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Healthy aging adviser: Designing a service to support the life transitions and autonomy of older adults

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ABSTRACT

A growing population of older adults is living alone, yet little is known about their need to maintain a sense of autonomy. In this study, an interdisciplinary team of design, nursing, and marketing researchers examined the patterns of older adults' autonomy and proposed a service to assist their life transitions. The objectives include: (1) exploring the principle of autonomy as the core value of a service design case study for older adults; (2) identifying their daily living needs in relation to autonomy; and (3) improving aging adults' autonomy by implementing a human-centred design approach to build a service. After conducting research with older adults living alone in an assisted living facility, we defined several service strategies: upfront preparation for life transitions, graduated preventive care, and desirable interactions with community. We designed a service named 'Healthy Aging Adviser' that supports the relational autonomy of older adults.

KEYWORDS

Service design, transformative service research, healthcare design, autonomy, design for older adults

Introduction

The Institute of Aging predicts that adults aged 65 and over will comprise 20% of the US population by 2030; however, little research has been conducted into how this population cultivates and maintains their sense of autonomy. This is significant, given that remaining autonomous is an important factor for wellbeing, including mental, physical, and social health (Murphy, Cooney, and Casey 2014; Sikorska-Simmons and Wright 2007). About 12.7 million older Americans live alone, including 40% who are aged 85 and older (Roberts et al. 2018). Throughout the aging process, autonomy

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poses a paradox in one's lived experience. Initially, older adults who live alone may become accustomed to an independent lifestyle, but, as they go through life transitions, such as giving up driver's licenses, they more frequently need an established support system.

In the United States, aging adults who live alone often rely on services rather than their immediate or extended family members (Klinenberg 2013). In many families, children typically step in to provide informal services that can buffer the instability of life transitions for aging adults; however, aging adults without the support of family tend to call on services such as hired caregiving, visiting nurses, and meal delivery. With the increasing age of adults who live alone and longer life expectancy, there is a need to study the patterns of autonomy among older adults populations and to design comprehensive care services that can support their autonomy needs through the various stages of aging.

In most studies conducted around aging, older adults are often portrayed as passive beings and aging as a problem to be solved. In this project, an interdisciplinary team with expertise in nursing, marketing, and design collaborated to understand the aging process as an opportunity for innovation with a focus on the concept of autonomy. We formulated research questions from each discipline's perspective: (1) Nursing: What are the factors and patterns of older adults' autonomy? (2) Marketing: How should older adults' autonomy be reframed in order to provide optimized support and help researchers to comprehend a broader spectrum of their daily needs? (3) Design: How can we utilise a human-centred design approach to build a service to nurture aging adults' autonomy?

With the aim to explore these questions, the team conducted an ethnographic study of adults 65 to 90 who live alone in an assisted living setting. Our findings reveal that older adults' sense of autonomy is highly relational, and several life transitions in their later life challenge them to reconfigure their sense of autonomy by rebalancing independence and connectedness. We identified key themes to define the areas where design intervention is needed and validated these needs by conducting a focus group session. We then developed a comprehensive care service system called the Healthy Aging Adviser, which focuses on helping older adults maintain their autonomy through life transitions.

Theoretical background

Design on aging: from negative to positive

Design for older adults has often been focused on the unique needs of this population. For example, universal design (Crews and Zavotka 2006), inclusive design (Pattison and Stedmon 2006), and digital interface design

(Zajicek 2001) highlight the importance of acknowledging the conditions of diverse people, including older adults. They commonly emphasise the significance of increasing accessibility and considering older adults' needs in the design process (Clarkson et al. 2013). However, it has been pointed out that there is an asymmetry between the aforementioned approaches and more solution-based applications that are often grounded in 'persisting images of aging based on models of deficiency' (Dankl 2017) that attempts to correct problems (Littlewood 1996, Friedman 1996). For example, products and services are sometimes labelled 'silver' and oversimplify the desires of individuals with ages ranging from 65 all the way to 100 years old. As a result, the outcomes often focus on fixing the negative states represented by a stereotyped cohort, such as physical and mental decline. Therefore, design solutions are frequently aimed at altering product functionalities to support the behaviours that are misaligned with standard products.

Recent design research emphasises the need for studying the desires and wants of older adults as they are, rather than attempting to correct their deficiencies, by making a connection to positive aging (Fronemann et al. 2016) and active aging (Kivnick 2021). Our study builds on these efforts and aims to contribute to design research by exploring the human value of autonomy as the key principle of service design. We propose that focusing on autonomy can supplement these approaches and bridge theories and practices by providing a perspective that construes ageing as a life progression of a holistic person. We intend to shift the perspective of aging from negative to positive, proposing the need to see the process as a natural transition in life, instead of as a gradual diminishment of abilities. In order to do this, we utilise the framework of Transformative Service Research, which focuses on positive human values to enhance wellbeing.

Transformative service research and the focus on values

Transformative Service Research (TSR) is a recent effort in marketing that aims at creating uplifting changes for the well-being of consumers, and construing positive social values as parameters of service quality (Anderson and Ostrom 2015). TSR targets wellbeing, including physical, mental, financial, and social health, especially for less-represented populations, thereby expanding the meaning of value in service from an economic value to cultural and moral values (Anderson et al. 2013). Among these values, the present research project focuses on autonomy, which is central to an individual's wellbeing.

Another characteristic of TSR is it often examines service in relation to collectives. For instance, TSR studies go beyond individual customer behaviour to provide insights about the holistic influence of families, communities, and

societies (Rosenbaum 2015). Therefore, TSR emphasises the importance of interdisciplinary research, which enables the study of rich relationships that formulate wellbeing from diverse perspectives. We utilised TSR as a theoretical framework from which to bring together the perspectives of design, nursing, and marketing by focusing on the value of autonomy. From a nursing perspective, autonomy is an essential condition for mental and physical health. From a marketing perspective, the focus on autonomy enables the study of a long-term care service rather than a short-term behaviour. From a design perspective, autonomy is a central value in humanising the experience of the user navigating a service system.

TSR is in alignment with the recent development of service design that aims for transformation in organisations and communities, especially in the reform of public services (Junginger and Sangiorgi 2009; Sangiorgi 2011). While TSR is a theoretical framework based on marketing and management, service design focuses on creating new services utilising a human-centred perspective. Scholars argue that service design plays a transformative role in service development and therefore is essential for the success of TSR (Anderson, Nasr, and Rayburn 2018). However, there is a dearth of case studies that present how the transformative framework can be applied to the development of a specific design project. By examining the concept of autonomy, the present study connects TSR with service design and explores the role that humanistic values play in enhancing service design, which is an approach yet to be studied.

Autonomy in moral and political philosophy

Immanuel Kant, the representative philosopher who discussed autonomy as a concept central to moral philosophy, argued that 'auto' refers to the freedom to choose a law to follow, and 'nomos' refers to the ability to make decisions independently (Kant 1785/1993). Kantian autonomy is, therefore, the ability to make self-imposed rules and govern one's own life in harmony with others. In this tradition, autonomy positions individuals as self-sufficient beings whose free will should not be compromised. This concept of autonomy served as the foundation for the construct of the modern citizen and has evolved into libertarian autonomy refereeing the individual's freedom for rational decisions and uncoerced actions (Kymlicka 1991).

Contrary to the libertarian notion of autonomy, which is often associated with independence, feminist theories propose the notion of relational autonomy as an alternative, which sees an individual as an open system framed by their relationships with others. As such, autonomy is impacted by internalised social conditions and commitments to relational values, such as care, interdependency, family, or community, along with cultural or religious

values (Friedman 1997). Additionally, autonomy can be context-dependent because there are occasions in which the individual's autonomy is voluntarily yielded and compromised for the sake of protection and autonomy in the long run. For example, those experiencing cognitive or physical impairment will sometimes be represented by legal protectors. This is referred to as supported autonomy and often takes the form of joint support in decision-making (Lorenzl 2013). In the present study, we focus on relational autonomy supported by service systems, as our ethnographic study identified the capability of connecting with other people and services as a key aspect of older adults' autonomy.

Autonomy in healthcare

There is a growing body of research that discusses how autonomy positively impacts mental and physical health, thus improving quality of life (Murphy, Cooney, and Casey 2014; Sikorska-Simmons and Wright 2007). Spear and Kulbok (2004) defined autonomy as 'a state of being independent or self-governing.' They also discussed variations of this definition in three areas, including: nursing research on adolescent autonomy with a focus on self-determination, control, decision-making, and social and risk behaviours; educational research on self-learning, intrinsic motivation, locus of control, and academic achievement; and psychosocial research on maturation, self-efficacy, independence, individuation, and self-actualisation.

In the context of healthcare for older adults, studies have shown several determinants for autonomy, with an emphasis on choice and control over routine. The ability to make independent decisions is integral to wellbeing and mental health (Mehegan, Rainville, and Skufca 2017), and those involved in shared decision-making show enhanced autonomy in relation to taking on social roles (Rodgers and Neville 2007). Furthermore, it has been found that exercising control over daily routines, such as self-management of medication (Perkins et al. 2012), choice of bedtime (Tuominen, Leino-Kilpi, and Suhonen 2016), as well as physical and communal activities, all promote autonomy.

Relationships have been identified as a key factor in autonomy among older adults living in residential care communities. While transitioning to residential care, autonomy is promoted through the maintenance of social roles and relationships with family, friends, and neighbours (Perkins et al. 2012; Walker and Paliadelis 2016). Services provided by caregivers are positively related to longer life in the community setting (Morville and Fjordside 2016); however, managing relationships and communicating preferences can be stressful if the caregiver is unfamiliar with the resident's needs. Notably, having the option to call for assistance 24 hours a day has been found to

enhance autonomy, as opposed to systems in which caregivers have a set visitation schedule (Tuominen, Leino-Kilpi, and Suhonen 2016). These studies align with our findings from the ethnographic study that reveals the importance of relationship in older adults' sense of autonomy.

Autonomy in design

Despite the importance of autonomy in human experience and wellbeing, little research has been done on this concept as a central principle of design. One approach to the study of autonomy is found in studies that explore the relationship between users and technology. Littlewood (1996) introduces 'ability' and 'willingness' as key factors in autonomy. Ability requires both knowledge about the choices available as well as the skills required to perform certain behaviours. Willingness comprises motivation and beliefs about one's own capabilities. Calvo et al. (2014) proposes four spheres of autonomy in technology design, including: software environments that promote autonomy through the freedom and control that comes from using a tool; assistive technology that supports and improves autonomy in daily activities; personalised design that addresses individual needs; and technologies that improve autonomy through psychological development.

Other explorations on autonomy have been conducted in the areas of value-sensitive design and inclusive design. Friedman (1996) discusses how design can promote user autonomy in relation to the user's ability to control the technology. Furthermore, Friedman suggests designers should perceive users as individuals who are self-determining and able to decide, plan, and act in ways that they believe will help them achieve their goals and promote their values. Davy (2015) explores the concept of autonomy in the context of inclusive design, arguing that standard definitions of autonomy that focus on individual capacity exclude people with intellectual disabilities, thus contributing to a lack of social and political assistance for this community. She proposes a model of autonomy that originates from the needs of vulnerable individuals, emphasising that design that focuses on autonomy can be more inclusive.

These theoretical frameworks commonly construe autonomy as a fundamental principle to support people utilising technology, tools, or built environments to realise their capacities for decision and action. This project aims to introduce a case study that highlights the human value of autonomy as a key principle of designing for a service.

Research methods

Drawing upon the aforementioned research about autonomy, we conducted a qualitative ethnographic study to learn the factors and patterns of older

adults' autonomy. The goal of our qualitative research was to create a richly nuanced portrait of autonomy that was grounded in individual experiences of older adults. Thus, we used a variety of methods, including interviews, observations, journaling, and a focus group session to obtain a deeply personalised understanding of our participants.

The participants included ten Caucasian women ranging from 65 to 90 years of age who suffered from chronic illness that impaired their autonomy in varying degrees. They were recruited from one assisted living home in Massachusetts. They had moved from a variety of locations across the United States where they lived alone, and their time residing in the assisted living home ranged from a few weeks to 21 years. Assisted living is a residential service for older adults who have some medical needs, but can otherwise manage their daily living activities in their own unit. This type of community provides a rich context for learning about challenges that older adults face as they strive to remain semi-autonomous even as they are relinquishing some of their autonomy. From the perspective of TSR, it is meaningful that this study focuses on the wellbeing of older adults in a senior home, with half categorized as low income, who have traditionally been portrayed as passive and dependent. However, our sample of interview subjects was limited to white females, as the residents of our partnering institution were primarily Caucasian women. In the following focus-group session, the team made efforts to expand the participant pool.

We focused on participants who were aware of their sense of autonomy and capable of describing their experiences and health conditions, utilising an Institutional Review Board (IRB) approved screening process. We began the study by conducting semi-structured sixty-minute interviews. Two weeks after the interviews, we conducted observations of the same participants in their apartments while they engaged in their daily routines (Figure 1).

Figure 1. Photos from observation sessions.

During this stage, the participants also wrote journal entries over a period of two weeks in an attempt to record their routines and interactions with others in relation to their subjective sense of autonomy. We retrieved nine journals with a combined total of 135 entries. Electronic data entry was checked for completeness. Quantitative journal entry data were summarised using descriptive statistics.

Interview transcripts, field notes, and qualitative journal entry data were analysed in Dedoose Web 2.0 using directed content analysis. Four team members, two from nursing gerontology and two from service design, examined the text to individually highlight the quotes and assign codes based on the relevance to autonomy and older adults' needs. After completing the coding, the team met to cross-check the codes and validate it based on the concurrence, antecedents, and consequences. We then utilised affinity diagramming to map the codes, define the optimal coding names, and organise them into categories. Afterward, researchers merged or updated the existing codes with the names defined in the mapping session. The qualitative analysis enabled us to discover sixteen themes that represent our subjects' patterns of autonomy as well as their unique needs in relation to autonomy.

These findings informed the next design concept phase, which was followed by focus group sessions that occurred four months after the initial research. We developed the sixteen themes that we distilled from the qualitative analysis into sixteen key design ideas, utilizing the principle of autonomy grounded in a TSR framework, to determine the key ideas that would represent each of the themes. We drew upon ideas that would help us achieve our aim of nurturing autonomy by fortifying connections among those that comprised the network of people and services surrounding the older adult. Using the storyboards that depict these ideas, we conducted a sixty-minute focus group session to validate these needs with twenty-four new participants. This group included three Caucasian males, one African-American woman, one Hispanic woman, and four women who identify themselves as multi-racial, in addition to fifteen Caucasian women. The participants were divided equally into four groups and two researchers were present at each session to facilitate discussion. The focus group sessions aimed to prioritise the design concepts and determine which would be most meaningful to develop further into services and interfaces.

Research findings

The paradox of autonomy: Independence and connectedness

Older adults' autonomy turns out to be a complicated concept—one where independence and connectedness co-exist. Our participants perceived autonomy as having three primary qualities: (1) an ability to make one's own

decisions, (2) completing one's own tasks, and (3) having the means with which to achieve one's goals. When we asked our subjects to define autonomy, many of them described autonomy as the capacity for making decisions and completing tasks, which is similar to the notion of libertarian autonomy—the individual's freedom for decisions and actions, often associated with independence (Kymlicka 1991). When asked to share life stories related to autonomy, however, many participants described autonomy as the ability to support and be supported by other people to accomplish goals in harmony, which is more similar to relational autonomy—an indirect sense of control framed by the individual's commitments to relational values (Friedman 1997).

In both responses, our subjects expressed that their physical ability to independently carry out everyday tasks had diminished, but that they retained their autonomy because they had learned to live differently. What was most important was that the older adults felt they had the 'means', or the human and service networks, with which to accomplish tasks in ways that satisfied them. These findings suggest that our participants have a highly relational sense of autonomy, which aligns with the studies that highlight the importance of social connection in autonomy (Rodgers and Neville 2007).

The participants' need to balance independence and connectedness surfaced though the interviews, observations, and journals, across all participants. For example, although the participants needed caregivers to manage the physical labour required to live their everyday lives, they commonly expressed a desire to have their own private time. It is well known in the literature that families provide the strongest support network for aging populations (Perkins et al. 2012; Walker and Paliadelis 2016). However, we found that older adults' increasing reliance on their grown children was often the source of conflicts and stress, because the older adults still wanted to maintain their decisional autonomy even though they need physical and emotional support from their children. Our subjects stated that it took a long time to reconfigure their sense of autonomy so as to adjust to a new life in an assisted living facility with family and professional caregivers. In the following section, we will introduce more details about the key themes that our team has identified from the qualitative analysis, based on the frequency and importance of the keywords cluster in relation to autonomy (Figure 2a).

We also analysed the relationships among themes (Figure 2b), which revealed that 'transition' is a significant issue and deeply impacts older adults' sense of autonomy. The life transitions experienced by older adults often involve giving up their home and moving to a nursing home closer to children who serve as primary caregivers. There are few studies about the transitional needs that emerge in a person's later life. Thus, it was surprising

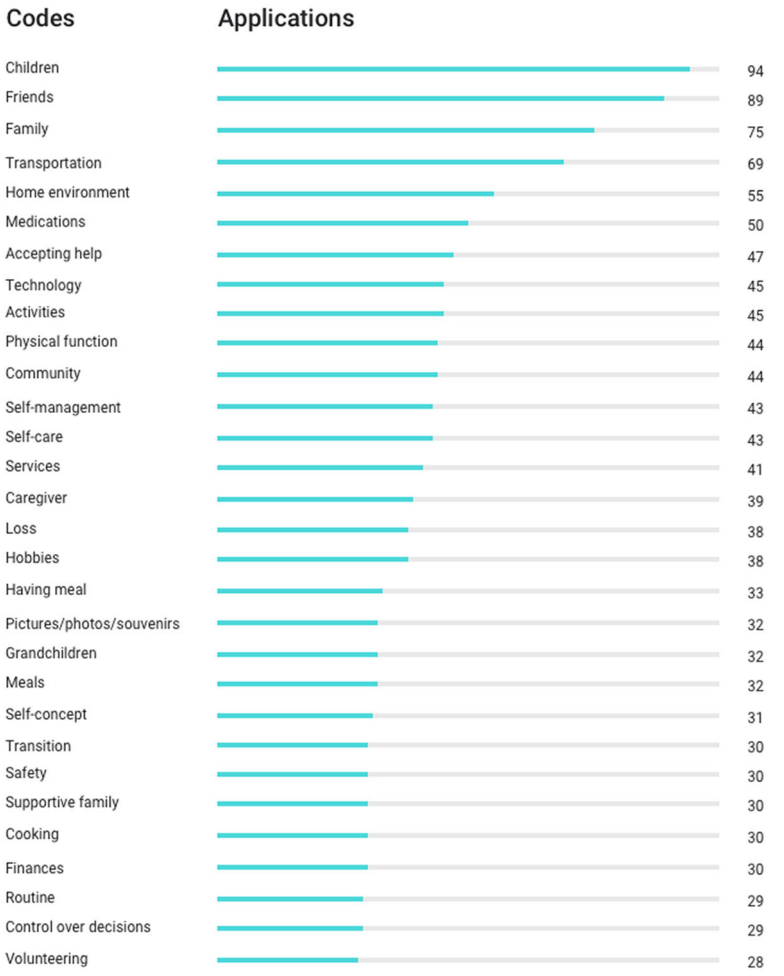


Figure 2. (a) Key themes by frequency and (b) Theme co-occurrences.

to learn that our participants commonly experienced such transitions and that these transitions forced them to redefine their sense of autonomy. The participants claimed that their sense of autonomy when they were younger was more associated with independence. However, they have experienced critical moments in their lives—such as breaking a hip bone or being diagnosed with chronic diseases—that made them feel like they were gradually losing their physical independence. Nevertheless, they described this process as a 'gain' rather than a 'loss' because it was just a process of discovering an alternative sense of autonomy from being connected with family members and service networks. Still, it took time and effort to find a new balance between independence and connectedness, which they described as an under-represented phase of later life.

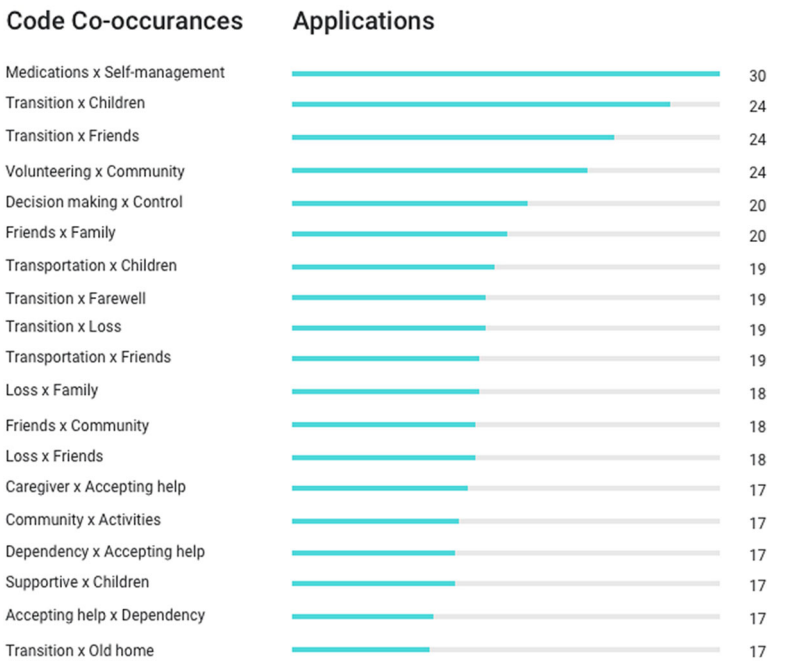


Figure 2. Continued.

Major themes

The theme of *children* was a key influence on the participants' decisions to move into the residential care setting, even when it required them to leave the region where they had lived most of their lives. A typical case is one in which a participant who used to live alone in her own home had developed a health or safety issue that prompted her children to become primary caregivers. Having children in close proximity was viewed positively for autonomy, as they provide socialisation, a sense of belonging, assistance with daily tasks, and reliable support during emergencies. Despite these benefits, the participants also considered their relationships with their children to be paradoxical in terms of autonomy. They described a sense of relinquishing autonomy (e.g., moving out of their old homes) at the request of their children.

Friends was the second most frequent theme. The participants described making more friends in the senior home and local community than they had expected, which had a positive impact on their sense of autonomy. The community room and the town's senior centre provided a daily gathering place. To move closer to their children, however, many of the participants had to give up lifelong relationships with friends, relatives, or pets. Their rooms were typically filled with photos of old companions with whom they had not seen in years.

Family was primarily described as supportive, both physically and emotionally. Family had always been central to the participants' lives even before they moved into residential care. The participants shared stories they told about their past experiences taking care of their own parents, whom they regarded as role models in the processes of aging. Participants with this *a priori* knowledge had a better sense of autonomy and showed greater attention to health.

Transportation, especially the ability to drive one's own car, was viewed as a symbol of autonomy, and many residents described a loss of independence they felt when relinquishing their licenses. As most of the participants previously lived in the suburbs, the loss of driving capability was especially critical to this group and therefore served as one of the factors in their decision to move into assisted living. Although the participants acknowledged the existence of alternatives, such as the community van or public transportation, they wanted to be able to travel on their own schedule.

Many participants associated the routine of self-administering their daily *medications* with health autonomy. Some participants received daily visits from homecare nurses who administered their medications and organised their pill boxes. The participants reported that mail-order services and automatic refills made it easier to manage their medications, which contributed to their sense of autonomy. Paying attention to health, knowledge about health, the daily management of health via medications, and healthy cooking were all described as important to older adults' autonomy.

Accepting help was another factor in promoting autonomy. Many participants had been assisted by caregiving services, and almost all of them had wearable devices for summoning help during an emergency. However, some participants hung the device on their apartment walls, stating that they were hesitant to push the button because they did not want to cause 'big trouble'. Some participants felt that accepting help made their lives easier and allowed them to stay autonomous, while others felt like accepting help was a source of conflict in regard to their independence. Participants whose physical conditions necessitated near-constant assistance expressed a desire to have closer relationships with their caregivers but were frustrated that the caregivers frequently changed. It was stressful for the participants to communicate their needs and routines with a new person, which negatively affected their sense of autonomy.

The participants described using *technology*, such as email, smartphones, and social media, to keep in touch with family and friends. However, they also struggled with using or troubleshooting these technologies, which jeopardised the connections they had made with people via technology. Some participants were aware of technology-mediated care services and owned devices gifted to them by family, but their lack of familiarity with digital

technologies kept the participants from realising the full potential of these services and devices. They expressed a strong desire to learn how to use new technologies.

The participants described keeping up with *activities* and schedules, events, and rituals to be important contributors to their daily sense of autonomy. Congregating at the senior centre or holiday rituals were important events that gave them a feeling of connectedness to their community. Activities held by the residential facility were viewed positively in relation to autonomy. The participants often looked forward to attending family events and going out to eat, in addition to rituals such as Sunday church service. They explained that they had the TV on all the time to maintain a sense of 'being connected to the world'.

Ideation and needs validation

Based on the themes that were defined from the qualitative analysis, the team brainstormed and conceptualised initial service ideas for sixteen storyboards, each comprising a three-step narrative with the following ideas: community connections, dining together, healthcare management, legacy, living environment, mobility/transportation, need to be alone, physiological and mental health, primary care management, relationship connections, safety, scheduling, shopping technology accessibility, transition help, and volunteering.

Using these high-level ideas, we conducted four sixty-minute focus group sessions (Figure 3) to validate the needs. The participants were asked to vote on ideas presented by each storyboard and offer verbal feedback along with

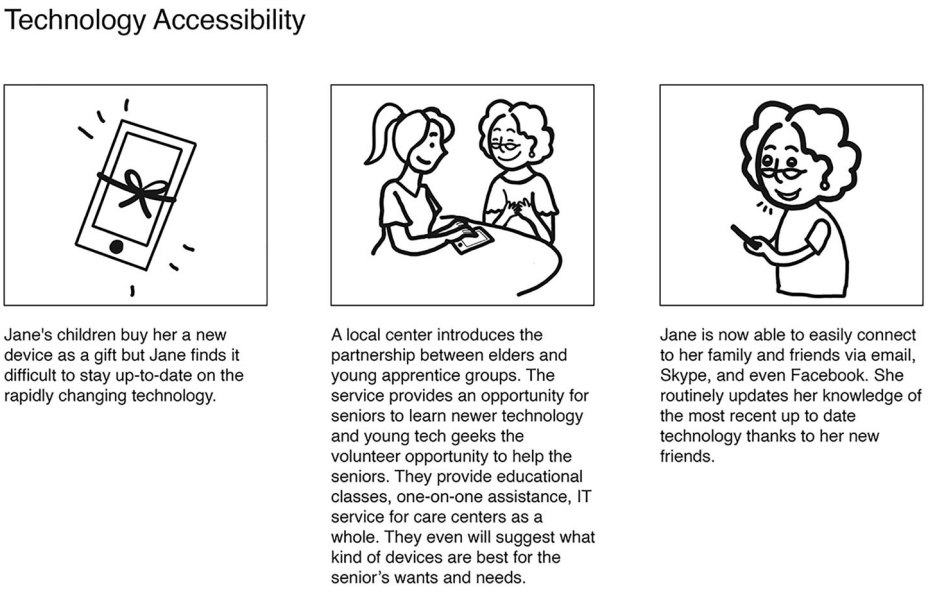


Figure 3. (a) Example of a storyboard and (b) Needs validation session.

Figure 3. Continued.

three stickers. A smiley face was placed next to ideas that the participants found personally useful ('Total Happy'), a golden star for ideas that could be useful for aging adults in general ('Total Star'), and a frowny face for ideas that might not be needed ('Total Sad'). The participants responded differently when they were asked whether certain ideas would benefit them personally versus older adults in general. The participants expressed that they did not need new services because they already had their 'old way of doing things' that they were used to. But they proposed that other older adults in the future should have better support. These differences prompted them to be more accepting of new ideas, and led to discussions among the participants that clarified the main areas for the design intervention.

The research team collected feedback from the focus group and organised the outcomes into a chart (see Figure 4). The top five ideas are as follows. *Relationship connections* refers to services to help with maintaining relational autonomy after they move to the assisted living facility. *Technology accessibility* is a community service in which volunteer students provide technology education for older adults so that they can better utilise digital services to achieve actionable goals. *Mobility/transportation* is a ridesharing service tailored to support seniors' autonomy needs for the capability to move between places even after giving up their cars. *Transition help* is a life management service designed to help older adults with relocation and meeting their needs, in relation to making the transition from a sense of autonomy as independence to a better utilisation of service networks and relational autonomy. *Safety* refers to helping older adults manage their safety needs in a proactive way, as well as managing less critical—yet still important—daily needs without feeling dependent or imposing on other people.

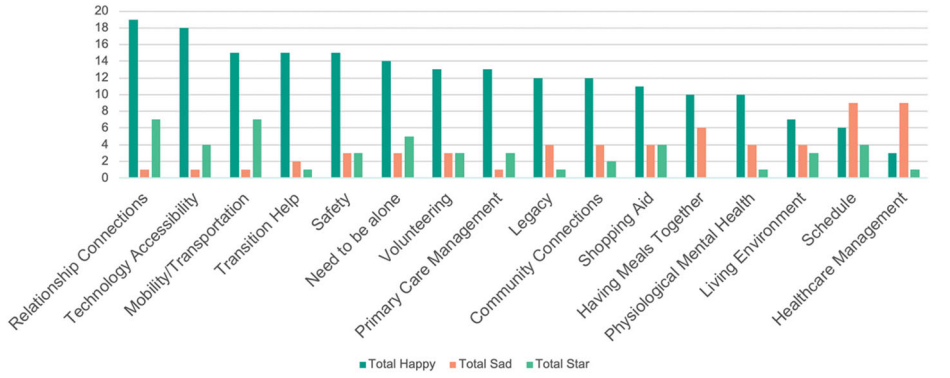


Figure 4. Outcomes from the needs validation session.

Service design

Based on the initial ideas that were prioritised by the participants, we identified the key service concept of 'Healthy Aging Adviser'. The goal is to improve the relational autonomy of older adults and support them in balancing between independence and connectedness. The service strategy includes: (1) providing upfront discussions about the aging process and planning for anticipated life transitions, with older adults at the centre of the service ecosystem; (2) providing graduated preventive care over a long period by introducing services that assist with the transition at each critical phase; and (3) supporting desirable interactions with stakeholders, community members, and social networks at various levels. With this strategy, we intend to transform the negative notion of aging as a process of 'giving up' independence to instead understanding it as the gradual progression of autonomy from physical independence to relational care and connectedness within one's community. Our service, the Healthy Aging Adviser, will be designed to support this transformation.

The Healthy Aging Adviser is a lifestyle management service that provides in-person consulting, a periodic gift box to help the recipient prepare for transitional phases, a mobile app, and a smart TV. Seven out of ten participants interviewed reported that they owned smartphones. Although usage among our participants was limited, it is expected that technology literacy will increase as a new generation of older adults, who are more familiar with technology, begin entering the over-65 population. All of our participants owned a TV, and four participants reported that they kept the TV on at all times, even when they were not watching anything. Still, because this group was most familiar with printed materials and mail, we designed a gift box with brochures, booklets, and artifacts to serve as a high-level communication system and increase unity between the touchpoints. Figure 5 provides a service blueprint with a synopsis of the aging process.

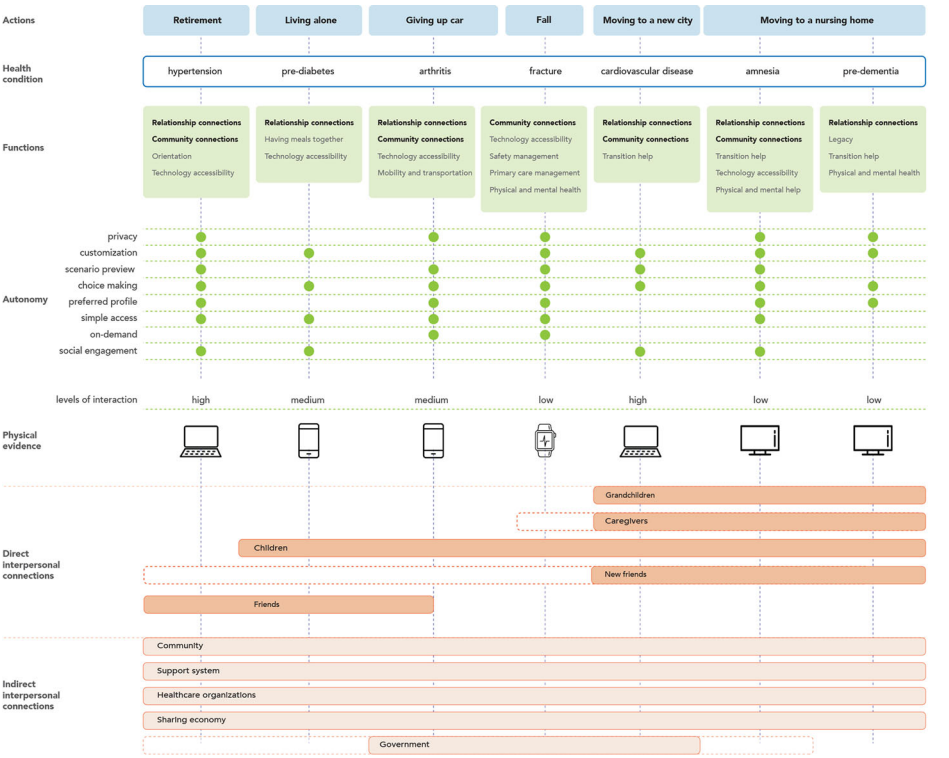


Figure 5. Service blueprint.

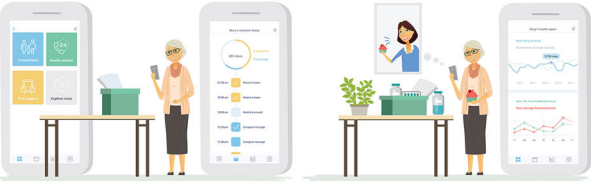
In this service blueprint, key life transitions for older adults are shown in the top row. Interspersed in each row are the triggers for service needs, especially those related to health conditions, as the service is gradually introduced. At each stage, attention has been paid to the supporting of different dimensions of relational autonomy, ranging from privacy to social engagement. Although the row labelled 'physical evidence' focuses on exploring what types of technology would be most appropriate for each stage of the aging process, the service system establishes face-to-face consulting and gift box delivery as the ideal path scenario (see Figure 6). Additionally, the technology and interfaces recommended are intended to assist in forming better connections between older adults and the people surrounding them, thus gradually increasing their sense of relational autonomy, as opposed to replacing human interaction altogether. Transition takes longer than just one touchpoint, requiring the collaborative support and engagement of every stakeholder along the older adults' journey.

The team used persona and scenario to represent the service concept and product ideas within the service system. We created our personas, Mary and Jenny, from the demographics of our participants and shared patterns of

Retirement: Introduction to the service

Our user persona, Mary, is married with children, was diagnosed with two chronic illnesses, and worked as a social worker until she retired at the age of 65. Mary lives with her husband in a suburban home. She knows that she has decades of life ahead of her and wants to plan for healthy and autonomous ageing. Mary meets with a consultant from the Healthy Ageing Adviser service and discusses her expectations for the future based on her health, financial situation, parents' history, family situations, and future goals. Together, they lay out a plan for the next 35 years. This shared decision-making process increases her sense of decisional autonomy.

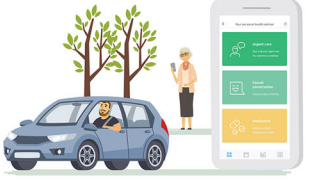
Living alone: Staying independent



Mary loses her husband and is faced with the reality of living alone. She still feels healthy, independent, and frequently socialises with friends. However, her daughter Jenny, who lives in another state, is concerned about her. As Mary discusses her current circumstances with the Healthy Ageing Adviser, her consultant introduces three features of the service: health watcher, connection, and tech support. These services will help her remain independent longer by providing the means to manage her health and daily tasks. The service will also assist her in connecting better with her family and neighbours to increase her sense of relational autonomy.

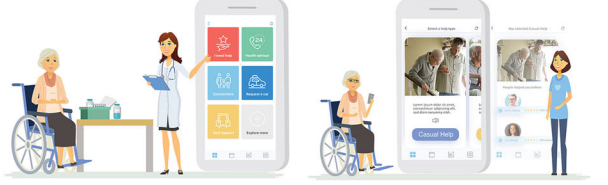
First, the health watcher assists Mary with healthcare information and advice about her high blood pressure and prediabetic symptoms. Second, connection provides her with opportunities to spend more time with her daughter; for example, two gift boxes containing the same recipe and ingredients are delivered to both Mary and Jenny, thus allowing them to virtually cook and eat together via the shared activity mediated by the service. Finally, tech support connects Mary to local volunteers who will teach her how to use smart devices and mobile apps, including the Healthy Ageing Adviser app.

Transportation: Mobility support



Mary eventually develops arthritis and has to relinquish her driver's licence; however, she is well prepared for this due to the gift box and information brochure she received from the Healthy Ageing Adviser. The service celebrates her "graduation" from driving and introduces her to the app's ridesharing feature, in which volunteers and neighbours who are trained in elder care provide personalised chauffeur services. As Mary's chronic illness develops, the service helps her order and manage her prescriptions, connecting her with 24-hour medical advice and urgent care.

Health decline: Casual, medical, and emergency help



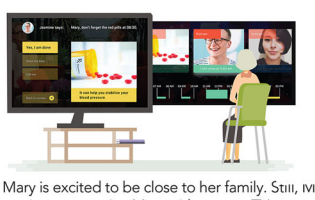
As Mary's physical capacity for independence gradually declines, the service adds more connections through a support network. The "I need help" function in the app allows her to call people for casual, medical, or emergency help. Mary requests casual help most often, which is answered by volunteers who offer physical help for tasks such as decorating walls for the holidays. This paid feature helps Mary balance her feeling of independence and connectedness by providing the means to complete daily tasks without the emotional burden of imposing on others.

Mary accidentally falls and breaks her hip, but she is able to use the emergency call feature to receive timely help from her neighbours, nurses, or paramedics. The service provides clear descriptions of what would happen when Mary calls for medical or emergency help so that she can request it without fear of causing trouble. Being connected to the support network makes Mary feel safe and in control of the situation. These services allow Mary to live at her home longer, while remaining independent and staying connected.

Moving to a new place

Mary's chronic disease eventually worsens, and Jenny decides to become her mother's primary caregiver. From the Healthy Ageing Adviser, Mary learned that this is a natural transition and has thus been mentally prepared for this stage. Based on the consultants' suggestions and discussions with her daughter, Mary moves into a nursing home near Jenny. The Healthy Ageing Adviser provides Mary with the tools to consider all the options in the area and find the one that works best for her. The service also assists with her family's collective sense of autonomy by supporting decision making when moving, such as downsizing her personal possessions and creating a to-do list.

Maintaining, managing, and building connections



Mobile app prototypes

Mary is excited to be close to her family. Still, Mary misses her old town and friends. The service now equips Mary with a smart TV system that supports her relational autonomy by assisting her in maintaining existing connections, managing her caregiving, and building new connections. The smart TV allows Mary to maintain communication with her old friends, who are now far away, and with her children and grandchildren via photos, video calls, and text messages. Mary can also use the smart TV to check her schedule and routines and to be reminded of appointments and medications. The scheduling component is connected to a mobile app used by Mary's family, caregivers, nursing home managers, and healthcare providers, allowing all stakeholders to stay connected with her. The smart TV also allows for smoother communication with caregivers, as Mary can use it to make collective decisions about schedules and learn about her caregivers. Mary can also save her preferences for home care so that she does not need to micromanage the communication of her routines and needs every time a new caregiver is assigned to her. The system will also allow her to access information about local volunteer opportunities or events so that she can connect to her community and make new friends.

Figure 6. Scenario: key interactions and interfaces.

qualitative information captured from interviews and observations. The scenario was created from our service design concept to model experience from the users' perspectives, and to present a future 'happy path' for showcasing users' interactions with the proposed service system and various products within the system.

Discussion

In this project, we studied autonomy among older adults in order to gain insights into designing a transformative service that can assist with healthy aging. We learned that there are diverse dimensions to older adults' autonomy, including the need for balancing independence and connectedness. Autonomy does not necessarily involve being alone, but can also mean the ability to choose to depend on society as needed. Humans have developed services as a system of mutual aid. Digital technology and interactive culture of our time have enabled participatory services on an unprecedented scale, which act as a social infrastructure for creating new relationships and opportunities for older adults to connect with their neighbours and the local community.

Our research on relational autonomy highlights the need for care that places older adults at the centre of the service ecosystem, which includes several sub-services that address the issues particular to each transitional phase of one's life after retirement. The focus of older adults care is gradually shifting from service organisations to home, which is economically beneficial for patients, while also improving the quality of service from healthcare providers (Hellström and Hallberg 2001; Navaie-Waliser et al. 2004). As with any transition, however, facilitating a healthy transformation that promotes a positive sense of autonomy takes time. There is a need for a service that can assist older adults with this transformation over a long span of time.

Transformative Service Research (TRS) framework's emphasis on positive social value enabled us to focus on autonomy as a parameter of research and analysis. It also helped us to identify relevant intervention points and choose ideas that align with the aim of enhancing of autonomy. In keeping with TSR's emphasis on service as a collective rather than an individual experience, we developed design solutions that considered the perspectives of multiple stakeholders and a long term impact of a service, leading to a holistic service concept that involve diverse touchpoints and community members over many years.

TSR also emphasises transdisciplinary collaboration. The fact that the team maintained a shared value of autonomy supported effective teamwork among the scholars from the three fields. From a design perspective, this project contributes to the study on the transformative potential of service design. A consideration of humanistic values such as autonomy is especially

important in determining which is the right direction in pursuing social changes by design. From a marketing perspective, this study contributes to the advancement of TSR by providing a case study to potentially maximise the wellbeing of older adults while minimising the cost of care, thus decreasing the social burdens of aging with chronic illnesses. From a nursing perspective, this research addresses the healthcare concerns of a growing population of aging adults who live alone, which creates issues with health access, safety, cost, and resource management. Our proposed system can contribute to the resolution of this emerging bio-psycho-social problem, offering theoretical and practical implications in addition to serving as a case study in the growing field of patient-centred research.

This study has some limitations that need to be addressed in the follow-up research. First, the sample group is quite small. Although qualitative design research usually focuses on the detailed experiences of a small group of people, there is a need to expand the number of participants and the research scope to include a more diverse pool of participants. Lastly, we found little connection to supported autonomy in this study and focused on the need for balancing libertarian autonomy with relational autonomy. This is likely because we excluded older adults with mental impairments. However, this group would add another dimension to the study of older adults' autonomy. Future study will need to expand the scope to understand the comprehensive relationship of libertarian autonomy, relational autonomy, and supported autonomy.

Disclosure statement

No potential conflict of interest was reported by the authors.

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