



## Mindfulness skills, psychological flexibility, and psychological symptoms among physically less active and active adults<sup>☆</sup>



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### 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 less 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, Shiroma, 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 (Roshanaei-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 as an important issue in health promotion and disease prevention research (Greeson, 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

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**Table 1**  
Background information of the physically less active and active groups.

Background variables	Physically less active adults (N = 58)		Physically active adults (N = 50)		p-value <sup>a</sup>
	%	Mean (SD) <sup>b</sup>	%	Mean (SD)	
Age, years		43.9 (5.1)		42.2 (5.3)	.098
Gender					.524
Women	81.0		76.0		
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					.688
In a relationship	74.1		76.0		
Divorced	17.2		14.0		
Single	6.9		8.0		
Widowed	1.7		0		
Other	0		2.0		
Highest education level					.178
Elementary school	1.7		0		
Vocational school	13.8		16.0		
High school	8.6		6.0		
Polytechnic/Bachelor's degree	58.6		42.0		
Master's degree/Ph.D	17.2		36.0		
Children (<18 years) in the same household	70.7		66.0		.601
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		.278
Diagnosed physical health problems	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.

<sup>a</sup> Independent samples *t*-test or Pearson's chi-squared test for group difference.

<sup>b</sup> SD, standard deviation.

(Gilbert & Waltz, 2010; Roberts & Danoff-Burg, 2010; Ulmer, Stetson, & Salmon, 2010). 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

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