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Relative deprivation and problem behaviour of youth**

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ABSTRACT

Being Poorer than the Rest of the Neighbourhood: Relative Deprivation and Problem Behaviour of Youth

According to the neighbourhood effects hypothesis, there is a negative relation between neighbourhood wealth and youths' problem behaviour. It is often assumed that there are more problems in deprived neighbourhoods, but there are also reports of higher rates of behavioural problems in more affluent neighbourhoods. Much of this literature does not take into account relative wealth. Our central question was whether the economic position of adolescents' families relative to the neighbourhood in which they lived, was related to adolescents' internalising and externalising problem behaviour. We used longitudinal data for youths between 12-21 years of age, combined with population register data. We employ between-within models to account for time-invariant confounders, including parental background characteristics. Our findings show that for adolescents, moving to a more affluent neighbourhood was related to increased levels of depression, social phobia, aggression, and conflict with father and mother. This could be indirect evidence for the relative deprivation mechanism, but we could not confirm this, and we did not find any gender differences. The results do suggest that future research should further investigate the role of individuals' relative position in their neighbourhood in order not to overgeneralise neighbourhood effects and to find out for whom neighbourhoods matter.

JEL Classification: I30, R23

Keywords: neighbourhood effects, externalising problems, internalising problems, relative deprivation, adolescents, residential mobility

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“A house may be large or small; as long as the neighbouring houses are likewise small, it satisfies all social requirement for a residence. But let there arise next to the little house a palace, and the little house shrinks to a hut.” Karl Marx, in *Wage labour and capital* (1847).

Introduction

Growing up in neighbourhoods with higher rates of poverty has been shown to be related to higher rates of problem behaviour in youth (Leventhal et al., 2009; Xue et al., 2005). Popular policy responses to such research finding are to create more socio-economically mixed neighbourhoods, with the idea that poor families could benefit from the presence of, and interaction with more affluent families (Galster & Friedrichs, 2015). Despite the popularity of neighbourhood mix policies, there is no convincing evidence that such policies have the desired effects (van Ham & Manley, 2010). Contrasting with the idea that richer neighbourhoods are better places to grow up in, there has also been report of higher rates of behavioural problems in more affluent neighbourhoods and for children from poor families moving from poor to more affluent neighbourhoods (for a review, see Leventhal & Brooks-Gunn, 2000). These conflicting findings might indicate that moving to a neighbourhood with a different level of wealth may not influence the problem behaviour of all adolescents in the same manner.

According to the relative deprivation mechanism (Galster, 2011) people compare themselves to their neighbours, and this might affect their perception of wealth (Marx, 1847) and subsequently their behavior. Moving from a relatively poor to a more affluent neighbourhood might strengthen the perception of (relative) poverty as in their new neighbourhood people might feel poorer than the rest of the neighbourhood. This might subsequently lead to more problem behavior. In our study, we focus firstly on how moving to a neighbourhood with a different level of wealth is related to psychosocial problem behaviour outcomes in adolescents in the Netherlands. Secondly we focus on how the relation between neighbourhood wealth and problem behaviour might differ between adolescents depending on their family's income. More specifically, we focus on both internalising (depression and social phobia) and externalising psychosocial problem behaviour outcomes (aggression and conflict with parents). By combining longitudinal survey data with population register data from the Netherlands, we can use repeated measures of problem behaviours, and detailed measures of changes in neighbourhood wealth and family income. Combined, these data are a strong tool to test the relative deprivation thesis.

Literature review

Neighbourhood effects

The sizeable literature on neighbourhood effects suggests that growing up in affluent neighbourhoods leads to better life chances compared to growing up in poorer neighbourhoods (see e.g., Dietz, 2002; Ellen & Turner, 1997; Galster, 2002; Nieuwenhuis & Hooimeijer, 2016), although the causal pathway and direction is not clear. Neighbourhood

effects have been found for outcomes such as education, unemployment, health, and deviant behaviour. A variety of social-interactive mechanisms are suggested to explain this relationship. For example, more affluent neighbourhoods may comprise more positive role models, showing the merits of education for youth, who, consequently, may internalise the pro-schooling norms that exist amongst the neighbourhood population (Ainsworth, 2002; Wilson, 1996). Furthermore, in more affluent neighbourhoods, residents might be better able to enforce social control over the neighbourhood youth, that way minimising the risk of deviant behaviour (Akers et al., 1979; Sampson & Raudenbush, 1999). Through these mechanisms, residents in affluent neighbourhoods who are relatively less affluent than the rest of the neighbourhood might profit from the overall neighbourhood affluence as well (Galster & Friedrichs, 2015). These ideas, however, hinge on the assumption that when families of different classes live side-by-side, they will also interact (positively) with each other. This assumption though, is often contested in the literature (Atkinson & Kintrea, 2000; Blokland & van Eijk, 2010; Karsten & Felder, 2015; Kleinhans, 2004; Nieuwenhuis et al., 2013a).

Although most research into neighbourhood effects seems to suggest positive effects of neighbourhood affluence on individual outcomes, some studies seem to find the opposite (for a review, see Galster, 2011). More affluent neighbourhoods have been linked to lower educational attainment for a sample of white US kids (Ginther et al., 2000), negative socio-economic outcomes for disadvantaged British women (McCulloch, 2001), and poorer health outcomes (Duncan & Jones, 1995; Shouls et al., 1996). Although some of these results are counter-intuitive, these findings suggest that neighbourhood effects are more ambiguous than they are often suggested to be.

Relative deprivation

A possible explanation for such negative externalities from living in affluent neighbourhoods is the relative deprivation mechanism. This mechanism suggests that individuals who are relatively poor in an affluent neighbourhood, might perceive their disadvantaged situation as a psychological strain. Because youth from relatively disadvantaged families perceive neighbours who have more resources and opportunities than they have themselves, they might create unrealistic expectations that cannot be attained with their current socio-economic position. Moreover, growing up in a family that is relatively worse off than the neighbouring families, and the inability to imitate the life-style of the better-off neighbours, confirms someone's relatively lower position in the social hierarchy (Bourdieu, 1984). This may lead to feelings of inferiority and shame, loss of self-esteem, dissatisfaction with their own situation and envy for their better-off neighbours (Galster, 2011; Honneth, 2007; McCulloch, 2001; Oberwittler, 2007; Sayer, 2007). This negative disposition might be related to youth's development. Studies that find support for the relative deprivation mechanism have thus far linked neighbourhood affluence to poorer educational, socio-economic, and health outcomes for the relatively poor (Duncan & Jones, 1995; Ginther et al., 2000; McCulloch, 2001; Shouls et al., 1996). However, the theory suggests that individuals might experience their relatively disadvantaged situation as a psychological strain, possibly leading to psychosocial problems. And conversely, people who are relatively richer than their neighbours might find it easier to achieve social recognition (Bacqué et al., 2014), which

might positively influence their psychosocial state. In order to examine this, we study whether there is a relation between neighbourhood wealth and adolescents' psychosocial problem behaviour, and whether this relation is moderated by the income levels of the adolescents' families'.

Relative deprivation and internalising and externalising problem behaviour

Studies that have thus far examined the relation between individual's relative deprivation compared to their neighbours and psychosocial problem behaviour are scarce and report mixed results for boys and girls. A twin study looking specifically at the effect of relatively worse economic positions compared to neighbours found that the effect of growing up amongst more affluent neighbours led to higher rates of antisocial behaviour for boys from low-income families compared to boys from low-income families growing up amongst poorer neighbours. For girls this effect was not found (Odgers et al., 2015). Furthermore, a study examining affluent youth found that for affluent boys and girl, levels of delinquency and anxiety-depression, respectively, were lower in middle-class neighbourhoods compared to affluent neighbourhoods (Lund & Dearing, 2012). This study suggests that, when youths are better off compared to their neighbours, they exhibit less problem behaviour. Another study of youths from England found that children in families which live in socially rented dwellings in neighbourhoods with low proportions of social renters experience higher rates of internalising problem behaviour than those living in neighbourhoods with high proportions of social renters (Flouri et al., 2015). This is also seems to support the idea that being poor amongst more affluent neighbours has a negative impact on psychosocial problem behaviour.

Examples can also be drawn from the US Moving to Opportunity (MTO) programme, where randomly assigned families in deprived neighbourhoods received vouchers to move to low-poverty neighbourhoods or an unrestricted voucher with which people were free to choose to move to any type of neighbourhood. The move to a low-poverty neighbourhood results in a worsened relative economical position compared to their neighbours, and could therefore, following the logic of the relative deprivation hypothesis, lead to more problem behaviours. However, these studies have to be interpreted with caution, because the effect of the neighbourhood could be confounded with the effect of moving, since the control group did not move. The MTO results are very distinct for boys and girls: boys who moved with their families to low-poverty neighbourhoods compared to those who did not move showed increased rates of major depression, PTSD, conduct disorder (Kessler et al., 2014), psychological distress and behavioural problems (Osypuk et al., 2012a, 2012b). However, contrasting with aforementioned findings, Leventhal and Brooks-Gunn (2003) found a positive effect for boys who moved with their families to a low-poverty neighbourhood; they showed lower rates of anxiety and depressive problems compared to boys who stayed in their poor neighbourhood. Girls who moved with their families to low-poverty neighbourhoods compared to those who did not move showed decreased rates of depression, conduct disorder (Kessler et al., 2014), psychological distress, major depressive disorder, and behavioural problems (Osypuk et al., 2012a, 2012b). The MTO studies, but also Odgers and colleagues (2015), found important differences between boys and girls, and even though the differences are inconsistent, they seem to suggest that boys experienced more detrimental results from relative deprivation than girls.

Focus of this study

Above mentioned studies on psychosocial problem behaviour supported the relative deprivation mechanism. However, all but one studies examined samples of children from low-income families, and one study (Lund & Dearing, 2012) examined children from affluent families. We contribute to this literature by using an average sample of youths to study whether the relative deprivation thesis still holds for the general population. And by combining survey data with population register data, we had access to very reliable and direct measures of the income levels of the youths' families and of the affluence of their neighbourhoods. To test the relative deprivation mechanism, we studied both internalising (depression and social phobia) and externalising (aggression and conflict with parents) problem behaviours in adolescents. We first examined the extent to which neighbourhood wealth was related to adolescents' psychosocial problem behaviour, and second whether this relation was different for adolescents from families with different income levels. In line with the relative deprivation thesis we hypothesise that moving to a wealthier neighbourhood will be related to an increase in psychosocial problem behaviours, and that this relation will be stronger for adolescents from lower income families, compared to adolescents from higher income families.

Additionally, we looked into gender differences. It was argued that boys have a higher propensity to be exposed to risk behaviours than girls, from which they learn skills to safely navigate the neighbourhood. However, if they move to low-poverty neighbourhoods, boys might not learn these skills, and therefore more often experience negative influences from moving to more affluent neighbourhoods. Because girls' leisure activity patterns are more restricted to the vicinity of the home, they are in less need of these skills, and are less likely to experience negative influences from moving to low-poverty neighbourhoods (Clampet-Lundquist et al., 2011). In line with this reasoning, we hypothesise that boys are more likely than girls to have a relation between, on the one hand, neighbourhood wealth and relative deprivation and, on the other hand, problem behaviour.

Data and methods

Participants

Our sample consisted of 926 Dutch youths who were part of the Conflict and Management of Relationships (Conamore) panel dataset (Meeus et al., 2010). For participation in the present study, written informed consent was obtained from adolescents and their parents, and also from all the participating schools. Treatment of participants was in accordance with the ethical standards of the APA and this study was reviewed and approved by the ethical-medical committee of University Medical Centre Utrecht, the Netherlands. Conamore consisted of 1,313 respondents recruited from various high schools in the province of Utrecht, the Netherlands. Conamore consisted of two cohorts: early-to-middle adolescents ($n=923$; 70.3%) who were on average 12.4 years of age at the first wave, and middle-to-late adolescents ($n=390$; 29.7%) with an average age of 16.7 years at the first wave. Six waves of data were collected, the first five waves annually between 2001/02 and 2005/06 and the sixth

wave in 2009/10. The sixth wave included an additional Life History Calendar (LHC; Caspi et al., 1999) with retrospective questions from the age of 12 until the sixth wave. For waves 1, 2, 3, 4, 5, and 6, the number of respondents was 1,313, 1,313, 1,293, 1,292, 1,275, and 1,026, respectively. For the first five waves, sample attrition was very low (7% from wave 1 to 5). Attrition from the fifth to the sixth wave was higher (20%), because of the 5-year time gap between wave five and six, compared to the one-year gaps between waves one through five. In order to obtain parental income data, we combined Conamore with Dutch register data by matching respondents on address and date of birth (see Measurements section below for more information). Of the 1,026 respondents, we lost 40 respondents that we were not able to match to the register data. After listwise deletion of cases with missing values, our sample consisted of 926 respondents, with on average between 4.6 and 4.9 observations per respondent over the five waves, depending on the model. Total observations were 4410.

We compared the respondents in our sample with the respondents before listwise deletion, which showed we had a higher attrition of respondents from foreign born parents than respondents with at least one Dutch born parent (18.8% before listwise deletion vs. 10.4% in our sample; $\chi^2(1)=35.42$; $p=.00$). Furthermore, comparing our sample to the sample before listwise deletion, there were no significant differences in the share of girls ($\chi^2(1)=2.09$; $p=.15$) and the share of the young-to-middle adolescents cohort ($\chi^2(1)=.34$; $p=.56$). Also, there were no differences between the two samples in the share of respondents who score 1 on depression or aggression, and in the mean values of social phobia, conflict with father, and conflict with mother.

Measurements

We combined three data sources for the analyses: the six waves of the Conamore panel dataset, postcode area characteristics from Statistics Netherlands (2006; 2011), and population register data from the Statistics Netherlands System of Social Statistical Datasets (SSD). The SSD is an extensive system of longitudinal datasets, combining, amongst other, population, tax, and housing registers, covering the full population of the Netherlands since 1999 (Bakker et al., 2014). Most measures described below were measured at five points in time (i.e., the first five waves of Conamore). Only the four time-invariant control variables (cohort, gender, parents foreign born, and parental education) did not vary over the five waves. Descriptive statistics can be found in Table 1.

Depression was measured using the Children's Depression Inventory (CDI) intended to capture depressive symptoms in children and adolescents (Craighead et al., 1998). The scale consisted of 27 items such as: "I am sad all the time", "I hate myself", and "Nobody really loves me". The items had a 3-point response scale, ranging from 'false', 'a bit true' to 'very true'. The Cronbach's alpha of the scale was .90. Depression was non-normally distributed, with a skewness of 2.48 and kurtosis of 10.85, and was therefore converted into a dummy variable, where 0 means not depressed, and 1 means depressed when on a scale from 0-2, respondents scored .2 or higher.

Social phobia was measured with a subscale of the SCARED (Hale et al., 2005). The social phobia scale consists of 4 items: "I don't like to be with people I don't know", "I feel nervous amongst people I don't know very well", "I find it difficult to talk to people I don't know", and "I'm shy amongst people I don't know very well". The items had 3 response

categories: ‘almost never’, ‘sometimes’, and ‘often’. The scale ranged from 0-2. Internal consistency for the scale was good (Cronbach’s alpha: .86).

Aggression was measured with a scale consisting of 17 items (Björkqvist et al., 1992). The scale measured two types of aggression: indirect and direct. Example items for the two types are respectively the following answers to the question “If you’re mad or angry with someone, what do you do?”: “I try to annoy the other so much that he/she will lose his/her patience” and “I hit or kick”. The items had 4 response categories: ‘never’, ‘sometimes’, ‘often’, and ‘very often’. The scale’s Cronbach’s alpha was .82. Aggression was non-normally distributed with a skewness of 1.58 and kurtosis of 6.63, therefore we made aggression into a dummy, where 0 means not aggressive, and 1 means aggressive when on a scale from 0-3, respondents scored .5 or higher.

Conflict with parents consists of two scales: conflict with father and conflict with mother, both consisting 35 items (Laursen, 1993). Respondents were asked how often they have conflict in the last week with their father/mother about, for example: “money or things of value”, “dating”, and “grades in school”. They were given 5 response categories: ‘never’, ‘almost never’, ‘sometimes’, ‘frequently’, and ‘often’. The scales ranged from 0 to 4 and the Cronbach’s alphas were .95 for the father and .95 for the mother.

With the Conamore dataset we constructed three time-varying control variables. First, we assessed whether respondents still lived in the parental home (0), or whether they had moved out (1). And second, we assessed how supportive the parental home was using the Network of Relationship Inventory (NRI; Furman & Buhrmester, 1985), which has adequate validity (Edens, 1999). The parental support scale consisted of 12 items and was asked separately about the father and the mother. Example items are: “Do you share secrets or personal feelings with you father/mother?” and “Does your father/mother appreciate the things you do?” The items had five answering categories ranging from ‘little or not at all’ to ‘more is not possible’. Cronbach’s alphas were .92 for fathers and .91 for mothers. We combined the scales for fathers and mothers into one scale measuring parental support, which ranged from 0 to 4.

Additionally we constructed four time-invariant control variables: cohort, gender, parents foreign born, and parental education. Cohort was measured as a dummy indicating whether a respondent belonged to the group young-to-middle adolescents (0; average age of 12.4 at the first wave), or middle-to-late adolescents (1; average age of 16.7 at the first wave). Gender was coded male (0) and female (1). The parents foreign born dummy measured whether both parents were born outside of the Netherlands (1), or not (0). And parental education was measured using six dummy variables: lower vocational education or lower (1); preparatory middle-level vocational education (2); middle-level vocational education (3); higher general continued education or preparatory scientific education (4); higher vocational education (5); and scientific education (6).

The Life History Calendar in the Conamore dataset was geocoded, and included all addresses, including six-digit postcodes (areas containing, on average, 17 households) where respondents had lived between the age of 12 and the time of the sixth wave data collection. Using postcodes we were able to link the Conamore data with six-digit postcode-level data provided by Statistics Netherlands (2006; 2011). From the Statistics Netherlands (2006) data we used the average property value as measured in 2004 as a proxy to measure

neighbourhood wealth, which was assessed to be a good indicator (Visser et al., 2008). The six-digit postcode areas consist of, on average, 17 households, and capture the average wealth in the proximate surrounding of the adolescents' homes. Using the Statistics Netherlands (2011) data we also constructed a control variable which measures the neighbourhoods' proportion of non-Western immigrants with 2010 information. Both variables were standardised.

Statistics Netherlands used a combination of address information and dates of birth to link Conamore data to register data provided by Statistics Netherlands: the System of Social Statistical Datasets (SSD; Bakker et al., 2014). After data linkage we could only access the data in a secure environment controlled by Statistics Netherlands. Through linkage we derived the income of the adolescents' core family from the SSD by taking the income of the two highest earners in the household, when adolescents were registered as 'children living at home'. When adolescents were not registered as living at home, we took their personal income. The income variable was standardised.

--- Table 1 about here ---

Analytical method

We employed hybrid random-effects models, also called between-within (BW) models, over the first five waves of the Conamore. The BW model is a hybrid model that combines the advantages of both fixed- and random-effects models (Bell & Jones, 2015; for examples, see Hedman et al., 2015; Nieuwenhuis et al., 2016). As fixed-effects models, the BW model regressed the within-person change in the dependent variables (internalising and externalising problem behaviours) on the within-person change in the independent variables. For the neighbourhood wealth variable this meant that we estimated how moving to a neighbourhood with a different level of wealth was related to changes in problem behaviour. For depression and aggression we ran logistic BW models, and for social phobia and conflict with parents we ran linear BW models. For the linear BW models we reported robust standard errors. Observed and unobserved time-invariant characteristics are automatically controlled for, as the sum of their change will always be zero. The coefficients and standard errors of time-varying variables in BW models are therefore identical to those in fixed-effects models. Additionally, as random-effects models, a BW model allowed the inclusion of time-invariant variables, providing additional information on differences between individuals that would not be available in fixed-effects models. For the BW method, the time-varying dependent variables were transformed into deviations from their person-specific means in order to create estimators equal to those in fixed-effects models. And in addition to the time-invariant variables, we included the person-specific means for the time-varying variables, which are time-invariant. For the neighbourhood wealth variable this meant that we estimated how differences between people in the wealth levels of the neighbourhood in which they grew up was related to levels of problem behaviour. To test for the moderating effects of parental income and gender, we made separate models including interactions between within-individual neighbourhood wealth and within-individual parental income or gender.

To investigate whether the BW models were preferred over random-effects models, we used the Wald test to test the equality of the pairs of coefficients (Allison, 2009). The

results indicated that the BW model was clearly preferred over the random-effects model for depression ($\chi^2(5)=33.18$, $p=.0000$), social phobia ($\chi^2(5)=46.75$, $p=.0000$), aggression ($\chi^2(5)=25.12$, $p=.0001$), and conflict with mother ($\chi^2(5)=11.79$, $p=.0377$). The model for conflict with father did not show that the BW model was preferred ($\chi^2(5)=8.40$, $p=.1354$), but for the sake of consistency, we use the BW model for conflict with father as well.

By design, the BW model removed potential selection bias from observed and unobserved time-invariant characteristics that influence both neighbourhood selection and internalising and externalising problem behaviour (Galster, 2008). Because time-varying characteristics were not automatically controlled for, we linked in parental income from the register data of Statistics Netherlands. We expected this to be the most important confounder, because changes in parental income may lead to a residential move, but also to changed relations within the family (Davis-Kean, 2005; Hanson et al., 1997; Nieuwenhuis et al., 2013b), possibly influencing adolescents' psychosocial adjustment. By controlling for parental income, in addition to parental support, we attempted to control for a good portion of the potential selection bias emerging through family environments.

Results

The results of the BW models were presented in Table 2. All models were significant with a significance level lower than 0.0001. The within-individual results showed that, after controlling for several individual, parental and neighbourhood characteristics, moving to a more affluent neighbourhood was related to an increase in adolescents' levels of depression, social phobia, aggression, and conflict with father and mother. This can possibly be explained by the relative deprivation mechanism: when adolescents move from a neighbourhood where they were relatively rich to a neighbourhood where they were relatively poor, this might explain the associated increase in psychosocial problem behaviours.

--- Table 2 about here ---

In order to test the relative deprivation hypothesis more directly, we interacted parental income with neighbourhood wealth. We expected that an increase in neighbourhood wealth would be stronger related to an increase in psychosocial problem behaviours for adolescents from families with lower income compared to families with higher income. Our results show that there was no difference between adolescents from families with lower and higher income levels. None of the interaction terms was significant (depression: $b=.02$, $s.e.=.29$, $p=.94$; social phobia: $b=-.01$, $s.e.=.02$, $p=.57$; aggression: $b=.21$, $s.e.=.17$, $p=.22$; conflict with father: $b=-.01$, $s.e.=.01$, $p=.68$; conflict with mother: $b=-.00$, $s.e.=.01$, $p=.88$). Thus, we could not confirm the relative deprivation mechanism by interacting neighbourhood wealth with parental income.

Additionally, we studied differences between boys and girls. Main effects of sex on psychosocial problem behaviour showed that girls were more prone for depression and social phobia, and less prone for aggression and conflict with their father than boys were (see Table 2 and Figure 1). There was no difference between boys and girls in the model for conflict with mother. We tested for differences between boys and girls in how susceptible they were to changes in neighbourhood wealth by including interaction effects between within-

individual changes in neighbourhoods wealth and gender. None of the interaction terms was significant (depression: $b=-.27$, $s.e.=.42$, $p=.53$; social phobia: $b=-.02$, $s.e.=.03$, $p=.60$; aggression: $b=.50$, $s.e.=.42$, $p=.23$; conflict with father: $b=.05$, $s.e.=.04$, $p=.18$; conflict with mother: $b=.04$, $s.e.=.05$, $p=.36$). Thus, we could not replicate the gender differences of the effect of relative deprivation on psychosocial problem behaviour found by previous studies.

--- Figure 1 about here ---

Further examining the results, the between-individual models showed that only in the social phobia model, there was a significant coefficient for neighbourhood wealth, indicating that adolescents living in wealthier neighbourhoods have lower levels of social phobia than adolescents living in poorer neighbourhoods.

Examining the within-individual control variables, several variables seemed to be related to psychosocial problem behaviour. First, on the family level, we found that increases in parental income were related to increases in aggression. Furthermore, increases in parental support were associated with decreases in depression and conflict with parents. It was not related to social phobia and aggression. Moving out of the home was only related to a decrease in conflict with both parents, which seems logical with the accompanying decrease in proximity.

Third, on the neighbourhood level, an increase in the proportion of non-Western immigrants was only associated with an increase in depression and aggression, not with social phobia and conflict with parents.

Finally, examining the time-invariant control variables, the young-to-middle adolescent cohort was more likely to have conflict with their parents and have aggressive behaviour than the middle-to-late adolescent cohort. Adolescents from foreign born parents only scored higher on aggressive behaviour, for the rest, they did not differ from native Dutch adolescents in their problem behaviour. And parental education did not have a clear effect.

Conclusion and discussion

We found indications for the relative deprivation hypothesis: controlled for changes in the income and dynamics of adolescents' family, moving to a wealthier neighbourhood was related to increased levels of depression, social phobia, aggression, and conflict with parents. However, we could not support the relative deprivation hypothesis with our more direct measure of interacting parental income changes with neighbourhood wealth changes

Our results lead to serious doubt on the effectiveness of urban renewal policies or housing voucher policies aimed at mixing lower class households with middle class households where the latter are supposed to serve as positive role models. The idea that the behaviour of affluent neighbours will simply rub off on their less advantaged neighbours, who consequently will experience all kinds of positive outcomes, seems far from reality. Many studies have linked neighbourhood affluence to advantageous outcomes for individuals, however, this is not universally true for all outcomes, and might be highly dependent on individuals relative status in the neighbourhood. Social mixing literature that links

neighbourhood inequality to positive individual outcomes might be picking up the positive effects for the relatively wealthy in the neighbourhood, who have more positive outcomes from social comparisons with their relatively poorer neighbours. The people at risk, that is, those at the bottom of the social hierarchy, might mainly experience negative outcomes of social mix.

We could not replicate the earlier found differences between boys and girls (Odgers et al., 2015; Osypuk et al., 2012a, 2012b). The reason we found no differences between boys and girls in our analyses might be because our sample is from the Netherlands. The studies that did find clear gender differences mainly use US samples of youths that were at high financial risk. It might be that boys and girls indeed react differently when they are in very demanding and stressful environments, or move from such environments to more affluent environments. However, in our data, we did not specifically target an at-risk population, but rather a normal population, that includes youths from all socio-economic backgrounds. In general our respondents did not grow up under extreme circumstances like those in the US samples. We speculate that gender differences in the reaction to changes in neighbourhood wealth become most pronounced under extreme circumstances. Perhaps there is even a threshold effect, and that the levels of poverty needed for a gender difference to become apparent, are only reached when specifically targeting at-risk youths.

We focussed on objective relative deprivation with our interaction between changes in neighbourhood wealth and changes in parental income. However, the reason we do not find significant interaction might be because this measure can possibly be considered a proxy for what is actually causing psychosocial problem behaviour, that is, subjective relative deprivation. It is likely that feelings of relative deprivation have a stronger relation with psychosocial problem behaviour than objectively measured relative deprivation. Individuals might objectively be relatively deprived, but when they do not experience it like that, it is unlikely to have an effect on their behaviour. This might explain why we do find an effect from moving to a wealthier neighbourhood (after controlling for changes in parental income), because relative to their old neighbourhood, adolescents might feel an increase in relative deprivation when moving to a wealthier neighbourhood. Subsequent studies might benefit from looking at people's perceptions about their relative status in order to grasp more directly what relative deprivation does to an individual's psychosocial problem behaviour.

We employed between-within (BW) models to overcome selection bias. BW models control for all time-invariant unobserved characteristics that could potentially influence both neighbourhood choice and psychosocial problem behaviour. BW models do not control for time-varying characteristics, so there is still a possibility of selection bias through time-varying characteristics. However, it is likely that most selection effects depend on family characteristics, because adolescents usually do not choose where to live, but rather their parents; and adolescents' psychosocial problem behaviour is likely related to family characteristics and parental child rearing strategies. Hypothetically, it might be that parenting strategies that influence psychosocial problem behaviour are related to parental considerations when choosing a neighbourhood for their child to grow up in. In that case, if we would not sufficiently control for parental characteristics, then our neighbourhood effects could merely be reflecting a family effect. In an attempt to control for a good portion of

selection bias stemming from time-varying family characteristics, we controlled for parental income, parental support, and living arrangement.

The conclusion that moving to a wealthier neighbourhood is related to increased psychosocial problem behaviour has various implications for both research and policy. First, for researchers interested in neighbourhood effects and neighbourhood mix it is crucial not to overgeneralise the influence of the neighbourhood, but to relate individuals to their neighbourhood (see also Nieuwenhuis, 2016; van Ham & Manley, 2012). This way, research can tease out the differential effects of neighbourhood characteristics for different people. And second, the widespread belief amongst policy makers that social mixing of neighbourhoods is a panacea for all kinds of social problems should be reconsidered. For the poor, living amongst wealthy neighbours is unlikely to result in more socially mixed networks and more individual opportunities that are assumed to come along with more mixed networks (Musterd & Andersson, 2005). And from our analyses, it even seems that moving to wealthier neighbourhoods is related to increased psychosocial distress for adolescents from relatively poor families. So, when targeting social problems, such as, in this case, psychosocial problem behaviour amongst adolescents, an environmental policy such as social mixing is unlikely to sort much effect. It is more likely that a solution can be found in targeting individuals by reducing inequalities and providing everyone with the same opportunities.

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Table 1. Descriptive statistics

	N ^a	Mean	S.D.	Min.	Max.
<i>Dependent variables</i>					
Depression	4388	.29	.46	0	1
Social phobia	4219	.56	.54	0	2
Aggression	4380	.31	.46	0	1
Conflict with father	4265	.60	.52	0	3.38
Conflict with mother	4381	.70	.53	0	3.39
<i>Time-varying variables</i>					
Neighbourhood wealth	4410	.07	1.02	-1.25	6.69
Parental income	4410	.02	1.00	-1.23	18.45
Parental support	4410	2.49	.60	0	4
Move out of parental home	4410	.01	.12	0	1
Neighbourhood non-Western immigrants	4410	-.05	.97	-.64	4.50
<i>Time-invariant variables</i>					
Cohort (ref.: young-to-middle adolescents)	926	.27	.44	0	1
Female	926	.55	.50	0	1
Parents foreign born	926	.10	.31	0	1
Parental education: Lower vocational education or less	926	.14	.35	0	1
Preparatory middle-level vocat. educ.	926	.19	.39	0	1
Middle-level vocational education	926	.20	.40	0	1
Higher general continued education or preparatory scientific education	926	.22	.21	0	1
Higher vocational education	926	.20	.40	0	1
Scientific education	926	.32	.46	0	1

^a The Ns of the time-varying variables (incl. the dependent variables) are based on observations within individuals. The Ns of the time-invariant variables is based on individual respondents.

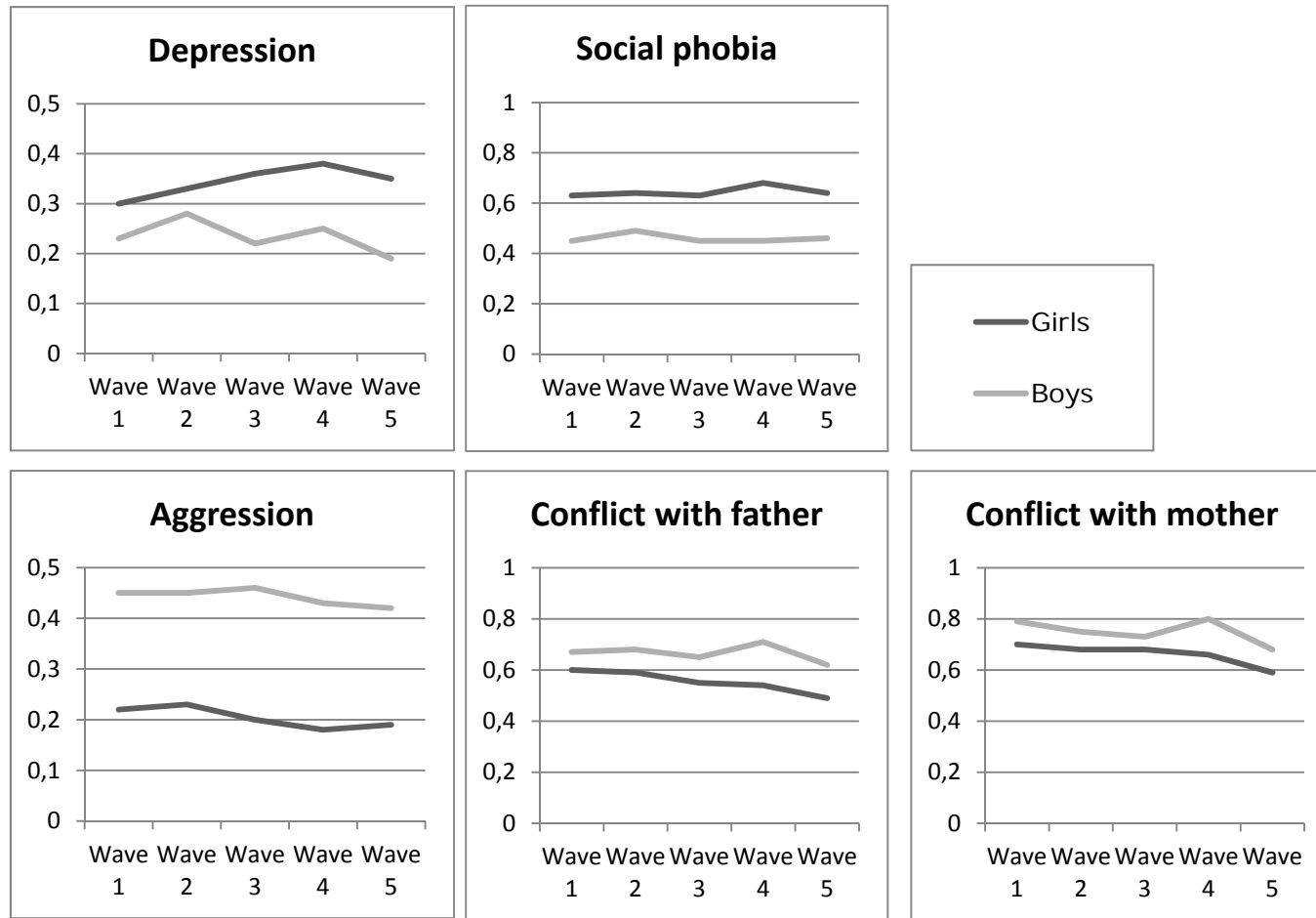
Table 2. Between-within models of internalising and externalising problem behaviour

	Internalising problem behaviour		Externalising problem behaviour		
	M1: Depression	M2: Social phobia	M3: Aggression	M4: Conflict with father	M5: Conflict with mother
	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)
<i>Within-individual change (deviations from individual means)</i>					
Neighbourhood wealth	.43 (.22)*	.04 (.02)*	.42 (.20)*	.05 (.02)*	.05 (.02)*
Parental income	.03 (.10)	-.01 (.01)	.17 (.08)*	.01 (.01)	.01 (.01)
Parental support	-.53 (.12)***	.01 (.02)	-.20 (.12)†	-.13 (.02)***	-.14 (.02)***
Move out of parental home	.37 (.47)	-.12 (.06)*	.51 (.51)	-.23 (.05)***	-.16 (.05)***
Neighbourhood non-Western immigrants	.68 (.22)*	-.00 (.03)	.45 (.22)*	.02 (.03)	.01 (.03)
<i>Time-invariant variables</i>					
Cohort (ref.: young-to-middle adolescents)	.18 (.21)	.03 (.04)	-1.00 (.20)***	-.18 (.03)***	-.19 (.03)***
Female	1.18 (.18)***	.21 (.03)***	-1.60 (.16)***	-.07 (.03)**	-.04 (.03)
Parents foreign-born	.47 (.34)	.01 (.05)	.67 (.32)*	.03 (.05)	.07 (.05)
Parental education (ref.: scientific educ.)					
Lower vocational education or less	-.06 (.26)	-.07 (.04)†	.12 (.24)	-.02 (.04)	-.01 (.04)
Preparatory middle-level vocat. educ.	-.24 (.23)	-.04 (.04)	.20 (.21)	.06 (.03)†	.05 (.03)
Middle-level vocational education	-.16 (.23)	-.07 (.04)†	.00 (.22)	.05 (.04)	.03 (.03)
Higher general continued education or preparatory scientific education	.24 (.23)	.01 (.04)	.23 (.21)	.03 (.03)	.04 (.03)
Higher vocational education	.21 (.22)	-.03 (.04)	.33 (.20)	.08 (.04)*	.07 (.03)*
<i>Between-individual differences (individual means)</i>					
Neighbourhood wealth	-.05 (.12)	-.04 (.02)**	.04 (.10)	.01 (.02)	.00 (.02)
Parental income	-.27 (.13)*	-.03 (.02)†	-.28 (.12)*	-.01 (.02)	.00 (.02)
Parental support	-1.46 (.19)***	-.15 (.03)***	-.76 (.17)***	-.17 (.03)***	-.24 (.03)***
Move out of parental home	-1.26 (1.36)	-.47 (.19)*	.11 (1.33)	.05 (.20)	-.18 (.19)
Neighbourhood non-Western immigrants	.10 (.12)	.03 (.02)	-.14 (.11)	.03 (.02)	.03 (.02)†
Constant	1.38 (.48)**	.85 (.08)***	1.40 (.44)**	1.08 (.07)***	1.32 (.08)***
Wald chi2 (df)	133.24 (18)***	140.10 (18)***	176.15 (18)***	254.05 (18)***	255.47 (18)***
Number of observations	4388	4219	4380	4265	4381
Number of respondents	920	920	920	903	918

Note: M1 & M3 are logistic between-within regressions; M2, M4 & M5 are linear between-within regressions.

*** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$

Figure 1. Mean values of internalising and externalising problem behaviour for boys and girls.



Note: scale anchors: depression (0-1), social phobia (0-2), aggression (0-1), conflict with father (0-3.38), conflict with mother (0-3.39).