



Need for Cognitive Closure decreases risk taking and motivates discounting of delayed rewards



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ABSTRACT

The Need for Cognitive Closure (NCC, Kruglanski & Webster, 1996) is a motivational force describing a general tendency to form clear judgments and to reach firm decisions. Since individuals high in NCC have an intolerance of uncertainty and ambiguity, as well as a preference for predictability, we hypothesized that they would show more risk aversion and reduced propensity to choose delayed rewards compared to individuals low in NCC. In Study 1, we showed that individuals high in NCC perceived specific activities as riskier, and therefore, showed lower willingness to engage in those activities than individuals high in NCC. In Study 2, high NCC individuals, compared to low NCC individuals made less risky choices in the cold version of the Columbia Card Task (CCT) – a task considered to involve deliberate decision making processes. In Study 3, we found the same relationship between the NCC and risk taking in a task involving more affective decision-making processes - the Balloon Analogue Risk Task (BART). We also employed a delay discounting task to assess the impact of NCC on inter-temporal choices. In line with our expectations, individuals high in the NCC opted for smaller but certain, or temporally more proximal, options.

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1. Need for Cognitive Closure decreases risk taking and motivates discounting of delayed rewards

The present work relates an epistemic motivation highly important to, and prominent in, the field of judgment and decision making – the Need for Cognitive Closure (NCC, Kruglanski, 1989, 2004) – to risk taking and inter-temporal choices. Although the influence of the NCC construct on numerous decision making phenomena has been shown (e.g. Kruglanski, 2004; Roets, Kruglanski, Kossowska, Pierro, & Hong, 2015), it had not yet been thoroughly studied in the realm of risky behaviors. The present paper focusses on inter-individual variability in risky and inter-temporal choices, providing evidence that NCC can contribute to explain such variability.

2. Individual differences in risk taking

Most recently, Josef et al. (2016) demonstrated stability of participants' responses over time, as well as the consistency across several risk related tasks, thereby providing evidence for the existence of a

stable personal disposition that underlies risky decision-making and decision-making under ambiguity (see also Highhouse, Nye, Zhang, & Rada, 2016; Lauriola, Levin, & Hart, 2007; Mishra & Lalumière, 2011; Soane & Chmiel, 2005). However, only few studies examined the role of individual difference variables in risk taking (e.g., Dahlbäck, 1990). The variables studied so far in relation to various forms of risky behavior are differences in self-control, impulsivity, sensation seeking (for an overview see Mishra, 2014; Lauriola, Panno, Levin, & Lejuez, 2014), as well as classic differences on the Big Five personality dimensions (Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005).

Lauriola and Levin (2001) investigated the relationship between the higher-level Big Five personality dimensions and risk taking, while differentiating between gain and loss perspectives. Overall, in line with prospect theory (Kahneman & Tversky, 1979), personality factors have been shown to be more important in predicting risk taking in order to achieve gains compared to avoiding losses. In particular, Emotional Stability (Neuroticism) and Openness to Experience predicted risk taking in the domain of achieving gains (Lauriola & Levin, 2001).

Going beyond explanations based on classic personality traits, motivational characteristic may afford new insights into risk taking propensity across individuals and situations. For instance, Zou and Scholer (2016) suggest that individuals' regulatory focus (promotion vs. prevention) may be an important predictor of risk taking stability as well

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as variability. Regulatory focus refers to individuals' goal to achieve positive outcomes (promotion-oriented goals) or to avoid negative outcomes (prevention-oriented goals, Higgins, 1997). Risk behavior could be perceived instrumental to both of these goals depending on whether the possibility for gains versus losses is emphasized. Thus, risk behavior will be perceived as more instrumental and enacted to achieve one's promotion-related goals if gains are emphasized (Zou, Scholer, & Higgins, 2014). By contrast, risk behavior will be perceived as more instrumental and enacted toward prevention-orientation goals when negative consequences or potential losses are emphasized. This may be the case because in situations involving loss, risky options offer the possibility of maintaining or returning to the status quo which is the primary motivation of prevention-focused individuals (Scholer, Zou, Fujita, Stroessner, & Higgins, 2010).

These findings exemplify that risk taking depends on the extent to which a behavior serves an individuals' motivation in a given situation. The notion that motivational necessities determine willingness to take risks is captured in our theorizing on Need for Cognitive Closure and decision-making under uncertainty.

3. Need for Cognitive Closure and decision-making under uncertainty

Need for Cognitive Closure (NCC, Kruglanski, 1989, 2004) has been defined as the "desire for a firm answer to a question and an aversion toward ambiguity" (Kruglanski & Webster, 1996, p. 264). It refers to the motivation to obtain stable, firm knowledge in order to avoid uncertainty. Individuals differ in their dispositional NCC, and these differences can be assessed using the NCC scale (Webster & Kruglanski, 1994). Generally, individuals with a strong need for closure tend to "seize" on information which allows them to make a judgment on a given topic and then "freeze" on that judgment, while individuals low in NCC tend to consider more options before reaching a decision, feel more comfortable keeping their options open and eschew binding or definite opinions. Accordingly, individuals high in NCC may seek less information before making a decision (Choi, Koo, Choi, & Auh, 2008; Houghton & Grewal, 2000), and they also report higher confidence afterward (Webster & Kruglanski, 1994).

Although numerous studies have shown that NCC is generally associated with limited information search, being high on NCC does not imply *cognitive laziness*. There are cases when high NCC individuals increase information processing and effort in order to attain closure. This may be the case when high NCC individuals lack an initial satisfactory knowledge base that can provide quick closure (see Roets et al., 2015 for a comprehensive review of NCC research). For instance, in a consumer choice paradigm, Houghton and Grewal (2000) found that high NCC resulted in a less extensive information search, but only when participants supposedly already had well-formed and accessible opinions on the product. In a related study, Vermeir, Van Kenhove, and Hendrickx (2002) asked participants to choose between brands of unfamiliar products so that reliance on prior knowledge was eliminated. They found that in these situations, high NCC individuals initially sought significantly more information. In other words, NCC is an important motivational tendency that could determine the amount of information processing to reach a conclusion and make a decision. The direction in which NCC pushes the information processing (low vs. high) depends to the extent to which the individual poses readily accessible information to obtain a clear-cut judgment or decision and therefore attain closure.

Despite being an important variable in judgment and decision-making (e.g., Kruglanski, 2004; Kruglanski & Webster, 1996; Roets et al., 2015), NCC has not yet been studied directly in the realm of risky decision-making. The present work fills that gap by assessing the impact of NCC on various risk related measures. We propose that, since individuals high in NCC want to avoid uncertainty (Berenbaum, Bredemeier, & Thompson, 2008) they will show lower willingness to take risks. Lower risk taking allows them to avoid the uncertainty of potential negative. On the other hand, we expect high NCC individuals' intolerance of

ambiguity (Schlink & Walther, 2007; Webster & Kruglanski, 1994) to be related to lower willingness to accept the prolonged uncertainty implied by a delayed reward, and therefore greater discounting of delayed rewards. NCC as a predictor for lower risk taking and greater discounting reflects the notion that situational motivational necessities determine an individuals' willingness to take risks. Our hypotheses are underpinned by results of some previous studies that are indirectly interesting for the present issue.

For instance, Schlink and Walther (2007) found NCC to moderate the so-called Ellsberg (1961) paradox. This paradox involves a scenario with two urns containing red and black balls. The ratio of black to red balls in Urn I is unknown (high ambiguity), whereas Urn II contains exactly 50 red and 50 black balls (little ambiguity). Schlink and Walther (2007) found that high NCC individuals have a preference for the urn with little ambiguity, whereas individuals with a low NCC showed no preference for either of the urns.

Studying post decisional regret and counterfactual thinking, Mannetti, Pierro, and Kruglanski (2007) found that individuals high in NCC are more prone to counterfactual thinking and post-decisional regret after choosing a non-status-quo option than after choosing the status quo option. Since choosing a non-status-quo option can be conceived of as a risky choice compared to maintaining the status quo, those findings further underpin our hypothesis that individuals high in NCC would show less readiness to take risks.

In the consumer context, Kim (2013) showed that individuals low in NCC preferred a brand offering a delayed value promotion, whereas individuals high in NCC preferred a brand offering an immediate value promotion. Kim (2013) argued that immediate promotions would offer a closed deal and reward when purchased, whereas delayed promotions' deals can only be closed in the future. Hence, delayed promotions involve both risk and time and they are accordingly evaluated as involving uncertainty (Patak & Reynolds, 2007). Kim's (2013) findings are in line with Vermeir and Van Kenhove (2005), who showed that consumers high in NCC are more likely to make use of coupons. Since individuals high in NCC plan their shopping trips in advance, they collect more coupons beforehand. Collecting coupons in advance could be considered a means to avoid uncertainty, help predicting future outcomes, as well as to quickly reach decisions.

In sum, we propose that individuals low in NCC would show greater risk taking than individuals high in NCC. Further, we expect greater willingness to delay gratifications for individuals low in NCC, whereas individuals high in NCC would opt for smaller but certain or temporally more proximal options. In Study 1, we showed that individuals high in NCC perceive various situations as riskier, and therefore, show less willingness to engage in them. In Study 2, we tested the hypothesis that individuals' dispositional NCC would predict their willingness to take risk in the cold version of the Columbia Card Task (Figner & Weber, 2011). In Study 3, we tested the same hypothesis for the more affective Balloon Analogue Risk Task (Lejuez et al., 2002). Moreover, we employed a delay discounting task to show that NCC would be negatively related to individuals' readiness to delay gratifications.

4. Study 1

With Study 1, we wanted to establish that individuals high in NCC would perceive activities as riskier and therefore be less likely to engage in them. In order to test this hypothesis, we assessed risk perceptions of various risky activities as well as the likelihood to engage in those risky activities.

5. Method

5.1. Participants

A total of $N = 139$ participants (61% female, $M_{age} = 36.50$, $SD_{age} = 11.91$) took part in a study on 'attitudes, personality, and evaluation of

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