

Mapping opportunity in time and space: An inductive approach

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Abstract: Several authors delineate “geographies of opportunity,” which are assumed to influence individual life courses. In transport geography and related subjects, “opportunity” is a term that is frequently used to circumscribe dynamics of spatial and social mobility. However, previous approaches to opportunity usually apply deductive reasoning in such a way that opportunity represents a local feature whose functional utility impacts individual lives. Such approaches are inadequate for the analysis of individual life courses, as neither the emergence of opportunity nor its meaning for individual motives is sufficiently incorporated. Such neglect may lead to insufficient or even incorrect conclusions about the relation of space, mobility and the life course, because a concept for systematic mappings of opportunities in both individual life courses and space has not yet been developed. This paper aims to reconceptualize opportunity as a personally and socially experienced interrelation between agents and their socio-spatial environment with beneficial outcomes for the respective life courses. With regard to mapping opportunity, pockets of local order and occasions are presented as mappable spatiotemporal entities. Occasions are sections in timespace, which are unique and meaningful to the development of the individual life course. Finally, we discuss implications for empirical application, future research, planning and policy.

Keywords: Activity spaces, kairos, life course, opportunity, occasion, pockets of local order, time-geography

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1 Introduction

During recent decades, some cities have experienced a high influx and spatial concentration of young adults, often attributed to societal developments like the transition towards the knowledge economy or demographic change (Moos et al., 2019; Simons & Weiden, 2016). Processes of reurbanization have been particularly driven by migration for higher education, while suburbanization is still frequently ascribed to spatial relocations of families (Frank, 2016; Walker, 2017; Zorlu & Kooiman, 2019). These processes are connected to housing preferences, which are relevant for urban development and planning policies. Often the aggregate processes of urban in- and out-migration and changes in residential preferences coincide with individual transitions such as the transition from youth to adulthood or family formation – life phases which are known to be highly formative in the life course (Arnett, 2000;

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Hochstenbach & Boterman, 2018; Salmela-Aro et al., 2007). As a consequence, coincidences of spatial and social (im)mobility as well as life course transitions have led several authors to implicitly or explicitly proclaim certain urban spaces as “geographies of opportunity” (e.g., Fielding & Halford, 1993; Galster & Killen, 1995; Rosenbaum et al., 2002; Simons & Weiden, 2016). Indeed, it is tempting to hypothesize a positive relation between prosperous urban infrastructure, urban cultures and individual professional advancement as well as personal development: the clustering of higher-education facilities, suitable job markets, numerous amenities and rather young demographics promise to offer many opportunities for “individual welfare” (Huinink & Kley, 2008, own translation; see e.g., Edlund, 2005; Nowok et al., 2013; Waibel, 2019).

However, it is inadequate to deduce correlations between life course transitions, spatial and social (im)mobility exclusively through macro-level approaches, like analyzing aggregate data on residential mobility and migration (Bailey, 2009). Such approaches are in danger of misjudging or even missing individual needs, which in turn might mislead assessments of demands and policies for urban development. In order to more specifically characterize geographies of opportunity, it is instead necessary to promote *mappings of opportunity* that capture meaningful localities in life courses through understanding the *experience* of opportunity¹ at the micro-level (cf. Houston et al., 2005). Everyday mobility as a derived demand always refers to tangible locations which constitute the activity space (Horton & Reynolds, 1971). Therefore, the activity space appears to be a promising starting point for the endeavor of mapping opportunity. Time-geography and transportation research frequently utilize the concept of the activity space as well as the term “opportunity” (Van Acker et al., 2010). For example, Geurs and Van Wee (2004) emphasize the notion of opportunities as locational supplies which are accessed through mobility, while other authors even utilize the term “opportunity” as an expression for location (e.g., Kwan, 1999; Merlin, 2017, p. 318). However, time-geography and transportation research lack conceptual substance, as “throughout the literature the distinction between facilities and opportunities often remains unclear” (Neutens et al., 2007, p. 1068). The existing conception of opportunity in time-geography and transportation research is thus insufficient for dealing with the complex interrelations between life course transitions, spatial and social (im)mobility.

While the main focus lies on the spatial perspective, life-course-oriented mappings of opportunity also require the incorporation of temporal and social perspectives. From a sociological and psychological viewpoint, the individual life is a developmental process, emerging in the context of social and spatial environments (Bronfenbrenner, 1979; Elder et al., 2003). During this development, the individual gains access to environmental resources, and crucial situations to use these resources eventually appear as opportunities to support the individual in unfolding her potential. However, the individual is not only passively exposed to certain circumstances but also actively constructs her life course (Elder et al., 2003; Findlay et al., 2015). Thus, opportunities *emerge* over the course of time, become recognizable at crucial moments and beneficially shape the further run of events in life (Bandura, 1982; Thomson et al., 2002). This developmental perspective may also be taken up by research on planning, e.g., for investigating “human use of the built environment as a dynamic process” (Cullen, 1978, p. 31). With regard to land-use planning, mappings of opportunity could identify places with significant impact on individual development and therefore may help to explore underlying mechanisms in the interrelation between people and their respective environments. In the context of mobility and transport, such mappings may be used to better understand how mobility practices shape the attainment of opportunities for encounters. These encounters might become meaningful to the individuals’ positioning in future

¹ “Experience of opportunity” is used here in the sense of “having the opportunity to do something.”

“structures of encounterability” (Axhausen, 2007, p. 26) and therefore yield further opportunities during development in the life course. In short, proper mappings of opportunity are capable of identifying spaces and places of opportunity, while simultaneously relating to individual life-course developments in social mobility and transitions.

Therefore, the aim of the present paper is threefold. Firstly, previous conceptions of opportunity in and beyond the fields of time-geography and transportation are presented in greater detail to identify the phenomenon to be mapped. We argue that opportunities are mainly conceived as generalizable, circumstantial or functional resources and that the exclusive application of this approach is of limited use to mapping opportunity in time and space (Section 2). Secondly, in order to produce adequate mappings of opportunity, we argue that it is important to incorporate the individual perspective in the emergence of opportunity by paying particular attention to individual agency in the context of social practice (Section 3). Thirdly, we present an attempt to reconceptualize opportunity as a personally and socially experienced interrelation between agents and their socio-spatial environment with beneficial outcomes for the respective life courses (Section 4). We proceed to discuss “pockets of local order” (Lenntorp, 2004) and “occasions” as two concepts to represent opportunity in time and space. The perspective on opportunity proposed here is aimed rather at the joint investigation of life course dynamics in spatial and social mobility than at concerns over social (in)equality, accessibility or activity choice. In Section 5 we finally conclude by discussing conceptual and methodological implications for empirical application, future research, planning and policy.

2 Previous approaches to opportunity

As argued in the previous section, the term “opportunity” appears to be central for understanding the nexus of spatial and social mobility. In our literature research we therefore aimed to identify explicit conceptualizations in theory or operational definitions in empirical applications. Following the introduction, we initially focused on the areas of time-geography, activity spaces and transportation. Using Google Scholar, we identified often-cited publications (Geurs & Van Wee, 2004; Handy & Niemeier, 1997; Kwan, 1999) and literature that explicitly referred to conceptual discussions on opportunity with regard to transport, accessibility and urban form (Van Acker et al., 2010). In the subsequent backward-snowballing process, we detected seminal publications that introduced “opportunity” in the respective concepts (Chapin 1968, 1974, 1978; Hansen, 1959). Finally, we searched for recent publications that also apply the term “opportunity” in order to trace possible changes in the use of the term. As the spatial notion of opportunity is also discussed in fields beyond the activity-based approach to transportation, we extended our search to urban studies as well as studies on migration and repeated the aforementioned procedure. For the present overview, we summarized approaches to opportunity in four fields, namely research on migration, neighborhood effects, accessibility and activities. As can be seen, the approaches presented differ by thematic fields, rather than by features in their approach to opportunity.

In the course of the research process, we found that there is no generally accepted definition of “opportunity.” Nevertheless, the term's use is widespread and incidental. Therefore, the overview in the next section is exemplary of the indefinite amount of literature using the term “opportunity” but cannot substitute for a systematic review, which would be a challenging endeavor in its own right.

2.1 Tracing some conceptual roots

“Opportunities” and their locations are often of explicit or implicit interest in research on migration (e.g., Kley, 2009; Kley & Mulder, 2010; Stouffer, 1940; Wagner, 1989). An illustrative example of this

perspective, which is mainly concerned with opportunities within spatially situated job and housing markets, can be found in studies on “escalator regions.” In Fielding’s (1992, pp. 3–4) research, opportunities are put in the context of “personal advancement” and “upward social mobility”: after migrating to a prosperous region, individuals use the locational resources to climb up the “social escalator” at comparatively high speeds and leave if “economic security and influence” have been achieved. On this basis, Fielding (1992) has coined the term “escalator region” as a “usefully provocative” metaphor. While some authors directly refer to this term (see Champion & Gordon, 2021), the notion of particular regions and cities as promoters for social mobility is also implicitly prevalent in other studies on migration.

Another strand of research is concerned with the unequal distribution of spatial opportunity and neighborhood effects within the urban context. This literature on a “geography of opportunity” pays particular attention to challenges such as social inequality, unemployment or ethnic segregation (Galster & Killen, 1995; Lens, 2017). Galster and Killen (1995, pp. 9–11) introduce process and prospect dimensions to the conception of opportunity: processes relate to the causal influences of “opportunity structures” (such as social networks and markets) on the “social advancement” of the individual. An individual component to opportunity is introduced by the prospect dimension, which refers to the subjectively expected outcomes of choices within a perceived “opportunity set.” Of these two dimensions, Galster and Killen pay special attention to the process dimension. For the production of “equal opportunity,” which basically refers to socially sound conditions of action, it is assumed that both opportunity structure and accessibility have to be equally distributed. Similar to Fielding’s concept of “escalator regions,” it is assumed here that opportunities for upward social mobility can be achieved through residential relocation in order to improve access to beneficial resources and networks. Despite ongoing discussion and development (e.g., Finio et al., 2020; Knaap, 2017; Lens, 2017), this particular academic discourse on geographies of opportunity lacks a precise definition of what “opportunity” actually means (Knaap, 2017).

In transportation research, where “access to opportunity” is of frequent interest (e.g., Kwan, 1999; Levinson & Wu, 2020; Merlin, 2017; Tao et al., 2020), a similar conception of “opportunity” prevails. In his seminal essay on accessibility and land use, Hansen (1959, p. 73, original emphasis) is interested in “the *potential* of opportunities for interaction” or “*the intensity of the possibility for interaction*” thus identifying opportunities as possibilities. As Hansen (1959, p. 73) refers to “commercial, industrial, and residential locations” only, “opportunity” mainly expresses functional utility in planners’ terms. This is also reflected in newer transport literature (for prominent examples see Geurs & Van Wee, 2004; Kwan, 1998, 1999) and results in the intermingling of “opportunities” with other terms such as “facilities” (Neutens et al., 2007) or “destination” (Handy & Niemeier, 1997; Lättman et al., 2016). Neutens et al. (2007, p. 1068) understand opportunities as spatiotemporally bound entities which may take shape in facilities, implicitly acknowledging opportunities that are not necessarily bound to facilities. Nevertheless, the authors still forego an elaborate conceptualization of opportunity. The reference to certain functions might have also contributed to establishing the logic of supply and demand in research on transport and accessibility. For example, in Breheny’s (1978, p. 463, emphasis added) view “[the] urban area is seen as a *resource or opportunity pool* in which resources are unevenly distributed and to which people are likely to have differing degree of access.” Geurs and Van Wee (2004) assume the ready supply of and demand for opportunities to be a basic feature in their framework of accessibility.

The last conception of opportunity presented here has developed over an expanded period and was influential in time-geography and transport studies. Chapin (1968, 1974, 1978) uses opportunities to more generally explain activity choice and behavior in the urban context. Chapin’s (1968, p. 13, emphasis added) line of thought is guided by “the notion that man *possesses a sense of destiny* and experiences needs in the *pursuit* of this destiny – mainly *needs for security, achievement, and status*, but also a *residual*

set of felt needs, such as the sheer enjoyment of an activity for its own sake.” This selection originates in Maslow’s hierarchy of needs (Chapin, 1974, p. 30, 1978) and serves as the basis for the analysis of aggregates of individuals. The fulfillment of such “destined” needs requires interaction with the (social) environment where opportunities for respective goal attainment (that is, access to certain institutions and upward social mobility) are located and supplied (Chapin, 1968, p. 14, 1974, p. 31). These opportunities are conceived of as situations that are contingent but anticipated to be beneficial for the satisfaction of the aforementioned needs. Activity is undertaken if an opportunity is available and suffices the qualitative requirements in the wake of certain needs (Chapin, 1974, pp. 31-34). The “general systems complex” (Chapin, 1974, p. 34) of institutions and organizations together with “external sources of change” (Chapin, 1974, p. 212) contributes to the generation of opportunities. Such opportunities may appear as “institutions, social organizations[,] facilities and/or services” (Chapin, 1974, p. 34). Chapin (1968, p. 16) furthermore uses his framework on various scales, ranging from daily mobility to migration in the life course. In the context of migration, two special sets of opportunities are distinguished. While “accessibility opportunities” refer to the spatial, temporal and social proximity of individuals, “livability opportunities” basically refer to the contemporary notion of urban amenities. Notably, in the later version of his framework, Chapin (1978) discusses the motivational structure of human activity in the context of (post-)industrialization and the respective sociocultural circumstances more explicitly. This choice framework combines both individual and structural influences on activity choice through four sets of factors: propensities, appropriate situations, opportunities and urban environmental contexts. Here “opportunity [...] refers to the availability of a physical place or facility suited to the activity and the congeniality of surroundings for engaging in the activity” (Chapin, 1978, p. 16). Opportunity is thus used to explain activity choice, not as an experienced outcome of activity.

2.2 Contesting previous approaches

In the approaches presented in Section 2.1, a widely acknowledged concept dedicated to the nature of opportunity and applicable to spatial analysis seems to be missing so far. While this is problematic in its own terms, it is for now sufficient to assume that access to opportunity is viewed as a crucial factor for generating individual welfare. “Opportunity” is mostly understood as the availability of resources or functions in spatial structure, which assumes that the “supply” of opportunities is perceptible and foreseeable to the individual, the planner or the researcher. Thus, both spatial and social mobility at the individual level are deduced from opportunities that are conceptually understood as preconditions of activity choice, mobility and activity. In this section, we discuss how and why this notion is problematic for life-course-oriented mappings of opportunity.

In the assessment of activity choice, structural determinants often encompass access to jobs, shopping facilities, recreational facilities and proximity to beneficial “assets and amenities” (Lens, 2017, p. 17), as well as social structure. In analysis, these phenomena are easily manageable for gaining generalized knowledge about aggregates of individuals. While some authors even consider social factors beyond infrastructure, they still adhere to a behaviorist conception of human action (see e.g., Blasius et al., 2008). The consequential generalization of opportunities comes at the expense of implicitly generalizing motivations for mobility against the background of the policy emphases mentioned above (Scheiner, 1998). For example, analyzed motives include “safety, affection, esteem and self-fulfilment” (Chapin 1978, p. 16), “social advancement” (Galster & Killen, 1995), “personal advancement” and “upward social mobility” (Fielding, 1992) or the notion of opportunity as an entirely unspecific “possibility for interaction” (Hansen, 1959; Neutens et al., 2013). In light of such generalizations, the link between place, mobility and progress remains unclear at the conceptual level. Instead, progress is often vaguely regarded in terms of socioeconomic outcomes (Champion & Gordon, 2021; Fielding, 1992; Galster &

Killen, 1995; Knaap, 2017), which ignores individual motives of activity choice and mobility in three ways. Firstly, activity choice and mobility are stimulated by a large variety of motives, which entail opportunities for outcomes far beyond the analytical scope of socioeconomic indicators (Cass et al., 2005; Mokhtarian et al., 2015). Evaluations of progress, success and failure are therefore a highly subjective matter, despite the indisputable influences of social values and norms. Secondly, the generalization of opportunity fails to consider the idiosyncrasy of life courses and the manifold perceptions of opportunities that depend on individual motives (Lung-Amam et al., 2018²; Sugden, 2003). Finally, especially in research on accessibility, “opportunity” usually refers to generalized options instead of actual choices (see Section 2.1), obscuring knowledge about the significance of choice options to the individual (cf. Farrington & Farrington, 2005). Consequently, a deductive approach to opportunity yields mappings that depict a generic set of locations reflecting an otherwise limited thematic scope. Mappings of opportunity which are sensitive to the manifold trajectories of life courses must, however, build on actual motives and capabilities that guide individual activity selection in order to more precisely record occurrences of opportunity. This stance furthermore adds to previous conceptions of space as a constraining factor for individual action by emphasizing individual proficiency.

In addition, the experience of opportunity is dependent on the interrelation between individuals and their environment in interactions that result from activity choice. Previous conceptions of opportunity implicitly assume a deterministic relation where opportunity is an environmental feature with functional effects on the individual. This tendency is especially visible in understandings of opportunities as supply (Geurs & Van Wee, 2004). In contrast, Gordon and Vickerman (1982) acknowledge that demand might be requisite for the supply of opportunities. While this line of thought has not been extended, it hints at the fact that the experience of opportunity not only depends on local function, but also on the various demands that are made in a particular situation and specific constellations of agents. Restaurants are employment opportunities to their staff, but also opportunities for socializing for the guests. Public transport is not only an opportunity for mobility but also an opportunity for social encounter (Wilson, 2011). Schools and universities are educational opportunities, which are also considered as opportunities for new acquaintanceships (Håring et al., 2014; Mollenhorst et al., 2008).

As a manifold of individual demands and preferences coincide in a particular section of timespace, the emergence of opportunity also depends on the formal and informal fit of copresent agents. However, copresence does not necessarily entail interaction and even interaction by itself does not necessarily imply opportunity. For example, a match of employer requirements and the skills of a potential employee, imagined to be a job opportunity at first contact, might nevertheless be outweighed by a lack of sympathy in the actual job interview. Informal qualities of interaction (e.g., soft skills, social networks, sympathy, intentions, preferences) therefore can modify the impact of antecedent structuring influences (such as individual motives, activity selection, social structure or local function) and leave open the possibility of chance and fortuity.

A “cartography of opportunity” (Knaap, 2017) exclusively focusing on *ex ante defined* structural phenomena only refers to locations which entail predictable outcomes for individual life courses and promise to affect individuals in a particular way. However, as people are mobile in order to meet their needs and goals, an investigation of opportunity also has to be sensitive to the peculiarities in individual motives for mobility, activity selection and the actual experience of opportunity. In this way, insights into the relationship between place, mobility and *meaning* can be advanced. We thus propose that deductive approaches to opportunities have to be complemented by an inductive conception of opportunity which focuses *ex post* on the *experience* of opportunity at particular localities and times. In the

² Lung-Amam et al. (2018) even raised the question about “opportunity for whom” and conducted a study which aimed to capture residents’ definitions of opportunity. However, the research design placed the survey after a discussion on neighborhood revitalization (Lung-Amam et al., 2018, p. 641), generating answers limited to the scope of basic urban services, environmental qualities and social structure.

following section we therefore turn towards discussing the role of individual agency in the emergence of opportunity.

3 Acknowledging individual agency

As the life course is conceived of “as an age-graded sequence of socially defined roles and events that are enacted over historical time and place” (Elder et al., 2003, p. 15), the mappings of opportunity should also be applicable in the context of life course transitions. In the life course theory presented by Elder et al. (2003), opportunities and constraints comprise important circumstantial factors in the trajectories of individual life courses, with opportunities being those circumstances that facilitate desired changes in life. This understanding resonates with the time-geographical concept of “projects” and action-theoretical approaches (Dijst, 1999; Hägerstrand, 1970; Scheiner, 1998).

However, Elder et al. (2003) also stress the importance of individual agency for the construction of life courses. Accessing opportunities in space during the course of time means being (or having been) in the right place at the right time to encounter agents that are helpful in the pursuit of one’s own motives (Chapin, 1978; Peters et al., 2010). Building on this stance, we argue that opportunities which are influential to the life course are not only experienced but are also in part produced by individuals. Therefore, we consider individual agency as being purposeful and active in the context of various constraints rather than being just responsive to external stimuli. Solely emphasizing plans and intentions as in time-geographic projects, however, risks making deterministic and simplifying assumptions about the consciousness of intention in all human action and neglecting those opportunities that emerge in a rather unplanned manner. As opportunities might develop some unexpected meaning in the life course, they also should be viewed in contexts of *dynamic* agent-environment relations that evade logics of rationality, conditionality and predictability. To understand the role of individual agency in the emergence of opportunities, we start by introducing the concepts of *kairos* and *fortuity* before moving on to aspects of agency and social practice.

3.1 Right place – right time

The ancient Greek term *kairos* is a qualitative conception of time, complementary to *chronos*, the widely known concept of progressing, quantified, objectively measurable time (Smith, 1986). Basically, *kairos* refers to a situation of challenge, to the right timing of action, to the adequacy of measures taken and to the unique state of affairs which enable the mastering of a situation of challenge (Kinneavy, 1986; Smith, 1969, 1986). In other words, *kairos* refers “to the special position an event or action occupies in a series, to a season when something appropriately happens that cannot happen at ‘any’ time, but only at ‘that time’, to a time that marks an opportunity which may not recur” (Smith, 1969, p. 1). It is especially the notion of proper timing and adequate action which underline the importance of individual agency in opportunity for achieving purpose. Due to its qualitative and rather (yet not exclusively) subjective character, *kairos* radically differs from *chronos*, as it implies a “genius temporis [sic!]” (Crang, 2005, p. 212) in a particular situation and confers significance to the event (Smith, 1986).

Several approaches implicitly conceptualize “kairotic” situations and their impact on life courses. For example, Giddens’ (2006, p. 33) “fateful moments” basically represent *kairos*, as they “are times when events come together in such a way that an individual stands, as it were, at a crossroads in his existence; or where a person learns of information with fateful consequences.” Fateful moments are defined as such by the individual and are therefore inherently reflexive, as the individual becomes aware of life circumstances that enable or even require the breaking of old and the establishing of new habits

(Giddens, 2006). Thomson et al. (2002, p. 339) argue that during the empirical investigation of personal narratives, it may not only be the interviewee who identifies fateful moments and their significant consequences. The researcher may also casually identify such moments or specifically ask about their existence. However, since fateful moments predominantly focus on individual agency, they tend to overlook those factors that lie beyond individual control in explaining the emergence of opportunities.

Another concept of kairotic moments incorporates the environmental perspective to a greater extent by emphasizing the role of interpersonal encounters in life courses: the “chance encounter” or “fortuitous event”³ is understood as a situation where strangers meet and become potentially meaningful to each other in their respective life courses, normally without having planned to do so (Bandura, 1982, p. 748; Shanahan & Porfeli, 2006). As in the concept of fateful moments, such occurrences comprise fortune as well as misfortune.

The formation of life experiences strongly depends on the individual selection and construction of particular social and material environments in which humans act *and* to which they react (Bandura, 1982, p. 747, 2001, p. 4; Elder et al., 2003, p. 13). Important factors in the individual choice and utilization of environments are, for example, self-efficacy, personality and the propensity to take risks (Bandura, 1998, 2001; Krantz, 1998). Bandura (1998) furthermore hypothesizes that the occurrence of chance encounters can be partially provoked by pursuing an active lifestyle, which increases the likelihood of encounters in general. The proposition of activity effects on the emergence of fortuitous events is backed by Becker’s (1994, p. 192) assumption that on the aggregate level the occurrence of chance encounters increases with a rising amount of “weak ties” (Granovetter, 1973).

Becker (1994) and Krantz (1998) have argued that science systematically overlooks fortuity in its effort to explain the existence of social phenomena, as coincidences obscure systematic patterns of premise and outcome. Both conclude that narrated stories might be sufficient to capture fortuitous encounters. Despite their relative unlikelihood and rarity in individual cases, high absolute numbers of such fortuitous events occur in large populations (Becker, 1994; Shanahan & Porfeli, 2006). The potential of chance encounters for research on spatial mobility has recently been explored by Gladkova and Mazzucato’s (2017) study on the impact of social encounters on migration pathways.

Kairos has also been discussed with regard to space and place. Rämö’s (1999) arguments are rooted in the distinction between *chronos* and *kairos* (see above) as well as the distinction between space (*chora*) and place (*topos*). Rämö (1999, pp. 316-323) distinguishes four concepts. *Chronochora* circumscribes timespace in its most abstract and logical form, while *chronotopos* refers to objectively conceivable events in time at a certain place. Aspects of meaning are incorporated through the concepts of *kairochora* and *kairotopos*. While *kairochora* represents the ability to act appropriately and timely in space, *kairotopos* substantiates this notion at the level of place. Regarding the importance of activity selection, *kairochora* could be understood as the appropriate and timely selection of activities in time as well as physical and virtual space (activity spaces; cf. Bandura, 1982). In contrast, *kairotopos* denotes appropriate and timely action at a particular place within a particular section of time. Sui (2012) also contributes to the incorporation of *kairos* in geographical thought by proposing various forms of time-geography, which serve as a framework for classifying past and directing future work in this field of research.

With regard to conceptualizing opportunity in time and space, shifting the view from *chronochora* to *kairochora* and *kairotopos* illustrates the turn from a deductive delineation of opportunity (see Section 2) towards an inductive perspective on the emergence, experience and meaning of opportunity in time and space (Rämö, 1999). Existing literature has shown that the impact of spatial structure and mobility may be modelled based on theoretical considerations, aggregate data and behavioral assumptions.

³ Also, “coincidence,” “chance event,” and “fortuitous encounter” are commonly used in the respective literature.

However, actual decisions (e.g., destination choice, mode choice, selection of acquaintances) are always embedded into individual biographies and reasoning which take place at specific times and localities. Thus, effects of mobility and land use on individual lives can only be fully understood by studying opportunity as a separate phenomenon in real world scenarios. Before conceptualizing opportunity and applying this conception to time and space in Section 4, it is necessary to further explore the role of agency in the emergence of opportunity with particular regard to social practice.

3.2 Agency, practice and the emergence of opportunity

The actions that are undertaken at a particular place in everyday life (e.g., a facility) are often routine due to their everyday nature. In time-geography, this notion is reflected in the concept of pockets of local order (POLOs), which circumscribe “a specific defined section of time-space [which] is endowed with particular infrastructure and [...] has a more or less formal system of regulation to facilitate the execution of [...] activities” (Lenntorp, 2004, p. 225). The section of timespace comprises the “pocket,” which may be part of a nested hierarchy of pockets (e.g., space: country, province, city, neighborhood, grocery store; and time: season, weekday, daytime; Ellegård 2019a, pp. 45-46). Agents, things, resources and processes are organized in the “order,” whose quality is generally determined by power (e.g., authorities, institutions) and performance (e.g., agents). However, orders can develop without deliberate organization (Hägerstrand, 1985, p. 207) and “might change when new conditions appear, like new projects, new people or new ideas” (Ellegård, 2019b, p. 9). Therefore, “the subjective world’s influence on what is realized in the material, Outer world” (Ellegård, 2019a, p. 152) is acknowledged in the concept of POLOs. Activities carried out in pockets are part of goal-oriented action during time-geographical projects (Ellegård & Vilhelmson, 2004; Hägerstrand, 1970, 1985; Lenntorp, 2004). Thus, the order appears to be mostly conceived as a determining factor for the fulfillment of projects. In the following, we explore the situational relation between individual and environment in greater detail.

Theories of social practice provide fruitful conceptual enhancement as they integrate both individual and aggregate accounts of social life. Social practice comprises individual performances which represent bodily and mental routines (Reckwitz, 2002). In practice theory, timespace represents “a social feature of an individual life, for much of it derives from and depends on social phenomena” (Schatzki, 2009, p. 39): within a particular spatiotemporal context, individuals act with regard to their experienced past and goals for their future (Schatzki, 2009). Individual motives coincide in time and space against the background of a normative “teleological structure” (Schatzki, 2009, p. 38), which represents “a range of prescribed or acceptable ends” (Schatzki, 2014, p. 34). The way in which individual motives are (not) linked in this context renders timespaces “partly common, partly shared and partly idiosyncratic” (Schatzki, 2009, pp. 39-40). For example, the practice of traveling by public transport results in rather *shared* timespaces without a need for close interaction, as the passengers’ goals do not contribute to the function of public transport. The practice of couple dance, on the other hand, requires mutual connection of motives through bodily interaction which results in *common* timespaces, while the *idiosyncrasy* of timespaces results from the uniqueness of individual reasoning, action and experience (Schatzki, 2009, p. 40). However, the line between shared and common timespaces is often blurred. Hubbard (2007, p. 124) delivers an illustrative example of shared practices within “out-of-town leisure parks,” where young people are eager for an “affective ambiance that offers the illusion of social mixing.” These spaces are simultaneously shared and common, as the joy of visiting such facilities is dependent on the presence of other people without the need for interaction. The emergence, progression and outcomes of practice thus depend on the goals, decisions and actions of the individuals involved (Rau & Sattlegger, 2018).

Several authors have emphasized the openness of social practice towards change and the possibility of subversion (Helbrecht & Dirksmeier, 2012; Strüver, 2015). Due to the event-like character of social

practice, “[structure] is [...] temporal and always implies the possibility of breaking down in ‘new events’ which do not conform to the code” (Reckwitz, 2002, p. 256). Butler’s (2004, p. 1) notion of a “practice of improvisation within a scene of constraint” is similarly expressed by Thomson et al. (2002, p. 338) who argue that individuals might deal with ostensibly deterministic circumstances “through a combination of timing, fortune and the deployment of individual skill.” Similarly, Becker (1994) has introduced the term “intercontingency” to describe the mutuality of presence, action and meaning, which is implicitly represented in life course theory as the “principle of linked lives” (Elder et al., 2003).

The theoretical approaches presented above appear promising for understanding opportunity in the life course. We argue that individual choice and agency affect the emergence of opportunity in at least four ways. Firstly, the individual selection of environments is subject to individual decisions which are path dependent and affect the constellation of agents at a given place and time. Secondly, individuals present at a particular place and time are part of the environment for each other, which enables them to *mutually support or constrain* opportunity through their intended and unintended (inter-) actions (Pred, 1984; Sugden, 2010). Thirdly, to a certain degree, supposedly constraining circumstances (e.g., orders, teleological structures) can be *deliberately bypassed or manipulated* through “unusual” or improvised action. Fourthly, in non-routine situations, structures or orders might be non-existent so that the outcomes of these situations entirely depend on the intercontingencies of copresent agents, yielding completely *unexpected and unintended opportunities*. As agency and meaning primarily concern the agent and social relations, we conclude that opportunity itself is foremost a personally and socially experienced phenomenon, which is embedded into time and space. However, from a conceptual viewpoint, opportunity is *not* an exclusive feature of time *or* space. Instead, an inductive conception of opportunity presupposes an understanding of *dynamic locality* where social relations are experienced and enacted and subsequently shape the characteristics and meanings of place (Massey, 1993, p. 148; Pred, 1983, 1984; Scheiner, 1998).

4 Relations between opportunities, time and space

In Section 2 we contested an exclusively deductive conception of opportunity while in Section 3 we discussed the role of individual agency in the emergence of opportunity. The emergence of opportunity represents a specific bi-directional interrelation between individuals and their respective socio-spatial environments. In this section, we propose a framework for comprehending the emergence of opportunity by focusing on individual experience while considering the social and spatial context (Peters et al., 2010). Afterwards we discuss the embedding of opportunities in the life course. Finally, we conceptualize spatiotemporal manifestations of opportunity, which ease the task of mapping opportunity and are applicable to the analysis of mobility in the life course.

4.1 Conceptualizing the emergence of opportunity

Individual action at a certain point in time (T, see Fig. 1) principally occurs in the context of material and social circumstances pertaining to both general life situation and specific activity. In addition, individual action and circumstances are connected to purposive factors, at the levels of both the general life situation and specific activity.

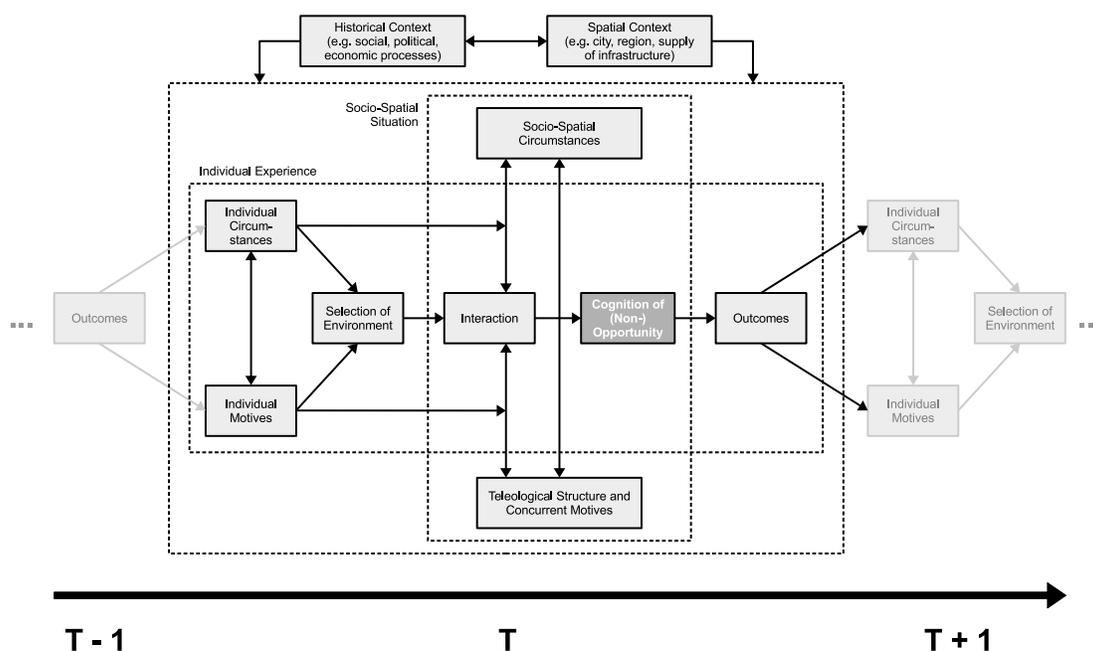


Figure 1. A framework for the emergence of individual opportunity in social and spatial context (Source: own figure)

First, we define circumstances and motives concerning the individual life situation (cf. Chapin, 1978). *Individual circumstances* comprise resources, traits and capabilities which are momentarily fixed and support or constrain individual choice and action. Examples for individual circumstances are social, cultural and economic capital, but also residential location, physical access, availability of travel modes, social networks and demographic characteristics. *Individual motives* refer to the motivational structure of goals and preferences, which guides choice and action (cf. De Vos et al., 2013). Goals are largely conscious imaginations of future outcomes of action and choice, and they are pursued in time-geographical projects (see Section 3.2). Furthermore, we define preferences as latent inclinations towards objects, sensations, persons etc. that might prompt rather spontaneous impulses for actions and choices (e.g., the sudden wish to buy ice cream). Despite this distinction, multiple motives might be simultaneously effective with varied importance at a certain point in time (“T” in Fig. 1; Hägerstrand, 1985). Overall, motives constitute the perceptual framework for the cognition of opportunity. Individual circumstances and motives are mutually dependent in that motives are formulated based on current circumstances or aim to change current circumstances through the utilization of anticipated opportunities.

In addition to life situation, circumstances and purposive factors concerning activity also appear in socio-spatial situations. *Socio-spatial circumstances* comprise social and physical features present within a particular section of space and time. Social features of place consist of aggregate individual circumstances as well as social networks and structure. Physical features comprise present bodies and objects as well as environmental conditions (e.g., weather). Purposive factors in a certain situation are *teleological structure* (or orders, see Section 3.2) as well as the *concurrent motives of all individuals present*.

The emergence of opportunity occurs in the context of the four aforementioned circumstantial and purposive conditions in life situation and activity (see Fig. 1): the individual chooses exposure to spatial

and social environments in accordance with her current life situation (Bandura, 1982; De Vos et al., 2013; Kaufmann et al., 2004; Urry, 2007). After a decision has been made, the individual becomes mobile⁴ in order to reach the destination, where she becomes part of a certain socio-spatial situation. She interacts with socio-spatial circumstances, teleological structures and other individuals present. In this contingent interaction, social and material interrelations become cognizable to the individual, rendering the situation opportune, irrelevant or even inopportune with regard to her motives. Accordingly, the individual life situation at T+1 is preserved or changed thereafter. As motives are central for the cognition of opportunity, defining opportunities is a subjective matter. In contrast to previous conceptions which conceived of opportunity as a precondition of action and choice (Section 2), the novelty of this framework lies in understanding opportunity as an *outcome* of individual agency and social practice. This framework therefore implies that opportunity is inferred from the empirical context, following an inductive logic.

4.2 The embedding of opportunities in the life course

Regarding the intercontingencies of interaction, the evaluation of a situation can only take place through *retrospection on anticipatory motives*⁵ and the *actual experience* of social interaction (Becker, 1994; Sarver, 1983; cf. Sugden, 2003). A specific interaction can be considered as opportunity if socio-spatial circumstances and teleological structure or concurrent motives have meaningfully corresponded with the individuals' motives of goal attainment or preference satisfaction⁶. In the case of goal attainment, opportunities are usually brought about through targeted selection of environments and subsequent interaction with the respective environments, in order to achieve progress (*anticipated opportunity*). Furthermore, the ex-ante definition of goals stirs individual sensitivity for factors that (potentially) fit the purpose of goal attainment. As opportunities for goal attainment take place in the context of conscious projects, their emergence might be explored through quantitative methods as well as qualitative interviews. However, opportunities usually "occur" and can be actively "obtained" only to a certain degree, as beneficial circumstances cannot be fully anticipated (Shanahan & Porfeli, 2006, p. 106). Thus, in light of less conscious preferences, opportunities might also unfold due to unexpected exposure to suitable circumstances, teleological structures or other peoples' motives. Such *fortuitous opportunities* are better understood through qualitative approaches, as the peculiarities of their emergence need to be explored through stories (Becker, 1994; Krantz, 1998).

An inductive approach to opportunity should also consider the effects of opportunities, as the outcomes of an opportune situation shape future personal motives and circumstances. Opportunities become *meaningful* because they significantly *change or preserve* existing routines during the individual life course. Thus, opportunities are highly relevant for understanding life course dynamics with regard to both daily and residential mobility (Scheiner, 2014, 2018). In the course of time, "*structures of encounterability*, of who is likely to be where, when, with whom" (Axhausen, 2007, p. 26, original emphasis) are recursively maintained, explored and modified through the mobile experience of opportunities for possible or necessary action (see e.g., Sharmeen et al., 2014). In this context, the experience of opportunity

⁴ Mobility in itself also implies temporary exposure to various intermediate social and spatial environments (e.g., cars, buses, trains), which might become meaningful unexpectedly and either impede original motives or yield new opportunities. The expression "passing propinquities" (Wilson, 2011) describes this notion very well. As Boterman and Musterd (2016) have discussed under the term "transport diversity," the potential for social interaction during travel is heavily affected by mode choice.

⁵Note that both anticipation and retrospection are not necessarily undertaken in a conscious manner but also through intuition and emotion.

⁶Therefore, it is not an opportunity to the individual if she does not perceive an interaction as opportunity, based on the perception of her own motives. It is also inadequate to assume an opportunity from the outside if there is insufficient knowledge about the individuals' motives and the outcomes in the context of a particular interaction.

can act as a mediator of spatial and temporal scales, as the structures of encounterability can be accessed at multiple scales. For example, making the acquaintance of a new friend at a bar might evoke the need to meet this friend regularly and therefore alter short-term daily activity spaces and mobility habits. A successful job interview might become the fateful moment which enables the graduate to permanently stay in her place of study and maintain her social networks, as she desired. Another job interview might as well prompt her to move to a new place, urging her not only to change her place of residence, but also her habits, social networks and thus her mobility behavior at both the micro *and* macro scale. With regard to the ramifications of opportunities, the need for and the use of an inductive approach to mapping opportunity becomes more obvious. However, as opportunities are social and personal phenomena (see Section 3.2), they cannot be mapped directly and require spatiotemporal concepts.

4.3 Capturing spatiotemporal manifestations of opportunity

From an inductive perspective, the actual experience of opportunity is always conceived to be idiosyncratic, as it depends on unique social, material and spatiotemporal interrelations. However, in time-geography and transportation, researchers are often confronted with routine practices. With regard to the goal of mapping opportunity in the life course and space, we therefore propose distinguishing between two spatiotemporally manifest forms of opportunity, which pertain to routine opportunities and *kairos* respectively. The established concept of *pockets of local order* (POLO, see Section 3.2) will suffice to capture *ordinary* opportunities in the life course, while for *extraordinary* moments of opportunity we introduce the concept of *occasions*.

In contrast to other approaches to opportunity in time and space (see Section 2), the POLO is conceptually embedded in actual time-geographical projects. The POLO includes bodies and objects whose interrelations are oriented towards the fulfillment of goals in the respective projects (Ellegård & Vilhelmson, 2004; Lenntorp, 2004). In this case, opportunities and their outcomes are foreseeable, as the routine interplay of aggregate circumstances, teleological structures and motives constitutes the *function* of the POLO (e.g., a grocery store or a school). Thus, the experience of ordinary opportunity through POLOs is mainly related to those motives which guided environment selection (anticipated opportunity) and it becomes meaningful mainly through long-term routinization (*kairochora*; cf. Rämö, 1999). Mapping individual activity spaces through the universe of individual POLOs in certain life phases promises to deliver important information for understanding life course dynamics in residential and spatial mobility.

When assessing biographical narratives, especially *meaningful occurrences of opportunities* appear to be interesting to both the narrator and the researcher (Bandura, 1998; Krantz, 1998; Thomson et al., 2002). The second form in which opportunities are spatiotemporally manifest is therefore the “occasion,” representing *kairotopos* as an extraordinary and meaningful spatiotemporal moment of subjective opportunity (Rämö, 1999; Shanahan & Porfeli, 2006, p. 108). These occasions comprise specific interrelations of circumstances and motives which diverge from everyday routines and significantly affect the individual life course. It is these occasions as specific sections of timespace that are relevant for the identification and mapping of spaces and places of crucial opportunity. Occasions represent occurrences of opportunity, which might be linked to motives that originally were either decisive (anticipated opportunity) or irrelevant (fortuitous opportunity) for environment selection. Occasions are not necessarily linked to a single point in time but might occur over an expanded course of time (Thomson et al., 2002, pp. 351-352), thus occasions might span a multitude of non-routine events. From an individual perspective, occasions are ideally capable of capturing a sequence of meaningful localities in the life course.

In the context of life course transitions and everyday mobility, the concept of occasions should not be confused with the concept of “key events,” which is prominently featured in the mobility biographies

approach (Lanzendorf, 2003; Rau & Manton, 2016; Scheiner, 2018). Key events are major tipping points during transitions, which are often viewed as highly influential for persistence and dynamics in residential mobility and mobility behavior (Müggenburg et al., 2015; Oakil et al., 2011). However, Scheiner (2018, p. 51) suggests that the key events approach might be limited in terms of properly comprehending individual experience and perception as well as their role in change in the life course. While key events are mainly used to focus on the outcomes of events to explain the dynamics of travel mode choice, occasions take both emergence and outcomes of events into account to map opportunity. The present inductive approach to opportunity is not mainly concerned with travel behavior but with the experience of meaningful moments in the life course and their possible relations to mobility and spatial environments.

5 Implications for empirical application, future research and policy

We have demonstrated that previous approaches to opportunity largely define opportunity as an *ex-ante* condition of human activity in time and space, which yields generic mappings of opportunity. We have further argued that significant changes in life can be mapped *ex post*, based on individual experiences of opportunity which reveal actual relations between individuals and their respective socio-spatial environments. The detection of opportunity in the approach proposed in this paper therefore follows the rationale of induction instead of deduction (see Section 2). Such an approach produces mappings of opportunities which are more specific, as they incorporate subsets of meaningful localities in individual lives. Unlike previous approaches, the perspective on opportunity presented here is not primarily aimed at concerns over social (in)equality, accessibility or activity choice, but at the joint investigation of life course dynamics in spatial and social mobility. This inductive perspective thus adds to previous opportunity conceptions in spatial research by emphasizing the importance of individual proficiency in the creation of opportunities.

The emergence of opportunities is a product of anticipation and fortuity, as individuals are capable of selecting desired environments and express their intentions through subsequent, unforeseeable interaction (Bandura, 1982; Chapin, 1974, 1978). Especially Bandura's hypothesis on the relation between activity and fortuity is compelling for the analysis of mobility in the context of individual development over the life course. Firstly, it helps to appreciate the role of access and mobility in the life course, as "equal opportunity" is not only a matter of spatial exposure (see Section 2), but also a matter of individual motives, capabilities, resources and choices (Kaufmann et al., 2004; Urry, 2007). Secondly, the hypothesis submits to the principle of agency in life course theory by explicitly incorporating individual activity choice (Elder et al., 2003). Future research on opportunity therefore should pay particular attention to individual motives, circumstances and the subsequent selection of environments. It is of special interest to identify those patterns and strategies in environment selection which systematically affect access to structures of encounterability. For enhanced insights on the interplay between built environments and individuals, it might be worthwhile to consider POLOs, occasions, accessibility and potential patterns of self-selection in activity choice with particular regard to individual personality (see e.g., Götz et al., 2020; Murray et al., 2005; Rentfrow & Jokela 2016). Furthermore, it is also interesting to map those opportunities that remain unused and to understand both the reasons for and the impact of such "idle" opportunities.

For mapping opportunity, both POLOs and occasions may be derived from subjectively perceived opportunity combined with insights on the selection of environments. The perception of opportunity may be approached through information on personal goals, norms and (life) satisfaction (Chapin, 1968; De Vos et al., 2013). In surveys, opportunity can be more clearly operationalized using statements and

Likert scales along selected domains of life (e.g., housing, jobs, education, friendship, relationship). Here, it would be useful to implement domain-specific assessments of a) motives (e.g., importance), b) active efforts for the experience of opportunities, c) actual experience of opportunities (e.g., frequencies), d) actual utilization of opportunities and e) satisfaction as an evaluative measurement of outcomes. The selection of environments and thus, the specification of land use, may be represented by activity spaces (see Hasanzadeh et al., 2019; Perchoux et al., 2014; Wang et al., 2012). Ideally their long-term variability is captured to further understanding of the relation between urban form, daily mobility, social mobility and individual development during the life course (Cagney et al., 2020). In addition, participants might be asked to name specific places of opportunity using techniques such as Public Participation GIS (PPGIS; for an application with activity spaces see Hasanzadeh et al., 2018). However, unless surveys explicitly ask about particular moments of *kairos* (e.g., job offer, first encounter with spouse; see Section 3.1), quantitative studies will most likely capture mainly POLOs, as activity spaces focus on habitual everyday mobility. Therefore, qualitative methods and mixed methods designs nevertheless appear to be an important supplement for capturing occasions. Here, places of opportunity can be mapped by applying methods such as Sketch Maps, Qualitative GIS, Mobility Mapping and (Im)Mobility Biographies (Boschmann & Cubbon, 2014; Kieslinger et al., 2020; Mennis et al., 2013; Weidinger et al., 2021). These methods could be combined with stories on the emergence, effects and meanings of opportunity (Becker, 1994) and knowledge about the long-term development of social networks (e.g., Carrasco et al., 2008). Mixed methods designs could also include interviews on travel diaries or tracking data (e.g., Flamm et al., 2008). The framework presented in Section 4.1 might be generally used as an aid for designing surveys or specific interview questions about the conditions of opportunity whose discussion might further enhance narratives about opportunities.

In addition to individual life course trajectories, understandings of social interactions at particular activity locations should be improved in order to make sense of mobility practices and to assess the “fit” between individual motives and environment selection. Places then are not only conceived as static carriers of spatial function and resources, but also as dynamic intersections of interpersonal expectations which frame the scope of possible contingencies and meanings. The selection of relevant localities for analysis could be based on previous mappings of activity spaces, and possible methodologies include observations, surveys and interviews. Quite certainly, data collection on particular localities will face challenges that are inherent to the inductive approach to opportunity (e.g., the passing of time, the multitude of agents and relations). Improved understandings of localities are not only of interest to understand individual life courses, but also (literally) offer the opportunity for policy interventions targeting local circumstances and teleological structures in order to improve the individual utility of land use. By gaining knowledge about how groups with certain characteristics and traits respond to circumstances in certain socio-spatial situations (see Section 4.1), localities might be redesigned so that their respective utility for these groups improves.

Throughout all steps of research design and data collection, it is of utmost importance to critically consider the handling of teleological structures and motives. Scholars should strive to uncover the individual aspirations and subtle preferences of participants and interviewees to improve understanding of life course trajectories. In this process, it is important to critically scrutinize research designs and analyses for biases (e.g., in the selection of life domains) and implicit or normative assumptions about purpose, success and failure in order to ensure adequate data collection. Critical reflection on how opportunity is approached in research designs helps to assess the significance of findings appropriately. These methodological considerations may help develop fruitful future research to better understand the emergence of opportunities in people’s life courses, and the role of transport and land use in this respect.

Although planning clearly cannot do justice to the needs and perceptions of every single individual,

an inductive approach to mapping opportunity appears to be informative for planning and policy in various ways. By emphasizing subjective perspectives while still incorporating broader socio-spatial influences, the approach allows for evaluations of policies that go beyond established evaluation procedures. It would certainly be interesting to apply the present concept to investigate similarities and differences between planners' conceptions of opportunity and individuals' perceptions of opportunity in real life. For example, from the perspective of planning, a pub may be an opportunity for social integration that helps to reduce segregation. At the same time, from an individual viewpoint the same pub may actually be avoided because it is *not* perceived as an opportunity. In planning practice, strategies to mitigate such mismatches might be designed and applied. Mapping places and spaces of opportunities of certain subpopulations may also help to estimate efficacy of or uncover deficits in land-use planning. Recent research on "multi-contextual segregation" (Park & Kwan, 2018) in activity spaces has demonstrated how use of space is differentiated by various characteristics (see also Boterman & Musterd, 2016; Wang et al., 2012). In this context, an inductive approach to opportunity is sensitive to the fact that accessibility needs are not universal (Farrington & Farrington, 2005) and may therefore help to refine measurements of access in planning practice (e.g., by guiding the selection of destinations that are actually relevant to certain subpopulations). An inductive approach to opportunity furthermore acknowledges that individual development (see Section 1) in time and space is a perceptual matter. On this basis, public campaigns may be developed to complement planning and policy interventions by enhancing individual proficiency regarding access and the recognition of opportunity in time and space. Finally, in planning for amenities (e.g., parks, cafés), insights on the emergence of opportunity in particular localities might help to identify and apply spatial design features which evidently benefit the emergence of meaningful interaction (see Section 1).

In this paper, we mainly focused on establishing opportunity as an independent research object and on explaining the emergence of opportunity for contextualization in time and space. However, basic theoretical and philosophical issues about the nature of opportunity remain largely untouched here. For example, future research might consider conceptual differences between "opportunities" and similar terms (such as "options" or "life chances") with particular regard to spatial planning and policy. Furthermore, this paper has not considered the relevance of unused opportunities from the perspectives of both individual life courses and spatial planning. Finally, we only focused on opportunity in an affirmatory sense, while ignoring comparable phenomena which negatively impact individual life courses and may be taken into account in future research and planning as well.

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