

Chapter 11

Studying Influences of Socio-economic Contexts and Spatial Effects on Educational Careers



Steffen Hillmert, Andreas Hartung, and Katarina Weßling

Abstract Socio-economic contexts and spatial effects have received increasing attention at the intersection of sociology and education. This research group has laid substantial groundwork in this emerging field of research by developing concepts and methodological techniques for analysing spatial contexts, by collecting and preparing relevant contextual data that can be linked with survey data, and by measuring the impact of socio-structural contextual characteristics on educational aspirations and chances of transition from school to vocational and academic training. For at least this specific stage in educational careers, the end of secondary schooling, we have been able to demonstrate that socio-spatial contextual settings (neighbourhoods and regional contexts) are relevant for educational inequalities. Our research has also demonstrated that the relation between socio-economic contexts and inequalities in education is complex. In particular, little is known about the temporal, spatial, and interpersonal variation in contextual effects. This chapter provides an overview of analytical concepts, measurements, and empirical findings that relate socio-spatial context conditions to educational outcomes, and it outlines promising avenues of future research.

S. Hillmert (✉)

Department of Sociology, University of Tübingen, Tübingen, Germany

e-mail: steffen.hillmert@uni-tuebingen.de

A. Hartung

Department of Spatial and Environmental Planning, University of Kaiserslautern-Landau, Kaiserslautern, Germany

e-mail: andreas.hartung@ru.uni-kl.de

K. Weßling

Federal Institute for Vocational Education and Training (BIBB) & Research Centre for Education and the Labour Market (ROA), Maastricht University, Maastricht, The Netherlands

e-mail: katarina.wessling@bibb.de; kwessling@maastrichtuniversity.nl

11.1 Introduction: Socio-spatial Contexts and Educational Outcomes

One of the most important determinants of individual life chances in modern societies is educational attainment. Research has shown repeatedly that the educational attainment process is not just a mere reflection of personal development but is also subject to social influences coming primarily from parents, peers, and the school (class) context (e.g., Breen & Yaish, 2006; Hofferth et al., 1998; Minello & Barban, 2012). However, educational differences between individuals remain even when family background, the proximate social environment, and school-related conditions are comparable. These educational disparities can be traced back partly to social processes in local and regional environments. Such spatial socio-economic contexts have received increasing attention in recent years (Logan, 2012; Sharkey & Faber, 2014). Previous research addressing the effects of spatially related contexts has been concerned predominantly with, on the one hand, aspects of *neighbourhoods* and, on the other hand, socio-economic *regional* conditions.

Studies focusing on *neighbourhood* characteristics have typically considered local levels of socio-economic deprivation or affluence. In that sense, neighbourhood effects do not refer to a single specific indicator but to an information set characterizing the close-range residential area. Neighbourhood effects on educational outcomes can be attributed to several causal mechanisms. In most instances, they are associated with peer influence, collective socialization, social disorder, institutional conditions, neighbourhood discrimination, market incentives, or environmental factors (for an overview, see Brooks-Gunn et al., 1993; Ellen & Turner, 1997; Friedrichs & Nonnenmacher, 2014; Galster, 2012; Jencks & Mayer, 1990; Sampson, 2019; Weßling, 2016).

- *Peer influence*: Such effects are due to interactions among youth through which attitudes, values, behaviour, as well as expectations towards education emerge or change. Such influences are typically transmitted through contagion (Crane, 1991).
- *Collective socialization*: Educational attitudes, values, behaviours, and expectations can be shaped by proximate adults functioning as role models.
- *Social disorder*: Educational outcomes may also be impacted by reactions towards the stress caused by an unstable and problematic environment.
- *Institutional conditions*: The availability and quality of schools (and also other facilities provided within a neighbourhood) affect youth not only through the chances of access to certain institutions but also through shaping the appreciation of institutional resources.
- *Market incentives*: Neighbourhoods may promote economic incentives that turn into a higher appreciation of education. In contrast, youth from areas with poor access to labour market or educational opportunities may undervalue educational attainment because they see little prospective economic value in it.

- *Neighbourhood discrimination*: Employers may hold lower expectations for individuals from particular local areas based on the negative reputation of these areas, and thus be less likely to hire them.
- *Environmental factors*: Exposure to ambient noise, toxins, lead, or other pollutants can affect cognitive and behavioural development and is detrimental for individuals' health. Poor health, in turn, negatively affects students' educational performance.

Neighbourhoods have been studied intensively in the US context (e.g., Sampson, 2019). In particular, negative effects of ethnic and social segregation and unfavourable conditions on various aspects of educational outcomes have been shown repeatedly. For example, neighbourhood effects have been linked to adolescents' mathematics and reading scores as well as final grades (e.g., Ainsworth, 2002; Galster et al., 2016; Garner & Raudenbush, 1991). There is also strong evidence for an influence of deprived neighbourhood conditions on early school dropout (e.g., Rendón, 2014; Wodtke et al., 2011) and lower educational aspirations (e.g., Owens, 2010). In the European context, socio-economically disadvantaged people do not appear to live as segregated as in the US context, and also ethnically concentrated neighbourhoods are more mixed in terms of countries of origin. Existing studies on neighbourhood effects in the European context have found that the impact of living conditions on educational outcomes is lower and less consistent, but there is evidence that residential conditions also affect individuals' opportunities and perspectives in this context (Musterd, 2019). However, most neighbourhood studies in Europe have found positive effects of favourable residential contexts on educational outcomes rather than negative effects of unfavourable contexts (e.g., Helbig, 2010; Kauppinen, 2008). For an overview of studies on the impact of neighbourhoods and academic achievements in which differences in the US and European contexts are discussed explicitly, see Nieuwenhuis & Hooimeijer (2016).

Despite early theoretical approaches that took a holistic perspective on contextuality such as the Chicago School in sociology (Abbott, 1997; Park et al., 1925) or the social ecological approach (Bronfenbrenner, 1979; Vaskovics, 1982) that advocated the integration of multiple spatial contexts such as neighbourhoods, districts, and cities, the neighbourhood effects literature has remained surprisingly unconnected with research on other socio-spatial contexts such as regions or cities. A large number of studies that link *regional* socio-economic and socio-structural conditions with education have dealt with labour market returns to education. Based on the human capital model, it has been argued that the individual risk of being unemployed can be reduced through investments in higher levels of educational qualifications. A positive influence on the chance of enrolling in higher education has been expected particularly in regions with high unemployment; however, those with more education may be less affected by regional variation, and many studies confirm group-specific differences (e.g., Betts & McFarland, 1995; Clark, 2011; Lauer, 2002). A supplementary argument for a positive relation between unemployment and further education is that high unemployment tends to discourage young adults from entering the labour market quickly (*discouraged worker effect*: Raffé & Willms, 1989). However, empirical evidence that combines

individual information on participation in post-compulsory education with macrolevel information has been rather ambiguous. Some studies have failed to find any influence (Micklewright et al., 1990), whereas others have found a weak impact of local labour market conditions on post-compulsory educational participation (Meschi et al., 2011). Beyond that, the regional educational infrastructure has been considered important with respect to individuals' aspirations and transitions to higher education. Regarding infrastructure, the distance to the next college or university has often been referred to, and the larger the distance, the less likely it is that young adults aspire to participate (Finger, 2016) or actually do participate in college or university education (e.g., Reimer, 2013; Spieß & Wrohlich, 2010; Tinto, 1973). Moreover, it has been shown that a long distance to higher education institutions is particularly detrimental for high school graduates from families with lower socio-economic status (e.g., Cullinan et al., 2013; Frenette, 2006). However, the distance approach fails to capture qualitative differences (e.g., fields of study offered, number of universities available, and quality of universities) in the accessibility of university education (Turley, 2009).

In summary, previous research has repeatedly—but often rather unsystematically—uncovered local and regional contextual effects on various aspects of education. It should be noted that these contextual influences have typically been rather small compared to well-known determinants of educational careers such as previous career steps or social background. However, a systematic decomposition and a more precise quantification of different socio-spatial context effects remain important tasks for social science research (cf. Hillmert, 2019). From a methodological point of view, even just an incorrect conceptualization and measurement of spatial contexts alone can lead to an overestimation or underestimation of effects (*modifiable areal unit problem* [MAUP], cf. Kwan, 2012). In this respect, the quantitative analysis of regional or neighbourhood effects may be regarded as still being in its infancy, particularly because the spatial dimension of these effects has often been neglected. Due to increasing data availability and advances in analytical techniques, it is only recently that many sociologists have become interested in spatial analyses and questions about the scale and structure of local and regional context effects and their relevance for individual outcomes such as educational attainment.

11.2 Our Contribution: Conceptualization, Data Preparation, and Flexible Measurement of Context and Spatial Effects

Our research group has contributed to this emerging field of research.¹ First, we have added to the conceptual and methodological literature on spatial contexts in quantitative educational research; second, we have collected and systematized

¹The two-phase project was part of DFG Priority Programme 1646, funded by the German Research Foundation (DFG), grants HI 767/7-1 and HI 767/7-2. See also <http://spaceandplace.de>

contextual-level data on socio-economic characteristics of neighbourhoods and regions; and third, we have carried out several substantive studies evaluating the impact of socio-economic context conditions on educational outcomes.

11.2.1 Conceptual Starting Points for Studying Context Effects

Context effects become apparent in various parts of the educational attainment process. On the basis of a general educational decision model (following, e.g., Becker, 2000; Boudon, 1974; Breen & Goldthorpe, 1997; Hillmert & Jacob, 2003), educational attainment can be divided analytically into the *formation of aspirations*, the *development of competencies*, and *educational transitions* along the educational life course. Educational attainment involves the interplay between the development of aspirations and the acquisition of competencies. These two processes result in actually fulfilled educational transitions (see Fig. 11.1). The development of aspirations and competencies follows a successive process of formation and continuous adaptation and becomes visible in stages that mark actual transitions. In that sense, ‘secondary effects’ (Boudon, 1974) are reflected in the influence of social environments on general aspirations towards education and on the individual demand for a certain educational level to be reached. When a decision situation—a so called turning point (Hodkinson & Sparkes, 1997)—approaches, individuals have to finally evaluate their educational aims in order to make the decision that is (subjectively) most meaningful at that particular time in the life

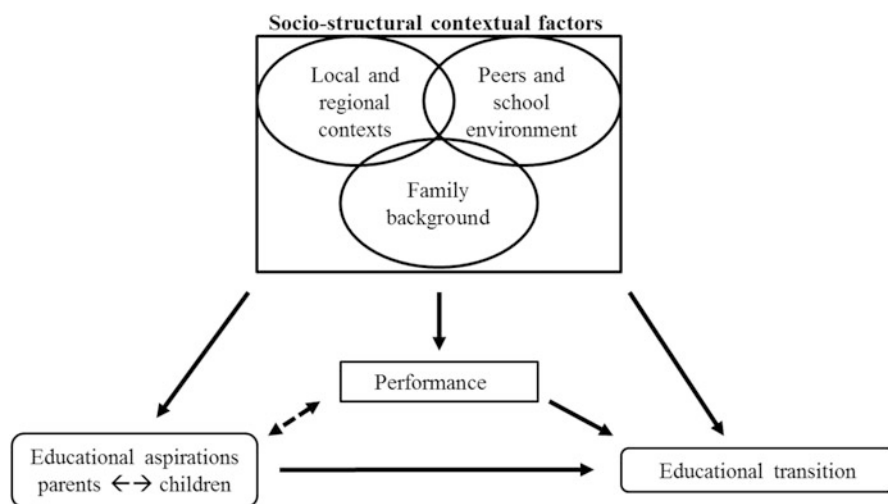


Fig. 11.1 Relationships between relevant contexts and educational attainment (at particular stages in an educational career). (Source: Authors' own illustration)

course. Educational performance can, thereby, have a direct effect on the fulfilled transitions (‘primary effects’) or it may be mediated through educational aspirations, because individuals adapt their expectations following performance feedback (e.g., by their grades or teachers’ recommendations). The reverse relation also exists: educational motivation in the form of aspirations can influence educational performance. All three components of the educational attainment process can be affected by socio-structural contexts. The particular focus of our project has been on the relevance of local and regional contexts.

The socio-spatial context that is relevant for individual attitudes and actions can be assumed to be a space to which the individual is frequently—though not necessarily continuously—exposed (Browning et al., 2016). There are several transmission channels or mechanisms through which local and regional contexts influence the educational attainment process (see Table 11.1). First, an individual’s exposition to educational norms and processes of collective socialization in the residential area influences educational preferences and aspirations (Freese, 2009). The development of competencies is assumed to be subject to socio-spatial contexts mediated by differential learning environments that foster or hamper educational progress. Norms concerning learning can also be considered relevant. Moreover, peers in the residential area can be important in the educational attainment process (e.g., Friedrichs & Nonnenmacher, 2014; Sampson et al., 2002; Weßling, 2016). Actual transitions can be assumed to be additionally affected by social interactions with individuals in the local or regional context that provide information on opportunities (e.g., training places or study opportunities). Furthermore, contexts provide such opportunities directly. The majority of the mechanisms listed relate to individual actors such as persons or companies. Most contextual data, however, is organized in the form of aggregated indicators that rather represent the probabilities of having specific interactions or taking relevant opportunities.

Table 11.1 Local and regional context effects on components of educational attainment

Typical mechanisms	Indicator variables	Educational outcomes
Social educational norms	Social and economic living conditions in neighbourhood, average educational/occupational level, housing prices, share of immigrant groups in local population, labour market conditions in region, educational infrastructure in region	→ Aspirations
Collective socialization		
Peer group influences		
Discouraged-worker effect		
Differential learning environments (social composition, social disorder, institutional conditions)	Average educational/occupational level of neighbours, distance to schools, age-specific population in neighbourhood	→ Competencies/ performance
Peer group influences		
Opportunities	Labour market conditions in region, educational infrastructure in region, regional employment structure and average wages	→ Transitions
Social interactions		

Source: Authors’ own compilation

In our project, we have selected a specific point in individuals' educational career—the end of general schooling when the transition to vocational and academic training is imminent—to empirically study the relevance of socio-spatial contextual conditions on educational aspirations and transition chances.

11.2.2 Screening and Preparation of Relevant Contextual Data

To analyse the role of socio-spatial contexts for educational careers, local and regional contextual-level information has been linked to individual-level survey data. When doing so, both the contextual-level and the survey data need to fulfil a set of requirements, and specific challenges in linking the different data types have to be addressed.

The *survey data* need, first, to contain comprehensive information about educational careers and should differentiate precisely between the various educational tracks and programmes; second, they need to be longitudinal to capture the educational transitioning processes across the life course; and third, they must contain substantive information about the local residential contexts and geospatial information about these contexts. Even if this is not the case, at least information about the place of residence (e.g., exact addresses or geographical locations, administrative district codes, postal codes, etc.) should be provided to allow the survey data to be combined with geospatial information from external, commercial, and administrative sources. When working with retrospective survey data, residential information is required not just for the time of the interview but for specific stages in the life course. For our purposes, residential information must be specific for the time during which the respondents completed school and made decisions about their further vocational or academic education. We identified two surveys that meet the specified requirements for the German case: the *German Socio-Economic Panel Study* (GSOEP)² and the *National Educational Panel Study*, Starting Cohort 6-Adults (NEPS-SC6) and Starting Cohort 4–9th Grade (NEPS-SC4)³ (Blossfeld et al., 2011).

The *socio-spatial contextual data* need, first, to be available in a time series format with a longer time frame. This allows us to disentangle temporal business-cycle effects from regional effects (cf. Hillmert et al., 2017a). Second, the contextual data need to be available for the point in time at which the educational transition of

²Socio-Economic Panel Study (SOEP), 1984–2012, version 29, doi:<https://doi.org/10.5684/soep.v34>

³National Educational Panel Study (NEPS): Starting Cohort Adults, doi:<https://doi.org/10.5157/NEPS:SC6:11.1.0>, and Starting Cohort 9th Grade, doi:<https://doi.org/10.5157/NEPS:SC4:11.0.0>. From 2008 to 2013, NEPS data were collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is being carried out by the Leibniz Institute for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network.

interest is measured in the survey data. For retrospective data, this point in time might lie up to 20 or 30 years in the past. This situation presents additional difficulties because area codes (e.g., administrative district or municipality codes) tend to change over time. Moreover, area codes in surveys are quite often available only for a particular territorial status. For example, in earlier versions of the NEPS-SC6, these were available for the territorial status in the year 2003. This means that when a respondent provides information about where she or he lived in 1975, then the area code available in the NEPS corresponds to the area’s territorial status in 2003. In the newer version of the data, this applies to the status of the year 2013. The districts of residence in GSOEP are currently harmonized according to the territorial status in the year 2014. Moreover, GSOEP is currently the only German panel dataset that allows for an exact localization of participating households (since 2000) for the purpose of linking them to external small-scaled contextual data. Territorial reforms in terms of mergers or dissolutions of municipalities or districts due to population developments and regional restructuring occur quite frequently. This can cause various problems in the preparation of consistent regional time series data (BBSR, 2011, 2013; Weßling, 2016; Weßling & Wicht, 2015). Each contextual unit can be represented spatially on a map by making use of its geometry. Geometries, often represented by the units’ centroids, are also necessary for applying techniques of spatial analysis and geographic information system (GIS) applications. Georeferences for administrative territorial units (in particular, municipalities, districts, and federal states) are provided by the Federal Agency for Cartography and Geodesy (*Bundesamt für Kartografie und Geodäsie*: BKG).

In the project, we have linked context information on the level of municipalities and administrative districts to data from both the NEPS and the GSOEP. The context information originated from several sources and represents socio-economic information on the local context (e.g., unemployment), information on the local educational infrastructure (e.g., number of universities), and compositional information on the population (e.g., size of specific age groups). This information on socio-structural and socio-economic contexts has been prepared in time series format and has been aggregated flexibly. Thus, in addition to the substantive conceptual and empirical work, particular effort has been made to collect and prepare socio-spatial contextual data in a time series format. Table 11.2 provides an overview of substantive information and geographic references that have been collected, prepared, and employed in our project.

Table 11.2 Collected and prepared local and regional contextual information

Information	Original data source	Time period	Aggregation levels
Socio-economic conditions: Unemployment (rate) Employment (rate) Percentage of higher educated	Federal Institute for Research on Building, Urban Affairs, and Spatial Development (BBSR) Federal Employment Office (<i>Bundesagentur für Arbeit</i>) microm Consumer Marketing	1969–now	Administrative districts (NUTS-3) Harmonized territorial status (West Germany) Market cells (approx. 470 households each)

(continued)

Table 11.2 (continued)

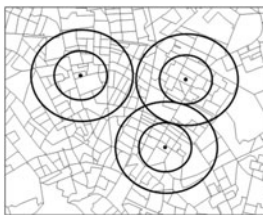
Information	Original data source	Time period	Aggregation levels
Socio-economic conditions: Unemployment (gender-specific, youth, long-term, foreign)	Federal Employment Office	1988–now	Administrative districts (NUTS-3) Harmonized territorial status (West Germany)
Population: Birth cohorts (age-specific population)	Statistical Office (<i>Statistisches Bundesamt Genesis</i>) Census 2011	1960–now	Administrative districts (NUTS-3) Harmonized territorial status (West Germany) 1 × 1 km
Educational infrastructure (university): Number of first-year students and students at universities in different fields of study (e.g., engineering, sciences, medical sciences, social/cultural studies) Name, locations, founding years of universities and universities of applied sciences	Higher Education Compass (<i>Hochschulkompass/Hochschulrektorenkonferenz</i>) German Council of Sciences and Humanities (<i>Wissenschaftsrat</i>) Statistical Office	1985–now	Municipalities (LAU-2) Harmonized territorial status (West Germany)
Educational infrastructure (school): Number of students and graduates per school type (primary and secondary schools)	Statistical Office <i>Wegweiser Kommune</i> (Bertelsmann Foundation)	1993–now	Municipalities (LAU-2) Harmonized territorial status (West Germany)
<i>Territorial/geographic information</i>			
Harmonized table of administrative districts	Statistical Office, BBSR	1960–now	Administrative districts (NUTS-3)
Harmonized table of municipalities	Statistical Office	1985–now	Municipalities (LAU-2) (West Germany)
Travel-time information	BBSR	2009	Municipalities (LAU-2)
Geocodes for administrative units	Federal Agency for Cartography and Geodesy (<i>Bundesamt für Kartografie und Geodäsie BKG</i>)	1997–now	Municipalities (LAU-2), Administrative districts (NUTS-3), Governmental districts (NUTS-2), Federal states (NUTS-1)
Geocodes for INSPIRE grids	Census 2011	2011	1 × 1 km
Geocodes for market cells	microm Consumer Marketing	2008	Market cells (approx. 470 households each)

Source: Authors' own compilation

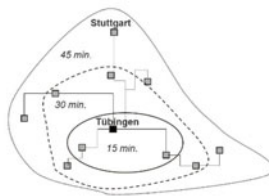
11.2.3 *Spatial Methods and Their Application in Substantive Research on Education*

By applying several competing and complementary approaches, we have demonstrated the relevance of spatiality in contextual analyses with a focus on educational aspirations and transitions at the end of secondary schooling. Already in the theoretical and conceptual groundwork, the general argument has been that an appropriate definition of the geographical scale of measurement depends upon the assumed theoretical relation between the social processes prevalent within a spatial context and individuals' choices or chances, and these mechanisms vary in terms of their spatial scale. We have been less interested in a summary of all possible effects that are concentrated on a particular geographical level, but rather in the correct geographic representation of the mechanisms of interest. Consequently, instead of measuring an overall 'impact' of a predefined spatial area (e.g., an administrative unit such as a district/*Landkreis*), the aim of empirical applications has been to capture the extension of theoretically relevant mechanisms represented by particular variables. Following this, various conceptualizations of relevant areas have been developed and applied in our research project (see Fig. 11.2).

One approach to assess the spatial reference of regional socio-economic contextual settings has been applied to the impact of regional unemployment on the transition to vocational education and training. For this purpose, data from the GSOEP were linked to administrative time series data on the level of NUTS-3 regions (*Landkreise/Kreisfreie Städte*). This allowed a flexible operationalization of the spatial context to capture the optimal radius in which school graduates search for vocational training places. Results indicate a negative relation between regional unemployment and the chances of entering vocational training in the dual system. Moreover, the effects of unemployment on training chances have a specific spatial structure: the labour market situation in respondents' districts of residence (i.e., their



a) Small-scaled physical distance radii (as in Hartung & Hillmert, 2019), measuring interpersonal contact intensity



b) Travel time radii (as in Weßling & Bechler, 2019), measuring commutable areas



c) District rings (as in Weßling, Hartung, & Hillmert, 2015), measuring personal perception of labour-market conditions

Fig. 11.2 Alternative conceptualizations of spatial referencing

proximate local environment) moderates the relation between the labour market situation in surrounding districts (i.e., their larger local environment) and the school leavers' chances of entering dual vocational training (Weßling et al., 2015). In a subsequent research article, Hillmert et al. (2017a) investigated to what extent individual transitions to vocational training in Germany are affected by local labour market conditions with a special focus on temporal and regional aspects. For this purpose, the authors developed and applied a method of statistical decomposition of time series data. The approach allows for a systematic differentiation between *long-term change*, *business-cycle fluctuations*, and *structural regional* differences in socio-economic conditions (see Fig. 11.3).

Such an approach can be useful for a broad set of empirical applications dealing with context effects. In this example, the decomposed labour market data were merged with longitudinal data from NEPS Starting Cohort 6 (NEPS-SC6). Results indicated that structural differences between regions have significant effects on the transition behaviour of school leavers, whereas temporary fluctuations are of only minor relevance. In Germany, the common focus on East-West differences often

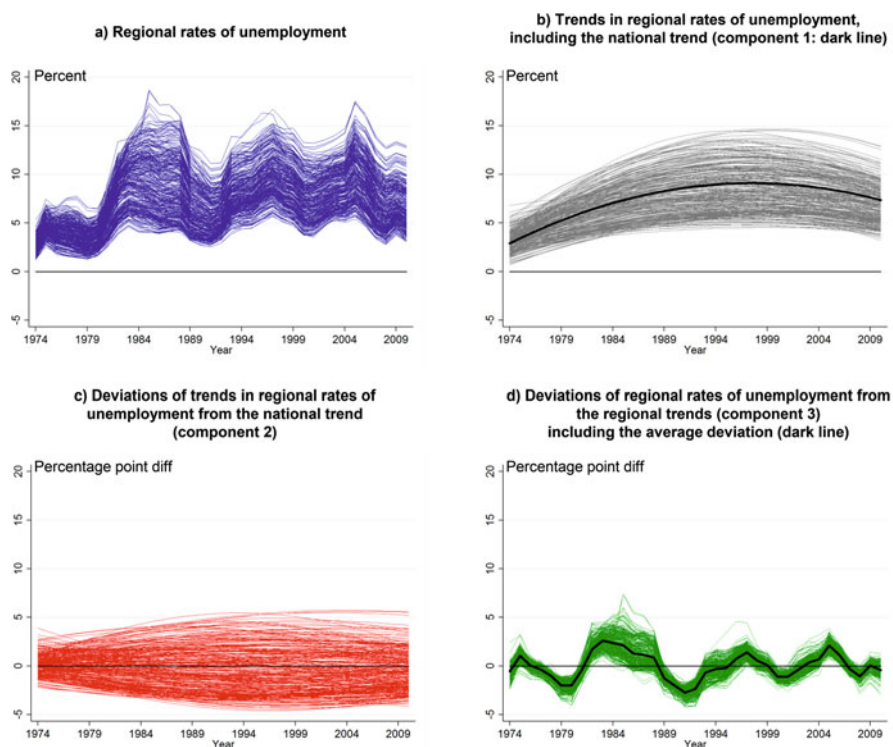


Fig. 11.3 Unemployment rates (percentages/percentage point differences) in West Germany: regional time series (1974–2010) and decomposition (Hillmert et al., 2017a, p. 541)

obscures the considerable regional differences in life chances, manifested by differential access to educational institutions, training opportunities, and employment.

Hartung et al. (2019) have aimed to explain how the regional labour market situation influences the educational and occupational aspirations of 9th and 10th graders. Their article developed a multidimensional concept of aspirations and directly tested the idea of discouragement by linking regional socio-economic conditions to educational and occupational aspirations before transitions take place. So far, only a very limited number of studies have linked regional conditions directly to educational preferences (e.g., Taylor & Rampino, 2014). In Hartung et al. (2019), the contextual data were combined with survey data from NEPS Starting Cohort 4 (NEPS-SC4). Results indicate that regional labour market conditions are relevant with regard to certain aspects of educational and occupational aspirations; in particular, occupational aspirations related to job status and general educational aspirations are influenced positively by the level of regional unemployment. However, the effects vary with respect to the attended school track. In another article, Hartung et al. (2022) also found evidence for an interaction with social background.

We have also used geographic information from the BBSR (*Federal Institute for Research on Building, Urban Affairs and Spatial Development*) on travel times between all German municipalities to flexibly aggregate socio-structural characteristics within travel time radii. Longitudinal microlevel data from the NEPS-SC6 have been linked to the macrolevel data on regional labour market conditions and the local university infrastructure. Results indicate that the chance of entering university and study-related mobility decisions both depend on labour market conditions and university infrastructure in the local context. In general, contextual effects decrease with increasing spatial extent. However, the spatial extent of these contextual effects varies for different socio-spatial characteristics (e.g., unemployment, study opportunities, traditional university town). Moreover, socio-spatial contextual characteristics interact with regard to the chances of entering university (Weßling & Bechler, 2019).

At least in sociology, research concerned with geospatial aspects of neighbourhoods has been rather limited—particularly for the case of Germany. Therefore, we acquired georeferenced information on so called market cells (geographical areas containing approximately 450 households each) from *microm Consumer Marketing* in order to link information on the social composition of neighbourhoods with survey data on individuals' educational aspirations (Hartung & Hillmert, 2019). It was expected that a greater percentage of higher educated in the proximate living environment forms a more favourable educational environment that positively affects individuals' perceptions of given educational alternatives. Corresponding analyses have looked at aspirations to attend higher education. Individual-level data from the GSOEP were merged with the microm data. A flexible 'ego-centered' concept of individuals' local contexts in the form of concentric circles with varying radii (cf. Hillmert, 2018) was applied to assess the geographical range

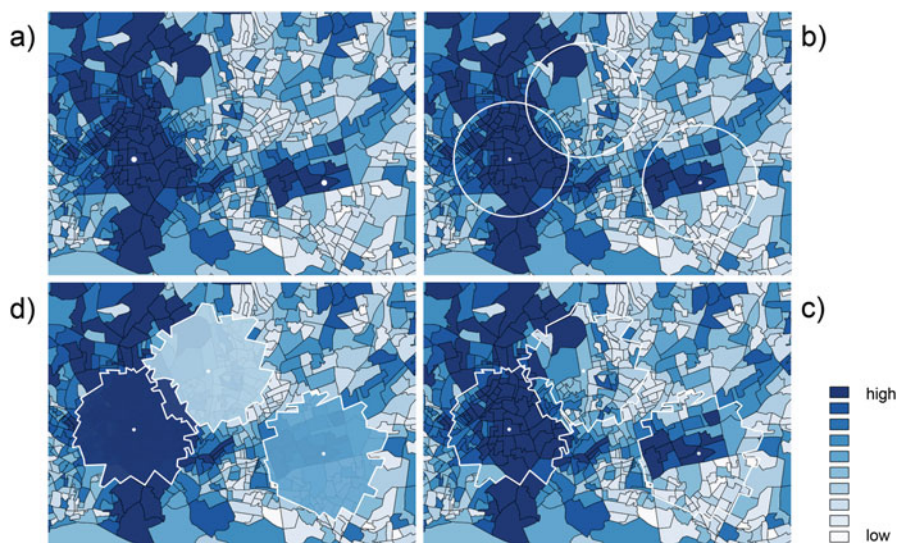


Fig. 11.4 Egocentric spatial neighbourhood contexts as ideal-typical and factual operationalisation (Hartung & Hillmert, 2019, p. 5). (a) Proportion of university graduates (light colours: low; dark colours: high) across small neighbourhood units (market cells) in a map section, and three individual residents (dots) as examples. (b) Ideal-typical definition of egocentric neighbourhoods (egohoods), illustrated with the same three individuals. (c) Factual operationalization of these egohoods. (d) Factual operationalization of the egohoods including calculated values for the proportion of university graduates in these egohoods

in which neighbourhood influences on the individuals' aspirations are strongest (see Fig. 11.4). Findings suggest that the share of higher educated in the neighbourhood is indeed important for the formation of aspirations to attend higher education.

Our research group has also contributed to the methodological discussion on the relevance of spatial contexts by demonstrating challenges in dealing with (imperfect) spatial information in survey data and by providing practical solutions (Hillmert et al., 2017b). For this purpose, we made use of the GSOEP and illustrated—by means of popular research examples on returns to education as well as on gender-based and migration-related wage gaps—how sensitive empirical results are to the specification of the regional level of aggregation and to the statistical method applied. In survey data, individuals' locations are often approximated by the geographical units they reside in. We have demonstrated that, in such cases, techniques of spatial analysis often do not provide results that are more precise than those of conventional analyses of survey data, e.g. multilevel analyses. Applying techniques of spatial analysis to limited geographical data is only fruitful if strong assumptions about the location of individuals and the spatial relationships among them can be justified.

11.3 Outlook: Promising Venues of Future Research

We have gained selected evidence on the relation between local and regional context conditions and educational attainment from our project work, and we can draw a number of conclusions. First, we have found evidence for the relevance of the regional socio-economic environment particularly for educational aspirations and transitions at the end of secondary school. Second, we have found that beneficial neighbourhood environments encourage young adults to strive for higher education. Third, we have found that the appropriate spatial scale is highly relevant for the measurement of context effects. Therefore, georeferenced data or at least data on different local or regional levels are required. Fourth, we have found that different contextual characteristics interact with regard to educational transition chances.

Based on both a thorough review of the literature and our own findings and experiences, specific gaps in previous research on socio-economic context effects on education can be identified. These gaps relate to the heterogeneity and the comparative or relative nature of socio-spatial contexts. We find that some effects of spatial contexts on educational outcomes—particularly effects on the relation between socio-economic characteristics of the region and the transition to vocational training or the labour market—are stable over time and place(s). However, some studies reveal positive evidence for a specific spatial contextual effect; others find reversed effects in this regard; and there are even studies that fail to find any influence at all. These ambiguous findings on the relevance of neighbourhoods and regions for educational attainment processes suggest that spatial contexts are not universally relevant but rather heterogeneous in terms of other characteristics. In the following, we sketch a brief outline of promising future research in this area. We envisage, in particular, three major lines of research: first, the impact of socio-spatial contexts along the educational life course; second, the simultaneous impact of multiple contexts (e.g., neighbourhoods, regional environment, and schools); and third, inter-group differences (with regard to cohort, ethnic origin, social origin, and gender) in socio-spatial contextual effects.

11.3.1 Impact of Socio-spatial Contexts Along the Educational Life Course

Following the conceptual framework of the life-course perspective (Elder et al., 2003) makes it possible to understand variations in spatial exposure and influences of local and regional contexts. First, contextual characteristics are not equally important over the life course. Rather, context effects can be expected to have life-course related profiles. Drawing on social ecological ideas about individual development (Bronfenbrenner, 1979), it can be assumed that there is an expansion in the individual space of action from early childhood to adulthood. This reflects the fact that close personal relationships are supplemented increasingly with selective

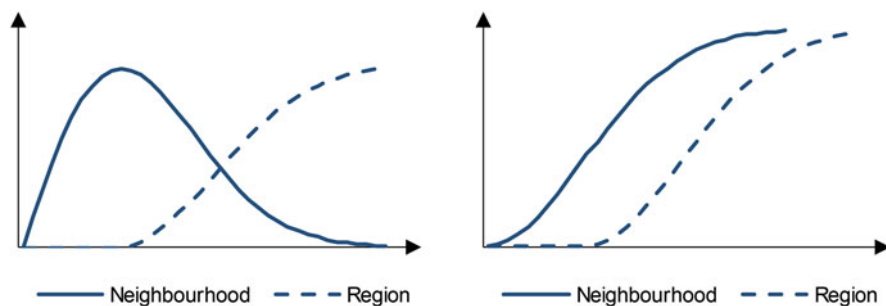


Fig. 11.5 Ideal-typical developments along the life course: spatial context effects (left) and cumulative spatial context effects (right) at different scales. (Smaller (proximate) contexts: neighbourhoods; larger (distal) contexts: regions. Source: Authors' own illustration)

participation in institutional, organizational, and market-based forms of social integration. Hence, when comparing socio-spatial context influences along the educational life course, we can expect a shift in relative relevance from proximate contexts of family and neighbourhood to larger-scale regional contexts that provide relevant opportunities for education, training, and employment (see Fig. 11.5, left). Second, socio-spatial context conditions require certain durations to become salient, so that exposure to specific context conditions can be expected to have cumulative effects along the educational career. Vice versa, particular contextual conditions can become effective only after a certain time of exposure (see Fig. 11.5, right).

So far, most studies have been very limited regarding the length of the observation window. Due to a lack of panel or life-course (residential) data, it has rarely been possible to follow individuals through their entire educational career (South et al., 2016). In contrast, many theoretical arguments call for a longitudinal (life-course) perspective to appropriately analyse spatial contextual effects (cf. Wodtke et al., 2011). It is reasonable to assume that socio-spatial effects—especially when they refer to the developmental aspect of aspirations and competencies—do not materialize immediately, but rather develop continuously in accordance with the relevant exposure of individuals to the context conditions. Furthermore, individuals are exposed to different contexts at different stages in their educational career (Sharkey & Faber, 2014). A life-course perspective on contextual effects is relevant for adequately studying combined consequences (Browning et al., 2016). Research that applies such a life-course perspective is scarce; some studies could show that children are more affected by neighbourhood externalities than adults (Hedman, 2011) because they are in a stage of the life course during which individual attitudes are formed. Crowder & South (2003) found that negative effects of neighbourhood distress on school dropout are stronger for younger than for older adolescents. Positive effects of conditions in advantaged neighbourhoods on high-school graduation were stronger when young people were exposed to the local context over longer periods of time. In turn, it can be argued that residential mobility during childhood can cause some individuals to not experience local contextual effects at all

(Jackson & Mare, 2007). However, so far, there has been only little empirical evidence for these assumptions, particularly with regard to intra-individual developments along the educational life course.

11.3.2 Simultaneous Impact of Multiple Contexts

Individuals live simultaneously in multiple contexts (Cook, 2003; Hillmert, 2019). These contexts are not necessarily, but often, of a spatial nature. For example, an individual is, at the same time, a resident of a neighbourhood, a city, and a region. There are a number of implications of the concept of multiple contexts: first, we know from previous research that neighbourhood conditions as well as regional characteristics impact on processes of educational attainment. However, the underlying theoretical mechanisms of the neighbourhood and the regional context can be assumed to be rather different (see also Table 11.1). A combination of different levels of aggregation makes it possible to observe combined effects of different mechanisms. These effects can be additive; or they may reinforce, compensate, or moderate effects of other socio-spatial contexts. Second, single relevant theoretical mechanisms may be located in complex contexts. In this respect, the interplay between the neighbourhood and the school context has received increased attention in research (Owens, 2010). For example, it has been shown that neighbourhood influences are mediated through the school and school-class context because both tend to overlap (Brännström, 2008; Kauppinen, 2008; Wicht & Ludwig-Mayerhofer, 2014). This suggests considering the influences of specific contexts on educational processes not separately, but simultaneously. Apart from the combination of school and neighbourhood contexts, however, there has been almost no research at all that connects several contextual units (e.g., regions, cities, and neighbourhoods) simultaneously with regard to educational aspirations, competencies, or transition chances. Both Weßling & Meng (2020) and Hedberg & Tammaru (2013) have found that neighbourhood effects are of only little relevance for transitions to employment once the socio-economic conditions of the city or the region have been included in the analytical model. However, there has been almost no research on the relation between other local and regional contexts such as the region, the neighbourhood, and the school. In particular, more emphasis should be given to the relevance of the school context as a mediator of local and regional contextual effects.

11.3.3 Inter-group Differences in Socio-spatial Contextual Effects

A third line of promising future research focuses on inter-group differences in the impact of relevant contextual settings. There is evidence that characteristics of the local and regional contexts are not equally relevant for individuals who have

different characteristics. However, little is known about why impacts differ for different social groups. Heterogeneity in the impact of socio-spatial contexts can be analysed in terms of social origin, ethnic origin, and gender, because these are among the most prominent factors influencing educational attainment. Moreover, analyses for different cohorts make it possible to assess the stability of socio-spatial context effects over time. It is well-studied that social groups are unequal regarding their educational aspirations, competencies, and transition chances. For example, immigrants are known to have relatively high aspirations, often explained by the 'immigrant-optimism thesis' (Kao & Tienda, 1998), while, at the same time, they have lower chances of succeeding in the educational system due to human capital (e.g., language skills) and information deficits (Erikson & Jonsson, 1996). Moreover, girls are known to perform better in school and to be more likely to hold advanced degrees. At the same time, they have lower aspirations or less confidence in their abilities. This is usually explained by gender roles (e.g., DiPrete & Buchmann, 2013). We expect these group-specific patterns to be mediated and moderated by socio-spatial contexts. Socially disadvantaged groups should benefit disproportionately from a favourable local or regional environment, because social interaction with individuals in the local or regional context can provide educationally relevant information that could otherwise not be provided in the familial environment. Socially disadvantaged groups are also more likely to be bound to their local environment due to economic moving costs or familial obligations. Hence, additional educational and occupational opportunities in the local or regional context should increase their educational chances in particular. Finally, social interaction in the local or regional context is more vital in a context with a high share of individuals with similar socio-structural characteristics (e.g., persons from the same ethnic group), so that the influence of socio-spatial contextual characteristics is supposed to be stronger in such a situation.

Disparities between social groups in terms of aspirations, competence development, or transition chances are among the most widely studied relations in research on stratification and inequality, but empirical studies that relate these differences to heterogeneous influences in socio-spatial contexts have been very limited, and the few existing studies have revealed rather ambiguous findings. Some studies have found that favourable regional or neighbourhood conditions are particularly relevant for disadvantaged groups (regarding, e.g., low socio-economic status of the family, see Helbig, 2010; Weßling & Bechler, 2019), whereas other studies have found positive interaction effects between local contexts and social origin only for students from advantageous familial backgrounds (Andersson & Malmberg, 2014); and yet other studies have found that a poor regional environment has a negative impact only on students from a low social origin (Meschi et al., 2011; Sievertsen, 2016). A majority of studies has found contextual effects (both positive and negative) to be stronger for male than for female students (Andersson & Malmberg, 2014), but some studies have failed to find any gender differences in the influence of spatial context characteristics (Frenette, 2006; Hedberg & Tammaru, 2013). For the US context, it has been shown repeatedly that adolescents of Black or Hispanic origin are disproportionately vulnerable to unfavourable local context conditions

(Chetty et al., 2016). However, there has been very little research on the specific relevance of socio-spatial contexts for the educational outcomes of different immigrant groups in the European context. Our own results indicate for the Netherlands that there are immigrant-specific variations in the impact of spatial contexts (Weßling & Meng, 2020). In the German context, young people of immigrant background appear to be less susceptible to positive impacts of favourable conditions in their proximate local environment (Hartung & Hillmert, 2019). We can also expect the scales and spatial profiles of local context effects to be group-specific. Particularly with regard to the various components of the educational attainment process (aspirations, competencies, and transitions), future research can be expected to further disentangle the relation between central dimensions of contexts and educational inequality.

There are also increasing data opportunities. For example, the *Leibniz Institute for Educational Trajectories* (LIfBi) is supplying researchers with a growing number of data waves and cases across the starting cohorts of the NEPS that are sufficient to observe numerous transitions in the educational career and to compare these transitions across cohorts and groups. Beyond that, the availability of several waves per starting cohort enables researchers to keep track of developments in aspirations, performances, and successive transitions along individual educational careers. Therefore, it is becoming increasingly possible to address contextual effects on the processes of educational attainment throughout the course of secondary school and beyond.

References

- Abbott, A. (1997). Of time and space: The contemporary relevance of the Chicago School. *Social Forces*, 75(4), 1149–1182.
- Ainsworth, J. W. (2002). Why does it take a village? The mediation of neighborhood effects on educational achievement. *Social Forces*, 81(1), 117–152.
- Andersson, E. K., & Malmberg, B. (2014). Contextual effects on educational attainment in individualised, scalable neighbourhoods: Differences across gender and social class. *Urban Studies*, 1–17.
- BBSR. (2011). *Indikatoren und Karten zur Raum- und Stadtentwicklung – INKAR Ausgabe 2009* [CD-ROM]. Bundesinstitut für Bau-, Stadt- und Raumforschung.
- BBSR. (2013). *Indikatoren und Karten zur Raum- und Stadtentwicklung – INKAR Ausgabe 2011* [CD-ROM]. Bundesinstitut für Bau-, Stadt- und Raumforschung.
- Becker, R. (2000). Klassenlage und Bildungsentscheidungen: Eine empirische Anwendung der Wert-Erwartungstheorie. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 52(3), 450–474.
- Betts, J. R., & McFarland, L. L. (1995). Safe port in a storm: The impact of labour market conditions on community college enrolment. *Journal of Human Resources*, 30(4), 742–765.
- Blossfeld, H.-P., Rossbach, H.-G., & von Maurice, J. (Eds.) (2011). Education as a lifelong process – The German National Educational Panel Study (NEPS). *Zeitschrift für Erziehungswissenschaft*, Special Issue 14.
- Boudon, R. (1974). *Education, opportunity, and social inequality: Changing prospects in Western society*. Wiley.

- Brännström, L. (2008). Making their mark: The effects of neighbourhood and upper secondary school on educational achievement. *European Sociological Review*, 24(4), 463–478.
- Breen, R., & Goldthorpe, J. H. (1997). Explaining educational differentials: Towards a formal rational action theory. *Rationality and Society*, 9(3), 275–305.
- Breen, R., & Yaish, M. (2006). Testing the Breen–Goldthorpe model of educational decision making. In S. L. Morgan, D. B. Grusky, & G. S. Fields (Eds.), *Mobility and inequality. Frontiers of research from sociology and economics* (pp. 232–258). Stanford University Press.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by design and nature*. Harvard University Press.
- Brooks-Gunn, J., Duncan, G. J., Klebanov, P. K., & Sealander, N. (1993). Do neighborhoods influence child and adolescent development? *American Journal of Sociology*, 99(2), 353–395.
- Browning, C. R., Cagney, K. A., & Boettner, B. (2016). Neighborhood, place, and the life course. In M. J. Shanahan, J. T. Mortimer, & M. Kirkpatrick Johnson (Eds.), *Handbook of the life course* (pp. 597–620). Springer.
- Chetty, R., Hendren, N., & Katz, L. F. (2016). The effects of exposure to better neighborhoods on children: New evidence from the moving to opportunity experiment. *American Economic Review*, 106(4), 855–902.
- Clark, D. (2011). Do recessions keep students in school? The impact of youth unemployment on enrolment in post-compulsory education in England. *Economica*, 78(311), 523–545.
- Cook, T. D. (2003). The case for studying multiple contexts simultaneously. *Addiction*, 98, 151–155.
- Crane, J. (1991). The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing. *American Journal of Sociology*, 96(5), 1226–1259.
- Crowder, K., & South, S. J. (2003). Neighborhood distress and school dropout: The variable significance of community context. *Social Science Research*, 32(4), 659–698.
- Cullinan, J., Flannery, D., Walsh, S., & McCoy, S. (2013). Distance effects, social class and the decision to participate in higher education in Ireland. *Economic and Social Review*, 44(1), 19–51.
- DiPrete, T. A., & Buchmann, C. (2013). *The rise of women: The growing gender gap in education and what it means for American schools*. Russell Sage Foundation.
- Elder, G. H., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–23). Kluwer Academic.
- Ellen, I. G., & Turner, M. A. (1997). Does neighborhood matter? Assessing recent evidence. *Housing Policy Debate*, 8, 833–866.
- Erikson, R., & Jonsson, J. O. (Eds.). (1996). *Can education be equalized? The Swedish case in comparative perspective*. Westview Press.
- Finger, C. (2016). Institutional constraints and the translation of college aspirations into intentions: Evidence from a factorial survey. *Research in Social Stratification and Mobility*, 46B, 112–128.
- Freese, J. (2009). Preferences and the explanation of social behavior. In P. Hedstrom & P. Bearman (Eds.), *Oxford handbook of analytic sociology* (pp. 94–114). Oxford University Press.
- Frenette, M. (2006). Too far to go on? Distance to school and university participation. *Education Economics*, 14(1), 31–58.
- Friedrichs, J., & Nonnenmacher, A. (2014). Die Analyse sozialer Kontexte. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 66(Suppl), 1–16.
- Galster, G. C. (2012). The mechanism(s) of neighborhood effects: Theory, evidence, and policy implications. In M. van Ham, D. Manley, N. Bailey, L. Simpson, & D. Maclennan (Eds.), *Neighbourhood effects research: New perspectives* (pp. 23–56). Springer.
- Galster, G. C., Santiago, A., Lucero, J., & Cutsinger, J. (2016). Adolescent neighborhood context and young adult economic outcomes for low-income African Americans and Latinos. *Journal of Economic Geography*, 16(2), 471–503.
- Garner, C. L., & Raudenbush, S. W. (1991). Neighborhood effects on educational attainment: A multilevel analysis. *Sociology of Education*, 64(4), 251–262.

- Hartung, A., & Hillmert, S. (2019). Assessing the spatial scale of context effects: The example of neighbourhoods' educational composition and its relevance for individual aspirations. *Social Science Research*, 83. <https://doi.org/10.1016/j.ssresearch.2019.05.001>
- Hartung, A., Weßling, K., & Hillmert, S. (2019). *Educational and occupational aspirations at the end of secondary school: The importance of regional labour-market conditions* (GSBE Research Memoranda No. 019). Research Centre for Education and the Labour Market, Maastricht University.
- Hartung, A., Weßling, K., & Hillmert, S. (2022). Interplay between family background and labour-market conditions in shaping students' occupational status expectations. *Journal of Education and Work*, 35(4), 405–421. <https://doi.org/10.1080/13639080.2022.2073338>
- Hedberg, C., & Tammaru, T. (2013). "Neighbourhood effects" and "city effects": The entry of newly arrived immigrants into the labour market. *Urban Studies*, 50(6), 1165–1182.
- Hedman, L. (2011). The impact of residential mobility on measurements of neighbourhood effects. *Housing Studies*, 26(04), 501–519.
- Helbig, M. (2010). Neighborhood does matter! Soziostrukturelle Nachbarschaftscharakteristika und Bildungserfolg. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 62(4), 655–679.
- Hillmert, S. (2018). Spatial context effects at different scales: A formal model for egocentric contexts in two- and three-dimensional space. *SocArXiv*. <https://doi.org/10.31235/osf.io/d4mu7>
- Hillmert, S. (2019). Multiple social contexts of education: Systematic commonalities, differences and interrelations. In R. Becker (Ed.), *Research handbook on the sociology of education* (pp. 69–87). Edward Elgar.
- Hillmert, S., & Jacob, M. (2003). Social inequality in higher education: Is vocational training a pathway leading to or away from university? *European Sociological Review*, 19(3), 319–334.
- Hillmert, S., Hartung, A., & Weßling, K. (2017a). A decomposition of local labour-market conditions and their relevance for inequalities in transitions to vocational training. *European Sociological Review*, 33(4), 534–550.
- Hillmert, S., Hartung, A., & Weßling, K. (2017b). Dealing with space and place in standard survey data. *Survey Research Methods*, 11(3), 267–287.
- Hodkinson, P., & Sparkes, A. C. (1997). Careerism: A sociological theory of career decision making. *British Journal of Sociology of Education*, 18(1), 29–44.
- Hofferth, S. L., Boisjoly, J., & Duncan, G. J. (1998). Parents' extrafamilial resources and children's school attainment. *Sociology of Education*, 71(3), 246–268.
- Jackson, M. I., & Mare, R. D. (2007). Cross-sectional and longitudinal measurements of neighbourhood experience and their effects on children. *Social Science Research*, 36(2), 590–610.
- Jencks, C., & Mayer, S. E. (1990). The social consequences of growing up in a poor neighborhood. In L. E. Lynn & M. G. H. McGeary (Eds.), *Inner-city poverty in the United States* (pp. 111–186). National Academy Press.
- Kao, G., & Tienda, M. (1998). Educational aspirations of minority youth. *American Journal of Education*, 106(3), 349–384.
- Kauppinen, T. M. (2008). Schools as mediators of neighbourhood effects on choice between vocational and academic tracks of secondary education in Helsinki. *European Sociological Review*, 24(3), 379–391.
- Kwan, M.-P. (2012). The uncertain geographic context problem. *Annals of the Association of American Geographers*, 102(5), 958–968.
- Lauer, C. (2002). Enrolments in higher education: Do economic incentives matter? *Education + Training*, 44(4/5), 179–185.
- Logan, J. R. (2012). Making a place for space: Spatial thinking in social science. *Annual Review of Sociology*, 38, 507–524.
- Meschi, E., Swaffield, J., & Vignoles, A. (2011). The relative importance of local labour market conditions and pupil attainment on post-compulsory schooling decisions. *International Journal of Manpower*, 40(8), 1482–1509. <https://doi.org/10.1108/IJM-11-2017-0303>

- Micklewright, J., Pearson, M., & Smith, S. (1990). Unemployment and early school leaving. *The Economic Journal*, 100, 163–169.
- Minello, A., & Barban, N. (2012). The educational expectations of children of immigrants in Italy. *The Annals of the American Academy of Political and Social Science*, 643(1), 78–103.
- Musterd, S. (2019). Neighborhood effects in Europe. In A. M. Orum (Ed.), *The Wiley Blackwell encyclopedia of urban and regional studies*. Wiley Blackwell. <https://doi.org/10.1002/9781118568446.eurs0217>
- Nieuwenhuis, J., & Hooimeijer, P. (2016). The association between neighbourhoods and educational achievement, a systematic review and meta-analysis. *Journal of Housing and the Built Environment*, 31(2), 321–347.
- Owens, A. (2010). Neighborhoods and schools as competing and reinforcing contexts for educational attainment. *Sociology of Education*, 83(4), 287–311.
- Park, R. E., Burgess, E. W., & MacKenzie, R. D. (1925). *The city*. University of Chicago Press.
- Raffe, D., & Willms, D. J. (1989). Schooling the discouraged worker: Local-labour-market effects on educational participation. *Sociology*, 23(4), 559–581.
- Reimer, D. (2013). Kontexteffekte und soziale Ungleichheit beim Übergang von der Schule zur Hochschule. In R. Becker & A. Schulze (Eds.), *Bildungskontexte. Strukturelle Voraussetzungen und Ursachen ungleicher Bildungschancen* (pp. 405–429). Springer.
- Rendón, M. G. (2014). Drop out and “disconnected” young adults: Examining the impact of neighborhood and school contexts. *The Urban Review*, 46(2), 169–196.
- Sampson, R. J. (2019). Neighbourhood effects and beyond: Explaining the paradoxes of inequality in the changing American metropolis. *Urban Studies*, 56(1), 3–32.
- Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing “neighborhood effects”: Social processes and new directions in research. *Annual Review of Sociology*, 28(1), 443–478.
- Sharkey, P., & Faber, J. W. (2014). Where, when, why, and for whom do residential contexts matter? Moving away from the dichotomous understanding of neighborhood effects. *Annual Review of Sociology*, 40, 559–579.
- Sievertsen, H. H. (2016). Local unemployment and the timing of post-secondary schooling. *Economics of Education Review*, 50, 17–28.
- South, S. J., Huang, Y., Spring, A., & Crowder, K. (2016). Neighborhood attainment over the adult life course. *American Sociological Review*, 81(6), 1276–1304.
- Spieß, C. K., & Wrohlich, K. (2010). Does distance determine who attends a university in Germany? *Economics of Education Review*, 29(3), 470–479.
- Taylor, M., & Rampino, T. (2014). Educational aspirations and attitudes over the business cycle. *Economica*, 81(324), 649–673.
- Tinto, V. (1973). College proximity and rates of college attendance. *American Educational Research Journal*, 10(4), 277–293.
- Turley, R. N. L. (2009). College proximity: Mapping access to opportunity. *Sociology of Education*, 82(2), 126–146.
- Vaskovics, L. A. (1982). Sozialökologische Einflussfaktoren familialer Sozialisation. In L. A. Vaskovics (Ed.), *Umweltbedingungen familialer Sozialisation: Beiträge zur sozialökologischen Sozialisationsforschung* (pp. 1–25). Enke.
- Weßling, K. (2016). *The influence of socio-spatial contexts on transitions from school to vocational and academic training in Germany*. Doctoral dissertation, Universität Tübingen. <https://doi.org/10.15496/publikation-15222>
- Weßling, K., & Bechler, N. (2019). Where do regional influences matter? The impact of socio-spatial indicators on transitions from secondary school to university. *Review of Regional Research*, 39(2), 163–188.
- Weßling, K., & Meng, C. (2020). The mediating and moderating role of neighbourhoods and regions on second generation immigrant youths’ school-to-work transitions in the Netherlands. *Population, Space and Place*. <https://doi.org/10.1002/psp.2384>

- Weßling, K., & Wicht, A. (2015). *Möglichkeiten der Nutzung regionaler Daten im Nationalen Bildungspanel (NEPS) – Ein Überblick* (NEPS Working Paper No. 54). https://www.neps-data.de/Portals/0/Working%20Papers/WP_LIV.pdf
- Weßling, K., Hartung, A., & Hillmert, S. (2015). Spatial structure counts: The relevance of regional labour-market conditions for educational transitions to vocational training. *Empirical Research in Vocational Education and Training*, 7(12). <https://doi.org/10.1186/s40461-015-0024-6>
- Wicht, A., & Ludwig-Mayerhofer, W. (2014). The impact of neighborhoods and schools on young people's occupational aspirations. *Journal of Vocational Behavior*, 85(3), 298–308.
- Wodtke, G. T., Harding, D. J., & Elwert, F. (2011). Neighborhood effects in temporal perspective. *American Sociological Review*, 76(5), 713–736.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

