



Mental imagery increases self-determined motivation to exercise with university enrolled women: A randomized controlled trial using a peer-based intervention



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ABSTRACT

Objectives: The purpose of this study was to examine the effects of a peer-based mental imagery intervention on the self-determined motivation and cardio-respiratory fitness of university enrolled women.

Design: Randomized controlled trial.

Method: 43 University enrolled women were randomized to peer-mentored or peer-mentored plus mental imagery conditions while 32 completed three meetings with peer-mentors and post-testing ($M^{\text{age}} = 19.91$; $SD = 1.70$).

Results: Significant improvements in cardio-respiratory endurance, ratings of perceived endurance, and self-determined motivation to exercise were observed across both study conditions. Participants assigned to the peer mentored plus mental imagery condition reported significantly greater increases in self-determined motivation to exercise at post-test compared to those in the peer-mentored condition. **Conclusions:** Peer-based interventions are a viable way to improve fitness and health outcomes while mental imagery appears to be associated with increases in autonomous forms of exercise motivation.

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Sedentary behavior, physical inactivity, and obesity are primary factors in global morbidity and mortality (World Health Organization, 2012). According to the World Health Organization (WHO), physical inactivity accounts for 6% of deaths worldwide primarily due to diabetes, breast and colon cancers, and ischemic heart disease. There is broad consensus that participation in regular physical activity reduces risk of coronary heart disease, diabetes, stroke, hypertension, and depression (Physical Activity Guidelines Advisory Committee, 2008). Physical activity is also a key determinant of energy balance and is therefore an important part of weight control strategies. Finding ways to promote the initiation and maintenance of physical activity behavior is an important global public health challenge.

Declines in physical activity (PA) begin in late childhood and show a significant drop during early adulthood. Population

surveillance data in the United States (U.S.) shows that approximately 24.8% of 18–24 year old adults report engaging in no leisure-time physical activity, compared with 27.8% of adults aged 25–44, 32.5% of those aged 45–64, and 41.8% of older adults aged 65–74. Amongst 18–24 year olds, greater than 40% do not follow recommended guidelines of accruing 150 min of moderate intensity aerobic physical activity per week, or 75 min of vigorous intensity, or an equivalent combination (United States Department of Health and Human Services, Physical Activity Guidelines Advisory Committee, 2008). Likewise, Healthy Campus 2020 identified physical inactivity and fitness as 1 of 10 student health priority areas for university enrolled students (American College Health Association, 2012). In short, intervening with the university population may help individuals establish sustained patterns of physical activity which may impact long-term health (Keating, Guan, Pinero, & Bridges, 2005).

It is also important that a smaller proportion of adult women meet public health guidelines, and PA differences between men and women become increasingly exaggerated over the life course

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(USDHHS, 2010). Among ethnic minority women in the U.S., African American, Hispanic, and Native Indians are among the least active segments of the population for all age groups. This is unfortunate because women generally live longer than men but also suffer from a greater number of disabling physical and mental conditions and report lower health-related quality of life as compared to men (Boiche, Sarrazin, Grouzet, Pelletier, & Chanal, 2008; Guay, Mageau, & Vallerand, 2003). PA is one possible pathway that may explain some of the differences between men and women in self-rated health and quality of life. While some data suggests that university enrolled women are more active than those not enrolled, there have been calls in the literature for increased research attention to university students in order to help young adults establish and maintain habitual PA (Keating et al., 2005). For these reasons, interventions targeting women during early adult life transitions, such as university enrollment, represent an opportunistic time to promote physical activity. Such efforts could help women develop self-management skills important for the maintenance of life-long physical activity behavior.

The United States Task Force on Community Preventive Services recommends that programs attempting to help individuals incorporate PA into their daily routines should include self-management skills such goal setting, self-monitoring of progress towards goals, problem solving to maintain behavior change, behavioral reinforcement through self-reward, and positive self-talk (Guide to Community Preventive Services, 2012). Another self-management skill, mental imagery, is emerging as a viable tool that may help increase exercise behavior with adults. Mental imagery can be defined as “The creation or recreation of an experience generated from memorial information, involving quasi-sensorial, quasi-perceptual, and quasi-affective characteristics, that is under the volition control of the imager, and which may occur in the absence of the real stimulus” (Morris, Spittle, & Watt, 2005, p. 18). This definition acknowledges the role of memory, sensory experience, volition, and emotions. Finding effective ways to deliver mental imagery and other self-management skills is an important theoretical and practical public health challenge.

Peer-based intervention delivery models

A growing body of evidence has supported the use of peer-based interventions to increase PA with adults throughout the age span (Martin Ginis, Nigg, & Smith, 2013). One randomized controlled trial (RCT) with sedentary older adults tested the impact of an evidence-based PA telephone intervention comparing the effects of adult peer mentors versus professional staff (Castro, Pruitt, Buman, & King, 2011). Results revealed that participants assigned to the peer-mentored condition experienced significant and equivalent improvements in PA behavior compared to those assigned to professional staff or an attention-control condition at the end of 12-months. Another theoretically-based RCT with sedentary older adults also showed promising findings in the delivery of PA interventions by trained peers. Participants in this study were randomized to a PA support condition or an attention matched control group. The intervention was designed to foster the major constructs predicted by self-determination (SDT) and self-efficacy theories (Bandura, 1997; Deci & Ryan, 1985) and included goal setting, the development of support networks, overcoming barriers to exercise, and, of relevance for this study, the use of mental imagery. Attention matched control group participants completed group meetings with peer mentors focused on a range of relevant health topics (health promotion condition). Results revealed significantly greater gains in moderate to vigorous PA compared to those in the health promotion group after 18-months follow-up (Buman et al., 2011). A significant time-by-group interaction revealed that participants in

the intervention condition showed significantly greater gains in self-determined motivation to exercise after 18 months as compared to control group participants. Importantly, the intervention used by Buman et al. (2011) included mental imagery homework assignments and the use of a guided imagery script.

Two reviews also support the use of peer-based interventions (Martin Ginis et al., 2013; Webel, Okonsky, Trompeta, & Holzemer, 2010). One meta-analytic review of randomized controlled trials across multiple health behaviors with adults across the age span supported the efficacy of peer-based interventions (Webel et al., 2010). The portion of the analysis focused on PA interventions showed a small to moderate standardized effect across the studies (Webel et al., 2010). In another systematic review researchers showed that all the studies reporting within-group analyses (5 out of 10) showed significant increases in PA behavior (Martin Ginis et al., 2013). When compared to alternative delivery methods, peer-based interventions were just as effective as professionally delivered approaches and more effective than attention control conditions. Overall, peer assisted interventions appear to be an effective way to nurture the basic needs predicted by SDT and increase PA behavior. What follows is theoretical and empirical justification for using a peer-based intervention model that involves the application of mental imagery to promote and increase exercise motivation and behavior with university women.

Self-determination theory

SDT has emerged as a viable framework to increase exercise behavior and appears well-suited for use within a peer-based intervention model. The basic need portion of SDT predicts that people have three basic psychological needs: autonomy, perceptions of competence, and relatedness (Deci & Ryan, 1985; Ryan & Deci, 2000; Ryan, Patrick, Deci, & Williams, 2008). Competence and autonomy are theorized to be necessary social conditions for people to be intrinsically motivated. When intrinsically motivated, individuals are autonomously engaged to exercise for the rewards, joy, and pleasure associated with chosen activities. SDT acknowledges that people have multiple intrinsic and extrinsic motives for exercise. Externally motivated exercise behavior is performed for contingencies in the environment such as praise from others (Ryan & Deci, 2007). Although many people engage in exercise for both intrinsic and extrinsic reasons, adherence is more likely to occur if individuals find enjoyment, inherent satisfaction, and have internalized motives towards participation (Rodgers, Hall, Duncan, Pearson, & Milne, 2010; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). Importantly, SDT predicts that intrinsic motivation is most likely to flourish when the need for relatedness is also supported in addition to autonomy and perceptions of competence. Environments and relationships where people feel a sense of empathy, connectedness, and belonging are considered essential for intrinsic motivation while feelings of rejection, insecurity, or alienation undermine this motivational process (Ryan & Deci, 2007).

Recent studies and systematic reviews have supported the basic tenets of SDT as an intervention strategy with overweight and obese women. In a randomized controlled trial (RCT), researchers assigned 239 women aged 25–50 years old to a health education curriculum or an SDT based condition (Silva et al., 2010). Participants in the experimental condition met weekly or bi-weekly in groups of 25–30 over the course of 30 weeks with an interdisciplinary team of Ph.D. or M.S. level exercise physiologists, nutritionists, and psychologists. The intervention was designed to foster the three basic needs predicted by SDT. Results showed that participants assigned to the intervention condition showed significantly greater weight loss, exercise, and autonomous forms of motivation to exercise at one year follow-up as compared to

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