

# Effects of Exercise Intensity and Self-Efficacy on State Anxiety With Breast Cancer Survivors

Rachel Blacklock, MA, Ryan Rhodes, PhD, Chris Blanchard, PhD, and Catherine Gaul, PhD

**A**nxiety, defined as an uneasy and unpleasant feeling of potential harm or distress that may occur in the absence of an obvious stimulus, often is reported in response to diagnosis and treatment of cancer (Newell, Sanson-Fisher, Girgis, & Ackland, 1999; Schwarz et al., 2008). In previous studies, breast cancer survivors have reported less control of their world and greater incidence of anxiety compared to age-matched women without a cancer diagnosis (Saleeba, Weitzner, & Meyers, 1996; Tomioch & Helgeson, 2002). Anxiety develops in association with cognitive processes relating to the inability to cope (Bottomley, 1998; Martens, Vealey, & Burton, 1990; Saleeba et al., 1996; Spencer et al., 1999; Stefanek, Derogatis, & Shaw, 1987).

Common anxiety-coping interventions include educational, informational, psychotherapeutic, and nonprofessional social support. These interventions report small effect sizes ( $d = 0.19-0.28$ ), highlighting the need for more treatment alternatives (Meyer & Mark, 1995).

An alternative nonmedical option that is gaining empirical support for coping with anxiety is exercise (Knapen et al., 2008; Tekin, 2002). With breast cancer survivors, the effect of habitual exercise also has been reported to decrease state anxiety (Segar et al., 1998). To date, only one study has examined the anxiolytic effects of acute exercise with breast cancer survivors (Blanchard, Courneya, & Laing, 2001). This study reported findings consistent with the previous literature regarding a one-time bout of exercise in the general population and reported a substantial effect size ( $d = 0.7$ ) (Callaghan, 2004; Focht, 2002; Motl & Dishman, 2004; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991). The anxiolytic effect of exercise may be important for cancer survivors as well as the general population; however, initial pilot work is required to warrant larger future studies in this area, examining potential exercise intensity effects and possible psychological explanations for the anxiety-exercise relationship.

A comparison of acute exercise intensity effects on state anxiety with breast cancer survivors and those without a cancer diagnosis will confirm whether additional work regarding exercise prescription at a specified intensity is required for optimal anxiolytic effects.

**Purpose/Objectives:** To determine whether acute exercise reduces state anxiety and whether this reduction is moderated by the sample (i.e., breast cancer survivors versus those without a cancer diagnosis), exercise intensity (i.e., moderate versus light), and the potential sample times intensity interactions; and to explore whether changes in self-efficacy and state anxiety reciprocally predict each other as suggested by social cognitive theory.

**Design:** Repeated-measures, experimental pilot.

**Setting:** University laboratory.

**Sample:** Breast cancer survivors ( $n = 25$ ) and age-matched women without a cancer diagnosis ( $n = 25$ ).

**Methods:** Cycling for 20 minutes at light and moderate intensities on two separate occasions. State anxiety and self-efficacy measures were completed before, immediately following, and 10 minutes after exercise.

**Main Research Variables:** State anxiety, self-efficacy, and light and moderate exercise.

**Findings:** 2 (sample)  $\times$  2 (intensity condition)  $\times$  3 (time) repeated-measure analyses of variance revealed a main effect for time ( $p < 0.01$ ,  $\eta^2 = 0.37$ ,  $F_{[2, 86]} = 24.687$ ), but between-sample and exercise intensity interaction effects were not significant. Autoregressive path analysis using ordinary least squares multiple regression revealed significant reciprocation for self-efficacy and anxiety pre-exercise (light intensity  $\beta = 0.49$ ,  $p < 0.05$ ; moderate intensity  $\beta = -0.37$ ,  $p < 0.05$ ) and post-exercise (moderate intensity  $\beta = -0.31$ ,  $-0.23$ ,  $p < 0.05$ ).

**Conclusions:** Acute exercise at light and moderate intensity decreases state anxiety for breast cancer survivors and those without a diagnosis. Additional research is warranted.

**Implications for Nursing:** Light- and moderate-intensity exercise may be a valuable alternative anxiolytic tool that also allows for the acquisition of myriad additional known health benefits associated with exercise.

Comparisons of special or diseased populations and the general population have been advocated so that differences or similarities in exercise-related psychology can be observed (Rhodes & Blanchard, 2007). Considering the population involved in the present study, comparing light and moderate intensities may provide preliminary practical information for exercise prescription.

Finally, understanding the mechanism underlying the exercise-anxiety relationship may be important for