# No place like home?

de Jong, Petra

*DOI:*
10.33612/diss.178356380

# Chapter 4

## STAYING PUT OUT OF CHOICE OR CONSTRAINT? THE RESIDENTIAL CHOICE BEHAVIOUR OF DUTCH OLDER ADULTS.

This chapter is reprinted from: De Jong, P.A., Rouwendal, J., & Brouwer, A.E. Staying put out of choice or constraint? The residential choice behaviour of Dutch older adults, and is subject to revisions by an international peer-reviewed journal.

# Abstract

Mobility on the housing market strongly declines with age. In contrast to younger age groups, older adults show a tendency to 'stay put'. There is little evidence whether this immobility of older adults is due to choice (i.e. the wish to age in place) or to constraint (i.e. the lack of alternatives). This study makes an empirical analysis of the underlying preferences for housing of Dutch older adults by reporting the stated preferences of Dutch older adults for bundles of housing characteristics. It offers insight in the relative importance of various aspects of housing and explores whether these preferences are stable for different age groups. The study finds a strong preference for the current dwelling, especially for the older age groups. Running separate models for different age groups results in an improvement of the log likelihood, indicating the presence of heterogeneity in housing preferences among Dutch older adults.



Keywords: ageing in place, housing preferences, stated preferences, conjoint analyses, older adults

# 4.1. Introduction

Residential mobility varies considerably depending on age (Kramer & Pfaffenbach, 2009). From previous studies it is known that older adults do not change residence to a large extent, especially compared to younger age groups (Geist & McManus, 2008; Tatsiramos, 2006; Walters & Owen, 2000). Rather, they have a tendency to 'stay put' where they have lived for a long time (Andersson & Abramsson, 2012; Feinstein, 1996). Previous studies also demonstrate that this tendency to stay put increases with age (Andersson & Abramsson, 2012; Costa-Font et al., 2009; Robison & Moen, 2000).



In recent years, the concept of 'ageing in place' has been attracting a growing academic interest (Atkins, 2018; Smetcoren et al., 2017). Ageing in place has been defined as "the desire and tendency of older persons to stay in their current dwelling units for as long as possible" (Pynoos, Nishita & Kendig, 2007, p. 711). In the Netherlands, as well as in other countries, it is usually viewed as the policy ideal of enabling people to remain in their existing home while ageing (Cutchin, 2003; Golant, 2011; Löfqvist et al., 2013), hence postponing and decreasing expensive institutionalized care (Wiles et al., 2012; Kendig et al., 2017). These policies are encouraged by emphasizing that growing old in one's own home and neighbourhood is in the best interest of older adults, as they can then age within a familiar and predictable environment that is supportive of their social, emotional and instrumental needs (Davies & James, 2011; Milligan, 2009; Lager, 2015).

Indeed, there has been, and continues to be, a strong desire of older adults themselves to age in place (Wahl et al., 2012). This desire may reflect an optimization strategy critical to late life, as it affords continuity and control over important aspects of daily life, including routines, self-care and other potentially meaningful and self-defining activities (Rowles et al., 2004). As such, it has been argued that ageing in place can enhance a sense of independence, identity, autonomy, security and emotional attachment with the dwelling and neighbourhood (e.g. Kendig et al., 2012; Pynoos et al., 2007; Wiles et al., 2012). However, some long-cherished home environments may ultimately become unsuitable for the needs of older adults (Han & Kim, 2016; Judd et al., 2014; Atkins, 2018). Several studies have demonstrated possible hazards and negative outcomes for the independence, health and wellbeing of older people when living in inadequate housing (Golant, 2011; Lord et al., 2006; Oswald et al., 2007; Sixsmith & Sixsmith, 2008; Wagner et al., 2010). So, depending on the circumstances, staying put can be both positive and negative (Atkins, 2018). It can be a desired choice, or a response to restrictions and constraints (Hanson, 2005), such as a lack of alternative dwellings (Hansen & Gottschalk, 2006). To meet the demands of older

adults over time, it is often recommended that a wide variety of housing options are available in the future (see e.g. Robinson & Moen, 2000; Weeks et al., 2005). However, there is little evidence to provide guidance for specific types of housing that should be developed (Weeks et al., 2013).

In this study the housing preferences of Dutch older adults is analysed by means of a conjoint choice experiment. It involves presenting older adults with a choice between their existing home and several (hypothetical) alternative dwellings. This provides us with more insight into the tendency of Dutch older people to stay in the current dwelling, and whether this is caused by choice (i.e. the desire to age in place) or by constraint (i.e. the lack of alternatives). In doing so, we are also able to offer insight in the relative importance older adults give to various housing characteristics. The findings will enable researchers, housing professionals, and policy makers to refine predictions of housing and design more effectively for the diverse needs of older adults.

## 4.2. Housing preferences

Although the concepts of preference and choice are widely used in housing research these terms are sometimes mistaken for each other. According to Jansen et al. (2011) preference refers to the relative attractiveness of an object, while choice refers to actual behaviour. As such, preference may guide choice, but the evaluation involved in preference may take place whether or not a choice has to be made. Another important difference between housing preference and housing choice is that preference is a relatively unconstrained evaluation of attractiveness (Jansen et al., 2011). Whereas housing choice will always reflect the joint influences of preference, regulations, market conditions, availability, and internal and external personal factors such as lifestyle, financial means and social class.

The study of housing preferences and housing choice has been, and still is, attracting the interest of researchers from a variety of disciplines such as environmental psychology, geography, urban planning, urban sociology and regional economics (Timmermans et al., 1992). As a result, housing preferences have been studied from different theoretical perspectives and with a great variety of methodological approaches (e.g. Sabagh et al., 1969; Ritchey, 1976; Priemus, 1984; Fawcett, 1986; Musterd, 1989; Smid & Priemus, 1994; Timmermans et al., 1994; Mulder, 1996).

Even though there is a large variety in methodology, the studies for housing preferences have many commonalities. According to Timmermans et al. (1994) all studies assume that houses can be described and qualified in terms of a set of attribute levels. Furthermore,

they assume that individuals or households obtain some utility from each of these attribute levels, and combine their part-worth utility according to some rule to arrive at an overall preference or choice. Nevertheless, many differences appear in the specification of these rules (i.e. the assumptions made about the underlying decision-making process) (Timmermans et al., 1994).

Differences in data collection procedures also exist: does it concern choices that have actually been made in the 'real world' (i.e. revealed preferences) or choices in response to survey questions (i.e. stated preferences)? Revealed preferences are based on observed choices in real markets and they are assumed to reflect people's preferences (Timmermans et al., 1994). Observational choice data are interpreted in terms of utility-maximizing behaviour and a utility function is derived from such data. This provides an indication of the 'worth' (the preference) of the various housing attributes (Jansen et al., 2011). Observed choices will always reflect the influence of market conditions and availability. The model used by a researcher to interpret these data does not always include all factors that are relevant in reality and may therefore be biased. According to Timmermans et al. (1994) it is therefore difficult, if not impossible, to interpret observed choices in terms of utilities and preferences.



On the other hand, stated preferences combines observations of elicited preferences and hypothetical choices with assumptions about the underlying processes of preference formation to yield predictions (Jansen et al., 2011). They are based on individuals' and households' expressed preferences and choices in an environment that can, to some extent, be controlled by the researcher. In some situations stated choice information is therefore more informative than observed choices (Timmermans et al., 1994). In this study the main concern is with measuring the stated housing preferences of older adults. By measuring preferences based on their expressed preferences, this study aims to expose whether the revealed preference of older adults (i.e. 'stay put') is caused by choice or by constraint.

## 4.3. Methods

### 4.3.1. Experimental design

In this paper the stated housing preferences of older adults are analysed based on a carefully constructed questionnaire, designed as a conjoint choice experiment. It involved presenting the respondents with a choice between several alternatives. In the present context, an alternative is a bundle of housing characteristics. A general characteristic is called an attribute and a specific value of the characteristic is called an attribute level.

An example of an attribute is the type of dwelling, with a possible attribute level being an apartment. In conjoint choice experiments, respondents indicate their preference by choosing the most preferred housing alternative, or by rank ordering the housing alternatives from the most preferred to least preferred. The choices made reflect the preferences for certain characteristics of dwellings.

By design, all respondents in our sample made a sequence of such choices. In our experiment, each choice set refers to three alternative combinations of housing characteristics, one among them being the respondent's current dwelling. The inclusion of the current dwelling as a choice option meant that older adults were able the choose to 'stay put'. The respondents were asked to indicate the first and the second most preferred alternative, thereby revealing their complete preference orderings of the three.

*Number of attributes*

To avoid complicating the task of the respondents too much, the number of attributes that may describe an alternative should not be too large. Therefore, the task for the respondents was simplified by taking their existing dwelling as the starting point. All characteristics of their current housing situation remained equal to their current values in the hypothetical alternatives, except for five attributes on which the specific choice focused (see Figure 4.1). Therefore, by definition, the remaining (unspecified) attributes were the same for all three alternatives.

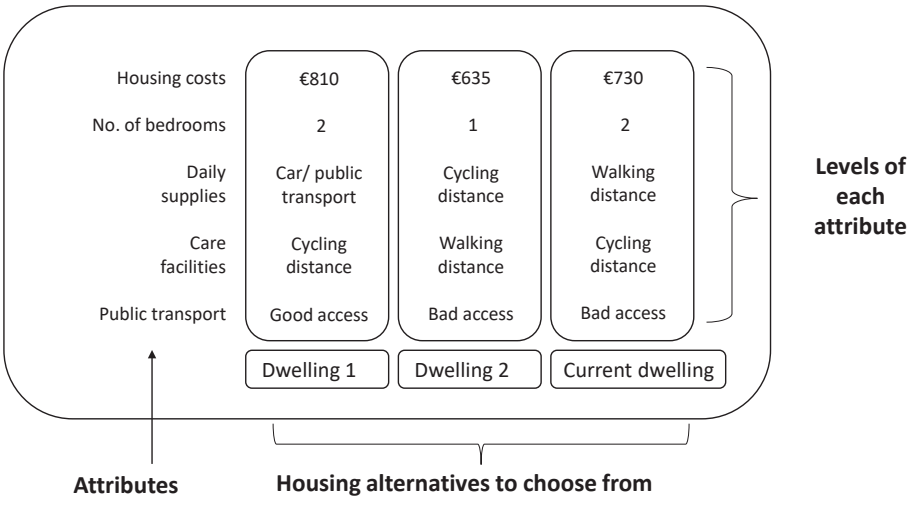


Figure 4.1 Example of a choice set

Since we were interested in more than five attributes, the conjoint choice experiment was subdivided into four games. In each game, the levels of at most five attributes were varied. The monthly cost of housing and the size of the dwelling (i.e. the number of bedrooms) were an attribute in each game, because these two dwelling characteristics are assumed to be key aspects in explaining the trade-offs older adults make (see Figure 4.2). The resulting overlap in the attributes of the different games makes it possible to estimate a model for all sequential choices jointly.



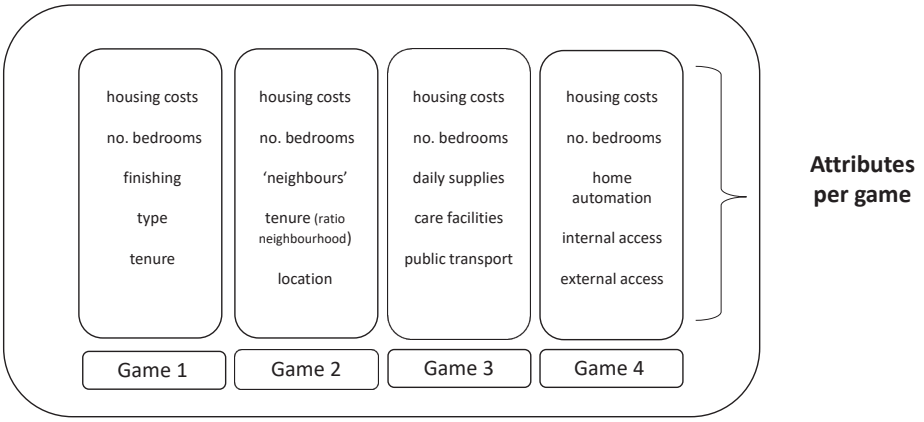


Figure 4.2 Housing games

*Realistic housing alternatives*

For each game, eight housing alternatives were pre-defined. The eight alternatives were chosen such that there was sufficient variation in their attribute levels and there were no obvious attractive and unattractive housing alternatives, in order to avoid trivial uninformative choices. The housing alternatives presented to the respondents had to be as clear and as realistic as possible. Therefore, some of the attribute levels were chosen on the basis of the current housing situation of the respondent (following Fowkes & Wardman, 1988). In this way we ensure that the monthly housing costs of the alternatives were not too far removed from the respondent's current situation. The same holds for the type of dwelling and the number of rooms. Since the attribute levels of the housing alternatives depended on the current dwelling of the respondent, they had to be generated by computer, based on answers given prior in the questionnaire (see: Appendix 4.1). This also implied that the alternatives could not be presented on physical cards.

*Number of comparisons*
On the basis of earlier experiences with conjoint choice experiments, it was expected that the respondents could be asked to do twenty-four such comparisons without increasing the cognitive burden too much (see e.g. Hensher et al., 2005; Louviere et al., 2000). Although the number of comparisons may seem large, nevertheless, its consequence is that only a small fraction of all possible combinations of alternatives could be presented to the respondents. Therefore, the respondents were also randomly assigned to one of six groups. Each group evaluated different combinations of alternatives of different games (see: Appendix 4.2).

### 4.3.2. Data collection
The data were collected in the summer of 2011 in cooperation with a housing association in Groningen, the Netherlands. The respondents were drawn from the directory of the housing association. Since this sample consisted solely out of tenants, the sample was extended with owner-occupiers. The total sample consisted of 6,684 respondents, aged 55 years or older, all living in the municipality of Groningen. In total 1,010 respondents participated in the research (response rate of 15%). Cases missing substantial data were filtered out prior to analysis, making a final sample of 952 respondents.

We determined the representativeness of our sample by comparing our dataset to the Housing Research Netherlands (HRN) dataset of 2009. The HRN survey is a large cross sectional survey in which information is gathered about the housing situation of people living in the Netherlands. The HRN dataset is representative of the Dutch population aged 18 and above, not living in an institution. The dataset of 2009 includes 78,071 observations, of which 29,129 persons are aged 55 years or older. Compared to the HRN dataset, the 'pre-elderly' (i.e. 55-64 years) and higher educated older adults are overrepresented in our sample (see Table 4.1).

The design of the experiment implied that the questionnaire was highly individual and could not be presented on paper. As a consequence 'old-elderly' (i.e. 75+ years) and lower educated respondents are underrepresented in our dataset.

### 4.3.3. Discrete choice model
In the housing games the respondents indicated a sequence of preference orderings, each of them referring to three housing alternatives (one of them being their current dwelling). The small number of alternatives suggests the use of a discrete choice model as a suitable tool for analysis. Among such models the conditional logit model is the easiest to handle because of its closed form expression for the choice probabilities. The logit model is the standard model for the analysis of the type of data at hand (see e.g. De Dios Ortúzar & Willumsen, 1994).

Table 4.1 Descriptive statistics sample

| Variable | Mean sample | Mean Groningen (HRN) | Mean the Netherlands (HRN) |
|---|---|---|---|
| Age | | | |
| 55-64 | 66.10% | 43.70% | 44.70% |
| 65-74 | 24.30% | 27.70% | 31.90% |
| 75+ | 9.60% | 28.60% | 23.40% |
| Gender | | | |
| Male | 53.90% | 36.90% | 42.80% |
| Female | 46.10% | 63.10% | 57.20% |
| Educational level | | | |
| Low | 33.00% | 53.40% | 53.70% |
| Middle | 23.90% | 20.90% | 23.00% |
| High | 43.10% | 25.70% | 23.30% |
| Children (living at home) | 8.90% | 5.80% | 9.30% |
| *n* | 952 | 206 | 29,129 |



*Model specifications*

The standard logit model has choice probabilities $p_i$ that can be written in closed form:

$$p_i = \frac{e^{v_i}}{\sum_{j=1}^{I} e^{v_j}}$$

Here $p_i$ denotes the probability that housing alternative $i$ is ranked first among $I$ housing alternatives (see for example Ben-Akiva & Lerman, 1985 for an elaborate discussion of the model) and $v_i$ is the deterministic part of the utility that the consumer attaches to alternative $i$. It is conventional to assume that $v_i$ is a linear function of a vector of explanatory variables $\mathbf{x}$, that is, $v_i = \beta \mathbf{x}_i$, with $\beta$ a vector of the parameters. Total utility $u_i$ is the sum of the deterministic part $v_i$ and a random variable $\varepsilon_i$.

The probability that housing alternative $i'$ is ranked second in the preference ordering of an individual, given that housing alternative $i$ is ranked first, can be written as:

$$p_{i'|i} = \frac{e^{v_{i'}}}{\sum_{j \neq i} e^{v_j}}$$

Here $p_{i'|i}$ denotes the probability that $i'$ is ranked second among the $I$ housing alternatives, given that $i$ is ranked first. Clearly $p_{i'|i}$ is identical to the probability that $i'$ is ranked highest among the $I$-1 alternatives that remain if the most preferred housing alternative $i$ is deleted from the choice set.[1]

1 See Beggs, Cardell, & Hausman (1980) for discussion.

We then consider the choices made by an arbitrary respondent $j$, $j = 1, \ldots, J$ in our sample. This respondent has repeatedly indicated his or her first and second choice among groups of three housing alternatives. The model explains these choices, as well as possible by finding the optimal values of the regression coefficients β. Therefore, the dependent variables are the observed choices and the parameters are the elements of β. These will be estimated by maximum likelihood.

The choice set offered to individual $j$ can be denoted as $A_{jk}$, $k = 1, \ldots, K$, with $K = 24$ being the total number of choice sets from which the respondent had to choose. Let $A_{jk} = \{a,b,c\}$ and suppose that alternative $c$ was ranked first, alternative $b$ second and (hence) alternative $a$ third. Given the logit assumptions made above, the probability that the respondent indicates this ranking equals:

$$P_{jk} = \frac{e^{v_c}}{e^{v_a} + e^{v_b} + e^{v_c}} \frac{e^{v_b}}{e^{v_a} + e^{v_b}}$$

Thus $P_{jk}$ is the probability that alternative $c$ is ranked first among the three alternative $\{a,b,c\}$, multiplied by the probability that $b$ is ranked first among the remaining alternatives $\{a,b\}$. The probability of the ranking indicated by the respondent can be written in this way for each choice set $A_{jk}$. The probability that respondent $j$ would make the particular sequence of rankings he or she indicated will be denoted as $P_j$ and is the product of the probabilities $P_{jk}$ over all $k$

$$P_j = \prod_{k=1}^{K} P_{jk}$$

This formulation reflects our assumption that a single preference ordering over all relevant attributes of the possible housing combinations governs the choices of our respondents. Each choice made by the respondents adds to our information about the preference ordering, and all information is used to estimate the parameters of the utility function representing that ordering simultaneously. The likelihood of the sequences of rankings indicated by all respondents is the product of all $P_j$s over $j$ and from this expression the log likelihood can be easily derived by taking logarithms. The maximum likelihood estimators are then obtained by maximizing log $L$ over the parameters.

$$L = \prod_{j=1}^{J} P_j$$

*Explanatory variables*

Housing decisions of older adults are influenced by many factors, and more often than not, older adults move for a combination of reasons (Oswald et al., 2002). The explanatory variables in our model were chosen on the basis of former research studying the residential

mobility of older adults. Our review of the literature indicates that factors related to income and housing costs are of particular importance (see among others: Weeks et al., 2013). For the remaining housing attributes we primarily focused on in the push and pull factors related to the immediate environment of older adults.

According to Lawton & Nahemow (1973), the fit between older adults and their environment determines the extent to which a person will be able to age in place. In other words: there is a need for a fit between the personal competences and environmental conditions. Deteriorating competencies can lead to mismatch between the individual and his or her living arrangement (Pope & Kang, 2010). For example, two Australian studies have demonstrated older adults' desire to downsize their housing due to a poor housing fit (Stimson & McCrea, 2004, Judd et al., 2014). Stairs and steps inside and outside the dwelling, and difficulties with housekeeping (e.g. cleaning) and/or maintenance are found to increase the preference for relocation (Hansen & Gottschalk, 2006, Erickson et al., 2006, Tyvimaa & Kemp, 2011; Weeks et al., 2012; Han & Kim, 2016).



Attributes for the dwelling included the number of rooms, housing type (including the presence of a garden), tenure, and accessibility of the dwelling (both internal and external). We also included a dummy for the current dwelling (irrespective of the characteristics of that particular dwelling, which were also included in the model). Among the places to which people develop attachment bonds, one of the most prominent in an individual's life is typically the place of residence (see among others: Fornara et al., 2019; Bonaiuto et al., 2006; Bonaiuto & Alves, 2012). With the inclusion of the variable 'current dwelling' we are able to recognize possible affective or emotional attachments to the current place of residence. Lastly, we added two attributes which were deemed to be relevant for policy purposes by the cooperating housing association: having a say in the finishing of the kitchen and bathroom (as opposed to as more standardised finishing) and the presence of home automation.

Aside from the dwelling, neighbourhood features are also factors for relocation (Smetcoren et al., 2017). Byrnes (2011) investigated the living conditions among older adults in a poor, age-segregated urban environment. The study found that a move to age-segregated housing can be an escape from harsh living conditions that do not match the needs of older residents. Additionally, the predominance of owner-occupiers can act as a pull factor as they are considered to be more involved in the safety and maintenance of their residential area (Parkes et al., 2002). Lastly, a lack of daily supplies and care facilities nearby counts for an important relocation trigger among older adults (see e.g. Kim et al., 2003), especially if public transportation is poorly organised (Tyvimaa & Kemp, 2011).

Neighbourhood attributes included tenure (ratio in the neighbourhood), household composition of the neighbourhood, location, distance to daily supplies and care facilities, and access by public transport. All explanatory variables are listed in Table 4.2, including an indication of the expected sign for the coefficient referring to a variable. The last column describes the current housing situation of the respondents (in percentages), and is given as a preliminary indication of the 'suitability' of the current living arrangement to age in place.

Table 4.2 Explanatory variables in the discrete choice model

| Variable | Type | Expected sign of coefficient | Current housing situation |
|---|---|---|---|
| **General** | | | |
| Disposable income | Continuous | + | |
| Current dwelling | Dummy | + | |
| **Dwelling attributes** | | | |
| Number of bedrooms | Continuous | - | 2.78 (mean) |
| Finishing | Dummy | + | |
| Home automation | Dummy | + | |
| Type | Categorical | | |
| Detached | | - | 6.2% |
| Non-detached, with garden | | - | 41.3% |
| Non-detached, without garden | | - | 3.8% |
| Apartment | | ref. | 48.8% |
| Tenure | Categorical | | |
| Rental | | - | 51.6% |
| Owner occupied | | ref. | 48.4% |
| Internal access | Categorical | | |
| Multiple floors | | - | 48.0% |
| One floor | | ref. | 52.0% |
| External access | Categorical | | |
| Elevator | | - | 28.8% |
| Staircase | | - | 23.0% |
| No staircase and/or elevator needed | | ref. | 48.2% |
| **Neighbourhood attributes** | | | |
| Tenure | Categorical | | |
| Mixture of owner occupied and rental dwellings | | - | 54.1% |
| Mainly rental dwellings | | - | 13.5% |
| Mainly owner-occupied | | ref. | 32.4% |

Table 4.2 Continued

| Variable | Type | Expected sign of coefficient | Current housing situation |
|---|---|---|---|
| Neighbours | Categorical | | |
| Mixture of single households, families and older adults | | - | 73.2% |
| Mainly older adults | | + | 8.9% |
| Mainly families | | ref. | 17.9% |
| Location | Categorical | | |
| Edge of the city | | - | 52.6% |
| Around inner city | | + | 34.3% |
| Inner city | | ref. | 13.2% |
| Daily supplies | Categorical | | |
| Walking distance | | + | 69.0% |
| Cycling distance | | + | 27.1% |
| Driving distance | | ref. | 4.0% |
| Care facilities | Categorical | | |
| Walking distance | | + | 47.6% |
| Cycling distance | | + | 43.9% |
| Driving distance | | ref. | 8.5% |
| Public transport | Categorical | | |
| Good access | | + | 93.0% |
| Poor access | | ref. | 7.0% |

Apart from factors related to the immediate environment of older adults, we also consider some individual characteristics into the model. Mainly, because we expect that people with different characteristics also give different weights to various attributes of choice alternatives. It is possible to take into account this influence of individual characteristics by means of additional variables $x$ in the utility function that are products of individual characteristics and attributes of the alternatives (i.e. interaction effects). As mentioned before, higher educated older adults are overrepresented in our sample and could potentially show a different preference pattern than lower educated older adults. Therefore, an interaction effect is included to correct for possible education effects. Lastly, it is conceivable that households with children living at home have other preferences with respect to their residential location than household without children (living at home).

## 4.4. Results

The estimation results are listed in Table 4.3. Model 1 has attributes of the alternatives as the only determinants of the utility function. Model 2 also incorporates the effects of some individual characteristics. A log likelihood ratio test reveals that adding individual characteristics (i.e. interaction effects) results in a statistically significant improvement of the fit of the model.

The estimated coefficient of the variable disposable income is, as expected, highly significant. With this estimate we can compute the estimated willingness-to-pay for a particular housing attribute. The willingness-to-pay is the amount of money by which the disposable income can be reduced after including a particular housing attribute, while keeping the consumer at the same utility level. The willingness-to-pay is calculated as the ratio of the coefficients of the particular housing attribute and disposable income. For example, for model 1 the willingness to pay for an extra room equals (0.081/0.325) = 0.2492, implying that an addition of one room would be worth 25 euro per month. The willingness to pay for the presence of home automation on the other hand, equals (-0,124/0.325) = -0.3815 implying that the absence of home automation designed to increase the comfort and safety of the dwelling would be worth 38 euro per month.

The respondents show a very strong preference for the current dwelling. The estimated coefficient for this variable is positive and highly significant. This strong will to stay put, is further illustrated by the fact that among the three presented alternatives, the current dwelling is chosen first 75% of the time by the respondents. In other words: when given a choice (albeit a hypothetical one), the majority of older adults would choose their current dwelling as the most preferred housing option. The number of rooms has a small significant effect on the evaluation of choice alternatives. We already demonstrated that the respondents would be willing to pay 25 euro per month for a dwelling larger in size. This is contrary to our expectation that older adults would prefer a smaller dwelling when they age. However, when this attribute is interacted with the household composition the coefficient is not significant anymore.

Having a say in the finishing of the kitchen and bathroom is a moderately desirable attribute. When this dummy is interacted with the level of education, it becomes clear that this attribute is strongly preferred by respondents with a high educational level. Respondents with a relatively low educational level, on the other hand, would rather not have a say in the finishing of the kitchen and bathroom and in return pay a lower housing cost.

The housing type is an important attribute. Model 1 shows that apartments are preferred to non-detached houses either with or without a garden. This corresponds with our expectation that older adults express a preference for dwellings that require less maintenance. However, it also shows a rather large difference between the current and desired housing type, since 40% of our sample is currently living in a non-detached house with a garden.

In model 1, tenure does not seem to have an effect on the evaluation of the choice alternatives. However in model 2, which also incorporates the effects of some individual characteristics, it does. Then, home ownership is preferred to renting a home. In the last few decades, the rise in home ownership among older adults in the Netherlands has been spectacular. During the late 1990s, about 30% aged 65 and over were home owners; this share rose to 45% in 2008 and by 2015, around half of all aged 65 and over owned a house (Statistics Netherlands, 2017).



The location of the living room, kitchen, bathroom and at least one bedroom on the same floor is preferred to having these located on multiple floors. This is in accordance with our expectations. The estimation results for model 2 show that the inclusion of the educational level does not affect the significance of this attribute. Though, model 2 also reveals that higher educated older adults do seem to prefer a house with multiple floors.

The external access of the dwelling is a significant housing attribute. Model 1 shows that access by elevator is strongly preferred to a dwelling with an entrance on street level (i.e. the reference case). The latter is preferred to a dwelling in which the respondent has to climb stairs in order to enter his or her dwelling. These results are partially according to our expectations. Previous studies have shown that deteriorating competencies can lead to incompatibility between the individual and his or her housing (Pope & Kang, 2010). As a preventative measure, older adults might be more prone to relocate to an environment that better fits their physical abilities, such as an apartment with no stairs. This might explain the overall preference for a dwelling which is accessible by an elevator, which can be found in an apartment building. It does, however, not explain why access by elevator is preferred to a dwelling with an entrance on street level. The results of model 2 demonstrate that higher educated do have strong preference for a dwelling which is accessible on street level. Knowing they also show a preference for a house with multiple floors, this result could potentially illustrate the desire for a single family home.

Table 4.3 Estimation results housing preferences by age

| | Whole sample | | | | | | Pre- elderly (55-64) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | | | Model 2 | | | Model 3 | | |
| | B | Sig. | S.E. | B | Sig. | S.E. | B | Sig. | S.E. |
| Disposable income (x100) | 0.325 | *** | 0.010 | 0.338 | *** | 0.010 | 0.303 | *** | 0.011 |
| Current dwelling | 1.750 | *** | 0.021 | 1.752 | *** | 0.021 | 1.574 | *** | 0.025 |
| **Dwelling attributes** | | | | | | | | | |
| Number of rooms | 0.081 | * | 0.042 | 0.069 | | 0.130 | 0.151 | *** | 0.050 |
| Number of rooms x no children living at home | | | | 0.033 | | 0.133 | | | |
| Finishing | 0.060 | * | 0.034 | 0.104 | * | 0.057 | 0.030 | | 0.041 |
| Finishing x low educational level | | | | -0.322 | *** | 0.073 | | | |
| Finishing x high educational level | | | | 0.191 | *** | 0.067 | | | |
| Home automation | -0.124 | *** | 0.034 | -0.133 | ** | 0.059 | -0.238 | *** | 0.041 |
| Home automation x low educational level | | | | -0.226 | *** | 0.075 | | | |
| Home automation x high educational level | | | | 0.219 | *** | 0.069 | | | |
| Type | | | | | | | | | |
| Detached | 0.080 | | 0.063 | 0.070 | | 0.063 | 0.284 | *** | 0.075 |
| Non-detached, with garden | -0.490 | *** | 0.043 | -0.505 | *** | 0.043 | -0.244 | *** | 0.054 |
| Non-detached, without garden | -0.917 | *** | 0.051 | -0.948 | *** | 0.051 | -0.835 | *** | 0.063 |
| Apartment | ref. | | | | | | ref. | | |
| Tenure | | | | | | | | | |
| Rental dwelling | -0.046 | | 0.031 | -0.064 | ** | 0.031 | -0.147 | *** | 0.036 |
| Owner-occupied | ref. | | | | | | ref. | | |
| Internal access | | | | | | | | | |
| Multiple floors | -0.761 | *** | 0.029 | -0.863 | *** | 0.059 | -0.647 | *** | 0.035 |
| Multiple floors x low educational level | | | | 0.064 | | 0.080 | | | |
| Multiple floors x high educational level | | | | 0.194 | *** | 0.074 | | | |
| One floor | ref. | | | | | | ref. | | |
| External access | | | | | | | | | |
| Elevator | 0.132 | *** | 0.035 | 0.394 | *** | 0.066 | -0.016 | | 0.043 |
| Elevator x low educational level | | | | -0.069 | | 0.089 | | | |
| Elevator x high educational level | | | | -0.540 | *** | 0.082 | | | |
| Staircase | -0.956 | *** | 0.040 | -0.954 | *** | 0.041 | -1.002 | *** | 0.048 |
| Staircase x low educational level | | | | 0.082 | ** | 0.036 | | | |
| Staircase x high educational level | | | | -0.085 | ** | 0.033 | | | |
| No staircase and/or elevator needed | ref. | | | | | | ref. | | |
| **Neighbourhood attributes** | | | | | | | | | |
| Tenure | | | | | | | | | |
| Mixture of owner-occupied and rental dwellings | 0.057 | | 0.045 | 0.044 | | 0.045 | 0.012 | | 0.054 |
| Mainly rental dwellings | -0.147 | *** | 0.049 | -0.171 | *** | 0.049 | -0.183 | *** | 0.059 |
| Mainly owner-occupied | ref. | | | | | | ref. | | |
| Neighbours | | | | | | | | | |
| Mixture of single households, families and older adults | 0.420 | *** | 0.041 | 0.437 | *** | 0.041 | 0.361 | *** | 0.050 |
| Mainly older adults | 0.089 | * | 0.047 | 0.113 | ** | 0.047 | -0.044 | | 0.057 |
| Mainly families | ref. | | | | | | ref. | | |

| Pre- elderly (55-64) | | | Young-elderly (65-74) | | | | | | Old-elderly (75+) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
| B | Sig. | S.E. | B | Sig. | S.E. | B | Sig. | S.E. | B | Sig. | S.E. | B | Sig. | S.E. |
| 0.317 | *** | 0.011 | 0.397 | *** | 0.025 | 0.399 | *** | 0.026 | 0.500 | *** | 0.043 | 0.507 | *** | 0.046 |
| 1.571 | *** | 0.025 | 2.135 | *** | 0.048 | 2.140 | *** | 0.048 | 2.181 | *** | 0.085 | 2.190 | *** | 0.088 |
| | | | | | | | | | | | | | | |
| -0.084 | | 0.143 | 0.003 | | 0.093 | -0.302 | | 0.428 | -0.238 | | 0.159 | 1.419 | * | 0.729 |
| 0.282 | * | 0.146 | | | | 0.335 | | 0.431 | | | | -1.717 | ** | 0.737 |
| | | | | | | | | | | | | | | |
| 0.065 | | 0.068 | 0.198 | *** | 0.072 | 0.400 | *** | 0.121 | 0.037 | | 0.131 | -0.492 | * | 0.252 |
| -0.401 | *** | 0.095 | | | | -0.370 | *** | 0.141 | | | | 0.483 | * | 0.268 |
| 0.180 | ** | 0.079 | | | | -0.100 | | 0.144 | | | | 1.268 | *** | 0.309 |
| -0.258 | *** | 0.070 | 0.161 | ** | 0.072 | 0.085 | | 0.123 | 0.345 | *** | 0.131 | 0.383 | | 0.248 |
| -0.283 | *** | 0.096 | | | | -0.115 | | 0.145 | | | | -0.239 | | 0.270 |
| | | | | | | | | | | | | | | |
| 0.178 | ** | 0.081 | | | | 0.350 | ** | 0.149 | | | | 0.554 | * | 0.311 |
| | | | | | | | | | | | | | | |
| 0.272 | *** | 0.075 | -0.022 | | 0.140 | -0.019 | | 0.141 | -0.879 | *** | 0.278 | -0.907 | *** | 0.288 |
| -0.258 | *** | 0.054 | -0.655 | *** | 0.087 | -0.662 | *** | 0.088 | -1.476 | *** | 0.152 | -1.522 | *** | 0.157 |
| -0.868 | *** | 0.063 | -0.866 | *** | 0.106 | -0.881 | *** | 0.107 | -1.197 | *** | 0.190 | -1.248 | *** | 0.192 |
| | | | ref. | | | | | | ref. | | | | | |
| | | | | | | | | | | | | | | |
| -0.164 | *** | 0.036 | 0.104 | | 0.071 | 0.098 | | 0.072 | 0.561 | *** | 0.123 | 0.536 | *** | 0.123 |
| | | | ref. | | | | | | ref. | | | | | |
| | | | | | | | | | | | | | | |
| -0.816 | *** | 0.071 | -0.910 | *** | 0.062 | -0.927 | *** | 0.123 | -1.165 | *** | 0.116 | -1.013 | *** | 0.253 |
| 0.239 | ** | 0.101 | | | | 0.079 | | 0.159 | | | | -0.300 | | 0.298 |
| 0.289 | *** | 0.086 | | | | -0.124 | | 0.162 | | | | -0.073 | | 0.359 |
| | | | ref. | | | | | | ref. | | | | | |
| | | | | | | | | | | | | | | |
| 0.307 | *** | 0.078 | 0.351 | *** | 0.077 | 0.610 | *** | 0.142 | 0.520 | *** | 0.127 | 0.337 | | 0.288 |
| -0.062 | | 0.114 | | | | -0.150 | | 0.185 | | | | 0.248 | | 0.322 |
| -0.490 | *** | 0.096 | | | | -0.664 | *** | 0.184 | | | | -0.057 | | 0.374 |
| -0.987 | *** | 0.049 | -0.826 | *** | 0.088 | -0.845 | *** | 0.089 | -0.823 | *** | 0.157 | -0.865 | *** | 0.160 |
| -0.089 | | 0.055 | | | | 0.227 | *** | 0.061 | | | | 0.072 | | 0.093 |
| -0.165 | *** | 0.039 | | | | -0.041 | | 0.075 | | | | 0.113 | | 0.131 |
| | | | ref. | | | | | | ref. | | | | | |
| | | | | | | | | | | | | | | |
| 0.001 | | 0.055 | 0.007 | | 0.098 | -0.009 | | 0.098 | 0.051 | | 0.160 | 0.023 | | 0.162 |
| | | | | | | | | | | | | | | |
| -0.212 | *** | 0.059 | -0.155 | | 0.103 | -0.166 | | 0.103 | -0.077 | | 0.185 | -0.130 | | 0.187 |
| | | | ref. | | | | | | ref. | | | | | |
| | | | | | | | | | | | | | | |
| 0.380 | *** | 0.050 | 0.502 | *** | 0.092 | 0.508 | *** | 0.092 | 0.467 | *** | 0.148 | 0.478 | *** | 0.150 |
| | | | | | | | | | | | | | | |
| -0.013 | | 0.057 | 0.308 | *** | 0.101 | 0.320 | *** | 0.102 | 0.454 | *** | 0.171 | 0.491 | *** | 0.174 |
| | | | ref. | | | | | | ref. | | | | | |

Table 4.3 Estimation results housing preferences by age

| | Whole sample | | | | | | Pre- elderly (55-64) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | | | Model 2 | | | Model 3 | | |
| | B | Sig. | S.E. | B | Sig. | S.E. | B | Sig. | S.E. |
| Location | | | | | | | | | |
| Edge of the city | -0.186 | *** | 0.048 | -0.182 | *** | 0.048 | -0.240 | *** | 0.061 |
| Around inner city | 0.020 | | 0.041 | 0.018 | | 0.042 | 0.054 | | 0.051 |
| Inner city | ref. | | | | | | ref. | | |
| Daily supplies | | | | | | | | | |
| Walking distance | 0.790 | *** | 0.050 | 0.518 | *** | 0.095 | 0.873 | *** | 0.059 |
| Walking distance x low educational level | | | | 0.211 | | 0.130 | | | |
| Walking distance x high educational level | | | | 0.467 | *** | 0.119 | | | |
| Cycling distance | 0.199 | *** | 0.053 | -0.055 | | 0.099 | 0.363 | *** | 0.062 |
| Cycling distance x low educational level | | | | -0.056 | | 0.140 | | | |
| Cycling distance x high educational level | | | | 0.621 | *** | 0.122 | | | |
| Driving distance | ref. | | | | | | ref. | | |
| Care facilities | | | | | | | | | |
| Walking distance | 0.375 | *** | 0.050 | 0.124 | | 0.093 | 0.430 | *** | 0.059 |
| Walking distance x low educational level | | | | 0.388 | *** | 0.128 | | | |
| Walking distance x high educational level | | | | 0.292 | ** | 0.117 | | | |
| Cycling distance | -0.051 | | 0.049 | -0.247 | *** | 0.091 | 0.064 | | 0.057 |
| Cycling distance x low educational level | | | | 0.093 | | 0.131 | | | |
| Cycling distance x high educational level | | | | 0.376 | *** | 0.112 | | | |
| Driving distance | ref. | | | | | | ref. | | |
| Public transport | | | | | | | | | |
| Good access | 0.997 | *** | 0.044 | 0.880 | *** | 0.082 | 0.957 | *** | 0.052 |
| Good access x low educational level | | | | 0.185 | | 0.113 | | | |
| Good access x high educational level | | | | 0.159 | | 0.102 | | | |
| Poor access | ref. | | | | | | ref. | | |
| Log likelihood | -27705.62 | | | -27552.09 | | | -19037.93 | | |
| *n* | 952 | | | 952 | | | 625 | | |

***Significant at 0.01 level; **significant at 0.05 level; *significant at 0.1 level.

| Pre- elderly (55-64) | | | Young-elderly (65-74) | | | Old-elderly (75+) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
| B | Sig. | S.E. | B | Sig. | S.E. | B | Sig. | S.E. | B | Sig. | S.E. | B | Sig. | S.E. |
| -0.234 | *** | 0.061 | -0.276 | *** | 0.096 | -0.280 | *** | 0.096 | 0.215 | | 0.150 | 0.199 | | 0.152 |
| 0.055 | | 0.051 | -0.129 | | 0.086 | -0.131 | | 0.086 | 0.123 | | 0.147 | 0.107 | | 0.148 |
| | | | ref. | | | | | | ref. | | | | | |
| 0.696 | *** | 0.111 | 0.665 | *** | 0.121 | 0.379 | | 0.232 | 0.520 | *** | 0.199 | 0.129 | | 0.472 |
| 0.030 | | 0.160 | | | | 0.308 | | 0.296 | | | | 0.228 | | 0.521 |
| 0.338 | ** | 0.136 | | | | 0.499 | | 0.304 | | | | 2.120 | ** | 0.992 |
| 0.203 | * | 0.117 | -0.147 | | 0.124 | -0.681 | *** | 0.225 | -0.180 | | 0.253 | -0.009 | | 0.533 |
| -0.307 | * | 0.175 | | | | 0.700 | ** | 0.300 | | | | -0.466 | | 0.616 |
| 0.473 | *** | 0.142 | | | | 0.816 | *** | 0.304 | | | | 1.467 | | 1.011 |
| | | | ref. | | | | | | ref. | | | | | |
| 0.190 | * | 0.107 | 0.326 | *** | 0.120 | 0.256 | | 0.226 | 0.104 | | 0.197 | -0.156 | | 0.503 |
| 0.376 | ** | 0.162 | | | | 0.171 | | 0.285 | | | | 0.223 | | 0.541 |
| 0.284 | ** | 0.133 | | | | 0.076 | | 0.306 | | | | 1.278 | | 0.932 |
| -0.103 | | 0.107 | -0.305 | *** | 0.116 | -0.485 | ** | 0.202 | -0.226 | | 0.234 | -0.278 | | 0.531 |
| -0.022 | | 0.161 | | | | 0.414 | | 0.280 | | | | -0.231 | | 0.602 |
| 0.333 | ** | 0.130 | | | | 0.177 | | 0.280 | | | | 1.732 | * | 0.911 |
| | | | ref. | | | | | | ref. | | | | | |
| 0.914 | *** | 0.096 | 1.079 | *** | 0.107 | 1.084 | *** | 0.197 | 1.325 | *** | 0.182 | 0.879 | ** | 0.411 |
| -0.039 | | 0.140 | | | | 0.166 | | 0.260 | | | | 0.288 | | 0.453 |
| 0.119 | | 0.117 | | | | -0.059 | | 0.264 | | | | 2.451 | *** | 0.856 |
| | | | ref. | | | | | | ref. | | | | | |
| -18930.51 | | | -6040.07 | | | -5991.33 | | | -2117.38 | | | -2085.35 | | |
| 625 | | | 229 | | | 229 | | | 89 | | | 89 | | |

With respect to the neighbourhood we find that a neighbourhood with a mixture of single households, families and elderly is most preferred and a neighbourhood with predominantly families is least preferred. As expected, older adults show a preference for neighbourhoods with predominantly owner-occupied dwellings. For the location of the neighbourhood we find that neighbourhoods located at the edge of the city are least preferred. We expected older adults to prefer to have their daily supplies and care facilities nearby; that is within walking or cycling distance of their homes. The estimation results of both model 1 and 2 confirm this expectation. Model 2 also demonstrates that this is particularly true for higher educated older adults. Public transport is, as expected, regarded as an attractive attribute.

4.4.1. Results by age

To correct for the overrepresentation of young older adults in our sample, we ran separate models for the 'pre-elderly' (55-64 years), the 'young-elderly' (65-74 years) and the 'old-elderly' (aged 75 and above). In doing so, it was also possible to shed some light on the possible heterogeneity in preferences by age. Here, we will only discuss the preferences that differ from the results of the whole sample and/or differ among the different age groups. Judging by model 5 and model 7 the numbers of rooms does not seem to have a significant effect on the evaluation of the choice alternatives for older adults aged 65 and above. Yet, when this attribute is interacted with the household composition (model 8) it becomes clear that for respondents aged 75 years or older without any children living at home, the estimate has the expected negative sign. Indicating that 'old-elderly' do prefer a smaller dwelling. From the age of 65, the presence of home automation does appear to be a desirable housing attribute, especially for the higher educated in these age-groups. For the 'young-elderly' (aged 65-74) both the presence of home automation and having a say in the finishing have a significant effect on the evaluation of the choice alternatives. Their willingness to pay for these 'luxuries' are respectively 40,55 euro and 49,87 euro per month.

With regard to the type of dwelling we find a clear hierarchy for the 'pre-elderly': non-detached houses with or without a garden are the least preferred, and detached houses are the most preferred type of dwellings. If we look at the oldest age group(s) we find further evidence for older adults' desire for houses that require less maintenance and better fit their physical abilities. Where 'pre-elderly' show a strong preference for owner-occupied dwelling, 'old-elderly' show an even stronger preference for rental dwellings, compared to the other age-groups. Note, that the birth dates of the 'pre-elderly' in our sample correspond with the so-called Dutch 'baby boom generation'. In 2010, a study by the Netherlands Institute for Social Research has shown that, as a result of increasing prosperity and their active life-cycle stage, the baby boom

generation was able to benefit from the extensive supply of new homes offered for sale on very favourable terms. From this starting point, they were able to move up the housing ladder in the course of time to ever better and larger homes. This is further illustrated by the fact that, by 2009, the majority of baby boom households (i.e. two out of three) owned their home (Van der Bie & Latten, 2012). Previous generations, on the other hand, are for more likely to rent their homes. It seems reasonable that the observed difference in opportunities (both economically and socially), have shaped the preference for tenure in old age.



With respect to the neighbourhood characteristics, it becomes clear that these play a more important role for the younger age groups than the oldest age group. For the 'old-elderly', compared to the other age-groups, the characteristics of the dwelling play a more significant role in the evaluation of the choice alternatives. We do, however, find that the desire to live among people of the same age becomes stronger by age. In fact, only 'pre-elderly' have a negative coefficient for predominantly living with older adults (although this result is not significant). From the age of 65 we find that older adults have preference for their daily supplies and care facilities within walking distance. From this age on, cycling is also not considered to be attractive anymore (although not all results suggesting this pattern are significant).

## 4.5. Discussion

Ageing in place seems to be the preferred residential strategy of most older adults (Smetcoren et al., 2017). Nonetheless, studies have demonstrated that, in time, certain home environments can create threats preventing older adults from ageing well (Golant, 2011; Lord et al., 2006; Oswald et al., 2007; Sixsmith & Sixsmith, 2008; Wagner et al., 2010). Several coping mechanisms can be applied in order to handle this incongruence (Golant, 2011, 2015; Peace et al., 2011), such as moving to a new environment. The research presented in this paper analysed evidence from a self-designed survey to examine the residential choice behaviour of Dutch older adults. Distinguishing between different age groups made it possible to scrutinise whether age affected the preference for staying put (i.e. age in place) or for moving to a new living environment.

When given a choice (albeit a hypothetical one) a vast majority of the respondents prefer to stay put. The preference to age in place becomes stronger by age. We, therefore, conclude that the tendency of Dutch older people to stay put is mainly caused by choice rather than by constraint. Interestingly, the estimation results demonstrate that certain desirable housing characteristics do not necessarily correspond with the existing living

arrangement (on average). The location of the neighbourhood, dwelling type, and the access (both internal and external) to their current dwelling are good examples of this. Therefore, we cannot conclude that the desire to stay put is due to the suitability of the current dwelling to age in place.

Instead, older adults might prefer to cope with the costs of a mismatch between their dwelling and their needs rather than move elsewhere (Costa-Font et al., 2009; Ewen et al., 2014). The attachment to place has often been cited as an important factor in explaining the low mobility of older adults (see among others: Birch, 1973; Butler, 1975; Ferraro, 1981; Golant, 1972; Lawton, 1978, 1986; Newman, 1976). The estimation results of this study seem to confirm that the preference to stay put is affected by factors such as residential place attachment.

In general, the older adults in our sample have a preference for apartments, which is also illustrated by the fact that they prefer houses accessible by an elevator in which the living room, kitchen, bathroom, and at least one bedroom is located on one floor. With regard the living environment the results indicate that older adults do not want to live in a neighbourhood which is located at the edge of the city. This is re-emphasized by their desire to have amenities, such as to have daily supplies, care facilities and public transport, in the vicinity of their homes. They would also like to be surrounded by mixture of single households, families and older adults, although most older adults would not mind living with predominantly older adults as well.

In addition, the estimation results of this study demonstrate the presence of heterogeneity among Dutch older adults. The next generation of older adults (the 'pre-elderly') is different from today's older adults. They have different expectations and abilities, due to having experienced expanded education opportunities, emancipation and participation (Kramer & Pfaffenbach, 2009). Therefore, future older adults can be expected to develop different lifestyles, which will likely lead them to favour different (residential) locations (Kramer & Pfaffenbach, 2009). In order to adequately take the heterogeneity among Dutch older adults into account, we need to further explore the relation the spatial context, on the one hand, and individual characteristics and lifestyles, on the other.

The analysis reported here does have limitations. The sample is from one municipality in one country and may not be representative of older adults living in other areas. In particular, our sample has a overrepresentation of 'pre-elderly' (i.e. 55-64 years) and higher-educated, as a likely result of the interactive design of the experiment. This may have increased the desirability of several attributes, such as the presence of home automation. However, the study's advantage also lies is this interactive design, which allows us to

incorporate the default living arrangement as a conscious choice, as well as presenting our respondents with realistic alternatives relative to the current living arrangement. Hopefully, other researchers will also consider the issues raised in this article by including the current living arrangement when analysing the residential choice behaviour of older adults.

In general, the housing choices of future older adults are likely to have an impact on spatial structures, simply due to the large numbers this generation represents (e.g. Andersson & Abramsson, 2012; Kramer & Pfaffenbach, 2009). This illustrates that the housing of an ageing society requires timely and adequate reactions in (housing) policy. The results of this study are helpful for informing decisions about housing options to support older adults who wish to remain in their homes and neighbourhoods, and to create types of housing that best meet the diverse preferences of the Dutch older population.



*Funding*
This work was supported by the Network for Studies on Pensions, Aging and Retirement (Netspar) [grant number RG2011.05].

# References


Andersson, E., & Abramsson, M. (2012). Changing Residential Mobility Rates of Older People in Sweden. *Ageing and Society, 32*(6), 963–982. https://doi.org/10.1017/S0144686X11000808

Atkins, M.T. (2018). On the move, or staying put? An analysis of intrametropolitan residential mobility and ageing in place. *Population Space and Place, 24*(3), e2096. https://doi.org/10.1002/psp.2096

Beggs, S., Cardell, S., & Hausman, J. (1980). Assessing the Potential Demand for Electric Cars. *Journal of Econometrics, 17*(1), 1-19. https://doi.org/10.1016/0304-4076(81)90056-7

Ben-Akiva M., & Lerman, S.R. (1985). *Discrete Choice Analysis: Theory and application to Travel Demand*. MIT Press.

Birch, D.L. (1973). *America's Housing Needs: 1970 to 1980*. MIT and Harvard Press.

Bonaiuto, M., & Alves, S. (2012). Residential places and neighbourhoods: toward healthy life, social integration, and reputable residence. In S.D. Clayton (Ed.), *The Oxford Handbook of Environmental and Conservation Psychology* (pp. 221–247). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199733026.013.0013

Bonaiuto, M., Fornara, F., & Bonnes, M. (2006). Perceived residential environment quality in middle- and low-extension Italian cities. *European Review of Applied Psychology, 56*(1), 23–34. https://doi.org/10.1016/j.erap.2005.02.011

Butler, R.N. (1975). *Why Survive? Being Old in America*. Harper and Row.

Byrnes, M.E. (2011). Moving behaviours of very low-income inner-city older adults. *Senior Housing & Care Journal, 19*(1), 35–47.

Costa-Font, J., Elivar, D., & Mascarillo-Miró, O. (2009). 'Ageing in Place'? Exploring Elderly People's Housing Preferences in Spain. *Urban Studies, 46*(2), 295-316. https://doi.org/10.1177/00420098008099356

Cutchin, M.P. (2003). The process of mediated ageing-in-place: a theoretically and empirically based model. *Social Science and Medicine, 57*(6), 1077-1090. https://doi.org/10.1016/S0277-9536(02)00486-0

Davies, A., & James, A. (2011). *Geographies of ageing: Social processes and the spatial unevenness of population ageing*. Ashgate Publishing.

De Dios Ortúzar, J., & Willumsen, L.G. (1994). *Modelling Transport*. Wiley.

Erickson, M.A., Krout, J., Ewen, H., & Robison, J. (2006). Should I stay or should I go? Moving plans of older adults. *Journal of Housing for the Elderly*, *20*(3), 5-22. https://doi.org/ 10.1300/J081v20n03_02

Ewen, H.H., Hahn, S.J., Erickson, M.A., & Krout, J.A. (2014). Ageing in Place or Relocation? Plans of Community-Dwelling Older Adults. *Journal of Housing For the Elderly, 28*(3), 288-309. https://doi.org/10.1080/02763893.2014.930366

Fawcett, J.T. (1986). Migration pyschology: New behavioral models. *Population and Environment, 8*(1&2), 5–14. https://doi.org/10.1007/BF01263014

Feinstein, J.S. (1996). Elderly health, housing and mobility. In D.A. Wise (Ed.), *Advances in the Economics of Aging* (pp. 275-316). Chicago University press. https://doi.org/10.3386/w4572

Fornara, F., Lai, A.E., Bonaiuto, M., & Pazzaglia, F. (2019). Residential Place Attachment as an Adaptive Strategy for Coping With the Reduction of Spatial Abilities in Old Age. *Frontiers in Psychology, 10*, article 856. https://doi.org/10.3389/fpsyg.2019.00856

Ferraro, K.F. (1981). Relocation Desires and Outcomes Among the Elderly. *Research on Aging, 3*(2), 166-181. https://doi.org/10.1177/016402758132003

Fowkes, T., & Wardman, M. (1988). The Design of Stated Preference Travel Choice Experiments, with Special Reference to Interpersonal Taste Variations. *Journal of Transport Economics and Policy, 22*(1), 27-44. https://www.jstor.org/stable/20052833

Geist, C., & McManus, P.A. (2008). Geographical mobility over the life course: motivations and Implications. *Population, Space and Place, 14*(4), 283-303. https://doi.org/10.1002/psp.508

Golant, S.M. (1972). *The Residential Location and Spatial Behavior of the Elderly: A Canadian example*. University of Chicago Geography Research Papers.

Golant, S.M. (2011). The quest for residential normalcy by older adults: relocation but one pathway. *Journal of Aging Studies, 25*(3), 193–205. https://doi.org/10.1016/j.jaging.2011.03.003

Golant, S.M. (2015). Residential Normalcy and the Enriched Coping Repertoires of Successfully Aging Older Adults. *The Gerontologist, 55*(1), 70-82. https://doi.org/10.1093/geront/gnu036

Han, J.H., & Kim, J.H. (2016). Variations in ageing in home and ageing in neighbourhood. *Australian Geographer, 48*(2), 255-272. https://doi.org/10.1080/00049182.2016.1240021

Hansen, E.B., & Gottschalk, G. (2006). What Makes Older People Consider Moving House and What Makes Them Move? *Housing, Theory and Society, 23*(1), 34-54. https://doi.org/1080/14036090600587521

Hanson, S. (2005). Perspectives on the geographic stability and mobility of people in cities. *Proceedings of the National Academy of Sciences of the United States of America, 102(*43), 15301-15306. https://doi.org/10.1073/pnas.0507309102

Hensher, D.A., Rose, J.M., & Greene, W.H. (2005). *Applied Choice Analysis; A Primer*. Cambridge University Press.

Jansen, S.J.T., Coolen, H.C.C.H., & Goetgeluk, R.W. (Eds.) (2011). *The Measurement and Analysis of Housing Preference and Choice*. Springer.

Judd, B., Liu, E., Easthope, H., & Bridge, C. (2014*). Downsizing amongst older Australians* (Vol. Final Report No. 214). Australian Housing and Urban Research Institute.

Kendig, H., Clemson, L., & Mackenzie, L. (2012). Older People: Well-being, housing and neighborhoods. In S. Smith, M. Elsinga, L. Fox O'Mahony, O. Seow Eng, S. Wachter, C. Hamnett (Eds.). *International encyclopedia of housing and home* (1st ed., Vol.5, pp. 150-155). Elsevier.

Kendig, H., Honge Gong, C., Cannon, L., & Browning, C. (2017). Preferences and Predictors of Aging in Place: Longitudinal Evidence From Melbourne, Australia. *Journal of Housing For the Elderly, 31*(3), 259- 271. https://doi.org/10.1080/02763893.2017.1280582

Kim, S., Kim, H., & Kim, W.G. (2003). Impacts of senior citizens' lifestyle on their choices of elderly housing. *Journal of Consumer Marketing, 20*(3), 210-226. https://doi.org/10.1108/07363760310472245

Kramer, C., & Pfaffenbach, C. (2009). Persistence preferred- on future residential (im)mobility among the generation 50plus. *ERDKUNDE, 63*(2), 161-172. https://doi.org/10.3112/erdkunde.2009.02.04

Lager, D.R. (2015). *Perspectives on ageing in place. Older adults' experiences of everyday life in urban neighbourhoods*. [Doctoral dissertation, University of Groningen].

Lawton, M.P. (1978). The Housing Problems of Community-Resident Elderly. *Occasional Papers in Housing and Community Affairs, 1*, 39-74.

Lawton, M.P. (1986). Housing Preferences and Choices: Implications. In R.J. Newcomer, M.P. Lawton, & T.O. Byers (Eds.), *Housing an Ageing Society: Issues, Alternatives, and Policy* (pp. 42-52). Van Nostrand Reinhold.

Lawton, M.P., & Nahemow, L. (1973). Ecology and the aging process. In C. Eisdorfer & M P. Lawton (Eds.), *The psychology of adult development and aging* (pp. 619-674). https://doi.org/10.1037/10044-020

Löfqvist, C., Granbom, M., Himmelsbach, I., Iwarsson, S., Oswald, F., & Haak, M. (2013). Voices on relocation and ageing in place in very old age – a complex and ambivalent matter. *The Gerontologist, 53*(6), 919–927. https://doi.org/10.1093/geront/gnt034

Lord, S.R., Menz, H.B., & Sherrington, C. (2006). Home environment risk factors for falls in older people and the efficacy of home modifications. *Age and Ageing, 35*(2), ii55–ii59. https://doi.org/10.1093/ageing/afl088

Louviere, J.J., Hensher, D.A., & Swait, J.D. (2000). *Stated Choice Methods; Analysis and Application*. Cambridge University Press.

Milligan, C. (2009). *There's No Place Like Home: Place and Care in an Ageing Society*. Ashgate.

Mulder, C.H. (1996). Housing choice: Assumptions and approaches. *Netherlands Journal of Housing and the Built Environment, 11*(3), 209–232. https://doi.org/10.1007/BF02496589

Musterd, S. (Ed.) (1989). Methoden voor woning- en woonmilieubehoefte onderzoek [Methods for housing and living environmental needs resesarch]. SISWO.

Netherlands Institute for Social Research. (2010). Wisseling van de wacht: generaties in Nederland [Changing of the guard: generations in the Netherlands]. Sociaal en Cultureel Planbureau.

Newman, S.J. (1976). *Housing Adjustments of Older people: A Report of Findings From the Second Phase*. Institute for Social Research.

Oswald, F., Schilling, O., Wahl, H-W., & Gäng, K. (2002). Trouble in paradise? Reasons to relocate and objective environmental changes among well-off older adults. *Journal of Environmental Psychology, 22*(3), 273-288. https://doi.org/10.1006/jevp.2002.0255

Oswald, F., Wahl, H-W., Schilling, O., Nygren, C., Fänge, A., Sixsmith, A., Sixsmith, J., Széman, Z., Tomsone, S., & Iwarsson, S. (2007). Relationships between housing and healthy aging in very old age. *The Gerontologist, 47*(1), 96–107. https://doi.org/10.1093/geront/47.1.96

Parkes, A, Kears, A., & Atkinson, R. (2002). What Makes People Dissatisfied with their Neighbourhoods? *Urban studies, 39*(13), 2413-2438. https://doi.org/10.1080/0042098022000027031

Peace, S., Holland, C., & Kellaher, L. (2011). 'Option recognition' in later life: variations in ageing in place. *Ageing & Society, 31*(5), 734–757. https://doi.org/10.1017/S0144686X10001157

Pope, N.D., & Kang, B. (2010). Residential Relocation in Later Life: A Comparison of Proactive and Reactive Moves. *Journal of Housing For the Elderly, 24*(2),193-207. https://doi.org/10.1080/02763891003757122

Priemus, H. (1984). *Nederlandse woontheorieën. Volkshuisvesting in theorie en praktijk* [Dutch housing theories. Public housing in theory and practice]. Delftse Universitaire Pers.

Pynoos, J., Nishita, C., & Kendig, H. (2007). Housing. In J.E. Birren (ed.), *Encyclopedia of Gerontology* (2nd ed, Vol. 2, pp.709-719). Elsevier.

Ritchey, P.N. (1976). Explanations of Migration. *Annual Review of Sociology, 2*, 363–404. https://doi.org/10.1146/annurev.so.02.080176.002051

Robison, J.T., & Moen, P. (2000). A life-course perspectives on housing expectations and shifts in late life. *Research on Aging, 22*(5), 499-532. https://doi.org/10.1177/0164027500225003

Rowles, G.D., Oswald, F., & Hunter, E.G. (2004). Interior living environments in old age. In H.-W. Wahl, R. Scheidt, & P.G. Windley (Eds.), *Ageing in context: Socio-physical environments* (Annual Review of Gerontology and Geriatrics, 2003)(pp.167-193). Springer.

Sabagh, G., Van Arsdol, M.D., & Butler, E.W. (1969). Some Determinants of Intrametropolitan Residential Mobility: Conceptual Considerations. *Social Forces, 48*(1), 88–98. https://doi.org/10.1093/sf/48.1.88

Sixsmith, A., & Sixsmith, J. (2008). Ageing in place in the United Kingdom. *Ageing International, 32*(3), 219–235. https://doi.org/10.1007/s12126-008-9019-y

Smetcoren, A-S., De Donder, L., Dury, S., De Witte, N., Kardol, T, & Verté, D. (2017). Refining the push and pull framework: identifying inequalities in residential relocation among older adults. *Ageing & Society, 37*(1), 90-112. https://doi.org/10.1017/S0144686X15001026

Smid, I., & Priemus, H. (1994). *Bewonerspreferenties: Richtsnoer voor investeringen in nieuwbouw en de woningvoorraad* [Resident preferences: Guideline for investments in new construction and the housing stock]. Delftse Universitaire Pers.

Statistics Netherlands. (2017). *Trends in the Netherlands*. Statistics Netherlands.

Stimson, R.J., & McCrea, R. (2004). A Push-Pull Framework for Modelling the Relocation of retirees to a Retirement Village: The Australian experience. *Environment and Planning A: Economy and Space, 36*(8), 1451-1470. https://doi.org/10.1068/a36206

Tatsiramos, K. (2006). *Residential mobility and housing adjustment of older households in Europe* (IZA Discussion Paper No. 2435). Institute for the Study of Labor.

Timmermans, H., Borgers, A., Van Dijk, J., & Oppewal, H. (1992). Residential Choice Behaviour of Dual-Earner Households: A Decompositional Joint Choice Model. *Environment and Planning A: Economy and Space, 24*(4), 517-533. https://doi.org/10.1068/a245017

Timmermans, H., Molin, E., & Van Noortwijk, L. (1994). Housing Choice Processes: Stated versus Revealed Modeling Approaches. *Netherlands Journal of Housing and the Built Environment, 9*, 215-227. https://doi.org/10.1007/BF02496997

Tyvimaa, T., & Kemp, C.L. (2011). Finnish Seniors' Move to a Senior House: Examining the Push and Pull Factors. *Journal of Housing for the Elderly, 25*(1), 50–71. https://doi.org/10.1080/02763893.2011.545742

Van der Bie, R., & Latten, J. (2012). Babyboomers, indrukken vanuit de statistiek [Baby boomers, impressions from statistics]. Statistics Netherlands.

Wagner, S., Shubair, M.M., & Michalos, A.C. (2010). Surveying older adults' opinions on housing: recommendations for policy. *Social Indicators Research, 99*(3), 405-412. https://doi.org/10.1007/s11205-010-9588-5

Wahl, H-W., Iwarsson, S., & Oswald, F. (2012). Ageing Well and the Environment: Toward an Integrative Model and Research Agenda for the Future. *The Gerontologist, 52*(3), 306-3016. https://doi.org/10.1093/geront/gnr154

Walters, W.H., & Owen, D. (2000). Types and patterns of later-life migration. *Geografiska Annaler Series B, 82*(3), 129-147. https://doi.org/10.1111/j.0435-3684.2000.00079.x

Weeks, L., Branton, O., & Nilsson, T. (2005). The influence of the family on the future housing preferences of seniors in Canada. *Housing, Care and Support, 8*(2), 29-34. https://doi.org/10.1108/14608790200500015

Weeks, L.E., Keefe, J., & Macdonald, D. J. (2012). Factors Predicting Relocation Among Older Adults. *Journal of Housing For the Elderly, 26*(4), 355-371. https://doi.org/10.1080/02763893.2011.653099

Weeks, L.E., Shiner, D., Stadnyk, R., & MacDonald, D.J. (2013). What should we build when they are ready to come? Evidence-based housing for older adults. *Seniors Housing & Care Journal, 21*(1), 69–85.

Wiles, J.L., Leibing, A., Guberman, N., Reeve, J., & Allen, R.E.S. (2012). The meaning of "ageing in place" to older people. *The Gerontologist, 52*(3), 357-366. https://doi.org/10.1093/geront/gnr098

# Appendices

Appendix 4.1 Questionnaire current housing situation [translated from Dutch]

**Current dwelling**

Question 1: What kind of house do you live in?

- Apartment
- Non-detached, without garden
- Non-detached, with garden
- Detached

Question 2: How many bedrooms are there (guest bedrooms included) in your home?

Question 3: Including yourself, how many people currently live in your household?

Question 4: Do you live in a rental or owner-occupied home?

- Rental
- Owner-occupied

Question 5: How much is the housing cost per month? This concerns the total amount that you pay per month in rent or mortgage, plus the amount that you spend monthly on gas, water, electricity and any service costs.

**Current neighbourhood**

Question 6: What is the location of your home? Please indicate which of the three options below is most applicable to your neighbourhood:

- Inner city area
- Around inner city
- Edge of the city

Question 7: How would you characterize the households in your neighbourhood? Please indicate which of the three options below is most applicable to your neighbourhood:

- Primarily (young) families
- Primarily older adults
- Mixture of single households, families and older adults

Question 8: How would you characterize the form of ownership of homes in your neighbourhood? Please indicate which of the three options below is most applicable to your neighbourhood:

- Primarily owner-occupied
- Primarily rental dwellings
- Mixture of owner occupied and rental dwellings

### Services in the neighbourhood

Question 9: How would you characterize the location of your daily supplies (e.g. the supermarket)?

- Within walking distance of my home
- Within cycling distance of my home
- Outside cycling distance of my home, but easily accessible by car

Question 10: How would you characterize the location of your care facilities (e.g. the general practitioner and the pharmacy)?

- Within walking distance of my home
- Within cycling distance of my home
- Outside cycling distance of my home, but easily accessible by car

Question 11: How would you characterize the accessibility of your home by public transport (e.g. the bus stop)?

- My home is easy to reach by public transport
- My home is difficult to reach by public transport

### Accessibility of your home

Question 12: How would you characterize the location of the primary areas (i.e. living room, bedroom, kitchen and sanitary areas) in your home :?

- These are located on one floor
- These are located on different floors

Question 13: How would you characterize access to your home (i.e. front door)?

- My home is accessible without the usage of stairs and/or a lift
- My home is accessible by stairs
- My home is accessible by elevator

Appendix 4.2 Combinations of alternatives and games per group

| Choice set | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| 1 | Game 1: alternative 1 & 3 | Game 1: alternative 1 & 4 | Game 1: alternative 1 & 8 |
| 2 | Game 1: alternative 2 & 4 | Game 1: alternative 2 & 3 | Game 1: alternative 2 & 7 |
| 3 | Game 1: alternative 5 & 8 | Game 1: alternative 5 & 7 | Game 1: alternative 3 & 6 |
| 4 | Game 1: alternative 6 & 7 | Game 1: alternative 6 & 8 | Game 1: alternative 4 & 5 |
| 5 | Game 1: alternative 1 & 8 | Game 1: alternative 1 & 7 | Game 1: alternative 1 & 3 |
| 6 | Game 1: alternative 2 & 7 | Game 1: alternative 2 & 8 | Game 1: alternative 2 & 4 |
| 7 | Game 1: alternative 3 & 6 | Game 1: alternative 3 & 5 | Game 1: alternative 5 & 8 |
| 8 | Game 1: alternative 4 & 5 | Game 1: alternative 4 & 6 | Game 1: alternative 6 & 7 |
| 9 | Game 2: alternative 1 & 8 | Game 2: alternative 1 & 7 | Game 2: alternative 1 & 3 |
| 10 | Game 2: alternative 2 & 7 | Game 2: alternative 2 & 8 | Game 2: alternative 2 & 4 |
| 11 | Game 2: alternative 3 & 6 | Game 2: alternative 3 & 5 | Game 2: alternative 5 & 8 |
| 12 | Game 2: alternative 4 & 5 | Game 2: alternative 4 & 6 | Game 2: alternative 6 & 7 |
| 13 | Game 2: alternative 1 & 4 | Game 3: alternative 1 & 7 | Game 3: alternative 1 & 8 |
| 14 | Game 2: alternative 2 & 3 | Game 3: alternative 2 & 8 | Game 3: alternative 2 & 7 |
| 15 | Game 2: alternative 5 & 7 | Game 3: alternative 3 & 5 | Game 3: alternative 3 & 6 |
| 16 | Game 2: alternative 6 & 8 | Game 3: alternative 4 & 6 | Game 3: alternative 4 & 5 |
| 17 | Game 3: alternative 1 & 4 | Game 3: alternative 1 & 3 | Game 4: alternative 1 & 8 |
| 18 | Game 3: alternative 2 & 3 | Game 3: alternative 2 & 4 | Game 4: alternative 2 & 7 |
| 19 | Game 3: alternative 5 & 7 | Game 3: alternative 5 & 8 | Game 4: alternative 3 & 6 |
| 20 | Game 3: alternative 6 & 8 | Game 3: alternative 6 & 7 | Game 4: alternative 4 & 5 |
| 21 | Game 4: alternative 1 & 7 | Game 4: alternative 1 & 3 | Game 4: alternative 1 & 4 |
| 22 | Game 4: alternative 2 & 8 | Game 4: alternative 2 & 4 | Game 4: alternative 2 & 3 |
| 23 | Game 4: alternative 3 & 5 | Game 4: alternative 5 & 8 | Game 4: alternative 5 & 7 |
| 24 | Game 4: alternative 4 & 6 | Game 4: alternative 6 & 7 | Game 4: alternative 6 & 8 |

| Group 4 | Group 5 | Group 6 |
|---|---|---|
| Game 1: alternative 1 & 7 | Game 1: alternative 1 & 4 | Game 1: alternative 1 & 3 |
| Game 1: alternative 2 & 8 | Game 1: alternative 2 & 3 | Game 1: alternative 2 & 4 |
| Game 1: alternative 3 & 5 | Game 1: alternative 5 & 7 | Game 1: alternative 5 & 8 |
| Game 1: alternative 4 & 6 | Game 1: alternative 6 & 8 | Game 1: alternative 6 & 7 |
| Game 2: alternative 1 & 8 | Game 2: alternative 1 & 7 | Game 2: alternative 1 & 8 |
| Game 2: alternative 2 & 7 | Game 2: alternative 2 & 8 | Game 2: alternative 2 & 7 |
| Game 2: alternative 3 & 6 | Game 2: alternative 3 & 5 | Game 2: alternative 3 & 6 |
| Game 2: alternative 4 & 5 | Game 2: alternative 4 & 6 | Game 2: alternative 4 & 5 |
| Game 2: alternative 1 & 4 | Game 2: alternative 1 & 3 | Game 3: alternative 1 & 8 |
| Game 2: alternative 2 & 3 | Game 2: alternative 2 & 4 | Game 3: alternative 2 & 7 |
| Game 2: alternative 5 & 7 | Game 2: alternative 5 & 8 | Game 3: alternative 3 & 6 |
| Game 2: alternative 6 & 8 | Game 2: alternative 6 & 7 | Game 3: alternative 4 & 5 |
| Game 3: alternative 1 & 4 | Game 3: alternative 1 & 3 | Game 3: alternative 1 & 4 |
| Game 3: alternative 2 & 3 | Game 3: alternative 2 & 4 | Game 3: alternative 2 & 3 |
| Game 3: alternative 5 & 7 | Game 3: alternative 5 & 8 | Game 3: alternative 5 & 7 |
| Game 3: alternative 6 & 8 | Game 3: alternative 6 & 7 | Game 3: alternative 6 & 8 |
| Game 3: alternative 1 & 7 | Game 4: alternative 1 & 3 | Game 4: alternative 1 & 4 |
| Game 3: alternative 2 & 8 | Game 4: alternative 2 & 4 | Game 4: alternative 2 & 3 |
| Game 3: alternative 3 & 5 | Game 4: alternative 5 & 8 | Game 4: alternative 5 & 7 |
| Game 3: alternative 4 & 6 | Game 4: alternative 6 & 7 | Game 4: alternative 6 & 8 |
| Game 4: alternative 1 & 7 | Game 4: alternative 1 & 8 | Game 4: alternative 1 & 7 |
| Game 4: alternative 2 & 8 | Game 4: alternative 2 & 7 | Game 4: alternative 2 & 8 |
| Game 4: alternative 3 & 5 | Game 4: alternative 3 & 6 | Game 4: alternative 3 & 5 |
| Game 4: alternative 4 & 6 | Game 4: alternative 4 & 5 | Game 4: alternative 4 & 6 |