

**POSITIVE EMOTIONS AND MOBILITY IN OLDER PEOPLE**

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## **ABSTRACT**

### *Objective*

The purpose of this study was to examine the association of positive emotions and mobility in older people.

### *Methods*

Cross-sectional data were obtained from Screening and Counseling for Physical Activity and Mobility in Older People (SCAMOB) conducted by Gerontology research center. It was a cross-sectional study on a total of 649 people who were sedentary but able to move outdoors independently took part in the study. Emotion was analyzed with CES-D scores, mobility was assessed based on the participants' self-reports of difficulty walking 500 meters or 2 km. Physical activity was assessed based on self-reports of level of physical activity.

### *Results*

People whose CESD score were 4 or less were categorized as having positive emotions while those whose score were 17 or higher were categorized as having depressive emotions. People with positive emotions were more likely to report a high level of physical activity and less difficulties in walking 500 meters or 2 kms than people with depressive symptoms.

### *Conclusion*

Older people's emotions have significant influence on physical activity and mobility. People with positive emotions are more active and have less difficulty in walking

**KEYWORDS: AGING, MOOD, MOBILITY, PHYSICAL ACTIVITY**

**ABBREVIATIONS**

CES-D      Center for Epidemiological Studies Depression

PA          Physical Activity

SCAMOB    Screening and Counseling for Physical Activity and Mobility

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## 1. INTRODUCTION

Various changes in physiological functioning happen in parallel with ageing process. And due to that, older individuals are vulnerable to decline in health and functioning abilities (Agree, 1999). Promotion of positive emotion can be one of several coping strategies to contend the effects of changes in health of older people. People with good amount of positive emotion tend to live longer and healthier lives. However, we know little about the effects of emotion of older people on changes in mobility. Studies on influences of positive life orientation and positive emotion among older people on health outcomes are not common (Ble, Volpato, Pacetti, & Zuliani, 2003). There is an assumption that a positive emotional state may contribute to a better physical functioning and independence, well-being and even increased survival (Spirduso & Cronin, 2001; Fredman, et al., 2006) and that is influenced by adaptive coping ability (Fredrickson et al., 2003) and hormonal responses (Epel et al, 1998; Pitkala et al, 2004). However, we still need more evidence about the effects of emotions among older people, especially whether it helps in maintaining mobility.

## 2. POSITIVE AND NEGATIVE EMOTIONS

Emotion is a psychological activity, which includes feelings and experiences, positive and negative, from devastation to any forms of joy. It stimulates human behavior with respect to a particular experience. However, in psychology the term emotion is not definite since some describes it as discrete emotional responses (happy, pleasure, fear, excitement and gratitude) (Chipperfield et al., 2003). Nonetheless emotions may be positive or negative and it considered a subjective emotional response to the experiences of an individual. In physical activity research both terms 'emotion' and 'affect' can be used interchangeably.

Although, positive affect and positive emotion is commonly referred to as being happy, contented, and having life satisfaction (Collins et al., 2008) it is still significantly distinctive from merely having no depressive symptoms. Positive affect is marked with self confidence, frequent optimism, and having a sense of emotional well-being (Fredman et al., 2006).

Older individuals were found out to be more adaptive to changing emotional stimuli compared with their younger counterparts. Researchers presume that it is due to their old age, and the rationale that as much as possible they wanted to spend their remaining days being emotionally positive, while ignoring negative experiences such as any illnesses (Chipperfield et al., 2003). Emotions are essential in the life of an individual because it spontaneously manifests any mental perception influenced by either positive or unpleasant physical and environmental stimuli. "They can help us guide our choices, avoid a danger and they also play a key role in non-verbal communication." (Chanel et al., 2005)

## 2.1 Assessment of emotions

The Center for Epidemiological Studies-Depression Scale (CES-D) is a self-rating scale with 20-items (Radloff, 1977). It evaluates depressed mood, positive affect, somatic and retarded activity and negative perception of interpersonal relationships (Herrero, & Gracia 2007) as the subscale of emotion. Essentially, characteristics of the study subjects must be considered such as culture, age, ethnicity, sex, and health status as these factors can influence subject's responses and the selection and usage of the subscales of CESD. The inclusion of positive affect (PA) items may enhance sensitivity to rule out depressive symptomatology when negative affect is high and positive affect is low (Watson, et al., 1988). However, it may not be particularly an adequate measure of depressive symptoms especially if the items are positively formulated; rather, it measures positive affect. But otherwise, negatively revised items of the PA subscale could possibly measure depressive symptoms (Iwata et al., 1998). Therefore it is suggested that it is important to determine the best subscale or dimension to be used for a specific population and study objective (Schroevers, et al., 2000). CESD is generally used to indicate the risk of an individual of developing clinical depression and not to specifically classify depressed individuals. Although the validity of the inclusion of positive affect item is not clear. Radloff (1977) recommended the use of the sum score of all four subscales to assess depressive symptoms. And it has been found to be highly reliable and have good construct validity in assessing depressive symptomatology (Zhang, Sun, Kong, & Wang, 2012; Maiano, Morin, & Begarie, 2011; Hann, Winter, & Jacobsen, 1999; & Knight, Williams, McGee, & Olaman, 1997).

Another measure that psychologists typically use is verbal responses in assessing person's feeling since personal responses about emotion are primarily subjective. Positive Affect Negative Affect Scale Expanded (PANAS-X) that measures general emotion,

assesses fear, sadness, guilt, and hostility as the basic negative emotions; while basic positive emotions comprises of self-assurance, attentiveness, and joviality; And shyness, fatigue, surprise, and serenity as other affective states that each comprises of several specific emotion terms. The findings were found out from a sample of adults, college students, and psychiatric clients, that shows college students marked with stressful examinations and psychiatric individuals have significantly higher levels of negative affect than adults, similarly, those with chronic fatigue syndrome have substantially lower positive affect than adults (Watson, & Clark, 1999). However, with Positive Affect and Negative Affect Schedule study using indicated time frames showed that positive affect is strongly not related to depression but anxiety (Crawford, & Henry, 2004).

## **2.2 Factors that influence emotions**

Emotions are influenced by external, physiological and behavioral components, and are among the most important aspects of psychological processes reflecting reality (Simonov, 1986), brought about by factors which are significant for the individual. It represents efficient ways of adaptation to changing environmental demands which alters human attention and behaviors (Epel et al, 1998). And regulation of emotions is influenced by cognitive function resulting to optimal affective state (Scheibe & Carstensen, 2010). Meanwhile, Ashby et al., (1999) found out that positive mood is influenced by an increase in dopamine levels that consequently manifests mood elevation.

### **2.3 Positive Emotion to Health**

People who experience positive and warm emotions live healthier and longer lives. The traditional definition of health formulated in 1948 by the World Health Organization (WHO) states that health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. It is well known that physical health is influenced by good nutritional intake, exercise, and preservation of physiological functions. But several studies nowadays also suggest a good dose of positive emotion. And to understand the concept of emotion, and its regulation and influence to health, a specific theory will be briefly considered here.

#### *The polyvagal theory*

The polyvagal theory (Porges, 2001) was derived from the extensive analysis of the autonomic nervous system which generally acts particularly in emotional expression and social behavior. The theory includes influences on psychological, behavioral, and physiological process indicating an adaptive strategy in emotional regulation. It also emphasizes that the nervous system is critically sensitive to the environmental demands and individual’s perceived stress, enabling the person to act in mediated condition. One of the functions of the vagus nerve is the regulation and stimulation of the facial muscles and cardiac/ heart rate which triggers physical emotional communication at times of both coping to stress and at resting state. Others may have investigated emotions through objective measures like measurement of the heart rate (Geisler et al., 2013) stimulated by the same theory. But such literature will not be further covered, since this current research utilizes the subjective measure of emotion using the CESD scale.

Emotional optimism and viewing life positively in any aspect has been found to have several healthy benefits in maintaining health and promoting recovery on post operative

patients (Fredman et al., 2006) and protects older populations against permanent institutional care decreasing the risk of functional decline (Pitkala et al., 2004). And despite of traumatic events and stressors in health, optimism may prompt highly effective psychological, social and behavioral coping benefits (Collins et al., 2008). Specifically, on cardiovascular benefits, high levels of positive emotion decrease the risk of having high blood pressure (Ostir et al., 2006). And Kubzansky et al. (2001) found that optimism among older men who view the “glass half-full” had a lowered risk of developing coronary heart disease,

Another study of positive emotions in relation to longer survival was found among the written autobiographies of Catholic nuns followed for 60 years (Danner et al., 2001). The study had explored a powerful association between positive emotional content in written output and longevity. And researchers have found that emotional content in their written expression during their early life were strongly positive. Hence, older women experiences more intense emotion when they reminisce emotional memories (Levenson, Carstensen, Freisen, & Ekman, 1991)

### **3. MOBILITY**

Generally, mobility is defined as the ability of an individual to move oneself in many ways such as by walking independently, using assistive devices, or by using transportation within his her own environment from home, to neighborhood, and other communities (Webber, Porter, & Menec, 2010). Outdoor mobility is defined as “the ability of an individual to move about, both physically or using transport, sufficiently to carry out activities outside the home” (Gagliardi et al., 2007). Outdoor mobility may boost social interaction such as visiting senior citizens activities or church gatherings (Mollenkopf et al., 1997). However, with increasing age and declining function, some

older individuals may develop fear of moving outdoors potentially leading to avoidance of outdoor mobility (Rantakokko et al., 2009).

### **3.1 Assessment of mobility**

Personal mobility is defined as that the person is able to perform activities of daily living as measured through functional assessments such as walking, standing, sitting, reaching, stooping, etc. (Meyer, Janke, & Beaujean, 2013). Mobility are traditionally measured with either objective performance based tools or subjective self-report tools. These functional assessments are key element in evaluation of health and wellbeing of older persons. However, selecting on the most appropriate measurement tool can be challenging. Decisions on the usage of measurement tool depends on the ease of use, several instruments varies with their psychometric properties, considerations also includes severity and type of functional limitation. These performance-based measures depends on the assessment of the trained observer based on the subject's physical performance, measured typically in a controlled environment. Conducting performance based measurement tools are less vulnerable to influences such as, subject's cognitive function, culture and education (Sager et al., 1992). This serves as an objective indicator of physical capacity and the inability of the subject to perform a task suggests serious impairment. Thereby, this tool considerably better predicts mortality (Angel et al., 2000). However, because this type of measurement are sometimes measured in a simulated environment, it is influenced by subject's motivation of participate; and information of the subject's ability to cope in his/her environment is scarcely provided.

In contrast, self-report measures are comparatively better in a way that it is conducted by a questionnaire or phone interviews with ease and convenience to both the subjects and observer, and requires lesser expence. Since it is subjectively obtained this type of

measurement tool is not influenced by observer bias. Thus, subject's response reflect the individual's adaptation to his/her functional impairment (Angel et al., 2000). On its downside, self-reports may be inaccurate due to subject's judgement on his or her capabilities. Thus, relying exclusively to self-reported measures of ADL function would fail to identify functional limitation (Reuben et al., 2004). In the end, collaborative outcome of both measures will better provide significant and comprehensive understanding on the interest of the researcher.

### **3.2 Mobility change with increasing age in theory**

Older person functional ability is considerably a reflection of the effects of health and medical conditions, lifestyle choices, physiologic changes in advancing age, social participation and support, and environment. Increasing age correlates with functional decline (Ho et al., 1997; Ayis et al., 2006). Mobility decline is comprehensively explained under the theoretical model of the disablement process (Nagi 1976; Verbrugge and Jette 1994) illustrating the process from physiological pathology affecting the body leading to impairments then consequently resulting to functional limitations and finally disability. Disability as stated by Nagi (1976) is the inability or limitations and difficulty in performing social roles and activities related to work, family or to independent living. The disablement process describes how chronic and acute are the conditions affecting physical activity and mental functioning influenced by the personal and environmental factors that speeds or slows disablement (Verbrugge and Jette 1994). In this process, it is explained from the main pathway which is the pathology as the abnormalities in biochemical and physiological functions that are medically detected as a disease, injury or developmental conditions. Next are the impairments or dysfunctions in the body that can consequently affect physical, mental or social functioning. Then as a result, functioning will be limited, restricting performance of fundamental physical and mental

activities in everyday life. And finally, disablement is a situation where doing daily activities is difficult.

### **3.3 Factors affecting physical function**

In cases of disability, it is essential to understand that disability is not innate to a person but rather it is an emphasis that there is a relationship between a person and the environment. Environmental Gerontology is driven by psychologically based perspective; studying the relationship and interaction of aging people with their physical and social surroundings, and explains how these relationships affects health and functioning of older people (Lawton and Nahemow 1973). It is concerned on the arrangements and modifications of the physical environment and role of neighborhood as these factors may considerably act as an opportunity and constraint or threat to the older individual. One way to further understand the person-environment interaction is by acknowledging the ecological model of aging; the competence and environmental press model (Lawton and Nahemow 1973). Competence as defined by Cavanaugh, and Blanchard-Fields (2006) is the theoretical upper limit of a person's capacity to function physically, mentally, and intellectually. Environment can be classified on the basis of its varying demands on the person termed as "environmental press" (Cavanaugh, and Blanchard-Fields 2006). This model explains the situation when a person is less competent to the demands of the environment, the greater the impact of environmental factor. When this happens, the individual will be less able to cope and may experience decline in health, sensory processes, motor and cognitive skills and decline in ego strength. On the other hand, a person's capabilities may be consistent with the demand and opportunities of the environment, this situation is termed as "optimal fit" (Wahl and Weisman 2003). Understanding this conceptual model will provide a better view on the factors affecting mobility among older individuals.

Disability happens when there is an interruption between the ability of an individual and the demand of the activity. On the other hand, disability can be alleviated through either increasing the individual's capability or reducing the demand. Because factors in the environment like the structural and technical barriers (Gagliardi et al., 2007) like heavy traffic and poor transportation connections added with fear, limits ability of older persons to move about outdoors (Rantakokko et al., 2009).

*Risk Factors of Mobility Decline.* Increasing age is accompanied with sensory impairments which seriously compromise older people's ability to carry out daily tasks. And moving outdoors is particularly difficult for older people with vision and hearing impairments restricting them from performing daily activities (Raina et al., 2004; Crews, and Campbell 2004).

Another factor is the decline in muscle strength and changes in body composition that contributes to the development and progression of disability in advancing age. It was found that lower extremity muscle mass and strength greatly predicts functional decline (Reid et al., 2008; Newman et al., 2003). This muscle mass and strength decline makes older persons more susceptible to adverse effects of excess body weight which causes sarcopenic obesity and frailty. With obese older adults, mobility decline is becoming more prevalent causing serious medical complications affecting quality of life. However, clinical management in obesity is a complex process because of the involvement of various reductions in relative health risks that is associated with increased body mass. In older adults, there is a decrease energy expenditure thereby increasing their body fat (Newman et al., 2009). Because of the increase in body fat there is increasing adiposity and exacerbated with advancing age is the reduction in skeletal muscle consequently leading to mobility and functional limitations (Vincent et al., 2010).

Prevalence of both conditions sensory impairments and obesity is high with increasing age. Some studies have reported that depressive symptoms were common among older people particularly with combined sensory impairments (Lupsakko et al., 2002). And association of obesity and depression were found to be more significant with obese persons at higher risk of developing depression, than depressed persons becoming obese (Luppino et al., 2010).

In addition, chronic diseases and poor mental and social conditions increase the risk of older people to mobility decline. And their behavior towards health is an important predictor for mobility decline, and individuals who do not exercise have twice the risk of disability (Ho et al., 1997). Therefore, living an active lifestyle and regular physical activity can maintain or improve functional ability, delaying disability (Spirduso & Cronin, 2001) and mental health among older people (Paivi et al., 2010) even with a presence of a disease .

#### **4. THE ASSOCIATION OF POSITIVE EMOTION AND MOBILITY**

Emotional wellbeing is influential to health including physical functioning (Fredman et al., 2006). And a decline or improvement in physical functioning may be influenced by changes in emotional status (Ble et al., 2003). People who are more emotionally positive tend to engage in active physical activity (Collins et al., 2008; and Pitkala et al., 2004). Thus, having a high level of emotional vitality can be protective on preventing lower extremity functional decline following acute medical illness (Ble et al., 2003) enabling them to cope better with physical impairments and develop alternatives to maintain mobility.

Positive emotions among older people decrease their vulnerability to becoming frail where strength and physical performance declines leading to the risk for disability. However, to understand the association of positive emotion to mobility it must be emphasized that frailty and disability are two distinct states although they are causally related. These terms are both physical outcome of underlying factors such as weakness, and diseases. And positive emotion is one factor that reduces prevalence of physical decline. Frailty as defined by Campbell, and Buchner (1997) as “a loss of the person’s capability to withstand minor environmental stresses”. This particularly occurs when impairment in function and decrease in physiological reserves becomes severe enough to cause disability (Ory et al., 1993). In a biological definition by Weiner et al (1992) and Ahmed, Mandel, and Fain (2007) frailty is characterized by diminished capacity of physiological function with accumulated losses in the system thereby resulting in reduced function, intolerance to challenge and increased vulnerability. Essentially, frailty is the consequence of “excess demand imposed upon reduced capacity” (Powel 1997) being an “aggregate expression of risk resulting from age- or disease associated physiologic decrements” (Fried et al., 2004). It is a condition associated with advancing age that

may have been triggered by disease; declining strength, endurance, balance, and walking performance; and low physical activity (Fried et al., 2001) inadequate nutritional intake, and stress (Ahmed et al, 2007). Whereas, disability as mentioned previously is the inability and difficulty in task performance; hence disability is considerably an outcome following frailty. However, development of frailty among older people can be minimized with increasing positive affect (Ostir et al., 2004; and Park et al., 2009). Such studies were briefly reported due to the relative pathway of frailty to disability. And understanding the distinction of both terms will provide comprehensive analysis on aging process and strategies to promote physical functioning. Previous studies suggest that a positive emotional experience creates more physiological benefits resulting to a decreased risk of developing physical limitations.

On the other hand, studies on association of depressive symptoms and its effect to physical activity will be reviewed briefly. It will add knowledge to the significance of emotion in relation to older people's mobility, given that, in contrast to positive emotional state, depressive symptoms is a factor that crucially affects physical functioning and mobility. Such as in an epidemiologic study of depression in older persons (Kivela & Pahkala, 2001) it was reported that depression in older aged persons lessens their physical functioning, significantly among those who has negative self-report assessments. In addition, high level of depressive symptoms and depression scores among older persons were observed to have a significantly increasing decline in physical performance (Penninx et al., 1998). Moreover, the result in significant decline in physical functioning is common among pessimistic older persons (Umstatted et al., 2006; and Brenes et al., 2001). These studies suggests that depression and poor physical performance are correlative causing a dynamic decline in both physical and psychological health among older people. Thus, association of having depressive symptoms and

physical functioning is an intricate relationship. It is difficult to ignore the possibility that disability can cause depressive symptoms rather than a consequence of depression. Because persons with limited physical function may find it difficult to achieve and maintain psychological wellbeing. Furthermore, due to the greater level of physical limitation, thereby increasing chronic strain, often it may have important mental health implication (Turner, & Noh, 1988). To this end, Turner and Noh found out that physical disability have significant association with dramatically high risk for depression. Physically disabled persons also appears to have severe depressive symptoms affecting their rehabilitation process due to their psychological adjustments (Noh, and Posthuma, 1990) and emphasized that the increased risk for depression is more significant among those with persistent symptoms.

## **5. OBJECTIVE OF THE STUDY**

The purpose of this study is to explore the effects of emotion on older people with and without mobility limitation.

This study would answer question:

- Do positive emotions correlate with less mobility difficulty in old age?

## **6. METHODOLOGY**

### **6.1 Study Design**

This current study used cross-sectional data of 649 participants recruited for the project entitled Screening and Counseling for Physical Activity and Mobility (SCAMOB; ISRCTN 07330512; Leinonen et al., 2007) and were assessed with Center for Epidemiological Studies Depression scale (CES-D).

### **6.2 Participants**

Participants were recruited from the Finnish population register and selected based on specific criteria provided that they are community-dwelling older persons who are aged 75-81 years, residing in the center of the city of Jyväskylä, Finland; must be able to walk at least 500meters, must be at most moderately physically active or sedentary.

The SCAMOB study (Leinonen et al., 2007) sent an information letter to all 75-81 year old registered residents of the city of Jyväskylä in order to find potential participants. It had a four-phase screening and data collection process at baseline. It consisted of phone interviews, face- to- face interviews at participants' home and a nurse's examination at the study center, and a physicians' examination if necessary.

### **6.3 Mobility**

Participants' mobility was assessed with their ability to move from one room to another, walking 500meters, walking 2kms. Disability was assessed by asking structured question "Do you have difficulty in....?" and participants were provided with five alternative responses: able to manage without difficulty; able to manage with minor difficulty; able to manage with great deal of difficulty; able to manage only with help of another person; and unable to manage even with help (SCAMOB; Leinonen, et al., 2007).

### **6.4 Physical Activity**

Physical activity assessment was based on the standard form from the Grimby (1986) scale. It includes responses: mainly resting or minimal physical activity, light physical activity, and moderate physical activity about 3-4 hours a week.

### **6.5 CES-D (Center for Epidemiological Studies Depression scale)**

The Center for Epidemiological Studies- Depression scale (CES-D) was used as a tool to measure participants' depressive symptoms (Radloff, 1977). In this study, CES-D scores were used to analyze different classification of emotion among the participants. The CESD scores were analyzed through quartile distribution, where the highest quartile was assigned as the negative emotion (CESD 17-44 points,  $f=110$ ), while the lowest quartile was assigned as the positive emotion (CESD 0-4 points,  $f= 169$ ), and the rest in the two middle quartiles as the intermediate group (CESD 5-16 points,  $f= 370$ ).

The reason for not using the cut-off score of 16 in this study is due to the greater number of participants' responses scored 0-16points ( $f= 539$ ) compared to the number of participants' responses scored 17-44 points ( $f= 110$ ). If cut off score of 16 was used, it will not be able to show the degree of positive emotions among older people with depressive symptoms. This study aims to analyze positive emotion, it is not possible to utilize the score of people of 16 or less since there are more people in this group

compared to those who scored higher, as this may give inaccurate results. Because although people who scored 0-16 points, they do not necessarily mean that they have an absolutely exclusive positive emotions only, but rather, using the quartile distribution making the three categories of emotions allows the representation of positive emotion among older people with the least amount of depressive symptoms. This way, it will be possible to rule out relationship of positive emotion to mobility.

Moreover, this study uses three categories of emotion: positive, and negative emotion, and neutral emotion to also acknowledge feelings and mood of participants unbiased to only positive and negative emotions.

## 7. RESULTS

Baseline characteristics of participants according to their depression points are presented in table 1. Older people who have positive emotions accounted for 26 %, 17 % of them have negative emotions, and 57% have intermediate state of emotions. Most participants were female and living without partner.

Positive and intermediate state of emotion were common to both males and females (35% and 52% vs.13% with negative emotions among men) and (23% and 59% vs. 18% with negative emotions among women),  $p = 0.014$ . People with positive and intermediate emotions were more likely that they are living with a partner (30% and 55% vs. 15% with negative emotions),  $p = 0.215$ . Intermediate emotions did not greatly varied among people's educational level and educational length in years,  $p = 0.295$  and  $p = 0.266$ . But the longer the educational experience the higher the people are likely to have positive emotions 23% vs. 18% with negative emotions for 1-6 years of education; 26% vs. 19% for 7-10 years of education; and 29% vs. 12% for those who have had education 11 years or more,  $p = 0.266$ . People with positive and intermediate emotions were likely to rate their health as very good (25% and 56% vs. 19% among those with negative emotions) or poor (27% and 57% vs. 16% with negative emotions),  $p = 0.565$ . Positive and intermediate emotions did not greatly varied as well among persons who have a confidant (26% and 57% vs. 17% with negative emotions) and who does not have any confidant (26% and 56% vs. 18% among those with negative emotions),  $p = 0.953$ . And intermediate emotions were most common among people who are at superior level of occupation (62% vs. 24% among those with positive emotions, and 14% are with negative emotions),  $p = 0.083$ .

Table 1. Characteristics of participants.

		CESD (depression points)			<i>p</i> <sup>1</sup>
		N = 649			
		Positive N = 169	Intermediate N= 370	Negative N=110	
Sex		%	%	%	0.014
	Male	35	52	13	
	Female	23	59	18	
Marital status					0.215
	Living in with partner	30	55	15	
	Living without partner	24	58	18	
Educational level					0.295
	Elementary	23	58	19	
	Middle/Secondary school	28	55	17	
	Higher education: matriculation/university	28	60	12	
Education in years					0.266
	1-6 years	23	59	18	
	7-10years	26	55	19	
	11/more	29	59	12	
Self-rated health					0.565
	Very good	25	56	19	
	Poor	27	57	16	
Presence of confidant					0.953
	Have someone	26	57	17	
	Sometimes with kin/ have no one	26	56	18	
Occupation					0.083
	Housewife	26	61	13	
	Entrepreneur/self employed	20	74	6	
	Lower/unskilled	28	52	20	
	Superior/skilled	24	62	14	

<sup>1</sup>p-values for Chi-square test

A greater proportion of people with negative emotions reported difficulty walking 0.5km or 2 km than of those who had positive or intermediate emotional state (Table 2). Statistically significant correlation were observed between depression points of older people and physical activity level ( $p < .001$ ), walking ability of 500 meters ( $p < .001$ ) and 2kms ( $p < .001$ ).

Older persons who have negative emotions are more likely to remain resting or doing only minimal PA (25% vs. 18% are people with positive emotions). There are more people with positive and intermediate emotions doing light PA (25% and 58%) vs. 17% are with negative emotions and moderate PA (37% and 54%) vs. 9% of people are with negative emotions,  $p = < .001$ .

Negative emotions were common among people with difficulty walking 500meters (29% vs. 11% of people with positive emotions), while people with positive emotions were more likely to be able to walk 500meters without difficulty (29% vs. 15%),  $p = < .001$ .

Similarly, people with negative emotions were more likely to have difficulty in walking 2kms (34% vs. 11% of those who have positive emotions) compared with people who have positive emotions who are more likely to be able to walk without difficulty (29% vs. 14% of those with negative emotions),  $p = < .001$ .

Table 2. Difference in CESD scores between level of physical activities, ability to walk 500 m, and 2km.

		CES-D (depression points)			<i>p</i> <sup>1</sup>
		Positive N = 169	Intermediate N = 370	Negative N = 110	
Physical Activity (Grimby scale)		%	%	%	
	Mainly resting/ minimal PA	18	57	25	<.001
	Light PA	25	58	17	
	Moderate PA (3-4hrs/wk)	37	54	9	
Walking 0.5 km					
	Difficulty walking	11	60	29	<.001
	Able to walk without difficulty	29	56	15	
Walking 2 km					
	Difficulty walking	11	55	34	<.001
	Able to walk without difficulty/help	29	57	14	

<sup>1</sup>p-values for Chi-square test

## **8. DISCUSSION**

The current study demonstrated that emotions had a dose-response relationship with mobility difficulties. Having positive emotions increased the likelihood of reporting no limitations in walking. While negative emotion increased the probability of having mobility limitations. People situated between positive and negative emotions, the middle group, the probability of walking difficulty was also intermediate.

Older persons with negative emotion tend to report less physical activity performance, they engage in only resting to minimal physical activity, and observed to have difficulty with walking 2km and even 0.5km. This result is found to be similar with the specific findings of the other studies exploring positive affect's association to frailty (Park, et al., 2009; & Ostir, et al., 2004). And studies exploring on the reversed dimension of positive emotion to physical activity reported that physical activity is associated to a low depression score among older adults (Kritz-Silverstein et al, 2001).

One specific factor common to both emotion and mobility is the stress. It was earlier reviewed that, physiological, and environmental stress influences greatly on physical functioning. Performance in carrying out tasks depends on the capability of an individual in relation to the demands of the task and the environment. Although, however stress is not unitary emphasizing that different demands reflects different effects on physiological aspect of an individual. A reversed dimension was found out that physical exercise have an alleviating effect to stress (de Geus, and Stubbe, (2007). And another buffering strategy to suppress the development of stress is the regulation of emotions (de Veld et al., 2012) which then protects an individual from risk of developing physical and psychological problems. Because stress have a great impact on emotions and physical

functioning, it is best to acknowledge various stress buffering approach to counter its debilitating effects on emotion and mobility.

To this end, physical activity and emotion may have been reported to be correlated; there has no clear information on its causal structure. Several studies have although confirmed the effects of physical activity to emotion (Salmon 2007; Kritz-Silverstein et al, 2001; Strawbridge et al., 2002; Kerr, and Kuk, 2000) and effects of emotion to physical activity. There is no precise confirmation on which aspect comes first, whether emotion or mobility. If Physical activity serves a way to improve emotional state, it may have the possibility that active people engaged in exercise because of emotional problem (Salmon, 2007). Individual's activity performance may provide emotional benefits triggered by the accumulation of several mood improvements in every physical activity sessions. Thereby, considering that physical activity produces anti-depressive, anti anxiety effects and reduced sensitivity to stress.

The current study's limitation on the methodological aspect is that, first; the cut-off score for the CES-D scale was not clearly stated in the literature. And the classification of "Positive emotion" in this study is not clearly defined as there are various alternative terms that are used interchangeably. In this study "positive emotion" term was used which was also used in previous studies (Ostir et al.,2008; Xu, and Roberts, 2010; & Ostir et al., 2006), while others used the term "Positive Affect" (Fredman et al., 2006; Kurland et al., 2006; & Park-Lee et al., 2009), "Positive Well-being" (Collines, Goldman, & Rodriguez, 2008), and "Positive Life Orientation" (Pitkala, Laakkonen, Strandberg, Tilvis, 2004) these terms may generally consists many clusters of positive emotion, feelings and mood.

CESD is a screening tool for depressive disorders. Participants scored in CES-D test have depressive symptoms regardless of the scores. In order to determine the different classification of emotions (Positive emotion, Neutral, and Negative emotion) the lowest quartile range of CESD scores was used as the positive emotion, while the highest as the negative emotion and the rest as the intermediate emotion. The three categories of emotion in this study which was obtained from the CES-D scores will therefore allow a further understanding that CES-D may not only be particularly useful to determine depressive symptoms as a negative emotion but as well demonstrated in this study that CES-D was used to identify different emotions and have just worked well in providing another view that those who scored the lowest can be considered to have positive emotion. Hence the strength of this study is that, it was able to provide information on the degree of depressive symptoms of older people based on their depression points using CESD. It showed that even among the persons who scored the least have the most amount of positive emotions, and those who were under the intermediate emotion group does not necessarily mean that they are either exclusively positively emotional or having exclusively depressive symptoms. Thus, this study has explored the effects of different emotions in association to mobility.

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