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Children's motility in an informal settlement in Cairo and parental influence: Implications for de-motorization

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Abstract

This paper investigates actual and potential mobility of children as enabled by themselves and their parents in a case study of one informal settlement in Cairo called Ezbet El-Haggana. Results aim to contribute to the discussion about possibilities for such settlements to avoid the typical trajectory of increased car-dependence observed in other parts of Cairo as with global trends. It is based on five Focus Group Discussions (FGDs) with children and four FGDs with mothers, together with field observations. A philosophical approach based on Vincent Kaufmann's notion of motility (potentiality of mobility) was employed to elucidate subjective factors influencing mobility. Based on results, the study argues that an informal settlement can contain not only physical prerequisites, but also behavioral and socio-cultural prerequisites that may facilitate a direct transition (leapfrogging) to a future of sustainable mobility and associated behavior and norms. An observed ingenuity, behavioral adaptation, and various means of compensation for resource scarcity enable both parents and children to exhibit travel behavior that is coincidentally sustainable and resilient, thereby positioning the inhabitants to better adapt to introduced sustainable transport interventions. Findings led to a conceptualization of a framework for analysis based on motility, which is expanded to account for the dynamics of motility-enhancement found in the case study, where aspects of one's skills, access, and appropriation are altered to mutually compensate for each other to maintain motility, or otherwise exhibit deficiencies that can be identified and addressed.

Zusammenfassung

Das vorliegende Paper untersucht anhand einer Fallstudie in einem informellen Viertel in Kairo, Ezbet El-Haggana, die tatsächliche und potentielle Mobilität von Kindern, ermöglicht von ihnen selbst und ihren Eltern. Die Ergebnisse tragen zur Diskussion über die Möglichkeiten solcher Viertel bei, den üblichen Entwicklungsverlauf hin zu mehr Abhängigkeit vom Auto zu vermeiden, wie dieser sowohl in anderen Teilen Kairos als auch global zu beobachten ist. Grundlage der Untersuchung sind fünf Fokusgruppen (FG) mit Kindern und vier FG mit Müttern, zusammen mit Beobachtungen vor Ort (Feldstudie). Um subjektive Faktoren, die Mobilität beeinflussen, zu analysieren, wurde ein philosophischer Ansatz basierend auf Vincent Kaufmanns Begriff der *Motilität* (Wirkungsvermögen der Mobilität) genutzt. Anhand der Ergebnisse argumentieren wir, dass ein informelles Viertel nicht nur die materiellen Voraussetzungen aufweisen kann, sondern dort auch die notwendigen Verhaltens- und

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sozioökonomischen Faktoren präsent sein können, die einen sprunghaften Übergang (*leapfrogging*) hin zu einer Zukunft nachhaltiger Mobilität und entsprechendem Verhalten und Normen ermöglichen. Sichtbarer Einfallsreichtum, Verhaltensanpassung und vielfältige Wege der Kompensierung von fehlenden Mitteln befähigen Eltern und Kinder zu einem Fortbewegungsverhalten, das gleichzeitig nachhaltig und belastbar ist. Sie sind auf diese Weise von vornherein prädestiniert für eine bessere Anpassung an implementierte nachhaltige Nahverkehrskonzepte. Die Ergebnisse führen zur Konzeptualisierung eines Analysemodells basierend auf Motilität. Dieses wurde erweitert, um das in der Feldstudie beobachtete Kräftespiel der Verbesserung der Motilität darstellen zu können, wobei zur Erhaltung der Motilität Aspekte eigener Fähigkeiten, von Zugang und Verwendung zur gegenseitigen Kompensation, verändert werden können. Gleichzeitig zeigt dieses Kräftespiel Probleme auf, die identifiziert und thematisiert werden können.

Keywords motility, Children's Independent Mobility (CIM), Cairo, informal settlements

1. Introduction

Greater Cairo's informal settlements have for long been observably undergoing a gradual process of improvement, largely driven by self-help initiatives, which is a distinct phenomenon characterizing the city (Shehayeb 2009; Sims 2010; Bremer and Shahjahan 2014). In this context, informal settlements in the city's urban areas represent regions that are aspiring to adopt the car-centered lifestyles of their formal counterpart within the same city, and are in an early stage of such development (El-Dorghamy and Mosa 2016). In research on a more global scale, it is indeed observed that in many advanced cities a typical trajectory of car dependence is observed as income increases. In early research on the topic, Chamon et al. (2008) assessed the link between GDP per capita and car ownership in the largest emerging markets, demonstrating a non-linear positive correlation whereby car ownership eventually accelerates once a threshold of per-capita income of about 5000 USD is exceeded. Furthermore, apart from the aggregate global increase in ownership and associated car-dependence, an arguable peaking or eventual decline of car dependence has been observed in certain economically advanced countries or specific cities, such as in parts of Europe and North America among others (Goodwin and Van Dender 2013; Metz 2013; Jones 2016). Further observation of such trajectories today shows that in numerous economically advanced cities, the path of car-dependence seems to eventually reverse. This is characterized by three stages, as argued in Jones (2016): Increase in car dependence (stage 1), peaking (stage 2), and eventual reduction in car-dependence (stage 3). The pattern is reminiscent of the environmental Kuznets' curve, describing historical trends of

climaxing environmental degradation and recovery (Kuznets 1955; Grossman and Kruger 1991).

Increased car-dependence is indeed observed in Egypt at the moment, and a notable facilitating factor for poorer communities is the availability of cheap ageing vehicles due to absence of age regulations, while fuels are also heavily subsidized (El-Dorghamy 2015). The topic of the car-dependence trajectory often stirs discussion on whether such a trajectory can be leapfrogged so that early-stage cities avoid repeating experience of unsustainable growth in car dependence (e.g. Chamon et al. 2008; Gärling and Fujii 2009; Jones 2016). This paper investigates this question in the context of one specific case study to contribute to the discussion. This is done through the study of appropriation of transportation options for children in an informal settlement in Egypt. We argue that a framework of analysis based on the concept of motility is instrumental in the discussion of such context.

The informal settlement under study is Ezbet El-Haggana (hereinafter referred to as Haggana), a dense informal area in Cairo, the capital city of Egypt. The particular demography investigated is of school-age children and their parents. Children are at the center of the study in recognition of the role of childhood experiences in habit formation and travel socialization (Baslington 2008; Buliung et al. 2012).

2. Coincidental sustainability

Much research on travel behavior related to car-dependence is focused on societies at advanced levels of development in terms of transport services and

quality of the built environment, and is accordingly focused on ‚shifting‘ modes and reducing car travel (e.g. *Gärling and Steg 2007; Bamberg et al. 2011; Handy and Krizek 2012; Schwanen et al. 2012*). In the meantime, little has been done to study areas in much earlier ‚pre-car‘ stages of development and question their potential to leapfrog, or to *maintain* existing elements of sustainable travel behavior in the face of change, which they might be only adopting coincidentally due to economic constraints. *El-Dorghamy and Mosa (2016)* highlight this argument inspired from exploratory research on informal settlements in Egypt. Another study aligned with this discourse is found in *Enoch et al. (2004)* observing developments in Cuba in response to energy crisis. *Enoch et al. (2014)* demonstrate the association between energy scarcity in the case of an oil crisis in the 1990s and the subsequent adoption of more economical mobility practices that are coincidentally more sustainable, not only in terms of mode choices but also in socio-cultural response: social and cultural norms have adapted to favorable mobility practices.

This perspective is scarce in existing literature since much of mainstream research on travel behavior in the context of poor areas is rather revolving around social exclusion and lack of accessibility (e.g. *Olvera et al. 2003; Anand and Tiwari 2006; Lucas 2011; Hernandez and Davila 2016*). The mainstream discourse therefore (understandably) focuses on poverty and impoverishment, yet it lacks appreciation of virtues that might be characteristic of certain poor communities such as social and cultural capital, entrepreneurial skills, and resource efficiency. Nevertheless, such virtues have been noted in numerous studies on informal settlements but in domains other than transportation (e.g. *Shehayeb 2009; Wahby 2013; Bremer and Shahjahan 2014; Cipolla et al. 2015*). In this respect, this paper aims to investigate a case study area in a developing country with acknowledgment of such factors that better explain the potentiality of mobility. To allow incorporation of such factors in the discussion of travel behavior and accessibility, reference to the notion of *motility* is used. Motility refers to both actual and potential mobility (*Kaufmann et al. 2004; Kaufmann 2014*). Results conclude with a suggested illustrative conceptualization of motility tailored to the context of this study, while arguing that elements of motility can be interchangeable and varying in scope or potentiality.

3. Motility in context

Motility, as an abstract notion, is defined as actual and potential socio-spatial mobility, and is comprised of all factors that determine an individual's potential to move (*Kaufmann et al. 2004; Kaufmann 2014*). *Flamm and Kaufmann (2006: 168)* define motility as „how an individual or group takes possession of the realm of possibilities for mobility and builds on it to develop personal projects“. It is, accordingly, a composition of factors related to three aspects: (a) access (availability of options and the conditions under which they can be used), (b) skills or competences (the actor's know-how, physical ability, understanding of rules and regulations, awareness of available options, ability to plan, etc.), and (c) appropriation (how access and skills are used, influenced by affective factors). In a more elaborate explanation of appropriation, *Kaufmann et al. (2004: 650)* explain that,

appropriation refers to how agents (including individuals, groups, networks, or institutions) interpret and act upon perceived or real access and skills. Appropriation is shaped by needs, plans, aspirations and understandings of agents, and it relates to strategies, motives, values and habits. Appropriation describes how agents consider, deem appropriate, and select specific options. It is also the means by which skills and decisions are evaluated.

Accordingly, the main quality of the concept of motility that renders its suitability for the analysis of the case study and question at hand is that it stems from the agency of the individual (or group) in realizing own mobility options and incorporates subjective factors that may enable or inhibit mobility. Motility is therefore found to provide a wide framework for analysis that accommodates the various complexities of the context of travel behavior (*De Witte et al. 2013*).

Unlike the concept of accessibility, motility revolves around the agency of the commuter in enabling mobility rather than focusing on the external enabling conditions. It thereby describes the agent, not the playing field. The concept has been developed in response to several arguable limitations associated with the notion of mobility. *Kaufmann et al. (2004)* note that mobility refers to actual tangible movement without consideration of potential movement, and it is also strictly spatial in nature, void of intangible factors that may influence mobility, such as social, cul-

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tural, and other context-specific factors. Motility on the other hand additionally incorporates *potentiality* of movement and considers social and cultural factors together with the structural aspects that collectively form a range of possibilities for movement (Kaufmann et al. 2004). Accordingly, UNHABITAT (2013: 108) explicitly guides policy makers and planners to consider the elements of motility to better understand the challenges of urban poverty as it provides a holistic view of underlying factors that enable or inhibit people's mobility.

4. Ezbet El-Haggana

About two thirds of Greater Cairo's 20 million inhabitants now live in informal settlements following a history of ineffective policy since the 1950s that could not adequately cater to the growing demand (Kipper and Fischer 2009; Sims 2010; Khalifa 2015). Ezbet El-Haggana in specific is one of Egypt's largest informal settlements, with a population in the proximity of one million citizens (El-Mouelhi 2014). It is located in the north-east quadrant of the city, which was originally the fringe of Greater Cairo (GC) before being engulfed with further expansion of the formal city. Inhabitants are originally migrants from other governorates of Egypt seeking job opportunities as well as migrants from other parts of GC. As with numerous other informal settlements in Egypt, a strategy of 'containment' was used to limit the geographic expansion of the settlement, yet it continued to grow vertically, with multiple story buildings gradually filling any remaining vacant land or replacing older buildings or shacks as the population and its density both continue to grow. It is therefore characterized by its very high density as well as vibrant commercial activity. Although enjoying accessibility to many commercial services and needs, there is much deficiency in basic infrastructure and public services. Streets are almost entirely unpaved and with no sidewalks, there are only two public schools within the populous settlement, and there is no police presence, among other missing public services as noted in previous research on Haggana (Wahby 2013; Bremer and Shahjahan 2014; El-Mouelhi 2014; El-Dorghamy and Mosa 2016). With regards to formal public transport, it is only available on the fringes of the settlement, and deficiencies are, in turn, compensated with various informal forms of transport services (El-Dorghamy and Mosa 2016).

5. Methods

Qualitative methods in travel behavior research are advisable for settings that are new and unfamiliar, or a mixed method approach that allows quantitative substantiation where necessary (Clifton and Handy 2003). Accordingly, research data was collected through FGDs with mothers and children. Each FGD lasted for 1.5 to 2 hours, implemented with guidance on social analysis techniques by Krueger et al. (2001), including thematic analysis. The care-givers participating were limited to mothers due to difficulty found in recruiting fathers, which is a challenge that has also been noted in similar research elsewhere (e.g. Peek and Fothergill 2009; Lang et al. 2011). In the case of Haggana, family men tend to work in more than one job and they work and commute for long hours throughout the entire week with uncertain schedules, which makes it difficult for the local NGOs to facilitate their recruitment for FGD. The FGDs were held in coordination with three selected local developmental NGOs located in Haggana that volunteered to support the research activity.

Participants were asked about their typical travel behavior and mode choices as well as perceptions about available and prospective common modes of transport, how they are being used, and affective factors associated with their decision-making process for themselves, and, in the case of parents, for their children as well. Specific areas of interest were (a) exploring factors that enable or inhibit their mobility, and how they adapt to their circumstances and use their resources, and (b) eliciting opinions about different modes of transport and about social and cultural norms and habitual practices associated with mobility. Detailed discussion of trips to school in specific were central to the discussions. Trips to school are often used as a convenient proxy to gain insight on children's travel behavior as it is usually the most frequent trip for children and plays a fundamental role in children's travel behavior and geographies (e.g. Ross 2007; Fyhri and Hjortol 2009; Lang et al. 2011; Fusco et al. 2012). Recurring themes were analyzed through the lens of motility by attributing them to respective components of the concept, access, skills, and appropriation.

Throughout the paper, quotes that are provided are only of those that reflect recurring themes in the interviews and discussions and are used for indicative purposes to exemplify results. All recurring themes

are described in the form of the salient beliefs or expressed perceptions that are shared in all focus groups and are recurring (repeated and confirmed by a majority) in each focus group as well. Children's quotes are indicated with their respective age, and all names used are pseudonyms to maintain anonymity, and among the respondents quoted herein, none have been quoted more than once. In the FGDs, children and parent's consent to participation was administered through the respective NGO in compliance with ethical requirements.

6. Sample description

The FGDs were conducted in three different areas of the settlement; four with mothers (N=30) and five with children (N=48) and held in the last quarter of 2014 and 2015 respectively during school holidays. Recruitment was through announcement by local NGOs. The five FGDs of children were samples of different age groups with the average ages of 9, 11, 13 (for two groups) and 15 respectively. The wide range of ages, despite the methodological limitation, was deemed favorable for the exploratory nature of the research allowing elicitation of informative feedback from a wide range of ages and informing about interactions between peers and siblings of different ages. All the children participating attended school, while about half of the mothers (16/30) have received no education at all, of which most were entirely illiterate. The rest received some level of education, while only two received higher education.

The mothers FGDs indicated a high level of walking and of use of transport services in terms of the reported frequency of use in the past three months. A majority (22/30) of the mothers reported using some kind of collective transport service at least five times per week, while only 5/30 reported using a car as frequently. However, walking (≥ 15 minutes) was by far the most common mode used, while in the case of cycling, it was by far the least used mode, where none of the FGD participants confirmed ever using them for commute. With respect to vehicle ownership, most of the households (24/30) among the participants do not own any type of motorized or non-motorized vehicle. Four of the households own a private car and four households own a motorcycle or an adult bicycle and there was one case of tuk-tuk ownership.

7. Results

The results demonstrate the nature of mobility and travel behavior of the children in Haggana with focus on their trips to school, characterized by high prevalence of independent mobility. The results led to a conceptualization of motility developed to facilitate analysis of similar contexts in future research. It is illustrated in upcoming *Figure 1* and explained throughout the presentation and discussion of the results. Firstly, the description of children's trip purposes and perceptions is explained. Findings of FGDs associated with the elements of motility (access, skills and appropriation) are then identified and presented, giving an overview of various factors that either enable or inhibit actual and potential mobility, including affective factors.

7.1 Children's trip purposes and perceptions

FGDs about children's mobility indicated several recurring themes of trip purposes that are sought regularly (once a week or more): going to school, going to private tutoring ("the lesson" or "the center"), going to the mosque or church for religious education (at mosques, churches, or NGOs) and practice, and "getting stuff" as commonly phrased to refer to miscellaneous errands being mostly for maintenance activities, and finally play or "training". The trip to school is the most frequent trip. Children's main interest in improving their urban environment as revealed in the FGDs with children is primarily removing dumped waste in the streets (39/48) and having more "gardens" and greening in the settlement (33/48), as well as removing "bullies" from the streets in the less reputable parts of the settlement (32/48), which are all perceived as nuances in their outdoor activities and travel experiences. To a lesser extent, other common venues for play other than the streets include youth centers or sports clubs that provide space for popular sports for children, mostly for boys. These venues are all located outside of the settlement except for one sports club that is adjacent to Haggana. Despite proximity of the identified local sports club, many families do not know about it and other families may choose to associate their children with venues outside of Haggana to differentiate themselves socially and to access facilities of better quality. The trip to school, being the most common trip, provided the most informative insights on children's travel behavior.

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7.2 Access to transport services and needs in Haggana

The most commonly used mode of transport within the sample in Haggana is walking, either for internal trips or for accessing public transport at the fringes of the settlement, whereas walking is defined by the authors as 15 minutes of walking or more to classify it as commute. All modes of transport and uses of public space are shared in the street, being the only available public space. The street network is dense and predominantly well-connected, but the streets are unpaved and entirely lack sidewalks, which is in consistence with the common characteristics of informal settlements in Egyptian cities. Diverse commercial activity is interspersed in the urban fabric, giving the settlement a characteristic liveliness that extends throughout the day and into late night. With regards to public transport service, the most common mode within the settlement is the motorized three-wheeler known as the 'tuktuk', an informal mode of transport commonly driven by children. Although known in Egyptian media as the transport service of the poor, the tuktuk is actually relatively expensive in Haggana, having a fare rate that starts at more than double the fare of the public bus or microbus if ridden individually, and the rate further increases sharply with distance. This stands in contrast to the flat rate of formal public transport in Egypt, which is heavily subsidized; approximately 2 EGP (0.1 Euros) per trip for public busses and 1 EGP (0.05 Euros) for the metro at the time of the field research. Tuktuks however provide the only transport service that can swiftly navigate through the narrow streets of the settlement and provide door-to-door service.

Another mode of collective transport is the pick-up truck, which also operates informally, providing a transport service during rush hours and then attending to regular commercial activities throughout the rest of the day, thereby optimizing vehicle use. This mode however is associated with the poorest segments within Haggana being the cheapest and most uncomfortable. It only navigates the main (widest) streets. The few main roads that cut across large areas of the settlement are where most of the motorized transport navigate, risking frequent occurrences of congestion and road blockages for diverse reasons. Common reasons include pedestrian congestions, civil works for infrastructure and new buildings, potholes and construction debris or other uncollected waste, uneven road width, and sewage overflow, among other causes of congestion.

Research findings from the interviews and FGDs show that a distinct paradigm exists in Haggana, where accessibility to transport services is not seen by the residents as the services provided formally by the government but rather as all the options available including the abundant informal services: the Tuktuk, pickup truck, and in the cases of a few wider streets, the 14-seat and 9-seat buses, all acknowledged as the available mix of options. Furthermore, by virtue of the origination of the settlement, being self-built by its earliest settlers who did not own cars (resembling a pre-motorization era settlement), it is highly walkable by design, and well-networked with narrow unpaved streets and pathways, and commercial activities accessible at street level. There is a notable difference between Haggana and its adjacent formal residential area (Dorghamy, 2018). It has significantly less services at street level, less pedestrian traffic and much space available for car parking by design further confirmed through field observations and notes. Perceptions in FGDs are aligned with this observation; the majority (24/30) of mothers find that most of what they refer to as their „daily needs“ are found within walking distance, and that they would be more isolated in other formal parts of the city or in other areas that are proposed by the government for resettlement. Similar views are expressed by most children (32/48).

7.3 Skills and Appropriation

Whereas the previous sections described available transport options, this section details the results and findings associated with the two other components that describe potential mobility: The aspects of 'skills' and 'appropriation' which are often described together.

FGDs indicated a high prevalence of independent mobility by children, where more than half (25/48) of them travel independently to school, including cases of children below 10 years of age, whether walking or by motorized means. With regards to motorized modes in specific, out of all modes of formal and informal public transport services used, they are all mostly (10/15) used independently without accompaniment of an adult care-giver. The most common mode of collective transport is the bus, and predominantly the 14-seat microbus in specific, which is operated in an informal manner. Some interviews indicated that in certain cases parents ensure that their child travels

with other minor friends or siblings as a compromise to the lack of adult accompaniment. However, this was not the case for most of the independent travelers in the sample, where the majority of them (22/25) still travelled entirely alone without even accompaniment of friends or siblings.

In the FGD with mothers, they explained that parents tend to coach children in their earlier years in navigating streets and using transport services, and they can alternatively be coached by older siblings or other older care-givers in the family.

Skills enabling actual and potential mobility are very context specific, including navigation skills gained through practice and training since an early age. Skills include relevant social skills, planning skills, decision making, spatial awareness and cognitive mapping. This is demonstrated in the high level of CIM and frequent use of various types of transport services early in life. Furthermore, with regards to 'appropriation' of available resources and of acquired skills, this is reflected in multiple observations, such as in the distinct acceptability of available services and mobility options as noted in *Table 1*, as well as in the use of the vacuum of formal regulation, which has been appropriated for more versatile and creative use of transport options, among other manifestations of appropriation whether by parents or children.

Table 1 reflects the prevalent perceptions about various modes of transport among the participant children. They were asked whether they find each transport mode generally good, bad, or if they have a

neutral opinion, which was followed by discussion to understand the nature of these perceptions. Results showed that the various transport services known and available are simply seen as being 'OK', as in neutral or otherwise perceived positively, while the only mode associated with negative experience is the exception of the scarcely used (but well known) pickup truck service. Children are seen by themselves and by their parents as highly competent in using diverse modes of transport and skillfully meeting their mobility needs as noted throughout the FGDs. Even cycling is commonly practiced at an early age, although seen exclusively as for play during earlier years of childhood.

Noura (10): We are happy because they paved Saaqa street, we like to cycle there, all of us like cycling [...]. We all go rent bicycles in the holidays and play in the street [...] but older girls don't ride bicycles. (Children's Group 2, participant 7)

Regarding acceptability of services (a manifestation of appropriation), transport services that are stigmatized elsewhere in the formal parts of the city (*El-Dorghamy 2018; Darwish et al. 2016*) are rather viewed as suitable and practical in Haggana, and often even as pleasant whether by children or by mothers as well. This perspective is exemplified in some of the typical comments on the various modes of transport:

Samia: The microbus is great for my daughter, it is cheap and I know that she will always find a seat. The public bus is also good but the microbus is always faster and goes anywhere. (Mothers' Group 1, participant 4)

Table 1 Modes of transport and respective predominant perception by the children (N=48). Source: *El-Dorghamy (2018: 85)*

Mode	Predominant perception (N=48)	Predominant opinions elicited
Tuktuk	Neutral (37/48)	It is seen as 'OK', mostly praised for practicality and fun, but criticized for its undisciplined drivers.
Microbus	Positive (41/48)	It is mostly praised for its speed and availability.
Public Bus	Neutral (40/48)	It does not elicit distinct perceptions other than being 'OK', but is often compared to minibuses in terms of speed and availability, both being less.
Private vehicle (chauffeured by car or motorcycle)	Positive (44/48)	Being chauffeured is mostly praised for its comfort.
Pickup truck	Negative (45/48)	It is mainly criticized for being uncomfortable to 'climb' into and to sit.
Walking	Neutral (37/48)	It is seen as 'OK'. Walking is seen as normal and does not elicit distinct positive or negative responses.
Cycling	Positive (38/48)	Cycling is mainly praised for being fun, although not used as a mode for transport as a norm.

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Hosneya: The Tuktuk? The problem is that children are driving them and they drive quite erratically, and sometimes they have loud music. But it's ok, it's very practical for us here. For example, if I am carrying stuff back home, I won't walk, I will take a Tuktuk. I mean, what type of bus would be able to drive through these narrow and bumpy streets? (Mothers' Group 4, participant 2)

This recurring neutral or positive attitude in interviews may be attributed to the fact that mobility was comparatively much less comfortable in the past when roads were even poorer in quality and the commute experiences were more stressful. As an example, women needed to buy and transport water buckets carried on their heads on a daily basis before the recent advent of water infrastructure. This was within the lifetime of the interviewed mothers as they noted in the interviews:

Ahlam: The world is better now. Yes, we still complain about the garbage piles and bumpy streets, but I know in the old days we still didn't even have water or sewers in our homes. I used to walk long distances to get water until my neck would hurt. (Mothers' Group 1, participant 8)

Conversely, in the formal or richer areas of the city, both formal and informal public transport services are available but might not be considered or not appropriated due to subjective factors related to stigmatization or other affective factors, or due to lack of necessary skills and awareness of the norms of use as explained in the FGD group of mothers. As an example, payment of fares (all in cash) on the minibuses in Egypt is conducted collaboratively during the trip with little verbal cues necessary (a manifestation of skills, including social skills). The passengers first take their seats and then pass money to each other, and then they pass the change back and forth, and sometimes a volunteer even groups the payments of multiple passengers, all to minimize the effort for the driver to find change, to calculate, to monitor, to distribute tickets, etc. There is also a sign language used between the driver and passerby on the street to remotely communicate the station names and landmarks that the microbus will pass by instead of stopping and asking. It is normal for someone on the street to make a hand signal of a station as a microbus passes by based on a wide vocabulary of hand signals for station names and other frequently-needed messages used, while the driver may reply with another

hand signal to communicate the actual route or terminal station without slowing down, and vice versa. This exemplifies further manifestation of skills and local knowledge identified.

Shaimaa: Well, the people I work for, for example, they would never use public transport (giggling), they would be like tourists (other participants laughing and nodding in agreement) [...] not even the metro. (Mothers' Group 3, participant 2)

This indicates how in the formal and richer parts of the city, access to a certain service may be still available, but due to limited forms of appropriation and skills, the motility of the individual can even be more limited than an individual in an informal settlement such as Haggana in terms of potentiality of mobility. Furthermore, an acquired sense of safety (an aspect of appropriation) amongst parents in Haggana enables children to enjoy more freedom in mobility.

Sanaa: You know, during the [2011] revolution and in the absence of police forces, everybody was saying that places like Haggana are dangerous and they were afraid from men from Haggana spreading into the city and attacking them. They think we are all thugs [...]. But, actually, at that time it was much safer to stay inside of Haggana than outside [...] and you know, we also have doctors, engineers, and lawyers here. (Mothers' Group 4, participant 7)

Hala: People know each other here [...] outside of Haggana, the neighbors don't even know each other. Do you know that we don't even have one assigned policeman inside Haggana? And my children can still freely walk in the neighborhood streets at night. We just tell them to avoid some places, that's all. (Mothers' Group 3, participant 1)

With regards to the acquired sense of safety, this can be attributed to two observations: In Haggana, the social ties and natural surveillance in the neighborhood streets reinforce the sense of security, while the slow movement of vehicles on bumpy shared-use roads, and their limited numbers, reinforce the sense of traffic safety. This may be described as 'coincidental' traffic-calming. Either characteristic, whether natural surveillance or coincidental traffic calming, are recognized and appropriated for the benefit of children's mobility and freedom. Nevertheless, nuisances from

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increased motorization over recent years is noted and is a recurring theme in FGDs and interviews.

Heba (15): Cars [in Haggana] keep increasing in numbers and the streets are being filled with cars, trucks and tuktuks. It's not dangerous like the roads outside [of the settlement] with all the fast cars, but it is still getting more and more congested. (Children's Group 5, participant 9)

Furthermore, whether with regards to mobility inside or outside the settlement, the flexibility in options or strategies to improve the sense of safety (further manifestation of skills) also contributes to children's potential mobility.

Mostafa (11): In the morning I walk with my older sister to the station and I take the microbus. She takes the public bus... On my way back, I can take any 'mowasla' [transport service] I find there. I like playing games on my cell phone on the ride back, and sometimes [after arriving at Haggana] I find friends when I'm walking back home. It's fun. (Children's Group 4, participant 2)

Options in planning children's mobility, by both parents and children, include commuting with siblings, friends, or neighbors, whether for the entire trip or part of it, as well as improved coordination and monitoring of trips through the widespread ownership of mobile phones, or agreeing with children on some compromises, such as agreeing on certain parts of the settlement to avoid, etc. Accordingly, some fears are partly addressed without excessively limiting children's freedom; a manifestation of appropriation of existing skills. Furthermore, the past positive experience of parents and habitual use of walking and public transport services may explain children's positive representations of their means of transport and their appropriation.

With regards to another mode of appropriation, associated with lack of formal regulation, it is observed that the lack of formal regulation and law enforcement allows for flexibility and creativity in services, not only from the supply side, but also demand-side creativity and strategy-making to meet mobility needs. *Flamm and Kaufmann (2006)* note that strategy-making is indeed a manifestation of appropriation by which the realm of possibilities for mobility can be expanded. From this perspective, examples in Haggana include residents organizing within the commu-

nity for the use of a tuktuk for collective transport or as a shuttle service, or arranging for the use of private 9-seat buses for various informal services to optimize its use throughout the day, such as for cargo or as a school bus at certain hours, or for rental, in addition to the more common use for informal public transport. This usually involves an entrepreneur from within the community and is planned through negotiated oral agreements, and often results in an efficient use of the limited assets (vehicles) available to meet more mobility needs, even including cargo as observed. Such means of appropriation are partly enabled due to some freedoms enjoyed in informality. Notably, it is not adequate to describe this as a state of 'lawlessness', since lawlessness is a misleading description of the context. Although formal law is not enforced, there is instead an abundance of norms and tradition in informal settlements that govern the community, as well as certain forms of planning and enforcement that suit the local needs. Through such practices and strategy-making, parents and the local community at large therefore provide a substantial contribution to expand the field of possibilities for the motilities of themselves and their children.

From the perspective of motility (potentiality of mobility), results show that children in certain aspects may be viewed as enjoying more advantage (fields of possibilities and enabling factors) compared to their counterparts in the formal parts of Cairo in terms of certain competences and means of appropriation that characterize them and constitute their motility¹. In this respect, we argue that the observed relative independence and mobility of children in Haggana may better situate them to adapt to a future less dependent on cars if car-restraining measures are gradually introduced by planners or if awareness campaigns are launched to promote or maintain sustainable mobility.

There are, however, affective factors associated with car use that fulfill certain socio-psychological aspirations beyond the primary function of the car. In the case of Haggana, some of the examples include association with masculinity and qualification for marriage, improving social status, sense of control and leisure, among other perceived secondary functions of the car noted in recurring themes.

Soha: I hope my child will have a car when he grows up. He will probably buy a motorcycle once he starts working, especially that [youth like

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him] like to show off in front of girls that they can earn money and so. But I think motorcycles are dangerous. (Mothers' Group 2, participant 4)

There are also several context-specific limitations to mobility identified, which would need to be addressed. There were certain features of appropriation in the sampled population that also had a negative impact on actual and potential mobility. These included gender restrictions enforced by inherited social norms and attitudes and other affective factors. It is locally perceived as against the norms for a woman to drive a vehicle, and even more so if a bicycle, which is often referred to as impossible or 'unthinkable', and is often ridiculed during interviews, although acknowledged as a norm in other parts of Cairo. This can be viewed as an *appropriation gap*, or an opportunity for enhancing motility.

Safaa: Do you think it's imaginable that a woman from a popular district drives a motorcycle or a bicycle in the street? ...Maybe only on a motorcycle as a passenger behind her husband or brother or something. (Mothers' Group 4, participant 6)

Amaal: When my daughter grows up I wouldn't let her ride a bicycle. In principle I think it is ok, but not in Haggana. People would look at her and boys will bother her. This is not a high-class area. (Mothers' Group 2, participant 2)

Hanaa (13): How can we (girls) ride a bike? The boys will not leave us in peace, and even if for example I ride a bike, in my case my parents will actually let me, but you have Sara here, her dad is from upper Egypt [the south], and he will never let her. (Children Group 3, participant 5)

Further subtle social restrictions are imposed on adolescent girls and young women, the age range where families pay most attention to maintaining their daughter's reputation until marriage according to local tradition and a sense of responsibility. This is reflected in the additional protective considerations made for girls in this age range when planning their commute, such as more attentive monitoring by mobile phone communication and by ensuring availability of accompaniment from a family member (e.g. siblings) or other female friends seen as trustworthy. A common theme however throughout the FGDs is that it seems that such perceptions and attitudes are changing to the better with time, especially among

youth, which demands further research dedicated specifically to this rapidly evolving topic.

Furthermore, although diverse skills or aptitudes inherent in the settlement are generally seen as enabling the use of many options and arrangements for mobility, there are also certain context-specific deficiencies in skills and aptitudes as well. This is highlighted in the perceived limited physical abilities of women compared to males or to younger females, where women (especially married women) are commonly represented as being overweight by default, and equally so the expectations for the future of their female children. Other distinct deficiencies in skills are those associated with the literacy rates, especially among the older population.

A synthesis of the observations of how children's motility is enabled by both the parents and children shows that there are different ways to compensate for a deficiency in various components of motility, such as lack of access in one aspect being compensated with greater ability for appropriation of other resources or acquired skills, suggesting a characteristic of resilience noted in the studied community. This synthesis of research findings is concluded in the suggested conceptualization illustrated in *Figure 1*. The figure illustrates a conceptualization of motility of children as an intersection of its components of skills, access, and appropriation, which in turn can each be acquired or lost to compensate for one another. Annotations are based on recurring themes identified throughout the FGDs. Parental guidance and support are internalized in each of the components of motility, which is influenced by parents' perceptions and background factors (e.g. subcultures, socio-demographics, etc.). Accordingly, the components of motility are not only mutually supportive, but can also be conceptualized as such in order to discuss how different individuals (or groups) can have a deficiency (a gap) or an abundance in any of the components. Such an expanded view of the concept may facilitate better discussion, diagnosis and intervention in aspects of people's motility.

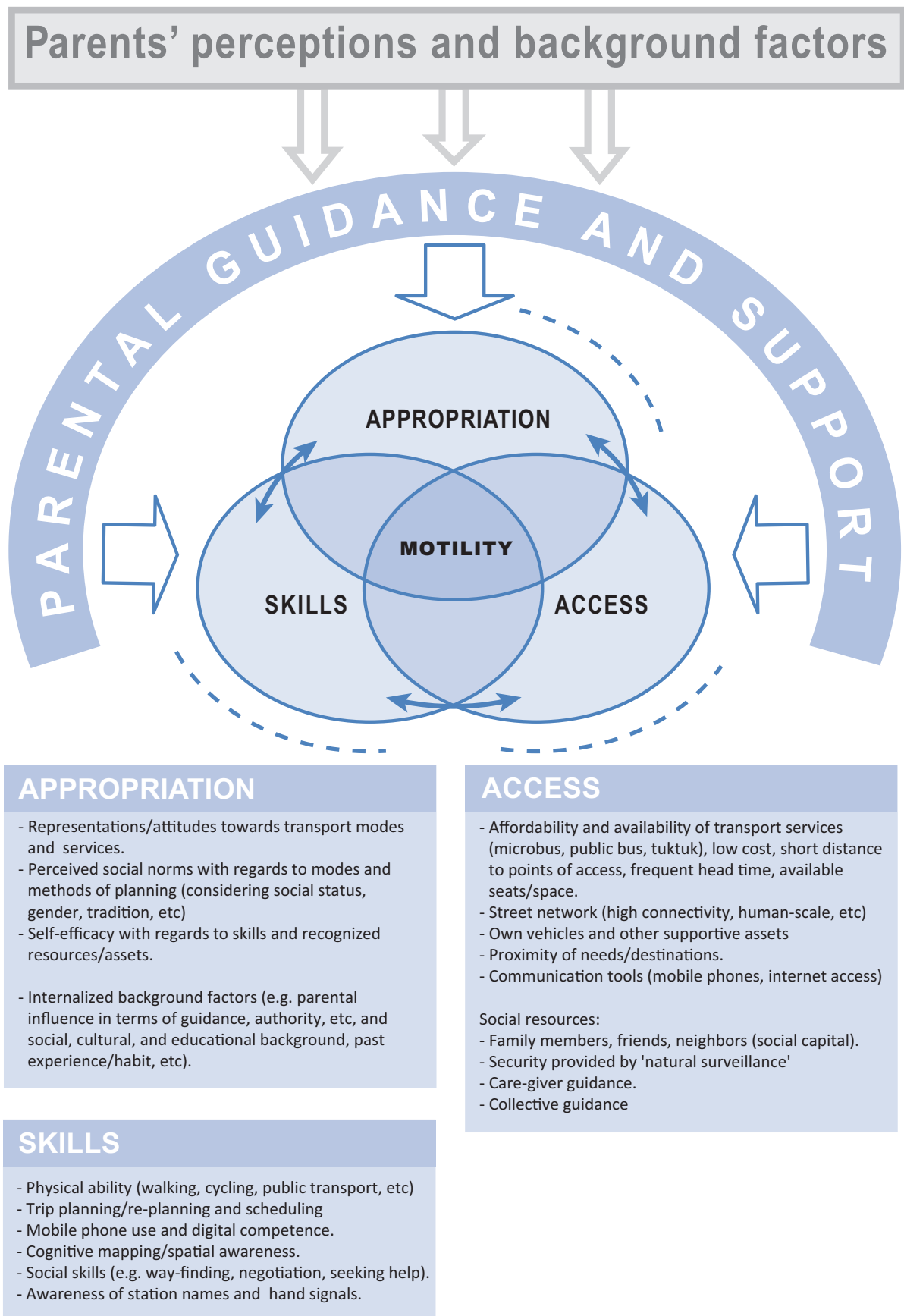


Fig. 1 Annotated illustrative conceptualization of children's motility in the informal settlement (dotted lines indicating variability in size). Source: El-Dorghamy (2018: 106)

8. Discussion and conclusion

Insights from the child-centered study of motility in the case study area suggests that Haggana can be viewed as a case of a 'leapfrog candidate' settlement, not only from the aspect of urban form but from the aspect of the high motility of residents, which may qualify them to better adapt to formal measures of promoting sustainable transportation. In this setting, the use of the motility concept as a framework for analysis was found suitable in accommodating the various intangible factors that influence mobility (or immobility), such as social, cultural, psychological, and other context-specific factors. The resultant conceptualization of motility, as informed by the FGDs, suggests the prevalence of a form of resilience, whereby a dynamic of mutual compensations between access, skills and appropriation can maintain the field of possibilities for mobility as enabled by the children and their parents. Accordingly, various forms of resilience towards sustainable mobility policies and programs (involving various constraints) is implied due to the diversity of elements enabling mobility as well as the coincidental prevalence of practices resembling sustainable travel behavior already. The focus on children in specific was informative in studying this perspective in recognition of the impact of childhood experiences in forming representations of travel modes and in socialization of travel behavior.

Both children and parents exhibit a high diversity in life skills associated with enabling mobility, and they are characterized as frequent users of public transport services and coincidentally follow travel behavior that resembles sustainable practices in many aspects (e.g. trip-chaining, walking, shared use, use of communication technology for better planning, etc.). These features are predominantly attributed to necessity and economic constraints. Results however indicate that such poverty-related lack of resources on one hand (including poverty, lack of public space, etc.) is compensated by acquisition of skills and development of appropriation of existing options on the other by both children and parents, i.e. exemplifying latent means of compensation developed in such context. Furthermore, alternative resources are made possible due to informal supply, where the lack of regulation provides a greater field of possibilities appropriated by the parents. This further contributes to maintenance of motility, such as in the creative development of local solutions to meet mobility needs. It is argued that with such acquired assets and appropriation of

resources, children in informal settlements of similar context can be better positioned to respond and adapt to sustainable transport policies and interventions introduced to their communities in the future due to such resilience. It is also foreseeable that certain deficiencies in aspects of appropriation of some transport options (e.g. those associated with gender constraints, or with illiteracy) may be in a diminishing trend as suggested in the FGDs. Accordingly, in terms of communities, rather than seen as the next car owners, they can alternatively be seen as a potential subject for leapfrogging so as to bypass the car-dependency phases of development.

It is also notable through field observations, the urban density is very high compared to the rest of the city, and mixed land use is a distinct characteristic of the settlement. This condition of suitable compact urban fabric resembles what was identified in Jones (2016) as one of the key factors necessary for the transition of a city from the pre-motorisation to the de-motorisation stage, noting that this highly walkable urban fabric is characteristic of old cities. In the observation of informal settlements in Greater Cairo, it is notable that this condition is evidently not only typical of old cities as noted in Jones (2016), but can also be found in more recently developed settlements that are also highly walkable, yet not because they are old, but rather due to the poverty-related low motorization prevalent during their recent formation stage, such as in the case of Haggana.

Implications of the findings of this exploratory research for policy makers and planners is that informal settlements of a similar context to Haggana can more easily accommodate imposed interventions promoting sustainable travel behavior that coincide with their own practices and norms, and should therefore be recognized as such and be indeed subjected to an early introduction of policies and regulations that moderate the increase in car dependence and motorization.

Notably, findings do not imply that such 'low-car' communities will remain as such in the future since aspirations are still aligned with the typical car dependence trajectory and with the consumerist culture that accompanies this perceived vision of modernity and wealth. The findings only imply that the *potential* to maintain this low-car status is there, and that measures to enforce a sustainable future (e.g. car restrictions and promotion of non-motorized transport

and public transport, etc.) can be better accommodated in these settlements, especially with regards to measures that constrain car ownership and use. The inhabitants are already habitualized to multimodal transport and have diverse skills and ability for various means of appropriation of resources (referring to norms, perceptions, attitudes, collective appropriation, creativity, etc.) to satisfy their mobility needs so as to avoid a typical car-dependence stage of development in the future as incomes increase and are accommodated to a relatively mixed-use compact urban setting.

The articulation of gaps in skills/aptitudes and gaps in appropriation also highlights alternative channels of intervention other than service supply (e.g. behavioral interventions and capacity building) that would enhance the lives of inhabitants of informal settlements of similar context. This research suggests a step forward in the development of frameworks for analysis that would facilitate the assessment of needs and design of asset-based interventions.

Note

¹ See *El-Dorghamy* (2018) for a deeper discussion of motility, the role of socio-psychological factors, and the relevance of the theoretical framework for studying disadvantaged communities.

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