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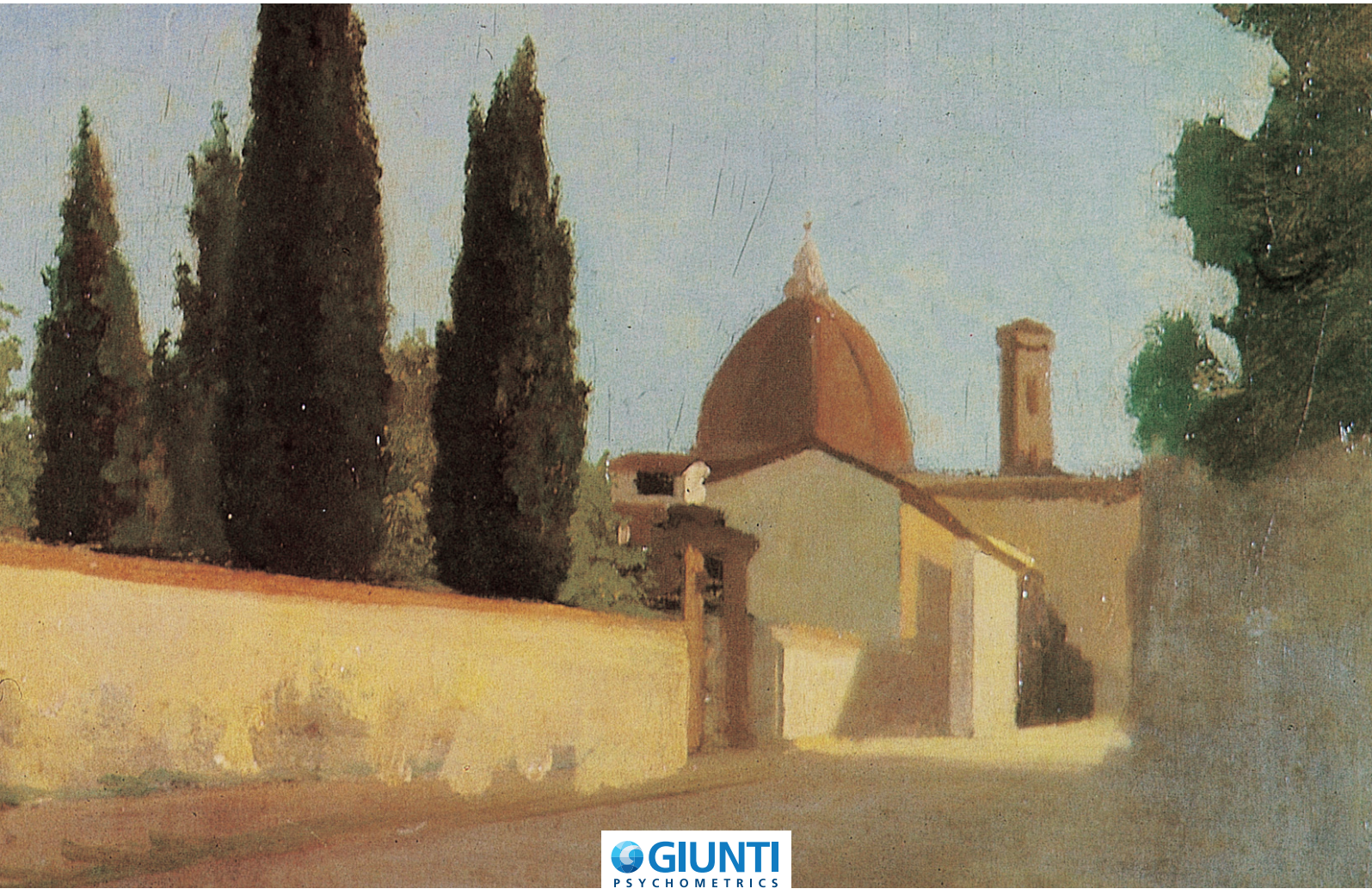

GIUNTI PSYCHOMETRICS

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Validation of the Italian version of the Need for Cognition Scale – Short Version

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ABSTRACT. Il contributo è finalizzato a fornire una validazione italiana della scala del Need for Cognition – Short Version (Cacioppo, Petty & Kao, 1984), uno strumento che misura le differenze individuali nella motivazione ad impegnarsi e apprezzare attività che richiedono uno sforzo cognitivo. L'interesse verso questa scala nasce dal suo utilizzo in diversi campi di ricerca, quali la persuasione, la percezione sociale, la psicologia politica. Sia l'analisi esplorativa che l'analisi confermativa, condotte su un campione di 508 partecipanti, hanno evidenziato l'emergere di due fattori legati a due differenti motivazioni: l'approccio alle situazioni cognitive e l'evitamento di situazioni che richiedono uno sforzo cognitivo. Le buone proprietà psicometriche della scala consentono di usare questo strumento in differenti ambiti sia di ricerca che scolastici.

SUMMARY. This research aims at providing an Italian validation of the Need for Cognition Scale – Short Version (NCS). This instrument measures individual differences in the motivation to enjoy effortful cognitive activities. NCS was administered to 508 students, equally distributed by gender (Mean age = 20.78; SD = 1.75). The Italian version of the scale, translated and adapted from the original version, is composed of 18 items on a 7-point Likert scale. An exploratory factorial analysis (Random split sample = 254) and a confirmatory factorial analysis (Random split sample = 254) proved that the scale had two correlated factors measuring two different kind of motivations (approach and avoidance of effortful cognitive activities). Results also indicated that the NCS had good reliability indices and satisfactory discriminant and convergent validity. Thanks to its good psychometric properties, the NCS has been proven to be a reliable tool in both educational and research areas.

Keywords: *Need for cognition, Approach, Avoidance*

INTRODUCTION

The *Need for Cognition* (*NC*; Cacioppo & Petty, 1982; Cacioppo, Petty, Feinstein & Jarvis, 1996) refers to individual differences in the motivation to enjoy and engage in effortful cognitive activities. Individuals with lower intrinsic motivation to think are characterized as cognitive misers, whereas individuals possessing higher intrinsic motivation to reasoning are thought to be chronic thinkers. Extensive research has showed that the NC affects different cognitive processes, including decision making, information processing, evaluating and recalling. In relation to the decision making, those high in NC tend to overthink available options prior to making a final decision. Furthermore, those who are high in NC have more positive attitudes toward tasks that require reasoning (e.g., recalling an information) and make more frequent or more extensive experiences using technologies that require effortful thinking (e.g., computer-aided instruction). Similarly, individuals high in NC are more influenced by the quality of arguments concerning a persuasive message processing compared to individuals low in NC. According to the Elaboration Likelihood Model of Persuasion (Petty & Cacioppo, 1986), in fact, people that are relatively unmotivated or unable to carefully/thoroughly process a persuasive message appear to be influenced by heuristic cues in the persuasion setting (e.g., how attractive the message source is). Research supported the idea that NC acts as a motivational drive to thinking and has shown that individuals low in NC are more influenced by heuristic cues than individuals high in NC (see Cacioppo et al., 1996, for a review). An alternative model offers a single-route reconceptualization that treats the dual routes to persuasion as involving functionally equivalent types of evidence from which persuasive conclusions may be drawn (Kruglanski & Thompson, 1999). However, also in the single-route model the NC is recognized as a motivation in determining the extent to which available evidence gets processed.

Since Cacioppo and Petty (1982) described the NC as a stable individual difference, they developed a 34-items scale for its assessment (*Need for Cognition Scale*, *NCS*), characterized by a single dominant factor as resulted from the Principal Component Analysis (PCA). Cacioppo et al. (1984) subsequently reduced the NCS to 18 items, based on those items with the highest factor loadings. Half of the items reflect a preference for effortful cognitive endeavours (e.g., "I really enjoy a task that involves coming up with new solutions to problems"), whereas the remaining items reflect the absence of such preference (e.g., "Thinking is not my idea of fun"). PCA on these 18 items extracted a single dominant factor that explained the 37% of the variance, with a high level of internal consistency (Cronbach's alpha = .90). Other authors have previously supported such one-dimension structure (e.g., Furlong, 1993), based on the PCA and the reliability index. However, the fact that all items of a scale load positively on a first unrotated factor, and that factor accounts for a moderate proportion of the total variance, does not preclude the emergence of two or more interpretable factors, after rotation (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Specifically, Stark, Bentley, Lowther and Shaw (1991) proposed a bi-factorial solution with a differentiation between the items reflecting an approach to cognitive effortful activities and those reflecting an avoidance of the cognitive activities. This solution has become predominant in last years. Relevant for the present paper, Forsterlee and Ho (1999) performed PCA followed by oblique rotation on the 18-item NFC and they reported a two-factor solution with the differentiation between the approach and the avoidance dimension. The 2 factors resulted highly correlated (r = .52). Similarly, Bors, Vigneau and Lalande (2006) reported a two-factor model for the French version of the scale with the differentiation between the approach and the avoidance dimension. Interestingly, the authors found out that only the avoidance dimension of NC was predictive of the academic success, supporting the idea that the approach and the avoidance are separate constructs of the NC. Recently, Zhang, Noor and Savalei (2016) performed a parallel analysis on NCS and the plot clearly indicated the bi-dimensional solution. In psychological research, however, the differentiation between the approach and the avoidance dimensions has already been widely accepted. A long-standing tradition of psychological theory and research suggests that these two motivations are at least somewhat distinct and, therefore, both motivations should be addressed separately (see Maio, Haddock & Verplanken, 2018, for a review).

To sum up, despite the one-dimensional solution has long been considered the best solution for the NCS, in the last decades the bi-factorial solution with the differentiation between the approach and the avoidance dimension of the NC predominates. Although several studies have used the NCS, to the best of our knowledge, researchers have not

directly tested the NCS structure in the Italian context. The present study, therefore, aims to provide a NC scale for the Italian context and to test its structure and validity.

AIMS AND OBJECTIVES

In the present research we addressed the study of the validation of the NCS (Short Version) in the Italian context. In particular, we aimed: 1) to test the NCS factor structure in an Italian sample; 2) to test the reliability of NCS in terms of internal consistency; 3) to investigate the relationship between the NC and other measures of cognition. More precisely, we explored the relationship between the NC and the cognitive dimension of the *Motivated Consumer Innovativeness* (*MCI*; Vandecasteele & Geuens, 2010), that is the extent to which an individual is oriented to buy new products for the desire to be mentally stimulated. We expected the CCI to correlate only with the approach dimension of the NC, given that both these dimensions reflect an approach to objects requiring effortful cognitive activities.

Furthermore, we explored the relationships among the dimensions of the NC and the *Need for Cognitive Closure* (*NCC*; Krusglanski, 1990), that is a cognitive-motivational content independent construct, defined as preference for definitive order and structure, a desire for firm or stable knowledge and a desire to figure out quick-fix solutions. Antecedents of this epistemic motivation are to be found in certain specific conditions that highlight the cost of openness and the benefits of closure (e.g. time pressure, ambient noise, mental fatigue). Past studies showed that NCC is negatively related to NC (Cacioppo et al., 1996), but a possible different relation with the approach and the avoidance dimension of NC has not been investigated yet. It could be reasonable to expect that this relationship is mainly driven by the avoidance dimension, given that this dimension reflects a tendency to avoid situations requiring long reasoning and a preference for a fast solution. We expected low or no correlation between the NCC and the approach dimension of NC.

The differentiation between the approach and the avoidance is not confined to the NC but it is present in other psychological constructs, as, for instance, the *Need for Affect* (*NA*; Maio & Esses, 2001), that is a motivation to approach emotional situations. Literature in this field showed a positive relationship between the total score of NA and NC, suggesting that NC also involves openness to emotional experience (Maio et al., 2018). To the best of our knowledge, nobody investigated the relationship between the approach and the avoidance dimensions of NA and NC. We expected the approach dimensions of these two scales to correlate with each other. Similarly, we expected the avoidance dimensions in the two scales to correlate (with each other) as well.

METHOD

Participants and procedure

The sample included 508 participants, with a mean age of 20.78 years (*SD* = 1.75, *range* = 19-36). Of these participants, 302 were females (59.40%). All participants had a high-school diploma, (4.5% of the sample further achieved the BA-degree).

The Italian version of the NCS was assessed both via an online procedure and a pen-pencil procedure. The students attending the University of Chieti and the University of Caserta were invited to enrol in research regarding attitudes and to complete an online (or a pen-pencil) questionnaire. In the first page, participants were informed that participation was voluntary, and that data were collected anonymously and used for research purposes only. The first section of the questionnaire aimed to assess demographic characteristics (i.e., age, gender, instruction). Then, all participants completed the Italian translation version of 18-items NCS (Cacioppo et al., 1984). In order to translate the items of the scale, a back-translation method was used. The original items of the scale and the translated ones are presented in Table 1.

Additionally, a sub-sample of 70 participants also completed the scales necessary to assess the convergent and divergent validity of the NCS. At the end of the questionnaire participants were thanked and debriefed.

Measures

– *Need for Cognition*. Participants rated the extent to which they agreed with the translated items of the approach (e.g., "I really enjoy a task that involves coming up with new solutions to problems", α = .79) and the avoidance dimension (e.g., "Thinking is not my idea of fun", reverse scored, α = .77). Participants responded to these statements on a 7-point scale from 1 = totally disagree to 7

Table 1 – Translated items of the NCS

Translated (and original) items of the NCS
NC1 - Preferisco i problemi complessi a quelli semplici (I prefer complex to simple problems)
NC2 - Mi piace avere la responsabilità di occuparmi di una situazione che richiede lunghi ragionamenti (I like to have the responsibility of handling a situation that requires a lot of thinking)
NC6 - Provo soddisfazione a riflettere lungamente ed intensamente per ore (I find satisfaction in deliberating hard and for long hours)
NC10 - Mi piace l'idea di fare strada facendo affidamento sul mio pensiero per raggiungere il massimo (The idea of relying on thought to make my way to the top appeals to me)
NC11 - Mi piacciono veramente i compiti che richiedono di escogitare nuove soluzioni ai problemi (I really enjoy a task that involves coming up with new solutions to problems)
N*C13* - Preferisco che la mia vita sia piena di problemi da risolvere (I prefer my life to be filled with puzzles I must solve)
NC14 - Mi attira l'idea di pensare in modo astratto (The notion of thinking abstractly is appealing to me)
NC15 - Preferirei un compito intellettuale, difficile ed importante, piuttosto che uno che sebbene importante non richieda molte riflessioni (I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought)
N*C18* - Di solito finisco col riflettere sui problemi anche quando non mi riguardano personalmente (I usually end up deliberating about issues even when they do not affect me personally)
NC3re - Pensare non corrisponde all'idea che ho del divertimento (Thinking is not my idea of fun)
NC4re - Preferirei fare qualcosa che richieda poche riflessioni piuttosto che qualcosa che sicuramente rappresenti una sfida alle mie capacità cognitive (I would rather do something that requires little thought 1than something that is sure to challenge my thinking abilities)
NC5re - Cerco di prevenire ed evitare situazioni in cui ci sia un'elevata probabilità di dover riflettere a fondo su qualche argomento (I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something)
NC7re - Penso solo tanto quanto basta (I only think as hard as I have to)
NC8re - Preferisco pensare a piccoli progetti quotidiani piuttosto che a progetti a lungo termine (I prefer to think about small daily projects to long term ones)
NC9re - Mi piacciono quei compiti che richiedono poca riflessione dopo avere imparato a svolgerli (I like tasks that require little thought once I've learned them)
NC12re - Non mi eccita granché imparare nuovi modi di pensare (Learning new ways to think doesn't excite me very much)
N*C16re* - Mi sento più sollevato che soddisfatto dopo aver terminato un lavoro che mi ha richiesto un grande sforzo mentale (I feel relief rather than satisfaction after completing a task that requires a lot of mental effort)
NC17re - Mi basta sapere che qualcosa abbia permesso di concludere il lavoro; non mi interessa come o perché funzioni (It's enough for me that something gets the job done; I don't care how or why it works)

Legenda. re = reverse items.
Note. Original items are in brackets.

= totally agree. For the approach dimension, we computed a score as the mean of the items, reflecting the approach dimension, so that higher scores indicate higher tendency to approach cognitive tasks. Similarly, we computed a score for the avoidance dimension by reverse scoring the avoidance items and calculating their mean. Consequently, for the avoidance dimension, a higher score indicated a minor tendency to avoid cognitive situations.

- *Cognitive Consumer Innovativeness*. The Italian version of the CCI Scale (Caricati & Raimondi, 2015; α = .85) comprises 6 items which measure the consumer innovativeness motivated by the desire to engage in mentally stimulating activities (e.g., "I often buy new products that make me think logically"). Participants responded to these statements on a 7-point scale from 1 = totally disagree to 7 = totally agree. A final score was computed as the mean of the items.
- *Need for Affect*. Participants' NFA was assessed with the short version of the NFA Scale (Appel, Gnambs & Maio, 2012). This scale comprises 10 items: five items measure the motivation to approach emotions (e.g., "Emotions help people to get along in life", α = .79), and five assess the motivation to avoid emotions (e.g., "I do not know how to handle my emotions, so I avoid them", α = .74). Participants responded to these statements on a 7-point scale from 1 = totally disagree to 7 = totally agree. Similarly to the NCS, we computed a mean score for the approach dimension and a mean score for the avoidance dimension by reversing the avoidance items. We selected the 10 items from the Italian version of the NFA Scale (Leone & Presaghi, 2012).
- *Need for Cognitive Closure*. The Italian version of the Revised NCC Scale (Pierro & Kruglanski, 2005; α = .81) comprises 14 items measuring a desire to look for a fast solution. Participants rated each item on a 7-point scale, with a higher value representing a higher NCC. A final score was computed as the mean of the items.

Data analysis

A preliminary analysis of the NCS scale was performed with the support of IBS SPSS Statistics for Windows, Version 22.0 (2012), in order to check the normal distribution by calculating mean, standard deviation, and indices of skewness and kurtosis. Inspection of skewness and kurtosis indicated that departures from normality were not severe (the indices were between –1.20 and 1.56), so no variable transformations were deemed necessary except for item 10 (see next section for more detailed information about this item). The sample was randomly divided into two samples of similar size. Random sample I (N = 254) was used to conduct an exploratory factor analysis (EFA) and data from the second split sample (N = 254) were used to conduct a confirmatory factor analysis (CFA). Through this methodology, the first sample can be used to develop a good fitting solution, and the final model is then fitted in the second sample to determine its replicability with independent data. The investigation of the factorial structure of the NCS (EFA) was performed through a Maximum Likelihood Factor Analysis (MLFA), with an Oblimin rotation to test whether the factors were related to each other. Confirmatory Factor Analysis (CFA) was conducted with EQS 6.0, allowing for correlation among error terms. To evaluate the CFA models, goodness of fit was estimated by Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR) and the Non-Normed Fit Index (NNFI). A Maximum Likelihood (ML) method of estimation was applied to test the hypothesized model. The Akaike Information Criterion (AIC) was used to compare the relative fit of models, with lower AIC values indicating superior model fit. Competing models were compared with regard to their model fit by performing a χ^2 difference test. If this difference is significant, the model with lower χ^2 is the best fit model, otherwise, if the difference in χ^2 is not significant, the more parsimonious model (i.e. the model with less parameters) is preferred (Bollen, 1989; Kline, 1998; Schermelleh-Engel, Moosbrugger & Muller, 2003). To compare the competitive models, we also used the difference in CFI (difference ≥.001 indicates better fit to data; Wang, 2015). Internal consistency was estimated by Cronbach's alpha and mean total correlations corrected item.

RESULTS

Factorial structure of the NCS

An exploratory factor analysis was performed on the NCS items in the Random Sample 1. To determine the appropriateness of factor analysis, we examined the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and

the Bartlett's test of sphericity. According to Tabachnick and Fidell (2007), KMO should be >.80, and the chi-square value of Bartlett's test should be significant. Both indices confirmed the adequacy of the sample: KMO = .80; χ^2 Bartlett (153) = 1184.33, p<.001. To determine the optimal number of factors to retain (i.e., the best trade-off between under- and over-factoring; see Fabrigar et al., 1999) we used the parallel analysis (Horn, 1965), as well as the theoretical basis of the different solutions. In the parallel analysis a set of eigenvalues is computed from randomly generated correlation matrices. These values can then be compared to eigenvalues extracted from the researcher's dataset. The number of factors to retain will be the number of eigenvalues (generated from the researcher's dataset) that are larger than the corresponding random eigenvalues (Horn, 1965). The EFA showed that the bi-factorial solution was more suitable to the data that the mono-factorial solution. However, given that item 10 and item 16 had not adequate loadings on any factor, we decided to run again the factorial analysis without these two items. The parallel analysis without these two items confirmed that the bi-factorial solution was the best solution for the data: only the first two eigenvalues obtained from real data (respectively 4.44 and 2.11) were greater than randomly generated eigenvalues. The rotated bi-factorial solution accounted for the 40% of the total variance (the first factor explained the 18% of the variance, the second one explained the 22% of the post-rotation variance). All items had loadings greater than .30 on the intended factors and negligible loadings on the other factor. Table 2 (in particular 2a) shows the items' factor loadings after the rotation. The loadings in the two factors were substantially identical to those emerged in the approach-avoidance differentiation (Stark et al., 1991) and were thus accordingly labelled in the same way. The two factors resulted correlated each other, r =.38.

To sum up, the exploratory analysis suggested the two-factor solution for the Italian short form version of the NCS with a distinction between the approach and the avoidance of effortful cognitive activities. CFA was conducted on the second split sample (Random Sample 2) to test the two-factor structure obtained with EFA. We used the maximum likelihood estimation method. The examined model was a two-related factor model in which the items were predicted to load onto the two factors derived from the EFA. A model can be said to have a good fit when the chi-square test is non-significant. However, given that for models with many cases, the chi-square is almost always statistically significant, other model fit indices are considered. Specifically, a model is considered to have acceptable fit when CFI and NNFI are higher than .90 and the SRMR and RMSEA values are smaller than .08 (smaller than .05 for excellent fit; Hu & Bentler, 1999). Modification indices were also inspected to assess the extent to which the hypothesized model was appropriately described. Correlated errors are specified when the items share a part of the variance.

CFA showed that the uni-dimensional model had bad fit indices: RMSEA = .113, 90% CI [.10;.12], CFI = .67; NNFI = .62; SRMR = .10. On the contrary, the bi-dimensional solution showed good fit, RMSEA = .058: 90% CI [.04;.07], CFI = .91; NNFI = .90; SRMR = .06. The modification indices analysis suggested to add covariance between the errors of item 1 and item 2 and the errors of item 2 and item 11 (freeing up errors covariances was allowed because they are part of the same latent variable). The covariance between the errors of item 1 and item 2 could reflect an approach to situation require long and complex reasoning. The covariance between the errors of item 2 and item 11 could reflect the pleasantness towards situation requiring reasoning and new solution to problems. In the final solution with these covariances, the fit indices for the bi-dimensional solution further improved (RMSEA = .051, 90% CI [.04;.06], CFI = .93; NNFI = .92; SRMR = .06) and demonstrated better fit compared to the unidimensional model [Chi-square difference = 182.06; df = 1; p<.001, Difference CFI >.001) that continued to show bad fit to data (RMSEA = .097, 90% CI [.09;.11], CFI = .76; NNFI = .71; SRMR = .10).

The AIC index confirmed that the bifactorial solution (AIC = -34.52) better fitted the data compared to the mono-factorial solution (AIC = 349.53). All factor loadings were statistically significant and ranged from .35-.79, with an average standardized factor loading of .57. Squared multiple correlations ranged from .12-.61, with an average SMC of .33 indicating that, on average, 33% of the variance in observed variables was accounted for by latent factors. CFA upheld that the factors were related with each other, r = .46.

To sum up, both the EFA and CFA supported a bi-dimensional solution for the Italian versions of the NCS, with a differentiation between the approach and the avoidance dimension of the cognition. Figure 1 depicts the bi-factorial solution of Italian NCS.

However, it sometimes happens that a genuinely unidimensional scale results as bi-dimensional due to the distortion stemming from the acquiescent response

Table 2 – Factor loadings (a), Percentage of variance explained by the factors (b), Mean items - Total correlations (c), Cronbach's alpha (d)

(a)* Factor loadings (Method of extraction: Principal Axis Factoring, Oblimin Rotation)	**Approach**	**Avoidance**
NC1	**.776**	−.103
NC2	**.662**	.122
NC6	**.575**	.117
NC11	**.493**	.101
NC13	**.531**	−.061
NC14	**.334**	.023
NC15	**.688**	−.122
NC18	**.320**	.092
NC3re	.060	**.375**
NC4re	.202	**.656**
NC5re	.048	**.723**
NC7re	.016	**.347**
NC8re	−.013	**.440**
NC9re	.141	**.509**
NC12re	−.057	**.619**
NC17re	−.130	**.635**
(b)* Percentage of variance explained	18%	22%
(c) Mean item - Total correlations**	.49	.49
(d) Cronbach's alpha**	.79	.77

Note. * Random sample 1 (N = 254), ** Total sample (N = 508). The factor loading in bold is significant.

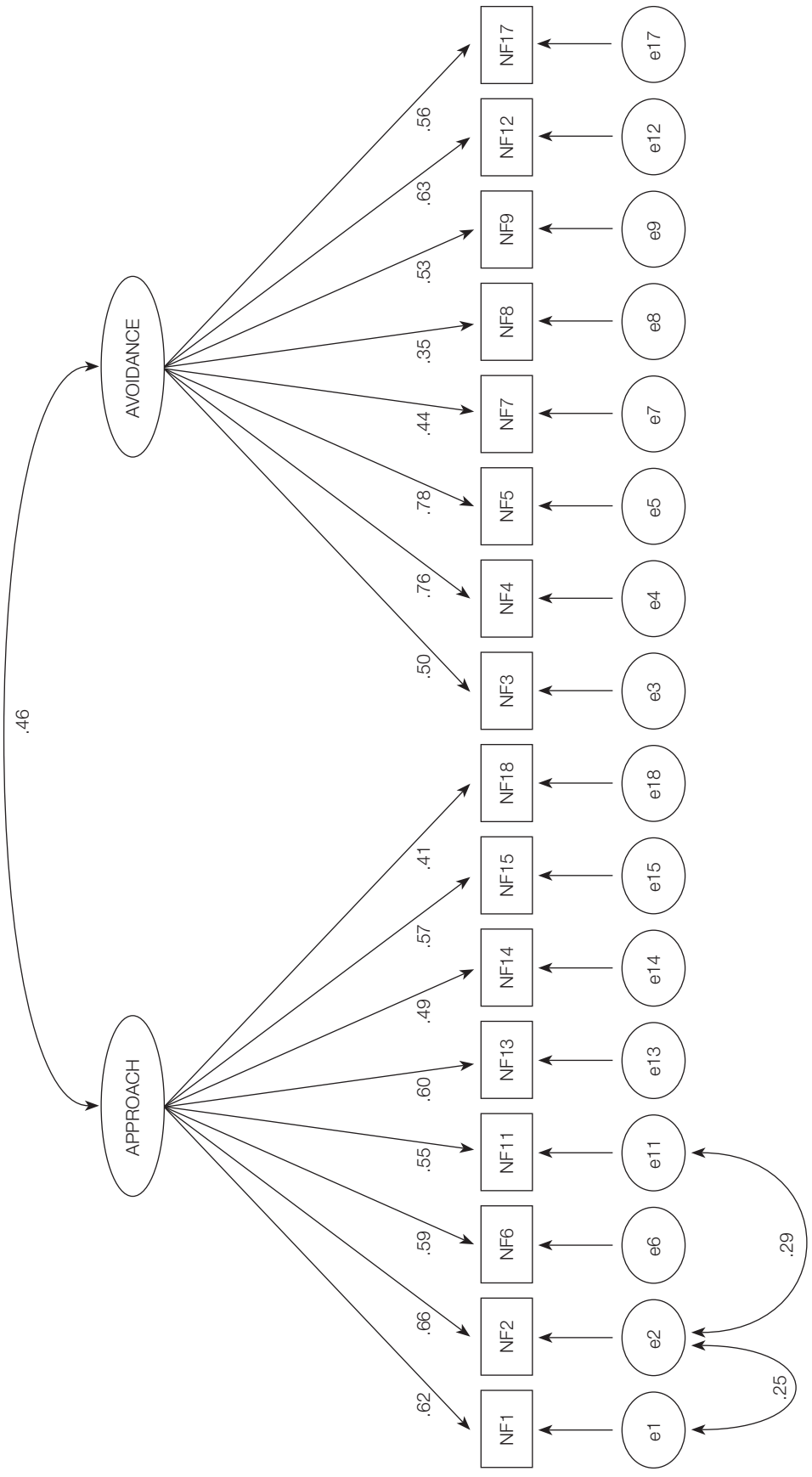

Figure 1 - Confirmative Factorial Analysis of the Italian Need for Cognitive Scale with standardized regression weights

Note. All the standardized regression weights are significant at $p<.001$.

set (Marsch, 1989). Schriesheim and Hill (1981) reported that negatively phrased items are less reliable, especially when they are mixed with positively phrased ones: such poor reliability may increase overall measurement error in the total scores. Responses to positively worded items may be more straightforward than responses to negatively worded items because of differences in semantic complexity, which may result in greater measurement error among the negative phrased items (Hankins, 2008). Method effects are systematic variance that is attributable to the measurement method rather than to the constructs the measures represent (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). To ascertain that the bi-factorial solution emerged from our data was not due to a method errors, we have compared the bi-factorial solution with an alternative model, by resorting to the correlated uniqueness approach (CCA; Marsch, 1989). The CAA allows the researcher to test the degree of distortion due to the response set and to correct for this distortion, by correlating the errors of the negative phrased items. Although this alternative model showed acceptable fit, except for the NNFI (RMSEA = .064, 90% CI [.05;.08], CFI = .92; NNFI = .87; SRMR = .05), the bi-factorial solution continued to fit better the data (Chi-square differences = 12.32, $df = 24$, $p = .098$, Difference CFI = .001). The AIC index confirmed that the bifactorial solution (AIC = −34.52) better fitted the data compared to the mono-factorial solution with correlated errors among the negatively worded items (AIC = 3.15).

Given the equivalence of the solution emerged from the EFA and CFA, we estimated the reliability and internal consistency of the NCS on the total sample of 508 participants.

Cronbach's alpha for the approach and the avoidance dimension were .79 and .77, respectively, thus confirming a good reliability. According to Nunnally and Bernstein (1994), an item is considered to have an acceptable level of internal consistency if its corrected item-total correlation is equal or greater than .33. All items satisfied this criterion, the mean of the item-total correlation was .49 for both the approach and the avoidance dimension (see Table 2, in particular 2c).

Convergent and divergent validity

Table 3 shows the correlations of the approach and avoidance dimension of NCS with other measures.

In line with our hypotheses, the approach dimension of NC correlated positively only with CCI, r (70) = .56, $p<.001$, and with the approach dimension of NFA, r (70) = .29, $p = .01$. The avoidance dimension of NC correlated instead with the avoidance dimension of NFA, r (70) = .26, $p = .03$, and with NCC, r (70) = −.44, $p<.001$. As expected, Table 3 also shows that the approach dimension was not related neither with NCC nor with the avoidance dimension of NFA. On the other hand, the avoidance dimension of NC did not correlate neither with CCI nor with the approach dimension of NFA. Taken together, these findings confirmed the convergent and divergent validity of NCS. Further, none of the correlation coefficients was equal to or greater than .70, thus indicating that the NCS dit not overlap with other constructs associated with the cognition and the psychology of the attitudes.

Table 3 – Zero-order correlation coefficients between the NCS and measured constructs

Variables	Cognitive Consumer Innovativeness	Need for Affect (Approach dimension)	Need for Affect (Avoidance dimension)	Need for Cognitive Closure
Factor 1 (Approach)	.56***	.29**	−.13	−.08
Factor 2 (Avoidance)	.08	.14	.26*	−.44***

Note. * $p<.05$; ** $p<.01$; *** $p<.001$; $N = 70$.

DISCUSSION

The aim of the present study was to provide a scale for the NC in the Italian context and to test its structure and its validity. The results confirm the reliability and validity of the Italian version of the NCS. Both the exploratory factor analysis and the confirmatory factor analysis suggested a bi-factorial solution for the Italian version of the NCS, with a differentiation between the approach to cognitive effortful activities and the avoidance of situations requiring a lot of thinking. Both the approach (α = .78) and the avoidance dimensions (α = .77) showed good internal consistency.

A separate examination of cognition approach and cognition avoidance is a valuable goal because these motivations might have distinct correlates, as confirmed from convergent and divergent validity. In fact, results showed that only the approach dimension is related to the cognitive desire to acquire new stimulating objects, whereas only the avoidance dimension is related to a desire to arrive fast at a solution, by avoiding uncertainty. Furthermore, the approach dimensions of NFA and NC were correlated with each other. Similarly, the avoidance dimensions of the two scale were related with each other, supporting the differentiation between the approach and avoidance in psychology research. The differentiation between the approach and the avoidance dimensions of NC could also differently predict other outcomes and future studies could explore these relationships.

The NCS may turn out a useful tool in both research and educational areas. For instance, in the research field, NCS could be used by scholars interested in the persuasion, given the extended literature showing that people who like reflection are more persuaded by a message which describes the details of the product, whereas people who avoid reflection are more persuaded by a message which does not require longer information processing. NCS could be used also in the social perception field, recent research suggests, in fact, that people with high level of NC more strongly appreciate competent people compared to incompetent people (Aquino, Haddock, Maio, Wolf & Alparone, 2016). Furthermore, NCS could be used in studies about the motivations underlying the use of technologies, given that people who like reflection usually enjoy stimulating technologies (Amichai-Hamburger, Kaynar & Fine, 2007). In the educational field, NCS could be used to have an indication about the teaching strategies, given that an efficient teacher should stimulate the reflection and thinking in the learners.

However, some limitations of this research need to be taken into account when interpreting its findings. First, the sample mainly consisted of young students, and this suggests caution regarding the generalizability of results. This problem does not affect the psychometric properties of the scale, but rather the demographic differences in the scores. Another limitation of this research is the limited number of participants used for the convergent and divergent validity. Given the low number of participants, we have tested the construct validity by performing a correlation approach rather than a SEM approach. However, the aim of the present research was the exploration of the factorial structure of NCS in the Italian context, thus future studies could purposely explore the convergent and divergent validity of the scale with a more adequate sample.

Overall, we provide evidence for the good psychometric properties of the NCS, a useful instrument for researchers and practitioners in several domains of the psychological field.

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