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# Considering daily mobility for a more comprehensive understanding of contextual effects on social inequalities in health: A conceptual proposal



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#### ABSTRACT

Despite growing interest in integrating people's daily mobility into contextual studies of social inequalities in health, the links between daily mobility and health inequalities remain inadequately conceptualised. This conceptual proposal anchors the relationship between daily mobility and contextual influences on social inequalities in health into the concept of mobility potential, which encompasses the opportunities and places individuals can choose (or are constrained) to access. Mobility potential is realized as actual mobility through agency. Being shaped by socially-patterned personal and geographic characteristics, mobility potential is unequally distributed across social groups. Social inequalities in realized mobility may thus result. We discuss pathways by which these may contribute to contextual influences on social inequalities in health. One pathway is reflected in disadvantaged groups encountering more fast-food outlets during their daily activities, which may relate to their higher risk of unhealthy eating. This proposal lays the bases for empirical research explicitly testing hypotheses regarding the contribution of daily mobility to social inequalities in health.

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#### 1. Background

In recent years, there have been calls to consider individuals' agency in contextual studies of social inequalities in health (Entwisle, 2007), and to take into account the interplay between individuals and their environment (Frohlich et al., 2001: Cummins et al., 2007; Kwan, 2009). A suggested response has been to integrate people's daily mobility across space when defining context or the spatial area(s) within which health-relevant resources and features are measured (Cummins et al., 2007; Kwan, 2009; Chaix et al., 2009; Matthews, 2011). Inspired by Hägerstrand's work in space-time geography (Hägerstrand, 1970), these calls reflect an increasing challenge to residential neighbourhoods as the sole and most salient settings for understanding contextual influences on social inequalities in health. Echoes of this push to adopt a daily mobility perspective can be found in Cummins' relational approach to place (Cummins et al., 2007), in Kwan's people-based exposure measures (Kwan, 2009), in Chaix's proposal to overcome the residential trap (Chaix et al., 2009), and

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in Matthews' coining of the term "spatial polygamy" to describe belonging to multiple settings (Matthews, 2011).

Concretely, place and health researchers are increasingly considering daily mobility by investigating "activity space" (Inagami et al., 2007; Basta et al., 2010; Kestens et al., 2010; Troped et al., 2010: Vallee et al., 2010: Christensen et al., 2011: Vallee et al., 2011: Zenk et al., 2011: Hurvitz and Moudon, 2012: Lebel et al., 2012), defined as "the subset of all locations with which an individual has direct contact as a result of his day-to-day activities" (Golledge and Stimson, 1997 p. 279). However, few studies have directly examined the relationship between daily mobility and social inequalities in health, rather than health more generally. This is so despite the fact that, as noted by several authors, daily mobility is a central driver of social stratification and inequality (Canzler et al., 2008; Manderscheid, 2009; Jiron, 2007; Kaufmann et al., 2004; Brighenti, 2011). Indeed, features and resources are unequally distributed across space (Golledge and Stimson, 1997), and the places where social groups conduct activities may be restricted due to elements of the social structure, including class and power relations (Gatrell, 2002; Hägerstrand, 1970). While inequalities in residential neighbourhood features and resources - defined as physical (e.g. green spaces, food stores, air pollution) and social (e.g. area-level disadvantage, crime rate)

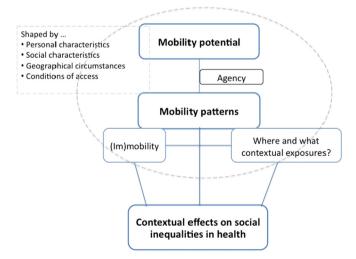
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attributes of environments – may translate into health inequalities (Kawachi and Berkman, 2003; Riva et al., 2007), so too could inequalities in exposures experienced during daily travels and activities. These relationships merit being studied.

Furthermore, the integration of mobility in place and health research has benefited from an increasing reliance on novel technologies, such as global positioning systems (Rainham et al., 2008) and interactive mapping tools (Chaix et al., 2012), to track people across space. However, it has not been accompanied by substantial developments on the conceptual front. Although Chaix et al. (2013) proposed a succinct conceptualization of the links between socio-economic position, mobility, environment, and physical activity/weight risk, the authors only briefly described factors which might account for a differential access to resources across areas of differing affluence. A conceptual proposal of the mechanisms by which social inequalities in mobility may arise and contribute to social inequalities in health is needed. It would allow testing a priori hypotheses and prevent post hoc theorizing about causal pathways, which risks over-interpretation of empirical findings based on assumptions alone (Frohlich et al., 2004). A conceptual base would also facilitate replication across studies and contribute to a unifying body of evidence (Frohlich et al., 2007).

#### 2. Objective

Drawing from literature in geography, urban studies, public health, and sociology, this paper seeks to provide elements of response to the above limitations. It introduces a conceptual proposal which anchors the links between daily mobility and contextual influences on social inequalities in health into the concept of mobility potential. Mobility potential is defined as the capacity to be mobile and a resource that is unequally distributed across social groups (Kaufmann et al., 2004). We argue that social inequalities in mobility potential may engender social inequalities in realized, observable mobility, or what we call *mobility patterns*. We review empirical evidence to describe social inequalities along two dimensions of mobility patterns: (1) the extent to which one is (im)mobile, and (2) the characteristics of places and resources experienced during daily travels. Finally, we discuss how social inequalities in mobility patterns may help explain contextual influences on social inequalities in health. Key concepts and their relationships are illustrated in Fig. 1 and described below.



**Fig. 1.** Diagram depicting the links between mobility potential, mobility patterns and contextual effects on social inequalities in health. Mobility potential requires agency to be converted into realized, observable mobility patterns. Concepts encompassed by the dashed circle are shaped by unequally distributed personal and social characteristics, geographic circumstances and conditions of access.

#### 3. Conceptual proposal

### 3.1. Daily mobility potential: an unequally distributed resource

We conceptualise daily mobility as a behaviour embedded within a social context (Kaufmann, 2011; Camarero and Oliva, 2008) which involves social norms (including aspects of interpersonal relationships), social structures (e.g. class, race, gender), as well as institutional practices (Poland et al., 2006). The concept of "mobility potential" which, following Kaufmann et al. (2004), is the "capacity to move in geographic and social space" (p. 750), is central to this perspective. Indeed, it has been developed to bridge the separation between spatial mobility and social inequality, and to consider the underlying causes of differential patterns of mobility across social groups (Camarero and Oliva, 2008). Mobility potential also acknowledges individuals' agency or capacity to act in a given social context: as depicted in Fig. 1, mobility potential is transformed into realized (im)mobility once agency has been expressed (Kaufmann et al., 2004; Manderscheid, 2009; Jiron, 2007; Weiss, 2005).

Several authors have referred to the potential to be mobile using various terminology including "motility" (Flamm and Kaufmann, 2006; Kaufmann et al., 2004), "spatial capital" (Lévy, 1994), "spatial capability" (Shin, 2011), and "spatial autonomy" (Weiss, 2005). However, Kaufmann et al. (2004) have offered one of the most thorough descriptions of mobility potential, describing it as a resource composed of interdependent elements of access, competence, and appropriation (Kaufmann et al., 2004). Rooted in Hägerstrand's space-time prisms (Golledge and Stimson, 1997) and other concepts such as potential path space or area (Miller, 1991; Kwan, 1998), "access" represents the set of opportunities and locations from which individuals can choose to participate in an activity. The "competence" element encompasses the physical abilities and skills needed to exploit mobility options. while "appropriation" refers to decision-making processes, evaluation of mobility options, and the adoption of a course of action which will eventually be enacted through agency (Kaufmann et al., 2004).

The "access" element of mobility potential is particularly relevant to the study of mobility and contextual influences on social inequalities in health. First, it incorporates both the range of possible mobilities in which one can engage, as well as the types and characteristics of places, activity settings, and resources accessible by being (im)mobile (Kaufmann et al., 2004). Knowledge of these dimensions of mobility is essential to any empirical investigation of contextual exposure measures and their relationship to health (Chaix et al., 2013). Second, access - and thus mobility potential - has been discussed as being influenced both by personal characteristics (e.g. preferences, needs, transportation resources) and social characteristics (e.g. gender, socio-economic status), as well as by geographic circumstances (e.g. public transit, the location of activity places and resources) (Kaufmann et al., 2004; Manderscheid, 2009). Access is also regulated by conditions which Hägerstrand has called "authority constraints" or "those general rules, laws, economic barriers, and power relationships that determine who does or does not have access to specific domains at specific times" (Pred, 1977 p. 208). These conditions may include, for instance, price and rights mechanisms (Bernard et al., 2007; Golledge and Stimson, 1997), as well as norms (Baldassare, 1978; Jiron, 2007; Skelton, 2013; Reynolds, 2013). As an outcome of price mechanisms, for example, high quality resources such as healthy foods, which are usually priced higher than unhealthy foods, are less accessible to low income groups. Furthermore, the cost of travel to access more affordable high-quality resources than those found in one's local area may deter people from doing so. Social and civic rights are another type of rules which determine access to resources provided by formal (often publically funded) institutions (Bernard et al., 2007). For example, resources such as public libraries or employment and health services may be earmarked to specific populations based on age, employment status, vulnerability, or

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