Automatic judgments of exercise self-efficacy and exercise disengagement in adults experienced and inexperienced in exercise self-regulation

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A B S T R A C T

Objective: We investigated whether judgments of exercise self-efficacy and exercise disengagement can be made automatically in situations of time pressure and information overload in individuals experienced and inexperienced in exercise self-regulation. Social Cognitive Theory (SCT) was used as the guiding framework.
Design: The study utilized a 2 (Exercise Self-Regulation Experience Group) × 4 (Judgments) × 2 (Memory Load) × 4 (Exercise Self-Efficacy) mixed design with repeated measures on the latter three factors.
Methods: Participants ($N = 124$) judged whether they (*self*) or an average *other* person were confident in their ability to exercise and to avoid exercise. Judgments were made under both memory-load and no-memory-load conditions, and response times were assessed.
Results: The experienced exercise group had faster response times for *self* judgments (than for *other* judgments) of schedule, barrier and coping efficacy. The inexperienced exercise group did not; instead, they exhibited faster response times for *self* judgments (than for *other* judgments) of exercise disengagement. For both exercise experience groups, response times for *self* and *other* judgments of exercise disengagement were faster when under no memory load than when under memory load.
Conclusions: When under time pressure, individuals experienced in exercise self-regulation make automatic judgments of exercise self-efficacy, whereas inexperienced individuals make automatic decisions to avoid exercise. For both experience groups, when under memory overload, decisions to avoid exercise require attention.

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In today's busy life, decisions of whether or not to exercise are routinely made in the face of time pressures, numerous competing goals (e.g., family and work), and disincentives to exercise (e.g., fatigue and stress). Exercise decisions may thus be highly susceptible to automatic cognitive processes (Dimmock & Banting, 2009). Research has shown that health-related self-regulation processes can be activated automatically in response to both internal cues (e.g., feeling tired) and external cues (e.g., weather conditions), and that these automatically-elicited processes influence health behavior (Goldman, Reich, & Darkes, 2006; Shadel & Cervone, 2006; Sheeran et al., 2005). Yet, to date, the focus of exercise research has been primarily on non-automatic processes involved in exercise decisions—in particular, on the roles of exercise-related beliefs and appraisals that are consciously elicited in response to self-report measures (Dimmock & Banting, 2009). Measures of automatic and non-automatic thought processes have been shown to tap different aspects of mental representations and explain unique variance in behavior (De Houwer, 2006). Identifying whether exercise-related decisions can be made rapidly and effortlessly may provide important insights into key factors that promote or deter exercise in the busy, multi-tasking contexts of daily life. Utilizing a perspective derived from Social Cognitive Theory (SCT; Bandura, 1986, 1997), this study examined the automatic processing of two sets of cognitive factors known to influence exercise decisions: Exercise self-efficacy and exercise disengagement judgments.

Self-regulation, exercise self-efficacy and exercise disengagement

Exercise behavior can be construed as a dynamic process of self-regulation, which can be defined as the management of cognitive, emotional, motivational, and social processes to make decisions, engage in behavior, and appraise feedback in the pursuit of goals (Cameron & Leventhal, 2003). These self-regulation processes involve cognitions and responses that are elicited through

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conscious effort as well as those elicited automatically (Bandura, 1986, 1997).

SCT and related research identify self-efficacy and disengagement judgments as cognitions that play a critical role in guiding exercise decisions (Bandura, 1997; Fletcher & Banasik, 2001; Schwarzer & Renner, 2000). Exercise self-efficacy is comprised of beliefs in one's abilities to engage in exercise self-regulation, such as abilities to overcome barriers to exercise (barrier efficacy), schedule regular exercise sessions (schedule efficacy), and cope with daily impediments to exercise (coping efficacy). Disengagement judgments include those justifying procrastination (i.e., delay in starting an exercise session) and reflecting denial (i.e., rejecting the negative impact of not exercising). Research supports SCT hypotheses that both self-efficacy and disengagement predict exercise behavior. High exercise self-efficacy is associated with greater exercise frequency (Rodgers et al., 2002), whereas exercise disengagement decisions, such as procrastination, are associated with lower exercise frequency (Kendzierski & Johnson, 1993) and greater exercise attrition (McAuley, Poag, Gleason, & Wraith, 1990). Yet these studies evaluated controlled, deliberative appraisals of self-efficacy and disengagement; to date, the possibility that exercise self-efficacy and disengagement judgments may be processed automatically has not been empirically tested.

Automaticity, exercise self-regulation experience, and representations of self-efficacy and exercise disengagement

Automatic judgments can promote adaptive self-regulation to the extent that they facilitate performance of desired behaviors while enhancing the efficiency of information and attentional processes (Bandura, 1986, 1997). Automatic judgments can impair self-regulation, however, if they involve thought processes that inhibit desirable behaviors. Once habitual ways of thinking and acting are automated, individuals pay little attention to aspects of their environment that may call for discerning or alternative responses. Automatic judgments of exercise self-efficacy and disengagement could thus foster ingrained habits of active or sedentary behavior.

According to SCT (Bandura, 1986, 1997), representations of self-efficacy emerge from *experiences* in self-regulation. Building on this perspective, we posit that exercise self-regulation experience, defined as the extent to which one contemplates exercise, exerts self-regulatory effort (i.e., attempts exercise) and engages in exercise, plays a critical role in the formation of mental representations of exercise that, over time, can be automatically activated by situational cues. With greater exercise self-regulation experience, representations of exercise self-efficacy become more elaborated and coherently integrated (Gill, Swann, & Silvers, 1998). Greater representational integration has been shown to correspond with greater accessibility, as reflected by faster and more effortless activation of representational beliefs (Anderson, 1983, 1993; Beilock, Bertenthal, Hoerger, & Carr, 2008).

Just as exercise self-regulation experience can enhance the automatic accessibility of self-efficacy representations, frequent experience with sedentary behavior can generate automatically accessible representations of exercise disengagement. Given that judgments of exercise self-efficacy and exercise disengagement are activated repeatedly, these automatic elicitations can promote or undermine the initiation and maintenance of regular exercise.

Research also suggests that, for exercise experiences, people develop representations of *others* as well as representations of the *self* (Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, 2005). With greater experience in exercise contemplation and attempts, the difference in accessibility of *self* and *other* representations should increase. Research demonstrates that greater differences in

the speed of activation of *self* versus *other* representations are observed when mental constructs have strong (versus weak) associations with representations of the *self* (Bargh & Tota, 1988; Dijksterhuis, Chartrand, & Aarts, in press; Williams, Wasserman, & Lotto, 2003).

It should be noted that our conceptualization of exercise self-regulation experience is distinct from the concept of exerciser self-schema, which are held by people who see themselves as regular exercisers and who regard exercise as important to their self-image. Although exercise self-schema have been linked with variations in exercise cognitions and behavior (Kendzierski, 1990; Yin & Boyd, 2000), they may not fully explain automatic exercise self-regulation processes, particularly since they may not be chronically accessible (Banting, Dimmock, & Lay, 2009; Brown & McConnell, 2009). In contrast, exercise self-regulation experience may be more strongly linked with automatic judgments of self-efficacy and exercise disengagement because it takes into account whether exercise is a significant concern, regardless of exercise frequency. Many individuals who do not exercise regularly nevertheless report having enduring exercise goals (Seppo & St. Clair, 2000). For these individuals, representations relating to exercise self-regulation (e.g., self-efficacy) can emerge because they frequently *think* about fitting exercise into their lifestyles even though they may not regularly *engage* in exercise.

Assessing automaticity of judgments of self-efficacy and exercise disengagement

According to a decompositional theory of automaticity (Moors & De Houwer, 2006), properties of automaticity can be investigated as separate entities. The property of efficiency encompasses two components: Fast speed of information processing (i.e., individuals become faster at making judgments) and effortlessness (i.e., information processing for two tasks can occur simultaneously without interference, such as talking while typing; Cohen, Servan-Schreiber, & McClelland, 1992; Moors & De Houwer, 2006; Pashler, Johnston, & Ruthruff, 2001). Efficient processes occur rapidly and induce the subjective experience that processing is effortless because they consume little or no processing resources or attention (Bargh, 1989, 1994; Moors & De Houwer, 2006). Each component of efficiency has been shown to have its own time course of change as processing becomes more automatic; thus, it is possible that the level of experience required for developing fast judgments (e.g., of exercise self-efficacy and disengagement) may differ from that required for these judgments to be processed effortlessly (Logan, 1985; MacLeod & Dunbar, 1988; Smith & Lerner, 1986).

In this study, we employed a dual-task paradigm adapted from Bargh and Tota (1988) (see also Andersen & Limpert, 2001; Andersen, Spielman, & Bargh, 1992), in which response latencies to relevant stimuli and a concurrent memory-load task were used to investigate whether judgments of exercise self-efficacy and exercise disengagement can manifest the property components of efficiency. In the dual-task paradigm, participants performed a primary task involving judgments of exercise self-efficacy and exercise disengagement either for *self* or for *other*, either on its own or simultaneously with a secondary, digit-retention task. For example, participants responded "yes" or "no" as quickly as possible to statements such as "Can I? Exercise when I am tired?" The efficiency of judgments is inferred from: (1) speed of response time; and (2) the extent to which processing of the judgments is unaffected by processing of the digit-retention task, as measured by changes in response latencies from no-memory-load to memory-load conditions. We expected that individuals experienced in exercise self-regulation would exhibit relatively automatic *self* judgments of