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QUALITATIVE PAPER

Factors that influence older adults' participation in physical activity: a systematic review of qualitative studies

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Abstract

Background: Despite the advantages of physical activity (PA), older adults are often insufficiently active to maximise health. Understanding factors that influence PA engagement will support well-designed interventions for older people. Our aim was to review the qualitative evidence exploring the factors affecting older adults' engagement in PA.
Methods: We searched six electronic databases for studies of community-dwelling older adults (≥70 years) including qualitative methods. We excluded studies of a single-disease group, individuals with cognitive impairment and care home residents. Methodological rigour was assessed with the Critical Appraisal Skills Programme, and framework synthesis was applied using the Capability Opportunity Motivation—Behaviour (COM-B) model, which hypothesises that behaviour is influenced by three factors: capability, opportunity and motivation.
Results: Twenty-five studies were included in the review ($N = 4{,}978$; mean 79 years) and 32 themes were identified. Older adults' capability was influenced by functional capacity (e.g. strength) and perceived risk of injury from PA (e.g. falls). Opportunity was impacted by the environment 'fit' (e.g. neighbourhood safety), the availability of social interaction and socio-cultural ageing stereotypes. PA was motivated by identifying as an 'exerciser', health gains and experiencing positive emotions (e.g. enjoyment), whereas negative sensations (e.g. pain) reduced motivation.
Conclusions: The qualitative synthesis showcased a complex web of interacting factors influencing PA between the sub-domains of COM-B, pinpointing directions for intervention, including a focus on whole systems approaches. There was a lack of research exploring PA influences in the oldest old and in low-income countries. Future research should seek to involve under-served groups, including a wider diversity of older people.

Keywords: older people, systematic review, Capability Opportunity Motivation—Behaviour (COM-B) Model, older adults, physical activity, qualitative synthesis

Key Points

- Older adults' activity was affected by interacting factors influencing their capability, opportunity and motivation.
- Perceived capability to engage with physical activity (PA) was influenced by functional capacity and perceived risk of injury from PA.
- The environment 'fit' and socio-cultural ageing stereotypes impacted older adults' opportunity to engage with PA.

- Immediate sensations and emotions associated with PA influenced older adults' motivation and adherence.
- A systems approach to policy and intervention is needed to cover the wide ranging influencing factors on older adults' PA levels and experiences.

Introduction

Physical activity (PA) and exercise are important lifestyle behaviours promoting healthy ageing and are considered key therapeutic strategies of common geriatric syndromes such as sarcopenia and frailty [1–4]. PA is any bodily movement produced by skeletal muscles that increases energy expenditure, whereas exercise refers to a sub-category of PA that is structured and repetitive with intention to improve fitness [5, 6]. Known clinical benefits of PA include attenuating decline in muscle function and cardiorespiratory fitness, maintaining functional ability and managing chronic disease [3, 7, 8]. From a sociological viewpoint, PA can enhance embodied pleasures in later life, improve well-being, enhance social interactions, reduce loneliness and support quality of life [9, 10].

With the known benefits, it is unsurprising that PA amongst older people is promoted [7, 11]. However, more than a quarter of the global adult population (1.4 billion adults) are insufficiently active for health [11] and only 2.5–22% of community-dwelling older adults achieve current WHO-recommended PA levels (150-min moderate intensity PA per week) [12, 13]. Consequently, understanding factors that influence older adults' PA engagement is important to aid development and implementation of strategies to improve PA participation and adherence [14, 15]. A theoretical understanding of behaviour change is essential to recognise the factors that could support older adults' PA experiences and behaviours [16]. One widely used system of behaviour change is the Capability Opportunity Motivation—Behaviour (COM-B) model, developed through the comprehensive coverage of 19 theories [17]. According to COM-B, for older adults to engage with PA they need the capability (physical and psychological), opportunity (physical and social) and strength of motivation (automatic and reflective) to participate [17]. Capability refers to the individual's capacity to engage in the activity concerned, opportunity is the factors that lie outside the individual that make the behaviour possible and motivation refers to the brain processes that energise and direct behaviour [17]. Research using COM-B suggests that, in younger people, habits, knowledge (capability), subjective norms, social support (opportunity), goals, affect and exercise self-identity (motivation) are key drivers of PA [18, 19]. Identifying the factors that specifically influence older adults' capability, opportunity and motivation to engage with PA could provide direction for improved intervention strategies using a systematic approach to help inform and update policy and practice within the burgeoning area of PA, exercise, ageing and health [17, 20].

Previous qualitative reviews of older adults have highlighted the short-term psychosocial advantages of PA (e.g. improved social interaction, enjoyment) as strong motivational influences compared with well-established long-term health benefits [14, 15]. Additionally, central barriers to older adults' engagement with PA included pain and discomfort, concerns with falling and access difficulties [15]. More recently, McGowan *et al*. [21] found that inactive older adults considered PA to be a by-product of other more meaningful activities rather than a purposeful activity within itself and, thus, they called for older adults' health interventions to focus on reducing sedentary behaviour rather than promoting PA per se. Although these have provided an integral insight into older adults' PA behaviours, they have not explicitly considered PA behaviour change models. The current review aimed to extend previous works [14, 15, 21] through mapping qualitative findings to the COM-B model thereby helping practitioners to move from describing factors influencing PA to supporting and suggesting specific intervention development through a systematic behaviour change model [22]. Our research question was: What factors influence community-dwelling older adults' participation in PA? Specifically, we aimed to explore the PA experiences of individuals ≥ 70 years, as this age group are at higher risk of multiple long-term health conditions, are likely to have difficulties with activities of daily living and are more likely to need health and care services [23]. Moreover, previous qualitative reviews have not specifically focussed on the oldest old.

Methods

This review was reported using the Enhanced Transparency in Reporting the Synthesis of Qualitative Research approach [24] (Appendix 1). The protocol was registered on the PROSPERO database: CRD42021160503. To improve the rigour of the review the Critical Appraisal Skills Programme (CASP) quality assessment tool for qualitative studies and the GRADE-CERQual ('Confidence in the Evidence from Reviews of Qualitative research') approach were added to the protocol. A concurrent review of the quantitative evidence is underway.

Search strategy

A systematic search of the literature was conducted on six electronic databases: CINAHL, Embase, MEDLINE, WoS, ASSIA and PsycINFO (7 March 2023; see Appendix 2 for search strategy and terms). Inclusion criteria were: (i)

community-dwelling older adults aged ≥ 70 years, including studies that examined the older adult population as a subgroup where extrapolation was possible and (ii) qualitative methods or mixed-method studies with a qualitative component. Exclusion criteria were: (i) a single-disease group (for example post-stroke), (ii) studies with an exclusive focus on participants with cognitive impairment, (iii) interventional studies (i.e. the researcher intercedes with a PA intervention as part of the study design), because of contextual differences in barriers and motivators and bias towards intervention successes, (iv) care home residents, (v) grey literature, such as conference abstracts and (vi) non-English articles because of a lack of available translation services.

Data screening and extraction

Titles and abstracts were independently screened by four authors (J.H., J.M., S.J.M. and A.W.). After exclusion of irrelevant citations, full-text articles were assessed by four review authors independently (J.H., J.M., S.J.M. and M.R.). Any disagreements were resolved through discussion and involvement of a senior author (A.H.M.K.).

Data extraction was primarily conducted by one author (S.J.M.) with 25% of articles independently extracted by a second author (N.J.C.). A pre-determined data extraction template was used. Data were extracted from the results and discussion sections of articles, including participant quotations and author interpretations. No significant differences were observed in data extracted between authors.

Data synthesis

A 'best fit' framework synthesis using the COM-B model of behaviour change was used to analyse data. A 'best fit' framework synthesis is a structured approach to extract and synthesise findings, facilitating rapid production of context-specific conceptual models explaining health behaviours [25, 26]. Extracted data from included studies were coded line by line in a deductive format against the COM-B model [26] using NVivo software. A coding tree of themes was developed based on the three main domains of the COM-B framework and their subconstructs including capability (psychological and physical), opportunity (physical and social) and motivation (reflective and automatic). Had any data not aligned with the COM-B framework, additional themes would have been developed through an iterative process using inductive thematic analysis [27]; however, this was not required. Coding was completed by one author (S.J.M.) and a 25% sample of codes were audited by a second author (N.J.C.) with no significant discrepancies identified. The authors worked together to improve theme names.

Quality rating

The methodological quality of studies was assessed using the CASP quality assessment tool for qualitative studies [28]. The CASP criteria were applied by one author (S.J.M.) with an overall quality score for each study (Appendix 3). Twenty-five percent of articles were independently rated by a second author (N.J.C.) with no significant discrepancies observed.

Confidence in findings

The GRADE-CERQual approach was used to guide the assessment of how much confidence to place in findings [29]. Confidence was judged as high, moderate, low or very low. All findings started as high confidence (i.e. highly likely the review finding is a reasonable representation of the phenomenon of interest) and then downgraded if there were important concerns about any of the CERQual components (Appendix 4).

Review author reflexivity

We acknowledge that the interpretation and findings of the current qualitative synthesis are influenced by the review authors' own experiences and views as clinical practitioners and academics [30]. Reflexivity was embraced across the review and synthesis processes through team discussions and through the first author keeping critical reflective notes of team decisions and interpretations of the data.

Results

Description of included studies

Twenty-five studies were included in this synthesis (Table 1). The number of papers screened, assessed for eligibility and included is presented in Figure 1. The included studies were published between 1998 and 2023, and were conducted across multiple countries, including Australia ($N = 5$), United Kingdom (UK) ($N = 4$), United States of America (USA) ($N = 4$), Canada ($N = 3$), New Zealand ($N = 2$), Sweden ($N = 2$), Norway ($N = 2$), the Netherlands ($N = 1$), Finland ($N = 1$) and Iceland ($N = 1$). Studies were mainly qualitative ($N = 20$), with five mixed methods studies. The qualitative data included in the review were collected using semi-structured interviews ($N = 11$), structured interviews/questionnaires ($N = 8$) and focus groups ($N = 3$). One study included both interviews and focus groups, one used both questionnaires and interviews, and one used interviews alongside participant observation.

Participants included older adults ($N = 4{,}978$; mean 79 ± 4 years), of which 64% were female ($N = 3{,}195$). Only six studies reported the ethnicity of participants, reporting mainly Caucasian ethnicities [31–36]. Fifteen studies included details of participants' socio-economic status. Because of the heterogeneity of measures it was difficult to assess overall socio-economic status of participants included in the review; however, most studies appeared to include middle-class older adults. Most studies defined PA as any movement above resting levels, and therefore, the type of PA explored in studies varied widely, including activities of daily living [37–39], everyday trip-making [40], sport [36, 41], tai chi [42], home falls prevention exercise [43, 44] and group exercise [45–47] (Table 1).

Table 1. Summary of included studies.

Authors, year and country	Number of participants and gender	Age	Qualitative methods	Primary aim	CASP score (/10)
Bassett *et al*. (2007) (Canada)	2,783 (1,735 F; 1,048 M)	75–104	Structured interview	To explore older Canadians perceptions of what makes an older person live long and well.	8
Bjornsdottir *et al*. (2012) (Iceland)	10 female	72–97	Semi-structured interview	To understand the PA experiences of older women living in retirement communities and what they experience as facilitators of and barriers to PA.	10
Burton *et al*. (2013) (Australia)	Subsample of 20 participants from a postal questionnaire (506) (16 F; 4 M)	70–102	Semi-structured interview (mixed methods)	To identify the motivators and barriers to being physically active for older people receiving either restorative or 'usual' home care services.	6
Chastin *et al*. (2014) (Scotland, UK)	9 female	70–92	Structured interview	To investigate the determinants of sedentary behaviour, strategies and motivators to reduce sitting time in a group of community dwelling older women.	9
Cohen-Mansfield *et al*. (2003) (USA)	324 (188 F; 136 M)	74–85	Questionnaire (mixed methods)	To ascertain perceived barriers and motivators to exercise in people age 74–85 and to clarify the meaning of these barriers and motivators by examining participant characteristics that relate to them.	7
de Groot *et al*. (2011) (Norway)	10 (5 F; 5 M)	71–91	Semi-structured interview	To describe motivating factors and barriers for older adults to adhere to group exercise in the local community aiming to prevent falls, and thereby gain knowledge about how health professionals can stimulate adherence.	10
Fougner *et al*. (2018) (Norway)	16 female	70–85	Semi-structured interview	To explore how ageing women, who participate regularly in group exercise classes, perceive their own bodies and the bodies of others.	10
Grant (2001) (New Zealand)	15 (8 F; 7 M)	71–79	Semi-structured interview	To examine the beliefs of a group of men and women over 70 years about the role and meaning of PA, including playing sport, in later life.	8
Grant (2008) (New Zealand)	26 (17 F; 9 M)	70–83	Semi-structured interview	To explore the meanings people over 70 years of age attribute to their experience when endeavouring to engage in a more physically active lifestyle.	10
Grossman *et al*. (2003) (USA)	33 (18 F; 15 M)	≥75	Semi-structured interview	To explore PA perceptions, motivations and barriers in underactive people over age 75.	8
Hirvensalo *et al*. (1998) (Finland)	589 (410 F; 179 M)	Sub-sample 75–84	Structured interview (Mixed Methods)	To investigate changes in involvement in various forms of physical exercise and the motives for and obstacles to participation over an 8-year follow-up of a representative sample of older people.	7
Jadczak *et al*. (2018) (Australia)	12 (8 F; 4 M)	76–91	Semi-structured interview	To explore pre-frail and frail older peoples' perspectives in relation to being advised about exercise and their perceptions of the general practitioners' (GPs) role in promoting exercise for older people.	9
Kirby *et al*. (2021) (USA)	18 female	70–83	Semi-structured interviews	To explore the experiences and motives of women 70 years of age and older who were actively participating and/or competing in the sport of volleyball.	10
Larkin (2004) (USA)	55 (45 F; 10 M)	65–94 [a]	Focus groups and semi-structured interviews	(i) To examine exercise-related psychosocial determinants of behaviour in people 65 and older according to the Model of Personal Investment (MPI), and (ii) to identify themes and related strategies to be used in exercise public health campaigns or for recruitment to and retention in exercise programmes.	8
McPhate *et al*. (2016) (Australia)	97 (71 F; 26 M)	≥70	Survey questionnaire, including qualitative sections	To identify older people's preferences for the delivery of group exercise programmes specifically designed for falls prevention.	8
O'Brien Cousins (2001) (Canada)	10 female	57–92[a]	Semi-structured interview	To understand how currently active seniors might have been triggered into active living and how currently semi-active or inactive seniors experience and interpret cues for PA.	6

(*Continued*)

Table 1. Continued

Authors, year and country	Number of participants and gender	Age	Qualitative methods	Primary aim	CASP score (/10)
O'Brien Cousins (2000) (Canada)	143 female	≥70	Survey questionnaire, including qualitative sections	To understand older women's beliefs that act as incentives and barriers to more active living.	6
Robins *et al*. (2016) (Australia)	394 (232 F;162 M)	72–82	Survey questionnaire, including quantitative and qualitative sections (mixed methods)	To explore why older adults begin, continue and discontinue group- and home-based falls prevention exercise and benefits and barriers to participation.	9
Sandlund *et al*. (2018) (Sweden)	18 (10 F; 8 M)	70–80	Focus group	To explore exercise preferences and motivators of older community-dwelling women and men in the context of falls prevention from a gender perspective.	9
Scourfield (2006) (UK)	7 (5 F; 2 M)	73–94	Semi-structured interviews	To explore what benefits the class members felt they derived from practising tai chi and whether or not the class members actually practised tai chi at home.	5
Simek *et al*. (2015) (Australia)	245 (148 F; 97 M)	70–91	Survey questionnaire, including qualitative sections	To examine the preferences of older adults towards the structure and delivery of home exercise programmes for the prevention of falls as well as the perceived benefits of and barriers to programme adherence.	9
Stathi *et al*. (2012) (UK)	25 (10 F; 15 M)	71–92	Survey questionnaire including quantitative and qualitative sections, and semi-structured interview (mixed methods)	To investigate personal, interpersonal and environmental factors salient to decisions about being active in neighbourhoods of different levels of deprivation.	10
van Hoven *et al*. (2019) (The Netherlands)	7 (6 F; 1 M)	71–95	Semi-structured interview and observation	To examine how older adults experience their everyday trip-making in the interplay between increasing losses and deficits in the process of ageing, and characteristics of the environment in which they perform daily activities.	9
Welmer *et al*. (2012) (Sweden)	20 (14 F; 6 M)	80–91	Focus groups	To describe experiences of PA, perceived meaning and the importance of and motives and barriers for participation in PA in people 80 years of age and older.	9
Zhang *et al*. (2022) (UK)	92 (43 F; 49 M)	74–83	Focus groups	To explore influences on PA amongst community-dwelling older people, and the secondary aim was to explore gender differences.	10

[a]Data extracted from sub-sample of over 70s.

Quality appraisal and methodological limitations

Most studies included rigorous methodological processes with 19/25 studies scoring 8 or higher on the CASP assessment (Appendix 3). The most common methodological limitation was poor reporting of researcher reflexivity ($N = 17$), followed by a lack of detail in ethical considerations ($N = 7$). Most qualitative findings were in depth explorations of phenomena with six studies considered having superficial data that lacked meaning. Overall, the studies reported adequately on research design, data collection, analyses and recruitment strategies.

Confidence in the review findings

Out of 32 review findings, 16 were graded as high confidence, 11 were graded as moderate confidence and five were graded as low confidence. The CERQual evidence profile (Appendix 4) shows details of the issues encountered that led to our decision to maintain or downgrade confidence assessments for each review finding.

Review findings

Data were mapped against the COM-B framework (Tables 2–4). All data were accommodated by the existing framework and placed within the six subdomains of the three main COM-B themes (Appendix 5). These subdomains are interconnected and interact to determine older adult's PA behaviours. A large proportion of review findings were classified within social opportunity (N [no. of review findings] = 10), followed by physical opportunity ($N = 7$), reflective motivational processes ($N = 5$), psychological capability ($N = 4$), physical capability ($N = 4$) and automatic motivational processes ($N = 2$). Review findings classified with high confidence are explained in more detail below (for remaining findings see Appendix 6).

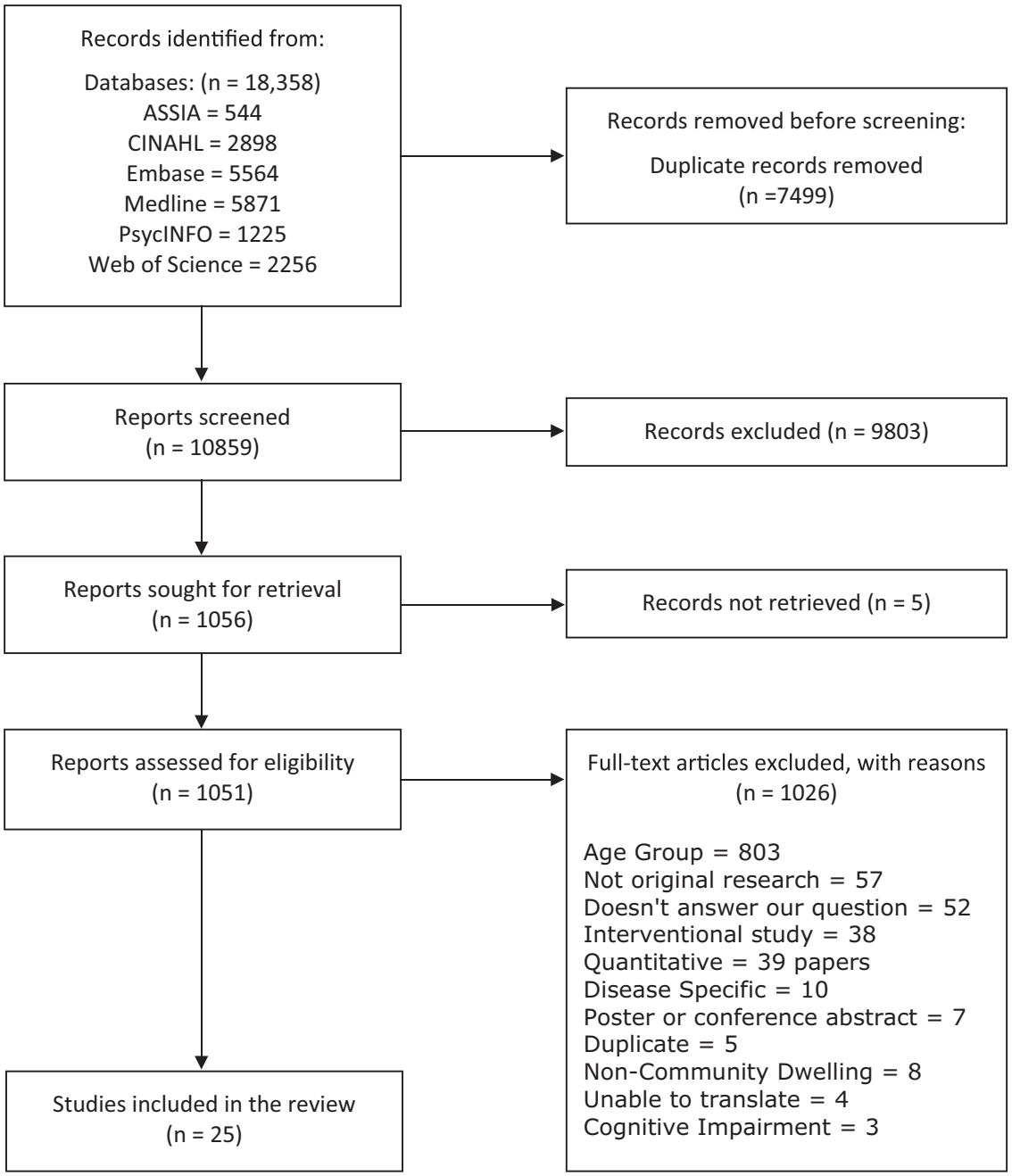

Figure 1. PRISMA flow diagram illustrating the number of articles included and excluded during the screening process.

COM-B component: capability

Physical capability

Perceived functional capacity to engage in PA with increasing age Factors that decreased older adults' perceptions of their physical capabilities to be active included reduced strength and mobility, and impaired hearing and eyesight. There was often tension between attitudes to remain active and the perceived natural decline associated with ageing, which caused perceptions that the body was a barrier to physical competence [34, 36, 41, 48]. Fatigue, and functional limitations, as well as feeling 'too old' and 'slowing down' were a deterrent to PA [35, 37, 38, 40, 41, 44, 45, 48–52]. Physical indicators of exertion, such as breathlessness, provided cues to alter activity levels, and could be off putting for individuals new to activity and for those with increased perceptions of frailty [32, 33, 37–39, 51].

Physical and psychological manifestations of health conditions limit perceived capability Older adults with a health condition experienced limiting symptoms and impairments, such as stiff and painful joints or dizziness, which often changed their perceived physical capabilities to be active [32, 33, 35, 37, 38, 40, 41, 43–45, 48, 49, 51–54]. Health symptoms could vary day to day depending on previous activities and sleep, which influenced future mobility decisions [40],

Table 2. Factors influencing older adults' capability to engage in PA rated as 'high confidence'.

COM-B Model of Behaviour Change	
Main Theme: Capability Subtheme L2: Physical Capability	
Subtheme L1 (No. of codes)	Quote examples
Perceived functional capacity to engage in PA with increasing age (66) (32, 33, 35–41, 43–45, 47–52)	'In spite of what the mind says sometimes the body just doesn't want to play' (Older Adult) 'The most consistently voiced barrier related to aging was a sense of slowing down. Lack of energy, feeling tired, poor stamina, diminished lung capacity, and lagging strength contributed to this general sense of slowing'. (Author) 'The men did not generally speak about fear or vulnerability, but many of them noticed that they had started to avoid doing heavy tasks, if possible, as this often led to pain or discomfort in the body for days afterwards'. (Author)
Physical and psychological manifestations of health conditions limit perceived capability (43) (32, 33, 35, 37, 38, 40, 41, 43–45, 48, 49, 51–54)	'You know, because of the stroke, I get tired easily. [. . .] I always have big plans, but that's just not doable anymore, I mean you're tired quickly, and I never used to experience that in the past, of course'. (Older Adult) 'Well, I really don't know on account of my back surgery, and my legs, and my leg surgery because see I have got no cartilage in this knee, and I've got nothing there to hold it or stand it up. That's the reason why my walking days and standing days are over'. (Older Adult) Debilitating health conditions, e.g. joint or heart problems, and the resultant medical events, e.g. hip or chest operations, impacted on activities, physical condition and loss of abilities such as driving or walking. Additionally, some medications caused side-effects like drowsiness. (Author)
Main Theme: Capability Subtheme L2: Psychological Capability	
Subtheme L1 (No. of codes)	Quote examples
Perceived vulnerability and risk of injury is a barrier to PA (47) (32–35, 37–40, 43, 44, 45, 49–51, 53, 55)	'Well, I can tell you one thing, running. Running to get on the tram I'll have to stop doing that now. It was only last month, I was running out at Valand to get on the red tramcar and I fell and hurt myself here, so it's a bit swollen now. But it's all right, I haven't been to the doctor. But I think it's a bit risky when you're getting on in years'. (Older Adult) 'Low self-efficacy and fear of falling were limiting for many women and suppressed their physical activity: "I fell, and I haven't gotten around since then. . .. I have less courage". Two of the women had experienced difficult hospitalization after a fall, which made them horrified even thinking of experiencing that again. "I had a horrible experience in the hospital. They gave me the wrong drugs. . . and instead of talking to me, they made fun of me. . . almost 2 years passed until I could talk about it without crying [sobs]"'. (Author and Older Adult)

and medication side effects, such as drowsiness, reduced perceived capability to be active [48].

Psychological capability

Perceived vulnerability and risk of injury is a barrier to PA Some older adults feared the unpredictability and vulnerability associated with ageing so were more careful with exposure to perceived risks, such as exertion and activities viewed as more dangerous, including resistance training and exercising alone [32, 34, 35, 38, 41, 45, 51]. Those who felt vulnerable were more likely to associate PA with personal risk and injury, including joint damage [33, 43, 51].

Fear of falling reduced confidence and motivation to be active, with worry about difficulties getting up off the floor, fractures and hospitalisations after a fall, impacting independence [32, 33, 37, 38, 40, 44, 45, 49, 50, 53]. Fear of falling depended on context, such as availability of physical support and treacherous weather, such as icy pavements [40, 45]. Occasionally fear of falling prompted certain exercise to improve functionality and reduce falls [39]; however, in most instances, fear prompted activity avoidance.

COM-B component: opportunity

Physical opportunity

Environment fit: affordances of the environment influenced older adults' PA Environmental affordances including the accessibility and availability of exercise facilities, aesthetic environmental features, availability of convenient and safe transport options, availability of meaningful neighbourhood amenities, and the perceived safety and walkability in the neighbourhood influenced older adults' PA. The availability of local facilities, including leisure centres designed for older adults needs and walking routes, facilitated PA [31, 32, 35, 36, 38, 48, 53]. Whilst a lack of accessible facilities to exercise, including poor availability of local group exercise programmes, were barriers [32, 38, 39, 43, 45, 47, 48, 52]. Older adults were motivated by the presence of nature and the sense of freedom provided by well-designed, aesthetically pleasing outdoor spaces, such as wooded trails [32–34, 39, 40, 51, 53]. Local parks were particularly important for older adults who struggled to travel longer distances [38]. Those still driving a car felt they had more freedom and convenient access to facilities beyond the local community [38]. Poor bus services, such as unreliable timing and limited routes, as well as logistical challenges in ordering taxis were barriers to PA opportunities for some [38, 40, 45, 48].

The proximity of meaningful amenities, such as shops and libraries, encouraged purposive walking [32, 35, 38, 40, 53]. Comparatively, a lack of local amenities outside of walking distance or of poor quality discouraged older adults from leaving the home [38]. Moreover, the safety of neighbourhood design, such as the quality of pavements, influenced the walkability for older adults [37, 38, 40, 51, 53]. In particular, the availability of rest stops, such as benches, was important to increase confidence for walking and reduced the fear of becoming uncomfortably fatigued [38, 45, 50, 53]. Groups of youths and fear of crime created concerns about personal safety and were a barrier to outdoor PA [38, 53].

Table 3. Factors influencing older adults' opportunity to engage in PA rated as 'high confidence'.

Main Theme: Opportunity Subtheme L3: Physical Opportunity		
Environment fit: affordances of the environment influence older adults' PA (100)	Accessibility and availability of exercise facilities and activity spaces (33) (31, 32, 35, 36, 38, 39, 42–45, 47, 48, 50, 52, 53)	'Some participants lacked the possibility to exercise on a regular basis. Only two of those five who had previously exercised still had an offer to continue with exercise. Only one participant had on her own account requested a prescription for group exercise. Many participants said they did not know if or where group exercise was available in their municipality'. (Author) 'All participants complained about the environment they live in, claiming that it does not offer adequate stimuli to encourage them to stand up or enough facilities to allow them to be active'. (Author)
	Aesthetic environmental features (17) (32–34, 38–40, 51, 53)	'During the walk, Mrs. Lutz describes how the sidewalk provides both sun and shade as a result of the tree line as well as the buildings present, which makes walking there a pleasant experience'. (Author) 'It [going for a walk] enriches my whole life. That's how it is for me. I feel so creative when there's a bit of movement and when I go out in the woods'. (Older Adult)
	Availability of convenient and safe transport options to access PA (30) (31, 38, 40, 43, 45, 47–50)	'The bus doesn't come along here as you know, and when you've got to carry heavy shopping it's quite a long way from the bus stop'. (Older Adult). 'Eleven participants commented on the value of using buses, with 7 stressing the importance of their free bus pass as an incentive to use the bus to go shopping, on day trips, to visit friends, and to get to areas suitable for leisure walks. Participants commented that the importance of the bus service might increase in the future when they could not drive'. (Author) 'All participants were car owners and reported heavy reliance on cars. "I think that the car should be at the center of most people's lives. It can get you to places so you can go to a garden center and go via the Mendips [a popular area of hills in the southwest of England]"'. (Older Adult)
	Availability of meaningful neighbourhood amenities (16) (32, 35, 38, 40, 53)	'the lack of local amenities resulted in having nowhere to go out locally, limiting any opportunities for purposive walking: "There's nothing to go out for now, unless you go downtown. There's nothing here, up here now. There's no cinema; there was, but that's finished"'. (Author and Older Adult). 'Those women who had had stores close by in the past mentioned how physically stimulating it had been going shopping: "I just found it very nice moving here [retirement community]. There was a store close by, and I just went there and did not need any help. . .. That meant I could go to the store sometimes more than once a day"'. (Author and Older Adult)
	Perceived safety and walkability in the neighbourhood (31) (37, 38, 40, 45, 50, 51, 53)	'I am so tired of the hills here just near the building. It takes a lot of effort to walk when you have a walker'. (Older Adult) 'the lack of resting places outside the home strongly limited their motivation or confidence to be active. They chose to sit down indoors because they feared being too tired or embarrassed if they walked outside and were caught short'. (Author) 'Darkness, fear of crime, and intimidating groups of youths made some participants anxious about walking in their neighbourhood. This anxiety was not confined to the night-time; fear also prevented some participants from going outdoors or encouraged them to drive to their destination during the daytime'. (Author)
Weather affects engagement and type of PA (26) (32, 33, 35, 37–40, 43, 45, 49, 50, 53, 54)		'Many participants also said they functioned better physically during the summer, due to better outdoor walking conditions. In addition some said that the sun and the long summer days had a positive psychological effect. "even if my balance is poor. . . it does help me anyway. You do exercise even if you have poor balance!"' (Author and Older Adult) 'Others reacted more positively to the cold weather or rain and described setting physical goals inside the house'. (Author) 'You are naturally afraid of [walking on] ice, afraid of falling. . .. You take more care, don't walk as energetically'. (Older Adult)
Main Theme: Opportunity Subtheme L3: Social Opportunity		
Benefit of social interaction and a sense of relatedness and belonging through PA (83) (31–33, 35–39, 41–45, 47–54)		'exercise is only part of the reason for going [to the session]. Catching up on the gossip and having coffee afterwards is the best part'. (Older Adult) 'Lack of sociability was a potential hindrance to PA, especially after losing a spouse: "It takes time to get going. . . also because I didn't have a driver's licence. It was as if I'd been locked in a closet, you are completely cooped up"'. (Author and Older Adult) '"this [exercise programme] was uncharted territory", most participants found joining a programme with others of similar age helped to ease the apprehension. . . Some found solace in "seeing others with a bit of wrinkly skin" and were relieved to find "it's not just me". . . "They're just like me.. getting older and have two left feet (laughs)" Being with people of similar age also provided a sense of belonging because "people look out for you. When you don't turn up [at the session] it is surprising how many ask if you're OK"'. (Author and Older Adult)

(*Continued*)

Table 3. Continued

Main Theme: Opportunity Subtheme L3: Physical Opportunity	
Importance of connections to place and community conviviality (14) (37–40, 48, 52, 53)	'Changes in the social makeup of some neighbourhoods led to loss of neighbourliness, resulting in a not so activity-friendly neighbourhood environment. Increased population mobility with young adults moving often in and out of neighbourhoods contrasted with the lifestyle of interviewees. . . Reasons interviewees provided that suggested a lack of strong social networks in their neighbourhood were having fewer older residents, neighbourhoods being empty during the daytime when the working neighbours were away, and few people walking around at any time'. (Author) 'Especially since the shopping centre is at short distance and typically reachable on foot, participants' stories showed how they made it part of their regular routines and felt a sense of belonging, local expertise and acknowledgement by others'. (Author)
The evolving socio-cultural ageing discourse influences PA participation (66) (31–34, 36, 37, 39, 41, 42, 48, 50–55)	'They could all recall stories about the way their parents lived and how the inherent message seemed to be communicated: "this is a time for disengagement: Being physically active hasn't always been of great importance to me. I learned exercising wasn't something older people did. Although both my parents had physical type jobs they certainly weren't very active when they retired. Retirement equated to rest"'. (Author and Older Adult) 'In addition to being busy for self-gratification, exercising was seen as a way to resist idleness, something the participants considered counterproductive to healthy ageing. Idleness also contributed to the stereotype of "older people being past their use-by-date". Furthermore, many participants thought, 'doing nothing [disengaging] gives us oldies a bad name'. (Author and Older Adult) 'Clearly the passage of seven or eight decades of life have situated elderly women in a new cultural period where scientists now tell them that old muscles are supposed to be moved when there was no apparent reason to do so before. Defensive reactions and exaggerated beliefs about risk may be linked to recent and uncomfortable realizations among older women that they have not been looking after themselves according to new standards, when more fairly they are being scrutinized by a society that has suddenly changed the health rules'. (Author)
Unrelatable media messages of PA in ageing (13) (31–33, 41, 54)	'During their lifetime the participants had encountered countless messages about "what to do to remain healthy". As Joan said, "it's never ending and sometimes hard to know what's true and what's not because things change". Although much of the information made sense, "sometimes you feel whatever you do, it is not good enough. There is always an expert with another bright idea about how to remain healthy and live forever [laugh]". Some of the messages were thought to be "just a sexy sell, a rip off. Buy this pill or join this programme and improve your health. Sounds easy but it's not like that, not when you're older"'. (Older Adult) 'Opinions emerged that older people were often illustrated in media as passive individuals, which may affect older people's views of what is expected of them'. (Author) 'Participants noted that exercise-related messages were emphasized for the young within the media and society. In other words, too much attention was given to young people at the exclusion of older people'. (Author)

Weather affects engagement and type of PA Weather conditions perceived to be dangerous and uncomfortable (e.g. rain and ice) prevented PA, especially for older adults who viewed themselves to be frail and vulnerable [32, 33, 37–40, 43, 45, 49, 50, 53, 54]. Risk of falls was often mentioned, especially on slippery surfaces [40]. Some older adults overcame this by exercising indoors [39, 49]. Clement weather often promoted PA outside and encouraged movement despite ailments [35, 45]. However, some older women disliked exercising in hot weather because of sweating [37].

Social opportunity

Benefit of social interaction, relatedness and belonging through PA Social interaction during PA (e.g. exercising with groups of peers) improved enjoyment and reduced feelings of loneliness, which was often more important than the activity itself [31–33, 35, 36, 38, 39, 41–43, 45, 47–54]. Older adults found humour within exercise groups important, as well as a sense of relatedness and comfort when exercising with people of a similar age and functional ability, which acted to improve exercise intensity and effort [32, 33, 36, 41, 45, 49, 52]. A lack of social opportunities during exercise was perceived as a disadvantage [35, 38, 42, 44, 47, 52].

Bereavement and the associated feelings of isolation could motivate interaction through PA; however, loneliness could also reduce the drive to be active through feelings of depression [39, 48, 53] and some older adults disliked group exercise [43, 48], highlighting the need to tailor for preferences in social context [33, 39, 48].

Importance of connections to place and community conviviality Older adults enjoyed being active in familiar neighbourhoods, feeling a sense of belonging, encouraging them to walk and visit amenities where they had a sense of conviviality and local expertise [40, 48]. Consequently, many older

Table 4. Factors influencing older adults' motivation to engage in PA rated as 'high confidence'.

Main Theme: Motivation Subtheme L2: Automatic Processes	
Subtheme L1 (No. of codes)	Quote examples
Creation of PA habits and PA as a part of self-identity (24) (31–34, 37, 38, 41, 45, 46, 50, 51, 55)	'Although difficult to modify one's way of life, most believed: "The less you do the less you want to do. Being physically active on a regular basis can become a habit, a bit like watching television. But there's got to be a purpose and a feeling of satisfaction, otherwise why bother?"' (Author and Older Adult) 'They had a sedentary pattern of life that was well established and described the inertia they felt in thinking about what it would take to change that. Physical activity was not a matter of life and death, and paying attention to nutrition seemed to be a higher priority'. (Author) 'For me it (exercise) is part of my identity'. (Older Adult)
Sensations and emotions associated with PA and inactivity (83) (31–33, 35, 36, 38–48, 50–52)	'Eleven women anticipated joint pain, especially in the hip area, behind the knees, and in back of the legs, although chest pain and general muscle pain were also mentioned'. (Author) 'After a good session I can be on an emotional high, a type of euphoria that takes my mind away from any discomfort with my arthritis'. (Older Adult) 'I enjoy the challenge of the games and always leave feeling good about myself, a kind of euphoria. My wife doesn't understand my excitement for "hitting a ball" but I believe it definitely contributes to my quality of life'. (Older Adult)
Main Theme: Motivation Subtheme L2: Reflective Processes	
Subtheme L1 (No. of codes)	Quote examples
Improvements in health and fitness (118) (31–39, 41–49, 51–53, 55)	'All participants acknowledged that during the past 20 years, significant changes had occurred in their physical competence and body function. It was evident that these changes in the physical body caused frustrations and that regular physical activity was deemed an important way to help negate the impact of these ailments. "I'm absolutely certain that being active has helped keep my ailment under control for the past few years. Before my operation I felt quite depressed, but this has gone and I now feel as if there is a purpose for living. I'm doing something that really excites me and helps keep me relaxed. I've got a new lease of life"'. (Author and Older Adult) 'Perceived benefits to physical health were the most common reason why older adults preferred to perform a specific home exercise activity, and this included assisting in management of a health condition; injury prevention; an increase in fitness, muscle strength, joint range of movement, and balance; and supporting a return to functional activities. For example, one person said, "It makes my muscles stronger and I think it will help me to get back to the things I want to do like walking longer distances"'. (Author and Older Adult) Barbara (72) explained, 'you have to respond quickly to the ball and I think that helps keep your brain active too, as well as your body'. Mary said, 'when you play tournaments it really helps your concentration', and Linda G. (70) remarked that playing (volleyball) kept her 'mind active and open to learning and experiencing'. (Older Adult)

adults wanted to be physically active to bolster health to 'age in place' and retain that connection with their community [37, 39]. Comparatively, unfamiliar surroundings and a feeling of disconnect within a neighbourhood hindered the desire to leave the home and be active. Reduced social networks in the neighbourhood were often caused by increased population mobility and fewer older residents [38, 53].

The evolving socio-cultural ageing discourse influences PA participation Historical socio-cultural norms of ageing as a period of decline and inactivity prompted some older adults to view ageing as a time to sit and rest, in which a 'retirement lifestyle' entitled relaxation [41, 50]. Perceptions of ageing as 'wear and tear', with nothing to be done about biological decline, made some older adults feel there was no point in exercising [32, 37]. Negative stereotypes of older adults as inactive predisposed a self-stigma, in some instances creating overestimation of perceived dangers of PA and feeling like they were the 'odd ones out' exercising [31, 32, 34, 41, 50, 53]. Comparatively, some older adults responded to negative ageing stereotypes by using PA to maintain agency and avoid marginalisation [31, 37, 42, 48]. For instance, sitting too much was perceived as socially undesirable for older women with concerns of being judged as lazy, or not useful [48, 50]. However, challenging stereotypes through engaging with PA was sometimes difficult in a risk-averse culture where activities designed for older adults were often sedentary, such as lunch clubs and bingo [50].

The emergence of positive ageing discourses has begun to normalise exercise participation, where older adults are encouraged to use PA as a strategy to self-manage health and are exposed to new and widespread health messages [31, 51, 52, 55]. This has created more PA opportunities and resources for older adults [31–33, 37, 41, 53, 54]; however, some older adults had difficulties transitioning to a new culture where suddenly 'old muscles are supposed to be moved when there was no apparent reason to do so before' [31, 51, 53]. Some older adults interpreted social and cultural messages as focussing too much on exercise as a commodity, ignoring play and spontaneity [41]. Furthermore, the way society encourages PA has changed alongside altered occupations and lifestyles that are now more sedentary compared with the older generation who often 'kept fit' through active

travel, occupations and daily house chores [39, 41, 53]. Hence, creating an incompatibility between the scientific and the socially and culturally constructed meanings of PA required for good health [31].

Unrelatable media messages of PA in ageing Appropriate media messages that had a clear health message inspired older adults to exercise [32, 33, 54]. Nevertheless, many health messages were considered confusing and untrustworthy, and framed in an overly general form when older adults felt that, 'in reality', PA and exercise were more complex [31, 41]. Moreover, older people were often illustrated as passive in the media with exercise images often dominated by younger, fitter bodies at the exclusion of older adults [32, 33, 41]. These images created tensions between the pressure to achieve an unrealistic 'young and slim' cultural ideal and to avoid negative stereotypes of ageing. Media messages were, thus, off putting and unrelatable to many older adults.

COM-B component: motivation

Automatic motivational processes

Creation of PA habits and PA as a part of self-identity Habitual PA improved older adults' automatic motivation to participate, with habits established when PA had a purpose and gave feelings of satisfaction [33, 38, 41, 45]. Establishing PA habits was perceived as a challenge and 'far more difficult than what the experts and magazines would have you believe' [31]. However, once established, older adults were dedicated to their exercise programmes [32]. Comparatively, when a sedentary pattern of life was well established older adults found it harder to introduce PA into their daily routine and did not see themselves as 'exercisers' [34, 38, 51]. Thus, having an 'exerciser' identity through established PA habits facilitated and motivated automatic PA behaviours and this was more likely when habits were formed at a younger age becoming a 'valued part of their existence' [34, 37, 38, 41, 46, 50, 55].

Sensations and emotions associated with PA and inactivity Positive feelings during and after PA, including enjoyment, individual expression and euphoria, acted to motivate future activity, 'fun is important regardless of age' [31–33, 35, 36, 39–44, 46–49, 51–53]. Comparatively, negative emotions and sensations during exercise could lead to reduced motivation to participate, including boredom, 'it's important to enjoy what you do and I find it [walking] quite boring compared to doing other things [hobbies]' [31, 32, 38, 43, 44, 51]. Discomfort and pain were also frequently mentioned as barriers to PA [31–33, 35, 39, 45, 48, 51]. Muscle soreness after activity was off putting, 'the first week I ever bowled in my life I thought I was gonna die. I think I used every muscle in my body' [32, 40]. Older adults who felt low or depressed, because of chronic conditions or death of friends, found initiating PA difficult, often owing to passivity and questioning the meaning of continuing to live [39, 43, 45, 48, 53]. Nevertheless, some older adults' experiencing depression avoided their negative feelings through moving more [39, 50].

Reflective motivational processes

Improvements in health and fitness The physical benefits associated with PA motivated participation to prevent disease, and enhance overall fitness, health and functionality [31–39, 41–45, 47–49, 51–53, 55]. PA was also prompted by diagnosis of chronic illness and used as a tool for rehabilitation and to reduce treatment burden [31–34, 39, 41, 43, 45, 48, 51, 53]. This was strongly linked to a desire for independence through improving physical and mental functionality. Moreover, PA was motivated by improvements in mental health and well-being, including stress management, reductions in anxiety and depression, improved emotion regulation and enhanced self-identity and confidence [32, 36–38, 41–43, 46, 48].

Discussion

Using the COM-B model of behaviour change, the review found a complex web of interacting factors that influenced older adults' PA between the sub-domains of capability, opportunity and motivation. Older adults' perceived capability to engage with PA was influenced by their functional capacity, and their perceived risk of injury from PA. Physical opportunity for PA was impacted by the weather, and the environment 'fit'. Social opportunity had a considerable influence on older adults' engagement with PA through the availability of social interaction, and the cultural milieu that dictated the way older adults and significant others thought about PA in later life. For instance, wider socio-cultural ageing stereotypes and discourses, including the influence of media outlets, social norms and self-stigma, influenced older adults' PA. Key factors motivating PA were internalising an 'exerciser' identity, and the health gains experienced through PA. Moreover, the immediate sensations and emotions experienced during and after PA had a strong influence on older adults' automatic motivational processes.

Our findings have similarities with previous reviews [14, 15, 21], which showed improved enjoyment of movement through opportunities to socialise, and similar barriers to PA, including perceived physical limitations (e.g. pain) and the influence of society's attitude towards the ageing population. However, our findings add depth and scope to previous reviews by showcasing the complex interactions between factors that influence older adults' PA through modelling our themes to the COM-B model. Consistent with an interactionist view, each theme interpreted in the current synthesis does not work alone to determine PA, rather a combination of factors interact to influence behaviour. Our analyses and interpretations illustrated a wide range of meanings older adults associated with PA compared with previous reviews [21], including enjoyment of PA in nature, using PA as a way to manage self-stigma associated with an ageing body and engaging with PA to improve health and maintain

independence. Whilst older adults are likely to experience similar life transitions (e.g. retirement, increased risk of chronic disease), the divergent experiences and influences of PA in the current review suggest that we need to consider older adults' embodied experiences of PA and avoid compartmentalising older adults to certain types of PA [56].

A key cultural influence impacting older adults' PA in the current review was the socio-cultural ageing stereotypes and discourses, including tensions between ageing as decline (i.e. decline is inevitable, older people are inactive and need to rest) and positive ageing discourses (i.e. pressure to use PA in the self-management of health and avoidance of disease). In line with social gerontology literature, we found that negative stereotypes of ageing could create self-stigma, which could result in avoidance of PA, or using PA as a way to challenge marginalisation through deconstructing negative ageing stereotypes [57, 58]. Moreover, our review corroborates the socio-cultural pressures related to body image, and the use of PA as a way to control appearance consistent with society's 'ideal' physicality and social expectations [59].

Other factors underlying older adults' PA in this review included the short-term embodied sensations and emotions associated with movement (e.g. pleasure and pain). Likewise, a burgeoning area of research attested the positive and negative affective experiences that influence PA participation amongst older adults and the wider adult population [60–62]. For example, older adults tend to avoid negative states such as expectations of daily pain [63]. Results from multilevel models demonstrated that on mornings when older people catastrophized more than usual about arthritic pain, they spent more time in sedentary behaviour and engaged in fewer minutes of moderate-to-vigorous PA [63]. Therefore, practitioners need to consider ways to combat the negative sensations associated with some older adults' experiences of exercise, such as pain and fatigue, for example, by paying close attention to the individualisation of exercise programmes, such as recommending exercise intensities below the ventilatory threshold and encouraging manageable short bouts of movement to build perceived capability [61].

Alternatively, scholars have reinforced the importance of improving the quality of older adults' PA experience through improving enjoyment and pleasure. Phoenix and Orr [64] presented a typology of pleasure for PA in older age, including sensual pleasure (e.g. feeling the breeze when walking outdoors), documented pleasure (e.g. accounts of walking routes), the pleasure of habitual action (e.g. providing purpose to everyday life) and the pleasure of immersion (e.g. focussing the mind through movement practices, such as yoga). As such, reframing PA as a pleasurable engagement with movement, rather than purely a health-related and anti-ageing behaviour, is essential for motivation and a key consideration in the design of future interventions [14, 65]. According to our findings, and in agreement with existing literature [14, 15, 21], one such strategy to improve enjoyment for older adults during PA is the availability of meaningful social interactions, using socialising as a way to enhance the quality of PA experiences [66]. For example, in previous research, having an exercise partner was viewed as a key enabler of PA for older people, in which PA was perceived as a central part of social life [67]. Sharing PA experiences with others can have various benefits for older adults including shared information about effective ways to be active, verbal encouragement from others, positive role modelling, a sense of social attachment and a social network to provide meaningful emotional support [68]. In light of these findings, practitioners should consider opening up avenues for development of intervention and policy design within broader social-ecological areas, attending to the complexity of older adults' PA experiences, rather than a restricted focus on long-term individualistic motivations [69, 70]. For example, researchers and practitioners are beginning to acknowledge the importance of co-design in the development of PA interventions for older people, addressing the complexity of older peoples' everyday lives in the community, which impact on their enjoyment and engagement with PA [71].

Implications

A strength of the current review was the use of framework synthesis that allowed PA influences to be mapped onto a theoretical behaviour change model (i.e. COM-B). The COM-B system is at the hub of a behaviour change 'wheel' (BCW) that can be used in the development, implementation and evaluation of evidence-based interventions through a systematic framework progressing intervention construction through stages [22]. Stage 1 involves understanding the behaviour, stage 2 involves identifying intervention options and stage 3 involves identifying content and implementation plans [22]. Using the COM-B model, we have addressed stage 1 and provided a 'behavioural diagnosis' of the influencing factors on older adults' PA through a synthesis of qualitative research that can help practitioners move through to the next phases of intervention design. Using a matrix of links between COM-B and the associated intervention and policy functions, the current behavioural analysis can be used as a foundation to plan appropriate PA interventions for older adults (Appendix 7).

In addition to the utility of the BCW, the multiple factors underpinning older adults' PA in this review indicate that a systems approach to policy and intervention, and resources guiding complex health intervention development, are needed to cover wider actions across multiple sectors [72, 73]. Cross-sectoral collaborations are required to harness a range of experts and skill sets to address the complexity of older adults' PA behaviours, considering comprehensive long-term models that consider the social, political and cultural contexts of ageing [74]. For instance, in the UK, integration of the National Health Service (NHS) with community voluntary organisations has enabled the development of 'green social prescribing', in which link workers helped connect service users through a person-centred approach to appropriate nature-based interventions [75, 76]. National organisations, such as UK Active Partnerships and Sport England, are likely to play an important role in the

development of whole systems approaches to PA within local communities, as set out in PA strategies, such as 'Uniting the Movement' [77], and through developing partnerships with NHS integrated care systems and health system leaders [74].

Strengths and limitations

The current review explored older adults' experiences of PA through merging in depth qualitative methodological findings, casting an interpretive, qualitative research lens to understand the diversity of meanings and contextual interpretations that older adults gave to their involvement in PA [78]. This is the only systematic review of qualitative studies to explore the factors influencing PA in adults over 70. Rigorous review and synthesis processes were adopted, including CERQual to pinpoint confidence in findings, and comprehensive framework mapping to the COM-B model. Despite these strengths, limitations in the current review need to be considered. Participants in this review were predominantly White, middle-class, women, from high-income countries, and there was a lack of representation of the oldest old (≥90 years). Therefore, the review lacked diversity in perspectives and experiences, constricting analysis and interpretations to a smaller segment of society. Moreover, the review was restricted to English articles; nevertheless, only five non-English studies were excluded from analyses. The literature suggests that lower socioeconomic status and Black and minority ethnic groups have significant socio-ecological barriers to PA and subsequently have lower PA levels [79, 80]. Hence, future research exploring PA influences should seek to involve under-served groups, including a wider diversity of older people.

Conclusions

Older adults' complex, divergent reasons for undertaking or avoiding PA are shaped through a range of interacting factors influencing their capability, opportunity and motivation. Their wider PA context and social culture are key. Our findings are consistent with some of the fundamental facilitators (e.g. social influences) and barriers (e.g. perceived physical limitations) to older adults' PA identified in previous reviews [14, 15, 21]; however, we have extended previous works through providing a map of influencing factors within a theoretical behaviour change model (i.e. COM-B). We hope these findings can be used to improve older adults' PA levels and to enhance the quality of their PA experiences.

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References

1. Nyman SR. A multidisciplinary approach to promoting physical activity among older people. In: Nyman SR *et al.*, eds. The Palgrave Handbook of Ageing and Physical Activity Promotion. Switzerland: Palgrave Macmillan, 2018; 1–20.
2. Angulo J, el Assar M, Álvarez-Bustos A, Rodríguez-Mañas L. Physical activity and exercise: strategies to manage frailty. Redox Biol 2020; 35: 101513. https://doi.org/10.1016/j.redox.2020.101513.
3. Pedersen BK, Saltin B. Exercise as medicine - evidence for prescribing exercise as therapy in 26 different chronic diseases. Scand J Med Sci Sports 2015; 25: 1–72.
4. Steffl M, Bohannon RW, Sontakova L, Tufano JJ, Shiells K, Holmerova I. Relationship between sarcopenia and physical activity in older people: a systematic review and meta-analysis. Clin Interv Aging 2017; 12: 835–45.
5. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep 1985; 100: 126–31.
6. American College of Sports Medicine *et al.* American College of Sports Medicine position stand. Exercise and physical activity for older adults. Med Sci Sports Exerc 2009; 41: 1510–30.
7. Izquierdo M, Merchant RA, Morley JE *et al.* International exercise recommendations in older adults (ICFSR): expert consensus guidelines. J Nutr Health Aging 2021; 25: 824–53.
8. Fragala MS, Cadore EL, Dorgo S *et al.* Resistance training for older adults: position statement from the National Strength and Conditioning Association. J Strength Cond Res 2019; 33: 2019–52.
9. Langhammer B, Bergland A, Rydwik E. The importance of physical activity exercise among older people. Biomed Res Int 2018; 2018: 7856823.
10. Lautenschlager NT, Almeida OP, Flicker L, Janca A. Can physical activity improve the mental health of older adults? Ann Gen Hosp Psychiatry 2004; 3: 12. https://doi.org/10.1186/1475-2832-3-12.
11. World Health Organisation. Global Recommendations on Physical Activity for Health. Geneva: World Health Organisation, 2021. https://www.who.int/publications/i/item/9789241599979 (20 December 2022, date last accessed).
12. Harris TJ, Owen CG, Victor CR, Adams R, Cook DG. What factors are associated with physical activity in older people, assessed objectively by accelerometry? Br J Sports Med 2009; 43: 442–50.
13. Sagelv EH, Ekelund U, Pedersen S *et al.* Physical activity levels in adults and elderly from triaxial and uniaxial accelerometry. PLoS One 2019; 14: e0225670. https://doi.org/10.1371/journal.pone.0225670.
14. Devereux-Fitzgerald A, Powell R, Dewhurst A, French DP. The acceptability of physical activity interventions to older adults: a systematic review and meta-synthesis. Soc Sci Med 2016; 158: 14–23.
15. Franco MR, Tong A, Howard K *et al.* Older people's perspectives on participation in physical activity: a systematic review

and thematic synthesis of qualitative literature. Br J Sports Med 2015; 49: 1268–76.
16. Morgan K, Tan MP. Behaviour change theories and techniques for promoting physical activity among older people. In: Nyman SR, *et al.*, eds. The Palgrave Handbook of Ageing and Physical Activity Promotion. London, UK: Springer International Publishing; 2018. https://doi.org/10.1007/978-3-319-71291-8_11.
17. Michie S, van Stralen, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement Sci 2011; 6: 42. https://doi.org/10.1186/1748-5908-6-42.
18. Howlett N, Schulz J, Trivedi D, Troop N, Chater A. A prospective study exploring the construct and predictive validity of the COM-B model for physical activity. J Health Psychol 2019; 24: 1378–91.
19. Willmott TJ, Pang B, Rundle-Thiele S. Capability, opportunity, and motivation: an across contexts empirical examination of the COM-B model. BMC Public Health 2021; 21: 1014. https://doi.org/10.1186/s12889-021-11019-w.
20. Noyes J *et al.* Qualitative research and Cochrane reviews. In: Higgins JP, Green S, eds. Cochrane Handbook for Systematic Reviews of Interventions. Hoboken: John Wiley & Sons, 2008, pp. 571–91.
21. McGowan LJ, Powell R, French DP. How acceptable is reducing sedentary behavior to older adults? Perceptions and experiences across diverse socioeconomic areas. J Aging Phys Act 2019; 27: 642–52.
22. Michie S, Atkins L, West R. The Behaviour Change Wheel: A Guide to Designing Interventions. Silverback Publishing, 2014.
23. Age UK. Briefing: Health and Care of Older People in England 2019. London: Age UK, 2019. https://www.ageuk.org.uk/our-impact/policy-research/publications/reports-and-briefings/ (4 September 2022, date last accessed).
24. Tong A, Flemming K, McInnes E, Oliver S, Craig J. Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. BMC Med Res Methodol 2012; 12: 181. https://doi.org/10.1186/1471-2288-12-181.
25. Barnett-Page E, Thomas J. Methods for the synthesis of qualitative research: a critical review. BMC Med Res Methodol 2009; 9: 59. https://doi.org/10.1186/1471-2288-9-59.
26. Carroll C, Booth A, Leaviss J, Rick J. 'Best fit' framework synthesis: refining the method. BMC Med Res Methodol 2013; 13: 37. https://doi.org/10.1186/1471-2288-13-37.
27. Braun V, Clarke V. Thematic Analysis: Practical Guide. London: Sage, 2022.
28. Critical Appraisal Skills Programme. CASP Qualitative Studies Checklist. Oxford, UK: Critical Appraisal Skills Programme, 2018. https://casp-uk.net/casp-tools-checklists/ (14 Januray 2022, date last accessed).
29. Lewin S, Bohren M, Rashidian A *et al.* Applying GRADE-CERQual to qualitative evidence synthesis findings-paper 2: how to make an overall CERQual assessment of confidence and create a summary of qualitative findings table. Implement Sci 2018; 13: 10. https://doi.org/10.1186/s13012-017-0689-2.
30. Rees R *et al.* The role of reviewer reflexivity: reflections from a mixed-method consultative systematic review. Abstracts of the global evidence summit, Cape Town, South Africa. Cochrane Database Syst Rev 2017; 9.
31. Grant BC. An insider's view on physical activity in later life. Psychol Sport Exerc 2008; 9: 817–29.
32. Larkin JM, Black DR, Blue C, Templin T. Perceived barriers to exercise in people 65 and older: recruitment and population campaign strategies. Medicine & Science in Sports & Exercise. 2005; 37: 5. https://doi.org/10.1097/00005768-200505001-00097.
33. Sandlund M, Pohl P, Ahlgren C *et al.* Gender perspective on older people's exercise preferences and motivators in the context of falls prevention: a qualitative study. Biomed Res Int 2018; 2018: 1–11.
34. O'Brien Cousins S. Thinking out loud: what older adults say about triggers for physical activity. J Aging Phys Act 2001; 9: 347–63.
35. Cohen-Mansfield J, Marx MS, Guralnik JM. Motivators and barriers to exercise in an older community-dwelling population. J Aging Phys Act 2003; 11: 242–53.
36. Kirby JB, Kluge MA. For the love of the game: an exploration of the experiences and psychosocial development of women 70 years of age and older who play volleyball. J Aging Phys Act 2022; 30: 445–54.
37. Grossman MD, Stewart AL. 'You aren't going to get better by just sitting around': physical activity perceptions, motivations, and barriers in adults 75 years of age or older. Am J Geriatr Cardiol 2003; 12: 33–7.
38. Stathi A, Gilbert H, Fox KR, Coulson J, Davis M, Thompson JL. Determinants of neighborhood activity of adults age 70 and over: a mixed-methods study. J Aging Phys Act 2012; 20: 148–70.
39. Welmer AK, Morck A, Dahlin-Lvanoff S. Physical activity in people age 80 years and older as a means of counteracting disability, balanced in relation to frailty. J Aging Phys Act 2012; 20: 317–31.
40. van Hoven B, Meijering L. Mundane mobilities in later life - exploring experiences of everyday trip-making by older adults in a Dutch urban neighbourhood. Res Transp Bus Manag 2019; 30: 100375. https://doi.org/10.1016/j.rtbm.2019.100375.
41. Grant BC. 'You're never too old': beliefs about physical activity and playing sport in later life. Aging Soc 2001; 21: 777–98.
42. Scourfield P. The symbolic value of tai chi for older people. Qual Aging Policy Pract Res 2006; 7: 4–12.
43. Robins LM *et al.* Older adult perceptions of participation in group- and home-based falls prevention exercise. J Aging Phys Act 2016; 24: 350–62.
44. Simek EM, McPhate L, Hill KD, Finch CF, Day L, Haines TP. What are the characteristics of home exercise programs that older adults prefer?: a cross-sectional study. Am J Phys Med Rehabil 2015; 94: 508–21.
45. de Groot GCL, Fagerstrom L. Older adults' motivating factors and barriers to exercise to prevent falls. Scand J Occup Ther 2011; 18: 153–60.
46. Fougner M *et al.* Aging and exercise: perceptions of the active lived-body. Physiother Theory Pract 2019; 35: 651–62.
47. McPhate L, Simek EM, Haines TP, Hill KD, Finch CF, Day L. 'Are your clients having fun?' The implications of respondents' preferences for the delivery of group exercise programs for falls prevention. J Aging Phys Act 2016; 24: 129–38.
48. Zhang J, Bloom I, Dennison EM *et al.* Understanding influences on physical activity participation by older adults: a qualitative study of community-dwelling older adults from the Hertfordshire Cohort Study, UK. PLoS One 2022; 17: e0263050. https://doi.org/10.1371/journal.pone.0263050.

49. Burton E, Lewin G, Boldy D. Barriers, motivators and life experiences of physical activity for older home care clients. J Aging Phys Act 2012; 20: S84–5.
50. Chastin SFM, Fitzpatrick N, Andrews M, DiCroce N. Determinants of sedentary behavior, motivation, barriers and strategies to reduce sitting time in older women: a qualitative investigation. Int J Environ Res Public Health 2014; 11: 773–91.
51. Cousins SO. 'My heart couldn't take it': older women's beliefs about exercise benefits and risks. J Gerontol 2000; 55: P283–94.
52. Hirvensalo M, Lampinen P, Rantanen T. Physical exercise in old age: an eight-year follow-up study on involvement, motives, and obstacles among persons age 65-84. J Aging Phys Act 1998; 6: 157–68.
53. Bjornsdottir G, Arnadottir SA, Halldorsdottir S. Facilitators of and barriers to physical activity in retirement communities: experiences of older women in urban areas. Phys Ther 2012; 92: 551–62.
54. Jadczak AD, Dollard J, Mahajan N, Visvanathan R. The perspectives of pre-frail and frail older people on being advised about exercise: a qualitative study. Fam Pract 2018; 35: 330–5.
55. Bassett R, Bourbonnais V, McDowell I. Living long and keeping well: elderly Canadians account for success in aging. Can J Aging 2007; 26: 113–26.
56. Harvey K, Griffin M. (In/ex)clusive fitness cultures: an institutional ethnography of group exercise for older adults. Aging Soc 2023; 43: 251–75.
57. Massie AS, Meisner BA. Perceptions of aging and experiences of ageism as constraining factors of moderate to vigorous leisure-time physical activity in later life. Soc Leis 2019; 42: 24–42.
58. Whaley DE, Ebbeck V. Self-schemata and exercise identity in older adults. J Aging Phys Act 2002; 10: 245–59.
59. Cameron E, Ward P, Mandville-Anstey SA, Coombs A. The female aging body: a systematic review of female perspectives on aging, health, and body image. J Women Aging 2019; 31: 3–17.
60. Ekkekakis P, Brand R. Affective responses to and automatic affective valuations of physical activity: fifty years of progress on the seminal question in exercise psychology. Psychol Sport Exerc 2019; 42: 130–7.
61. Smith AE, Eston R, Tempest GD, Norton B, Parfitt G. Patterning of physiological and affective responses in older active adults during a maximal graded exercise test and self-selected exercise. Eur J Appl Physiol 2015; 115: 1855–66.
62. Taylor BA, Pescatello LS. For the love of it: affective experiences that may increase physical activity participation among older adults. Soc Sci Med 2016; 161: 61–3.
63. Zhaoyang R, Martire LM, Darnall BD. Daily pain catastrophizing predicts less physical activity and more sedentary behavior in older adults with osteoarthritis. Pain 2020; 161: 2603–10.
64. Phoenix C, Orr N. Pleasure: a forgotten dimension of physical activity in older age. Soc Sci Med 2014; 115: 94–102.
65. Tulle E. Physical activity and sedentary behaviour: a vital politics of old age? In: Tulle E, Phoenix C, eds. Physical Activity and Sport in Later Life. London: Palgrave Macmillan, 2015; 9–20.
66. Santos LHO, Okamoto K, Funghetto SS *et al.* Effects of social interaction mechanics in pervasive games on the physical activity levels of older adults: quasi-experimental study. JMIR Serious Games 2019; 7: e13962. https://doi.org/10.2196/13962.
67. Kosteli MC, Williams SE, Cumming J. Investigating the psychosocial determinants of physical activity in older adults: a qualitative approach. Psychol Health 2016; 31: 730–49.
68. Whaley DE. Social relationships and promoting physical activity among older people. In: Nyman SR, *et al.*, eds. The Palgrave Handbook of Ageing and Physical Activity Promotion. London, UK: Springer International Publishing, 2018; 317–35.
69. Boulton ER, Horne M, Todd C. Multiple influences on participating in physical activity in older age: developing a social ecological approach. Health Expect 2018; 21: 239–48.
70. Golden SD, McLeroy KR, Green LW, Earp JAL, Lieberman LD. Upending the social ecological model to guide health promotion efforts toward policy and environmental change. Health Educ Behav 2015; 42: 8S–14. https://doi.org/10.1177/1090198115575098.
71. Mansfield L, Kay T, Anokye N, Fox-Rushby J. Community sport and the politics of aging: co-design and partnership approaches to understanding the embodied experiences of low-income older people. Front Sociol 2019; 4: 4. https://doi.org/10.3389/fsoc.2019.00005.
72. Rutter H, Cavill N, Bauman A, Bull F. Systems approaches to global and national physical activity plans. Bull World Health Organ 2019; 97: 162–5.
73. Dowding D, Lichtner V, Closs SJ. Using the MRC framework for complex interventions to develop clinical decision support: a case study. Stud Health Technol Inform 2017; 235: 544–8.
74. Bird EL, Evans D, Gray S *et al.* Opportunities to engage health system leaders in whole systems approaches to physical activity in England. BMC Public Health 2022; 22: 254. https://doi.org/10.1186/s12889-022-12602-5.
75. Leavell MA, Leiferman JA, Gascon M, Braddick F, Gonzalez JC, Litt JS. Nature-based social prescribing in urban settings to improve social connectedness and mental well-being: a review. Curr Environ Health Rep 2019; 6: 297–308.
76. National Health Service. Green Social Prescribing. England: National Health Service, 2022. https://www.england.nhs.uk/personalisedcare/social-prescribing/green-social-prescribing/ (4 April 2022, date last accessed).
77. Sport England. Uniting the Movement. Loughborough, UK: Sport England, 2021. https://www.sportengland.org/about-us/uniting-movement (4 September 2022, date last accessed).
78. Phoenix C, Tulle E. Physical activity and ageing. In: Piggin J, Mansfield L, Weed M, eds. Routledge Handbook of Physical Activity Policy and Practice. Oxford, UK: Routledge, 2018; 266: 264–73.
79. Koshoedo SA, Paul-Ebhohimhen VA, Jepson RG, Watson MC. Understanding the complex interplay of barriers to physical activity amongst black and minority ethnic groups in the United Kingdom: a qualitative synthesis using meta-ethnography. BMC Public Health 2015; 15: 643. https://doi.org/10.1186/s12889-015-1893-0.
80. Sport England. Active Lives Adult Survey May 2020/21 Report, Loughborough, UK, 2021. https://www.sportengland.org/research-and-data/data/active-lives?section=access_the_reports (5 September 2022, date last accessed).

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