PAAH
PHYSICAL ACTIVITY AND HEALTH

Avoiding God's Waiting Room: Lessons from the Lived Experiences of Older People who Use Digital Technology to Support Physical Activity

RESEARCH

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ABSTRACT

Background: Digital technologies provide new opportunities to promote, incentivise and support physical activity as an essential component of healthy ageing, but their potential is yet to be fully realised. There is mixed information about older people's capacity to use digital technologies to support physical activity, and about how it can benefit them.

Methods: This study focuses on older people who report some success in using digital technology to support physical activity. We conducted narrative interviews with 17 purposively sampled survey respondents aged 70+ who had reported using smartphones, tablets/computers or wearable/portable digital devices to support their physical activity. We sought to identify transferable lessons from their experiences and to explain how these experiences were shaped by contextual factors, including the COVID-19 pandemic. Data was analysed inductively and deductively.

Results: Interviewees perceived digital technology as a facilitator and motivator for physical activity, describing multiple benefits. Many disparaged their technical skills yet they used technology creatively to access and enhance physical activity, driven by philosophies of active living which underpinned their refusal to "sit in God's waiting room". Most reported navigating challenges associated with ageing in a discriminatory society, compounded by COVID-19 impacts. We identified four 'lessons': 1. Embrace technology, 2. Find your thing, 3. Be adaptive and 4. Resist 'being old'.

Conclusions: Leveraging trusted social and health professional relationships to model and encourage technology-supported physical activity, and strengthening the value proposition of technology for older people *with* older people, may encourage their use of digital technology to support physical activity.

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INTRODUCTION

Digital technologies—such as smart phones, tablets and computers that provide access to online resources, and wearable or portable devices that monitor physical activity—provide new opportunities to promote, incentivise and support physical activity as an essential component of healthy ageing (Aldenaini et al., 2020; Helbostad et al., 2017). Technology has the potential to enhance older adults' physical capability, knowledge, confidence and motivation to engage in physical activity (PA) (Backonja et al., 2014; Campelo & Katz, 2020; McGarrigle & Todd, 2020; Pirhonen et al., 2020) and can support self-determination needs of autonomy, competence and relatedness that shape PA-related attitudes and beliefs (Mehra et al., 2020). Contemporary generations of older people are increasingly digital-ready thanks to greater exposure to technology than previous generations (Vereijken & Helbostad, 2018), which in many cases has been amplified by the COVID-19 pandemic (McCabe et al., 2021).

Technologies and technology-based interventions aimed at promoting PA are becoming increasingly sophisticated, for example, drawing on social-ecological approaches that incorporate medical, technological and psychosocial perspectives (Forberger et al., 2017). Many engage users via recognised behaviour change techniques and 'persuasive strategies' such as activity tracking, movement reminders, personalisation that may enhance meaningfulness and enjoyment, recognition and rewards for goal attainment and mechanisms for social connection (Aldenaini et al., 2020; McGarrigle et al., 2020; Peine et al., 2021; Sullivan & Lachman, 2017; Vereijken & Helbostad, 2018). Websites and apps for PA and fall prevention in older people are often informed by evidence (Mehra et al., 2020) including motivational theories developed or adapted for older people (Helbostad et al., 2017; Yang et al., 2021).

However, there is mixed information about the real world benefits of digital technology for older people and about their capacity to engage with and make the most of new technologies to support PA (Aslam et al., 2020; McKee et al., 2012; Urban, 2017; Vereijken & Helbostad, 2018). Some studies of older people using technology to support PA indicate improved levels of activity (Aslam et al., 2020; Brickwood et al., 2019; Liu et al., 2020; Satake et al., 2021) and reduction of fall risks (Rizanti, 2021), increased mobility (Hassett et al., 2020), self-efficacy (Yang et al., 2021) and relatively high adherence (McGarrigle & Todd, 2020). Although some websites and apps for PA and fall prevention have been shown to safely facilitate exercise at home (Mehra et al., 2020), there is limited rigorous evidence about the safety and/or effectiveness of unsupervised use of technology to support PA by older people more broadly (Vereijken & Helbostad, 2018). And it is unclear to what extent older users of technology find that it provides sustained motivation for PA over time (e.g. does the 'fun factor' diminish?) (Liu et al., 2020; Vereijken & Helbostad, 2018) or whether it supports active living in a way that contributes to aspirations such as ageing satisfaction (Shirahada et al., 2019), life satisfaction, sense of purpose and role fulfilment (Morgan et al., 2019). There are possible negative effects such as social alienation due to reduced interpersonal contact, impaired cognition and sleep caused by screen time (Weiner-Light & Wolf, 2021) and anxiety about privacy (Smirnova, 2022) and poor technological competence (Andrews et al., 2019; Iancu & Iancu, 2020; Pirhonen et al., 2020).

Heterogeneity is also a consideration (Chimento-Díaz et al., 2022). PA-related technology may offer little to help older people struggling with barriers to being active such as pain and physical limitations (Perracini et al., 2017), fear of falling or beliefs about PA being unnecessary or too risky (McGarrigle et al., 2020). It may also be unsuitable for frailer people or those with poorer health and/or complex needs (McGarrigle et al., 2020; Vereijken & Helbostad, 2018), including reduced cognitive capacity (Ranieri et al., 2021). Access to technology can be affected by disparities in age, socioeconomic status, education (McCabe et al., 2021; Schumacher & Kent, 2020; Sullivan & Lachman, 2017) and cultural background or context (Shirahada et al., 2019).

It is widely recognised that technology and the meanings we give it are social constructs. Technology acts both as a product and a shaper of human capacity, thus it is 'ambivalent', with the potential to have positive and negative effects (Beimborn et al., 2016; Ying et al., 2019). An in-depth understanding of how and why older people engage with technology to support PA should consider both. Greater understanding of older people's agency and resourcefulness in using technology can generate creative solutions to the challenges of healthy ageing in place (Peine et al., 2021).

This study focuses on older people who report some success in using technology to support PA. It explores the variation in their experiences, attitudes and strategies, and the contextual features that influence them. Our research questions are: (1) what can we learn from older people's experiences of using technology to support physical activity? and (2) how are these experiences shaped by contextual factors?

METHODS

METHODOLOGY

This study is informed by a sociocultural approach that attends to the meanings people give to using technology to support PA, and how this is influenced by context over time (Zittoun & Baucal, 2021). The study design draws on sensitising concepts (Given, 2008) as applied to older people and technology use, including motivational theory (Backonja et al., 2014; Yang et al., 2021), ageing as a social, discursive practice (Beimborn et al., 2016; Maxwell et al., 2021; Urban, 2017; Zittoun & Baucal, 2021), ageing and narrative identity (Butina, 2015; McAdams, 2008), models of technology use that have informed other studies of older people's use of technology (Iancu & Iancu, 2020; Pelizäus-Hoffmeister, 2016), and the wider literature on older people's physical activity and wellbeing (Batsis et al., 2021; da Cruz et al., 2021; McCabe et al., 2021; Neves et al., 2021; Roschel et al., 2020; Roy et al., 2020; Son et al., 2021).

In keeping with this sociocultural focus, a narrative research method was used (Moen, 2006). This is an interpretivist approach premised on the idea that people make sense of the world and their place in it via storied accounts that incorporate narratives about their history, identity, relationships and roles (Murray, 2018). Narratives are not regarded as factual but as social products in which people represent themselves within a social, historical and cultural context (Bailey & Tilley, 2002; Lawler, 2002). The narrative approach guides data collection strategies and analysis (Moen, 2006).

RECRUITMENT

This qualitative study capitalised on a national Australian survey entitled *COVID-19 social restrictions: impact on quality of life, mental and social wellbeing, and physical activity in community-dwelling people aged 70+ years*. The survey included questions about respondents' use of technology to support PA, and asked if they were willing to be contacted about taking part in an interview. At the commencement of this study, 51 survey respondents (of the 374 total) reported that they used some form of technology to support PA, indicated that they were willing to be approached for an interview and provided contact details. They ranged in age from 70 to 91.

We invited 24 people from this group, sampling purposively for maximum variation in age, socioeconomic status (using postcodes as a proxy), state or territory and country of birth, aiming for equal numbers of men and women. Further invitations were planned as data analysis progressed if we later judged the data from these interviews to lack sufficient conceptual depth (Nelson, 2016). Email invitations were sent with study information attached. Where potential interviewees expressed an interest, informed consent was obtained via return of email and preferences for date, time and mode of interview were negotiated by email.

Ethical approval for this study was provided by the Human Research Ethics Committee at the University of Sydney, reference number: 2020/714.

DATA COLLECTION

A single experienced qualitative researcher conducted 1:1 semi-structured interviews using an informal, conversational style of interaction with question/prompts designed to encourage reflective story-telling (Murray, 2018; Pelizäus-Hoffmeister, 2016). The interview guide (Appendix 1) was structured to generate responses in relation to key sensitising concepts. It was informed by guidance on avoiding the pitfalls of ageism in research with older people; in particular, challenging assumptions of homogeneity and recognising that ageing occurs in a social context (Stephens et al., 2018). Interviewees could choose to take part via telephone or videocall. Face-to-face interviews were not offered due to COVID-19 restrictions which, at

the time interviews were conducted (January–February 2022), were in place in all Australian jurisdictions.

Interviews were audio recorded and transcribed verbatim. The interviewer corrected each transcript while listening to the audio and added annotations to capture variations in inflection that indicated emotional or attitudinal nuances (e.g. sarcasm, humour, uncertainty, grief) that should be considered during analysis. A running analytic memo was kept in which reflections on each interview were captured, and ideas about provisional themes were developed (Saldaña, 2020).

DATA ANALYSIS

We took a thematic approach focusing on the content of each story and how interviewees seemed to make sense of their experiences (Bamberg, 2012). In the first phase of analysis, we categorised the data inductively (following ideas in the data) and deductively, using some of our sensitising concepts as a loose framework (Riessman, 2008), e.g. 'being older' and 'technology as a motivator'. Strong patterns in this data and in the analytic memo indicated the importance of agency, such as perseverance, adaption and problem-solving, experientially-derived 'philosophies of life' and hard-learnt lessons within participants' accounts. A second phase of analysis was used to identify 'lessons' that captured these patterns, paying particular attention to the discursive and rhetorical use of narrative devices such as metaphor, repeated words or ideas and how decision-making, causality and identity were presented (Bailey & Tilley, 2002; Bamberg, 2012; Lawler, 2002). Themes (lessons) were developed by moving iteratively between the coding, memos and the whole transcripts to ensure participants' comments (which are fragmented during coding) were considered as aspects of wider sense-making in context (Atkinson & Delamont, 2006; Bailey & Tilley, 2002; Butina, 2015; Riessman, 2008). Throughout, we aimed to stay close to participants' meanings to ensure that themes reflected their interpretations, including how their use of technology to support PA was shaped by personal histories (Baú, 2016).

One researcher (AH) led this analysis. A second researcher (HG) read a portion of the transcripts (which were selected for maximum variation), wrote analytic memos and engaged in discussion about the key ideas in each narrative. In phase two, a workshop was held with the whole author group acting as 'critical friends' (Smith & Sparkes, 2020) in which provisional themes were presented with associated data and interrogated by the group. This led to further refinement of the themes.

Analysis was conducted in parallel with data collection, enabling us to make a data-driven determination about when to cease interviews. We used Nelson's five criteria for 'conceptual depth' to guide this decision (Appendix 2) (2016). The conduct and reporting of this research was guided by criteria for assessing rigour in narrative research (Greenhalgh et al., 2005) (Appendix 3).

RESULTS

Seventeen of the 24 invitees took part in interviews: 10 women and seven men. Four invitees did not respond. One declined due to caring responsibilities, and two initially expressed interest but did not return their consent. Interviewees ranged in age from 71 to 82 with an average age of 75. They lived in three states/territories: New South Wales, Victoria and Australian Capital Territory. Eight lived in low-to-middle socioeconomic areas. Two were still working, and four had migrated to Australia from other countries.

All interviewees described themselves as physically active—both before and during COVID-19 restrictions—but estimated minutes of PA per week varied considerably. Based on their survey data, which included structured exercise and incidental walking, two people estimated they were physically active for 100–200 minutes per week, three estimated between 200–300 minutes, five between 300–400 minutes, three between 400–500 minutes, two between 500–600 minutes, and two reported regularly doing more than 600 minutes of PA per week. Eleven had significantly adapted their physical activities to work around COVID-19 restrictions.

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Interviewees described three main types of technology they used to support PA: 1. Devices that provide access to online classes and videos, 2. Wearable or portable devices with apps that monitor PA, providing data about incidental activity, daily or weekly goal achievement or sporting scores, and/or which send reminders to move; and 3. Smartphones with headphone capabilities that enabled access to audio—music, podcasts, audiobooks and radio—via streaming services and apps during exercise. They used these devices to support a wide range of activities including walking, running, cycling, swimming, aqua aerobics, golf and online classes in yoga, Pilates, Tai Chi, Qi Gong, generic seniors' exercise and different forms of dance including Zumba. Many interviewees had been introduced to and used digital technology extensively during their working lives.

Reported benefits included improved balance, coordination, muscle strength and overall fitness (sometimes leading to reduced medication), weight loss and maintenance, more manageable joint pain, and enhanced mental health and general wellbeing: *"It keeps me younger" (male, 75)*. Many interviewees reported multiple benefits:

> 'I get a sense of accomplishment from having done something positive in the day, but also I believe in the endorphins that exercise promotes. I think it does make you feel better.... physically stronger and more flexible, which is going to give you a better older age.... [And] I think it helps my mental health. When I didn't exercise over Christmas, I felt quite flat but when I started doing video classes again, I felt better'. (female, 72)

LESSONS FROM OLDER PEOPLE'S EXPERIENCES OF USING TECHNOLOGY TO SUPPORT PA

The following results focus on four 'lessons' derived from participants' accounts of their life choices and their advice to other older people: 1. Embrace technology, 2. Find your thing, 3. Be adaptive and 4. Resist 'being old'.

1. EMBRACE TECHNOLOGY

The narratives in our data repeatedly emphasised the contribution of technology to life satisfaction and, specifically, ageing satisfaction. This revolved around connection with family and friends; ability to pursue interests independently; access to information, entertainment and mental stimulation and enhanced physical and mental health:

> '... it certainly helps me stay physically active but I think the digital media also makes me more mentally active.... I do crosswords, I do pixel puzzles, I do brainteasers, I do all those things online every day. It does help keep the brain ticking along as it should be'. (female, 80)

Interviewees described ways technology supported them to be physically active. The most valued of these were highly individualised activity data monitoring, having entertaining audio as 'company' during exercise, and access to a plethora of online classes which were cheaper, more convenient and less threatening than attending a face-to-face class, thus increased the likelihood of 'shopping around' and trying new activities. Technology could also be enjoyable in itself: 'So I had to learn to use Zoom and gradually you get better and better at it. You suddenly discover, "Oh, you can put a different background on". And then somebody says, "How did you do that?" and you tell them. So that was fun'. (female, 72)

Interviewees' explained that exposure to technology over their life course had shaped current use, but in many cases, family and friends and sometimes health professionals had played important roles in encouraging initial or sustained use of technology to support PA. Friends had often recommended and/or jointly participated in online classes which in nearly all cases were targeted at older people. Family seemed especially important in introducing new devices and gadgets that encouraged sustained PA: 'I have a wife and a son and a daughter who are hell-bent on keeping me physically active so I would think that when any new technology comes along, they're going to say, "Use it!" or they're going to buy it and make me use it'. (male, 77). Technology also provided a means for family and friends to share interests, e.g. by comparing step counts or golf scores.

Surprisingly, most, including those who had used technology extensively in the workplace, described an historically antagonistic relationship in which they had been a 'critical, anti-computer person' (male, 81) who 'loathed' technology and felt obliged to 'grapple' with it out of necessity rather than interest or desire. Yet they were now technological converts—'I'm very fond of computers now.... I think they're terrific' (male, 81) and strongly valued technology as a tool to support their chosen forms of PA. Indeed, many said they would find it challenging to maintain their current PA without technology and would mourn its loss: 'If it was gone? I'd grumble like hell' (male, 77). However, most interviewees (excluding those with IT training) tended to describe themselves as lacking technical competence. They were 'luddites' and 'technophobes' who denigrated their expertise—'I find that Apple is good but I'm a bit stupid' (female, 82)— and pointed out that they were not as smart as their phones and were failing to use devices and apps to their full extent. One interviewee explained that he had worked with computers since he was 15 years old, yet: '... technology is moving along so quickly that, as an older person, I find it increasingly bewildering. Young people are born to it and treat it as natural. To me, it's verging on magic, even though I understand how it works'. (male, 72)

Age was generally regarded as exacerbating lack of competence, partly because of interviewees' relatively late engagement with digital technologies as part of their homelife, but also because of the physiological challenges of ageing:

> '[Things] do get harder because it does take a lot more cognitive power as you get older.... And the other thing, of course, is my eyes aren't as young as they were'. (female, 73)

> '... as you age, your coordination gets worse. To me, there's no doubt about that. And it involves other physical characteristics like strength and muscle twitch and hand/eye coordination. Your eyes don't work as well, your hands don't work as well. You get arthritic joints and so your coordination deteriorates. More than anything, that would stop me from taking up new things'. (male, 77)

Despite this, all interviewees had integrated technology into their everyday routines—'It's just part of my life now' (female, 74)— and, in some cases, were 'addicted': 'I actually I go into withdrawal syndrome if I can't use any of my computers' (male, 81). Many were also advocates who promoted technology-supported PA amongst their peers, and espoused it as a tool that could enhance many aspects of life for older people: 'You've got to grasp it!' (male, 75). This integration was regarded as a necessity for dealing with the impacts of COVID-19:

> '... I think this pandemic has forced a lot of people older than me ... people in their 80s and 90s, it's forced them into a technological world... Essentially it's very, very difficult today not to have a smartphone because you need it to be able to read the QR codes and to log on and to log off just to live your normal life, to be able to go shopping to buy food, buy petrol, buy anything. You've got to be able to use technology'. (male, 77)

Contrary to the common dichotomy of technology versus nature, several interviewees described how using technology helped them 'commune with nature' by nudging them to leave the house and walk for prolonged periods, and by enhancing those walks via background music, podcasts and audiobooks and, in one case, photographing clouds and flora:

> '... when I walk I often listen to music or a story, an audio story.... if you put a story on or music, then you just step it out and suddenly "Oh!" you're home.... It's more enjoyable. I look forward to going for that walk to listen to some story I'm listening to.... So that helps to keep me motivated'. (female, 72)

Dealing with data

Interviewees described how they found PA data produced by wearable devices to be motivating, giving them a sense of achievement and validation. This reliable data encouraged them to walk, cycle or run further in order to meet goals in distance, intensity or other aspects of form (e.g. cadence in cycling as measured by a Garmin watch): '... if you're out on a long-ish run, it's an encouragement perhaps to do the extra three or five kilometres when you're feeling a bit

weary… I'd say it was a motivational factor' (male, 75) and 'I think the thing about the circles on the Apple watch is you really want to complete those circles before you go to bed'. (female, 71).

But there were marked gender differences in how they engaged with this data, possibly because our male interviewees tended to be engaged in more competitive activities (golf and competitive cycling and running). For the women, data was used more as a rough affirmation they had 'done a good job' and they expressed a lack of concern about failing to capture the entirety of their PA:

> '[My Apple watch] tells me how many kilojoules I've used, how long I've been working. What else does it do? There's about four things at least but I don't find them terribly important except after a week or so when it tallies them all up and tells me what a good girl I've been'. (female, 82)

Whereas most of the men who used wearable devices curated their data, often meticulously, so capturing PA details was more important:

> 'My watch confirms how far I've run, how fast I'm going at the time, what my average pace is at the end.... And it keeps a record. If I didn't want to keep a spreadsheet of what I've been doing, the watch keeps an internal record of what you've been up to, but I've got a laptop … and I record things like where, who organised an event, how far, how fast, and position in finishing'. (male, 75)

For a few, this PA data feedback loop shaped how they organised their daily activities:

> 'The only time I don't have my phone on me is when I'm in the shower, so every step I take is recorded.... If I've got some shopping to do or I need to go to the pharmacy … I work out the steps and a way of getting steps through all the chores I've got to run. Then I'll check on the phone, as I'm going, to make sure that I actually haven't miscalculated'. (male, 72)

Thus any loss of PA data for these interviewees was '*very inconvenient*' and when it occurred it triggered a crisis response: '*Oh my God, I'm missing out on something here!*' (male, 71).

The limitations of technology

Accounts of how technology was used to support PA highlighted limitations as well as benefits. Despite being 'smart', devices were poor at incorporating contextual information that affected PA. For example:

> '… [My Apple watch] doesn't take into account that today is a 40-degree day and… it's not safe for you to walk when it's 40 degrees and you are in your 70s. It doesn't do that corresponding collation stuff. It's a black and white measure. Yeah. That makes me cross … I just think, "Mm, it'd be nice if it just said, 'You did well considering it was 40 degrees outside. Congratulations!'". Because it knows the temperature … so it could do it. It's just not something necessarily anyone in Apple has seen as important'. (female, 73)

Some used dual forms of technology complementarily to support PA, especially where their device failed to address a need, as in the quote above, or did not provide data that was considered to be reliable:

> '… the cheaper version [of the Fitbit] I got has worked fine, but I don't trust its blood pressure so I have a blood pressure machine. And if I went with what's on my watch, I'm brilliant. But my machine tells me the truth.... So I don't trust that, but I do trust the steps and the heart rate on the Fitbit. They're pretty good'. (female, 72)

In interviews we asked about potential tensions between technologies regarding PA, e.g. does social media lure us into sedentary behaviour, while activity monitors create incentives to get moving (Gao & Lee, 2019)? However, this did not seem to resonate for most interviewees and only two were able to give an example.

2. FIND YOUR THING

It was widely acknowledged that people need to find forms of PA and supporting technology that suit their individual interests, preferences and capabilities. PA as viewed as the starting point:

> 'I was not engaged physically when I was younger.... I did anything to avoid having to play sport at school.... I didn't have particular physical skills. I didn't know how to throw a ball.... So I just didn't engage physically really, well, until I did yoga. I started doing yoga where they don't do this, "Oh, you're hopeless. You've got to be better than everybody else" .... Mostly, you're doing the best you can. And that really made a difference to my attitude to physical activity.... You really just have to find your thing'. (female, 72)

While several interviewees had found their thing many years ago, most of those who attended online classes or videos, or used digital audio resources, had followed more recent recommendations from family, friends or health professionals, or had found them via internet searches or through trusted ageing-related organisations. Interviewees found credible health advice via authoritative websites but applied different criteria when determining whether a PA class or resource found online was worth pursuing. Often, an activity needed to be tested experientially to see how it felt:

> 'I guess I will try the activities regardless of who's put them out and then I think "Yes" or "No".... So, I saw one where you did all this rolling round with a pool noodle and I'm, "I'll try that." [So I did, but] I thought "That's so painful, they've got to be kidding". I just eliminated that one.... I try some of them I think might be good, but .... if it hurts you or it's not your cup of tea, then don't bother'. (female, 72)

Those engaged in online classes or who used videos stressed the importance of exercise that targeted older people's abilities and needs:

> 'They don't have unrealistic expectations like a lot of gym classes I used to go to. It's, "Oh, you can do it. You can do it. Just push yourself." They don't do that, you know? They say, "Go as far as you can" or if you're putting your arm up the wall, "put it up to your level of comfort, don't force it." And this is what seniors want, not getting shoulders with torn muscles and those sorts of things'. (female, 73)

Consequently, there was a preference for older instructors and dedicated classes for older people which are more available online:

> 'I did go to a yoga class at my gym, but it was all young people ...and I didn't go to that for very long, partly because I was ignored by everybody, and partly because I felt like a klutz. Yeah. Whereas when you're with people your own age, it doesn't matter'. (female, 72)

Online classes were preferable to face-to-face classes when the threat of exposure to COVID-19 loomed and had other benefits, but there was general agreement that they were not as successful at facilitating social connectivity or accurate instruction as face-to-face classes:

> '... it saved travelling and ... you could do it in your own home. You didn't have to particularly wear gym gear.... The disadvantages of the Zoom classes were that you just didn't get together with that lovely group of people. We used to go for coffee after the class.... And even though I was seeing those people with the Zoom classes, it certainly wasn't the same as going downstairs and all sitting around and having a coffee'. (female, 73)

> '...it was much better than not doing anything, so I got to like it, but it's not as nice as going to a class.... the teacher is really switched on and everything, but it's much easier for her to demonstrate something to me in a class ... if we're not doing something correctly she'll pick it up very easily, whereas online she can't see me as well'. (female, 71)

And there was a suggestion that lack of observation might lead to lack of effort in PA:

> '... sometimes I was very happy I wasn't being observed.... But really I think it's good to be where people can actually see you.... Otherwise, it lacks that imperative to try and do better, because no one's watching you'. (female, 74)

A few pointed out that pre-recorded video classes had unique benefits such as flexible timing, the ability to pause and review an instruction or take a break, and reduced threat of social embarrassment:

> '... it's a more supportive environment. You can do it without anybody watching you and telling you how hopeless you are. Or you can try something out by yourself.... that's probably effective, to be able to watch and practise in your own space'. (female, 72)

3. BE ADAPTIVE

Adaptivity was a prevalent theme and a conscious stance for many interviewees: 'You have to modify. Change is the only constant in life' (male, 73). Accounts of why interviewees had taken up particular types of PA revealed considerable adaptation in response to changing physical abilities and needs, involving revised activities and adoption of technology to support them:

> 'About four years ago I had to have a total knee replacement for both knees because I used to do a lot of running.... So I had an operation to replace my cartilage with prosthetics. Since then I've taken to walking regularly. That's helped my fitness a lot because, well, before I had the operation, I could barely walk. Anyway, I'm well over that. Now I can walk 10,000 steps, not a problem at all....I set myself a target of how many steps I'm going to do each day. My phone helps me keep track of it'. (male, 72)

Despite a keen awareness of reduced capabilities, interviewees found ways to maximise healthy activities. This required tenacity as well as creativity in how they adapted online programs to accommodate various 'quirks and pains': 'My routine is to do my own version of yoga because I've got quite a lot of problems with osteoarthritis'. (female, 82)

> 'I can't do everything that they put up in each program. I just do what I can and I don't force my back into anything that I know's going to hurt it. But there's a lot I can do ... so I'm quite happy with that arrangement.... It's a limited field I play in but I can still play so that's what I do'. (female, 80)

Adaptation was frequently mentioned in relation to COVID-19 restrictions which meant that many interviewees who had 'found their thing' were unable to continue with established patterns of PA: 'I had a fairly balanced lifestyle. Then of course COVID came along and stuffed the whole thing up'. (female, 74)

Those who were able to continue with their usual forms of PA, such as cycling, running, walking and golf, were obliged to make some changes to minimise physical contact, but the most significant impacts were closed gyms and face-to-face classes which obliged interviewees to find online equivalents or, in some cases, to advocate for and support their regular classes to move online. Some exercise instructors in online classes facilitated adaptation by identifying workarounds for gym equipment:

> 'I made do with makeshift equipment, which [the instructor] encouraged. So yes, I've got a couple of olive jars filled with water and a two litre milk bottle filled with water as my weights. And I haven't bothered to get proper weights because they seem to be quite adequate'. (female, 73)

4. RESIST 'BEING OLD'

There was a clear differentiation between 'getting older' (an inevitability) and 'being old'—enacting the social stereotype of 'an old dear' and 'giving up' in relation to PA and engagement with life in general. Accepting the realities of ageing and working within those limitations, while simultaneously refusing to give in to them, appeared to be at the heart of success in staying active and, in many cases, in adapting to technology-supported PA: 'Acknowledge your limitations but don't let your limitations stop you from doing certain things'. (male, 77)

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> 'I can't get younger, but I can perhaps stave it off a little bit by being physically active... There's a number of things as you get older that you can't do quite as well as you used to.... You just have to live with it.... I do find older people in my age group can be quite infuriating when they don't take up physical activity, when they won't use technology. I see too many people in my age group are ready to sit in God's waiting room, which is a bit sad. Because I'm going to go sooner or later - I might as well enjoy it while I can'. (male, 75)

There were many accounts of seeing peers lapse into physical decline which acted as an incentive to stay active:

> 'I feel very lucky to be able to exercise.... my two best friends from school days both have physical issues ... and they can't do what I'm doing.... And my husband too ... he's very limited in what he can do and so he didn't ever get involved in the video classes. He's just sort of let that go. So I guess that's more motivation for me to keep going, because I can see other people have become ... incapable of doing what I am still able to do'. (female, 73)

Similarly, observing peers' refusal to engage with technology seemed to cement interviewees' desire to make the most of it themselves:

> 'I get frustrated when older people say they don't want to learn technology and they don't want to understand it. ... You have to have some sort of knowledge about all things connected to the internet really. It's all digital now.... I don't think that people realise just how important it is that you keep up with technology if you can'. (female, 72)

There was a refusal to slip into 'being old' even when confronted with illness, injury and painful conditions such as osteoarthritis, osteoporosis, sciatica and other forms of knee and back pain: 'I ache in places I didn't even know I had before. Backache is constant.... but it's just whether you give it into it completely, and I refuse to' (male, 71). And PA was an integral part of this resistance: 'I'm really aware that I need to stay fit ... I mean, osteoarthritis is such a bastard, if you don't move, your buttocks seize up' (female, 71).

Interviewees frequently expressed a sense of surprise at their chronological age, explaining that 'I don't really see myself as old' (female, 74):

> 'I had to have a couple of days in hospital last year and the nurse said to me, "We're going to send you up to the geriatric ward now." And I said, "Why the geriatric ward?" And she said, "Well, you're a geriatric." And I said, "Oh, okay." Because I hadn't considered myself as geriatric until that time'. (female, 80)

And they refused to slide passively into stereotypical old age:

> '... I don't want to walk past a shop front, look in the shop window and see a reflection of ... someone I don't want to be. I don't want to say, "Who is that person?" ... I want to grow old disgracefully. I want to go kicking and screaming into that grave, I don't want to go gently'. (male, 71)

Physical activity philosophy

Much of this determination to stave off 'being old', and thus to maintain PA and support it using technology, appeared to be underpinned by a personal philosophy of active living which encapsulated interviewees' core beliefs about exercise and healthy ageing. Examples included: 'Keep active because if you sit still you ossify or die' (male, 75); 'I just like to make sure that I keep going. In fact, that's my motto, keep on keeping on' (female, 82); 'If you don't use it, you lose it' (male, 77); and 'Giving up is not an option while you're alive' (female, 73).

These pro-PA philosophies seem to drive a clear sense of purpose and helped combat the temptation to avoid exercise:

> 'I understand that I have to get up and go for a walk, but finding the motivation to do it is another matter.... I do it, but it's not something I enjoy. I don't come back going, "Yoo-hoo! Isn't that fabulous!" It's about knowing that if you want to be reasonably

> healthy (and at my age that's all you can be) then you have to do it...So keeping going is important.... Even if it's not as well or it takes longer or whatever, you've got to keep going'. (female, 73)

THE CONTEXT OF USING TECHNOLOGY TO SUPPORT PHYSICAL ACTIVITY

Two aspects of context were especially important for framing the findings above. The first was interviewees' day-to-day social experiences of being an older person. Familiar themes of ageism in workplaces and the community at large, including feeling less valued and relevant were prominent (although not universal), as were experiences of being patronised:

> 'You're certainly less visible in society as an older person, as a grey head. People call you "dear" which annoys me terribly.... I think you can see in the current aged care debacle that society ... doesn't value its older members'. (female, 73)

Anxiety about social exclusion caused by ageing was evident, acting as a motivator to stay as active and engaged as possible:

> 'I've got friends that are 10, even 20 years younger than me, but that are already 10 years older than me in their fitness levels, and in their mindset, you know? And I don't want to be like that. I really don't. I'm afraid of getting old'. (male, 71)

However, for several interviewees, experiences of ageism were compounded by experiences of sexism and racism, 'This society is a discriminatory society, especially against seniors, and then in my case it becomes a two-pronged or double whammy because I'm... My skin colour is not white' (male, 73).

Impacts of the global COVID-19 pandemic had exacerbated the challenges of ageing. Many interviewees found social restrictions 'tough' and 'terribly isolating' and had a new appreciation for the lifeline that technology provided in helping to combat some of the loneliness and mental health threats of social distance and loss of routine: '... it was through the phone and the computer systems that I was able to relate to people' (male, 81). Yet, in many cases technology was unable to off-set anxiety and loneliness; loss of meaningful daily structure, socialising and family roles; and deconditioning and other negative impacts on PA, e.g. loss of social contact for those who liked to walk, run or cycle with friends or family: 'You feel lonely. You are alone on the road' (male, 73). The pandemic had also exposed attitudes that exacerbated the feeling of being devalued:

> 'I think the virus has made it worse.... older people have become almost dispensable. So you can get rid of them. If I look at the way governments have... You had the NSW Premier going "Bring it on" ... and the number of elderly dying, particularly in nursing homes ... has been appalling. And there's been, from my perspective, no balanced approach against opening up the borders – because the tourism needs it.... but we've had so many deaths and nobody cares'. (female, 73)

DISCUSSION

Findings from this narrative study exploring older people's experiences of using technology to support PA challenge ageist generalisations that older members of our community are 'onlookers' in society with declining skills, agency and vitality, who lack competence in using technology (Maxwell et al., 2021). Our interviewees were highly engaged in living active, resourceful lives despite the challenges that many of them faced. They differentiated between 'getting older' and 'being old'. The former was an inevitability that they were striving to manage, while they rejected the latter as a stereotype they chose not to enact. These findings echo other studies in which people describe how they navigate dualities in their experience of growing older. For example, by proposing 'rules for ageing' that both counter and accept the impacts of growing older (Furstenberg, 1995), and by balancing potentially contradictory experiences of ageing such as strength and weakness, reconciliation and regret (Fischer et al., 2008). Similarly, Nolan and Scott's survey analysis identified coexisting narratives of progress and decline in ageing (2009). These dualities can be exacerbated by technology which itself offers a 'double-edged

sword' by increasing connectivity and access to services while potentially overwhelming users with information and highlighting their limitations (Tong et al., 2022).

Technology was embraced as a strategy for staying physically (and mentally) active and refusing to 'be old'. In common with other studies, the highly individualised use of technology was motivated by a desire to age well (Miller et al., 2021), and to resist loss of independence and identity (Brittain et al., 2010; Lopez et al., 2021; Rodriguez, 2016). Despite the importance of 'finding your thing' (i.e. identifying the form of PA that suits you best), interviewees were highly adaptive, changing PA routines and uses of technology to cope with changing bodies and changing circumstances, including COVID-19-related impacts. This highlights how some older people are able to optimise their use of resources and opportunities to stave off the worst threats of ageing while many others struggle (Furstenberg, 1995; Torres & Hammarström, 2006). It is not surprising that our interviewees fell into the more active, adaptive and resilient group given that we recruited older people who were already using technology to support PA. Importantly, all had developed identities as active adults which helped them carry regular PA into older age, bolstered by philosophies that affirmed their PA choices and motivated them to stay active.

Most interviewees had histories of significant workplace engagement with technology. However, many who shared examples of using technology effectively to support PA also described themselves as technologically limited or incompetent. One explanation for this apparent contradiction is the dominance of 'deficit discourses' around ageing which emphasise loss of capacity (Dionigi, 2015; Vines et al., 2015). Ageing is a social practice, constructed and performed through social interactions (Urban, 2017). Technology has 'colonised'' our social lives and is now very much a part of this practice (Pelizäus-Hoffmeister, 2016). Ambivalent or apparently paradoxical feelings may be a natural response to being an older user of technology in an ageist society (World Health Organization, 2021). Evidence for this can be seen in other studies in which older people 'seemed to want to disregard their limitations even while speaking about them' (Torres & Hammarström, 2006) and reported simultaneous feelings of enthusiasm and apprehension about technology (Vaportzis et al., 2017). Perceptions that technology is designed for and by young healthy people may exacerbate this apprehension (Weber et al., 2021), as may 'stereotype threat' where fear of conforming to a negative stereotype can undermine competency (Lamont et al., 2015). Some argue that technology is itself inherently paradoxical, for example, functioning as both a mitigator and exacerbator of vulnerability (Yap et al., 2021).

Of particular concern was the intersection between experiences of different forms of discrimination and COVID-19. The World Health Organization warns that ageism compounds threats to health and wellbeing of other forms of social prejudice and institutional discrimination (2021), while Rosen argues that COVID-19 has acted as 'an x-ray of society', exposing deep-seated prejudices and structural inequities with deadly effects on the most vulnerable members of our communities (2020). No interviewees argued that feeling devalued by society had directly impacted their sense of identity or desire for self-care via PA, but it seems likely that such feelings could erode confidence, self-esteem and sense of belonging in the wider community which could, in turn, chip away at resilience.

IMPLICATIONS FOR ENCOURAGING TECHNOLOGY-SUPPORTED PHYSICAL ACTIVITY

Trusted relationships and support systems

In common with other studies (e.g., (Moore et al., 2021; Peek et al., 2016; Perracini et al., 2017; Vereijken & Helbostad, 2018)), we found that family and friends often encouraged interviewees to use technology to support PA. They modelled technology-supported activity behaviours, introduced new devices and gadgets that encouraged sustained PA, recommended or joined them in online classes, shared activity data generated by smartphones and wearables, and provided informal IT help. Future research could develop and test strategies for leveraging the potential of family support and peer-to-peer engagement.

Some interviewees had been prompted to use technology to support PA by health professionals. Others note that health consultations with GPs, physiotherapists and many specialists provide unique opportunities for authoritative, individualised encouragement regarding PA (Brickwood

et al., 2019; Hassett et al., 2020; Levinger & Hill, 2021; Perracini et al., 2017). Person-centred dialogue in routine health consultations about PA benefits and options could include advice about health supporting technologies and trusted online classes and resources, many of which have been developed recently in response to COVID-19. As one of our interviewees put it,

> '... talk about the benefits of exercising and just encourage people to explore what they can do.... encourage organisations that support the elderly to maybe get somebody to produce videos or do Zoom classes, because having access to a trusted source of online stuff would be good too'. (female, 73).

The value proposition of using technology

Technology alone seldom changes PA (Gao & Lee, 2019); it must demonstrate value in order to motivate people to use it. But features that designers regard as useful may not add value in a way that resonates with older people, most of whom are not 'digital natives' like their younger counterparts (Moore et al., 2021; Ranieri et al., 2021) and often reject health and PA-related technologies due to poor integration of their preferences and perspectives (Harrington et al., 2020; World Health Organization, 2022). This may be partly because these technologies target individual accomplishment and productivity, neglecting important motivators for many older people such as social connectivity or contributing to society (Backonja et al., 2014). Our findings reinforce calls for an approach that supports older people to use technology creatively to enhance healthy ageing and life satisfaction, rather than framing ageing as a problem that can be mitigated with technology (Dionigi, 2015; Morgan et al., 2019; Satake et al., 2021).

Yet how to achieve such an ambition is unclear (Gao & Lee, 2019). Person-centred technology training and one-on-one support, especially peer support, are identified as mechanisms for empowered use of technology (McCabe et al., 2021; Miller et al., 2021). We also know that greater personalisation can foster autonomy (Mehra et al., 2020; Ng & Ho, 2020), tools for connectivity can support psychological wellbeing (Ranieri et al., 2021; von Humboldt et al., 2020), while technologies that incorporate behaviour change techniques are easy to use, and provide accurate activity data may be better at supporting motivation for PA (Aldenaini et al., 2020; McGarrigle & Todd, 2020). But PA-related technology still misses the mark for many older people (Vereijken & Helbostad, 2018) and can have negative effects such as highlighting impaired physical and cognitive capacities (Andrews et al., 2019; Iancu & Iancu, 2020; Pirhonen et al., 2020), or prompting shame at failing to meet activity goals (Urban, 2017). Given that ageism can be perpetuated in technology design (World Health Organization, 2022), ultimately, increasing the value proposition of using technology to support PA for healthy ageing will require involving older people (from diverse cultural backgrounds (von Humboldt et al., 2020)) as co-designers engaged in the development and testing of these technologies (Haase et al., 2021; Harrington et al., 2020; Vereijken & Helbostad, 2018) and in the design of programs that can support older people to optimise their use of technology for PA (Vargemidis et al., 2020). There is also an ethical and pragmatic imperative for older people and organisations that represent them to participate in wider processes of social change such as research and policy development (Beimborn et al., 2016; Thomas et al., 2020; Zittoun & Baucal, 2021). As Zittoun and Baucal argue, older people have,

> '... the longest life experience, and are likely to remember the past, to have learned from the changing world, and from their own course of life. They may have much to contribute to our current and future situations, and it may be essential for our societies to rely on their experiences and philosophies ...' (*2021*).

STRENGTHS AND LIMITATIONS

Qualitative research is best suited to producing new and deeper insights into older people's relationships with PA and technology (Morgan et al., 2019; Yap et al., 2021). Older people contribute uniquely to this research, drawing on a longitudinal view of personal transition and cultural change (Zittoun & Baucal, 2021) to provide tried and tested strategies for managing the challenges—physical, psychological, cognitive, social and environmental—of ageing in contemporary society (Beimborn et al., 2016). We sampled purposively to capture maximum variation within a sample frame of people who reported using technology to support PA.

This means our data reflects considerable diversity, but only among a group of people we would expect to be engaged with both PA and technology use. Their stories help us understand what works for this population, and have wider implications, but do not necessarily provide insights into how to engage older people who are wary of or sceptical about PA or using technology, or who face greater hurdles in doing so. Lastly, findings from narrative research are highly context-specific. This study enriches our understanding of how older people use technology to support PA within contemporary Australia, but may have limited transferability to other settings and time points (Riessman, 2008). Restrictions related to COVID-19 affected attitudes towards and uses of technology, and it not known to what extent these will evolve or endure.

CONCLUSION

Interviewees perceived technology as a facilitator and motivator for PA. Despite some self-disparagement in their technological skills, they used a variety of technologies creatively to access and enhance PA, driven by philosophies of active living. Most reported navigating challenges associated with ageing in a discriminatory society, compounded by COVID-19 impacts. They suggested four 'lessons': 1. Embrace technology, 2. Find your thing, 3. Be adaptive and 4. Resist 'being old'. Leveraging social and health relationships and strengthening the value proposition of technology for older people, *with* older people, may encourage their use of technology to support PA.

ADDITIONAL FILES

The additional files for this article can be found as follows:

- **Appendix 1.** Interview guide. DOI: https://doi.org/10.5334/paah.221.s1
- **Appendix 2.** Determining conceptual depth. DOI: https://doi.org/10.5334/paah.221.s2
- **Appendix 3.** Research rigour. DOI: https://doi.org/10.5334/paah.221.s3

ETHICAL AND CONSENT

Ethical approval for this study was provided by the Human Research Ethics Committee at the University of Sydney, reference number: 2020/714. All participants gave informed consent to take part in an interview via an online survey and then verbally at the beginning of their interview.

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COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS

AH designed this study, led the data collection and analysis, and drafted the manuscript. HG contributed to data coding. All authors took part in the data analysis workshop and subsequent discussions about emergent themes. All authors reviewed and edited the manuscript and approved the final version.

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