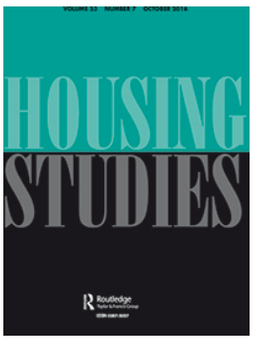

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Individual differences in the neighbourhood level determinants of residential satisfaction

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ABSTRACT

Residential satisfaction is a key variable in understanding residential mobility. Many researchers have studied the individual level and neighbourhood level determinants of satisfaction, however, very few have studied which neighbourhood characteristics affect satisfaction for whom. In this paper, ordered logit models are estimated, explaining satisfaction from neighbourhood characteristics, personal characteristics and interactions. These interactions test whether neighbourhood characteristics have similar effects on satisfaction for all individuals, or whether individual characteristics affect the size and direction of these effects. Satisfaction is found to be less affected by the share of ethnic minorities for ethnic minorities than for natives, because minorities are more satisfied in neighbourhoods with higher shares of their own ethnic group. Neighbourhood characteristics are found to have a stronger effect on satisfaction for owner-occupiers and parents with children than for others, however the impact of neighbourhood ethnic composition does not vary with tenure or household type.

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Residential satisfaction; ethnicity; interactions; residential mobility; segregation

Introduction

Residential satisfaction is a key variable in residential mobility research (Lu, 1998; Speare, 1974). As dissatisfaction is thought to lead to mobility desires and behaviour, insight in the determinants of residential satisfaction is crucial for understanding residential mobility (Lu, 1999). People differ in which neighbourhood characteristics affect their residential satisfaction (Galster & Hesser, 1981). Declining property values, for instance, might lead to dissatisfaction among owner-occupiers, while for renters this is less likely to be the case (Gould Ellen, 2000). In the US, the racial composition of the neighbourhood is found to have a stronger effect on satisfaction for whites than for blacks or Latino's (Swaroop & Krysan, 2011).

Differences between individuals in the effects of neighbourhood characteristics on residential satisfaction lead to differences in mobility desires and thus to selective residential mobility. Selective residential mobility is one of the main driving forces of segregation. Therefore, to gain more insight in segregation and selective residential mobility it is crucial

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to understand which neighbourhood characteristics affect satisfaction for whom. Also for policy-makers who try to create mixed, stable and attractive neighbourhoods it is important to have insight in which neighbourhood characteristics are important for whose satisfaction (Baum *et al.*, 2010; Gould Ellen *et al.*, 2013; Pinkster *et al.*, 2015).

Much research has been done on which personal characteristics affect residential satisfaction (Amérigo & Aragones, 1997; Galster & Hesser, 1981; Greif, 2015; Grogan-Kaylor *et al.*, 2006; Lu, 1999; Parkes *et al.*, 2002; Permentier *et al.*, 2011). Similarly, many researchers have tested the effects of neighbourhood characteristics on satisfaction (Baum *et al.*, 2010; Dekker, 2013; Galster & Hesser, 1981; Parkes *et al.*, 2002). There are only a few studies explaining residential satisfaction from neighbourhood characteristics that look into differences between population groups. The studies of Baum *et al.* (2010), Friedman (2011), Hipp (2010) and Swaroop & Krysan (2011) analyse differences between racial or ethnic groups in the effects of neighbourhood characteristics on satisfaction, while Baum *et al.* (2010), Greif (2015) and Parkes *et al.* (2002) look into differences between owner-occupiers and renters.

This is one of the first studies that, especially focuses on individual differences in the determinants of residential satisfaction. It adds to the previous research by simultaneously including multiple interaction effects between personal characteristics and neighbourhood characteristics. These interaction effects test whether neighbourhood characteristics such as the neighbourhood ethnic composition, crime rates or dwelling values have similar effects on all individuals, or whether individual characteristics affect the size and direction of these effects. Based on data from the Housing Research Netherlands Survey, a series of ordered logit models is estimated in which individual residential satisfaction is explained from neighbourhood characteristics, personal characteristics and interactions.

Residential satisfaction

Residential satisfaction is the key variable in the residential mobility model of Speare (1974). According to this model residential dissatisfaction will cause residential mobility and personal and neighbourhood characteristics will only affect mobility via satisfaction. Other authors have extended this model, stating that people will only move beyond a certain level of dissatisfaction (Brown & Moore, 1970; Wolpert, 1965) and that besides satisfaction also personal opportunities and constraints affect residential mobility (Landale & Guest, 1985; Lu, 1998). Residential satisfaction depends on the congruence of the residential situation with the desired residential situation (Brown & Moore, 1970; Lu, 1999). The desired residential situation depends on a household's needs and aspiration (Grogan-Kaylor *et al.*, 2006). Households differ in their housing needs and aspirations and therefore will react differently to similar residential situations (Kahana *et al.*, 2003). The next paragraphs will describe the (main) effects of personal and neighbourhood characteristics on satisfaction, while the next section will focus on the interaction effects, or on which neighbourhood characteristics are important to whom.

Individual level determinants of residential satisfaction

Personal characteristics are thought to mainly affect residential satisfaction through selection effects (Parkes *et al.*, 2002; Permentier *et al.*, 2011). Given the opportunity, people select environments that are in line with their residential needs (Rapoport, 1980). People with

more opportunities on the housing market can therefore be expected to be more satisfied. On the other hand, especially among people with few opportunities on the housing market, cognitive restructuring might occur when their residential situation is not in line with their preferences. This would result in people with few opportunities reporting relatively high levels of satisfaction (Amérigo & Aragonés, 1997). Earlier research, however, found no evidence of cognitive restructuring; people with more opportunities are generally found to be more satisfied. A higher income (Parkes *et al.*, 2002; Permentier *et al.*, 2011) and a higher educational level (Harris, 2001; Lu, 1999) are found to be related to higher levels of residential satisfaction. Older people have had more time to select themselves into a neighbourhood of their preference and are therefore found to be more satisfied (Permentier *et al.*, 2011). For households with children and owner-occupiers the neighbourhood is more important (Gould Ellen, 2000), also because these groups generally stay longer in the same neighbourhood (Feijten, 2005). Much research has found that owner-occupiers (Dekker, 2013; Lu, 1999; Parkes *et al.*, 2002; Swaroop & Krysan, 2011) and parents with children living at home (Dekker, 2013; Lu, 1999; Permentier *et al.*, 2011) are more satisfied with their residential environment. Length of residence is thought to have a positive effect on satisfaction as over time residents will have more social contacts in their neighbourhood and become more attached (Lu, 1999). However, in models taking into account, other personal characteristics results are mixed. Although Parkes *et al.* (2002) find a positive effect of length of residence on satisfaction, other papers find insignificant (Swaroop & Krysan, 2011) or negative (Dekker, 2013; Lu, 1999) outcomes. This might be explained by the fact that in general people improve their residential situation over their housing career; most people who move, move to better dwellings and neighbourhoods (Clark *et al.*, 2006). People with a long length of residence could be people who soon will move, or people who have been unable to move on, which are both related to lower levels of satisfaction. Also on the effect of race or ethnicity on residential satisfaction, the results are mixed. In the US, Galster & Hesser (1981) and Lu (1999) find that whites are more satisfied than blacks, while Harris (2001) finds no significant effect of race on satisfaction. Similarly in Europe, Dekker (2013) finds that ethnic minorities are less satisfied, while Parkes *et al.* (2002) and Permentier *et al.* (2011) find no ethnic differences in satisfaction. In both Europe and the US, minority groups have a disadvantaged housing market position. Possibly they are found to be less satisfied because they live in worse neighbourhood conditions, while this effect disappears when neighbourhood characteristics are effectively controlled for.

Neighbourhood level determinants of residential satisfaction

Residential satisfaction depends on the characteristics of the neighbourhood (Clark *et al.*, 2006). People are found to be more satisfied in neighbourhoods with high incomes and/or high dwelling values (Dekker, 2013; Galster & Hesser, 1981; Harris, 2001; Lu, 1999; Swaroop & Krysan, 2011). Good schools and low crime rates (Harris, 2001; Parkes *et al.*, 2002), accessibility (Baum *et al.*, 2010; Parkes *et al.*, 2002) and high shares of owner-occupied dwellings (Harris, 2001) are found to be related to higher satisfaction with the neighbourhood. Finally variables such as general appearance, noise (Baum *et al.*, 2010; Parkes *et al.*, 2002), dilapidated dwellings (Galster & Hesser, 1981) and deterioration (Harris, 2001) relate to residential satisfaction.

There is a special interest in the effect of the neighbourhood ethnic or racial composition on residential satisfaction. In the US, higher shares of blacks and Hispanics are found to be related to lower levels of satisfaction (Galster & Hesser, 1981; Harris, 2001; Swaroop & Krysan, 2011) and in the Netherlands, satisfaction is found to be lower in neighbourhoods with higher shares of non-western ethnic minorities (Dekker, 2013). The racial proxy theory argues that the racial or ethnic composition of the neighbourhood is not the *cause* of dissatisfaction. High shares of ethnic minorities often coincide with poverty, high crime rates or low school quality and these other variables lead to dissatisfaction (Harris, 2001). To test the racial proxy theory, researchers have investigated whether neighbourhood ethnic composition still affects residential satisfaction when other neighbourhood characteristics are taken into account. They find that other neighbourhood characteristics such as poverty, property values, turnover rates, school quality and disorder can only partly explain the relation between ethnic composition and dissatisfaction. When these characteristics are taken into account, people in the US are still found to be less satisfied in neighbourhoods with higher shares of blacks and Latinos (Gould Ellen, 2000; Harris, 2001; Swaroop & Krysan, 2011). In the Netherlands, when many other neighbourhood characteristics are taken into account, people are still found to be less satisfied in neighbourhoods with higher shares of non-western minorities (Dekker, 2013).

Which neighbourhood characteristics are important to whom?

There are only a few papers that look into differences between population groups in the effect of neighbourhood characteristics *on satisfaction*. Therefore, in the next paragraphs, I will also use research on residential mobility and moving desires to provide insight in which neighbourhood characteristics are important to whom.

Ethnic differences in the effect of neighbourhood ethnic composition on satisfaction

People prefer to have contact with others who are similar to themselves (Putnam, 2007; Tajfel, 1982), therefore they feel more safe or more at home in neighbourhoods with higher shares of their own ethnic group (Dekker, 2013; Phillips, 2007). Living among the own ethnic group is advantageous (Bolt *et al.*, 2008) as co-ethnics can provide opportunities for employment, housing, social security (Logan *et al.*, 2002; Musterd *et al.*, 2008) and a sense of security and belonging (Phillips, 2007). The effect of the neighbourhood ethnic composition on satisfaction will therefore differ between ethnic groups. The share of ethnic minorities will have a stronger negative effect on satisfaction for natives than for ethnic minorities. In addition, there will be differences between ethnic minority groups, because ethnic minorities will prefer to live among their own ethnic minority group but not among other ethnic minorities (Boschman & Van Ham, 2015).

Researchers in the US have measured the effect of the racial composition of the neighbourhood on satisfaction separately for blacks and whites. They find a stronger negative effect of the share of blacks on satisfaction for whites than for blacks (Friedman, 2011; Harris, 2001; Swaroop & Krysan, 2011). Hipp (2010), however, finds no significant interaction effects between individual ethnicity and the ethnic composition of the neighbourhood. He finds that individuals are less satisfied in neighbourhoods with higher shares of blacks and

Latinos, but the size of this effect does not differ between ethnic or racial groups. Baum and colleagues (2010) study effects of the neighbourhood ethnic composition on residential satisfaction in Australia. They find that, especially immigrants from English speaking countries are less satisfied when the share of immigrants from non-English speaking in their neighbourhood is higher. There is no earlier research on ethnic differences in the determinants of satisfaction in the Netherlands, however Van Ham & Feijten (2008) study who wants to leave their neighbourhood and find a stronger effect of the share of non-western minorities on desires to leave for natives than for ethnic minorities.

Based on the theory and earlier research we expect to find ethnic differences in the effect of ethnic composition on neighbourhood satisfaction. The share of ethnic minorities will have a stronger negative effect on satisfaction for natives than for ethnic minorities and ethnic minorities will be more satisfied in neighbourhoods with high shares of their own ethnic group (hypothesis 1).

Other differences in the effect of neighbourhood ethnic composition on satisfaction

Gould Ellen, (2000) and Goyette *et al.* (2014) test in the US whether there are individual differences in the effect of neighbourhood ethnic composition on mobility. Goyette *et al.* (2014) find that White households with young children are more likely to leave ethnic diverse neighbourhoods than other White households and Gould Ellen, (2000) finds that, especially households with children and owner-occupiers avoid neighbourhoods with high or increasing shares of blacks. Goyette *et al.* (2014) state that this might be explained by 'pure race' reasons; White parents want to maintain a distance between their children and children of ethnic minorities. However, they state that also racial proxy reasons might explain these differences as minority concentration is correlated or perceived to be correlated with crime rates, school quality (Goyette *et al.*, 2014) and declining property values (Gould Ellen, 2000). These race-associated neighbourhood characteristics are especially, important to owner-occupiers and households with children; therefore especially, these groups avoid neighbourhoods with high or increasing shares of blacks. Xie & Zhou (2012) use stated preferences research from the US to test whether there are individual differences in racial tolerance. Based on Farley-Schuman show cards (Farley *et al.*, 1978) they test if people would want to move into neighbourhoods with increasing shares of blacks and model the effect of personal characteristics on tolerance for black neighbours. They find that home-owners, parents with children living at home, married couples, older people and lower educated people are less tolerant to Black neighbours. These afore-mentioned papers give insight in which population groups will be more sensitive to neighbourhood ethnic composition or more tolerant to ethnic minorities, however, the article by Greif (2015) on Los Angeles is the only one that focuses on individual differences in the effect of ethnic composition *on satisfaction*. Greif (2015) studies interaction effects between home-ownership and neighbourhood characteristics including the neighbourhood ethnic composition in models explaining satisfaction. She finds significant interaction effects, showing that for home-owners satisfaction is more affected by the neighbourhood ethnic composition than for renters.

Based on the literature, it can be expected that the effect of the neighbourhood ethnic composition on satisfaction differs between population groups. For home-owners and

parents with children living at home, the share of ethnic minorities is expected to have a stronger negative effect on satisfaction than for others (hypothesis 2).

Group differences in the effects of other neighbourhood characteristics

Satisfaction is found to be more affected by neighbourhood characteristics for home-owners than for renters (Greif, 2015; Parkes *et al.*, 2002). Greif (2015) models satisfaction and finds significant interactions of home-ownership with neighbourhood economic advantage, ethnic composition and the share of owner-occupied dwellings. Parkes *et al.* (2002) find in England that in affluent, predominantly owner-occupied neighbourhoods owner-occupiers are more satisfied than renters, while in poor neighbourhoods with high shares of rented dwellings, renters are more satisfied. Baum *et al.* (2010) study neighbourhood satisfaction in Australia and find that the share of social housing has a stronger negative effect on satisfaction for owner-occupiers than for public tenants. Van Ham & Feijten (2008) study the desire to leave the neighbourhood in the Netherlands and find that, especially home-owners want to leave neighbourhoods with high shares of rented dwellings. Greif (2015) argues that disadvantageous neighbourhood characteristics are particularly important to home-owners as they could lead to declining property values and therefore financial problems. Home-ownership can hamper moving behaviour, especially when property values are declining. If neighbourhood characteristics are not congruent (anymore) with residential needs, dissatisfied renters can more easily than dissatisfied home-owners leave the neighbourhood. Therefore neighbourhood stressors such as crime, disorder, racial segregation or poverty will have a stronger effect on satisfaction for home-owners than for renters (Greif, 2015). Neighbourhood characteristics are more important for parents with children living at home (Gould Ellen, 2000). Households with children spend more time within the neighbourhood, therefore they are more affected by neighbourhood amenities and the population composition of their neighbours (Weck & Hanhörster, 2015). Secondly, having children makes parents more conscious of neighbourhood characteristics including school quality (Boterman, 2013) and safety (Permentier *et al.*, 2011).

Based on the literature, it can therefore be expected that neighbourhood characteristics have a stronger effect on satisfaction for home-owners and parents with children living at home than for others (hypothesis 3).

Data and methods

This study uses the Housing Research Netherlands survey (WoON 2012), a housing survey that is representative for the Dutch population 18 year and older (not living in institutions). In the Housing Research Netherlands survey, respondents are asked about their satisfaction with their residential environment (How satisfied are you with your current residential environment?). Not dwelling characteristics, but characteristics of the environment such as the quality of public space, access to facilities or social demographic characteristics and social cohesion determine how satisfied people are with their residential environment (Blijie *et al.*, 2012). In addition, this survey contains data on many personal characteristics such as ethnicity,[1] income, education, household type, tenure and length of residence.[2] This data-set was combined with data on neighbourhood characteristics from Statistics Netherlands and the Leefbaarometer. Statistics Netherlands has data on neighbourhood ethnic, household

and dwelling composition and on dwelling values and accessibility of all neighbourhoods. The number of restaurants within 3 km and the distance to the closest supermarket are used as indicators of accessibility of facilities. These are often used indicators of neighbourhood amenities in the Netherlands. It is important to take into account neighbourhood accessibility in studies of residential satisfaction, as other neighbourhood characteristics such as ethnic composition, dwelling composition or safety will be evaluated differently in highly accessible central urban areas than in suburban areas. Dwelling values are an important predictor of residential satisfaction (Dekker, 2013), they both reflect the attractiveness of the neighbourhood and the socio-economic status of its residents.

The Leefbaarometer has created an indicator of neighbourhood safety based on available spatial statistics about vandalism, disturbance, violent crime, theft and nuisance. These objective safety indicators are empirically found to affect liveability. The safety indicator is created in such a way that neighbourhoods with the highest predicted liveability based on these available safety indicators score +50, while neighbourhoods with the lowest predicted liveability score −50. Therefore, if for instance, vandalism is found to have a strong negative effect on liveability, neighbourhoods with high levels of vandalism will score low on the indicator of neighbourhood safety (Leidelmeijer *et al.*, 2008). The neighbourhood data are available on the level of administrative neighbourhoods (*buurten*) as defined by Netherlands Statistics. Within urban areas, neighbourhoods are small, with an average size of 1.4 km^2 and an average number of 6000 inhabitants. They often have natural borders such as main roads or waterways. Neighbourhoods are the smallest administrative area level in the Netherlands and, more than larger areas, in line with what people perceive as their residential environment. The actual perceived residential environment might be even smaller than administrative neighbourhoods. This might lead to an underestimation of the interaction effects, as within heterogeneous neighbourhoods ethnic minorities will be more likely to live in the streets or blocks with the highest shares of ethnic minorities.

In total, there are 69,330 respondents in the Housing Research Netherlands 2012 survey. In accordance with most other research on residential satisfaction, also in this research, the focus is on urban areas. Within the Netherlands, there are large differences in ethnic composition between urban areas. The urban areas of the four largest cities; Amsterdam, Rotterdam, The Hague and Utrecht are much more ethnically diverse than other urban areas. To be able to study the effects of neighbourhood ethnic composition, only respondents in the urban areas of the four largest cities in the Netherlands are included. Only respondents with independent housing careers[3] are selected, because only these households are asked about their satisfaction with their residential environment. This selection includes 18,349 respondents.

To determine in which neighbourhood the respondent lives, the survey was merged with the municipal register data. However, for a small share of the respondents (53 respondents, 0.2%), the registered address did not match the address from the survey, therefore these respondents had to be excluded. For some neighbourhoods, neighbourhood characteristics such as average dwelling values, neighbourhood safety or the share of specific ethnic minority groups are missing. To be able to include all neighbourhood characteristics in the models, respondents living in neighbourhoods with missing data (236 respondents, 1.3%) had to be excluded. All models are estimated on 18,060 respondents.

The dependent variable, satisfaction with the residential environment, is measured on a five-point Likert scale. Most people are satisfied with their residential environment. Only

1.8% is very dissatisfied, therefore this group was merged with dissatisfied. The dependent variable thus has four ordered categories. Therefore, to explain satisfaction I use ordered logit regression models. These models make use of the order of the response categories and estimate the effect of the independent variables on being in a higher category of satisfaction. An ordered logit model can be described as a model that estimates a latent variable Y^* and a number of cut points (c). $Y = 1$ ((very) dissatisfied) if $Y^* \leq c_1$, $Y = 2$ (not satisfied/not dissatisfied) if $c_1 \leq Y^* \leq c_2$, $Y = 3$ (satisfied) if $c_2 \leq Y^* \leq c_3$ and $Y = 4$ (very satisfied) if $Y^* > c_3$. The latent variable Y^* is estimated as $Y^* = \beta X + \varepsilon$ in which X is a vector of independent variables and β is a vector of parameters. An individual is (very) dissatisfied ($Y = 1$) if $\beta X + \varepsilon \leq c_1$ and very satisfied ($Y = 4$) if $\beta X + \varepsilon \geq c_3$. Because of the error term, residential satisfaction is not deterministically defined by the model, however, based on the distribution of the error term it is possible to calculate the probability that an individual is in a certain category of satisfaction.[4] In the ordered logit models, both personal and neighbourhood level variables are included. The 18,060 respondents are clustered in 1174 neighbourhoods; therefore, people living in the same neighbourhood automatically will have the same neighbourhood characteristics. To take into account, these interdependencies, multilevel models were estimated. On average there are 15 respondents per neighbourhood (minimum = 1, maximum = 401). Analysis of correlations and VIF-values shows no multicollinearity problems, all variables can jointly be included in the models (Tables 1 and 2).

Results: determinants of neighbourhood satisfaction

This section describes the results from a series of ordered logit multilevel models explaining satisfaction with the residential environment from neighbourhood characteristics, personal characteristics and interactions. In a first model (model 1, Table 3), only neighbourhood characteristics are taken into account. The share of non-western minorities has a negative effect on neighbourhood satisfaction; the effect of the share of western minorities is insignificant. People are found to be more satisfied in neighbourhoods with high safety scores, high dwelling values and good accessibility of facilities.[5] The share of owner-occupied dwellings in the neighbourhood has no effect on satisfaction.[6]

In model 2 (Table 3), both neighbourhood characteristics and personal characteristics are included. Similar to model 1, people are found to be more satisfied in neighbourhoods with low shares of non-western minorities, high dwelling values and good accessibility. When personal characteristics are taken into account the effect of safety on residential satisfaction becomes insignificant. This outcome seems to be different from earlier research, both in the Netherlands (Dekker, 2013) and in other countries such as the US (Harris, 2001; Galster & Hesser, 1981), the UK (Parkes *et al.*, 2002) or Australia (Baum *et al.*, 2010) that found strong and significant effects of neighbourhood safety on satisfaction. However, these earlier

Table 1. Frequency distribution of the dependent variable ($N = 18{,}060$).

Neighbourhood satisfaction	
Very satisfied	27%
Satisfied	52%
Not satisfied/not dissatisfied	13%
Dissatisfied	6%
Very dissatisfied	2%

Source: Own calculations based on WoON 2012, provided by Netherlands Statistics.

Table 2. Descriptive statistics of independent variables ($N = 18{,}060$).

	Mean	Std deviation	Minimum	Maximum
Neighbourhood characteristics				
% non-western minorities	23%	19%	1%	89%
% western minorities	11%	5%	2%	50%
Safety scale	−14	26	−50	45
Dwelling values (x1000 euro)	223	115	79	1.838
Distance to closest supermarket (km)	0.6	0.4	0	6
Number of restaurants within 3 km	110	187	0	1.259
% owner-occupied dwellings	46%	21%	0%	99%
Personal characteristics				
Income (×1000 euro)[a]	37	29		
Length of residence (years)	13.4	12.3	0	85

Personal characteristics; categorical variables	Percentage
Ethnic background	
Native Dutch	74
Non-western minority	16
Western minority	10
Household type	
Single	35
Couple	29
Couple with children	26
Single parent household	7
Other household	3
Age	
<45	40
45–55	20
55–65	18
65–75	13
75+	10
Education	
Low	35
Middle	31
High	34
Owner-occupier	52
Single family dwelling	46
Health status	
Less healthy	23
Healthy	27
Very healthy	51

Source:Own calculations based on WoON 2012, provided by Netherlands Statistics.
[a]Netherlands Statistics does not allow disclosure of minimum and maximum income.

studies measured neighbourhood safety as *perceived* neighbourhood crime and/or *perceived* neighbourhood safety, while our study uses an objective indicator of neighbourhood safety. Earlier research shows that individuals who *feel* unsafe in their neighbourhood or *perceive* high levels of crime in their neighbourhood also *report* lower levels of residential satisfaction. However, we find (almost) no effect of *objective* neighbourhood safety on residential satisfaction.

Also personal characteristics are found to affect satisfaction. Non-western minorities are more satisfied than natives or western minorities. Singles are more satisfied than larger households, especially compared to couples with children. Singles generally have lower demands for their neighbourhood than couples and families and are therefore found to be more satisfied when neighbourhood characteristics are taken into account. In line with the literature, older people (over 45) and households with higher incomes are found to be more

Table 3. Multilevel ordered logit models explaining residential satisfaction.

	Model 1	Model 2	Model 3	Model 4
Neighbourhood characteristics				
% non-western minorities	−0.021**	−0.022**	−0.025**	−0.025**
% western minorities	0.007	0.009	0.011*	0.011*
Safety	0.003*	0.001	0.001	0.001
Dwelling values (x1000)	0.002**	0.002**	0.002**	0.002**
Distance to closest supermarket (km)	−0.180**	−0.183**	−0.176**	−0.177**
# restaurants within 3 km	0.000**	0.001**	0.001**	0.001**
% owner-occupied dwellings	0.002	0.000	−0.001	−0.001
Personal characteristics				
Ethnic background (ref = native Dutch)				
Non-western minority		0.326**	0.027	0.022
Western minority		−0.057	−0.109	−0.108
Household type (ref=single)				
Couple		−0.092*	−0.095*	−0.098*
Couple with children		−0.112*	−0.121*	−0.127**
Single parent household		−0.057	−0.064	−0.060
Other household		−0.086	−0.089	−0.091
Age (ref < 45)				
45–55		0.113**	0.112**	0.112**
55–65		0.343**	0.340**	0.340**
65–75		0.575**	0.575**	0.575**
75+		0.918**	0.917**	0.916**
Income (×1000)		0.001*	0.001*	0.001*
Education (ref =low)				
middle		−0.066	−0.063	−0.061
high		−0.173**	−0.165**	−0.164**
Length of residence (years)		−0.007**	−0.008**	−0.008**
Owner-occupier		0.279**	0.276**	0.276**
Single family dwelling		0.253**	0.256**	0.258**
Health status (ref=less healthy)				
Healthy		0.265**	0.772**	0.773**
Very healthy		0.767**	0.268**	0.269**
Interactions				
%Non-western minorities*NW			0.009**	0.005
%Non-western minorities*W			0.003	0.003
%Own ethnic group*NW				0.015*
/cut1	−2.670	−2.157	−2.235	−2.234
/cut2	−1.434	−0.900	−0.977	−0.975
/cut3	1.104	1.705	1.629	1.632
Log likelihood	−19987	−19676	−19667	−19664

Note: All models control for urban area.
Source: Own calculations based on WoON 2012, provided by Netherlands Statistics.
*$p < 0.05$; **$p < 0.01$.

satisfied with their neighbourhood. Length of residence has a negative effect on satisfaction. Owner-occupiers, people in single family dwellings and healthy people are more satisfied.

The first hypothesis states that the share of non-western minorities in the neighbourhood has a stronger negative effect on satisfaction for natives than for minorities themselves, because people are more satisfied in neighbourhoods with high shares of their own ethnic group. Therefore, in model 3, interaction effects are included between the share of non-western minorities and individual level ethnicity. The main effect of the share of non-western minorities remains significant negative. The interaction effect of the share of non-western minorities with being a western minority is not significant and the interaction with being a non-western minority is significant and positive. This indicates that the negative effect of the share of non-western minorities on satisfaction is less strong for non-western minorities themselves than for natives or western minorities. For natives, a

one per cent point increase in the share of non-western minorities leads to a 2.5% decrease (exp-0.025 = 0.975) in the odds of being in a higher category of satisfaction. Compared to neighbourhoods with the highest percentage of non-western minorities (89% non-western minorities), in neighbourhoods with (almost) no non-western minorities, natives are nine times ((exp0.025)^89 = 9.25) more likely to be (very) satisfied. Also non-western minorities are more satisfied in neighbourhoods with lower shares of non-western minorities, however, this effect is smaller. Non-western minorities in neighbourhoods with (almost) no non-western minorities have four times higher odds ((exp(0.025 – 0.09))^89 = 4.15) of being (very) satisfied compared to non-western minorities in neighbourhoods with the highest share of non-western minorities.

In model 4, an extra interaction effect is included between being a non-western minority and the share of the own ethnic group in the neighbourhood.[7] This interaction effect is significant and positive, indicating that non-western minorities are *more* satisfied if the share of their own ethnic group is higher. After inclusion of this interaction effect, the interaction with the total share of non-western minorities is no longer significant. This confirms hypothesis 1; model 3 shows that the negative effect of the share of non-western minorities on satisfaction is less strong for non-western minorities than for natives and western minorities. However, model 4 shows that this is explained by a preference to live among the own ethnic group. When it is taken into account that people are more satisfied in neighbourhoods with higher shares of their own ethnic group, the total share of non-western minorities in the neighbourhood has an equally strong negative effect on non-western minorities as on natives.

Hypothesis 2 state that for owner-occupiers and parents with children living at home satisfaction is more dependent on the ethnic composition of the neighbourhood than for renters and households without children. To test this, model 5 (Table 4) includes an interaction effect between the neighbourhood share of non-western minorities and homeowner. This interaction effect is significant and negative, indicating that indeed the share of non-western minorities has a stronger negative effect on satisfaction for home-owners than for renters. For renters, the odds of being (very) satisfied are 6 ((exp0.021)^89 = 6) times higher in neighbourhoods with no non-western minorities compared to neighbourhoods with the highest share of non-western minorities (89%), while for owner-occupiers the odds of being (very) satisfied are 9 ((exp(0.021 + 0.004)^89 = 9) times higher in neighbourhoods with no non-western minorities compared to neighbourhoods with the highest share of non-western minorities.

Similarly, in model 7, an interaction effect is included between the share of non-western minorities in the neighbourhood and a dummy variable for whether there are children in the household. Both individuals with and without children living at home are less satisfied in neighbourhoods with higher shares of non-western minorities, however this effect is stronger for individuals with children living at home. Models 5 and 7 thus confirm hypothesis 2. These findings are in line with research from the US that home-owners (Greif, 2015; Xie & Zhou, 2012) and households with children (Gould Ellen, 2000; Goyette *et al.*, 2014; Xie & Zhou, 2012) are more sensitive to the neighbourhood ethnic composition.

Hypothesis 3 states that, besides neighbourhood ethnic composition, also other neighbourhood characteristics have a stronger effect on satisfaction for owner-occupiers and parents with children living at home than for others. To test this in models 6 and 8, interaction effects of tenure and household type with the neighbourhood share of ethnic minorities as

Table 4. Multilevel ordered logit models explaining residential satisfaction.

	Model 5	Model 6	Model 7	Model 8
Neighbourhood characteristics				
% non-western minorities	−0.021**	−0.022**	−0.021**	−0.022**
% western minorities	0.010*	0.010*	0.009	0.010
Safety	0.001	0.000	0.002	0.000
Dwelling values (×1000)	0.002**	0.002**	0.002**	0.002**
Distance to closest supermarket (km)	−0.183**	−0.185**	−0.184**	−0.186**
# restaurants within 3 km	0.001**	0.001**	0.001**	0.001**
% owner-occupied dwellings	−0.001	−0.001	0.000	0.000
Personal characteristics				
Ethnic background (ref = native Dutch)				
Non-western minority	0.322**	0.321**	0.340**	0.344**
Western minority	−0.057	−0.057	−0.058	−0.056
Household type (ref = single)				
Couple	−0.092*	−0.091*	−0.084*	−0.076
Couple with children	−0.113*	−0.112*	−0.032	−0.271*
Single parent household	−0.060	−0.057	0.036	−0.194
Other household	−0.089	−0.091	−0.093	−0.089
Age (ref < 45)				
45–55	0.113**	0.115**	0.111**	0.112**
55–65	0.342**	0.343**	0.344**	0.348**
65–75	0.576**	0.578**	0.579**	0.585**
75+	0.921**	0.924**	0.922**	0.929**
Income (×1000)	0.001*	0.001*	0.001*	0.001*
Education (ref = low)				
Middle	−0.065	−0.066	−0.067	−0.066
High	−0.174**	−0.175**	−0.175**	−0.176**
Length of residence (years)	−0.008**	−0.008**	−0.007**	−0.007**
Owner-occupier	0.366**	0.421**	0.28**	0.286**
Single family dwelling	0.253**	0.251**	0.249**	0.248**
Health status (ref = less healthy)				
Healthy	0.768**	0.769**	0.767**	0.767**
Very healthy	0.266**	0.266**	0.265**	0.266**
Interactions	*with home-owner*		*with children*	
%non-western minorities	−0.004*	−0.002	−0.003*	0.002
Safety		0.003		0.003
Dwelling values		0.000		0.001*
/cut1	−2.128	−2.084	−2.126	−2.198
/cut2	−0.872	−0.827	−0.869	−0.941
/cut3	1.734	1.779	1.737	1.667
Log likelihood	−19674	−19672	−19674	−19669

Note: All models control for urban area.
Source: Own calculations based on WoON 2012, provided by Netherlands Statistics.
*$p < 0.05$; **$p < 0.01$.

well as neighbourhood dwelling values and safety are included. The effect of dwelling values on satisfaction is found to be significantly stronger for parents with children living at home than for others. Neighbourhood safety has an (insignificant) stronger effect on satisfaction for both owner-occupiers and parents with children living at home than for others. When these interaction effects are included, the differences between owner-occupiers and renters, and between people with and without children, in the effect of the share of non-western minorities are no longer significant. Home-owners and parents with children are not more averse than others to non-western minorities, other neighbourhood characteristics explain why, especially these groups are dissatisfied in neighbourhoods with high shares of non-western minorities.

In line with the research of Greif (2015) and Xie & Zhou (2012), I found in model 5 that owner-occupiers are more sensitive than renters to the ethnic composition of the

neighbourhood. Similarly, in model 7, I found that parents with children are more sensitive than others to the neighbourhood ethnic composition, which is in line with the findings of Gould Ellen, (2000) and Goyette and colleagues (2014). However, these effects disappear when interaction effects between other neighbourhood characteristics and home-owner or children are taken into account. Parents with children are not more affected than others by the neighbourhood ethnic composition, but more affected by neighbourhood dwelling values, which is correlated with neighbourhood ethnic composition.

Conclusions

Within a long tradition of research into neighbourhood determinants of residential satisfaction, there are only a few studies that look into differences between population groups. There are some studies that analyse differences between ethnic groups (Friedman, 2011; Hipp, 2010; Swaroop & Krysan, 2011) or between owner-occupiers and renters (Baum *et al.*, 2010; Greif, 2015; Parkes *et al.*, 2002), however, this study goes beyond previous research by simultaneously including multiple interaction effects between personal characteristics and neighbourhood characteristics. These interaction effects not only test for which groups satisfaction is most dependent on neighbourhood characteristics, but also which neighbourhood characteristics affect satisfaction, especially for these groups.

The neighbourhood share of non-western minorities has a stronger negative effect on satisfaction for natives than for non-western minorities. However, this is not because natives are more averse to 'others' than non-western minorities; satisfaction among non-western minorities is less affected by the share of non-western minorities in the neighbourhood because they are more satisfied in neighbourhoods with higher shares of their own ethnic group. This shows how important it is to distinguish between different categories of non-western minorities and to simultaneously include multiple interactions. The total share of non-western minorities has a similar negative effect on satisfaction for non-western minorities as for natives, however, the share of the own ethnic group has a positive effect on satisfaction.

Satisfaction is expected to be more dependent on the neighbourhood ethnic composition for owner-occupiers and households with children. Earlier research in the US found that home-owners and household with children are less tolerant to Black neighbours (Xie & Zhou, 2012) and their residential satisfaction (Goyette *et al.*, 2014; Greif, 2015) and mobility behaviour (Gould Ellen, 2000) is more dependent on the neighbourhood ethnic composition. It is, however, unclear whether the lower satisfaction among owner-occupiers and households with children in minority concentration neighbourhoods is *caused* by the concentration of ethnic minorities. Possibly, ethnic concentration is associated with neighbourhood characteristics that are especially, important to home-owners or households with children such as declining property values or low school quality (Gould Ellen, 2000; Goyette *et al.*, 2014). Also in this research, initially satisfaction is found to be more dependent on neighbourhood ethnic composition for home-owners and parents with children living at home than for others. Unlike previous research, I subsequently include interaction effects with other neighbourhood characteristics. When interaction effects with dwelling values and neighbourhood safety are taken into account, the effect of neighbourhood ethnic composition on satisfaction does no longer vary with tenure or household type. Satisfaction among home-owners and parents with children living at home is, more than among others,

affected by neighbourhood characteristics, but not more affected by the ethnic composition of the neighbourhood. By simultaneously including multiple interactions, this research thus shows that in the Netherlands dissatisfaction is not caused by the ethnic composition. The ethnic composition is a proxy for other neighbourhood characteristics that cause dissatisfaction. Possibly, also in the US, Greif (2015), Xie & Zhou (2012), Gould Ellen, (2000) and Goyette and colleagues (2014) might not have found individual differences in sensitivity to neighbourhood ethnic composition if they would have taken into account individual differences in sensitivity to other neighbourhood characteristics. Not the racial composition, but neighbourhood characteristics correlated or perceived to be correlated with race such as dwelling values or school quality might explain why especially home-owners or households with children are dissatisfied or move out of these neighbourhoods.

This research has thus found differences between ethnic groups, tenure groups and household types in the effect of neighbourhood characteristics on satisfaction. This indicates that within the same neighbourhood, one group will be satisfied, while another group is dissatisfied. Natives are dissatisfied in neighbourhoods with high shares of non-western minorities, while non-western minorities are satisfied if they live among their own ethnic group. Especially, parents with children are dissatisfied in neighbourhoods with low dwelling values, for other households dwelling values in the neighbourhood have less impact on residential satisfaction. Dissatisfaction is a key determinant of residential mobility (Speare, 1974). Therefore, differences in satisfaction might lead to selective mobility and thereby to segregation and high turnover rates. Policy-makers in many countries try to create stable, attractive and mixed neighbourhoods (Baum *et al.*, 2010; Bolt *et al.*, 2010; Cheshire, 2007), also by attracting higher income households to deprived urban restructuring neighbourhoods (Boschman *et al.*, 2013). This research shows that there are differences between household types and between ethnic groups in how neighbourhood characteristics affect residential satisfaction. Insight in which neighbourhood characteristics are important to whom, and which households will be satisfied despite certain neighbourhood stressors is very important for effective policy design (Baum *et al.*, 2010; Gould Ellen *et al.*, 2013; Pinkster *et al.*, 2015).

Notes

1. The data uses the Statistics Netherlands definitions of ethnic groups. Non-Western minorities are people of whom at least one parent is born in Africa, Latin America or Asia (except Indonesia and Japan). Western minorities are people of whom at least one parent is born in another country outside the Netherlands.
2. The WoON survey is based on a random sample drawn from the municipal register data. The survey uses a mixed method approach combining internet questionnaires (CAWI), with interviews held by phone (CATI) or face-to face (CAPI). The overall response rate is 59%.
3. This excludes dependent household members such as children living in the parental home and lodgers.
4. The error term is logistically distributed, therefore the probability that an individual is at least in a certain category of satisfaction can be estimated as $P(Y > j) = [\exp(\beta X - c_j)]/1 + [\exp(\beta X - c_j]$.
5. I use the distance to the closest supermarket and the number of restaurants within 3 km as indicators of accessibility of facilities.
6. All models include controls for differences between the four urban areas. In Utrecht, people are less satisfied than in Amsterdam, Rotterdam or The Hague.

7. For Turks, Moroccans, Surinamese and Antilleans, this is the share of their own ethnic group, while for other non-western minorities it is the share of other non-western minorities.

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