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**Educational inequalities: ethnic segregation of social networks of parents, ethnic
diversity in the district, or both?**

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Master Thesis Social Inequalities, Sociology

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Word count: 7017

June 25, 2023

Abstract

This study examines the effect of ethnic social network segregation within an ethnically diverse district. It explores the effects on the education level of Moroccan-Dutch, Turkish-Dutch and native Dutch children in secondary school in the Netherlands. Previous relating studies have focused on the effects of neighbourhoods on the education level of children, but the ethnic segregation of the parental social network had been, up until this point, not been taken into consideration. Three linear probability models were deployed to test whether there are any associations (N = 942). Additionally, six linear probability models were deployed when the dataset was split into two according to ethnicity (one with Dutch natives, N=559, and one with Moroccan-Dutch and Turkish-Dutch, N=383). The results of the linear probability models show that, overall, ethnic social network segregation within an ethnically diverse district does not have an association with the education level of children in secondary school. However, when the dataset was split into two, there is an association found in the latter between ethnic social network segregation within an ethnically diverse district and education level of children in secondary school. Furthermore, there is an association found between ethnic social network segregation of Dutch natives and education level in secondary school. This thesis thus shows that there is some effect of ethnic social network segregation within ethnically diverse districts on the education level of children in secondary school, but future research must be carried out to apprehend what this association precisely entails.

Key Words: *secondary education level, ethnic social network segregation, inequalities, neighbourhood diversity*

Introduction

In the Netherlands, ethnic diversity has received much scholarly and media attention in the last few years. Since three Dutch cities have become majority-minority cities, people with a Dutch descent in these cities have become an ethnic minority, raising the question as to what this super diversity means with regards to the national ethnic majority (Crul, 2016). Diversity and inclusion officers are rising to ensure a diverse and inclusive work environment, and policies are implemented to enable everyone in society to participate, regardless of ethnicity. Undeniably, reality shows that the societal system still generates inequalities with regards to, among others, ethnicity. One of them being educational inequalities.

Namely, it appears that despite differences within ethnic minority groups (Crul, 2016), minoritized non-western ethnic people are more likely than the Dutch ethnic majority to obtain lower educational attainment (Van de Werfhorst & Van Tubergen, 2007; Stevens, Crul, Slootman, Clycq & Timmerman, 2019). This educational inequality perpetuates other inequalities such as inequality of opportunity and contributes to income inequality (Van de Werfhorst & Van Tubergen, 2007). There is evidence that ethnic segregation plays a crucial role in influencing these inequalities (Boterman, Musterd & Manting, 2020).

Furthermore, the neighbourhoods and districts children grow up in are important predictors for educational attainment (Sykes & Kuyper, 2013; Nieuwenhuis & Hooimeijer, 2016; Boterman & Lobato, 2021). Especially the ethnic composition and the presence of various forms of capital seem to play a role in educational outcomes (Nieuwenhuis & Hooijmeijer, 2016). Specifically, neighbourhoods are places where youth is being socialised by social norms and values. Besides, children learn from role models, who are important in determining the attitudes regarding education. Moreover, the neighbourhood is an area where the extent of social cohesion and control are paramount in providing protection against negative behaviours (Fleischmann, Phalet, Deboosere & Neels, 2012).

The largest groups of minoritized non-western ethnic people in the Netherlands are Turkish-Dutch and Moroccan-Dutch (Central Bureau for Statistics, 2022). They tend to reside in specific neighbourhoods, and their residence appears to be in an urban rather than in a rural environment (Leidelmeijer, Schulenberg & Noordhuizen, 2015). Oftentimes, these neighbourhoods are comprised of a diversity of ethnicities. The Dutch majority appears not to live in these diverse neighbourhoods, and lives rather segregated (Crul, 2016).

Research has shown that ethnically diverse neighbourhoods contain less social cohesion than neighbourhoods with less diversity (Putnam, 2007; Van der Meer & Tolsma, 2014). Specifically, people appear to possess less contact with neighbours (Lancee & Dronkers, 2011). Aside from social cohesion, also social capital seems less available in these neighbourhoods (Putnam, 2007). These neighbourhoods also appear to have higher concentrations of people being dependent on welfare benefits, having lower educational attainment, and a higher percentage of unemployment (Leidelmeijer, Schulenberg & Noordhuizen, 2015).

Neighbourhood effects are thus important to consider when examining educational inequalities. However, effects of social capital also manifest outside the boundaries of the neighbourhood (De Graaf & De Graaf, 2002). Specifically, parental social networks might influence educational outcomes of children by intergenerational transmissions of values and the availability of resources within these social networks (Curry & Holter, 2019; Roth & Salikutluk, 2012). Moreover, it matters what the composition of the social networks is with regards to the available help and support for children in school.

The ethnic composition in the social networks of parents mostly consists of people as themselves (Van Tubergen, 2015). This might partly be explained by the homophily principle, meaning that people have a tendency to feel attracted to people similar to them (Van Tubergen, 2015). The ethnic majority is oftentimes higher educated and has a higher social-economic status than minoritized non-western ethnics, which makes segregation more problematic for

minoritized non-western ethnics. Moreover, social networks provide an important basis for moving up the social ladder (Galster, 2011).

Within the social networks of Moroccan-Dutch and Turkish-Dutch parents, issues regarding racism and discrimination are widespread, leading to negative concrete attitudes. This means that it is not believed that schooling is important to personal future success (D'hondt, Van Praag, Stevens & Van Houtte, 2015). Furthermore, because social networks of parents partly determine the availability of social and cultural capital, it might be that minoritized Moroccan-Dutch and Turkish-Dutch parents have lower parental resources regarding education than native Dutch parents (Roth & Salikutluk, 2012).

Earlier research has focused on neighbourhood effects on educational attainment, but the combination with the segregation of the social networks of parents has thus far not been made. Therefore, this study likes to explore the effect of ethnic segregation of social networks within a certain amount of ethnic diverse neighbourhoods, on education level of children. The above information leads to the following research question:

What is the effect of an ethnically segregated social network on the education level of Dutch, Moroccan-Dutch and Turkish-Dutch children in secondary school, given the degree of ethnic diversity in the neighbourhood they live in?

The information of this study contributes to existing literature by examining ethnic segregation, ethnic diversity, social-economic status and education levels all together in the Dutch context. Furthermore, this study combines the ethnic diversity within neighbourhoods with the segregation of the social network of parents. This combination leads to a more complete image of the influence of segregation and diversity on educational inequalities.

Theoretical framework

The expected association between ethnic social network segregation with the interaction of ethnic neighbourhood diversity and secondary education levels can be split up into two different elements. First, the effect of ethnic neighbourhood diversity on secondary education levels. Second, the effect of ethnic social network segregation on secondary education levels.

Ethnic neighbourhood diversity

Ethnic diversity within neighbourhoods has certain effects that can be classified as neighbourhood effects. These effects in turn produce different mechanisms as are described hereunder.

Social-interactive mechanisms

The social composition of the neighbourhood produces various social processes. As Galster (2011) argues, these processes include among others: social contagion and collective socialisation; social network; social cohesion and control; competition and relative deprivation.

Collective socialisation, also called ‘role modelling’, means that youth in the neighbourhood is socialised to norms and values. Collective socialisation is often investigated within a context of disadvantaged neighbourhoods, where heterogeneous cultural models are competitive and sometimes conflictive (Otero, Carranza & Conteras, 2021). The role models in neighbourhoods might either have negative or positive effects on educational outcomes, depending on the nature of the role models (Fleischmann et al., 2012). In this regard, neighbourhoods with greater exposure to peer groups that engage in deviant behaviour also possess greater negative attitudes towards education. The contagion mechanism then ensures the adoption of these attitudes by other neighbours (Nieuwenhuis & Hooimeijer, 2016).

Additionally, the social network within a neighbourhood appears to be important when considering educational outcomes (Galster, 2011). Interpersonal communication between neighbours ensures the flow of resources to go beyond one's own household (Fleischmann et al., 2012). This flow is, according to attachment theory, generated by close social relationships and positively influences educational attainment (Brandén, Birkelund & Szulkin, 2019).

Furthermore, the ethnic composition of the neighbourhood might influence the existing social cohesion and social control (Galster, 2011). Research by Van der Meer and Tolsma (2014) shows that more ethnic diversity in a neighbourhood might lead to less social cohesion. However, ethnically diverse neighbourhoods stimulate interethnic contact and this in turn might influence the level of trust in the neighbourhood. Social control may then provide protection against negative behaviours (Fleischmann et al., 2012). Nonetheless, when there is little social cohesion, residents will be less able to control the norms in the neighbourhood regarding education (Nieuwenhuis & Hooimijer, 2016).

Lastly, competition and relative deprivation appear to play a role in the effect of ethnically diverse neighbourhoods on educational outcomes. In neighbourhoods with relatively more ethnic heterogeneity, conflict theory predicts more disorder because of competition over scarce resources. When people from other ethnic groups are better off, people might experience relative deprivation, consequently perceiving people from out-groups as a threat (Nieuwenhuis & Hooimeijer, 2016).

Institutional mechanisms

Aside from social-interactive mechanisms, neighbourhood effects might manifest via institutional mechanisms. First, ethnically diverse neighbourhoods often contain lower quality schools than neighbourhoods with mostly the ethnic majority. Living in an ethnically diverse neighbourhood thus seems to affect the opportunities of the residents because school choice

might be influenced by school proximity (Galster, 2011; Nieuwenhuis & Hooimeijer, 2016). The lower quality of schools in these neighbourhoods may be explained by the difficulty these schools face in attracting good teaching staff due to their lack of resources (Nieuwenhuis & Hooimeijer, 2016).

Secondly, neighbourhoods with a diversity of ethnic minorities may be stigmatised by institutions because of public stereotypes (Galster, 2011). This might reduce the opportunities in the education system because ethnic minorities may face racism or racial discrimination at schools (Stevens et al., 2019).

Thirdly, the effects of school quality and stigmatisation are associated with school segregation (Sykes & Kuyper, 2013; Zwier, Geven, Bol & Van de Werfhorst, 2022). Zwier et al. (2022) find that children with a disadvantaged background are more likely to choose a secondary school where a larger share of primary school peers are also enrolled, perpetuating school segregation. However, Sykes and Kuyper (2013) find that the ethnic school composition of Dutch secondary schools is not associated with educational attainment, but that socio-economic composition is. Nevertheless, school socio-economic composition does not account for all the inequalities in educational outcomes. The relationship between ethnically diverse neighbourhoods and school segregation must therefore be examined through a multilevel lens, acknowledging that school segregation also contributes to reproducing and consolidating existing socio-economic inequalities (Boterman & Lobato, 2022).

Ethnic social network composition

Alongside ethnically diverse neighbourhoods, also the ethnic composition of the social network of parents is a pivotal element when examining educational inequalities (De Graaf & De Graaf, 2002; Smith, Van Tubergen, Maas, & McFarland, 2016). Specifically, the social network of parents is an element of social capital of parents (Putnam, 2000). Research shows

that the composition of social networks is partly determined by the principle of homophily, meaning that people have a tendency to feel attracted to people who are like them (Van Tubergen, 2015). In the Netherlands, around 75% of the social network of Moroccan-Dutch and Turkish-Dutch are composed of the same ethnicity, and for the native Dutch majority this is 95% (Van Tubergen, 2015). This means that personal matters, including educational matters of the child, are almost exclusively discussed with people from their own group.

The social network of parents sets the following mechanisms in motion that could contribute to educational outcomes of children.

Educational expectations

Parents define the educational aspirations of students, partly because they express their expectations towards their child(ren) (Roth & Salikutluk, 2012). Social networks of parents may influence their expectations and shape their beliefs. Additionally, these social networks may enforce norms of behaviour regarding education (Curry & Holter, 2019). Research has shown that the presence of high-prestige social ties influences the expectations of parents towards education. Moreover, the presence of people with good jobs also influences these expectations (Roth & Salikutluk, 2012). Expectations regarding education, in turn, influence the behaviour of children in the educational system. By vertical socialisation, between parents and children, intergenerational transmission of cultural traits is ensured. Specifically, minorities of Moroccan or Turkish descent may hold different educational expectations than the Dutch majority.

Educational attitudes

Children of Moroccan or Turkish descent are mostly brought up with positive abstract attitudes towards education, meaning that they express strong beliefs that schooling is important. However, concrete attitudes may differ from abstract attitudes. Concrete attitudes define whether the role of schooling is important in personal future success. It has been shown that the more negative concrete attitudes are, the more likely it is that educational attainment is lower (D'hondt et al., 2015). Most minority children appear to carry pessimistic concrete attitudes, anticipating fewer opportunities in education and the labour market due to their socio-economic background and to the prospect of racial/ ethnic discrimination (D'hondt et al., 2016). Awareness of discrimination or racism might be even higher to the extent that these events are widespread through the social network of the parents.

Social capital

Besides the forming of attitudes and expectations towards education, also the availability of resources plays an important role in social networks of parents. When parents possess high social capital, resources from the social network are accessible when necessary (Roth & Salikutluk, 2012). Social capital in this instance means that social support is provided within the social network. Especially the communities of minoritized Moroccan-Dutch and Turkish-Dutch may place community needs over individual needs, putting emphasis on advising and mentoring the children within the communities (Mishra, 2020).

Moreover, the social relationships of parents may be of importance when exchanging information on the students' homework or other related school information. It even appears that parental involvement in the education of their child(ren) is associated with contact with other parents (Curry & Holter, 2019). When parents know the parents of the peers of their

children, it is easier to share (school) information in the social network. Besides, guiding and monitoring children's behaviour becomes easier (Zwier & Geven, 2023).

Methods and data

This study will use the NETHERLANDS Longitudinal Lifecourse Study (NELLS; Tolsma, Kraaykamp, De Graaf, Kalmijn & Monden, 2014) dataset. NELLS was conducted in two Waves, where Wave 1 was collected in 2009 and Wave 2 in 2013. The study has an initial sample of 5312 Dutch inhabitants aged 15-45 in Wave 1, and with oversamples of Moroccan-Dutch and Turkish-Dutch. The purpose of NELLS was to create a public dataset usable for the sociological research community, in order to carry out studies with a focus on social cohesion, norms and values, and inequality. Respondents were sampled via a two-stage stratified sampling: "the first stage was a quasi-random selection of 35 municipalities by region and urbanisation and the second stage was a random selection from the population registry based on age and country of birth of the respondent and his/her parents" (Tolsma et al., 2014, p. 9). Both Wave 1 and Wave 2 consisted of a face-to-face interview and a self-completion questionnaire (Tolsma et al., 2014).

NELLS fits the purposes of this study because it focuses on minoritized Moroccan-Dutch and Turkish-Dutch and native Dutch. Moreover, the focus on social cohesion and inequality fits the aim of this study.

The sample focus was on native Dutch/ Moroccan-Dutch/ Turkish-Dutch parents with at least one child in the age range 12 to 18 years. That is because following formal education in the Netherlands is compulsory until 18 years and children will be placed in tracks when they are 12 years old. The original dataset was formatted in a wide format, which meant that each row represented a parent. To be able to conduct analyses for different children of one

respondent, I decided to realign the dataset to a long format so that each row represented a child.

The original dataset contained 1552 variables. After examining the variables, only the most important variables to this research and according to theory were kept, which took the amount of variables down to 11. The variables are described in the sections hereunder.

Outcome variable

The *education level* in secondary school of children in the age range 12-18 is the outcome variable. Education level is in this study operationalized by the question ‘which educational track is your child currently following?’, and this was measured in Wave 2. The answer categories contained: (1) no primary education, (2) primary education, (3) practical vocational secondary education, (4) theoretical vocational secondary education, (5) general secondary education, (6) pre-academic secondary education, (7) upper secondary vocational education, (8) post-secondary vocational education, (9) tertiary vocational education, (10) university bachelor, (11) university master, (12) PhD, (13) foreign primary education, (14) foreign secondary education, (15) foreign tertiary education, (16) no education. Since I was primarily interested in the education level in secondary education, I created a new binary variable with 0 = practical vocational secondary education, theoretical vocational secondary education or upper secondary vocational education, and 1= general secondary education or pre-academic secondary education.

Exposure variables

Ethnic district diversity is one of the variables that has been used as an exposure variable. Using the percentage of non-western people in a district is a common way of measuring diversity in a district (Fajth & Bilgili, 2020). I used this to look at the diversity in

the districts. In this way, I would be able to have a closer look at how the different districts are composed in terms of ethnicity.

Secondly, *ethnic social network segregation* also functioned as an exposure variable. This is defined as ‘the extent to which groups are exposed to one another by occupying nearby positions’, as is based on previous research on segregation in social networks (Bojanowski & Corten, 2014). In order for a social network to be segregated, the composition of the social network must be known. The composition of the social network was measured by a question in Wave 1 on the core discussion social network in which respondents were asked to note down 5 names with whom they discuss important personal matters. They were then asked to answer what the ethnic background of these people is, and this is based on the country of the birth parents. The answer categories contained (1) Netherlands, (2) Morocco, (3) Turkey, (4) Surinam, (5) Netherlands Antilles, (6) other country.. namely...Measuring the core discussion social network this way is in line with previous research (Wiertz, 2016; Tolsma & Van der Meer, 2018). A binary variable was created in which a social network was segregated when the parents did not have any friends with a different ethnicity than themselves, and a social network was not segregated when they had at least 1 friend with a different ethnicity than themselves. There were some people who did not fill in any names so in that case these respondents were seen as a missing value.

Control variables

Socio-economic status is the first variable that has been controlled for. As socio-economic status (SES) may play a role in the alleged association between ethnic diversity, ethnic social network segregation and secondary education level, it will be included as a control variable. I used the question of how much the household income is before the taxes. The answer categories had a range of 17 answer categories that ranged from less than €150 a month to

€7000 or more. I have recoded it into four groups. There was a rest category in which respondents indicated that they did not know their household income or they did not want to tell. This missing data was N=129, so I decided to impute these answers using Multivariate Imputation by Chained Equations (Mice). I ran the “Random Forest” imputation and the “Multinomial Logistic Regression” imputation and saw a minimum difference in the distribution. However, since Random Forest is more difficult than Multinomial Logistic Regression, and the fact that there is a small difference in distribution, the preference goes to use of the simpler and more intuitive model of Multinomial Logistic Regression. All the other variables were included in the imputation.

Ethnicity is also controlled for. In line with the definition used by Statistics Netherlands, I distinguished respondents born in Turkey or Morocco or whose mother or father was born there, and Dutch natives. In the original dataset, Turkish-Dutch and Moroccan-Dutch were separated into different categories based on whether they were first or second generation immigrants. I decided to merge these categories into one so that the analysis would become more comprehensible. Hence, the final dataset contained three categories for ethnicity: Dutch natives, Moroccan-Dutch and Turkish-Dutch.

Cultural capital of the parents was also controlled for. Cultural capital can be defined as familiarity of parents with conceptual codes with its normative and artistic manifestations that underlie the Dutch dominant culture (De Graaf, De Graaf, & Kraaykamp, 2000). This has been measured in terms of attending high-brow activities. This is in line with previous research (De Graaf, De Graaf, & Kraaykamp, 2000). I used the items in which respondents were asked to indicate how often they participated in 5 different activities in the last 12 months. The options consisted of high-brow (e.g., classical music concert) and low-brow (e.g., going to a coffee shop) activities. The answer categories ranged from ‘never’ to ‘12 times or higher in the last 12 months’. One factor was found (Eigenvalue > 1), with factor loadings ranging from .39 to

.71. After this check, four items were merged into a scale, *cultural capital*. To measure the reliability of this scale, Cronbach's Alpha was measured: .64.

Gender of the parents was also controlled for because there appears to be social network differences between gender types and this might have an impact on the education level (Moore, 1990; Van Tubergen, 2015). It is a binary variable in which 1 = man and 2 = woman.

Age of the parents was also a control variable because it might be that age has an effect on the amount of difference of ethnic ties (Van Tubergen, 2015). I used the age from Wave 2. There were 3 parents under 25 years old. However, because it is highly unlikely that these respondents did indeed have children over 12 years old, they were excluded from the analysis.

Next, the *educational attainment* of the parents was used as a control variable because the educational attainment of children relates to the educational attainment of the parents (Van de Werfhorst & Van Tubergen, 2007; Stevens et al., 2019). The answer categories were similar to the answer categories of the educational track of the children. I decided to merge the categories pre-vocational secondary education or lower into 'lower education', the categories of higher levels of higher education or vocational training into 'middle education', and all the higher levels into 'higher education'.

After the dataset was put into long format, N was 1300. However, after excluding missing values of the education level of the children (NAs= 336), ethnic social network segregation (NAs= 5), age (NAs= 3), parental education (NAs=14), N= 942. Further descriptives can be found in Table 1.

Table 1*Descriptive statistics*

N=942	Proportion	α^*	Min	Max	Mean	SD
Secondary education level child						
Lower education	.752					
Higher education	.248					
Social network segregation						
Not segregated	.49					
Segregated	.51					
Diversity in district (% of non-Western people in district)			0	85	14.5	14.5
Socio-economic status (household income, a month)						
Group 1 (< €150 - €999)	.070					
Group 2 (€1000 - €2999)	.471					
Group 3 (€3000 - €4999)	.267					
Group 4 (€5000 - €7000 or more)	.059					
Ethnicity						
Moroccan-Dutch	.182					
Turkish-Dutch	.222					
Native Dutch	.596					
Cultural capital		64				
Gender						
Men	.363					

Women	.637				
Age parents		31	53	43	3.8
Educational attainment parents					
Lower education	.367				
Middle education	.378				
Higher education	.255				

*Cronbach's Alpha

Statistical techniques

The open-source programme R is used to run the analyses. First, I performed two simple Chi-Square tests to see if there is any significant association between the variables *ethnic social network segregation* and *secondary education level* of children, and *ethnicity* and *secondary education level* of children. Second, since *ethnic district diversity* is also an important variable, I conducted a boxplot with *ethnic district diversity* and *secondary education level*.

Second, linear probability models are deployed to give an answer to the research question. This model has the preference above a logistic regression model because the results are more intuitive and easier to interpret.

Three models were executed in the following order. First, model 1 contains *ethnic segregation* as exposure variable. Second, model 2 contains *ethnic district diversity* as exposure variable. This way, the effect of the exposure variables can be assessed, apart from the interaction effect. Hence, in the third model the focus is on the interaction effect.

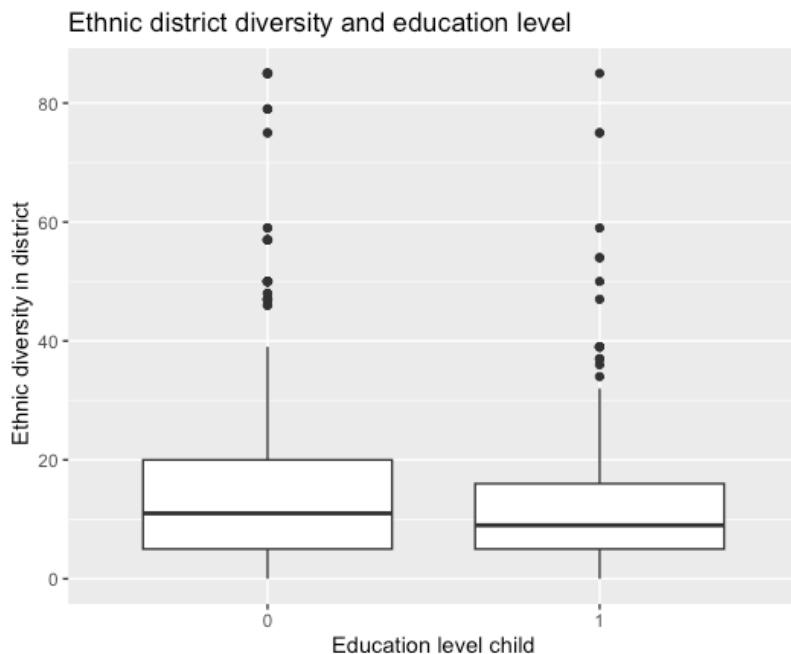
Two additional models were added to examine the greater effect of ethnicity. Models 4, 5, 6 contains only Dutch natives whereas models 7, 8, and 9 only contains Moroccan-Dutch and Turkish-Dutch.

Results

In this section, the results of the preliminary analyses as well as the linear probability models are discussed. As for the first Chi-Square test, a significant association was found between *ethnic social network segregation* and *secondary education level*: X^2 (df=1, N = 961) = 13.805, $p < .01$. A Chi-Square test was also performed to see if there is any association for *ethnic social network segregation* of the parents and their *ethnicity*. There is a significant association between these two variables: X^2 (df=2, N=961) = 278.83, $p < .01$. As for the boxplot for *ethnic district diversity* and *secondary education level*, this is visualized in Graph 1. Graph 1 shows that the median of children following higher levels of secondary education and living in an ethnically diverse district is somewhat lower than children following lower levels of secondary education and living in an ethnically diverse district, but there is not a substantial difference between these two levels of secondary education and the amount of ethnic diversity within the district.

Graph 1

Boxplot of ethnic district diversity in percentage, with secondary education level, in which 0= lower levels of secondary education and 1= higher levels of secondary education



The results of the first 3 models are visible in Table 2. In the first model *ethnic social network segregation* ($\beta = .09$; $p = .003$) is the main exposure variable and the model shows that parents with an ethnically segregated rather than unsegregated network, the chance of having a child who follows a higher level of secondary education increases by 9 percentage points on average and net of control. In terms of the magnitude of this effect, there is thus a 36%¹ increase of children following higher levels of secondary education compared to the baseline as seen in Table 1.

The main exposure variable in model 2 is *ethnic district diversity* ($\beta = .11$; $p = .922$). It appears that if the ethnic diversity within a district increases by 1 point, the chance of having a child who follows a higher level of secondary education increases by 11 percentage points on

¹ $(.248+.09)/.248 = 36\%$

average and net of control. Moreover, it is important to consider that the effect is not significant, and that caution is advised when interpreting the magnitude of its effect.

In model 3, the interaction term of *ethnic district diversity and ethnic social network segregation* ($\beta = .26$; $p = .197$) is added. The result shows that the effect of diversity in the district is larger on the education level of children by those parents with an ethnically segregated social network than those who do not. However, this effect does not appear to be significant, meaning that the effect of the association of the interaction term is too uncertain to be able to substantially say something about its magnitude.

Table 2

Regression Analysis output of Model 1, Model 2, Model 3 with outcome variable = education level of children (0 = lower levels of secondary education, 1 = higher levels of secondary education)

N=942	Model 1	Model 2	Model 3
Intercept	.24 (.21)	.33 (.21)	.26 (.21)
Ethnic district diversity	-	.01 (.12)	-.09 (.14)
Ethnic social network segregation	.09** (.03)	-	.06 (.04)
SES			
Group 2	-.04 (.05)	-.04 (.05)	-.04 (.05)
Group 3	-.00 (.06)	.00 (.06)	-.00 (.05)
Group 4	.20** (.07)	.21** (.08)	.19** (.00)
Ethnicity			
Moroccan-Dutch	.00 (.04)	-.06 (.04)	.00 (.04)
Turkish-Dutch	.00 (.04)	-.04 (.04)	.00 (.04)
Cultural capital	-.00 (.00)	-.00 (.00)	-.00 (.00)
Gender	-.01 (.03)	-.00 (.03)	-.01 (.03)
Age	-.00 (.00)	-.00 (.00)	-.00 (.00)
Educational attainment			
Middle education	-.01 (.33)	-.01 (.03)	-.01 (.03)
Higher education	.13** (.04)	.12** (.04)	.13** (.04)
Interaction term (<i>Ethnic district diversity & ethnic social network segregation</i>)	-	-	.26 (.20)
Adjusted R ²	.055	.045	.054

*Note: Standard Errors in Parentheses. ***p < .001, **p < .01, *p < .05*

Alongside the effects of the ethnic social network segregation and the ethnic diversity in the district, the effects of ethnicity are paramount in this study. However, in the previous models there have not been found an effect of ethnicity. It may be that this variable does not cover the overall effects of ethnicity enough. Hence, six models were added to see if there is any difference in effects when the dataset is split up into one with only Dutch natives (models 4, 5, and 6) and one with only Moroccan-Dutch and Turkish-Dutch (models 7, 8, and 9). These results are captured in Tables 3 and 4 respectively.

First, looking at Table 3, the following results of the models containing only Dutch natives are discernible. In model 4, *ethnic social network segregation* ($\beta = .10$; $p = .004$) is the main exposure variable and the model shows that for Dutch natives with an ethnically segregated rather than unsegregated social network, the chance of having a child who follows a higher level of secondary education increases by 10 percentage points on average and net of control. In terms of the magnitude, it appears there is an increase of 40%² more children in higher secondary education compared to the baseline. Second, in model 5, *ethnic district diversity* ($\beta = .25$; $p = .361$) is the main exposure variable. This means that if the ethnic diversity within a district increases by 1 point, the chance of having a child who follows a higher level of secondary education increases by 25 percentage points on average and net of control. However, this effect is not significant, and caution is advised when interpreting the magnitude of its effect. Lastly, in model 6 the interaction term of *ethnic district diversity and ethnic social network segregation* ($\beta = -.88$; $p = .115$) is added. This interaction term is not significant and hence no strong conclusions can be warranted.

² $(.248+.10)/.248 = 40\%$

Table 3

Regression Analysis output of only Dutch natives, with outcome variable = education level of children (0 = lower levels of secondary education, 1 = higher levels of secondary education)

N=559	Model 4	Model 5	Model 6
Intercept	-.85** (.31)	.17 (.31)	-.98** (.31)
Ethnic district diversity	-	.25 (.28)	.90* (.44)
Ethnic social network segregation	.10* (.04)	-	.19** (.06)
SES			
Group 2	-.12 (.09)	-.13 (.09)	-.11 (.09)
Group 3	-.06 (.09)	-.06 (.09)	-.04 (.09)
Group 4	.17 (.11)	.17 (.11)	.19 (.11)
Cultural capital	.01 (.01)	.00 (.12)	.01 (.01)
Gender	.01 (.04)	.01 (.04)	.00 (.04)
Age	.00 (.01)	.00 (.01)	.00 (.01)
Educational attainment			
Middle education	-.01 (.05)	-.01 (.04)	-.01 (.05)
Higher education	.12 (.05)	.12* (.05)	.12* (.06)
Interaction term (<i>Ethnic district diversity & ethnic social network segregation</i>)	-	-	-.88 (.56)
Adjusted R ²	.078	.068	.082

*Note: Standard Errors in Parentheses. ***p < .001, **p < .01, *p < .05*

Furthermore, Table 4 shows the results of the models containing Moroccan-Dutch and Turkish-Dutch. Model 7 shows that for Moroccan-Dutch and Turkish-Dutch with an ethnically segregated rather than an unsegregated social network, the chance of having a child who follows a higher level of secondary education increases by 9 percentage points, net of control (*ethnic social network segregation* ($\beta = .09$; $p = .100$)). However, this effect is not significant, and no strong conclusions can be warranted. Next, model 8 shows the main effect of *ethnic district diversity* ($\beta = -.09$; $p = .479$). This means that if the ethnic diversity within a district increases by 1 point, the chance of having a child who follows a higher level of secondary education decreases by 9 percentage points on average and net of control. Again, this effect is not significant and should be interpreted with caution. Lastly, model 9 shows the interaction effect of *ethnic district diversity and ethnic social network segregation* ($\beta = .84$; $p = .005$). For children with parents whose social network is ethnically segregated, a one-point increase in ethnic district diversity leads to a 36 percentage points difference in the chances of following a higher level of secondary education³. Conversely, for children with parents whose social network is not ethnically segregated, a one-point increase in ethnic district diversity leads to a decrease of 32 percentage points in the chances of following a higher level of secondary education⁴.

³ $(B \cdot X1 = -.32) + (B \cdot X2 = -.16) + (B \cdot X1 \cdot X2 = .84) = .36$

⁴ $(B \cdot X1 = -.32) + (B \cdot X2 = 0) + (B \cdot X1 \cdot X2 = 0) = -.32$

Table 4

Regression Analysis output of only Turkish-Dutch and Moroccan-Dutch, with outcome variable = education level of children (0 = lower levels of secondary education, 1 = higher levels of secondary education)

N=383	Model 7	Model 8	Model 9
Intercept	.40 (.26)	-.49 (.27)	-1.46*** (.27)
Ethnic district diversity	-	-.09 (.12)	-.32* (.14)
Ethnic social network segregation	.09 (.05)	-	-.16 (.11)
SES			
Group 2	.01 (.06)	.02 (.06)	.02 (.06)
Group 3	.03 (.08)	.03 (.08)	.05 (.08)
Group 4	.02 (.13)	.04 (.13)	.01 (.13)
Cultural capital	-.02 (.01)	-.02 (.01)	-.01 (.01)
Gender	-.04 (.04)	-.04 (.04)	-.04 (.04)
Age	-.04 (.04)	-.00 (.00)	-.01 (.00)
Educational attainment			
Middle education	.00 (.05)	-.00 (.00)	.00 (.05)
Higher education	.12 (.07)	.09 (.07)	.09 (.07)
Interaction term (Ethnic district diversity & ethnic social network segregation)	-	-	.84** (.30)
Adjusted R ²	-.001	-.007	.016

*Note: Standard Errors in Parentheses. ***p < 0.001, **p < 0.01, *p < 0.05*

Discussion and conclusion

The motive of this study was to find out how educational inequalities are perpetuated by differences in ethnic social network segregation in ethnically diverse districts. This question arose because it appears that in the Netherlands minoritized people with a non-western background possess, on average, lower educational attainment than Dutch natives (Van de Werfhorst & Van Tubergen, 2007; Stevens et al., 2019). Often, neighbourhood effects come into play (Galster, 2011; Van der Meer & Tolsma, 2014), meaning that minoritized non-western people such as Moroccan-Dutch and Turkish-Dutch live in ethnically diverse neighbourhoods with less social cohesion and less available social capital (Galster, 2011). In contrast, Dutch natives tend to live in more segregated districts with mostly other Dutch natives (Crul, 2016).

However, since people are not bound to contacts within the neighbourhood, the question arose whether the ethnic composition of the social network matters in terms of the education level of the child in secondary school. A social network could, after all, provide social capital and role models for children (Galster, 2011). An ethnically segregated social network could provide children with only one-sided educational expectations and attitudes, indicating that children of Dutch natives own more social capital, making it easier for them to manoeuvre their way through the Dutch education system (Boterman & Lobato, 2021; Roth & Salikutluk, 2012). A less ethnically segregated social network might balance these effects out, eventually leading to lower educational inequalities. That led to the following research question: **‘what is the effect of an ethnically segregated social network on the education level of Dutch, Moroccan-Dutch and Turkish-Dutch children in secondary school, given the degree of ethnic diversity in the district they live in?’** For analyses, 9 linear probability models were conducted, and these generated some interesting results.

First, it appears that for all models, ethnic diversity in districts does not seem to have a substantial effect on the education level of children in secondary school. Furthermore, ethnic social network segregation does seem to have an effect in both model 1 as model 4 in which in the latter there were only Dutch natives. The magnitude of the effects is in both cases quite large (36% and 40% respectively). The effect found in model 1 could be due to the overrepresentation of Dutch natives in the dataset, explaining why the effect is also found in model 4. Specifically, the ethnically segregated network of parents of Dutch native children appears to have some association with the education level of children in secondary school. This is in line with previous research which shows that children of Dutch natives own more social capital than non-native Dutch (Boterman & Lobato, 2021; Roth & Salikutluk, 2012). Especially, with an ethnically segregated network, Dutch natives might hold more high-prestige social ties than non-native Dutch, also influencing their expectations of parents towards education (Roth & Salikutluk, 2012).

Second, the models only containing Moroccan-Dutch and Turkish-Dutch show an association between the differential effect of ethnic district diversity and social network segregation and the education level of children. This indicates that when Moroccan-Dutch and Turkish-Dutch live in an ethnically diverse district, the children of parents with an ethnically segregated social network have a higher chance of following a higher level of education in secondary school relative to children with parents with no segregated social network. This might indicate that an ethnically segregated social network protects against some of the negative neighbourhood effects. This is not in line with research since one would expect that segregated social networks of Moroccan-Dutch and Turkish-Dutch to have more negative concrete attitudes toward education due to stigmatisation and discrimination (D'hondt et al., 2015).

Thirdly, there was no association found between secondary education levels and the ethnic diversity in the district. This generates an important consideration. Apparently, there might be a more equal distribution of education levels in secondary school than thought beforehand. This is interesting since previous literature did find such neighbourhood effects (Galster, 2011). However, the lack of effects in this association is in line with research by Sykes & Kuyper (2013) in which the ethnic composition of schools has little effect on the educational attainment of children. Sykes & Kuyper did find that socio-economic status has some effect on educational attainment (2013). Therefore, it could be interesting for future research to examine any possible associations between socio-economic status in neighbourhoods together with the segregation of social networks and this role in educational inequalities.

There are some limitations to this thesis. First, the computation of *ethnic social network segregation* has only been done with close ties, while one might expect acquaintances and even more distanced ties to play an important role in the social network. After all, these ties could also provide important resources.

Second, the effects in this thesis could be biased by the omission or imperfect measurement of important common causes of ethnic social network segregation, ethnic district diversity and secondary education levels. Since this is an associational study, no claims of causal inference can be generated. The potential unmeasured confounder of *ethnic social network* and the *secondary education level* of children could be the location of the district the children live in. In other words, Dutch natives tend to live in segregated districts in which they only encounter other Dutch natives. For example, districts in rural areas in the Netherlands could influence both the *secondary education levels* of children as well as the *social networks* of parents. Additionally, the potential unmeasured confounder of the association of *ethnic social network segregation* and *ethnic diversity in the district* on the secondary education level of the child of Moroccan-Dutch and Turkish-Dutch could be the homophily principle (Van

Tubergen, 2015). This would mean that Moroccan-Dutch and Turkish-Dutch tend to live in an *ethnically diverse district* but possess a strong *social network* of people from their own ethnicity. The social capital and social cohesion might be high in the *social network* itself, eventually leading to more help within the network, and influencing the *secondary education level* of the child. Future research should take these confounders into account and should consider other potential confounders.

Third, this thesis only considered three ethnic groups but since there are now super-diverse cities in the Netherlands, Dutch natives are no longer the majority in some cities (Crul, 2016). There are now numerous ethnic minorities which might make it interesting to examine the differences of ethnicities with social network segregation within ethnically diverse neighbourhoods and districts.

Fourth, the interaction effect found in model 9 might be significant due to the small sample size. Contrary, it could also be that no associations were found due to this small sample size.

All in all, although a general association has not been found between an ethnic segregated social network within ethnically diverse districts and secondary education levels, there appears to be an association when the dataset is split into two groups. Then it appears that there is a differential effect of ethnic residential diversity for Moroccan-Dutch and Turkish-Dutch with segregated social networks compared to those people with no segregated social networks. For native Dutch such an interaction effect has not been detected, although there appears to be a separate effect for ethnic segregated social networks. Future research must be carried out to examine what these associations precisely entail. This information has scientific and practical relevance because this study contributes to a marginal body of literature focusing on educational inequalities while simultaneously examining the combination of ethnic district diversity and ethnic social network segregation.

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Appendix - ethics and privacy checklist

PART I: GENERAL INFORMATION

Project title: Msc thesis Sociology, Social Inequalities

Name, email of student: Charlotte Turksma, 666853ct@student.eur.nl

Name, email of supervisor: Gabriele Mari, mari@essb.eur.nl

Start date and duration: January until June

Is the research study conducted within DPAS YES - NO

If 'NO': at or for what institute or organization will the study be conducted?

(e.g. internship organization)

PART II: HUMAN SUBJECTS

1. Does your research involve human participants. YES - NO

If 'NO': skip to part V.

If 'YES': does the study involve medical or physical research? YES - NO

Research that falls under the Medical Research Involving Human Subjects Act (WMO) must first be submitted to an accredited medical research ethics committee or the Central Committee on Research Involving Human Subjects (CCMO).

2. Does your research involve field observations without manipulations that will not involve identification of participants. YES - NO

If 'YES': skip to part IV.

3. Research involving completely anonymous data files (secondary data that has been anonymized by someone else). YES - NO

If 'YES': skip to part IV.

PART III: PARTICIPANTS

1. Will information about the nature of the study and about what participants can expect during the study be withheld from them? YES - NO

2. Will any of the participants not be asked for verbal or written 'informed consent,' whereby they agree to participate in the study? YES - NO

3. Will information about the possibility to discontinue the participation at any time be withheld from participants? YES - NO

4. Will the study involve actively deceiving the participants? YES - NO

Note: almost all research studies involve some kind of deception of participants. Try to think about what types of deception are ethical or non-ethical (e.g. purpose of the study is not told, coercion is exerted on participants, giving participants the feeling that they harm other people by making certain decisions, etc.).

5. Does the study involve the risk of causing psychological stress or negative emotions beyond those normally encountered by participants? YES - NO

6. Will information be collected about special categories of data, as defined by the GDPR (e.g. racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, genetic data, biometric data for the purpose of uniquely identifying a person, data concerning mental or physical health, data concerning a person’s sex life or sexual orientation)? YES - NO

7. Will the study involve the participation of minors (<18 years old) or other groups that cannot give consent? YES - NO

8. Is the health and/or safety of participants at risk during the study? YES - NO

9. Can participants be identified by the study results or can the confidentiality of the participants’ identity not be ensured? YES - NO

10. Are there any other possible ethical issues with regard to this study? YES - NO

If you have answered ‘YES’ to any of the previous questions, please indicate below why this issue is unavoidable in this study.

What safeguards are taken to relieve possible adverse consequences of these issues (e.g., informing participants about the study afterwards, extra safety regulations, etc.).

Are there any unintended circumstances in the study that can cause harm or have negative (emotional) consequences to the participants? Indicate what possible circumstances this could be.

Please attach your informed consent form in Appendix I, if applicable.

Continue to part IV.

PART IV: SAMPLE

Where will you collect or obtain your data?

DANS, NELLS 2014

Note: indicate for separate data sources.

What is the (anticipated) size of your sample?

Note: indicate for separate data sources.

What is the size of the population from which you will sample?

5312 respondents

Note: indicate for separate data sources.

Continue to part V.

Part V: Data storage and backup

Where and when will you store your data in the short term, after acquisition?

R

Note: indicate for separate data sources, for instance for paper-and pencil test data, and for digital data files.

Who is responsible for the immediate day-to-day management, storage and backup of the data arising from your research?

I am

How (frequently) will you back-up your research data for short-term data security?

Daily

In case of collecting personal data how will you anonymize the data?

Note: It is advisable to keep directly identifying personal details separated from the rest of the data. Personal details are then replaced by a key/ code. Only the code is part of the database with data and the list of respondents/research subjects is kept separate.

PART VI: SIGNATURE

Please note that it is your responsibility to follow the ethical guidelines in the conduct of your study. This includes providing information to participants about the study and ensuring confidentiality in storage and use of personal data. Treat participants respectfully, be on time

at appointments, call participants when they have signed up for your study and fulfil promises made to participants.

Furthermore, it is your responsibility that data are authentic, of high quality and properly stored. The principle is always that the supervisor (or strictly speaking the Erasmus University Rotterdam) remains owner of the data, and that the student should therefore hand over all data to the supervisor.

Hereby I declare that the study will be conducted in accordance with the ethical guidelines of the Department of Public Administration and Sociology at Erasmus University Rotterdam. I have answered the questions truthfully.

Name student: Charlotte Turksma



Date: 26-03-2023

Name (EUR) supervisor: Gabriele Mari



Date: 26-03-2023