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Guess what? Implicit motivation boosts the influence of subliminal information on choice

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ABSTRACT

When is choice affected by subliminal messages? This question has fascinated scientists and lay people alike, but it is only recently that reliable empirical data began to emerge. In the current paper we bridge the literature on implicit motivation and that on subliminal persuasion. We suggest that motivation in general, and implicit motivation more specifically, plays an important role in subliminal persuasion: It sensitizes us to subliminal cues. To examine this hypothesis we developed a new paradigm that allows powerful tests of subliminal influences as well as stringent assessments of subliminality. The results of two experiments suggest that implicit motivation can enhance the effects of subliminal priming on choice.

1. Introduction

Can our decisions be affected by subliminal messages? This question has fascinated scientists and the general public alike, but it is only recently that reliable empirical data began to emerge, suggesting that it is indeed possible. The new data also suggest that conscious needs may modulate this effect: subliminal messages become more effective when they are related to or can potentially satisfy a physical need (e.g. thirst; Strahan, Spencer, & Zanna, 2002). Yet, given the limited capacity of consciousness (Kahneman, 1973), and the multiplicity and complexity of human behaviors, the scope of influence of conscious needs and motivations is likely to be very limited, and much control must be relegated to implicit motivations (Custers & Aarts, 2010; Hassin, Aarts, Eitam, Custers, & Kleiman, 2009). In the current study we bridge the implicit motivation literature with that on the subliminal modification of choice. In two experiments we examine whether implicit motivation boosts the influence of subliminal stimuli on choice, and how.

2. Subliminal priming and choice

While debated for many years (e.g., Eriksen, 1960; Holender, 1986), there is a growing body of research indicating that the cognitive system can process subliminal information, and that meaningful single units (e.g., words, numbers) can even be processed semantically (for recent reviews see Kouider & Dehaene, 2007; Van den Bussche, den Noortgate, & Reynvoet, 2009; but see Pratte & Rouder, 2009). The evidence comes mainly from priming paradigms, in which subliminal primes affect the way in which participants categorize supraliminal targets (Abrams, 2008; Dehaene et al., 1998; Forster, 2004; Greenwald, Klinger, & Schuh, 1995; Kiesel, Kunde, Pohl, & Hoffmann, 2006; Kinoshita & Hunt, 2008; Klauer, Eder, Greenwald, & Abrams, 2007; Naccache & Dehaene, 2001).

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Evidence for *direct* influence of subliminal stimuli on *choice*, however, is scarcer. Two main paradigms have been used to investigate this question. In one, scientists insert *free choice trials* into priming experiments of the type described above. Thus, for example, Schlaghecken and Eimer (2004) showed that subliminally presented arrows biased participants' responses in trials in which they could freely choose which among two buttons to press (e.g., left vs. right key-press). Importantly, this effect was found *only when free choice trials were intermixed with instructed trials*, in which participants were instructed to press a button that corresponded to supraliminal arrows. The authors concluded, then, that the effect of subliminal primes on free choice can be obtained only when the appropriate stimulus–response mapping is consciously active and rehearsed (see also Kiesel, Wagener, Kunde, Hoffmann, & Fallgatter, 2006; Klapp & Haas, 2005).

Another source for evidence on subliminal influence on choice is the literature on subliminal persuasion. Since Vicary's infamous report in 1957, in which he claimed that the subliminal message *Drink Coke* affected drink consumption, scientists have been trying to document similar effects in laboratories (Pratkanis, 1992). It is only recently, however, that replicable findings of this sort were obtained (Bermeitinger et al., 2009; Karremans, Stroebe, & Clauss, 2006; Strahan et al., 2002; Winkielman, Berridge, & Wilbarger, 2005). Strahan et al. (2002) showed that subliminal primes affected consumption, but only if there was a relevant physical need.[1] Thus, for example, when exposed to thirst-related subliminal words, thirsty participants (but not non-thirsty ones), were more likely to choose a thirst-quenching beverage (compared to a control beverage). Extending these findings, Karremans et al. (2006) demonstrated that priming thirsty (but not non-thirsty) people with a subliminal *brand* of beverage increased the likelihood that they choose to drink this brand. Similarly, Bermeitinger et al. (2009) showed that subliminally presented brands of dextrose pills biased choices of tired (but not non-tired) participants. To summarize, then, subliminal persuasion research suggests that subliminal stimuli affect action when that action seems relevant to a conscious physical need.[2]

While two literatures reviewed above converge in suggesting that subliminal stimuli can directly influence choice, they highlight different preconditions of that influence. In the free-choice paradigm, subliminal stimuli were found to bias choices *only if* the appropriate stimulus–responses mapping has been rendered active (Klapp & Haas, 2005). In the subliminal persuasion paradigms, however, influence of subliminal primes occurred *only if* an appropriate physical need was active (Strahan et al., 2002).

3. The present research

In the current research we turn our spotlight from physical needs to implicit motivation (Bargh, 1990; Kruglanski, 1996). We do so because motivation is very broad in its scope, and it influences many of the decisions we make, the thoughts we think, and the emotions we experience (Higgins, 2011; Higgins & Kruglanski, 2000). We focus on *implicit motivation* because given the limited resources available for conscious processes (Kahneman, 1973), it is likely to play a significant role in human behavior (Hassin, Aarts et al., 2009).

The research on implicit motivation has significantly expanded in recent years (for recent overviews see Custers & Aarts, 2010; Dijksterhuis & Aarts, 2010). It shows that implicit motivation can affect various processes, from behaviors in public good games (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001), through executive functions, allocation of resources, and self control (Aarts, Custers, & Marien, 2008; Bijleveld, Custers, & Aarts, 2010; Fishbach, Friedman, & Kruglanski, 2003; Hassin, Bargh, & Zimerman, 2009), to emotional phenomenology (Shidlovski & Hassin, 2011). Interestingly, recent research shows that, under certain circumstances, implicit motivation may even have stronger influence than explicit motivation (Bijleveld, Custers, & Aarts, 2011).

The current research, then, examines whether and how implicit motivation modulates the effects of subliminal stimuli on choice. To do so we developed a novel paradigm that draws on the strengths of both paradigms described above. In the category-based choice task (CBC) paradigm participants are asked to choose one out of four category-labeled cards (see Fig. 1). The winning category is randomly determined in each trial, and if participants choose the right category they are rewarded. Prior to choosing, participants are exposed to a subliminal prime – an exemplar from the winning category. The CBC task, then, allows for measuring the effect of subliminal primes in *repeated decisions*, and the decisions can be rendered more or less *consequential* by manipulating reward.

The CBC allowed us to use two measures for distinguishing conscious from unconscious perception: subjective and objective (Merikle & Daneman, 2000). The first measure is an elaborate and motivated trial-by-trial *subjective measure*: Participants were asked to report the prime by typing it in a response window. This trial-by-trial probe method allows minimizing memory distortions (Kunimoto, Miller, & Pashler, 2001). A second indication of awareness was a trial-by-trial *objective* measure. After participants had made their choice, they were asked to make a lexical decision, namely, to determine whether the prime had been a word or a non-word (Reingold & Merikle, 1988).

[1] In Experiment 3, the authors examined how subliminal priming alters conscious phenomenology and thereby choice, in a way that is very similar to goal priming techniques used by various laboratories (see Custers & Aarts, 2010, for a review).

[2] In an interesting extension of this literature Veltkamp, Custers, and Aarts (2011) subliminally associated drinking-related words with positive affect, and showed that this manipulation also leads to increased drinking. Thus, the increase in physical need (and respective behavior) can result not only from deprivation, but also from a change in the need's hedonic value.