



Enhancing self-efficacy and exercise readiness in pregnant women

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ABSTRACT

Objectives: Despite the benefits associated with exercise during pregnancy, many expectant mothers are inactive.

Design: The present study examined whether persuasive messages could influence task and scheduling self-efficacy, exercise intention, action plans, and behavioral commitment among pregnant women.

Methods: After completing premanipulation task and scheduling self-efficacy and exercise intention measures, participants ($n = 125$) were randomly assigned to read one of four efficacy-enhancing messages: scheduling, task, combined scheduling/task, or control. Postmanipulation task and scheduling self-efficacy, intentions and action plans and behavioral commitment were then assessed.

Results: Repeated-measures ANOVAs revealed that compared to the control group, inactive participants who read the persuasive messages reported significant increases in scheduling self-efficacy, task self-efficacy, and intention from premanipulation to postmanipulation as well significantly stronger action plans.

Conclusions: Written persuasive messages may promote exercise behavior during pregnancy by increasing scheduling and task self-efficacy, intention, and action plans for exercise.

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The initiation and maintenance of regular exercise is a challenging and complex behavior. This is especially true during pregnancy, where a recent study reported that fewer than one in four pregnant Canadian women are sufficiently active (Gaston & Vamos, *in press*). This is cause for concern because regular exercise during pregnancy is associated with numerous maternal and fetal benefits, including improved cardiovascular fitness, fewer musculoskeletal complaints, improved mental health, and reduced risk of gestational diabetes and pre-eclampsia (American College of Sports Medicine, 2006; Lewis et al., 2008). For these reasons, understanding exercise initiation and maintenance during pregnancy is a research priority.

According to social cognitive theory, self-efficacy is the underlying construct that is fundamental for competent performance (Bandura, 1989). Broadly, self-efficacy refers to an individual's confidence in his or her ability to engage in a certain behavior (Bandura, 1989). Major reviews of exercise-related self-efficacy have demonstrated that higher self-efficacy is associated with greater exercise participation (McAuley & Blissmer, 2000; McAuley, Pena, & Jerome, 2001). Furthermore, a growing body of literature has revealed that in addition to task efficacy (i.e., confidence in one's ability to physically carry out the task of exercise) self-regulatory

efficacy is also a consistent predictor of exercise behavior (Cramp & Bray, 2009; Rodgers, Hall, Blanchard, McAuley, & Munroe, 2002). This is not surprising given that Bandura (1997) pointed out that self-efficacy judgments are more about managing the various skills required for complex behavior (i.e., self-regulatory self-efficacy) than about one's ability to perform an isolated motor act (i.e., task self-efficacy). One example of self-regulatory self-efficacy is scheduling/planning self-efficacy, or the degree of confidence in being able to plan and schedule exercise into one's lifestyle.

Pregnant women face unique challenges to exercise during pregnancy and self-efficacy appears to be particularly important for overcoming pregnancy-related barriers. In a prospective examination of self-efficacy, barriers, and leisure-time exercise during pregnancy, Cramp and Bray (2009) found that 'being too tired', 'time constraints', and 'physical limitations' accounted for over 70% of barriers reported. While 'being too tired' and 'physical limitations' are related to participants' perceptions of their ability to physically carry out the task of exercise (i.e., task self-efficacy), time constraints (i.e., the inability to fit exercise into one's schedule) are a direct consequence of low levels of scheduling self-efficacy. Furthermore, task and barrier self-efficacy (the confidence to overcome barriers) both emerged as important predictors of leisure-time exercise, explaining over 30% of the variance in leisure-time physical activity. Taken together these results indicate that fostering both scheduling and task self-efficacy is likely to be

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equally important for promoting exercise initiation and maintenance during pregnancy.

According to self-efficacy theory (Bandura, 1997), self-efficacy judgments stem from four major sources of information: personal mastery experience, vicarious experience, verbal persuasion, and physiological states. While personal mastery enhances self-efficacy through successful past or present performances of the target behavior, vicarious experience involves observing similar others perform the target activity successfully. Verbal persuasion aims to foster self-efficacy by leading one to believe that he or she is capable of the task at hand, and the fourth strategy endeavors to correct misinterpretations of physiological states. The association between individual intervention techniques and change in recreational exercise self-efficacy was explored in a recent meta-analysis (Ashford, Edmunds, & French, 2010). Based on the average effect size, these authors reported that overall, the interventions demonstrated a small but significant increase in self-efficacy (mean $d = +.16, p < .001$). Interventions targeting multiple sources of self-efficacy produced the largest increases in self-efficacy, and vicarious experience and feedback on past or others' performance emerged as particularly important intervention components.

The importance of self-efficacy stems from its direct relationship with intention, which is perceived by the majority of social-psychological theories to be the most proximal determinant of behavior. The relationship between these three constructs was recently quantified in a meta-analysis of meta-analyses. Duff (2011) reported overall medium-large effects for the relationship between self-efficacy and intention ($r = .46$) and intention and health behavior ($r = .45$), and a moderate effect for the relationship between self-efficacy and health behavior ($r = .28$). Despite the importance of these variables, an obvious intention-behavior gap remains. Action planning, which involves identifying how, when, and how one will perform the behavior, has been identified as one successful strategy for translating intentions into action (Rise, Thompson, & Verplanken, 2003). Furthermore, evidence exists that individuals with high self-efficacy derive the greatest benefits from action planning (Luszczynska, Schwarzer, Lippke, & Mazurkiewicz, 2011).

Attempts to manipulate self-efficacy have relied on numerous strategies, including persuasive messages. Written persuasive messages have been used to successfully change exercise-related self-efficacy in a variety of populations including pregnant women (Gaston & Gammage, 2011; Gaston & Prapavessis, 2009). In addition to the need for such messages to be grounded in behavior change theory, Jones, Sinclair, and Courneya (2003) pointed out that researchers in the exercise domain should also consider incorporating theories of persuasion such as Petty and Cacioppo's (1984) Elaboration Likelihood Model. According to this model, persuasion occurs via two cognitive processing routes: central and peripheral. Central route processing occurs when the issue in question is carefully elaborated upon (thought about). In contrast, peripheral route processing takes place when an individual conserves cognitive effort and relies on simple message characteristics such as source credibility. Which route is chosen depends upon an individual's motivation and ability, and motivation is most influenced by the personal relevance of the message topic (Petty & Cacioppo, 1984). Therefore, successful cognitive change via the central route depends upon a highly relevant message and strong arguments while via the peripheral route it depends upon a credible source. Research in the exercise domain has demonstrated that a message from a credible source results in greater elaboration and more positive exercise intentions and behavior compared to a similar message from a noncredible source (Jones et al., 2003). Furthermore, the processing route that an individual takes does not appear to be associated with their own individual stage of exercise readiness (Rosen, 2000).

While task self-efficacy has been targeted in numerous interventions (Ashford et al., 2010), to the best of our knowledge only one published study has experimentally manipulated scheduling self-efficacy in an exercise setting. Using a cardiac rehabilitation population ($n = 54$), Woodgate and Brawley (2008) randomly assigned participants to one of two groups: efficacy-enhancing or control. Participants completed premanipulation scheduling self-efficacy and exercise intention measures before reading their respective persuasive messages. The efficacy-enhancing message was about a senior who learns about the importance of exercise for cardiac rehabilitation and discovers ways to successfully schedule more independent exercise into their schedule. Based on social cognitive theory, the message relied on verbal persuasion, past mastery experiences, vicarious experience, and correcting physiological misinterpretations. The control message featured information about diet following a cardiac event (i.e., importance of minimizing salt intake, etc.). Following treatment, participants completed postmanipulation measures of scheduling self-efficacy, intentions, agreement with action plans, and behavioral commitment. Behavioral commitment assessed participants' willingness to seek out additional information about exercise and represents a useful measure of whether an intervention succeeded in, at the very least, sparking participants' interest to learn more. Results revealed that only participants who read the efficacy-enhancing message reported significant pre-post increases in scheduling self-efficacy and exercise intention as well as significantly greater action plan agreement and behavioral commitment. The authors concluded that a persuasive message may be one step toward motivating cardiac rehabilitation patients to exercise independently.

In light of these promising results and the importance of self-efficacy for exercise during pregnancy, the primary purpose of this study was to examine whether a written persuasive message grounded in self-efficacy theory (Bandura, 1997) could experimentally alter pregnant women's scheduling and task self-efficacy and exercise intention from premanipulation to postmanipulation. Walking four times per week for 30 min was chosen as the target behavior given that it is an excellent form of exercise during pregnancy (Davies, Wolfe, Mottola, & McKinnon, 2003) and can be performed anywhere with minimal investment. This frequency and duration was chosen in accordance with Canadian guidelines for exercise during pregnancy (Davies et al., 2003). In addition, it was decided to examine how these different types of self-efficacy influence exercise cognitions among participants who are already active (i.e., currently meeting guidelines for exercise during pregnancy) versus those who are inactive (i.e., currently not engaging in recommended levels of exercise). According to Rothman (2000) investigators should not assume that the psychological factors that enable inactive individuals to adopt a new pattern of behavior will assist in sustaining that behavior over time. Furthermore, in their review of physical activity adoption and maintenance, Marcus et al. (2000) concluded that some behavioral strategies may be more important for initiating exercise (i.e., targeting moderate as opposed to vigorous activity, choosing an enjoyable activity) while other strategies may be more beneficial for promoting exercise maintenance (i.e., ensuring social support, rewarding oneself).

A four-group design was employed with one information-control group and three efficacy-enhancing experimental groups: scheduling, task, and combined scheduling and task. For inactive participants only, it was hypothesized that: (a) scheduling self-efficacy would increase for all three experimental conditions compared to their counterparts in the information-control condition. In descending order, the greatest increase was expected for the scheduling group, followed by the combined and task groups; (b) task self-efficacy would increase for all three experimental

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