DEMOGRAPHIC RESEARCH
A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 36, ARTICLE 59, PAGES 1813–1826
PUBLISHED 15 JUNE 2017
http://www.demographic-research.org/Volumes/Vol36/59/
DOI: 10.4054/DemRes.2017.36.59

Descriptive Finding

The temporal stability of children's neighborhood experiences: A follow-up from birth to age 15

Tom Kleinepier

Maarten van Ham

Contents

Demographic Research: Volume 36, Article 59
Descriptive Finding

The temporal stability of children's neighborhood experiences: A follow-up from birth to age 15

Tom Kleinepier[1]

Maarten van Ham[2]

Abstract

BACKGROUND
Despite increasing attention being paid to the temporal dynamics of childhood disadvantage, children's neighborhood characteristics are still frequently measured at a single point in time. Whether such cross-sectional measures serve as reliable proxies for children's long-run neighborhood conditions depends on the stability in children's neighborhood experiences over time.

OBJECTIVE
We investigate stability in children's neighborhood environment over time, focusing on two of the most commonly studied neighborhood socioeconomic conditions: The ethnic composition and mean income of the neighborhood.

METHODS
Drawing on data from the Dutch population registers, an entire cohort of children born in the Netherlands in 1999 (n=179,166) is followed from birth up until age 15. We use year-to-year correlations in the percentage of non-Western ethnic minorities and the mean logged income in the neighborhood to evaluate the temporal stability of children's neighborhood experiences.

RESULTS
Results indicate that children's neighborhood characteristics are more stable over time with regard to ethnic composition than with regard to the mean income. Children who had moved at least once had less stability in neighborhood characteristics than children who never moved. Finally, neighborhood experiences were found to be more stable over time for ethnic minority children, although differences were small with regard to mean income in the neighborhood.

[1] Faculty of Architecture and the Built Environment, Delft University of Technology, the Netherlands. E-Mail: t.kleinepier@tudelft.nl.
[2] Faculty of Architecture and the Built Environment, Delft University of Technology, the Netherlands, and School of Geography and Sustainable Development, University of St. Andrews, UK.

CONCLUSIONS
We conclude that single point-in-time measurements of neighborhood characteristics are reasonable proxies for the long-run ethnic composition of children's neighborhood environment, but rather noisy proxies for the long-run income status of their neighborhood, particularly for those who moved.

1. Introduction

Over the past decades there has been a growing interest among social scientists as to what extent and how characteristics of the neighborhood in which people live influence various individual outcomes, such as educational achievement, employment, delinquency, and health (e.g., Luke and Xu 2009; Sampson, Morenoff, and Gannon-Rowley 2002; van Ham et al. 2014). Although 'neighborhood effects' have been found across the life course, neighborhoods seem to be more relevant for children and adolescents than for adults, because young people are more likely to spend a great proportion of their time in their local environment (Duncan, Boisjoly, and Harris 2001). Furthermore, neighborhoods have been shown to have a stronger effect on individual outcomes in cases where residents had been living in the neighborhood for a long period of time, due to accumulated exposure to risks and/or opportunities (Galster 2012; Hedman et al. 2015; Wodtke, Harding, and Elwert 2011; Wodtke 2013). Thus, in other words, especially those young people who have been consistently exposed to socioeconomically deprived neighborhoods may experience negative outcomes.

Despite the fact that research increasingly recognizes the importance of the temporal dynamics of childhood disadvantage, children's neighborhood characteristics are still frequently measured at a single point in time (e.g., Assari et al. 2016; de Vuijst, van Ham, and Kleinhans 2015; Page and Solon 2002; van Ham et al. 2014). Whether or not such point-in-time measures serve as valid proxies for the neighborhood conditions that children endure in the long run depends on the amount of continuity or change in children's neighborhood environment over time. The literature is inconsistent in this regard. One line of research argues that single point-in-time estimates are almost or just as good as longitudinal measures of neighborhood composition during childhood, suggesting that children's neighborhood environments are stable over time (Jackson and Mare 2007; Kunz, Page, and Solon 2003). However, other research shows that longitudinal measures of neighborhood characteristics yield stronger effects than cross-sectional measures, highlighting the need to take temporal dimensions into account (Crowder and South 2011; López Turley 2003).

The main aim of this research note is to provide more insight into the stability of children's neighborhood experiences over time. We focus on two of the most commonly studied neighborhood socioeconomic characteristics, viz. the mean income and ethnic composition of the neighborhood. Our study contributes to previous research in three important ways. First, whereas prior research on neighborhood histories of children has mainly used relatively short periods of observation, we observe almost the entire childhood life course. Over a longer observation period there is likely to be greater variation in neighborhood characteristics because families have had more time to move to another neighborhood and because neighborhoods have had more time to change. Second, whereas previous studies on neighborhood histories of children are largely confined to the United States, we focus on the Netherlands. Extant research shows that the United States has lower levels of social and economic mobility than northern and western European countries (Isaacs 2008). Assumptions about the temporal stability of children's neighborhood characteristics from US research may therefore not be valid in the European context. Third and lastly, we pay attention to potential ethnic differences in neighborhood stability over time. Quillian (2003) shows that although black American families are as likely as white families to move, they have greater difficulty 'escaping' poverty neighborhoods. This suggests that point-in-time measures of neighborhood characteristics may more accurately represent the long-run neighborhood experiences of ethnic minority children than those of ethnic majority children.

2. Data

We use administrative microdata from the System of Social Statistical Datasets (Bakker, van Rooijen, and van Toor 2014). This is a longitudinal geo-coded database of interlinked population registers covering demographic, socioeconomic, and geographic information on the entire population of the Netherlands. Data is currently available for the period 1999–2014. We select all individuals who were born in the Netherlands in 1999 and follow them up until age 15 in 2014. Children who died or emigrated before age 15 were excluded from the analysis. This leaves us with a total research population of 179,166 children.

Neighborhoods are operationalized using 500×500 meter grids. At the beginning of the observation period in 1999 the research population was spread over 26,804 of these grid cells, containing 535 inhabitants on average. We focus on two neighborhood characteristics, namely the income distribution and ethnic composition. Regarding the income distribution, we compute, for each year, the average gross monthly income in each neighborhood. We use a natural logarithmic specification to account for the typical

right-skewed distribution of income. The ethnic composition of a neighborhood is measured as the percentage of non-Western ethnic minorities in the neighborhood in each year. Following the standard definition of Statistics Netherlands, people are assigned a non-Western background if at least one parent was born in Africa, Latin-America, Asia (excluding Indonesia and Japan), or Turkey.

3. Analytic strategy

When examining stability in children's neighborhood characteristics over time, it is important to recognize the difference between absolute and relative stability, as they warrant different analytical approaches (Alder and Scher 1994). Absolute stability refers to the consistency in an individual's absolute value in multiple-time observations. A common approach to measure absolute stability is to calculate within-person standard deviations in a set of repeated measurements. However, because the income distribution and the ethnic composition of a neighborhood have very different ranges and means, the standard deviations of these variables cannot be compared directly. Although there are ways around this, such as using the coefficient of variation (i.e., the standard deviation divided by the mean), this adds a level of complexity that makes the results less readily interpretable.

Relative stability, on the other hand, refers to the consistency of an individual's ranking order within a group, based on a measure across time. Relative stability has typically been represented by year-to-year correlations, i.e., the correlation between values at two different time points. The advantage of this method is that the interpretation is straightforward: Correlations close to 1 indicate a strong consistency in characteristics over time, while a correlation below .50 represents a rather low consistency (Bloom 1964; Hinkle, Wiersma, and Jurs 2003). Furthermore, most neighborhood-effects hypotheses are concerned with a neighborhood's socioeconomic position relative to that of other neighborhoods rather than the absolute percentage ethnic minorities or the absolute income level in a neighborhood.

Against this background, we choose to focus on relative stability in children's neighborhood environment over time. Specifically, we estimate year-to-year correlations in neighborhood characteristics using Pearson's r. This replicates the approach followed in previous work (e.g., Kunz, Page, and Solon 2003). In order to test whether there are significant differences in the temporal stability of the neighborhood's ethnic composition and mean income we use a range of tests for comparison of dependent correlations with nonoverlapping variables available in R's *cocor* package (Diedenhofen and Musch 2015). Furthermore, using Fisher's z transformation, we test

whether stability of neighborhood characteristics over time differs significantly between movers and non-movers as well as between native Dutch and ethnic minority children.

4. Results

In Table 1 we present year-to-year correlations of the percentage of non-Western ethnic minorities (above diagonal) and the mean logged income (below diagonal) in the neighborhood. Following the rule of thumb for interpreting the strength of a Pearson correlation coefficient (Hinkle, Wiersma, and Jurs 2003), we use a color-coding scheme to facilitate readability of the tables. Green indicates a very strong correlation (>.90), yellow indicates strong correlation (.70 to .90), orange indicates moderate correlation (.50 to .70), and red indicates low correlation (.30 to .50). Unsurprisingly, it can be seen that the longer the duration between two measurement moments, the lower the correlation in neighborhood characteristics. For example, the correlation between ages 1 and 10 is clearly lower than that between ages 1 and 2. Furthermore, the correlations with regard to the ethnic composition are substantially stronger than the correlations of the mean income of the neighborhood. For instance, we find a correlation of $r = .74$ between the year of birth and age 15 with respect to ethnic composition, as compared to $r = .52$ for mean logged income. As regards the statistical significance of the difference between ethnic composition and income, all the correlation coefficients for mean income were found to be significantly lower than those for the percentage ethnic minorities, with $p<.001$.

Table 1: Year-to-year correlations of neighborhood characteristics, percentage non-Western above diagonal and mean logged income below diagonal (N=179,166)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	—	.948	.907	.874	.849	.830	.815	.802	.789	.780	.771	.764	.758	.752	.746	.740
1	.855	—	.952	.915	.887	.865	.848	.832	.818	.807	.798	.790	.783	.775	.769	.764
2	.804	.882	—	.958	.925	.900	.880	.863	.848	.836	.825	.816	.808	.800	.793	.787
3	.761	.828	.903	—	.962	.935	.913	.894	.877	.863	.852	.842	.833	.825	.818	.811
4	.724	.790	.854	.909	—	.968	.943	.921	.902	.887	.874	.864	.855	.847	.839	.831
5	.694	.759	.819	.868	.913	—	.971	.947	.925	.909	.896	.885	.875	.866	.857	.849
6	.664	.727	.782	.824	.862	.910	—	.972	.948	.930	.916	.904	.893	.883	.874	.865
7	.649	.706	.759	.800	.834	.873	.913	—	.973	.953	.937	.924	.912	.901	.891	.882
8	.632	.684	.734	.773	.802	.837	.874	.924	—	.977	.960	.946	.932	.920	.909	.900
9	.612	.663	.711	.748	.776	.809	.841	.885	.926	—	.980	.964	.949	.935	.924	.914
10	.597	.646	.693	.729	.756	.788	.815	.855	.888	.927	—	.981	.965	.950	.938	.927
11	.580	.630	.676	.708	.732	.763	.792	.828	.859	.892	.928	—	.981	.965	.952	.939
12	.575	.623	.668	.700	.724	.753	.781	.817	.848	.876	.900	.926	—	.981	.966	.953
13	.562	.614	.654	.684	.709	.735	.765	.799	.825	.853	.876	.896	.939	—	.981	.965
14	.548	.599	.640	.668	.691	.718	.746	.780	.806	.830	.848	.869	.907	.934	—	.979
15	.524	.569	.608	.635	.656	.678	.702	.733	.754	.777	.798	.813	.845	.866	.893	—

Note: Very high correlation (≥.90) in green; high correlation (.70 to .90) in yellow; moderate correlation (.50 to .70) in orange; low correlation (.30 to .50) in red.

We proceed by testing whether children who have changed residence have less stability in neighborhood characteristics over time than children who have never moved. Tables 2 and 3 present year-to-year correlations for, respectively, the percentage non-Western minorities and the mean logged income in the neighborhood for movers (above diagonal) and non-movers (below diagonal), separately. As can be seen in the tables, we find that children who moved at least once have much lower correlations in neighborhood characteristics across time than children who did not move. Particularly, the correlations of the percentage of non-Western ethnic minorities in the neighborhood of children who never moved are strikingly high, the lowest correlation being r = 0.95. However, while the correlations are substantially lower for movers, the lowest correlation (i.e., between age 0 and age 15) of r = .60 still indicates a relatively strong persistence in the ethnic composition of the neighborhood of children who have moved. The results with regard to mean income in the neighborhood show an overall less stable picture, but again the distinction between movers and stayers is substantial. For example, the correlation between ages 0 and 15 of r = .39 for movers is much lower than the r = .70 for children who have never moved. Additional analyses (not in tables) indicate that, for both the ethnic composition and the income distribution of the neighborhood, all correlation coefficients differ significantly between movers and non-movers, with $p<.001$.

Table 2: Year-to-year correlations of percentage non-Western minorities in the neighborhood, movers above diagonal (N=97,319) and stayers below diagonal (N=81,847)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	—	.918	.855	.803	.765	.735	.712	.691	.673	.659	.646	.637	.628	.620	.611	.604
1	.998	—	.925	.866	.821	.786	.760	.735	.714	.698	.683	.672	.662	.652	.643	.636
2	.995	.998	—	.933	.880	.840	.809	.781	.757	.739	.722	.709	.697	.686	.676	.668
3	.992	.995	.998	—	.939	.895	.859	.828	.801	.781	.762	.747	.734	.722	.711	.701
4	.989	.992	.995	.998	—	.947	.907	.872	.840	.816	.796	.781	.766	.754	.742	.731
5	.986	.990	.993	.996	.998	—	.952	.912	.877	.852	.830	.813	.797	.783	.769	.757
6	.983	.987	.991	.994	.996	.998	—	.954	.914	.885	.861	.842	.825	.809	.795	.782
7	.980	.984	.988	.991	.994	.996	.998	—	.954	.921	.895	.875	.855	.837	.822	.808
8	.977	.981	.985	.989	.992	.994	.997	.998	—	.961	.933	.910	.888	.867	.850	.835
9	.974	.978	.982	.986	.989	.992	.994	.996	.998	—	.966	.940	.914	.892	.873	.858
10	.970	.975	.979	.983	.986	.990	.992	.994	.997	.999	—	.969	.940	.916	.896	.878
11	.967	.972	.976	.980	.984	.987	.990	.992	.995	.997	.998	—	.968	.941	.919	.898
12	.964	.969	.974	.978	.982	.985	.988	.991	.993	.995	.997	.998	—	.968	.943	.920
13	.961	.966	.970	.975	.979	.982	.985	.988	.991	.993	.995	.997	.999	—	.968	.941
14	.957	.962	.967	.972	.976	.980	.983	.986	.989	.991	.993	.995	.997	.999	—	.964
15	.953	.959	.964	.968	.973	.977	.980	.983	.986	.989	.991	.993	.995	.997	.998	—

Note: Very high correlation (≥.90) in green; high correlation (.70 to .90) in yellow; moderate correlation (.50 to .70) in orange; low correlation (.30 to .50) in red.

Table 3: Year-to-year correlations of mean logged income in the neighborhood, movers above diagonal (N=97,319) and stayers below diagonal (N=81,847)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	—	.830	.740	.667	.615	.575	.542	.515	.493	.470	.450	.437	.432	.421	.409	.387
1	.884	—	.856	.771	.712	.666	.625	.590	.562	.534	.510	.496	.489	.477	.464	.436
2	.879	.913	—	.875	.803	.748	.699	.660	.625	.592	.567	.551	.541	.525	.512	.482
3	.868	.896	.937	—	.887	.824	.766	.722	.683	.648	.620	.600	.589	.571	.554	.521
4	.849	.882	.915	.936	—	.896	.828	.780	.733	.695	.665	.641	.628	.610	.591	.554
5	.834	.872	.905	.922	.934	—	.896	.837	.785	.743	.710	.684	.668	.646	.625	.586
6	.813	.853	.886	.897	.904	.927	—	.900	.842	.795	.757	.728	.712	.687	.663	.619
7	.811	.851	.885	.896	.902	.919	.930	—	.909	.853	.810	.778	.758	.730	.707	.658
8	.804	.841	.875	.888	.890	.906	.916	.943	—	.912	.860	.824	.801	.769	.744	.687
9	.790	.829	.865	.877	.880	.895	.904	.927	.944	—	.916	.872	.844	.810	.780	.720
10	.780	.822	.857	.870	.875	.890	.894	.916	.927	.943	—	.921	.878	.840	.807	.748
11	.760	.802	.838	.846	.850	.869	.877	.900	.915	.922	.937	—	.919	.874	.837	.773
12	.758	.801	.837	.846	.850	.865	.876	.896	.907	.919	.931	.936	—	.927	.883	.810
13	.746	.795	.828	.837	.843	.860	.873	.894	.904	.914	.927	.927	.955	—	.919	.838
14	.734	.783	.816	.823	.829	.849	.863	.884	.895	.904	.909	.915	.943	.958	—	.876
15	.703	.746	.779	.788	.794	.806	.817	.840	.848	.858	.870	.870	.895	.895	.920	—

Note: Very high correlation (≥.90) in green; high correlation (.70 to .90) in yellow; moderate correlation (.50 to .70) in orange; low correlation (.30 to .50) in red.

Finally, we examine ethnic differences in the temporal stability of children's neighborhood characteristics. In Tables 4 and 5 we present year-to-year correlations for, respectively, the percentage non-Western minorities and the mean logged income in the neighborhood for native Dutch children (above diagonal) and children with at least one parent born abroad (below diagonal), separately. Although the share of ethnic minorities who moved at least once (63%) is higher than among the native Dutch (52%), we find significantly ($p<.001$) stronger year-to-year correlations in the ethnic composition of the neighborhood among ethnic minority children than among native Dutch children. For example, the correlation in the percentage non-Western minorities in the neighborhood at ages 0 and 15 among native Dutch children ($r = 0.59$) is clearly lower than among children from immigrant families ($r = 0.72$). The results are less conclusive regarding the mean logged income in the neighborhood. While the correlations in the mean logged income are generally higher for ethnic minority children than for native Dutch children, the differences are very small and negligible. In addition, many differences are not statistically significant, with $p>.01$.

Table 4: Year-to-year correlations of percentage non-Western minorities in the neighborhood, native Dutch above diagonal (N=146,312) and ethnic minorities below diagonal (N=32,854)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	—	.913	.845	.791	.754	.724	.700	.680	.661	.645	.634	.624	.617	.609	.600	.592
1	.945	—	.920	.859	.814	.780	.752	.727	.704	.687	.674	.663	.653	.644	.634	.626
2	.903	.950	—	.929	.877	.836	.804	.776	.751	.732	.718	.704	.694	.682	.671	.662
3	.867	.910	.955	—	.939	.893	.856	.825	.796	.775	.758	.743	.731	.719	.707	.698
4	.838	.878	.918	.958	—	.945	.904	.868	.835	.811	.793	.776	.763	.752	.739	.729
5	.816	.853	.892	.929	.966	—	.951	.911	.873	.845	.826	.808	.793	.780	.766	.755
6	.801	.835	.870	.906	.940	.969	—	.952	.910	.879	.858	.838	.823	.808	.793	.782
7	.785	.818	.851	.886	.917	.944	.971	—	.952	.917	.893	.872	.855	.838	.822	.809
8	.771	.803	.834	.867	.896	.922	.947	.973	—	.958	.932	.908	.887	.868	.851	.836
9	.761	.791	.821	.853	.880	.905	.929	.952	.977	—	.966	.938	.915	.894	.874	.859
10	.750	.779	.808	.838	.865	.890	.912	.934	.958	.979	—	.968	.941	.918	.897	.880
11	.743	.770	.798	.828	.854	.879	.900	.921	.944	.963	.981	—	.968	.942	.919	.899
12	.735	.762	.788	.817	.843	.866	.887	.907	.929	.946	.963	.980	—	.968	.942	.920
13	.728	.754	.780	.808	.834	.856	.875	.895	.914	.931	.946	.962	.980	—	.967	.941
14	.721	.747	.773	.801	.826	.847	.865	.884	.903	.920	.935	.950	.966	.981	—	.964
15	.716	.742	.767	.793	.816	.837	.855	.875	.893	.909	.924	.937	.952	.965	.979	—

Note: Very high correlation (≥.90) in green; high correlation (.70 to .90) in yellow; moderate correlation (.50 to .70) in orange; low correlation (.30 to .50) in red.

Table 5: Year-to-year correlations of mean logged income in the neighborhood, native Dutch above diagonal (N=146,312) and ethnic minorities below diagonal (N=32,854)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	—	.846	.799	.758	.721	.692	.658	.644	.627	.607	.591	.573	.569	.555	.541	.513
1	.880	—	.871	.818	.780	.750	.714	.695	.673	.651	.635	.617	.611	.600	.584	.551
2	.813	.906	—	.895	.845	.811	.771	.749	.723	.699	.681	.663	.655	.641	.625	.591
3	.755	.845	.920	—	.900	.860	.811	.789	.761	.735	.716	.693	.686	.669	.651	.616
4	.716	.802	.870	.930	—	.902	.847	.821	.787	.760	.741	.714	.706	.691	.672	.635
5	.682	.763	.825	.883	.938	—	.897	.860	.822	.793	.772	.745	.736	.718	.699	.657
6	.662	.738	.795	.847	.895	.940	—	.901	.858	.824	.798	.773	.763	.746	.727	.679
7	.643	.712	.765	.814	.859	.898	.943	—	.912	.871	.840	.811	.802	.783	.764	.713
8	.623	.689	.742	.788	.829	.867	.908	.952	—	.915	.874	.843	.834	.810	.791	.733
9	.606	.669	.718	.764	.802	.838	.877	.916	.952	—	.916	.877	.863	.839	.816	.757
10	.588	.649	.698	.743	.781	.815	.850	.887	.922	.958	—	.916	.888	.863	.833	.778
11	.576	.637	.683	.726	.762	.795	.826	.862	.894	.926	.958	—	.915	.883	.854	.792
12	.568	.626	.672	.713	.749	.780	.811	.844	.874	.902	.930	.955	—	.929	.897	.827
13	.558	.616	.660	.699	.734	.763	.793	.825	.850	.877	.903	.925	.960	—	.926	.849
14	.544	.602	.646	.684	.716	.742	.770	.804	.827	.852	.878	.898	.925	.952	—	.879
15	.526	.581	.622	.657	.685	.710	.738	.769	.790	.816	.840	.856	.882	.903	.925	—

Note: Very high correlation (≥.90) in green; high correlation (.70 to .90) in yellow; moderate correlation (.50 to .70) in orange; low correlation (.30 to .50) in red.

5. Discussion

This study investigates the temporal stability of children's neighborhood characteristics, focusing on the ethnic composition and the mean income of the neighborhood. Our findings indicate that children's neighborhood characteristics are notably more stable over time with regard to ethnic composition than with regard to the mean income. One reason for this is that we defined ethnicity based on country-of-birth criteria, which are fixed and invariable. Thus, if children do not move, the only way in which the ethnic composition of their neighborhood can change is through migration turnover (i.e., immigration and emigration) and natural turnover (i.e., births and deaths). Income, by contrast, can also change over time for individuals, leading to a lower stability over time in the mean income of neighborhoods. Moreover, the fact that income can change for individuals over time implies that income is also more prone to measurement error, which may have reduced the observed temporal stability as well.

Furthermore, the stability of children's neighborhood characteristics over time was found to be much lower for children who had changed residence at least once than for children who never moved. While this may not be a surprising finding it is an important finding in that it indicates that a substantial share of children experienced neighborhood

social mobility (either up or down) when changing residence. Yet, despite higher residential mobility rates among ethnic minorities than among the native Dutch, the stability in neighborhood characteristics over time was not found to be lower among ethnic minority children. To the contrary, particularly the ethnic composition of the neighborhood was found to be more stable over time among children from immigrant families than among native Dutch children. These findings are in line with previous research (Quillian 2003; van Ham et al. 2014) suggesting that ethnic minority children have a stronger persistence of neighborhood disadvantage than children from the majority population.

In summary, this study shows that single point-in-time measures are reasonable proxies for the ethnic composition of children's neighborhood in the long run. Also among children who moved, we find moderately strong associations between the ethnic composition of the origin and destination neighborhoods. With regard to the mean income of the neighborhood, however, point-in-time measures are less suitable proxies for children's long-run experiences. Especially among children who have moved, the correlation between the mean income in the neighborhood in early childhood and that in adolescence is weak. This seems problematic, as previous research indicates that exposure to neighborhood disadvantage is particularly harmful in early childhood (Anderson, Leventhal, and Dupéré 2014). We conclude that future research should pay more attention to the temporal conceptualization of children's neighborhood environment, especially with regard to neighborhood economic deprivation.

6. Acknowledgements

The research leading to these results has received funding from the European Research Council under the European Union's Seventh Framework Program (FP/2007-2013) / ERC Grant Agreement n. 615159 (ERC Consolidator Grant DEPRIVEDHOODS, Socio-spatial inequality, deprived neighbourhoods, and neighbourhood effects).

References

Alder, A.G. and Scher, S.J. (1994). Using growth curve analyses to assess personality change and stability in adulthood. In: Heatherton, T.F. and Weinberger, J.L. (eds.). *Can personality change?* Washington, D.C.: American Psychological Association: 149–173. doi:10.1037/10143-007.

Anderson, A., Leventhal, T., and Dupéré, V. (2014). Exposure to neighborhood affluence and poverty in childhood and adolescence and academic achievement and behavior. *Applied Developmental Science* 18(3): 123–138. doi:10.1080/10888691.2014.924355.

Assari, S., Lankarani, M.M., Caldwell, C.H., and Zimmerman, M.A. (2016). Fear of neighborhood violence during adolescence predicts development of obesity a decade later: Gender differences among African Americans. *Archives of Trauma Research* 5(2): 314–375. doi:10.5812/atr.31475.

Bakker, B., van Rooijen, J., and van Toor, L. (2014). The system of social statistical datasets of Statistics Netherlands: An integral approach to the production of register-based social statistics. *Journal of the International Association for Official Statistics* 30(4): 1–14.

Bloom, B. (1964). *Stability and change in human characteristics*. New York: Wiley.

Crowder, K. and South, S.J. (2011). Spatial and temporal dimensions of neighborhood effects on high school graduation. *Social Science Research* 40(1): 87–106. doi:10.1016/j.ssresearch.2010.04.013.

De Vuijst, E., van Ham, M., and Kleinhans, R. (2015). The moderating effect of higher education on intergenerational spatial inequality. Bonn: Forschungsinstitut zur Zukunft der Arbeit (IZA Discussion Papers, No. 9557).

Diedenhofen, B. and Musch, J. (2015). cocor: A comprehensive solution for the statistical comparison of correlations. *PLoS ONE* 10(6): e0121945. doi:10.1371/journal.pone.0121945.

Duncan, G.J., Boisjoly, J., and Harris, K.M. (2001). Sibling, peer, neighbor, and schoolmate correlations as indicators of the importance of context for adolescent development. *Demography* 38(3): 437–447. doi:10.1353/dem.2001.0026.

Galster, G. (2012). The mechanism(s) of neighbourhood effects: Theory, evidence, and policy implications. In: van Ham, M., Manley, D., Simpson, L., Bailey, N., and Maclennan, D. (eds.). *Neighbourhood effect research: New perspectives*. Dordrecht: Springer: 23–56. doi:10.1007/978-94-007-2309-2_2.

Hedman, L., Manley, D., van Ham, M., and Östh, J. (2015). Cumulative exposure to disadvantage and the intergenerational transmission of neighbourhood effects. *Journal of Economic Geography* 15(1): 195–215. doi:10.1093/jeg/lbt042.

Hinkle, D.E., Wiersma, W., and Jurs, S.G. (2003). *Applied statistics for the behavioral sciences*. Boston: Houghton Mifflin.

Isaacs, J.B. (2008). International comparisons of economic mobility. In: Haskins, R., Isaacs, J.B., and Sawhill, I.V. (eds.). *Getting ahead or losing ground: Economic mobility in America*. Washington, D.C.: Brookings and Pew Economic Mobility Project: 37–46.

Jackson, M.I. and Mare, R.D. (2007). Cross-sectional and longitudinal measurements of neighborhood experience and their effects on children. *Social Science Research* 36(2): 590–610. doi:10.1016/j.ssresearch.2007.02.002.

Kunz, J., Page, M.E., and Solon, G. (2003). Are point-in-time measures of neighborhood characteristics useful proxies for children's long-run neighborhood environment? *Economics Letters* 79(2): 231–237. doi:10.1016/S0165-1765(02)00324-5.

López Turley, R.N. (2003). When do neighborhoods matter? The role of race and neighborhood peers. *Social Science Research* 32(1): 61–79. doi:10.1016/S0049-089X(02)00013-3.

Luke, N. and Xu, H. (2011). Exploring the meaning of context for health: Community influences on child health in South India. *Demographic Research* 24(15): 345–374. doi:10.4054/DemRes.2011.24.15.

Page, M.E. and Solon, G. (2002). Correlations between brothers and neighboring boys in their adult earnings: The importance of being urban. *Journal of Labor Economics* 21(4): 831–855. doi:10.1086/377021.

Quillian, L. (2003). How long are exposures to poor neighborhoods? The long-term dynamics of entry and exit from poor neighborhoods. *Population Research and Policy Review* 22(3): 221–249. doi:10.1023/A:1026077008571.

Sampson, R.J., Morenoff, J.D., and Gannon-Rowley, T. (2002). Assessing 'neighborhood effects': Social processes and new directions in research. *Annual Review of Sociology* 28(1): 443–478. doi:10.1146/annurev.soc.28.110601.141114.

Van Ham, M., Hedman, L., Manley, D., Coulter, R., and Östh, J. (2014). Intergenerational transmission of neighbourhood poverty: An analysis of

neighbourhood histories of individuals. *Transactions of the Institute of British Geographers* 39(3): 402–417. doi:10.1111/tran.12040.

Wodtke, G.T. (2013). Duration and timing of exposure to neighborhood poverty and the risk of adolescent parenthood. *Demography* 50(5): 1765–1788. doi:10.1007/s13524-013-0219-z.

Wodtke, G.T., Harding, D.J., and Elwert, F. (2011). Neighborhood effects in temporal perspective: The impact of long-term exposure to concentrated disadvantage on high school graduation. *American Sociological Review* 76(5): 713–736. doi:10.1177/0003122411420816.