



Depressive symptoms associated with psychological correlates of physical activity and perceived helpfulness of intervention features



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ABSTRACT

The anti-depressive benefits of physical activity are well-evidenced; however little is known about whether people with more frequent depressive symptoms have different psychological correlates of physical activity than people with less frequent symptoms, or whether special consideration is needed in targeting web-based physical activity interventions toward people with frequent depressive symptoms. An online cross-sectional survey was used to collect data from 511 adults (age = 45.99 ± 14.73 years). Two multiple regression analyses were conducted to test the relationship between frequency of depressive symptoms and (1) psychological correlates of physical activity (i.e., intentions, perceived behavioral control, affective attitudes, instrumental attitudes, and perceived physical activity effectiveness), and (2) perceived helpfulness of a variety of web-based physical activity intervention features. People with more frequent depressive symptoms had lower perceived behavioral control of physical activity ($\beta = -0.19$), were more likely to report that goal-setting intervention tools ($\beta = 0.10$) and personally-relevant information ($\beta = 0.09$) would be helpful, and were less likely to report intervention features portraying information about how similar people are being regularly active as helpful ($\beta = -0.10$) than those with less frequent symptoms. These findings highlight key components for designing web-based physical activity intervention content for people with depressive symptoms.

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Depressive symptoms constitute a great burden to society – costing billions annually in medical expenditures and loss of productivity (Cassano & Fava, 2002; Marcus, Yasamy, van Ommeren, Chisholm, & Saxena, 2012). Even mild symptoms can substantially interfere with quality of life and health (Carroll, Phillips, Hunt, & Der, 2007; Judd, Paulus, Wells, & Rapaport, 1996). The prevalence of clinical depression has increased to 350 million people worldwide (Cassano and Fava (2002), Marcus et al. (2012), and in

Australia, depression has become the leading cause of disability burden, with 6.2 years of life lost to disability for men and 9.8 years for women (Mathers, Vos, Stevenson, & Begg, 2001). More than 20% of Australians experience at least mild depressive symptoms (Crawford, Cayley, Lovibond, Wilson, & Hartley, 2011).

A promising approach for reducing the burden of depressive symptoms is regular physical activity. The anti-depressive benefits of physical activity can be equal to or sometimes stronger than cognitive-behavioral therapy or medication (Babyak et al., 2000; Cooney et al., 2013; Martinsen, 2008). Evidence suggests that physical activity interventions may be more effective in promoting physical activity among people without depressive symptoms than those with depressive symptoms (Pomp, Fleig, Schwarzer, and Lippke (2012); therefore it may be that people with depressive symptoms have unique needs in regards to physical activity interventions.

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1. Depressive symptoms and psychological correlates of physical activity

Physical activity interventions based on traditional behavior change theories such as the theory of planned behavior (Ajzen, 1991), self-determination theory (Deci & Ryan, 2002), and Bandura's (1977, 2004) social cognitive theory have focused on enhancing psychological constructs including a person's *intentions* to participate in physical activity, *perceived behavioral control* (i.e., perceptions of ability to perform the behavior), *affective attitudes* toward physical activity (i.e., beliefs about the pleasantness or unpleasantness of physical activity), *instrumental attitudes* toward physical activity (i.e., beliefs about the benefits of physical activity), and the *perceived effectiveness* of physical activity to enhance physical health and mental wellbeing.

Many symptoms of depression, such as feelings of low energy, perceptions of lack of control, pessimism, feelings of helplessness, lack of interest, loss of pleasure, low self-esteem, and self-regulation difficulties (American Psychiatric Association (2013), Cassano and Fava (2002) are likely to have a negative influence on these psychological correlates of physical activity. For example, frequent states of low motivation, fatigue, and an overall reduced behavioral activation system (Kasch, Rottenberg, Arnow, & Gotlib, 2002) may result in weaker intentions to be physically active. Additionally, depression can create hyposensitivity to rewards and result in heuristically-driven displeasure with uncomfortable or unpleasant behaviors (Shankman, Klein, Tenke, & Bruder, 2007); therefore people with more frequent depressive symptoms might have less favorable affective and instrumental attitudes toward physical activity than people with less frequent symptoms. Further, feelings of low self-worth associated with depression (American Psychiatric Association, 2013; Cassano & Fava, 2002) may precipitate low perceived behavioral control over physical activity.

Previous qualitative (Azar, Ball, Salmon, & Cleland, 2010; Searle et al., 2011) and quantitative (Allan, Johnston, Johnston, & Mant, 2007; Craft, Perna, Freund, & Culpepper, 2008; Pomp et al., 2012) evidence supports that depressive symptoms impact psychological correlates of physical activity. For example, in a qualitative analysis of 40 young women, Azar et al. (2010) found that young women with depressive symptoms reported more previous negative experiences with physical activity, more barriers to physical activity, lower confidence in their ability to engage in physical activity (i.e., self-efficacy), and a stronger social influence toward inactivity than young women without depressive symptoms. Searle et al. (2011) conducted a qualitative study on 33 men and women with depressive symptoms and found that they reported lack of motivation and confidence as major barriers to engaging in physical activity. In a study of cardiac and orthopedic rehabilitation patients, Pomp et al. (2012) found that patients with depressive symptoms reported less previous positive experiences with physical activity. Relatedly, Allan et al. (2007) found that coronary syndrome patients with depressive symptoms felt less confident about their abilities to be physically active than those without depressive symptoms. It seems evident that depressive symptoms impact psychological correlates of physical activity, but this evidence has come mostly from small samples of women and cardiac or orthopedic rehabilitation patients. More research is needed to understand the impact of depressive symptoms on the psychological correlates of physical activity across a more representative sample of the general adult population.

2. Depressive symptoms and physical activity intervention features

There are a variety of behavior change techniques that can be

implemented through a variety of delivery modes to assist people in increasing physical activity (Michie, Abraham, Whittington, McAteer, & Gupta, 2009), and there are increasing trends towards delivering these intervention strategies using web-based platforms (Davies et al., 2012; Vandelanotte, Spathonis, Eakin, & Owen, 2007). By using text, video, or graphical-based messaging, web-based physical activity interventions have been used to provide advice on how to fit physical activity into a daily schedule (e.g., Cook, Billings, Hersch, Back, & Hendrickson, 2007; McKay, King, Eakin, Seeley, & Glasgow, 2001), information about the physical and psychological health benefits of physical activity specifically tailored to the target audience (e.g., McKay et al., 2001), comparisons of physical activity levels of similar people (e.g., Bosak, Yates, & Pozehl, 2009), and ways to make physical activity interesting and fun (e.g., Cook et al., 2007). Additionally, interactive and computer-tailoring technology allows web-based interventions to incorporate tools to help set effective goals to be physically active (e.g., Kelders, Van Gemert-Pijnen, Werkman, Nijland, & Seydel, 2011; Mummery, Schofield, Hinchliffe, Joyner, & Brown, 2006), provide feedback tailored specifically to a person's needs (Lustria, Cortese, Noar, & Glueckauf, 2009), and options to freely express opinions and ideas about the program (e.g., Bosak et al., 2009; Kolt et al., 2013). Although these intervention components have shown to be acceptable and effective in the general population (Davies et al., 2012; Vandelanotte et al., 2007), it remains unknown if people with depressive symptoms also perceive them as being helpful.

3. The present study

The promotion of physical activity among those with depressive symptoms is a promising public health approach to reducing disease burden. However, little is known about how key psychological correlates of physical activity behavior differ as a function of frequency of depressive symptoms, or the unique intervention needs of people with frequent depressive symptoms. To inform future physical activity behavior change interventions targeting people with depressive symptoms, this study aimed to test the association of frequency of depressive symptoms with (1) psychological correlates of physical activity (i.e., intentions, perceived behavioral control, affective and instrumental attitudes, and perceived effectiveness of physical activity) and (2) perceived helpfulness of web-based physical activity intervention features. It was hypothesized that people with more frequent depressive symptoms would have weaker intentions to be physically active, lower perceived behavioral control, and less positive attitudes toward physical activity than people with less frequent depressive symptoms. Given the lack of previous evidence regarding web-based physical activity intervention interests of people with depressive symptoms, no specific hypotheses relating to this aim were formed.

4. Methods

4.1. Procedure & participants

Data used in this cross-sectional study were collected from the baseline assessment of a larger on-going research project (Australian New Zealand Clinical Trials Registry number: ACTRN12613001215718). Participants were recruited via advertisements promoting a web-based physical activity intervention for people with depressive symptoms ('*Feeling down? Get active!*'). Participants were required to be 18 years or older. Informed consent was provided prior to participating in the study. Approval for all study protocols was obtained from the human research ethics committee of the Central Queensland University (approval H13/08-147).

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