Goal priming, public transportation habit and travel mode selection: The moderating role of trait mindfulness

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A B S T R A C T

Habits in travel mode occur in a stable context and create strong links between travel goals and travel modes in memory. As a consequence, priming a travel goal (i.e., going to a place) in memory increases the accessibility of the associated travel mode among habitual users of this transportation mode. We posit that individual differences in attention to present moment and experience (dispositional mindfulness construct; Brown & Ryan, 2003) could moderate the interaction between travel goal priming and habit strength. In this study, habitual vs. non-habitual users of a subway line were nonconsciously primed with travel goals that were strongly associated with the use of a subway line. In the second part of the study, participants chose, among four travel modes, the one(s) that allowed reaching a specific place. Priming and habit strength contributed non-additively to decision times, but among low-mindfulness participants only. Among non-habitual users, priming speeded decisions at high levels of mindfulness, but slowed decisions at low levels of mindfulness. From a fundamental and applied point of view, discussion focuses on processes crossing habits, non-deliberated responses to environmental cues, and mindfulness.

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1. Introduction

Among the most habitual overt behaviors occurring recurrently in a stable context, transportation would probably be ranked in the top 10, along with eating, working, and sleeping. Indeed, using a travel mode is one of the most habitual behaviors people routinely perform. Imagine you just got a new job. In order to go to your new office for the first time, you have to choose a travel mode (own car, car sharing, bus, bicycle, railway, etc.). In that situation, you can either scrutinize available modes of transportation as a function of one or more attributes (distance, travel frequency, monetary cost, speed, comfort, social reputation, risk level, etc.) or even imitate the majority's choice, follow the advice of your neighbor, or be persuaded by the advertising campaign of a public transportation company. After this deliberative phase, perhaps you decide to use your car to reach your workplace. As you execute this daily behavior, the chosen transportation mode becomes a firmly established habit, leading you to quickly and easily select this transportation mode rather than any other. In the end, a simple smell of coffee in the morning may become a sufficient cue to remind you that it is time to start your car and drive to your office.

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2. Habits and automaticity

If habits in transportation have been largely investigated, the concept of habit stems from the history of psychological science. Habits can be defined as "learned dispositions to repeat past responses. They are triggered by features of the context that have covaried frequently with past performance, including performance places, preceding actions in a sequence, and particular people. Context activates habitual responses directly, without the mediation of goal states" (Wood & Neal, 2007, p. 843). In short, habits refer to near-automatic choices or behaviors in stable contexts (Neal, Wood, & Quinn, 2009; Neal, Wood, Wu, & Kurlander, 2011; Ouellette & Wood, 1998; Verplanken, 2010; Verplanken & Aarts, 1999; Wood & Neal, 2007).

From a decision-making point of view, habits have both benefits and pitfalls (Neal, Wood, & Drolet, 2013). First of all, once they are well established, using habits requires few cognitive resources. Indeed, literature about habits in transportation (Aarts, Verplanken, & van Knippenberg, 1997; Banister, 1978; Chen & Chao, 2011; Fujii & Gärling, 2007; Gärling & Axhausen, 2003; Gärling, Fujii, & Boe, 2001; Joireman et al., 1997; Verplanken, Aarts, & van Knippenberg, 1997; Verplanken, Walker, Davis, & Jurasek, 2008) broadly documents that the choice of a transport mode required few cognitive resources when people repeatedly used a mode of transportation in a given context. If you take your car every day from your home garage to your workplace, you don't weigh the pros and cons of travel modes every morning, unless an important change occurs in the context that focuses your attention on your choice. Conversely, a stable context and a satisfactory cost/benefit ratio lead to a scripted decision-making mode. Habitual users also need fewer attributes to decide, and are more resistant to other interfering tasks at hand (Aarts et al., 1997). Another self-regulatory benefit of habit is that people can use their free mind space to concentrate on other issues. For instance, before and/or during their transportation time, people can plan their next professional meeting and, in a global fashion, can be more open to their present environment. At odds, habits have some pitfalls when their presence leads people to miss the benefits of new opportunities. Habits have been successfully introduced in social cognitive models of prediction of behavior, as they make a specific contribution to behavioral intentions or behaviors (Chen & Chao, 2011). Nevertheless, travel choice remains a deliberate decision when people have to change their current habits, as in the context of an intervention that persuades them to change (Bamberg, Ajzen, & Schmidt, 2003).

From a cognitive point of view, people learn, from repeated choices, to connect a place (i.e., where to go) and a travel mode (i.e., how to reach this place). In other words, through time and experience, people develop strong links in memory between places and travel modes that allow them to reach these places. By means of associative networks, people can rapidly decide on a transportation mode at a low cognitive cost. For habitual travelers, as place-travel modes' associations are very accessible in memory, a place, a goal, or an activity can automatically trigger the choice of a given travel mode. Other travel options are not scrutinized.

Experimental demonstration of automaticity in habits is substantially grounded on the effect of nonconscious primes on decision-making and behavior (e.g., Bargh, 2006, 2014). In the case of daily behaviors, Neal, Wood, Labrecque, and Lally (2012) observed that priming places leads individuals to quickly recognize words related to an activity they regularly perform in these places. For example, priming the word "forest" led participants habitually exercising in woody areas to shorter recognition times for the word "running". This was not the case with more abstract words, even when they were related to the ultimate goal of the behavior (in this example, "to be in good health"). In the transportation domain, as far as we know, only Aarts and Dijksterhuis (2000a, 2000b) provided a demonstration of automaticity in decision-making among habitual users of a transportation mode. They observed that students in the Netherlands, where cycling is a widely used transportation mode, responded faster to bicycle-related words upon the presentation of the word "university" when the goal "to attend lectures at the university" was previously nonconsciously primed. The magnitude of this effect increased with habit strength, measured as the frequency of use of the bicycle to reach target locations (e.g., "university"). In other words, habit strength moderates the effect of nonconscious goal priming.

In sum, previous research indicated that when a means is strongly associated with a goal, the mere activation of a place or a goal activates the corresponding habitual means' mental representation that, in turn, triggers the behavior. One might wonder if individual differences occur in such effortless or automatic effects of habits. Moderation by individual variables is plausible when measurement goes beyond questions focused on explicit and reasoned intentions (Conner et al., 2007). Many choices are driven by contextual cues, but we are more or less able to purposely use these cues to pursue our current goals. As research on mindfulness (e.g., Brown, Creswell, & Ryan, 2015; Brown & Ryan, 2003) points out individual differences in the way people trade off between their current goal(s) and their attention to environmental cues, we will focus here on this concept as a source of differences in the ability to process and utilize contextual cues.

3. Mindfulness and decision making

In the framework of Self-Determination Theory (Deci & Ryan, 1985), Brown and Ryan (2003) suggest that mindfulness covers a specific sense of situational awareness and openness to experience. More precisely, Brown and Ryan (2003, p. 822) define mindfulness as "an open or receptive attention to and awareness of ongoing events and experience"; in other words, individuals' ability for "being attentive to and aware of what is taking place in the present". Individuals in the general population reliably differ in their propensity to be mindful (e.g., Brown & Ryan, 2003; Carlson & Brown, 2005). Two forms of mindfulness have been operationalized. Dispositional mindfulness refers to stable individual differences concerning average