The value of mind-body connection in physical activity for older people

Abstract

Exercise that targets balance and strength is proven to prevent falls in older age. The Successful AGEing (SAGE) yoga trial is the first large randomised controlled trial to assess the impact of yoga on falls in people aged ≥60 years. We conducted a realist process evaluation to explain the strong participant engagement observed using interviews (21 participants, 3 yoga instructors) and focus groups (12 participants, 4 yoga instructors) . Results showed that relaxation, breathing and yoga's mind-body connection created a satisfying internal focus on bodily sensation which was valued by participants. The mechanisms of mindfulness and embodiment appeared to facilitate this. Mindfulness and embodiment are also linked to, and enhance engagement with, other forms of physical activity. By focusing creatively on these mechanisms we can develop a range of programs that target improvements in physical and mental health (including reducing falls and fear of falls) and appeal to older people.

Keywords: accidental falls, embodiment theory, exercise, qualitative research, yoga

Introduction

Falls are a major public health issue globally; they are a leading cause of fatal and non-fatal health loss worldwide (James et al., 2020) and the primary cause of injury-related death in people aged 70 and over (WHO, 2014). Physical activity in older age is important for general health and wellbeing, and plays a vital role in preventing physical decline, falls and fall-related injuries (WHO, 2020). Exercise programs that challenge balance have the greatest fall prevention effects (Ng et al., 2019), and much can be gained from the implementation of such programs that illustrate the significance of task and context specificity (Carr & Shepherd, 2000). However, participation in and adherence to fall prevention programs is not always optimal (Bunn et al., 2008; Ng et al., 2019).

Yoga is a popular physical activity with a focus on strength and balance exercises combined with breath and relaxation (Tew et al., 2020). Previous systematic reviews identified the positive impact of yoga-based exercise on balance and mobility (Youkhana et al., 2016) and health-related quality of life and mental wellbeing (Tulloch et al., 2018) in people aged 60 years and over. There is also evidence that older people believe yoga to be an acceptable and beneficial form of exercise. (Nayak et al., 2015; Perkins et al., 2020; Tiedemann et al., 2018). Consequently, yoga has excellent potential as a strategy to reduce falls and fall-related injuries for older people (Tiedemann et al., 2018). Our Successful AGEing (SAGE) yoga trial (Oliveira et al., 2020) is testing this hypothesis in the first large randomised controlled trial of yoga as a fall prevention program for people aged 60 and over.

The SAGE yoga trial

The SAGE trial is a parallel two-arm, pragmatic randomised controlled trial with 700 participants. Participants are aged 60 years and over, living independently at home; not currently participating in yoga; and able to travel to an intervention location or (since the start of the COVID-19 pandemic) join an online class. People are excluded if they are “house-bound”; have a cognitive impairment; have

insufficient English language skills to fully participate; are unable to walk 10 metres unassisted; have a progressive neurological disease or a medical condition precluding exercise (e.g. unstable cardiac disease).

Rolling recruitment of approximately 25 participants per month has just been completed and occurred via newspaper advertising, through contact with community organisations, such as Rotary and Probus and via social media. Participants randomised to the group-based yoga program (Arm 1) attend a free, 60-minute Iyengar (Iyengar, 2014) style yoga class twice a week with an experienced instructor in-person or on-line and are asked to complete a home-based yoga program for at least two extra 20 minute sessions per week for 12 months. Class content is based on our pilot trial (Tiedemann A et al., 2013) and emphasises standing yoga postures that build balance and strength, followed by slow breathing and relaxation. The program is tailored to individual ability and progressed as skill and confidence increases. The Iyengar style of yoga involves holding postures and using aids ("props" such as supportive blocks and straps) to modify postures as needed and has been used successfully with older adults (Roland et al., 2011).

Participants allocated to the seated home-based yoga relaxation program (Arm 2) attend two one-hour workshops to learn the seated relaxation yoga program and then practise this at home.

The primary outcome of interest is rate of falls 12 months post-randomisation. Secondary outcomes include mental wellbeing, physical activity, health-related quality of life, balance self-confidence, physical function, pain, goal attainment and sleep quality (Oliveira et al., 2020). The SAGE yoga trial received approval from the Human Research Ethics Committee of The University of Sydney (reference 2019/604) and all participants provided written consent.

This trial is ongoing. A realist process evaluation was conducted in parallel with the trial and found participants are reporting high levels of participation, adherence and enjoyment (Haynes et al.,

2021). To explain these process outcomes, five initial program theories and associated mechanisms were developed based on discussions with trial leaders and implementers, and the literature. These theories were tested and refined with interviewees. A sixth theory, "yoga's special properties" was identified inductively from interview data and the literature, and comprised two potential mechanisms: mindfulness, a focus on the present moment (Cox et al., 2016; Gaiswinkler & Unterrainer, 2016; Khanna & Greeson, 2013; Parra et al., 2019; Tang et al., 2015; Wheeler et al., 2017), and embodiment, a feeling of being "at home" in one's body (Cox & Tylka, 2020; Impett et al., 2006; Mahlo & Tiggemann, 2016; Piran & Neumark-Sztainer, 2020). The aim of this qualitative study was to explore in more detail, through participants' experiences, how the mechanisms of mindfulness and embodiment identified in the process evaluation maximised engagement with yoga. Our findings contribute new information to the discussion on how to maximise participation and adherence in programs such as the SAGE yoga trial intervention.

Methods

Process evaluation has an important role in strengthening program design, implementation and transferability (Moore et al., 2015). We conducted a realist process evaluation to investigate what is working for whom and in which circumstances in the SAGE yoga trial. Realist evaluation, based on a realist philosophy of science, is data driven, pragmatic, and develops program theories that describe which mechanisms an intervention appears to be activating (or failing to activate), and how this is mediated by the intervention context to generate proximal impacts (Maxwell, 2012; Pawson & Tilley, 2004). Our realist evaluation used mixed methods (routine process measures such as attendance and completion data, and feedback forms as well as interviews and focus groups) with an emphasis on exploration of participants' and yoga coaches' causal explanations for the observed process outcomes described above. The qualitative data presented in this study gives voice to the

participants in the SAGE yoga trial in order to understand and conceptualise mechanisms that they, and the yoga instructors, felt were enhancing their engagement with yoga.

The SAGE yoga exercise program was designed to be delivered face to face in a yoga studio, but social restrictions imposed due to the COVID-19 pandemic meant that the first four groups (46 participants) to be enrolled as part of the 2-year rolling recruitment process started classes in a studio and were subsequently moved online and delivered by the same instructors via Zoom (i.e., they received a hybrid model of program delivery). Our interest in the experience of this transition to an online format led us to commence our evaluation at this time point and has been detailed elsewhere (Haynes et al., 2022).

The realist process evaluation analysis included data from these 46 intervention participant feedback forms. Three participants dropped out when classes moved online leaving 43 participants, and another four dropped out as the program continued, leaving 39. Twenty four of the 39 participants who completed the program gave permission for us to contact them for an interview, and three of these either failed to reply or declined due to illness. Therefore 21 interviews were conducted with all consenting and available participants of the first four groups, and we also interviewed all the current instructors (n=3).

Our process evaluation method has been described in detail previously (Haynes et al., 2021). Briefly, routine process measures such as attendance and program completion were examined, along with feedback forms (n=46) which reported the views of all participants who had completed the program at the time this evaluation was conducted. Participant observation of online classes was undertaken, discussion with trial leaders and implementers took place, and emails and texts from participants who withdrew were also reviewed. These activities allowed us to identify process outcomes

(proximal impacts) and develop initial program theories. Semi-structured phone interviews were then conducted with participants in the intervention group who had consented to be contacted for an interview (n=21) at the time the initial evaluation was undertaken, and with the current yoga instructors (n=3). Interviews were conducted by one researcher (AH), were recorded with participant's consent and aimed to explicitly test the initial program theories and explore participants' views about causal relationships between the intervention strategies and context, and the program outcomes (Manzano, 2016; Pawson & Tilley, 2004). Recordings were transcribed and coded using NVIVO software (QSR, 2018). Interviews were analysed using a realist approach to thematic analysis (Wiltshire & Ronkainen, 2021), and themes were both data and theory driven. We coded for program theories in NVivo using its traditional node function (one node for each theory), and supplemented this with additional nodes for context, mechanisms, and outcomes. A separate node was created for "Gains and Losses" to collate all data where participants compared the difference between online and face to face classes. Two researchers (HG and AH) coded transcripts in parallel with data collection and both coded a proportion of transcripts using preliminary coding frames and frequently discussed how each new transcript was reshaping existing theories and forming new ones. The complete coding framework and analysis process can be found in our methodology paper (Haynes et al., 2021).

The emergent theory that there is "something special about yoga" was coded under "yoga's special properties" and forms the basis of this study. Unprompted, participants described something unique about their experience of yoga practice, specifically their enjoyment of the relaxation techniques, breathing and mind-body connection, which they contrasted to other physical activities they had experienced. Later interviews were adapted to take account of this evolving theory by including it in the questioning. Further review of the literature identified mindfulness and embodiment as possible mechanisms that may activate the pathway of engagement and enjoyment in these circumstances.

Our aim here is to explore these concepts further and discuss the possibility of leveraging these mechanisms in future exercise programs aimed at reducing the risk of falls.

While qualitative research cannot be generalised on a statistical-probability basis, we believe our findings offer transferability and analytic generalisability (Smith, 2018). Transferability is supported by our sample (e.g. over 50% of the participants who had completed the trial at the point we conducted this study were interviewed, including those who gave negative feedback and had stopped attending classes), the rich description of these participants' views (Haynes et al., 2022; Haynes et al., 2021) and evidence in the literature of the mind-body connection as a pathway to engagement and adherence demonstrated in other activities and population groups. Analytic generalisability is supported by the realist evaluation approach we used which identifies program theories and potential mechanisms and describes contextual factors that influence these (Kraus, 2018; Smith, 2018).

As more recent trial participants experienced a different context, i.e., a program of SAGE yoga classes that were provided entirely online, a second stage of evaluation was conducted including focus groups with 12 of these latter participants and four SAGE yoga teachers. The program theories developed in the initial evaluation were tested in these focus groups and held true for the entirely online classes. This alignment in findings between our two stages of data collection, using different methods, indicates that data saturation has been achieved for this process evaluation.

Results

Interviews with participants of the hybrid program (n=21 participants, 3 instructors) took on average 50 minutes (29-66 minutes). Participant interviewees ranged in age from 61 to 80 years old and the majority (71%) were female, reflecting the proportion of women enrolled in the trial overall. The

interviews included participants who gave negative survey feedback. The three yoga instructors were all female with over 15 years' experience of delivering Iyengar yoga to groups, including those with older people.

Focus groups (four in total) conducted with instructors and participants of the entirely online yoga program took between 60 and 66 minutes. Three focus groups contained study participants (12 participants, nine women and three men, aged 60-80 years old) and one focus group contained four yoga instructors (all women).

Key findings

Mindfulness

Mindfulness can be described as an "attentive, unprejudiced perception of all mental content, such as thoughts, feelings, emotions and bodily sensations" (Gaiswinkler & Unterrainer, 2016). In yoga, this is developed through control of breath as well as meditation techniques which aim to cultivate a sense of the present moment.

Our evaluation participants often compared yoga to other forms of physical activity, drawing attention to its "peaceful" emphasis on mindful relaxation and attention to the body:

> *I've always thought there was something different about yoga. I think that it's a mindfulness practise. It's not just a physical practise. (*P13, female, 67 years)

Although most participants did not use the term "mindfulness", they often talked about attention to their breath as something they enjoyed and as a point of difference with other activities they had participated in:

I think the breathing had a lot to do with it, and it's about giving yourself permission, or space, or time, to move into the new area of that stretch or that position, or that lift. Whereas in an exercise class, that isn't there. Music moves on. (P9, female, 73 years)

Participants also described the way the yoga class both opened and closed with relaxation as unique and beneficial:

We would start with a form of relaxation and then end with a form of relaxation. Other classes don't do that, other forms of exercise. And I think that was a good way to connect not just with the body, but also to be more mindful, to make a connection with the brain and with what was happening in our bodies. (P13, female, 67 years)

A number of participants were explicit that this inclusion of "brain work" made it more enjoyable and beneficial than regular gym classes:

Well, it's much nicer than jogging. It's much nicer than going to a gym. The fact that I think it's good for your brain as well, the meditative part of it is good. I prefer doing yoga to attending a gym and using all those awful bits of equipment, which I have tried. (P19, female, 70 years)

Consistent with participants' descriptions, the yoga instructors did not use the term mindfulness. This teacher explained she was very aware that using what she described as "fluffy" terms could put people off yoga. It seems, at least in her view, mindfulness techniques of breathing and relaxation could be taught and practiced effectively without necessarily being named.

> *We had that big buzz a couple of years ago around mindfulness. Yoga is mindfulness. It's asking you to stop. It's asking you to be in your body. It's asking you to be present.* (I1, female, instructor)

As well as reporting enjoyment of, and benefit from, the relaxation and breathing techniques of yoga, several participants saw the value of these practices extending beyond yoga to everyday life in ways they had not expected. For example, this participant found the relaxation practice valuable in stressful times, such as:

> *Sitting around at RPA [a large hospital] waiting for someone to come out of an operation. How you sit in a chair or relax, I probably do it more generally as a general thing in life now.* (P1, male, 61 years)

Another participant described how she used both the psychological and physical tools provided by yoga in her day-to-day life:

> *I think the mental aspect, yoga probably helped me calm down more and deal with everything that was going on in my life last year better… it is quite interesting. (But now) I've hurt my back. I've just got a pulled muscle or something, and you know what I'm doing? My yoga stretches.* (P17, female, 62 years)

And one woman who had fallen regularly in preceding years speculated that yoga's emphasis on being present had helped her avoid falls in the past year by readjusting her pace of life:

> *[I'm] much more conscious of the fact that I do need to take things a little bit easier…. So I don't rush. So I think maybe that's part of the mindfulness too, of yoga, the fact that I have slowed down a bit and I've given myself permission to slow down* (P19, female, 70 years)

Embodiment

In addition to breathing, relaxation and mindful connection, many participants described how yoga facilitated a greater sense of connection with their body, often known as "embodiment". Embodiment has been described as a deep awareness of and responsiveness to bodily sensations (Impett et al., 2006), thus embodying activities are those that facilitate attentiveness to the body, a sense of physical empowerment and competence, and involve a state of absorption or flow (Menzel & Levine, 2011). This awareness facilitates a sense of being fully in the body as one engages with the world, rather than the experience of viewing and working on the body as an object, as is common in many physical activity programs (Phoenix & Grant, 2009; Tulle, 2008).

This participant eloquently described the experience of how yoga enables embodiment:

> *I think that there is nothing to experience except your body and that doesn't happen very often in modern society. There's nothing going on, nobody is doing anything, everybody is actually really still, they are not having eye contact, the teacher isn't chatting. All you've got is what it feels like to have your feet on the floor and your head lined up above them and so that attention to what is actually happening in you and what happens if you move one bit a little bit. And some people have never thought about feeling that.* (P10, female, 70 years)

Another participant described how an emphasis on bodily self-care allowed her to address an injury she had been living with:

> *…I'm not a person who's in their body. I'm in my head all the time. I'm out there with the brood, the crowd, trying to keep a handle on the kids… I don't give myself time to think about my body, so it's no surprise it's taken me three years to get over an injury. That's what I got in yoga that I wasn't getting in the physio which was about 'Fix it, fix it, fix it', instead of being aware of what my body was needing. It was about 'do the exercise,' it wasn't about 'work with my body'. Yoga has you work* ***with*** *[emphasis original] your body, it wasn't about the exercise.* (P13, female, 73 years)

Some participants also pointed out that yoga allowed them to attend to their body in a way that they had previously neglected:

> *I just think that for me, it was just energising my body in a way that I hadn't done for so long. You know, after a couple of weeks I thought 'Why did you wait 40 years?" You know, "Why did I stop?"* (P3, female, 60 years)

The idea that people disconnect from their bodies as they age was also taken up by one of the instructors, who felt that older people have a tendency to dissociate from their body rather than reside in it, and that yoga helps to address this:

> *I think, especially because it's integration with their breath, it's bringing them present into their bodies. And often as we get older, we come to be much more in our head and we almost disconnect from our physical bodies and I think that's why so many people fall, because they're not really in their bodies anymore as much, especially in the legs. And so, with the yoga and the way the program is being set out, it's very much legwork orientated, very much balance, and so it is forcing them to bring that awareness into their legs.* (I2, female, instructor)

Discussion

The data from our yoga trial detail participants' deep enjoyment of breathing, relaxation and mind-body connection, which they often compared favourably with other physical activities. These findings suggest that mindfulness and embodiment may be strong mechanisms for the ongoing participation of older people in yoga and have implications for the upscaling and roll out of the SAGE intervention and other yoga programs.

Yoga and embodiment

In keeping with our assertions, links between yoga and positive ways of living with the body have been identified in young adults, for example practising yoga for at least 30 min a week for one year has been associated with higher levels of body satisfaction (Neumark-Sztainer et al., 2018). Yoga practice has also been associated with a more positive body image through reduced self-objectification (Mahlo & Tiggemann, 2016), and with body responsiveness and awareness (Daubenmier, 2005); more engaged yoga practitioners (as measured on the Yoga Immersion Scale) report greater mindfulness and improved psychological wellbeing (Gaiswinkler & Unterrainer, 2016). Drawing on this research and others (Cook-Cottone, 2016; Piran, 2017), Cox and Tylka proposed a conceptual model that yoga practice supports positive embodiment by providing a context where participants are directed to inhabit their body as a subject rather than as an object (Cox & Tylka, 2020). The idea of working with the body rather than on the body was brought up by one of our participants quoted above and can be better understood in light of some of the theorising around the aging body.

Embodied older bodies

We know physical activity contributes to positive aging and hence it is a focus of much health promotion (Phoenix & Grant, 2009). However it has been suggested that while "becoming older" is manifested through the body and as such is an embodied experience, the dominant focus of health promotion on biological and functional measures to determine health and prescribe "treatment" for aging can lead to the body being seen as an object to be manipulated (Eichberg, 2000; Powell & Longino, 2001). The medicalisation of the aging process with the implied deficiency of bodies (Markula & Pringle, 2006) as well as social narratives tend to focus on physical decay and emphasise the mind-body split of much of western thought (Humberstone & Cutler-Riddick, 2015). This suggestion is supported by our yoga teacher when she commented that older people tend to disconnect from their physical bodies, as well as by some participant's descriptions of their embodied experiences.

Some researchers have identified ways in which older people have interrupted this increasing separation of mind and body with age. For example, Tulle's research (2008) identified ways which older elite athletes deliberately reconstructed ideas about their aging identity in order to embody themselves as aging and competent. According to the researchers one reason the older athletes were able to do this was because the organisation Veteran Athletics provided a structure which enabled runners and other athletes to reconstruct performance and tailor their training to take account of changes in bodily ability. Rather than denying bodily aging, they recognised there were fluctuations in the mind-body relationship which they considered normal, not pathological and adapted accordingly. Parallels can be drawn here with the yoga class as an environment which facilitates this mind-body relationship.

Embodied older bodies and yoga

Humberstone and Cutler-Riddick (2015), in their phenomenological, in-depth study of older women (aged 50-72 years) also found that, through learning "body techniques" made available in yoga

classes, dominant sociocultural discourses regarding older women's bodies and identities about aging could potentially be interrupted. Similarly, our research found that yoga provided an opportunity for older people to enjoy an embodied physicality which they had not experienced recently, if ever. Hence participants experienced the SAGE yoga program as purposeful, satisfying, relevant to their daily life and life-enhancing: factors which are known to facilitate participation in fall prevention programs (Bunn et al., 2008) and which our participants identified as factors in their adherence to the twice-weekly, 40-week SAGE yoga intervention.

Embodiment, older people, and physical activity

These findings offer support for our argument that mindfulness and embodiment are relevant to the future development and implementation of the SAGE intervention and similar yoga-based programs that aim to prevent falls. However, in keeping with realist evaluation principles, it is also important to consider whether these mechanisms are specific to the context of yoga or can be activated in other physical activities that could, potentially, be built into a wider range of fall prevention exercise programs. If we look further afield than the yoga research, we find examples of mindfulness and embodiment as mechanisms for enjoyable engagement in other forms of physical activity. For example, older people participating in either a dancing or fitness class, when interviewed, reported experiencing different subjectivities depending on the "culture" of fitness associated with the class, as identified through ethnographic research (Paulson, 2005). While the fitness participants focused on physiological changes and functional capacity to enhance individual fitness and health, the dance group focussed on graceful movement of the body in relation to others. The finding that the dance class participants "disciplined their minds to control their bodies during the sessions" (p. 243) is in keeping with our participants' experiences of lived embodiment during yoga.

Embodied immersion and physical activity

Similarly, a mixed methods investigation of older women who regularly participated in physical activity found that they identified aspects of embodied pleasure, to varying degrees, depending on the type of activity. For example, swim participants spoke of the enjoyment of the water itself, the "glide" and "flow", as integral to their continued participation. A similar pleasure was described by both golfers and walkers who enjoyed their leisure activity because it was enacted in the context of nature, beauty, relaxation, "enrichment of life" and "renewal of self" (Berlin et al., 2018, p. 34). There are also similarities to the Japanese concept of shinrin-yoku (forest bathing) which is thought to improve mental health, particularly anxiety. A recent systematic review suggested the mechanisms of nature connectedness were activated in this practice and called for further investigation into these (Kotera et al., 2020).

Phoenix and Orr's (2014) research around the pleasure of physical activity identified four different types of pleasure older people derived from being physically active. Of relevance to our research is the concept of "pleasure of immersion" (p. 99) – the bringing together of the body and the mind to immerse oneself completely in an activity with a transforming effect that can last beyond completion of the activity. Immersion requires a focus of body and mind which is often achieved through movement which, in turn, facilitates detachment from external issues, providing "me time" and a sense of identity. Pleasure through immersion may also be attained through attachment to a place – either real (e.g. the wilderness) or imaginary (e.g. therapeutic landscapes created through music). Yoga was one activity through which Phoenix and Orr's study participants achieved the pleasure of immersion, but they also described activities such as hill walking and Zumba classes as providing similar immersive pleasure. The process of shutting out external distractions in order to feel the "flow" and achieve a mind-body integration state is also described by competitive athletes (Menzel & Levine, 2011).

<u>Meditative movement</u>

A study looking at Tai Chi and Qigong (TCQ) explored the relationship between mind and body as a more direct pathway, using embodied cognitive science theory to hypothesise that bodily postures can facilitate mental qualities and mental states. The researchers concluded that the postures and movement patterns of TCQ may be associated with improvements in psychological wellbeing as seen in clinical trials (Osypiuk et al., 2018). The effect may be bi-directional, in that movement patterns can be associated with short term changes in mood and conversely experimental manipulation of mood can lead to changes in posture. The relationship between yoga postures and mood is less clear (Shapiro & Cline, 2008) but the concept of "meditative movement" which the researchers use to describe TCQ may be relevant to our findings with yoga. Larkey (2009) defined meditative movement as any physical activity that combines these four components: a focus of the mind in meditative practice; a focus on breathing to bring the mind to a restful state; movement that is usually slow, relaxed and flowing; and attainment of deep relaxation. Activities meeting this definition could also reasonably be described as practices which achieve the states of mindfulness and embodiment. Yoga, Tai Chi/Qigong, Aikido, Sufi Dance, as well as Western methods such as Pilates, Alexander Technique and Feldenkrais have all been described as meeting the criteria for meditative movement (Payne & Crane-Godreau, 2013; Weber et al., 2020). While this is a relatively unexplored concept and classifying and measuring the four criteria an activity must meet to be considered a meditative movement is fraught with difficulty, it allows us to consider whether the criteria of meditative movement might be met by activities which are not traditionally thought of as mind-body activities, but that research tells us people find meditative and invigorating, such as hill walking and dancing. It also offers a more refined idea of what practices might activate the mechanisms of mindfulness and embodiment within a physical activity. This expands our options for drawing on a wide range of activities for designing fall prevention and healthy aging programs that engage older people.

Limitations

We acknowledge that a limitation of this study is that we were only able to speak with participants who were still in the trial so we have no information about the views of those who declined to enrol or later withdrew. It may be that mindfulness and embodiment failed to attract or engage those people, or actively discouraged them. Also, as with all interview-based evaluation, people who agree to be interviewed may be more enthusiastic about the program, possibly skewing the results towards positivity.

Conclusion

Participants in the SAGE yoga trial identified something particular about their experience of yoga that provided them with a novel sense of enjoyment and satisfaction, contributing to their enthusiastic engagement and adherence to the program. Incorporating the potential mechanisms of mindfulness and embodiment into future fall prevention exercise programs and other physical activities for older people could enhance their success through improved participation and adherence.

We argue that, far from being unique to yoga (as our participants suggested), these mechanisms are likely to be present in other activities which incorporate mind-body connection in conjunction with movement. Integrating the qualities identified in meditative movement with forms of physical activity that challenge balance offers scope for alternative forms of enjoyable and effective fall prevention programs. Tai Chi/Quidong, martial arts, some forms of dance and hill walking are all examples of activities that facilitate mindfulness and embodiment, as well as challenge balance. By focusing on ways to enhance these mechanisms of meaningful engagement (mindfulness and embodiment), as well as the physiological mechanisms designed to increase strength and balance, we can develop and evaluate a wide range of different programs that are both effective and appealing. The challenge is to become more creative and person-centred in our thinking about program design.

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