of their model, suggesting that, indeed, NFC-related traits are mostly included in the BFFM.

Limitations

First, the sampling was nonprobabilistic, which biased the recruitment toward young adult females with high school to college education and self-reported middle socioeconomic status. These features could have conditioned the responses to the instruments. For example, it is possible that individuals with college degree could have reported higher NFC than those with lower degrees. Also, the sample being comprised mostly by women, could have oriented personality factors such as agreeableness and negative emotionality towards negative and positive distributions, respectively. It is important to notice, however, that several of our findings were in tune with those of the previous literature (which also tends to employ non-probabilistic samples), which could speak for the validity of our results; some other of our findings, such as the goodness-of-fit of the NCS-6 model will still need further testing in future studies.

One last important limitation was the fact that the baseline data was collected during the COVID-19 pandemic, which could have impacted the scores in some measures such as in negative emotionality due to pandemic-related anxiety. Even NFC could have been swayed because of the restricted opportunities to engage in cognitive stimulating activities due to lockdown measures.

CONCLUSION

This study had the overall purpose of introducing the NCS-6 for its use within the Mexican population. As the first study of its kind to evaluate its psychometric properties. Although evidence was not found regarding the usefulness of the NCS-6 as a complementary measure when assessing personality with the BFFM, we gathered sufficient evidence as to suggest its use as an individual measure of the specific behaviors comprised by NFC, especially by using individual items.

Future validity studies should test our findings using probabilistic sampling methods and recruitment and testing of special subgroups identified as possible cases of high NFC, such as high achieving students or employees. Also, these future studies should consider the use of other, more closely related and objective outcomes to measure predictive validity of NFC, for instance, academic grades and workplace productivity.

DATA AVAILABILITY

Data is available upon request to the corresponding author.

REFERENCES

- Cacioppo, J. T., Petty, R. E., & Feng Kao, C. (1984). The efficient assessment of need for cognition. *Journal of Personality Assessment*, 48(3), 306–307. https://doi.org/10.1207/s15327752jpa4803_13
- Cacioppo, J. T., Petty, R. E., Feinstein, J. A., & Jarvis, W. B. G. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. *Psychological Bulletin*, 119(2), 197–198. <https://doi.org/10.1037/0033-2909.119.2.197>
- Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology*, 56, 453–484. <https://doi.org/10.1146/annurev.psych.55.090902.141913>
- Coelho, G., Hanel, P. & Wolf, L. (2020). The very efficient assessment of need for cognition: developing a six-timen version. *Sage*, 27(8), 1870–1885. <https://doi.org/10.1177/1073191118793208>
- Falces, C., Briñol, P., Sierra, B., Becerra, A., & Alier, E. (2001). Validación de la escala de necesidad de cognición y su aplicación al estudio de cambio de actitudes. [Validation of need for cognition scale and its application to the study of attitude change]. *Psicothema*, 13(4), 622–628.
- Feist, G. J. (2012). Predicting interest in and attitudes toward science from personality and need for cognition. *Personality and Individual Differences*, 52(7), 771–775. <https://doi.org/10.1016/j.paid.2012.01.005>
- Fleischhauer, M., Enge, S., Brocke, B., Ullrich, J., Strobel, A., & Strobel, A. (2010). Same or different? Clarifying the relationship of need for cognition to personality and intelligence. *Personality & Social Psychology Bulletin*, 36(1), 82–96. <https://doi.org/10.1177/0146167209351886>
- Hu, H. (2022). The need for cognition as it relates to personality traits of openness to experience and conscientiousness. *BCP Education and Psychology* 7, 241244.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in

- covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Liu, Q., & Nesbit, J. C. (2024). The relation between need for cognition and academic achievement: A meta-analysis. *Review of Educational Research*, 94(2), 155–192. <https://doi.org/10.3102/00346543231160474>
- Lombardi, E., Aloï, E., Tarchi, C. & Traficante, D. (2023). Measuring the need for cognition: Structural analysis and measurement of invariance of the short version of the Need for Cognition Scale in Italian adolescents. *Applied Psychology Bulletin*, 296, 77–90. <https://doi.org/10.26387/bpa.2023.00001>
- Loose, T., Vásquez, A. & Álvarez, L. (2022). Spanish version of need for cognition scale: Evidence of reliability, validity and factorial invariance of the very efficient short form. *Current Psychology*, 42(17), 14440–14451. <https://doi.org/10.1007/s12144-022-02739-2>
- Lua, V. Y. Q., Ooi, W. M., Najib, A., Tan, C., Majeed, N. M., Leung, A. K.-y., & Hartanto, A. (2024). Think your way to happiness? Investigating the role of need for cognition in well-being through a three-level meta-analytic approach. *Motivation and Emotion*, 48(1), 75–99. <https://doi.org/10.1007/s11031-023-10047-w>
- Nowlin, E. L., Walker, D., & Anaza, N. A. (2018). How does salesperson connectedness impact performance? It depends upon the level of internal volatility. *Industrial Marketing Management*, 68, 106–113. <https://doi.org/10.1016/j.indmarman.2017.10.007>
- Soto, C. J., & John, O. P. (2017). The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *Journal of Personality and Social Psychology*, 113(1), 117–143. <https://doi.org/10.1037/pspp0000096>
- Toledo-Fernández, A., Pérez-Matus, S., Villalobos-Gallegos, L. (2022). The Big Five Inventory-2: Confirmatory factor analysis and latent profiles in Mexican sample. *Suma Psicológica*, 29(2), 119–128. <https://doi.org/10.14349/sumapsi.2022.v29.n2.4>
- Wu, C.-H., Parker, S. K., & de Jong, J. P. J. (2014). Need for cognition as an antecedent of individual innovation behavior. *Journal of Management*, 40(6), 1511–1534. <https://doi.org/10.1177/0149206311429862>
- Xu, P., Cheng, J. (2021). Individual differences in social distancing and mask-wearing in the pandemic of COVID-19: The role of need for cognition, self-control and risk attitude. *Personality and Individual Differences*, 175, 110706. <https://doi.org/10.1016/j.paid.2021.110706>
- Zainal, N. H., & Newman, M. G. (2022). Curiosity helps: Growth in need for cognition bidirectionally predicts future reduction in anxiety and depression symptoms across 10 years. *Journal of Affective Disorders*, 296, 642–652. <https://doi.org/10.1016/j.jad.2021.10.001>

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SUPPLEMENTARY MATERIAL

TABLE A1.

Spanish-Translated Items of the Need for Cognition Scale – 6 Items Version

1. Me atraen más los problemas muy complejos que los sencillos.
2. Me gusta asumir la responsabilidad de afrontar una situación que requiere pensar mucho.
3. Pensar no responde a mi idea de diversión.
4. Prefiero hacer algo que requiere pensar poco a algo que sea un reto para mi capacidad intelectual.
5. Realmente me gustan las tareas que requieren encontrar nuevas soluciones a los problemas.
6. Prefiero una tarea que sea intelectual, difícil e importante, más que una que no requiera pensar mucho, sea o no sea importante.

Response options are in a Likert scale from 1 = *Nada característico de mí* to 5 = *Muy característico de mí*.

TABLE A2.

Fit Indices for the One-Factor Model of the Need for Cognition Scale – 6 Items Version

Index	Value
Fit indices	
Comparative fit index (CFI)	0.91
Tucker-Lewis index (TLI)	0.85
Bentler-Bonett nonnormed fit index (NNFI)	0.85
Bentler-Bonett normed fit index (NFI)	0.90
Parsimony normed fit index (PNFI)	0.54
Bollen's relative fit index (RFI)	0.84
Bollen's incremental fit index (IFI)	0.91
Relative noncentrality index (RNI)	0.91
Information criteria	
Log-likelihood	-11785.80
Number of free parameters	18.00
Akaike information criterion (AIC)	23607.61
Bayesian information criterion (BIC)	23701.57
Sample-size adjusted Bayesian (SSABIC)	23644.39
Other fit measures	
Root mean square error of approximation (RMSEA)	0.11
RMSEA 90% CI lower bound	0.09
RMSEA 90% CI upper bound	0.12
RMSEA <i>p</i> -value	2.842×10^{-12}
Standardized root mean square residual (SRMR)	0.04
Hoelter's critical <i>N</i> ($\alpha = .05$)	140.08
Hoelter's critical <i>N</i> ($\alpha = .01$)	179.10
Goodness of fit index (GFI)	0.99
McDonald fit index (MFI)	0.94
Expected cross validation index	0.14