Mindfulness skills, psychological flexibility, and psychological symptoms among physically less active and active adults

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ARTICLE INFO

Article history:
Received 20 August 2013
Received in revised form 13 May 2014
Accepted 17 June 2014
Available online 2 July 2014

Keywords:
Well-being
Physical activity
Mindfulness
Adults
Psychological flexibility
Objective measures

ABSTRACT

Mindfulness skills, psychological flexibility and psychological symptoms were compared among 58 physically less active and 50 physically active adults who were recruited and classified based on their self-reported physical activity. Additionally, this study evaluated the association of objectively measured physical activity with psychological variables.

Methods: Participants completed questionnaires evaluating their mindfulness skills and psychological flexibility as well as their psychological and depressive symptoms. Physical activity was assessed objectively using an accelerometer for seven consecutive days.

Results: Based on the self-reported physical activity levels physically active individuals had better mindfulness skills and lower psychological and depressive symptoms compared to physically less active adults. A consistent correlation was observed between objectively measured physical activity and psychological well-being.

Conclusions: This study support the view that physically active adults had better psychological well-being compared to physically less active adults. These results also suggest that a physically active lifestyle is related to better mindfulness skills and having less psychological and depressive symptoms.

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Living a sedentary lifestyle has become a widespread health problem in Western countries, and is one of the causes of chronic diseases such as type 2 diabetes and cardiovascular disease (Lee, Shirota, Lobelo, Puska, & Blair, 2012). Physical activity has also been inversely associated with mental disorders such as depression (Dunn, Trivedi, & O’Neal, 2001; Galper, Trivedi, Barlow, Dunn, & Kampert, 2006; Lucas et al., 2011), and this association seems to be bi-directional. It has been found that individuals who exercise at least two to three times a week experience significantly less anger, cynical distrust and stress compared to those who exercise less or not at all (Hassmén, Koivula, & Uutela, 2000). Furthermore, a higher sense of coherence and a stronger feeling of social integration has been reported in regard to individuals who exercise at least twice a week in comparison to their less active counterparts (Hassmén et al., 2000). On the other hand, lack of psychological well-being, such as in the form of depression, may also contribute to a sedentary lifestyle and poor adherence to physical activity behaviour (Roschanaei-Moghaddam, Katon, & Russo, 2009).

Mindfulness is a concept that has attracted researcher and practitioner attention worldwide during the last decade (Baer, 2003; Brown & Ryan, 2003) and has become an important issue in health promotion and disease prevention research (Greerson, 2009). Mindfulness involves attending to relevant aspects of experience in a non-judgemental manner. In mindfulness training, the goal is to maintain awareness moment by moment, disengaging oneself from beliefs, thoughts, and emotions (Kabat-Zinn, 1982; Ludwig & Kabat-Zinn, 2008).

A number of studies have evaluated the associations between mindfulness and different health behaviours. Mindfulness skills have been associated with better well-being (Baer, 2003; Hofmann, Sawyer, Witt, & Oh, 2010), healthier eating practices, and better quality of sleep and physical health (Murphy, Mermelstein, Edwards, & Gidycz, 2012). In addition, mindfulness skills have also been recognised as an important element involved in disengaging individuals from their automatic thoughts, habits, and unhealthy behaviour patterns (Baer, Fischer, & Huss, 2005). Furthermore, several studies have shown that greater levels of mindfulness are associated with higher levels of physical activity...
Mindfulness has also been found to moderate the intention–behaviour relationship in the physical activity context in that intentions have predicted leisure-time physical activity in mindful individuals but not among less mindful ones (Chatzisarantis & Hagger, 2007).

Psychological flexibility is another concept that has been recognised as a very important part of purposeful behaviour, dynamically representing well-being and satisfaction in life (Kashdan & Rottenberg, 2010). Psychological flexibility refers to the ability to be in the present moment with full awareness and openness to experiences based on one's own values in life (Harris, 2009; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). This concept is used especially in Acceptance and Commitment Therapy (ACT), which has been defined as a third wave therapy, having evolved from traditional behaviour therapy and basic behavioural principles (Hayes et al., 2006). Research evidence has shown that ACT interventions help people to live a more flexible and meaningful life according to their own values, and have been a powerful aid in overcoming many kinds of mental or health-related problems (Powers, Zum Vörde Sive Vörding, & Emmelkamp, 2009). Besides the evidence from ACT research, little is known about how psychological flexibility is associated with physically active or inactive lifestyles.

The purpose of this study was to compare mindfulness skills, psychological flexibility and psychological symptoms among physically less active and active adults who were recruited and classified based on their self-reported physical activity. Additionally, we evaluated the association of objectively measured physical activity with mindfulness skills, psychological flexibility and psychological symptoms. Based on the available research evidence (e.g., Gilbert & Waltz, 2010; Roberts & Danoff-Burg, 2010; Ulmer et al., 2010), we hypothesized that physically active adults have better mindfulness skills, greater psychological flexibility, and less psychological and depressive symptoms compared to physically less active adults.

### 1. Methods

#### 1.1. Study population

The study population ($N = 108$) was comprised of Finnish adults, who were recruited in the Central Finland region in the autumn of 2011. In order to reach two samples who differ by their physical activity levels, the groups were recruited separately. One sample was aimed to look for participants who do not accomplish moderate-to-vigorous physical activity (MVPA) level of 2.5 h per week and defined as a "physically less active group". The other sample was targeted to look for participants who meet the currently recommended minimum moderate-to-vigorous physical activity (MVPA) level of 2.5 h per week and defined as a "physically active group". Physically less active adults were recruited through advertisements in local newspapers and physically active adults were recruited through three local fitness centres using advertisements.

Background information was collected using a questionnaire. The mean age of participants ($N = 108$) was 43 years (standard deviation, $SD = 5.2$), and 79% were women. There was no significant difference between the physically less active and the active group in terms of age, gender, education, number of children, body height, or diagnosed mental health problems (Table 1). Participants’ physical activity levels were also measured objectively. Based on the objective physical activity measurements, the two groups differed significantly in their mean levels of objectively measured physical activity (Table 1).

### Table 1

Background information of the physiologically less active and active groups.

| Background variables | Physically less active adults ($N = 58$) | Physically active adults ($N = 50$) | $p$-value* |
|----------------------|----------------------------------------|------------------------------------|-----------|
| **Age, years**       | % Mean ($SD^a$)                         | % Mean ($SD$)                       |           |
| Women                | 81.0 (19.0)                             | 76.0 (24.0)                         | .001      |
| Men                  | 19.0 (24.0)                             |                                   |           |
| **Physical activity level** |                                   |                                   |           |
| MVPA time, min/day  | 24.3 (12.4)                             | 62.7 (24.7)                         | <.001     |
| HEPA time, min/day   | 6.4 (6.8)                               | 37.9 (22.3)                         | <.001     |
| Steps/day            | 6921 (1993)                             | 12050 (3809)                        | <.001     |
| **Civil status**     |                                   |                                   |           |
| In a relationship    | 74.1 (14.0)                             | 76.0 (14.0)                         |           |
| Divorced             | 17.2 (8.0)                              | 17.2 (8.0)                         |           |
| Single               | 6.9 (2.0)                               | 6.9 (2.0)                          |           |
| Widowed              | 1.7 (0.0)                               | 1.7 (0.0)                          |           |
| Other                | 0 (0.0)                                 | 0 (0.0)                             |           |
| **Highest education level** |                                   |                                   |           |
| Elementary school    | 1.7 (0.0)                               | 1.7 (0.0)                          |           |
| Vocational school    | 13.8 (6.0)                              | 13.8 (6.0)                         |           |
| High school          | 8.6 (3.6)                               | 8.6 (3.6)                          |           |
| Polytechnic/Bachelor’s degree | 58.6 (42.0)                          | 58.6 (42.0)                         |           |
| Master’s degree/Ph.D | 17.2 (36.0)                             | 17.2 (36.0)                         |           |
| Children (<18 years) in the same household | 70.7 (66.0) | 70.7 (66.0) | .001 |
| **Body height, cm**  | 169.1 (8.1)                             | 170.1 (9.7)                         | .575      |
| **Body weight, kg**  | 80.6 (15.7)                             | 68.3 (13.8)                         | <.001     |
| **Body mass index**  | 28.3 (5.7)                              | 23.4 (2.8)                         | <.001     |
| <25 (normal weight)  | 34.5 (78.0)                             |                                   |           |
| 25–30 (overweight)   | 34.5 (20.0)                             |                                   |           |
| >30 (obese)          | 31.0 (2.0)                              |                                   |           |
| Diagnosed mental health problems | 12.1 (6.0) | 12.1 (6.0) | .278 |
| Diagnosed physical health problems | 41.4 (18.0) | 41.4 (18.0) | .009 |

Note: MVPA = moderate-to-vigorous physical activity, HEPA = health-enhancing physical activity defined as continuous MVPA lasting for at least 10 min at a time.

* Independent samples t-test or Pearson’s chi-squared test for group difference.

$^a$ SD, standard deviation.
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