Applying Selective Optimization and Compensation Model to Mobility Adaptations of Older Adults: An Integrative Review and Implications for Nursing Care

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ABSTRACT

Mobility challenges can have a significant impact on older adults' ability to live at home independently and their quality of life. The Selective Optimization and Compensation model offers insights into how people select and adapt in order to advance their goals in life. It is not well understood how useful this model is in understanding older adults mobility challenges. An integrative review of the literature of research that has used Selective Optimization and Compensation model to examine strategies for older adults' mobility challenges was conducted. Key Selective Optimization and Compensation behaviours identified in the literature review included giving up activities for less strenuous activities, optimizing capacity for mobility and modifying mobility behaviours. Use of the Selective Optimization and Compensation model shifted the focus to older adults' capacity rather than their losses. Future research should continue to explore the complex connection between mobility and older adult well-being. Utilizing the Selective Optimization and Compensation model in this research might help to identify key behaviours older adults are implementing to successfully age-in-place

Key Words: Selective Optimization and Compensation Model (SOC); older adults' mobility challenges; implications for nursing care

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Globally, life expectancy is increasing, ranking it as one of society's greatest achievements (WHO, 2011). Research has linked older adults' perception of their quality of life with aging-in-place, which is defined as the ability to maintain independent, daily functioning in one's own home (Siren & Hakamies-Blomqvist, 2009). Scholars suggest that for many older adults aging-in-place is of such high importance it is viewed as sign of successful aging (Kelly, Fausset, Rogers, & Fisk, 2014). However, as individuals age, there are increased rates of morbidity, disability, and dependency (WHO, 2011), all of which can compromise older adults'

mobility and therefore their ability to live at home. Baltes and Baltes' (1990) theory of *Selective Optimization with Compensation (SOC) model* could offer insights into how older adults could adapt to limited mobility in order to retain their ability to live at home.

Background

Mobility is an important component of functioning for older adults as it allows them to maintain independence, make use of community facilities and participate in meaningful social and physical activities (Chase, Lozano, Hanlon, & Bowles, 2018; Rantanen, 2013; Rush, Watts, & Stanbury, 2011). Yet, decline in mobility represents one of the most common indicators of disability in older adults (Statistics Canada, 2007). Mobility impairments in older adults has been associated with higher risk of depression (Siren & Hakamies-Blomqvist, 2009), falls (Enderlin et al., 2015), hospitalization (Fried, Bandeen-Roche, Chaves, & Johnson, 2000), and institutionalization (Hajek et al., 2015). Therefore, changes in older adults' mobility have considerable significance on their ability to age-in-place and could seriously impact their performance of activities of daily living.

As individuals age, they tend to adapt to age related changes by adjusting to differences in their abilities (Siren & Hakamies-Blomqvist, 2009). These adjustments can be psychological, physical, or social, thereby allowing these individuals to cope with age related changes in ways that result in them feeling satisfied with their life (Siren & Hakamies-Blomqvist, 2009). This process has been theoretically described in the *Selection Optimization with Compensation* (SOC) model (Baltes & Baltes, 1990).

The SOC model proposes the use of three fundamental processes - selection, optimization and compensation. These aspects are allegedly essential for older adults to adaptively respond to the everyday demands and the functional decline related to aging (Baltes & Baltes, 1990; Freund & Baltes, 1998; Freund & Baltes, 2002; Lang, Rieckmann, & Baltes, 2002). Selection focuses on goal choice, while optimization and compensation focus on the means of achieving the goal (Abraham & Hansson, 1995; Baltes & Baltes, 1990; Freund & Baltes, 2002). Appropriate orchestration of the three processes are believed to maximize gains and minimize the losses associated with aging (Freund & Baltes, 1998). As limitations present themselves, older adults are able to adjust activities or roles by choosing what is most satisfying to them and where to focus their resources (Abraham & Hansson, 1995).

The process of *selection* refers to the older adult identifying and prioritizing goals or activities (Baltes & Baltes, 1990; Freund & Baltes, 1998; Freund & Baltes, 2002). For example, an older adult may prioritize activities that are of high priority such as the activities of daily living. This process may occur in response to *loss of resources* (personal or environmental), referred to as loss-based selection, or by selectively disengaging from an activity to focus on a more important goal, which is referred to as *elective-based selection* (Janke, Son, & Payne, 2009).

The process of *optimization*, describes how older adults' purposefully make efforts to enhance existing reserves or resources to continue performing activities or achieve goals (Baltes

& Baltes, 1990). For example, to achieve the goal of attending a seniors' center or church due to the social benefits, the older adult may rest the day before to conserve energy for the activity, or may enlist family or friends in driving them to the event to limit the their effort in engaging in the activity. In this example the older adult is planning and pacing their activity.

The final process, *compensation*, refers to older adults adapting or modifying activities when faced with limitations (Baltes & Baltes, 1990). Compensation occurs when specific behavioural capacities are lost, as a result of pain or disability. For example, the older adult may start to use a cane or walker to enhance their ability to walk, while minimizing their pain. It is important to note that unlike selection, compensation allows the older adult to continue performing activities by different means such as substituting one activity for another or using an assistive device.

A strength of the SOC model is that it acknowledges and accepts the changes that accompany the process of aging through adaptation. The SOC model also provides tangible methods to address physical and psychological changes related to aging, by promoting modification of behaviours (Freund & Baltes, 2002). Furthermore, the SOC addresses the heterogeneous way in which older adults define and measure their success related to aging (Burnett-Wolle & Godbey, 2007). A limitation of the model is that older adults' ability to optimize activities or goals may be limited based on the resources they have the ability to access. Therefore, older adults with financial restraint may be more likely to rely on the process of selection rather than optimization. However, it is not well understood how useful the SOC model is in examining how older adults adapt to mobility challenges.

Purpose

The primary purpose of this paper is to examine research that has applied the SOC strategies to mobility in older adults.
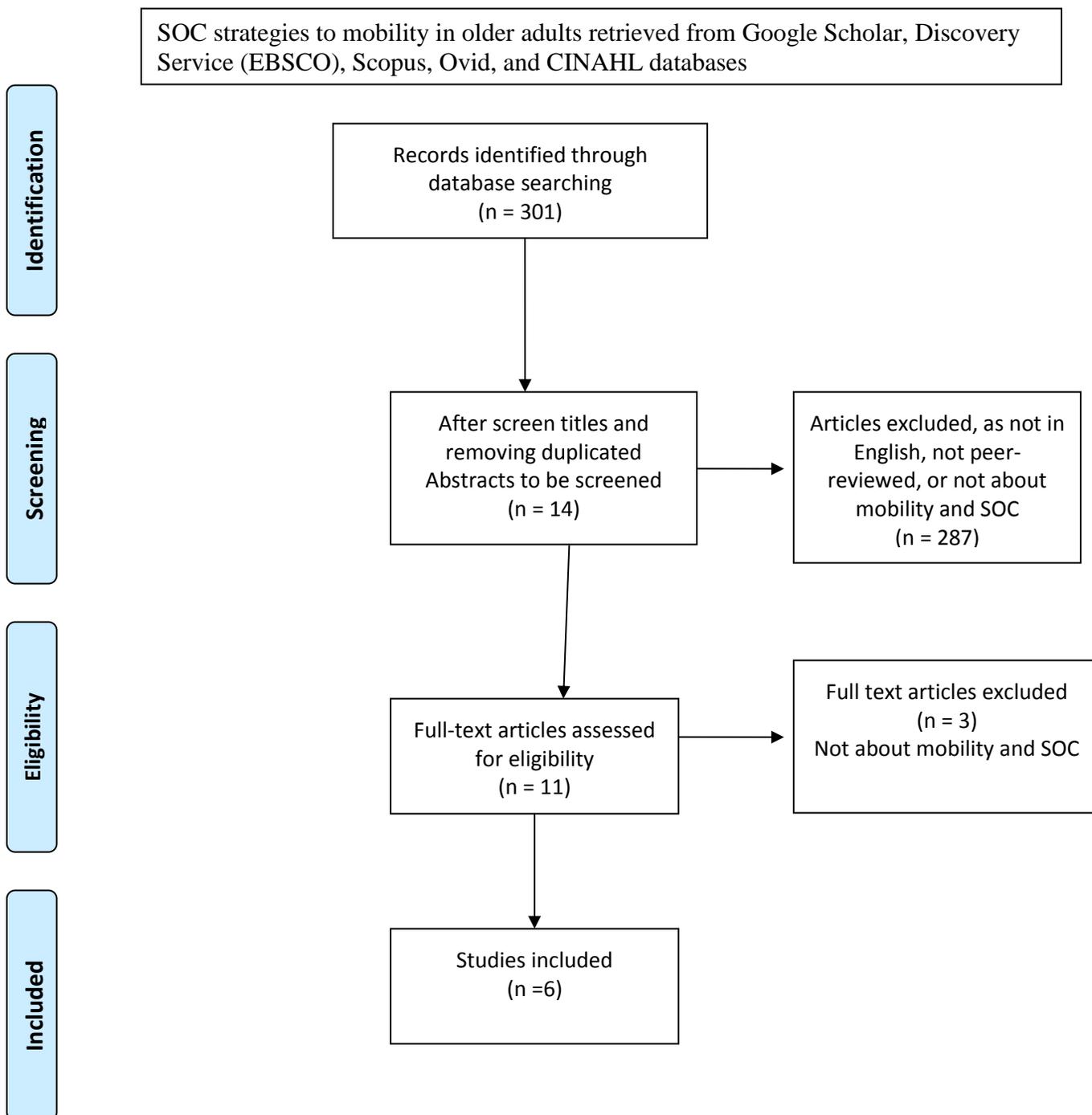
Methods

An integrative review of the literature were conducted of research that has used the SOC to examine strategies to address the mobility challenges experienced by many older adults. Electronic databases and grey literature were searched. The search was conducted using Google Scholar, Discovery Service (EBSCO), Scopus, Ovid, and CINAHL databases. Keywords included in the search were ("physical activity" OR "physical inactivity" OR exercise OR mobility) AND ("selections, optimization, compensation" OR "selections, optimization with compensation") AND ("older adult" OR aging OR senior OR elderly).

The following inclusion criteria to narrow the selection of anticipated results: English language, peer-reviewed, as well as articles between the years of 2000-2018. Articles were excluded if they did not include application of the SOC model, were not focused on the population or interest or lacked focus on mobility. The search yielded 301 articles. After reviewing titles and excluding duplicates and those that did not meet the inclusion criteria, the abstracts of 14 articles were screened. Eleven articles that addressed the topic were read in their

entirety to determine eligibility. Six studies met the inclusion criteria and were included in this review (please see Figure 1, p. 4).

PRISMA 2009 Flow Diagram

SOC strategies to mobility in older adults retrieved from Google Scholar, Discovery Service (EBSCO), Scopus, Ovid, and CINAHL databases

Identification

Records identified through database searching
(n = 301)

Screening

After screen titles and removing duplicated Abstracts to be screened
(n = 14)

Articles excluded, as not in English, not peer-reviewed, or not about mobility and SOC
(n = 287)

Eligibility

Full-text articles assessed for eligibility
(n = 11)

Full text articles excluded
(n = 3)
Not about mobility and SOC

Included

Studies included
(n =6)

Content analysis was conducted on the six included studies to identify themes. The Mixed Methods Appraisal Tool (MMAT) was used to examine the quality of each of the studies, see Table 1 for more details (Pace et al., 2012).

Table 1:

Author and Country	Methods	Results	Quality Appraisal score
Carpentieri, Elliott, Brett & Deary (2017) United Kingdom	Mixed methods study using (1) semi-structured biographical interviews were conducted with 33 older adults (77-78 years old) to explore what they found most meaningful in life and (2) quantitative descriptive analysis of 171 older adults to examine well-being and physical function. Coding and analysis of interviews examined talk of SOC related to physical function.	Older people who talked about SOC elements had a high incident of well-being despite low physical functioning.	Objectives are not clearly stated. 5.3 criteria is absent as the researchers do no discuss the limitations of integrating the data. They do not clearly identify the number of interviews they conducted or how they conducted the quantitative analysis that is presented in the paper.
Gignac, Cott, & Bradley (2002) Canada	Quantitative study using regression analysis to examine differing combinations of illness and disability variables, psychosocial variables and SOC of 248 people aged 55 and older. To identify categories of adaption behaviors these people were interviewed and content analysis of 25 random interviews was conducted.	There is variability in older adults' efforts to manage disability with most efforts aimed at compensation and optimization rather than selection.	All quality criteria were met.
Janke, Son, & Payne. 2009 United States	Quantitative non-probability convenience sample of 178 older adults between the ages of 51-95 completed a SOC questionnaire to assess their global life-management strategies when faced with changes in level of functioning and ability.	Adults use strategies associated with the model of SOC to adapt and change their leisure activities.	All quality criteria were met.

	Descriptive statistics and t tests examined differences in the means of the respondents.		
Kelly, Fausset, Rogers, & Fisk 2014 United States	Qualitative study interviewing 44 people between the ages of 65 and 85 to understand potential solutions to manage difficulties presented in four scenarios to better understand needs for aging in place. Solutions were analyzed and classified using SOC model.	Most participants would use compensation and most frequently tools and technology.	All quality indicators were met.
Rush, Watts, & Stanbury. 2011 Canada	A qualitative descriptive study to understand the mobility adaptations of community-living older adults.	Older adults used selection, optimization, and compensation adaptations across a range of mobility behaviors. The SOC model identified older adults' agency and motivations.	All quality indicators were met.
Siren & Hakamies-Blomqvist, 2009 Finland	Qualitative study using focus groups with 13 people ranging in age from 65-81 to understand how mobility was connected to well-being. Content analysis was used.	Independent mobility was closely connected to everyday life and lifestyle. Obstacles were overcome by mental and technical compensation.	All quality indicators were met.

Results

The six studies reviewed for this paper discussed a variety of ways older adults implemented the strategies of the SOC model through the use of different adaptive processes (Carpentieri et al., 2017; Gignac et al., 2002; Janke et al., 2009; Kelly et al., 2014; Rush et al., 2011; Siren & Hakamies-Blomqvist, 2009). Two of the studies were conducted in Canada (Gignac et al., 2002; Rush et al., 2011), two in the United States (Janke et al., 2009; Kelly et al., 2014), one in Finland (Siren & Hakamies-Blomqvist, 2009), and one in Scotland (Carpentieri et al., 2017). One of the studies was mixed methods (Carpenieri et al., 2017), two were quantitative

(Gignac et al., 2002; Janke et al., 2009) and three were qualitative (Kelly et al., 2014; Rush et al., 2011; Siren et al., 2009). The SOC model was used to study the adaptation behaviours of older adults across the spectrum of mobility, from older adults with osteoarthritis (Gignac et al., 2002), community dwelling older adults' views on well-being in the context of physical decline (Carpentieri, Elliott, Brett, & Deary, 2017; Kelly et al., 2014; Rush et al., 2011; Siren & Hakamies-Blomqvist, 2002) and to leisure activities among older adults with arthritis (Janke et al., 2009). There were similarities and differences in how each article discussed selection, optimization and compensation. For this reason, the literature will be further discussed in the following three sections: Selection as an adaptive strategy, optimization as an adaptive strategy and compensation as an adaptive strategy.

Selection as an Adaptive Strategy

Selection was evident and discussed in all the articles (Carpentieri et al., 2017; Gignac et al., 2002; Janke et al., 2009; Kelly et al., 2014; Rush et al., 2011; Siren & Hakamies-Blomqvist, 2009). In the articles by Carpentieri et al. (2017), Kelly et al. (2014); Siren and Hakamies-Blomqvist (2009) and Rush et al. (2011). For example, the participants in the study by Rush et al. (2011) described selection as avoiding an activity altogether, that is, they found that participants would give up leisure and recreational activities. This aspect was often associated with an injury or body-related limitation such as a bad knee or shoulder. This message was echoed by participants in three other studies where loss-based selection was an important strategy utilized when certain activities were given up for less strenuous activities (Carpentiere et al., 2017; Kelly et al.,2014; Siren & Hakamies-Blomqvist, 2009).

Fear of falling was noted to be related to activity selection in the study by Rush et al. (2011) as it caused one participant to give up washing the windows outside as he feared falling off the ladder. Driving was another domain in which older adults used self-imposed selection in both Rush et al. (2011) and Siren and Hakamies-Blomqvist (2009). This included participants restricting their driving to times they felt safe or giving up their driving completely. Janke et al. (2009) found that the availability of resources has a significant influence on the use of SOC strategies, most often causing individuals to focus on selection rather than the other processes of SOC as they required more resources to be available.

This finding was also noted in the study by Gignac et al. (2002) where use of selection was found to be associated with having fewer social resources, greater awareness of the impact of osteoarthritis on activities, and greater personal care limitations. In two of the studies older adults perceived selection as control over which activities to limit, it was seen as a reasonable trade-off and an individual choice in prioritizing activities in response to their individual aging process (Gignac et al., 2002; Rush et al., 2011).

Optimization as an Adaptive Strategy

Optimization was found to be an important adaptation strategy for the older adults who continued to engage in most activities (Rush et al., 2011). The participants the study by Rush et al. (2011) study optimized their mobility capacity in a variety of ways including pushing self to

capacity, balancing tensions, anticipatory planning and changing environments, which included going south for the winter. An example of pushing self to capacity included engaging only in activities identified as important, such as, going down stairs for laundry. Balancing tensions included balancing between pushing themselves to do something and preserving safety. An example of anticipatory planning was thinking ahead so that only one trip down the stairs was necessary versus four. Some participants found changing environments, such as going south for the winter allowed them to continue the activities they enjoyed. Respondents in the study by Kelly et al. (2014) also mentioned changing their behaviour to continue performing the same activities when faced with mobility decline. Even with simple tasks such as walking around the house, respondents mentioned taking their time prior to standing up before walking (Kelly et al., 2014).

It was found that optimization strategies in leisure activity were used as a preventative measure by individuals to reduce the impact of arthritis pain and symptoms prior to participating in the activity (Janke et al., 2009). Similarly, Gignac et al. (2002) reported that participants aimed at anticipating difficulties before they arose, which was frequently used when dealing with physical limitations. Another important finding in the study by Gignac et al. (2002) was that because optimization can pre-empt problems in advance of difficulties, this may actually reduce the experience of disability or mask the reporting of it.

Optimization was the least commonly cited strategy in the study by Carpentieri et al. (2017). They concluded that this aspect may have been related to optimization being positively associated with high physical functioning, which was not the case for their participants. Carpentieri et al. (2017) suggested that optimization requires a greater level of resources than what is available to many older adults.

Compensation as an Adaptive Strategy

Compensation was allegedly the most difficult mobility adaptation for older adults in Rush et al.'s study (2011) based on the range of response – from unacceptance to acceptance- it elicited. They reported participants' compensation included substituting alternative modes of mobility (i.e. driving rather than walking), modification of mobility behaviour (i.e. installing grab bars in the tub), receiving help (i.e. using paid or unpaid help to do the gardening), and using assistive devices, such as canes or walkers. Rather than restrict or give up activities, older adults with osteoarthritis tended to compensate by using assistive devices or equipment (Gignac et al., 2002).

The most frequently mentioned means of compensation in Kelly et al.'s (2014) study was using tools and technology, with participants experiencing limited mobility using chair lifts and hand rails for the bathroom. Home modifications were also mentioned as a compensation strategy, the most common responses were installing ramps in the house so that a person in a wheelchair could move between rooms (Kelly et al., 2014). Participants also utilized outsourcing as a compensation strategy, which included hiring a person to complete various jobs the older adult could no longer complete (Kelly et al., 2014). Similarly, Carpentieri et al. (2016) found

compensation to take on two forms, which included utilizing tools such as walking sticks and making adaptations to one's home to ease mobility in their personal environment.

One participant in the study by Siren and Hakamies-Blomqvist (2009) utilized her ability to drive as a compensation strategy for declining physical functioning. Her ability to drive was positively highlighted by the woman as feeling free. Another common means of compensation in this study was related to the effect environment had on mobility. Weather and icy streets caused participants to fear falling, however a common perception was that this obstacle could be overcome by choosing the right equipment, footwear and attitude.

Discussion

The studies included in this review have demonstrated that the SOC model is a useful strategy for understanding how successfully adapting and modifying goals or activities may increase older adults' abilities to cope with changes to mobility and therefore positively affect their quality of life. The authors of the studies identified a range of strategies that the SOC model was being implemented by older adults to manage changes to their mobility. Older adults modified their behaviours, substituted one way of performing an activity with another, or used assistive devices to perform activities.

This review highlights that it may be helpful for older adults to include processes such as, planning ahead or pacing activities when mobility is challenged. Use of the SOC in examining older adults' mobility issues emphasizes their agency in choosing how to adapt to changes in ways that promote their well-being. This is an important finding as much research focuses on how healthcare providers can assist older adults with mobility challenges (Clegg, Barber, Young, Forester, & Iliffe, 2011), or the benefits of exercise on older people's (Kabri, et al., 2018; Labra, Guimares-Pinheiro, Maseda, Lorenzo, & Millan-Calenti, 2015). For example, scholars who have conducted a systematic review of the literature to determine the effects of exercise on improving mobility with older adults do not identify if exercise programs increase the older person's capacity to determine their own activities (Clegg et al., 2011). We understand from change theory that for change to occur individuals must adopt the new activity themselves, rather than as what healthcare providers tell them they must do (Mitchell, 2013). The use of SOC to explore mobility challenges with older adults offers the opportunity for them to determine what changes are most meaningful in their lives.

A greater use of the SOC strategies may be associated with better health of older adults as successful self-regulation and adaptation of activities can positively impact their health and well-being (Janke et al., 2009). Nurses could use the SOC model as a means of identifying how older adults are adapting or compensating for their mobility challenges. This information could assist nurses and older adults working together in ways that foster the older person's sense of capacity and quality of life. Future research should continue to explore the complex connection between mobility and older adult well-being. Utilizing the SOC model in this research might help to identify key behaviours older adults are implementing to successfully age-in-place. These findings would be useful to health promotion programs aimed at supporting aging-in-place.

This review was limited by numbers of studies who used the SOC model and who spoke English. It is possible that there were studies in other languages that used the SOC model. However, our findings suggest that the SOC is a helpful model to use in examining mobility with older adults in ways that promote their agency in promoting their desired quality of life.

Conclusion

This review demonstrates that older adults use the adaptive strategies of selection, optimization and compensation, individually and combined, across a variety of mobility behaviours (Rush et al., 2011). Key SOC behaviours identified in the literature review included giving up activities for less strenuous activities, optimizing capacity for mobility and modifying mobility behaviours. Our key finding is that the use of SOC in examining older adults' mobility challenges shifts the focus to the older person's capacity to manage their desired activities.

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