Psychological Determinants and Outcomes of Sedentary and Physical Activity Behaviours

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Published online: 18 September 2010
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There is now a large body of literature that supports the protective role of physical activity for both physical and psychological health. Sedentary behaviour was previously considered the functional opposite of physical activity, but 10 years ago, Owen and colleagues highlighted the need to study physical activity and sedentary behaviour as two distinct modes of behaviour that can independently influence health [1]. Since then, there has been growing evidence that participation in sedentary behaviours such as television viewing, computer use and sitting at work are associated with higher risk of chronic disease outcomes (type 2 diabetes, obesity), and leisure-time sitting has recently been associated with increased mortality [2]. Growing research points to the possible synergistic effects of physical activity and sedentary behaviours in contributing to health outcomes.

This special issue of the *International Journal of Behavioral Medicine* focuses on understanding the psychological correlates and outcomes of sitting and physical activity behaviours in a series of six articles. In the first study, Teychenne, Ball and Salmon systematically review the literature to determine the effects of sedentary behaviour on risk for depression [3]. Although the quality of studies and findings were mixed, the majority and higher quality studies demonstrated that sedentary behaviour is associated with a higher risk of depression and other mental health problems. Their findings also offer preliminary evidence that internet use as a specific sedentary behaviour may actually confer mental health benefits, possibly due to the use of the internet for social connection and support.

Importantly, the effect of sedentary activity on mental health may be greater for those with low physical activity levels than those with higher participation in physical activity, and further studies to assess the interrelationships between physical activity and sedentary behaviours are now needed.

Paxton, Motl, Aylward and Nigg examine the role of psychological variables in explaining the relationship between physical activity behaviour and global quality of life. In a sample of older and culturally diverse adults, they demonstrate that physical activity behaviour is related to quality of life via an association with mental health difficulties (depression and anxiety) and self-efficacy for physical activity [4]. Participating in physical activity improves both self-efficacy and mental health difficulties, which in turn have complementary positive effects on quality of life.

The third article in this series by Taylor, Nichols, Pakiz, Bardwell, Flatt and Rock examined the associations between physical activity, fitness and important health-related psychological variables in a cross-sectional study of breast cancer survivors [5]. Expected and well-demonstrated associations between physical activity and cardiorespiratory fitness were confirmed in this population, although physical activity levels were low among the breast cancer survivors that participated and were unrelated to measures of psychological health. These findings are consistent with those from physical activity interventions among cancer survivors, which have not shown consistent meaningful effects on depression, fatigue or self-esteem [6]. However, the low levels of physical activity among breast cancer survivors and other well-demonstrated positive health effects of physical activity after cancer treatment warrant continued efforts to improve physical activity participation in this growing population.

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The next two papers in this special issue focus on physical activity and sedentary behaviours in adolescent populations from Africa and Singapore. Peltzer reports findings from an impressive study across eight countries in Africa that both physical activity and sedentary behaviours are positively associated with substance use among adolescents [7]. There were some variations in leisure-time physical activity levels across countries and large variations in use of tobacco, alcohol and illegal drugs. Adolescents engaged in more frequent leisure-time physical activity were more likely to use alcohol more often and at higher quantities. Those with higher levels of leisure-time sitting behaviour were more likely to smoke and use tobacco in other ways, use alcohol more often and in higher amounts, and engage in excessive drinking and illegal drug use. Further, Peltzer found clear dose–response associations between time spent sitting for leisure and all substance use outcomes, such that the risk of substance use increased as sitting time increased. This research has important implications for understanding the potential negative health consequences of programmes to increase physical activity and reduce sedentary time among adolescents.

Lee, Loprinzi and Trost provide some clues for designing effective physical activity behaviour change interventions for Singaporean adolescents by describing the contribution of demographic, psychosocial and environmental factors to explaining variance in physical activity participation [8]. They found that while demographic factors accounted for only 1% of variance in physical activity behaviour, modifiable psychological (self-efficacy and physical activity enjoyment) and environmental factors (parental support and team sports participation) significantly and independently predict an additional 10% of the variance in physical activity participation. Having sporting equipment at home was significantly associated with participation in girls but not boys. These findings highlight the potential importance of the home environment and parental support for encouraging physical activity during adolescence.

Healthcare professionals may be an additional source of support for physical activity behaviour change, especially for those engaged in regular treatment for health issues shown to be positively affected by physical activity participation. Burton, Pakenham and Brown's findings in the sixth paper of this special issue highlight the possible barriers and enablers for psychologists to promote physical activity with their clients [9]. While most psychologists surveyed thought that physical activity counselling could be useful and was appropriate as part of psychological treatment, fewer thought that clients would find it acceptable, and the majority did not provide physical activity counselling (individual assessment, goal setting and planning) as part of treatment. Psychologists are often in regular contact with those at risk of a range of poor physical and

mental health outcomes and have many of the generic behavioural counselling skills that are effective for individualised physical activity promotion. Burton, Pakenham and Brown's study demonstrates psychologists' willingness to develop specialised skills for physical activity counselling. The current challenge of integrating physical activity behaviour change counselling into allied health care can be informed by the more well-developed evidence base from similar action in primary care [10, 11].

Together, this collection of papers explores the psychological determinants and outcomes of physical activity and sitting behaviours across diverse populations—healthy western adults, older Hawaiian adults, women who have survived breast cancer, and African and Singaporean adolescents—as well as the factors predicting physical activity counselling behaviour among psychologists. What is clear from this collection of work is the importance of taking into account the social and cognitive variables that may explain and influence change in these behaviours, as well as the translation of these health behaviours into health outcomes. This work also highlights the emerging need to simultaneously consider relationships between physical activity and sedentary behaviours and their individual and combined effects on health. This special issue of the *International Journal of Behavioral Medicine* provides a sampling of the range of topics that are attempting to progress our understanding of these areas.

As we move towards an increasing focus on the independent roles of sedentary and physical activity behaviour in contributing to health, we will need to uncover the dose–response relationships between specific sedentary behaviours and different health outcomes, including effects on specific mental health outcomes such as anxiety, depression, stress and quality of life. The mechanisms that may explain the effect of sedentary behaviours on health are still unclear and likely to be multifaceted, given the potential psychological, physiological, social and environmental mechanisms at play. There is a need to routinely assess participation in sedentary behaviours alongside physical activity in population health monitoring activities and continue developing a better understanding of effective strategies to change sedentary and physical activity behaviours and the underlying psychological mechanisms that may be important in doing so.

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