

Revisiting the Factorial Validity of the 15-item Need for Closure Scale

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ABSTRACT - The purpose of this study was to re-assess the factorial validity of Roets and Van Hiel's (2011) 15-item Need for Closure Scale (NFCS) while correcting for methodological limitations associated with their initial validation of the measure. Four hundred twelve adult volunteers completed the NFCS as part of an unrelated study. Confirmatory factor analysis of the measure revealed evidence of a single dominant factor with results consistent with those presented by Roets and Van Hiel. Internal consistency for the measure was also high. Despite continued limitations in operationalizing the close-mindedness facet, the 15-item NFCS appears to be a satisfactory measure of the need for closure construct.

Need for closure refers to a desire for firm, stable, and secure knowledge as opposed to experiencing ambiguity (Kruglanski & Webster, 1996). Research indicates that although the need for closure can arise from external conditions such as mental fatigue, time pressure, noise, and task dullness, it also can be thought of as a stable dimension of individual differences (Webster & Kruglanski, 1994). In order to measure individual differences in closure needs, Webster and Kruglanski (1994) developed a 42-item Need for Closure Scale. When constructing the scale, the authors wrote items to represent five different manifestations (i.e., facets) of need for closure: preference for order (ten items), preference for predictability (eight items), decisiveness (seven items¹), discomfort with ambiguity (nine items), and close-mindedness (eight items). Based on the authors' factor analytic work, as well as the work of others (see e.g., Roets & Van Hiel, 2011), the NFCS is generally treated within the literature as measuring a unidimensional need for closure construct (see Neuberg, Judice, & West, 1997, for a different perspective on the dimensionality of the NFCS).

Recently, Roets and Van Hiel (2011) noted that the length of the full NFCS has led many researchers to develop "idiosyncratic" measures of the construct as a practical solution to the problem of scale length. They correctly noted that lack of standardization in measurement presents difficulties when it comes to comparing research findings across studies. As a response to this problem, they developed a shorter, 15-item measure of need for closure by factor analyzing their 41-item NFCS (Roets & Van Hiel, 2007) in an aggregated sample of 1584 participants. They selected their items by forcing a single component solution (from an initial principal components analysis, PCA) and then choosing the three highest loading items from each (theorized) closure facet from their

original 41-item measure. This, they reasoned, allowed the “content richness and the predictive power of the construct” (p. 91) to be maintained. Following, the authors utilized exploratory (components analysis) and confirmatory factor analysis to provide factor analytic evidence for the fit of their one-factor model.

In their discussion, Roets and Van Hiel (2011) raised a question in regards to their study findings. Specifically, they noted that “it might be possible that the responses on the 15-item scale somewhat depend on whether these items are imbedded in the full NFCS or whether they are assessed as a stand-alone questionnaire” (p. 94). In effect, this statement was an acknowledgement that the measurement properties of their 15-item NFCS may depend, in part, on the context in which the items were originally measured. By changing the context of measurement, researchers using the reduced 15-item measure of need for closure may be changing the measurement of the closure construct. Based on their reasoning, Roets and Van Hiel recommended future research testing the 15-item scale as a “stand-alone measure” (p. 94). One aim of the present study was to address this question.

A second aim of this study was to address a methodological limitation associated with the Roets and Van Hiel (2011) study. Specifically, following item selection based on an initial factor analysis, the authors utilized exploratory and confirmatory factor analysis to validate their model using *the same sample data* from which the 15-item measure was developed. A potential consequence of this approach is that the authors capitalized on sample-specific factors, resulting in an overfitting of their model to the data and a decrease in the likelihood that their model validation results would replicate in future population samples. Arguably, a better strategy for validating their single factor model is to cross-validate their model in an independent population sample. In this study, I sought to address this methodological limitation by factor analyzing the 15-item measure using an independent sample.

Method

Participants

Four hundred twelve individuals (male 30.8%, female 68.9%, 1 missing) participated in this study. Participants’ ages ranged from 17 to 82 (Mean=34.46, SD=12.98). In terms of racial/ethnic breakdown, 71.4% of the sample identified themselves as White, 8.7% as African American/Black, 6.3% as American Indian or Alaska Native, 4.6% as Asian, and 3.9% as Hispanic/Latino.

Measures and Procedures

Participants were solicited electronically (e.g., via email, Facebook) by graduate students enrolled in this author’s quantitative methods course to participate in an unrelated study. Participants who agreed to participate logged onto Survey Monkey and completed a questionnaire containing the 15-item measure of Need for Closure Scale (Roets & Van Hiel, 2011), along with other questionnaires measuring political ideology, dogmatism, and political interest and involvement.³ Participants responded to items on the need for closure measure on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Example items from the 15-item NFCS include, “I dislike it when a person’s statement could mean many different things” and “I enjoy having a clear and structured

mode of life. Based on Roets and Van Hiel's (2011) work, each of the five (i.e., preference for order, preference for predictability, decisiveness, discomfort with ambiguity, close-mindedness) theorized facets of need for closure was measured with three items from the 15-item scale.

Results

Confirmatory Factor Analyses

LISREL 8.80 was utilized to carry out confirmatory factor analyses on the 15-item Need for Closure Scale. Missing data were treated with multiple imputation through PRELIS. Initial data screening revealed departures from univariate normality on a number of items. Unsurprisingly, the test of multivariate normality was statistically significant ($p < .001$) as well, indicating a violation of the multivariate normality assumption required for accurate maximum likelihood estimation. As such, an asymptotic variance-covariance matrix was input into LISREL as a weight matrix along with the sample covariance matrix. Fit of the confirmatory factor analysis (CFA) models was judged according to the criteria suggested by Kline (2011) and Schumacker & Lomax (2010). RMSEA and SRMR values less than .05, AGFI and NFI values around .90 or greater, and CFI values around .95 or greater are each considered indicators of good model fit.

Six CFA models² were tested with the data. For the first model test, all items from the 15-item Need for Closure Scale were loaded onto a single latent need for closure variable. Consistent with the approach taken by Roets and Van Hiel (2011) in their validation study, the error terms for items within the same facet were allowed to correlate. Overall, this model fit the data quite well (see Table 1). All factors loadings were statistically significant in the model. The R^2 values for the items ranged from .02 to .52, with 13 of the 15 items exhibiting R^2 values greater than .15. The two lowest loading items were "I do not usually consult many different opinions before forming my own view" ($R^2 = .02$) and "When I have made a decision, I feel relieved" ($R^2 = .12$). The former item was from the close-mindedness facet, whereas the latter was from the decisiveness facet, of Roets and Van Hiel's (2007) 41-item NFCS. Ranges of within-facet R^2 values for the one-factor, correlated errors model are as follows: preference for order, .32 - .34; preference for predictability, .29 - .49; decisiveness, .12 - .26; discomfort with ambiguity, .31 - .52, close-mindedness, .02 - .33.

The second CFA involved testing a one-factor model that did not allow for correlated errors. The overall fit of this model was poor (Table 1), although all factors loadings were statistically significant. The R^2 values for the items ranged from .04 to .61, with 12 of the 15 items exhibiting R^2 values greater than .15. The third CFA was a test of a five-factor model with the five need for closure facets (see Webster & Kruglanski, 1994) being treated as uncorrelated. The R^2 values for the items ranged from .05 to .92, with 14 of the 15 items exhibiting R^2 values greater than .15. The fit indices (Table 1) for this analysis indicated that the model was also a very poor fit to the data.

The fourth CFA involved a test of a correlated, five-factor model. The fit statistics for this model were suggestive of good fit to the data (see Table 1). However, upon further inspection, it was apparent that the correlation matrix of latent factors for this final model was non-positive definite. This appeared to stem from the presence of linear

dependencies in the matrix (see Schumacker & Lomax, 2010), as evidenced by several correlations falling at or above .79 (with two exceeding .90).

The fifth CFA involved a test of a correlated two-factor model, consistent with Neuberg et al.'s (1997) claim that items from the Need for Closure Scale measures two factors: "desire for decisiveness" (represented by the decisiveness items) and the "need for simple structure" (represented by the remaining items; p. 1408). Although Roets and Van Hiel (2007) revised the decisiveness scale to better measure the need for closure construct as originally conceptualized by Webster and Kruglanski (1994), a two-factor test of their 15-item Need for Closure Scale nevertheless seemed prudent for this study. The overall fit of the correlated two-factor model was poor (Table 1), although all factors loadings were statistically significant. The R^2 values for the items ranged from .04 to .80, with 13 of the 15 items exhibiting R^2 values greater than .15. Further supporting a unidimensional interpretation of the scale, the correlation between the two factors was .53 ($p < .001$). Finally, the sixth CFA involved a test of an uncorrelated two-factor model. The fit of this model to the data was poorer than that of the correlated-errors model.

Table 1
Model Fit Statistics

	SB χ^2	RMSEA	RMSEA 90% CI	CFI	SRMR	AGFI	NNFI
One-factor, correlated errors	151.58 ($p < .001$)	.05	.04, .06	.97	.05	.90	.96
One-factor, uncorrelated errors	648.51 ($p < .001$)	.12	.11, .13	.87	.08	.70	.84
Five uncorrelated factors	800.97 ($p < .001$)	.14	.13, .15	.83	.26	.67	.80
Five correlated factors	160.85 ($p < .001$)	.05	.04, .06	.97	.05	.90	.96
Two correlated factors	586.69 ($p < .001$)	.12	.11, .13	.89	.08	.72	.87
Two uncorrelated factors	671.11 ($p < .001$)	.13	.12, .13	.87	.16	.70	.85

Note. **Correlation matrix of latent variables is non-positive definite

Internal Consistency

Cronbach's alpha for the 15-item scale was .87 in this sample.

Discussion and Conclusion

The first model test in the current study largely replicated the Roets and Van Hiel (2011) results. Although the overall fit of the 15-item NFCS was somewhat poorer than that presented in the Roets and Van Hiel study, the fit of the one-factor model in the current sample was reasonably good. Also similar to the previous study, items measuring the facets preference for order, preference for predictability, and discomfort with ambiguity appeared to be the stronger, whereas items measuring close-mindedness and decisiveness appeared to be weaker, indicators of the need for closure construct. It is notable that the same poor loading close-mindedness item in the Roets and Van Hiel study also emerged as the poorest indicator of close-mindedness in the current study, suggesting that perhaps this item in particular needs re-consideration in the long- and short-forms of the NFCS. The internal consistency of the 15-item measure in the current study was exactly that presented in Roets and Van Hiel's study, suggesting that the internal consistency of the measure may hold up across independent samples (holding other test conditions constant).

Five alternative models were considered in this study. A comparison of the single-factor models (with and without correlated errors) revealed that there is significant

variation in the items that may be facet-specific, irrespective of the variation attributable to need for closure. A comparison of the model fit statistics from the one-factor (correlated errors) and five-factor (correlated and uncorrelated factors) models reveals that a single factor model better explains the variation in the 15-item measure than a five factor model. Similarly, the one-factor (correlated errors) model appears to exhibit a substantial improvement in fit over that of two-factor (correlated and uncorrelated) models.

Conclusion

The current study was designed to address methodological limitations associated with Roets and Van Hiel's (2011) validation of the 15-item measure of Need for Closure. First, the study was based exclusively on the 15 items Roets and Van Hiel selected for inclusion in their shortened scale, thereby addressing the question of whether item-presentation context may have impacted their results. Secondly, the study was based on an independent sample of respondents, unlike Roets and Van Hiel who developed their measure and validated it on the same set of participants. Based on the findings from the current study, it appears that methodological limitations associated with Roets and Van Hiel's (2011) study did not bias their results or interpretation of the measure in any substantive way. It seems reasonable to conclude that the 15-item Need for Closure Scale does function as a reasonable alternative to the 41-item scale described by Roets and Van Hiel (2007). Even so, it appears that more work needs to be done to identify a better set of indicators of the close-mindedness facet.

Footnotes

¹Criticisms surrounding the operationalization of the decisiveness facet (i.e., that it measured ability rather than need content) prompted Roets and Van Hiel (2007) to revise the decisiveness facet (6 items).

²Technically, the first model represents a direct effort to replicate the results obtained by Roets and Van Hiel's (2011) in their analysis of the 15-item scale. I also tested five additional models that I considered to be plausible alternative models concerning the factor structure of the scale. Thanks to an anonymous reviewer for this suggestion. Three- and four factor models were not considered as there are no theoretical or empirical precedents for loading the items in these ways.

³Because these variables are not used in the current study, they will not be described further.

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