

# Using self-efficacy theory to develop interventions that help older people overcome psychological barriers to physical activity: A discussion paper

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## Abstract

**Background:** Only a fifth of older people undertake a level of physical activity sufficient to lead to health benefit. Misconceptions about the ageing process and beliefs about the costs and benefits of exercise in late life may result in unnecessary self-imposed activity restriction. Thus, adhering to a physical activity can be difficult particularly when the benefits of exercise are often not immediate. Many of the barriers to engaging in physical activity among older people are attitudinal. It is therefore important to take account of the non-physical aspects of physical activity intervention programmes, such as increasing confidence. Self-efficacy is a widely applied theory used to understand health behaviour and facilitate behavioural modification, such as the increase of physical activity.

**Aim:** This paper aims to examine the ways in which self-efficacy theory might be used in intervention programmes designed to overcome psychological barriers for increasing physical activity among older people.

**Conclusion:** A number of studies have demonstrated that exercise self-efficacy is strongly associated with the amount of physical activity undertaken. Evidence from some trials supports the view that incorporating the theory of self-efficacy into the design of a physical activity intervention is beneficial. Physical activity interventions aimed at improving the self perception of exercise self-efficacy can have positive effects on confidence and the ability to initiate and maintain physical activity behaviour. There are a number of ways for nurses to facilitate older people to draw on the four information sources of self-efficacy: performance accomplishments, vicarious learning, verbal encouragement, and physiological and affective states. Research challenges that future studies need to address include the generalisability of exercise setting, the role of age as an effect modifier, and the need for more explicit reporting of how self-efficacy is operationalised in interventions.

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**Keywords:** Older people; Physical activity; Barriers; Confidence; Information sources of self-efficacy

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## What is already known about the topic?

- The health benefits of physical activity are well documented.
- Older people are less likely than younger adults to meet public health goals for sustained activity.

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- Older people face a number of barriers that prevent them initiating and maintaining regular physical activity or exercise.

### What this paper adds

- A discussion of the psychological barriers that prevent older people adopting and maintaining physical activity.
- A discussion of the literature reporting attempts to incorporate self-efficacy theory in interventions designed to improve physical activity and exercise among older people.
- Practical suggestions of how the four information sources of self-efficacy can be operationalised within physical activity intervention programmes.

## 1. Introduction

The health benefit of physical activity is well-established. However, the majority of adults do not undertake regular physical activity. It has been estimated that between 60% and 85% of adults globally are not sufficiently active (World Health Organisation, 2003). Only about a fifth to a quarter of older adults undertake sufficient activity to accrue health benefits (Hawkins et al., 2004; Health Education Authority UK, 1999; Wang, 1994).

Recent physical activity guidelines recommended that adults aged over 65 years should perform moderately intense aerobic exercise 30 min a day, 5 days a week, and that this amount of exercise can be accumulated throughout the day in 10-min bouts (American College of Sports Medicine, 2006). For older people, any form of exercise might be encouraged to achieve this goal. While the evidence for the efficacy of physical activity, particularly aerobic exercise, is well-established (Jenei et al., 2002; Matos Mde et al., 2004; Potvin et al., 2000), there is a need for a better understanding of the necessary components of an effective physical activity intervention that is acceptable to older people.

This paper discusses the underlying psychological barriers to engaging in physical activity among older people and the use of the concept of self-efficacy to inform interventions that might increase older people's physical activity. The possible ways to promote physical activity among older people by the use of the four information sources of self-efficacy are explored in the light of the published literature.

## 2. Barriers to engaging in physical activity among older people

Older people are less likely than younger adults to meet public health goals for sustained activity (Ory et al., 2002). They may assume that the health promotion messages about exercise are aimed at younger adults or that limitations in physical functioning prevent them from undertaking exer-

cise. Thus, helping sedentary older people to start and adhere to regular exercise is likely to pose particular challenges.

The attitudes and beliefs that older adults possess about the costs and benefits of exercise in later life can influence their activity level. Misconceptions about the ageing process among older adults may result in activity restriction (Lachman et al., 1997). There is evidence from qualitative data that some older people view exercise as irrelevant to their own lifestyle even though they believed that exercise may be beneficial to others (Campbell et al., 2001). Older people may be also unaware of the benefits of exercise in later life or discount the personal relevance of physical activity (King et al., 1992). Many of them do not consider themselves to be candidates for exercise programs because they associate exercise with extreme physical exertion. Others may be concerned that exertion through exercising may cause injury, or that physical decline is inevitable and irreversible with advancing age (Lachman et al., 1997; Lachman, 1991).

It is claimed that the tendency for individuals with low perceived confidence to engage in fewer health-promoting behaviours becomes stronger in older adults (Newsom et al., 2004; Resnick and Spellbring, 2000; Rodin, 1986, 1989). In a large survey of Canadian adults aged 60 and over (Newsom et al., 2004), younger respondents (aged 60–74) were more likely to be physically active compared to the older ones (aged 75 and over). The older respondents, in contrast, were more likely to report their health status or disability as a barrier to improving their health. Nearly half of the respondents indicated that a lack of will power was a barrier to them changing their health behaviour.

Perceived poor health and the symptoms of physical disabilities associated with chronic disease are frequently reported as major barriers faced by older adults (Clark, 1999a,b; Lian et al., 1999). Older people with chronic health problems may be limited in the type and level of physical activity that they can undertake and may also be less confident in trying out new forms of exercise than younger adults. Some older people may be aware of less demanding forms of exercise but have difficulty in accessing information as to how to commence such activities or perform them safely and effectively. Fear of falling also acts as a significant barrier for older people (Arfken et al., 1994; Howland et al., 1993). Results from cross-sectional studies have shown that engaging in activities of daily life is related to one's belief that one can do the activity without falling (Powell and Myers, 1995; Tinetti et al., 1990). Other barriers preventing older adults overcoming a long-term sedentary lifestyle include problems of managing time and the difficulty of rescheduling regular physical activity to one's daily routine (King et al., 1992).

Maintaining physical activity is an important element in the success of achieving and maintaining the maximum benefit of exercise. However, adhering to a physical activity can be difficult because the benefits of exercise are often not immediate when one needs to stick at the activity for some

time in order to feel the rewards. This is reflected by the finding from a meta-analysis of 127 physical activity intervention studies that approximately half (40–65%) of adults dropped out within the first 3 to 6 months of starting an exercise program (Dishman and Buckworth, 1996). Although previous studies have reported that older adults can achieve particularly good exercise adherence and maintenance (Emery et al., 1992; McAuley et al., 2003), the dropout rate in aerobic exercise could be as high as 37% (Kelley and Kelley, 2001).

Factors relating to adherence to a physical activity programme included attitudes towards the exercise, the perceived severity of the symptoms, ideas about cause of disease, and the perceived effectiveness of an intervention (Campbell et al., 2001). The ability to maintain lifestyle change is thought to be improved by the use of behaviour change strategies. Evidence from a number of intervention studies designed to promote healthy lifestyles with the use of behavioural approaches suggest that interventions using behavioural or cognitive-behavioural strategies were more effective than health education, exercise prescriptions, or instruction alone (Brawley et al., 2000; Ettinger et al., 1997). Other studies have reported the importance of addressing people's confidence, attitudes and beliefs as well as the affective dimensions in order to maximize the effectiveness of exercise programmes (Dishman et al., 1985; King et al., 1992; McAuley et al., 1993; Newsom et al., 2004). One review of physical activity interventions targeting older people emphasized the importance of implementing behavioural strategies in promoting physical activity (King et al., 1998).

Given that many of the barriers to engaging in physical activity among older people are attitudinal, it is essential to take account of the psychological components, such as confidence, perceived exercise enjoyment and satisfaction in the development of physical activity programs designed for this age group. One of the most widely applied theories in predicting health behaviour and facilitating behavioural modification is the theory of self-efficacy, a central concept of Bandura's social cognitive theory (Bandura, 1986, 1997). In relation to various health promotion behaviours, the concept of self-efficacy has been incorporated into several conceptual models of health behaviour, such as the theory of planned behaviour (de-Vries et al., 1988; McCaul et al., 1993) and the health belief model (Rosenstock et al., 1988), as an integral influence or extended construct in behavioural modification. The concept of self-efficacy has also been used extensively to enhance health promotion efforts in a variety of outcome behaviours, such as weight loss (Reicks et al., 2004; Roach et al., 2003), smoking cessation (Haukkala et al., 2000; Staring and Breteler, 2004), alcohol abstinence (Skutle, 1999), and diabetes self care (Clark, 1997). Interventions designed with a focus on exercise self-efficacy may lower dropout rates from exercise programs and increase maintenance of exercise participation (McAuley et al., 1994, 2004).

### 3. Overview of self-efficacy theory

Self-efficacy refers to a person's sense of confidence in his or her ability to perform a particular behaviour in a variety of circumstances (Bandura, 1986, 1997). Bandura proposed that an individual's persistence and efforts toward specific behaviour is closely related to his or her level of self-efficacy. The personal perception of efficacy may further determine the type of activities chosen, the effort to be expended, and the degree of persistence in the effort (Bandura, 1977b; Eysenck, 1978). A key part of self-efficacy theory is that the stronger the individual's belief in his or her ability to perform a set of actions, the more likely they will be to initiate and persist in the given activity. In contrast, those who have a lower level of self-efficacy may dedicate less effort and, therefore have a greater tendency to abandon their attempts in carrying out the target behaviour (Bandura and Cervone, 1983).

Bandura (1986) bases his concept of behaviour change on two central theories: self-efficacy and outcome expectations. The underlying assumption of social cognitive theory suggests that behavioural change and the maintenance of that behaviour are a function of the expectations about one's ability to perform a certain behaviour (self-efficacy) and the expectations about the outcome resulting from performing that behaviour (outcome expectations). Both self-efficacy and outcome expectations play a role in the adoption of health behaviours, the modification of unhealthy habits, and the maintenance of change (Bandura, 1991).

An individual's self-efficacy and outcome expectations may be inconsistent on occasion. People may agree that there are health benefits to doing exercise in general (outcome expectations), whereas they may judge themselves incapable of including regular exercise in their daily life (self-efficacy) because of, for example, lack of time. The inconsistency between self-efficacy and outcome expectations may result from the lack of knowledge and the level of skills in relation to each specific behaviour. Despite individuals believing that a certain process of action will achieve specific outcomes, they may not, in fact, proceed with any action when they perceive that they do not possess the appropriate skills and knowledge to achieve those outcomes (Bandura, 1977a).

More recently, Bandura (1997) has argued that people's level of affective states and actions are based on beliefs rather than on objective assessments. Belief in a positive consequence of a particular behaviour may be more important than whether the behaviour has really caused a positive consequence in the past. For this reason, how people behave can often be better predicted through the beliefs they hold about their capabilities than by what they are actually capable of accomplishing. This helps to explain why people's behaviour is sometimes inconsistent with their actual capabilities and why their behaviour may differ widely even when they have similar knowledge and skills. Therefore, whether or not the relevant knowledge and skills are present,

having confidence in adopting behaviour may be sufficient to initiate it.

### 3.1. *Self-efficacy and exercise*

Self-efficacy beliefs are important in understanding exercise behaviours. The belief that one can exercise under the circumstances of constraints and impediments, is likely to be associated with a greater likelihood of undertaking exercise (Clark, 1996; Sallis et al., 1988). Various studies have demonstrated that exercise self-efficacy is a crucial determinant of physical activity behaviour, among other determinants, such as age, gender, the type of activity, and accessibility of facilities (Dishman et al., 1985; King et al., 1992). Exercise self-efficacy has also been shown to be an influential predictor of actual physical activity (Bozoian et al., 1994; McAuley and Courneya, 1992; McAuley et al., 1994). People with higher self-efficacy expectations maintain a greater sense of energy during exercise, perceive less effort being expended during exercise, report a more positive affect, and feel more revitalized during and after exercise. In contrast, perceived high physiological strain may weaken one's belief in being able to carry out the activity.

Several studies have also found that self-efficacy may have a role in the early stages of exercise adoption as well as in the maintenance of the exercise (Garcia and King, 1991; McAuley, 1992; Sallis et al., 1990). Indeed there is evidence to suggest that self-efficacy is more closely associated with initiating an exercise program, but its role in terms of long-term adherence is unclear (McAuley et al., 1993). Similarly, a study examining 5 months exercise adherence in middle-aged adults found that self-efficacy was a significant predictor of exercise behaviour in the early and middle stages of an exercise programme but not during the final month (McAuley et al., 1994). These findings correspond with an earlier study that suggested that one's self-efficacy is associated with the short-term adoption of activities but the relationship with long-term maintenance of activities is less clear (Sallis et al., 1986).

For physical activity intervention, the problems of exercise onset, the long-term maintenance of change, and the adherence to exercise regimens make the substantial health benefits from exercise fewer than expected. Results from previous studies raise the question as to whether the focus on improvement of self-efficacy is necessary for bringing change in physical activity behaviour. These studies found that self-efficacy-based interventions significantly changed the desired outcomes, such as the difference in the distance walked among older adults (Allison and Keller, 2004) and the improvement in physical activity (Allen, 1996), but not in self-efficacy itself. Other results from experimental studies that have used theory-based intervention strategies to enhance activity behaviour by enhancing self-efficacy also do not fully support the theoretical linkages (Calfas et al., 1997; McAuley et al., 1994). However, other studies have

found that physical activity interventions with the aim of improving the self perception of self-efficacy have positive effects on confidence and the ability to initiate and maintain physical activity behaviour (Dunn et al., 1999; Lee et al., 2007a). Previous studies on exercise adherence also reporting perceptions of efficacy as important predictors in the maintenance of new behaviour (Dishman and Buckworth, 1996; King et al., 1992; Rhodes et al., 1999; van der Bij et al., 2002). In general, the majority of research affirms self-efficacy beliefs as critical in the initial adoption of an exercise routine. If personal beliefs can influence the adoption of and adherence to physical activity, efforts to incorporate the theory of self-efficacy into the design of a physical activity intervention are likely to be beneficial.

## 4. Information sources of self-efficacy within self-efficacy theory

The information and feedback that an individual obtains from the performance of a task are referred to as sources of self-efficacy (Bandura, 1977b, 1986). According to self-efficacy theory, there are four major information sources of one's self-efficacy: performance accomplishments, vicarious learning, verbal encouragement, and physiological and affective states. These sources may come in several forms. Performance accomplishments would include positive experiences in performing a behaviour (for example being an exerciser at a younger age). Vicarious learning is the observation of others engaging in similar behaviour; for older people this might include observing an older person with physical limitations walking regularly. Verbal encouragement to carry out the behaviour may come from, for example, family or significant others. An example of information from physiological and affective states might be the pleasure associated with walking in the countryside and therefore adopting the behaviour in a comfortable way both physically and psychologically. A belief in one's ability to carry out a specific behaviour successfully is likely to be fostered by being exposed to these sources, although the importance of these sources may vary according to the type of behaviour and different age groups of target population.

## 5. Implications of the information sources for enhancing exercise self-efficacy among older people

The following sections introduce each of the four information sources and report how they have been operationalised as an intervention, what the evidence (if any) is for its effectiveness and its likely relevance for older people.

### 5.1. *Performance accomplishments*

Performance accomplishment is the experience perceived from an individual's performance of a specific activ-

ity (Bandura, 1997). It is assumed that a sense of self-efficacy is enhanced by successful experiences and weakened by negative experiences. This may be why performance accomplishments are believed to be the most influential source among the four information sources of self-efficacy beliefs, because they are based on personal experience and, therefore, have greater authenticity for the individual (Bandura, 1986, 1997). However, there is a lack of evidence to suggest that performance accomplishment alone can generate expected behavioural changes among older people.

As people's experiences of success may improve their self-efficacy, and disappointments at an early stage may reduce it, breaking the task or behaviour down into small achievable pieces may be useful, in order to build up and accumulate confidence (van de Laar and van der Bijl, 2001). This is also the reason why greater support is necessary in the initial stage of the behaviour or task to enhance confidence and minimize frustration that may damage self-confidence (Bandura, 1995). Establishing small goals to enhance exercise self-efficacy among older people may be highly effective for some individuals when goal setting was found to increase confidence in carrying out a desired behaviour (Bandura, 1986; Blair, 1995; Shilts et al., 2004). Individualised goal setting in a tailored intervention to the individual needs and capacities of the participants and allowing for gradual progress has been suggested as particularly suitable for older adults (Lachman et al., 1997). Making an individual's effort and progress visible through the use of personal exercise diaries was seen to be helpful by Taiwanese elders in a community-based walking intervention programme (Lee et al., 2007a).

### 5.2. Vicarious experience

Seeing others' achievements or learning from other's related behaviours, especially for individuals who are uncertain of their capability to perform a specific behaviour may help an observer believe that he or she can possess the capabilities to perform equivalent activities (Bandura, 1997). A trial of vicarious experience provided through visits to patients about to undergo cardiac surgery by those who had recovered from a similar procedure showed this intervention to be effective in helping the patients to cope with surgical anxiety (Parent and Fortin, 2000). Several investigations have also tested the use of videos to enhance self-efficacy (Gortner and Jenkins, 1990; Gross et al., 1995). Other forms of enhancing self-efficacy through vicarious learning have been through role play within group programmes.

However, the characteristics of the source of vicarious experience need to be taken into account as they are likely to be highly influential in the success of bringing about the desired outcome. People with a comparable lifestyle, such as friends or colleagues, or those with similar characteristics in age, sex, and socio-economic status may serve as models for a specific behaviour and necessary skills. This may be a

particular issue for older people where a lack of role models within a similar age group may re-enforce the belief that exercise is irrelevant.

The relative success of vicarious experience is likely to be contingent on the comparability of the role models (Bandura, 1995). In particular, role models who succeed despite difficulties, such as slow progression or trial and error, are often in a better position than those who achieve quick success, without problems (Gonzalez et al., 1990). Therefore, choosing role models for the vicarious learning of regular physical activity among older people should take into account their comparability with the subjects; for example, choosing successful older people facing similar health problems in carrying out physical activity. Nevertheless, there is a lack of specific evidence on the effect of the use of vicarious experience in the design of physical activity intervention for older people.

### 5.3. Verbal encouragement

As people enter late life, they may have a greater real or perceived need for guidance in appraising their capacity for physical activity and in making appropriate choices regarding ways to be active (Dye and Wilcox, 2006). Realistic positive feedback from significant others or professionals was proposed as an important reward to induce individuals to carry out and maintain a specific behaviour (Bandura, 1997). People may interpret their successes negatively or simply ignore or underestimate their achievements. Therefore, it is important that verbal encouragement is directed in such a way that it helps people to interpret the experience as a success (Bandura, 1997; Maddux and Lewis, 1995). When others, especially significant others or professionals, have confidence in one's capacities to succeed, this may generate greater self-confidence to some individuals (Booth et al., 2000; Gortner and Jenkins, 1990; Lee et al., 2007a; Oetker-Black et al., 1997). Other studies also found that encouragement from healthcare providers significantly influenced physical activity particularly among older adults (Burton et al., 1999; Yusuf et al., 1996).

Although verbal encouragement alone may be limited in terms of promoting one's self-efficacy, it can serve to reinforce self-change if the positive appraisal is realistic (Bandura, 1997). On the one hand, empirical studies have found that verbal encouragement from a trusted, credible source was found to successfully improve exercise behaviour (Gilliss et al., 1993; King et al., 1991, 1997; Resnick, 1998). On the other hand, if unrealistic beliefs about personal capabilities are encouraged, this may, in contrast, lead to a loss of credibility of the provider, and further weaken the recipients' confidence in their own capabilities. Trials that used both telephone and face-to-face encouragement and support to older people to facilitate their regular walking as exercise found an effect on both exercise self-efficacy score and self-reported level of walking frequency (Lee et al., 2007a,b; Yardley et al., 2007).

#### 5.4. *Perceiving physiological and affective responses*

One's perception of physiological and affective responses in relation to a specific activity is counted as the other source in relation to self-efficacy because these personal perceptions may affect judgments about one's efficacy beliefs (Bandura, 1986, 1997). Older people may perceive their physical signs or symptoms in stressful or tough situations as threatening signs of their vulnerability to physical dysfunction. In physical activity involving strength, for example, people may interpret their fatigue, breathlessness, and aching muscles as indicators of their physical inefficacy. Feeling stressed or diffident may undermine an individual's perceived ability to undertake a specific behaviour and the stressful emotional state may eventually lead to the termination of the behaviour.

Self-efficacy might be increased by reducing stress and negative emotion, by correcting negative interpretations of one's physical and psychological responses to the behaviour (Gattuso et al., 1992; Johnson, 1996), and by considering alternative interpretations toward physical symptoms (van de Laar and van der Bijl, 2001). For example, when older people experience muscle ache or fatigue in the early stages of taking up exercise, the role of a health care provider may be to help them interpret these as necessary steps to longer-term health gain rather than perceiving them as negative consequences of exercise. Enhancing a positive physical status, reducing stress and negative emotional states, and offering alternative interpretations of what are perceived as negative physiological and psychological indicators were viewed as essential in building up efficacy beliefs among older adult participants (Resnick, 2002). However, it is necessary to establish further evidence about the use of alternative interpretations of the physiological and psychological state in promoting older people's physical activity.

#### 5.5. *Combining information sources*

A combination of the four primary sources of self-efficacy is likely to have the potential to produce optimal results. Individuals can weigh and integrate information from various sources in forming a personal judgment of efficacy (Bandura, 1986) and may improve their performance by seeing, hearing, and feeling what they are doing (Bandura, 1997).

One study sought to enhance exercise adherence in sedentary adults by employing the four modes of efficacy development (McAuley et al., 1994). The primary focus of the intervention was the provision of efficacy-based information from the four primary sources, including the mastery of performance accomplishments, social modelling (vicarious learning), social persuasion (verbal encouragement), and the interpretation of physiological and emotional responses. Participants who experienced the benefit of this programme adhered better to exercise activities than the subjects in the control group who received attention and

health information but not the efficacy enhancement. In summary of the programme, mastery accomplishment was through an exercise log, social modelling was provided through videotapes of individuals with similar characteristics engaging in exercise, encouragement was given through the formation of "exercise buddy groups" of two or three individuals, and participants were sensitised to information relating to emotional and physiological states through the provision of information regarding how the physiological system responds to exercise stress.

Another trial aimed to explore the impact on efficacy beliefs on older adults involved in a rehabilitation programme (Resnick, 1998). Individuals in the treatment group received three efficacy enhancing interventions: role modelling, verbal persuasion, and physiological feedback. The treatment group experienced stronger efficacy beliefs regarding programme participation, more discharges from the institution, and less pain than the control group. Efficacy beliefs, both self-efficacy expectations and outcome expectations, were reported to relate to participation, functional performance, and length of stay.

A study testing the effect of a self-efficacy intervention delivered through telephone contacts found an improvement in distance walked although not in exercise self-efficacy itself (Allison and Keller, 2004). The use of the four information sources of self-efficacy to enhance levels of self-efficacy and physical activity in this study was through: goal setting and rehearsal of desired behaviours to encourage performance accomplishments; verbally encouraging relative progress and attribute accomplishments to participants' own abilities; questioning the participants about their responses to physical activity and helping the participant to interpret symptoms accurately; and vicarious learning by way of drawing attention to the relative progress of other persons with a similar age and health condition.

A positive finding was also found in a community-based walking intervention programme with the use of the self-efficacy theory to inform the intervention carried out by a public health nurse (Lee et al., 2007a). Among hypertensive older people, the four information sources of one's exercise self-efficacy was used through both face-to-face and telephone contacts to encourage individual's confidence in initiating and maintaining regular walking as exercise aimed at reducing systolic blood pressure. After 6 months, a greater improvement in exercise self-efficacy score and self-reported walking was observed among intervention group participants. A post-trial interview study also suggested that self-efficacy played an important role in initiating and maintaining older people's regular walking as exercise (Lee et al., 2007b).

## 6. **Research challenges**

There are a number of other issues that need to be addressed if the evidence-base for self-efficacy physical activity interventions is to be used to enhance the health

of older people. Most research effort in the field of exercise self-efficacy has been targeted at testing interventions for older people that have used a combination of the four information sources. However, there has been a tendency for study reports to lack the level of detail required to know to what extent interventions informed by the concept of exercise self-efficacy have incorporated the four information sources. Future work could usefully test whether older people respond better to one source than to the other. It is not clear from the published literature whether certain exercise settings lend themselves more naturally to self-efficacy interventions. Some of the information sources such as verbal encouragement and vicarious experiences would suggest that activities that can be undertaken in groups may be particularly suitable. There appears therefore to be scope in testing this idea formally by conducting studies of self-efficacy-based interventions in both group and individual activity settings.

The research literature reviewed in this discussion paper has defined older people variously as over 60 (Booth et al., 2000; Ettinger et al., 1997; Lee et al., 2007a; Lian et al., 1999; Posner et al., 1990), over 65 (Yusuf et al., 1996), between 60 and 95 (Yardley et al., 2006, 2007), 80 and over (Dye and Wilcox, 2006), mean age of 78 (Resnick, 1998) or even mean age of 54 (McAuley et al., 1993), 50–65 (King et al., 1991), 50 and older (King et al., 1998). The term ‘older people’ refers to a heterogeneous group and there is a need to understand the modifying effect of age in the relationship between interventions and health outcomes.

More importantly, with recent reconceptualisations of self-efficacy related to exercise (Brawley et al., 2003), it will become important to distinguish between both one’s belief of his or her ability to achieve particular tasks and one’s belief of his or her ability to maintain and self-regulate adopted activities. This will require trials of interventions that have sufficient follow-up and are sufficiently powered to detect changes in both aspects of self-efficacy.

## 7. Conclusion

Older adults are likely to be hindered by a number of psychological factors in adopting and maintaining regular physical activity. Addressing attitudes and beliefs may maximize effectiveness of a physical activity programme. The application of self-efficacy theory has been used in several physical activity intervention programmes where increasing confidence may facilitate adherence to a physical activity programme. The use of the four information sources of self-efficacy (performance accomplishment, verbal encouragement, vicarious learning, and physiological and affective responses) can have a positive effect on the confidence individuals feel in carrying out and maintaining increased physical activity. Self-efficacy theory applied via the four information sources can play a key role in future nurse-led intervention programmes designed to promote physical activity among older people. Future studies

are warranted to standardise and quantify both provision and obtaining the four sources in the physical activity intervention. Only then, the precise way of applying the four information sources for the design of physical activity intervention to facilitate older people’s physical activity could be informed.

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