“Building the threads of connection that we already have”: The nature of connections via technology for older people

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Running head: Connections via technology

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Abstract

Objectives: The social connectedness of older people is of increasing concern. Technology has been suggested for enhancing social inclusion. This study aimed to explore the nature and quality of connections via technology.

Methods: Qualitative exploration of experiences, stories, and needs were undertaken through semi-structured interviews with older (7) and middle-aged (3) adults with rich experience of connections via technology in Australia and England. Core aspects of connections through technology were constructed through interpretive description analysis.

Results: Four key aspects were: 1. *The calibre of connections:* descriptions of a range of subjective quality of connections and characteristics of good connections; 2. Experiences of poor connection (*mis- and dis-connection*) including descriptions of experiences creating isolation; 3. *Reasons to connect* described the purposes of technology-based connections including connecting with others, themselves and places important to them; 4. *Making connections work* described active strategies to enhance connection.

Conclusions: Using technology is part of the social engagement of many people. Considering the related feelings of connection and support strategies and needs could enhance future research and practice with older people.

Clinical implications: The different characteristics and potential positive and negative experiences of connection via technology need consideration in measuring social isolation and supporting older adults.

Introduction

Isolation in later life affects one-half of older people and has significant detrimental effects on health and mortality, making it a public health priority (Gerst-Emerson & Jayawardhana, 2015). Social isolation and loneliness are related constructs capturing respectively, the objective state of having little or reduced contact with other people, and the negative emotional response to having subjectively insufficient social connection (Ong, Uchino & Wethington, 2016). Evidence based approaches to promote health and wellbeing through combatting isolation involve supporting connection to communities, social groups and valued people and places (e.g. Haslam et al., 2016). Maintaining social group memberships and perceiving oneself as connected rather than isolated or lonely is significantly independent of health and frailty measures related to longer life and improved health and wellbeing across a number of robust studies in different countries (Haslam et al., 2018). Being mobile within the community and maintaining lifespace (geographic area in which activities are conducted) is also related to physical and mental health and wellbeing outcomes for older adults (De Silva et al., 2019; Polku et al., 2015). Maintaining social connectedness may relate to mobility within communities, and also requires time and energy for participation in roles and activities, all of which may be challenged by illness or role cessation in later life (Morris et al., 2014).

Technology use is often discussed in relation to isolation and connectedness. Everyday technologies used for social purposes include standard cellphones, smartphones, computers, tablets, videocall platforms, email, messaging, social media, and online communities. Emerging technologies for social connection include telepresence robots, avatars, virtual reality and virtual worlds (Baez et al., 2019). There is variable evidence about the usefulness of technology for social connection for older adults. Recent work suggests that in terms of

supporting connection within families, telephone, emails and video did not achieve the same emotional impact, in terms of loneliness as face to face connection, however they did provide functional connection (Burholt et al. 2020). Some research suggests that online and social media technologies may increase social isolation (Best et al., 2014; Boulianne, 2015). At the same time, similar technologies have been identified as enabling social connectedness, including providing ways to expand social opportunities and reduce feelings of isolation (Chopik, 2016). Understanding impact and pathways to objective and subjective connection may be particularly pertinent when people face barriers to continuing usual community and social participation.

Older people represent a group with proportionally lower uptake of technology, including online social technologies, for various reasons. This has led to concerns that older people may become marginalised and excluded from services and opportunities that are available only through these channels (Helsper & van Deursen, 2015). Traditional ways of understanding and measuring social networks, social isolation and loneliness, have reflected the objective (for example, numbers of interactions, numbers of people providing support) and subjective (for example, feelings of loneliness, feeling unsupported) aspects of these constructs (Cornwell & Waite, 2009). The growth of technology-based social interactions in daily life and the introduction of technology-based interventions for older people with measurable impact on measures of loneliness, social isolation have been documented (e.g. (Khosravi & Ghapanchi, 2016). The current pandemic and related lockdowns mandated use of remote ways of social connection, and there is suggestion that meaningful, identity-related connections can be positive, regardless of medium (Haslam, 2020). There is, however a large body of work on the potential for technology through form, function and interaction, to impact on the experience and outcomes of its use (Lidwell et al., 2010). The nature of connecting via technology for older adults within daily life remains poorly understood and it

is unclear whether these connections are experienced and valued in the same way as traditional connections. An indepth exploration of the range of ways that older people experience technology-based connections to people and places was required. This study aimed to explore the nature of quality of connections to people and places experienced via technology for older people.

Methods

A qualitative phase was undertaken within a larger participatory study design (Muller & Kuhn, 1993). The overall study was guided by lived experience experts with relevant expertise in using technology for connection including older people and people using technology as their primary form of connection due to health issues. Participation within the study was separate from reference group guidance, and separate recruitment occurred for each phase. This phase was underpinned by Interpretive Description (Thorne, 2016), and narrative approaches (Josephsson & Alsaker, 2014), in that open exploration of a range of experiences and stories were sought, along with exploration of the needs and strategies as experienced. These were undertaken to inform general understanding of the experiences being studied and also to be applied within subsequent stages of the study and in practice (Thorne, 2016). The interview guide and analysis were structured to center key stories and experiences that related to connection (Josephsson & Alsaker, 2014). In addition, the applied experience of the research team in the clinical and technology fields were not bracketed. Rather, this was used during the development of the study and during analysis to build understanding of the concept being studied, while leveraging the team's understanding of what the issues might be, and which stories shared could illuminate or challenge what was currently understood 'in practice' (Thorne, 2016). The study received ethical approval from

the relevant human research ethics committees at the University of Queensland (#2019000641) and University of Exeter (eCLESPsy001325 v3.0).

Participants

For this phase, people who considered themselves to have rich insights into the nature of connections via technology for older people were sought to participate in semistructured interviews about their own experiences. Participants needed to be adults, able to provide consent and be able to participate in a semi-structured interview in English via a medium they were comfortable with (face to face, telephone, videoconference), and be willing to have their interview audio recorded. Recruitment aimed to involve people with a range of relevant experiences and perspectives to enable open exploration of the topic. The researchers therefore held an open concept of who may be rich sources of relevant experience and information, leaving it to potential participants to respond to the call for people with experiences related to connection via technology for older people, without imposing age or other related exclusion criteria. Once interviewing started, purposeful recruitment of participants with experiences or characteristics not yet heard from was attempted. Saturation of findings was not an aim of this preliminary phase and recruitment was regarded as completed after a range of experiences were elicited within a practical timeframe.

Procedure

Information about the study was made available through community and research groups, technology interest groups, seniors groups, newsletters and social media in Australia and the United Kingdom. Interested potential participants emailed or called researchers, any questions were answered, eligibility was confirmed and the interview was arranged. Prior to the interview, participants received a written information sheet, had the opportunity to ask

questions, and, if willing to participate, provided written consent. Semi-structured interviews were conducted in Brisbane, Australia and Exeter, UK, using an interview guide to facilitate consistency (appended). The guide shaped discussion about the nature of connections to people and places in general, their own experiences with technology-based connections, and perspectives on current and future technology development. Data collection took place in 2019. Interviews were transcribed verbatim.

Data analysis

Interviews were conducted and transcribed and read by members of the research team during the data collection process. This enabled purposeful recruitment of participants with different experiences or perspectives, and continued exploration of issues raised within interviews with subsequent participants. Analysis involved reading and rereading transcripts by the research team to draw out core concepts raised within them, particularly connections via technology. An initial description of nine key aspects was developed by one member of the research team (JL) based on all transcripts. These were discussed with the research team, alongside current practice issues and concerns and contextual information, and organized into five core ideas which focused around the nature of good connections via technology. Another team member (SA) independently reviewed and coded four transcripts for core meaning. These approaches were brought together through discussion, sorting, reflection and consensus and built into four key aspects of connection described by the participants, which built an understanding of connection that could be applied in the clinical and technology contexts.

Findings

Ten participants who considered themselves to have relevant lived experience in relation to older people's connection through technology completed semi-structured interviews.

Interviews were conducted face to face (n = 7) or via videoconferencing (n = 3). Demographic details are in table 1. Five participants lived in the United Kingdom and five lived in Australia. Most participants (7) were older adults. Others identified that they had relevant lived experience of connections via technology in relation to disability/illness and connection in rural/regional communities with unequal connectivity.

Participants described using a range of technologies to connect to people and places. These included telephones, internet, social media, video conferencing, messaging and social apps. Participants described a range of technology hardware including desktop computers, laptops, tablets, smart phones and landline phones. Many used combinations depending on their location and the interaction. Most participants reported using technology daily or multiple times per week. A few (3) described themselves as being enthusiastic about technology, a few were reluctant users of technology (2), *"I think they frogmarched me into the … shops and said Mum you need an iPhone"* (Participant 4), with the remainder (5) representing an intermediate view of technology use, "*I mean there are people who are a lot more adept with smart phones and wristwatch technology …, that kind of thing, that I know is out there, but I don't necessarily link with that"* (Participant 9).

Four key aspects of connections via technology were constructed from the data (Figure 1). Verbatim quotes are used to illustrate the described experience.

1. Caliber of connections

A key aspect in describing the connections achieved via technology from all participants was characterizing the quality of the connection experience. Participants indicated that all technology-based connections were not experienced equally, but rather represented a range of

qualities. There was some hierarchy of the caliber of connections with some being described as allowing a feeling of genuine connection to others, others an acceptable feeling of connection, and yet others leading to negative connection experiences. Overall the positive experiences, along with the feeling of the ubiquity of technology, meant that people accepted these connections as an expected part of their life, as described by Participant 9 "*I mean it's good, it's, and it's the way of the future and … you know, you can't stop it".*

For all participants, there was consensus that technology mediated connection to people and places was inferior compared to in person connections or visits, as explained by Participant 2

> *Never is it ever better than being in the same room as somebody. No…Because I think seeing someone in the flesh allows you to feel how they feel and to perceive what they're thinking in a much better way than if you do on a screen.*

Participants strongly preferred face-to-face connections. Alongside this view, however, was the reflection that face-to-face connections or community access may be limited at times, or for some people. In these situations, technology-based connections took on heightened value and importance. Participants described a range of experiences that had made face to face connections a less accessible option including health, energy levels, community accessibility, geographic distance from key people (e.g. family moving away), and a desire to connect with a network beyond that locally available. Participant 10 related the impact of illness on her ability to access regular face to face connections.*" When you're ill, and sort of housebound a lot, you actually lose that every day [interaction]."* Technology could enable essential emotional support to be available, as described by Participant 4 "*One or more of my sons*

calls me via What's App every day. They are scattered around the world all four of them. My husband is dead. Without that connection to my sons I would give up."

Some participants indicated that the modern world also meant that technology-based connections had become required or expected for continued participation in family, community and global roles. This meant that even if they did not experience a subjective feeling of connection, or even if the feeling of connection was largely negative, they felt that they were required to maintain this avenue of connection, as described by Participant 2 "*It's not how I like to communicate. But you have to fit in to a certain extent but and I am probably quite stubborn and quite old fashioned."* Conversely, the majority of participants also identified that technology-based connections, despite any problems, had provided opportunities for closeness, expanded networks or interaction that would not otherwise be possible: *"You start to feel limitations of the technology but at the same time there's a real connection between people globally. It would be difficult or impossible through conventional technology"* (Participant 6).

Characteristics of good connections

When identifying high and low caliber connections, participants identified key characteristics of good connections. These encompassed a broad range of attributes from the technical to the emotional. Across participants, a good connection was described as:

Close to 'real' connections Participants described high caliber connections as feeling as close as possible to an in-person experience. Identified aspects included high-quality sound, instantaneous and clear pictures, and seeing body language and context. Participant 1 described the impact of videoconferencing on being able to provide support to a remote family member "*You could see her, literally see her eyes. And she could see us, being calm, or whatever we needed to be you know. Yeah, I think it saved her bacon basically."*

Good connections helped users to have a window into their communication partner's situation, emotional state, and life, and this deepened the experience of connection. This helped people feel the experience was subjectively similar to the 'real' thing. Participant 6 described the value of technology-based connections with an online support group establishing new connections:

> *You can still visually see each individual and you've got more of that communication feedback than just the audio component. And you also get to see into people's private home, as it were. You get an understanding of how they live and, …their routines as well, what's happening in the – what the environment is that they're in.*

Emotionally satisfying and supports wellbeing High caliber connections were described as helping people feel part of their network, reducing feelings of isolation and loss, and strengthening feeling part of the world. Participant 5 described feeling closer to her son in maintaining technology based contact when he moved:

> *It helped so much with feeling able to keep the connection going, because we're really close. Because I was a single parent with him for five years so we're massively close and … I don't know how I would have managed without it. It was just lovely…It made the connection feel …in some ways it almost felt closer.*

More broadly, participants identified that good connections went on to support health, comfort and safety within their life. They could help with feeling prepared for other experiences, connecting people around important issues, reducing fatigue of other forms of connection and building efficacy in managing health and life challenges.

Easy and responsive to use The usability of technologies strongly contributed to the caliber of connection experienced. Technologies that allow for responsive use across platforms, suiting different needs of communication partners, and have simple user

requirements were identified as essential. Participant 7 described how she maintained her social connections using various platforms:

> *Whatever is the intersection of what works for me and what works for them is fine. So, there are some people that I don't switch up with, because they're too sick for some things or they are too technologically impaired…I do have a few relatives who are not on almost anything technological. So, they have phone calls and they use it and technically, [friend] has email, but you have to ring her up and tell her to read her email.*

Unexpectedly good connections

In addition to connections built up of desirable characteristics, some participants identified experiences where low expectations were challenged and unexpectedly good technology-based connections occurred. These indicated that high fidelity and high-quality technology were not necessarily required, and lower technology connections could subjectively give a strong and genuine feeling of connection. For example, a few participants identified that simple messaging (picture and text) had led to fun, spontaneous and ongoing connections with groups and individuals. While the sensory and traditional communication experiences were not similar to conversations or traditional correspondence of participants, the low effort required meant that all communication partners could prioritize and engage with the connection over time, embedding it into their lives. Participant 7 explained:

> *So, text messages are excellent, because people text you all the time when they wouldn't use pretty much any other more complex measure … But short form, basically, text-based or photo-based things are so convenient that you end up using them a lot more.*

Participants described that these new ways of connecting surprised them, led to them learn new skills and engage in completely different ways of connecting with social networks across the regular day. Participant 4 described fun interactions with extended family through

messaging technology *"we have this thing which comes up every so often called 'pun Friday' and somebody floats an idea and the puns go round the world from Singapore to France, to Switzerland, to Berlin and the puns can go on all day and a bit and get absolutely ridiculous".*

2. Mis and dis connection (experiences of poor connection)

Participants also described neutral and disappointing experiences of connection. These related to technical and interpersonal difficulties and unmet expectations. Misconnections were characterized as stressful or effortful connections, misunderstandings and potential conflict during technology-based connections. Disconnections were experiences that led to feelings of isolation, decisions of leaving social groups, and reduced overall social interaction in relation to technology use. In forming comparisons of quality, participants were clear that these were made mainly in relation to a lifetime of interactions that had mainly not used technology. They also noted that their current social technology use built on connections and skills that mainly predated social technology usage *"I grew up before there was a computer, before it existed I developed my inter-connectiveness with people and places without that"* (Participant 2).

Misconnections and disconnections may relate to excessive effort, leading to personal or household stress, or enabling only unfulfilling interactions. Some stressful or difficult interactions were attributed to not understanding the 'rules' of social media communities, not being able to escape from persistent contacts, and inadvertently offending people during technology-based interactions. Others focused on what might be missed through using technology. Participant 9 described his experience with videoconferencing technology in comparison to face to face conversations

I find difficult because, because there's that technological gap if you like, call it that, … or a space between you and them which is on the airways and is technology and it sometimes doesn't always work and … it's just a less comfortable feeling, I mean I would, I could sit here and talk to you, but if I were talking to you by Skype … I probably would be a bit more stilted and a little bit more formal and a lot briefer."

Participant 7 described that the feeling of connection or disconnection is a subjective one in relation to many factors in the interaction, and can't always be attributed to characteristics of the technology or the interaction:

because feeling of connectedness or feeling of disconnectedness is such a kind of abstract … Like, it's just an in – it's an inside feeling. You can't get it from my heartbeat or my breathing rate or even from how many times I smile that hour or like, anything really. It's completely subjective, interior perspective.

Additionally, some participants described worrying about the connection choices of other generations, and the missed skill and life experiences attributed to online-only connections. The impact of the privacy, security and potential manipulations by companies involved was raised by some participants. They identified the global impact of manipulated online connections, exemplified by participants discussing concerns about Cambridge Analytica and its impact on major voting outcomes.

More extreme personal experiences of poor connection were described by a few participants. These related to poor connection experiences heightening experiences of isolation and loneliness. In addition, poor connection experiences that meant people did not seek required services or supports were described. These particularly related to government and service-based websites described as creating or amplifying a digital divide where people who could

not access essential services because of a lack of internet access or difficulties experienced in managing the complex sites.

> *So government now has this mandate to provide data and to provide access, but they don't necessarily think about what that means in terms of digital inclusion.*
> *It's there but it's not accessible. It's not inclusive. It's not provided. The myGov [Australian Government services] website is difficult* (Participant 8).

In a type of connection couched as "second class citizens" some participants described a lower caliber connection experience of needing to attend gatherings via technology, where an in-person event was occurring. The poorer experience had strong impacts ranging from feeling unheard or less valued, to heightening feelings of isolation. One participant who was homebound described the devastating experience of attending a family member's funeral online.

> *Watching everyone else together with each other is pretty much as painful as you can get. …Because it was … so much reminding me of how excluded I was. …. They're not horrible people, they weren't doing it at me in any way, but that's the effect, it's what it feels like. Even when it's not the intention* (Participant 7).

3. Connecting for a reason

Connecting with others

In describing technology-based connections, participants were clear that these were used with purpose, generally enabling something that was not possible through traditional modes of connection. Connecting with others was the main purpose, particularly staying connected to people who were important to them, but who were no longer local. Participants characterised the world as increasingly global and many described family, friend and professional networks

that were once a local connection now requiring technology. Participant 8 described "*I've had a lot of experience with using online connections because I've lived in a lot of different places and trying to maintain connections."* Some also noted that other valued people, particular those in younger generations may be only or most accessible via technology. Participant 2 described:

> *I do it with my kids because they want me to see their kids but it's, it's just not the same as being with them, it just fills the gaps in between seeing them [laughs]. Yes like a way of keeping a communication going on a superficial-superficial level.*

Following on from this, some participants described connecting with new people or searching out people from the more distant past once they were using technology for connections. This medium was seen as enabling connections with those who would not be otherwise found easily, and those who would never have met in regular life. Many participants described both deep connections, generally to people who had key roles in their lives; and a broader set of more shallow connections with other people. Both of these types of connections helped people feel more connected within their social world and community:

> *In the [online shared experience] group, in some ways, it's more high quality than some of my personal connections because we're just having these very open and honest discussions.*

> *So in relationships or in interactions where I already have a personal relationship with people it's [quality of connection] not widely different. So friends and family I keep in touch with via Skype or Messenger or things like that. It's just, I guess, building the threads of connection that we already have.* (Participant 8)

Connecting with myself

In addition to connecting with others, participants described ways in which technology helped them connect with their identity, roles and values. This ranged from professional experience to being a person who likes to try new things *"I am quite nerdy … and I know computers and enjoy doing that"* (Participant 5).

In addition to this, participants described connecting with people, groups or activities via technology that reflected lifelong values, shared life events and meaningful occupations. For example, participants joined online groups focused on current or past life experiences. They also sought involvement in activism and connecting with others who had shared values. This particularly seemed to be the case when these connections were not locally available. Doing good in the world was a strong motivator for some participants to pursue technology-based connections. Participant 2, who was reluctant to use technology, described involvement in environmental activism as a motivator *"For the betterment of those places I will use technology".*

Less commonly, people reported using technology to connect to places, by exploring information about places they had visited or where people they knew were. They might also seek to grow their understanding of a person in their social network, or an occurrence in the world through connecting with the location, or sharing their experiences in that location with others. These were seen as distinctly less resonant than actually visiting or being in these locations, but were acceptable when people were not able access important locations:

> *Moving into residential aged care is that you basically, you've basically lost your connections with the past, … you're in there, that's it. A method of, of having those people keep connections with the past would be really good* (Participant 9).

4. Making connections work

Beyond the direct interactions experienced through technology, participants described a range of strategies to enhance the benefit of these connections and minimize harms. Participants described having developed purposeful strategies to ensure these connections are positive and resonant, and to minimize potential risks such as taking actions to maintain their privacy and reduce the possible stress or manipulation, or disruption, that may occur through online connections. Strategies included having the platform accessed only on one device, reducing interruptions from notifications and reflecting on the impact on oneself and feelings of connection in their current surroundings. Some participants indicated that they also shared these strategies with their social networks or included these when helping other older people learn to use technologies that are new to them.

Technology-based connections were also leveraged to heighten the benefits of face-to-face interactions. Participants noted that technology was efficient for the organisation, preparation or support for attending in person connections, and if used correctly, freed up energy and time for more valued forms of connection. Some participants described a shift to using technology for "life admin" (Participant 1) or making the arrangements for social connections which freed up time and energy for the actual gatherings with friends. Others described switching between platforms depending on their health and energy to continue connection even when going to see people or having a lengthy chat was not possible *"I switch around a lot. Some days I feel too tired to talk, but I can imagine a very slow text conversation. Other days, like today, I can't really type, [but] I can talk the hind leg off a donkey"* (Participant 7). Others described the benefits of technology for being able to plan, consider and correct correspondence if worried about a message, as described by Participant 3

> *Given the choice I prefer to email somebody than telephone then to be honest. I collect my thoughts and because I am getting older, I forget things, I forget things a*

lot. I forget a name or I'll forget well I did yesterday you know short term memory loss that is really annoying and because if you are in an email you can stop it think and it will come back to you but on the phone you can't do that.

Technology was described as enabling an unprecedented ability to control and organize social connections, which made some participants feel more positive about their abilities to manage these as they aged or experienced health changes. Participant 1 described his experience with using a familiar technology platform when he chose *"I feel very safe, I feel very- super detached until I want to be attached and 'ok I'll do it' and that's the way I like it."* Overall these strategies indicated that people were, at least at times, fitting the technology and ways of connecting into their own life, values and current situation.

Discussion

Participants in this study were experiencing connections via technology in a variety of ways within their daily lives and describing impacts on their social networks and feelings of social isolation. Even though participants indicated that they consistently preferred face-to-face connections, the use of technology formed an important part of their regular social connectedness. The quality and characteristics of these connections seem to reflect interactions between identity, life roles, environments and close and distant social networks, as well as characteristics of the technology itself. Participants also described ways in which they actively managed the technology-based connections to lead to more positive outcomes. All participants used technology of some kind to connect socially on a regular basis, but the nature, purpose and feelings related to this varied. This highly variable use of technology is consistent with the trend of lower but rapidly increasing technology use for older people (Anderson & Perrin, 2017), and the potential for impacts on social networks and social

isolation (Baez et al., 2019; Baker et al., 2018). It is also likely that this reflects the study design where people comfortable discussing technology are more likely to have volunteered.

This study cannot make conclusions about the impact of technology-based social connections on social connectedness or perceived isolation, but can suggest some issues that may be worth considering in measuring and supporting these aspects for older people. The descriptions of positive and negative connections can help to broaden considerations in measuring technology-mediated social networks and outcomes. The objective aspects (frequency, number in network, nature of relationships) and subjective aspects (perceived depth of interaction, feelings of isolation) traditionally considered (Cornwell & Waite, 2009) could be supplemented by considering links with identity, feelings of perceived control, technological events (failures, channels of connection), identity implications and unintended consequences. Other studies have found that technology is used for both maintaining existing and establishing new social connections (Barbosa Neves et al., 2019; Fakoya et al., 2020; Poscia et al., 2018). The need for time and potentially support to feel confident with technology use before meaningful connection is experienced, has been found in other studies introducing social technologies with older people (Barbosa Neves et al., 2019). Our study indicated that positive connection experiences also required finding platforms, times and methods that suited all members in the interaction, with particular consideration for intergenerational differences as has also been documented elsewhere (Barbosa Neves et al., 2019).

Participants characterized technology-based connections as largely building upon existing relationships and experiences, and/or providing a means when preferred face to face options were not possible. This could be considered within the context of receiving formal health or

social services via technology. While often not the preferred option, technology-based service delivery has the potential to be acceptable for many (Lawson et al., 2020), particularly in the context of limitations to face to face service availability (Fisk, Livingstone & Pit, 2020). Establishing rapport through good quality social interactions in formal health and social services is vital, and no less so within telehealth (Henry et al., 2017). Efforts to optimize the benefits of the technology, for example in terms of reducing travel burden and administrative aspects, may still need active balancing with preferred forms of interaction, and efforts to support relationships (Lawson et al., 2020; Schulver et al, 2017). While telehealth options will improve access to places and during situations when other forms of attendance are not possible, maintained uptake may still require attention to technical, confidence and relationship-based aspects of the experience (Lawson et al., 2020; Sabesan et al. 2014).

The purposeful strategies used to optimize social connectedness, and reduce negative effects described in the current study fit with aspects of the Selection Optimization Compensation model of successful ageing (Baltes & Carstensen, 2003). Participants described making careful choices about platforms, notifications and times for engagement. They asked for support, recognized the impact of different interactions on their wellbeing, and engaged in things that had value to them. Valuable avenues included key relationships, identity expression, activism and important roles. Participant experiences supported other research which shows human interaction is multi-faceted and reflects different psychological needs. People demonstrated they placed value even on weak ties and shallow interactions if these connected them to broader communities and ideas (Granovetter, 1977). This is consistent with loneliness research which indicates a need for connection to others (relational closeness) and a feeling of community (collective closeness) (Hawkley et al., 2005). They also reflected on the impact of their usage. Participants described managing their energy levels by

prioritizing technology use for the less fulfilling aspects of social engagement (administrative and organisational), for supporting clear communication and confidence (using email to enable time to find appropriate wording), and freeing up time to engage socially in a face to face context. These strategies, as well as understanding the safe strategies for technology use, may help to form the basis of approaches to supporting effective technology use for older people who are less confident or who haven't developed successful strategies.

While the data collection occurred in 2019, the global pandemic in 2020 has made the findings of this study potentially more resonant. Many older people have been advised to cease or reduce face to face contact and community engagement. Social connections have had to move online including intergenerational contact, key life events (weddings, funerals), community groups and general daily socialization as well as healthcare (Brooke & Jackson, 2020; Pachana et al., 2020). Participants in this study consistently preferred face to face connections, and supporting this finding, the loss of this for many people during the pandemic has been reported as very difficult (Armitage & Nellums, 2020). The unintended negative consequences, effortful nature of connection and positive connection experiences described in this study have been reported as many people move to technology-based connections. The solutions and strategies reported by participants in the current study may be used to offer solutions to other older people needing to or choosing to use technology for social connection.

Limitations and future directions

This study represented a small exploration of experiences from people self-selecting as being comfortable talking about technology, in a single interview. It did not seek saturation of findings or a representative sample and as such cannot seek to be transferred to all contexts or

all older technology users. We did not engage with older people who use no technology for social connections, or users who were unable to communicate in English. In addition, we included three middle-aged participants who identified as having relevant lived experience. This may not directly relate to the experiences and perspectives of current older adults. Future studies could explore these issues with a wider group, as well as considering longer engagement for data collection. Future directions also include the application of the findings of this stage in workshops with older people to inform technology design within the co-design study.

Clinical implications

-Health and social care professionals may need to consider individual clients' perspectives on and experiences with technology for connecting socially and provide tailored support as required.

-Consideration of technology-based options, including negative experiences, should occur in measuring and supporting social connectedness and isolation.

-Active strategies to optimize connection experiences and minimize risk of negative outcomes can be supported, to enhance both general connectedness and telehealth service experiences.

Conclusion:

A range of technology-based connections are experienced by older people. Purposeful choices about connections and strategies to enhance the experience were described. Characteristics of good connections, as well as experiences that have left people feeling isolated were developed. These can be applied in the development of future technologies,

supports for older people developing technology-based connections and in measuring social networks and isolation.

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