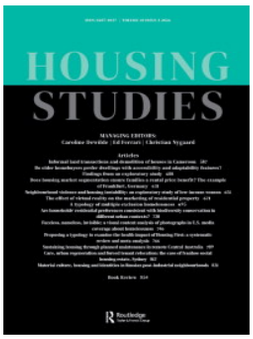

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Do older homebuyers prefer dwellings with accessibility and adaptability features? Findings from an exploratory study

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ABSTRACT

Demographic changes have prompted the development of 'age-friendly' housing design standards in several countries, but there has been limited exploration of whether older prospective homebuyers would prefer to purchase homes with accessible and adaptable features. This exploratory study used a stated choice experiment to explore whether prospective homebuyers in England aged 50 and over would prefer homes with accessibility and adaptability attributes. Respondents were significantly more likely to select dwellings with step-free access and adaptable bathrooms than properties without these features and were willing to pay significantly more to purchase them.

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Older people; housing; homebuying; accessibility; adaptability; willingness to pay

Introduction

The World Health Organisation's Age-friendly Cities initiative sets out how policy-makers and communities can adapt to ageing populations, highlighting the built environment (WHO, 2007). The potential for home environments to impact on older people's health and wellbeing (Carnemolla & Bridge, 2020) has resulted in several countries developing (optional) accessible and adaptable housing design standards (CMHC, 2017; Habinteg, 2016; Lifemark, 2019; Livable Housing Australia, 2019). The aim is for new homes to meet the needs of people with existing physical disabilities but also to more easily accommodate changing requirements as occupants age-in-place.

In the UK, the Lifetime Homes standard (LHS) was developed by charities in the early 1990s, and includes a range of accessibility and adaptability features (Kelly, 2001). This specification has been largely incorporated into England's optional 'M4(2)' building regulations (Habinteg, 2016), with local planning authorities able to set targets for a proportion of new dwellings to be built to this standard (Habinteg,

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2019). Government has been urged to make the M4(2) a mandatory baseline for new dwellings across England (HoME, 2019) and has launched a consultation to inform its decision (MHCLG, 2020). Developers, arguing this will increase their costs (EC Harris, 2014), have opposed local authorities setting targets for such homes (Booth, 2018). On the other hand, it has been estimated that higher standards would result in savings for the NHS and wider society in the long term (Roys, 2012). There has been limited post-occupancy evaluation of accessible homes (Sopp & Wood, 2001; Sutherland & Tarbatt, 2016), with the public health argument judged as weakly evidenced (Katikireddi *et al.*, 2011).

It has sometimes been argued or implied that homes with accessibility and adaptability features will be preferred by prospective occupants (Carrol *et al.*, 1999; JRF, 2007). Reasons for indifference to such features among some older people have been reported (Aitken *et al.*, 2020), but there has been limited consideration of the extent to which older homebuyers prefer dwellings with these attributes. High homeownership in the older population groups in developed countries mean the choices of older owner occupiers are critical. Accessible and adaptable homes will have a greater impact in the short to medium term if they are selected over other properties by people in these groups. This article reports on an exploratory study which sought to answer the research question: do older homebuyers prefer dwellings with accessibility and adaptability features? The study focuses on England for two reasons. First, England has experienced a rapidly ageing population, which is predicted to continue in the decades ahead (ONS, 2021). Secondly, housing accessibility has received heightened levels of public attention in recent years (HoME, 2019) prompting the government to reconsider building regulations (MHCLG, 2020). Accessible housing has thus become a topical debate, to which this research directly contributes. Given growing interest in housing accessibility and standards across the developed world, it also adds to international knowledge on this issue from the older homebuyer's perspective, while contributing to understanding ageing in place. As an exploratory study the research offers both methodological insights and indicative findings.

Ageing, housing and relocation

'Ageing in place' comprises a focus on ecological resources with reliance on objective indicators such as housing quality, access to amenities and transport, blended with subjective views on satisfaction with neighbourhood safety, friendliness, and housing quality (Peace *et al.*, 2005). The maintenance of independence and wellbeing are associated with a sense of control, a high degree of person-environment fit (Lawton, 1983) and deep emotional bonding with the home (Iwarsson *et al.*, 2004). For this reason Daatland and Hansen (2007) have suggested that personal control and ability to exercise choice are important contributors to housing satisfaction and may be more salient in late old age when other personal resources may decline, threatening feelings of continued independence.

As people age, many face the alternatives of ageing-in-place or relocating to a new environment (Curryer, 2016; Vasunilashorn *et al.*, 2012). Relocation has commonly been understood in the context of a push-pull framework comprising a

mixture of negative perceptions of existing environments and perceived advantages of prospective destination dwellings (Wiseman, 1980). Sociological interpretations of migration have focused on the life cycle, with growing and shrinking households both prompting relocation (Rossi, 1980). The potential of enjoying new leisure opportunities and the end of regular commuting may also free older people to consider new locations upon retirement (Litwak & Longino, 1987).

Relocation may not be pursued for reasons such as place attachment (Rowles & Bernard, 2013), perceptions of limited time to develop new social networks (Charles & Carstensen, 2010; Golant, 2020), and the psychological minimisation of challenging environmental conditions (Lawton & Nahemow, 1973). However, delaying action may increase tension and vulnerability as the individual's control over their environmental conditions reduces over time, potentially leading to isolation and loneliness as emotional resources are undermined by neighbourhood changes (Sixsmith & Sixsmith, 2008). In the context of the US, Golant (2008) argues that ageing in place does not work for vulnerable low-income householders who must draw on multiple forms of assistance. This may influence the supply of property that could be more effectively used by families (Wood, 2013; Legal & General, 2018).

While gerontologists have focused on residential comfort and mastery (Golant, 2011), housing economists have considered how destinations will be assessed against both movers' existing dwellings and housing aspirations, while influenced by the wider social environment and behavioural characteristics (Marsh & Gibb, 2011). This perspective has been concerned with cost-benefit analysis and subjective expected utility, incorporating returns on investment (Clough *et al.*, 2004). As they would argue, decisions of whether and how to adapt one's home or relocate do not occur in an economic vacuum. Brown & King (2005) distinguish between abstract choice and effective choice, where the latter encapsulates access to material resources which provide individuals with a genuine power to exercise decision-making. Individuals are dependent on the political-economic context and the power afforded them by governments and markets (Brown & King, 2005).

Environmental gerontology and theories of relocation have generally been focused on how older movers achieve immediate improvements in dimensions such as residential comfort and mastery (Golant 2011). The inclusion of a temporal dimension is less common. Golant (2003) considers time but focuses more on the individual's past rather than their future expectations. Consciousness of time increases in our deep old age with Laslett (1989) and Gullette (1997; 2004) discussing the anxiety created by our uncertainty of continuance for those in the so called fourth age. Charles and Carstensen (2010) suggest that relocation in later life may be hampered by the conscious view that there are fewer years ahead in which to build a social network in a new place. The benefits of a new environment may be seen as unlikely to be realised and combined with the perceived upheaval of moving, these expectations may strengthen a desire to remain in an existing residence (Golant 2020). Similarly, in making substantial financial investment in one's home, an older person may question whether the time they have left justifies such expenditure.

Previous research fails to consider the wider expectations of prospective movers which might shape relocation decision-making outside of death. This might encompass changes to physical, mental and cognitive health. In addition, the previous

focus has only been on the decision to relocate rather than how expectancies shape the type of location or dwelling that prospective movers would seek. The present study seeks to fill these theoretical and empirical gaps by exploring the attractiveness of accessibility and adaptability features to older prospective movers.

Market-based destinations for older people are becoming increasingly diverse, commonly including targeted developments such as sheltered housing, extra-care and retirement villages (Frank, 2016), with evidence suggesting these hold potential benefits for some groups (Holland *et al.*, 2015). The alternative of mainstream accessible housing has immediate value to people with existing physical disabilities (Celeiro *et al.*, 2017), who may find such properties to be scarce and unaffordable (Satsangi *et al.*, 2018), but beneficiaries also include people with temporary injuries and families with young children (Gusheh *et al.*, 2021). As such, these dwellings are often conceptualised as being pro-life-course since they accommodate common changes that occur over a lifetime (JRF, 2007). However, accessible housing has been criticised for placing too much emphasis on adult motor impairment, while overlooking sensory and cognitive impairments and the needs of children, as well as considerations of the sensual experience of home temperature, light and sound (Rooney *et al.*, 2018; Milner and Madigan, 2004).

There has been limited investigation into the demand for accessible and adaptable housing features among older people, especially in England. Accessibility and adaptability have been identified as desirable (Centre for Ageing Better, 2019; Croucher, 2008), but Glover (2019) found that they were relatively low priorities when respondents ranked attributes. In three Polish cities Iwański *et al.* (2019) found that the proportion of respondents aged 60 and over who selected wheelchair accessibility and accessible bathrooms as decisive elements of a good dwelling were lower than those who selected a balcony, attractive views and quiet, but higher than spill and smoke sensors, telemedicine and air-conditioning. Andersson *et al.* (2014) found that single level dwellings, elevators for dwellings on the third floor or above, and design for occupants to 'manage themselves' (p9) were more popular than design for disability, potentially highlighting the importance of language. A stated choice experiment in the Netherlands identified a cluster of respondents who preferred elevator accessible apartments, while another preferred ground floor, single level dwellings (de Jong *et al.*, 2018).

Mulliner *et al.* (2020) found bathroom features (such as walk in showers, downstairs bathroom), anti-slip flooring, and adaptable design possessed reasonably high mean ratings of importance. However, when compared to other characteristics these scores placed the features significantly behind attributes such as a safe neighbourhood, energy efficiency, cleanliness and aesthetics, but far ahead of larger homes, access to employment and ability to extend the property.

Previous research on older people's preferences for accessibility and adaptability suffers from two limitations. First, it has not asked respondents to make trade-offs between dwellings with different features, which better reflects the homebuying process. Secondly, studies have largely focused on the views of older people generally, rather than those intending to relocate. Since fewer older people move home, this approach potentially means the exercise remains largely hypothetical to participants. Overall, previous research may have captured a partial understanding of older people's preferences for accessible and adaptable design.

Materials and methods

This section begins with an outline of the rationale for the overall approach taken to the methodology and methods. From the perspective of the definitional framework of housing needs, choices, preferences, expectations and aspirations outlined by Preece *et al.* (2020), this study focuses on housing preferences, which the authors define as the 'expression of a desire or want for a particular form of housing' (p. 90). There are three justifications for this. First, a focus on housing needs, which relate to a failure to meet an adequate standard of housing, places emphasis on immediate concerns and would therefore place accessibility and adaptability features as only of relevance to those who actively require them currently. While such features are of potential benefit to individuals with existing disabilities, part of the conceptualisation of lifetime home models is that such features are there to be used as need arises. Secondly, housing aspirations generally relate to more optimistic desires and long-term ambitions whereas housing preferences are more associated with the 'context of constrained agency' (Preece *et al.*, 2020, p. 89). Thirdly, the focus is on preferences rather than choices because few accessible and adaptable properties exist, which makes it practically challenging to gather data on the choices made by older buyers.

The study is based on the theory of consumer behaviour following Lancaster (1966). This assumes utility to occupiers from housing derives from the characteristics of housing. This utility of the characteristics of housing is estimated through a stated choice experiment (SCE), in which customers are presented with sets of alternative combinations of characteristics and asked to choose their most preferred alternative set. In an SCE individual i is assumed to choose the attribute combination j over the alternative attribute combination k if $U_{ij} > U_{ik}$. i.e. if the utility from choice set j is greater than that from choice set k. Figure 1 shows a typical choice card, with different attribute levels. These attribute levels are varied across choice card sets, and the individual answers a number of choice sets (typically 4 to 8).

An SCE models the choice on each card as a function of the attributes. The characteristics of the individual can also be included. Since the dependent variable (choice) is a nominal variable (1 or 0), a binary logistic regression model is used, or a multinomial logit model if there are more than two alternatives. Repeated choices by customers between sets of attribute alternatives reveals trade-offs customers are willing to make between attributes, and their preferences for each attribute. The econometric specification of SC models can be found in Train (2003). SCEs have the advantage of allowing an estimation of respondents' preferences for attributes which are not widespread in the marketplace, such as accessibility and adaptability features (DCLG, 2016). While Q-methodology also explores perspectives, it focuses on sorting participants into groups based on similarities in their general viewpoints, whereas an SCE presents a choice between two or more options, gathering a more nuanced exploration of trade-offs within a specific scenario.

The prototype SCE developed included five accessibility and adaptability attributes in addition to price. This was trialled at two focus groups with people aged 50+ who had recently purchased a home or were intending to do so. The SCE was

Aspect	Property A	Property B	
Property Type	House	Bungalow	
Number of Bedrooms	4	2	
Entrance	Step-free access at the entrance to the property	Steps at the entrance to the property	
Bathroom	Bathroom includes provision for easier and cheaper installation of a level access shower in the future	Bathroom does not include provision for easier and cheaper installation of a level access shower in the future	
Bathroom Walls	Bathroom walls strong enough for installation of grab rails in the future	Bathroom walls would need to be strengthened for installation of grab rails in the future	
Cost	8% above your purchase budget	3% above your purchase budget	
Which Property would you Purchase? (Choose Only One)	☐ I would purchase Property A	☐ I would purchase Property B	☐ I would purchase neither property

Figure 1. Example choice card.

revised to include some features which did not relate to accessibility and adaptability based on participant feedback.

The final SCE included six attributes: property type; number of bedrooms; entrance type; bathroom adaptability; bathroom wall adaptability; and price (Table 1). These accessibility and adaptability attributes were chosen because they appear in both the LHS and M4(2) building regulations. They are therefore realistic examples of features which: are increasingly being included in new housing developments; campaigners argue need to be included in all new dwellings; and some developers are likely to oppose. Secondly, these features do not depend on whether the dwelling has multiple levels. Features in the LHS and M4(2) regulations related to multi-level dwellings were excluded to avoid their incompatibility with bungalows and flats. The cost attribute was defined as 'the sum you would pay the vendor for the property'. This

Table 1. The final DCE list of attributes and attribute levels.

Attribute	Levels
Property type	Flat
	House
	Bungalow
Number of bedrooms	1
	2
	3
	4
Entrance	Steps at the entrance to the property [or building if flat]
	Step-free access at the entrance to the property [or building if flat]
Bathroom	Bathroom does not include provision for easier and cheaper installation of a level access shower in the future
	Bathroom includes provision for easier and cheaper installation of a level access shower in the future
Bathroom walls	Bathroom walls would need to be strengthened for installation of grab rails in the future
	Bathroom walls strong enough for installation of grab rails in the future
Price	Equal to your purchase budget
	1% above your purchase budget
	3% above your purchase budget
	8% above your purchase budget
	12% above your purchase budget

was provided in percentage terms in relation to the respondent's budget. The questionnaire defined budget as 'the sum you are intending to pay for your new property'. The questionnaire advised that it may be helpful to imagine one's budget before answering the questions.

The combinations of alternatives within each choice were created using an orthogonal experimental design in SAS.[1] This design ensured that the respondents' preference for each attribute could be separately identified, i.e. attributes were not correlated with each other.[2] This produced 60 sets of attribute profiles, which were paired to produce 30 'choice cards'. Each choice card asked a respondent to choose between Property A, Property B or to opt-out and purchase neither property, effectively maintaining the status quo (Figure 1). The 30 choice cards were spread across five different versions of the questionnaire, with each respondent asked to make six choices.

The questionnaire comprised five sections. The first included questions on current home and the dwelling sought. The second captured the importance of each of 14 housing attributes on a seven-point Likert scale. Eleven attributes related to accessibility and adaptability, mostly drawn from the LHS and M4(2) regulations. The third section comprised the SCE questions. This began with an explanation of how to complete the choice questions, advised respondents to use the accompanying information sheet, and included a completed example with a description. The six choice cards followed. The fourth section captured some features of respondents' current homes and the final section asked demographic questions. The accompanying information sheet included an image of a step-free access property and a definition of this attribute drawn from the M4(2) regulations. It also included an image of a level-access shower, accompanied by a definition of both level access showers and 'provision for cheaper and easier installation of level access shower in the future' as used in the SCE, again drawing on the M4(2) regulations.

The pilot focus groups were attended by 13 participants, who were aged 50+ and had purchased a new home in the previous year or were intending to do so in the near future. In addition to the revisions discussed above, changes to the survey made after the focus groups included clarifying the term 'budget', making clear that properties should be considered identical other than the differences stated, and changing the images used in the information sheet. The qualitative findings from the wider focus group discussions have been reported elsewhere (Aitken *et al.*, 2020).

Recruitment

Respondents were purposively sampled using two eligibility criteria: aged 50 or over and the intention to relocate within the following two years. Paper questionnaires with pre-paid return envelopes were mostly distributed in the North East of England to older people's charities and community organisations, estate agents, people attending local events and supermarkets, staff working in local authorities, and members of the research engagement panel VOICE. Respondents were offered entry into a prize draw as an incentive. Shopping vouchers of £100 and £50 were used as prizes for the winner and runner-up respectively. A total of 93 questionnaires were distributed from August to December 2018 and 67 eligible responses were received (72 %).

Analysis

Likert scale data were analysed by calculating the mean importance rating. A Likert scale does not conform to economic theory, unlike an SCE. The SCE data was analysed by conditional logistic regression analysis using R, following the guidance of Aizaki *et al.* (2015) and using the associated support CEs R package (Aizaki, 2015). The analysis was independently confirmed using nlogit. The dependent variable was choice (1 or 0), and the independent variables the attributes of housing (Figure 1; Table 1). Some respondent characteristics were also included, although this complicates the model since these are invariant across choices for that respondent. The coefficients for each variable indicate the mean utility of that attribute to respondents, although the magnitude of each coefficient is scaled to the unit in which the attribute is measured. Also important is the sign on the coefficient (positive or negative relationship), and whether the coefficient is statistically significant. The attributes become more comparable when the economic values or willingness-to-pay (WTP) for a marginal change in each attribute is calculated.

Mean marginal willingness to pay (WTP) for an attribute is calculated by dividing each housing attribute coefficient by the price coefficient. WTP is thus the ratio of two random variables (a housing attribute coefficient and a price coefficient), so WTP itself is a random variable. Mean WTP and the confidence limits for WTP was calculated using the Krinsky and Robb method[3].

Finally, a latent class (LC) analysis was conducted using nlogit. LC models introduce heterogeneity into the analysis by assuming the distribution of tastes and utility varies between 'latent' (i.e. as yet unobserved) classes or groups of individuals; whilst

assuming preferences within each LC class are homogeneous. Each LC corresponds to a segment, or sub-housing market, of the population, with each class having a distinct and different set of preferences, choice behaviour, and attribute coefficients.

Ethics

The questionnaire provided the background to the research, advised that respondents could choose not to participate in the study and could also refrain from answering questions. It stated that all information provided would be kept strictly confidential and that respondents would not be identified in sharing the findings. Data were stored following the Data Protection Act 2018 and the General Data Protection Regulation.

Results

Sample

Fewer questionnaires were distributed than expected. Some older people's charities assisting with distribution commented that many of their service-users did not live in or seek market housing for sale and/or were not intending to relocate in the near future. The estate agents also struggled to generate interest, potentially because many buyers are aged under 50. Respondents were mostly female and largely under 70 (Table 2). Just over one fifth reported a long-term illness, disability or infirmity which limited their activities at least some of the time. Three quarters aimed to relocate in between one and two years' time, with the remainder aiming to do so within the next 12 months. Significant minorities reported that they did not know about the adaptability of their bathroom (26.9 per cent) or strength of their bathroom walls (10.3 per cent).

Importance of housing attributes

Four of the five attributes with the highest average importance scores from the Likert scale items were unrelated to accessibility and adaptability with off-street parking reported as the most important (Table 3). The accessibility or adaptability feature to receive the highest average score was bathroom walls which are strong enough for future installation of grab-rails. The attributes with the lowest scores were generally those which related to adaptability for major changes, such as through-floor lifts, stair-lifts and shower rooms at entrance level.

Modelling

The high numbers who reported not knowing whether their current bathroom was easily adaptable to installing a level access shower or had walls which could mount grab-rails (Table 2) posed challenges in modelling the SCE data including the status quo. Two models were produced to overcome this issue. The first model: combined

Table 2. Respondent characteristics from the survey data.

		Count	Percentage
Gender ($n=67$)	Female	44	65.7%
	Male	23	34.3%
Age ($n=60$)	50–59	25	41.7%
	60–69	16	26.7%
	70–79	15	25.0%
	80+	4	6.7%
Ethnicity ($n=67$)	White - British	63	94.0%
	White - Other	2	3.0%
	Chinese/Chinese British	1	1.5%
	Other	1	1.5%
Economic activity ($n=67$)	Retired	29	43.3%
	Working full time	25	37.3%
	Working part time	10	14.9%
	Looking after home or family	1	1.5%
	Other	2	3.0%
Household income ($n=67$)	£0–9,999	5	7.5%
	£10,000–£19,999	7	10.4%
	£20,000–£29,999	10	14.9%
	£30,000–£39,999	11	16.4%
	£40,000–£49,999	4	6.0%
	£50,000–£59,999	8	11.9%
	£60,000+	15	22.4%
	Rather not say/Don't know	7	10.4%
Current housing tenure ($n=63$)	Owner occupier - own outright	34	54.0%
	Owner occupier - with mortgage	24	38.1%
	Private rent	3	4.8%
	Social Rent - housing association	1	1.6%
	Social rent–local authority	1	1.6%
Curent home ($n=64$)	Flat/apartment	3	4.7%
	Semi-detached house	25	39.1%
	Terraced house	13	20.3%
	Detached house	15	23.4%
	Bungalow	6	9.4%
	Other	2	3.1%
Current home value of owners ($n=60$)	£50,000–£99,999	2	3.3%
	£100,000–£149,999	7	11.7%
	£150,000–£199,999	13	21.7%
	£200,000–£249,999	13	21.7%
	£250,000–£299,999	8	13.3%
	£300,000+	17	28.3%
Time in current home ($n=60$)	0–9 years	15	25.0%
	10–19 years	23	38.3%
	20–29 years	7	11.7%
	30–39 years	12	20.0%
	40 years or more	3	5.0%
Number of bedrooms in current home ($n=61$)	1	1	1.6%
	2	7	11.5%
	3	35	57.4%
	4	18	29.5%
	5 or more	6	9.8%
Home satisfaction ($n=67$)	Very satisfied	29	43.3%
	Fairly satisfied	24	35.8%
	Neither satisfied nor dissatisfied	7	10.4%
	Fairly dissatisfied	5	7.5%
	Very dissatisfied	2	3.0%
How well do you think your current home can meet your needs over the next five years? ($n=65$)	Very well	12	18.5%
	Fairly well	32	49.2%
	Neither well nor poorly	6	9.2%
	Fairly poorly	10	15.4%
	Very poorly	5	7.7%
Relocation status ($n=61$)	I aim to relocate in the next year	15	24.6%
	I am to relocate between one and two years time	46	75.4%

Table 2. (Continued).

		Count	Percentage
Viewings attended in the last six months ($n = 58$)	0	28	48.3%
	1–3	19	32.8%
	4–7	11	19.0%
Tenure Sought (multiple selections allowed) ($n = 65$)	Social Rent	5	7.7%
	Private Rent	3	4.6%
	Shared Ownership	2	3.1%
	Ownership	65	100.0%
Home type sought (multiple selections allowed) ($n = 65$)	Flat/apartment	20	30.8%
	Terraced house	14	21.5%
	Semi-detached house	25	38.5%
	Detached House	19	29.2%
	Bungalow	45	69.2%
	Other	4	6.2%
	Don't Know	4	6.2%
Respondent long term illness or disability ($n = 65$)	I don't have any long-term illness, disability or infirmity	47	72.3%
	Yes I have a long-term illness, disability or infirmity that doesn't limit my activities	4	6.2%
	Yes I have a long-term illness, disability or infirmity that limits my activities some of the time	8	12.3%
	Yes I have a long-term illness, disability or infirmity that limits my activities all of the time	6	9.2%
Household long-term illness or disability ($n = 65$)	No - I am the only person in my household	16	24.6%
	No one (else) in my household has any long-term illness, disability or infirmity	34	52.3%
	Yes they have a long-term illness, disability or infirmity that doesn't limit their activities	2	3.1%
	Yes they have a long-term illness, disability or infirmity that limits their activities some of the time	8	12.3%
	Yes they have a long term illness, disability, or infirmity that limits their activities all of the time	5	7.7%
Long term care provision in household ($n = 64$)	No, I am the only person in my household	16	25.0%
	No, I do not provide care to the other member(s) of my household	42	65.6%
	Yes	5	7.8%
	Rather not say	1	1.6%
Current entrance ($n = 67$)	Step-free access to the door	24	35.8%
	Steps to the door	43	64.2%
Current bathroom ($n = 66$)	Bathroom does not include provision for easier and cheaper installation of a level access shower in the future	20	30.3%
	Bathroom includes provision for easier and cheaper installation of a level access shower in the future	39	59.1%
	Don't know	7	10.6%
Current bathroom walls ($n = 67$)	Walls are strong enough for instllation of grab rails in the future	39	58.2%
	Walls would need to be strengthened for installation of grab rails in the future	10	14.9%
	Don't know	18	26.9%

responses for 'don't know' with 'no' for the two bathroom-related attributes; recoded respondents who reported currently residing in a property with five or more bedrooms as having four bedrooms; and added an alternative specific constant (ASC) to the dataset to distinguish between choosing a hypothetical property (A or B) and opting out. The model produced a large and significant coefficient for the ASC, indicating that respondents were much more likely to select a hypothetical property than opt-out (Table 4), consistent with respondents' intention to relocate within the next two years. In this model respondents were significantly more likely to select a bungalow over a house ($p < .01$) and significantly more likely to select a house

Table 3. Likert scores of the importance of housing attributes.

Attributes	Average Score
Off-street parking	6.09
Type of property (e.g. flat/house/bungalow)	6.03
Back garden	5.60
Bathroom/shower room walls which are strong enough for installation of grab rails in the future	5.17
Number of bedrooms	5.17
Personal washing facilities (bath/shower) on the same level as the entrance	4.66
Level access shower	4.55
Bathroom includes provision for easier and cheaper installation of a level access shower in the future	4.49
Step-free access at the entrance to the property or building	4.43
The age of the property	4.42
Space for creating a shower room with a level access shower on the entrance level within the existing property (i.e. without an extension)	4.36
Stairs which are wide enough to allow for cheaper installation and convenient use of a stair lift in the future	4.31
Wider doorways and corridors	4.06
A clear route for a through floor lift to be installed easily in the future.	3.25

Table 4. Main effects models with and without the inclusion of the status quo.

	Model 1 (including status-quo)		Model 2 (excluding status-quo)	
	Coefficient	Standard Error	Coefficient	Standard Error
Alternative specific constant	14.23***	2.95	–	–
Dwelling type				
House	–		–	
Flat	−0.47**	0.23	−0.57*	0.31
Bungalow	0.68***	0.20	0.73**	0.29
Bedrooms				
One bed	–		–	
Two bed	1.33***	0.29	1.22***	0.38
Three bed	1.66***	0.30	1.72***	0.37
Four bed	1.69***	0.30	1.61***	0.39
Accessibility and adaptability characteristics				
Step-free access at entrance	0.81***	0.15	0.50**	0.21
Bathroom with provision for easier and cheaper installation of a level access shower	0.48***	0.15	0.64***	0.22
Bathroom walls strong enough for installation of grab rails in the future	0.30**	0.15	0.30	0.20
Price	−14.37***	2.82	−0.13**	0.06
Observations	362		182	
Respondents	61		62	
Zero log-likelihood	−397.70		−126.15	
Log-likelihood at convergence	−304.47		−81.80	
Adjusted ρ^2	0.21		0.28	

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Table 5. Models including interaction terms.

	Model 3 (with age interaction term)		Model 4 (with disability interaction term)	
	Coefficient	Standard Error	Coefficient	Standard Error
Alternative specific constant	15.33***	3.12	14.36***	2.99
Dwelling type				
House	–			
Flat	−0.48**	0.24	−0.49**	0.23
Bungalow	0.67***	0.20	0.65***	0.20
Bedrooms				
One bed	–			
Two bed	1.23***	0.30	1.34***	0.30
Three bed	1.65***	0.30	1.66***	0.30
Four bed	1.75***	0.30	1.72***	0.30
Accessibility and adaptability characteristics				
Step-free access at entrance	0.65***	0.22	0.71***	0.17
Bathroom with provision for easier and cheaper installation of a level access shower	0.50**	0.22	0.37**	0.17
Bathroom walls strong enough for installation of grab rails in the future	0.20	0.23	0.27	0.17
Price	−15.35***	2.99	−14.47***	2.87
Age interaction terms				
Age x step-free access at entrance	0.08	0.29	–	–
Age x bathroom with provision for easier and cheaper installation of a level access shower	0.12	0.30	–	–
Age x bathroom walls strong enough for installation of grab rails in the future	0.06	0.31	–	–
Activity-limiting disability interaction terms				
Activity-limiting disability x step-free access at entrance	–	–	0.43	0.32
Activity-limiting disability x bathroom with provision for easier and cheaper installation of a level access shower	–	–	0.61	0.35
Activity-limiting disability x bathroom walls strong enough for installation of grab rails in the future	–	–	0.16	0.35
Observations	338		351	
Respondents	57		59	
Zero log-likelihood	−371.33		−385.61	
Log-likelihood at convergence	−285.42		−296.43	
Adjusted ρ^2	0.20		0.20	

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

than a flat ($p < .05$). Dwellings with more than one bedroom were significantly more preferred ($p < .01$). As expected, price had a significantly negative impact on the likelihood of a property being chosen. Homes with step-free access and adaptable bathrooms were both significantly more likely to be selected ($p < .01$), as were those with stronger bathroom walls ($p < .05$).

The second model excluded the status quo option. Observations where it was selected were entirely removed and the data for this option were removed in observations where it was not chosen. Despite reducing the dataset by half, this model produced broadly the same results (Table 4). However, bathroom walls were no longer significant, and flats were no longer significantly less preferred than houses at $p = .05$.

Table 6. Latent class model.

	Class 1		Class 2	
	Coefficients	Standard error (coefficient)	Coefficients	Standard error (coefficient)
Alternative specific constant	20.20***	5.95	2.80	9.98
Dwelling type				
House	1		1	
Flat	−0.85*	0.47	−0.59	0.47
Bungalow	1.03***	0.32	0.56	0.48
Bedrooms				
One bed	1		1	
Two bed	2.93***	0.68	0.44*	0.55
Three bed	3.84***	0.73	1.17*	0.63
Four Bed	2.31***	0.83	1.17	0.66
Accessibility and adaptability characteristics				
Step-free access at entrance	1.63**	0.71	−0.38	0.38
Bathroom with provision for easier and cheaper installation of a level access shower	0.94***	0.30	0.26	0.31
Bathroom walls strong enough for installation of grab rails in the future	0.46	0.40	0.49	0.36
Price	−25.24***	6.24	−3.14	9.79
Estimated latent class probabilities	77.96%		22.04%	
Observations	384			
Respondents	58			
Zero log-likelihood	−421.87			
Log-likelihood at convergence	−293.53			
Adjusted ρ^2	0.30			

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Table 7. Marginal willingness to pay estimates.

	Marginal willingness to pay	2.50%	97.50%
Flat	−4.53*	−21.19	0.81
Bungalow	5.82**	0.60	31.26
Two bed	9.74**	2.25	52.51
Three bed	13.72**	5.59	65.53
Four bed	12.91**	4.79	62.05
Step-free access at entrance	3.97**	0.33	19.48
Bathroom with provision for easier and cheaper installation of a level access shower	5.12**	1.45	19.80
Bathroom walls strong enough for installation of grab rails in the future	2.40	−1.14	12.59

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

The potential influence of two interaction factors involving the accessibility and adaptability features were also explored using the approach applied in Model 1. Those who had the median age of the sample of 61 years or older were not found to be more likely to select a dwelling with any of the accessibility and adaptability

features (Table 5). The same was true for those respondents who reported an activity-limiting illness, disability or infirmity (Table 5). Latent class modelling was completed using the dataset as prepared for Model 1, but respondents were only included in this analysis if they had contributed responses to all six SCE questions, to ensure each respondent contributed equal data. Two classes were identified (Table 6). The majority of respondents fall into class 1, which significantly prefer step-free access and bathroom-to-shower room adaptability. Class 2 are a mixture of respondents who have unclear, ambiguous and diverse preferences, with no statistically significant attraction ($p < .05$) toward any attribute, including the ASC, suggesting they may be less committed to the prospect of relocation.

Marginal willingness to pay

Model 2 was used to complete the marginal willingness to pay calculation (Table 7). Respondents were willing to pay significantly more than their budget in percentage terms (5.1%) to purchase a property which has an adaptable bathroom [i.e. with provision for easier and cheaper installation of a level access shower, ($p < .05$)] and for properties with step-free access (4%, $p < .05$)) but not for properties with stronger bathroom walls.

Discussion

This exploratory study investigated older prospective homebuyers' preferences for dwellings with accessibility and adaptability features. This is thought to be the first study to explore this issue in England using a SCE. It contributes indicative findings, an assessment of the methodological challenges encountered and implications for future research, policy and practice.

The paper makes three key empirical contributions. First, the results indicated that other concerns outweighed accessibility and adaptability features for our sample. This is consistent with previous studies which have found that selecting accommodation which is future proofed against the risk of disability is not the overriding issue for older home movers (Glover, 2019; Iwański *et al.*, 2019; Mulliner *et al.*, 2020). This potentially undermines proposals for minimum regulations, but it can be argued that intervention by the state is required to represent broader societal and economic perspectives. However, due to the low turnover of housing stock (GOS, 2008), it may take decades until most properties possess accessibility and adaptability features, limiting the impact government design mandates may have in the short to medium term. This demonstrates the continued importance of household prioritisation and decision-making.

Secondly, our sample preferred dwellings with step-free access and adaptable bathrooms, with a 77 per cent market share, and would be willing to pay significantly more for these properties. The evidence was found to be weaker for adaptable bathroom walls. While previous research has explored accessibility and adaptability features in groups (Mulliner *et al.*, 2020), this study provides greater nuance as to how the views of older homebuyers may vary for specific attributes. The differences

observed may be because the adaptable bathroom wall attribute specifically referred to grab-rails, which may overtly signal disability. This is consistent with the work of Andersson *et al.*, (2014) who found lower attraction to design for disability than design for independence.

Findings from the focus groups suggested that some older homebuyers are reluctant to consider the prospect of developing disabilities and the use of accessibility and adaptability features in the future (Aitken *et al.*, 2020). Associated stigma can delay home adaptations (Bailey *et al.*, 2019). Further qualitative research is needed to understand why some accessibility and adaptability features may be more preferred than others.

Thirdly, the study found that neither age nor activity-limiting disability, illness or infirmity significantly impacted on respondents' preferences for accessibility and adaptability features. This echoes the work of Przybyła *et al.* (2019) but is inconsistent with other research (Andersson *et al.*, 2019; Mulliner *et al.*, 2020). It was expected that older respondents would prefer homes with 'future proofed' design, given the association between age and disability (DWP, 2020). This may be a limitation of the sample. If it had included greater numbers of people in their late 70 s and older, there may have been expectations of longer life spans (O'Dea & Sturrock, 2018) and higher chances of future disability. Alternatively, preferences for step-free access and adaptable bathrooms may not be related to current, or expectations of future, disability. It may be that such preferences are driven by increasing market penetration and aesthetic appeal of features such as wet rooms (Bailey *et al.*, 2018). It is important to recognise the small sample sizes involved in exploring these interaction effects and that this limitation prevents the drawing of firm conclusions. Studies with significantly larger sample sizes will be better placed to explore the interaction of age and disability with preferences for accessibility and adaptability features.

Previous theories of environmental gerontology have generally ignored temporal considerations and where they are discussed this is generally in relation to an older person's social and psychological history and how this impacts the present (Golant, 2003). This paper makes two temporal-related theoretical contributions, building upon Golant's (2020) work on relocation. First, we expand upon Golant's focus on expectations of death to encompass two additional expectancies: expectations of future disability; and the expected utility of certain features to moderate the impact of disability. Second, we expand on Golant's focus from how temporal considerations influence *whether* to relocate to *where* to relocate.

Given the preference for step-free access and adaptable bathrooms regardless of age and disability, respondents may be considering how these features will offer benefits in the years and decades ahead. The lack of attraction to adaptable bathroom walls for grab-rails suggests that respondents may believe there is limited probability of experiencing disability which would benefit from grab-rails or that the feature itself has limited utility. The participants had a median age of 60 and a significant minority had retired fully from work and as such could be considered as in the 'third age' (Laslett, 1989). Their potential unwillingness to consider their future self as disabled and life limited could be part of a societal unease with the fourth age (Laslett, 1989). If the third age is a time (for some) of self-actualisation

and greater freedom of choice then in stark contrast the fourth age is characterised by 'the intersection of age, impairment and socio-cultural values of decline' with the stark reminder that life is finite (Grenier, 2012, p. 55). In housing terms there is a clear tension between supporting one's independent living thus signalling the third age and those housing choices that may signal impairment and entry to the fourth age. Previously documented aesthetic reservations about features such as grab rails may heighten anxiety regarding the transition to a fourth age (Bailey *et al.*, 2019).

There are also four methodological reflections to consider. First, the process of selecting the accessibility and adaptability attributes to include in the SCE was challenging because of how many relate to whether the dwelling is single- or multi-level. One potential solution is to group accessibility and adaptability features into one broad attribute which communicates a design orientation toward independence or ageing-in-place. However, this method would not assist in exploring the relative attractiveness of different accessibility and adaptability features.

Secondly, recruitment was challenging. The requirement that respondents intend to relocate has not been widespread in previous research and allowed the current study to gather more realistic perspectives. However, this requirement significantly reduces the pool of eligible respondents (MHCLG, 2019). Future research might consider using market research companies and panel providers.

Thirdly, the relatively high proportion of respondents who reported not knowing about the adaptability of their current home created challenges with modelling related to the status quo option. One solution may again be to use one attribute for accessible and adaptable design which may be more likely to result in fewer 'don't know' responses. Alternatively, responses could be restricted to the two hypothetical dwellings. On the one hand, this approach might be reasonable if the eligibility criterion of intention to move remains, as the option of not moving is less appealing to these respondents. On the other hand, this may result in a greater number of missing responses from those who are equally unattracted to either hypothetical dwelling.

Finally, SCEs are now extensively used in a variety of fields and the present study demonstrates how quantitative estimates can be derived for the demand for, and value of, accessible and adaptable housing features, as an aid in decision-making by government and private developers. There is the opportunity to build upon this approach by combining it with Q-methodology (see Hampson *et al.*, 2022). While resources were heavily constrained in the present study, future explorations might consider an enhanced SCE with the inclusion of Q-methodology to provide enriched explanations for differences in respondents' preferences towards housing accessibility and adaptability.

In England, policy on ageing is split across several government departments and there is no overarching 'Minister for Older People'. However, the government has recently developed new policy on adult social care funding and is consulting on new minimum accessibility standards. The findings from the present study are indicative, but if replicated they have several implications for policy and practice. First, they suggest that there may be advantages to developers engaging with the accessibility and adaptability agenda, or at least that higher building regulations may be less harmful to their interests than they may believe (Booth, 2018). The findings identify specific features which developers and estate agents may wish to emphasise to attract older buyers. Further research should explore whether older buyers'

marginal willingness to pay could partially or wholly offset the extra building costs involved. This could result in more accessible and adaptable homes, regardless of whether higher building regulations become mandatory.

Secondly, the findings also point toward the importance of information-sharing. There is no specific accreditation scheme for accessible and adaptable homes which is widely used by estate agents and developers in England. Property websites do not commonly allow filtering by design features or standards and there is no central database of properties with accessibility features, unlike Energy Performance Certificates (EPC) and the Fenestration Self-Assessment (FENSA) scheme. The findings point toward exploring an accreditation scheme which can be widely adopted by the construction industry and estate agents and allow homebuyers to access more detailed information about the design of properties (Russell, 1999). This may facilitate more informed decisions on home purchases in later life.

Limitations

There are several limitations to the study. First, the sample was small, not necessarily representative of older prospective homebuyers across England, and comprised individuals rather than households. Secondly, only a limited number of accessibility and adaptability variables and wider housing variables were included. There are cognitive limitations on how many attributes respondents can trade-off against each other in a single SCE, without the respondent adopting some simplifying heuristic, effectively ignoring some attributes in the choice set. Future studies might consider including multiple SCEs in the study and comparing preferences across them; using a revealed preferences approach; or using one general attribute for accessible and adaptable design, leaving greater space for other control variables. Thirdly, sensory experience of engaging in property viewings is likely to be heavily influential in reality but cannot be practically included within an experiment. Finally, the study used percentages above respondents' budgets to indicate property prices, which may have distanced them from the actual sums involved. Using an online questionnaire which could display property prices based on the budget inputted by respondents would overcome this limitation.

Conclusion

This study explored preferences for accessible and adaptable design features among older people. Dwellings designed to take account of changes in housing needs may be of particular value to older people, who are more likely to experience disability. However, the extent to which older movers prefer such properties is largely unexplored. This creates the prospect that accessible and adaptable homes may be occupied by younger households who would be less likely to experience short to medium term benefits. The study was innovative in applying an SCE approach, which has been under-utilised in this field, and in only capturing the preferences of older people who reported an intention to relocate in the near future. The indicative results demonstrated that accessible and adaptable design features were low priorities among

respondents but that on average they still preferred properties with some such features and were willing to pay more for them. The results demonstrate how some accessibility and adaptability features may be more persuasive in older people's homebuying decisions than others. It adds to the growing body of evidence internationally that older homebuyers may prefer certain specific accessible and adaptable design features when selecting a new home but demonstrates how this may be unrelated to age and disability.

Notes

1. Statistical Analysis System, a statistics software suite developed by the SAS Institute in North Carolina.
2. If two attributes were correlated with each other in the experimental design then it is impossible to distinguish the separate effect of each attribute on the dependent variable (choice).
3. The Krinsky and Robb method takes a large number of draws from a normal distribution, with means given by the estimated coefficients, and covariance as estimated by the covariance matrix of the coefficients (see Hole, 2006).

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