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A longitudinal study on the stability of the need for cognition

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ABSTRACT

It is unclear whether the Need for cognition (NFC) is a stable trait. The current study tests whether individual-level changes in NFC occur over time and whether, in line with cognitive development and decline across the lifespan, these changes in NFC differ between age groups (i.e., ≤24, 25–49 and ≥50).

Methods: A total of 5746 respondents participated in a five-wave online personality questionnaire, including an 18-item NFC-scale. A series of growth curve models (GCMs) were used to assess change in NFC over time and autoregressive correlations (rho) and the differences (Δ) between NFC scores in 2008 and 2014 as indicators of stability.

Results: Assessment of internal scale structure revealed that a substantive NFC scale (i.e., one factor) provided the best fit. Ascending (Δ = 0.241) growth curves are reported for younger respondents. For middle aged respondents descending (Δ = −0.059) and for older respondents descending growth curves (Δ = −0.098) are reported. The rho for younger (rho = 0.119) and older respondents (rho = 0.106) were lower compared to those of middle aged respondents (rho = 0.189).

Conclusion: Small individual-level changes in NFC occur over time. Younger respondents' NFC is more likely to increase and older respondents' NFC is more likely to decrease compared to middle aged respondents.

1. Introduction

Psychological science is (partly) aimed at understanding behaviour by formulating theories that provide insight into behavioural processes. Within the present-day psychology, the cognitive perspective plays an important role in explaining behaviour based on information processing; e.g., learning, perception, thinking and memory (Brysbaert, 2006; Zimbardo, Johnson, McCann, Peeck, & Birnie, 2009). It is assumed that information processing is frequently used throughout daily life and there exist individual differences regarding the ability and motivation to do so (Cacioppo, Petty, Feinstein, & Jarvis, 1996). In dual-process models such as the heuristic-systematic model and the Elaboration Likelihood Model (ELM) two ways to process information are distinguished: a peripheral, more heuristic, route and a central, more systematic, route. When processing information through the central route, elaboration is high: the individual takes information carefully into account by systematically examining, considering, scrutinizing and thinking about the information (O'Keefe, 2008). When processing information through the peripheral route, elaboration is low: the individual relies more on heuristics such as the number of arguments or the presence of visual cues (O'Keefe, 2008; Sher & Lee, 2009). In order to process information through the central route both motivation and the ability to consider information carefully are prerequisites (Cacioppo et al., 1996). To explain individual differences in the tendency to process information through the central route, Cacioppo and Petty (1982) introduced the concept of need for cognition (NFC) as a personality trait.

1.1. Need for cognition

An individual's NFC refers to one's intrinsic motivation to process information through the central route and can be defined as the tendency to engage in and enjoy effortful thinking (Furnham & Thorne, 2013). Since the introduction of NFC in 1982, individual differences in NFC have been widely studied (Cacioppo et al., 1996). Furnham and Thorne (2013) classify NFC as an individual difference variable as it varies among individuals and translates into individual differences in behaviour. For example, compared to individuals with a low NFC, individuals with a high NFC tend to engage more in activities that require thinking and reflecting (Nair & Ramnarayan, 2000), show more openness towards new ideas (Furnham & Thorne, 2013) and seek more information when confronted with problems (Fortier & Burkell, 2014). Besides these individual differences, the interrelatedness between NFC and cognitive abilities, intelligence and other personality traits has also been studied. Positive correlations between NFC and cognitive abilities (Soubelet & Salthouse, 2016), openness towards new ideas,

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conscientiousness, and intelligence (Furnham & Thorne, 2013) are reported in previous research. According to Hess (2014) a decline in cognitive resources could even result in a loss of motivation to engage in cognitive effortful tasks due to increased costs of cognitive engagement and fatigue effects afterwards. Despite the associations with other traits and constructs, NFC distinguishes itself as a separate trait due to its unique ability to actively mobilize cognitive resources (Fleischhauer et al., 2010), which are needed to process information through the central route. This is relevant given the debate within the field of personality research concerning the stability of traits.

1.2. Trait stability

Many personality traits, and also NFC, are assumed to be stable and enduring patterns throughout adulthood and later life (Furnham & Thorne, 2013; Roberts & Mroczek, 2008). Although many still proclaim this perspective, there exists little empirical evidence to support it (Cobb-Clark & Schurer, 2012). On the contrary, recent longitudinal studies report personality changes even into old age (Roberts & Mroczek, 2008). The most significant changes in personality seem to occur during adolescence and between late adulthood and old age; both changes before the age of 30 and after the age of 50 seem to take place (Leszko, Elleman, Bastarache, Graham, & Mroczek, 2015; Specht, Egloff, and Schmukle, 2011). A rationale for these trait changes is provided by a high degree of biological, social and environmental changes that occur during these ages, as personality trait changes are influenced by task and life transitions (Leszko et al., 2015).

Previous research concerning personality trait stability often concerned Big Five personality traits (Blonigen, Carlson, Hicks, Krueger, & Iacono, 2008; Hampson & Goldberg, 2006; Leszko et al., 2015) or self-esteem (Trzesniewski, Donnellan, & Robins, 2003), but NFC seems to be neglected so far. Although, no longitudinal research focussing on the stability of NFC has been conducted yet, Soubelet and Salthouse (2016) report that previous studies often report no or only small age differences in NFC. According to Soubelet and Salthouse (2016), this is surprising as NFC is associated with cognitive abilities (Bors, Vigneau, & Lalande, 2006; Fleischhauer et al., 2010), and cognitive abilities show strong and negative associations with age (Salthouse, 2009). A possible explanation for this discrepancy is that the meaning of NFC in not consistent across ages. However, Soubelet and Salthouse (2016) report no age differences in internal scale structure and external correlates suggesting that the discrepancy between cognitive abilities and NFC age trends cannot be explained by age differences in the meaning of NFC. Complementary Cacioppo et al. (1996) report decreasing time-over-time correlations ranging from $r = 0.92$ after 7-weeks and $r = 0.66$ after 8-months indicating larger changes in NFC over time. Hence, by studying internal scale structure and changeability of NFC over time and across age groups, this study contributes to and expands the current scientific debate.

1.3. Techniques in assessing trait stability and change

Although there exists a consensus about the use of longitudinal methods as an appropriate way to investigate trait stability and change, there are a few methodological pitfalls in this type of research (Magnusson, Bergman, Rudinger, & Törestad, 1994). First, stability and change is often estimated over only two waves, doing so restricts estimating long-term patterns of stability and change and reduces statistical power. Second, in previous research, stability and change is often estimated using methods that assess rank-order stability or mean-level change. Rank-order stability assesses changes in the ordering of individuals within a population to estimate stability in relative sense. Thus, using rank-order stability only allows comparison of order between individuals and does not assess change within individuals (Caspi, Roberts, & Shiner, 2005). The latter also holds for methods that examine mean-level changes, as they assess amounts of change for samples as a whole by comparing mean-scores over time. A serious limitation of relying on means lays in the mechanism of compensation; if some individual scores increase while other decrease over time the changes cancel each other out (Caspi et al., 2005). The most comprehensive picture of stability and change is provided by examining individual-level changes over time (Blonigen et al., 2008; Caspi et al., 2005; George, 2000). In this study, individual-level changes in NFC will be examined by using data gathered with a five-wave longitudinal study among a representative sample of Dutch speaking permanent residents of the Netherlands.

1.4. The current study

Based on previous research about personality trait changeability (Blonigen et al., 2008: Hampson & Goldberg, 2006; Roberts & Mroczek, 2008) it is hypothesized that small individual-level changes in NFC over time will occur. Complementary to this, it is suggested that changes in NFC are age specific as the motivation to engage in cognitive effortful tasks is associated with the availability of cognitive resources (Hess, 2014). Therefore, it is hypothesized that NFC of younger respondents will increase while the NFC of older respondents will decline over time. This second hypothesis is partly based on the assumption that personality traits develop during youth and are more or less stable during adulthood (Soto & Tackett, 2015) and partly based on the development and decline of cognitive abilities throughout lifespan (Loeffler, Raab, & Cañal-Bruland, 2016). To further notice, all hypotheses were articulated before data-analysis and can be considered to be confirmatory.

It needs to be stressed, however, that age groups are not easily defined with regard to cognitive development and decline due to both individual differences and considerable heterogeneity of cognitive aging across various cognitive domains (Harada, Natelson Love, & Triebel, 2013; Hartshorne & Germine, 2015). In this study, younger respondents are defined to be aged ≤ 24 as various peaks in cognitive performance concentrate around the late teens and early 20s (Hartshorne & Germine, 2015). The group with older respondents is defined as being aged ≥ 50, as performance in various cognitive domains seems to decline after the age of 50 (Hartshorne & Germine, 2015). The age specific banding was specified before analysing and can be considered to have a confirmatory nature. Both hypotheses led to formulation of the following research questions: to what extent does NFC of Dutch people changes over time? And to what extent do these changes differ for respondents aged ≤ 24, 25–49 and ≥ 50?

2. Methods

The current study used data gathered by LISS (Longitudinal Internet Studies for Social science) panel administered by CentERdata (Tilburg University, The Netherlands). Between May 2008 and December 2014 LISS panel collected data by distributing monthly online questionnaires among a representative sample of Dutch speaking permanent residents of the Netherlands.

2.1. Recruitment

The recruitment procedure of the panel, visualized in Fig. 1, resulted in the registration of 5176 households. After entering the panel, a household questionnaire examining demographics of all household members led to the collection of demographic data of 10224 individuals aged 15 to 95. After gathering demographical data, all individuals aged ≥ 16 were invited to participate in a variety of online questionnaires. These questionnaires concerned a wide variety of topics (e.g., regarding health, leisure time, work). Within the current study, data from five waves that included assessment of NFC was used. Note that in this study respondents aged 15 in 2008 who started participating after turning 16 in 2009 were also included.