

Child mobility in school-related decisions in Dutch renewal plans



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1: Summary:

This research will shed light on how child mobility is incorporated in urban renewal projects in several Dutch municipalities. Child mobility involves physical activity and independent mobility. Both concepts have benefits for children's health and well-being. Instead of investigating how child mobility and school-related decisions separately are incorporated in urban renewal plans, this research tries to make a connection between these two topics.

To investigate this, a document analysis and interviews were conducted based on four urban renewal projects in Rotterdam, Enschede, Utrecht and Groningen. Schools become increasingly sizable and central in function, which can negatively impact safe child mobility (Van der Klis, 2013). This should be accounted for in renewal plans, but that is not always apparent. Furthermore, schools themselves become increasingly responsible for managing and informing the municipalities about undesirable traffic situations. This design mediating mechanism demands continuous interaction with the municipality. However, as urban designs are the basis of safe child mobility, it is more important that child mobility is integrated in the planning process from the start. This integration is not always apparent, which demands the establishment of multidisciplinary teams that potentially devote more attention to child mobility.

Figure 1: Kiss and Ride Roombeek neighbourhood (Buro Sant en Co, n.d. (previous page)

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1: Introduction

1.1: Background

The majority of children in the Netherlands and other Western countries doesn't meet the guidelines regarding physical activity, leading to health risks amongst children (Aarts, 2011). Physical activity is associated with topics as free play, organized sports, walking and running (van Loon & Frank, 2011). Active transportation is also a form of physical activity: "it refers to physical activity for the purposes of transportation, primarily walking and cycling" (van Loon & Frank, 2011, p. 282). Besides health benefits, active transportation is also related to reduced noise, air pollution and traffic hazards associated with reduced traffic (van Loon and Frank, 2011). It is thus important to promote active transportation, especially among children, the adults of the future.

Next to active mobility, good urban renewal or urban revival plans should also stimulate child independent mobility. Children are increasingly restricted in their everyday movement (Pooley et al., 2005; Stark et al., 2018), for example visible in parents accompanying (often by car) their children to school. Independent mobility covers children going to school on their own by slow modes. A child inclusive urban design should accommodate active and independent child mobility.

However, urban renewal plans are not per definition inclusive regarding these two aspects. A notable difficulty is the fragmented policy field of child mobility. Amongst others, the educational department, mobility experts, landscape architects and city engineers all have different ideas about this issue. Child mobility is one of the many issues in urban renewal projects and is often only implicitly addressed.

As child active and independent mobility are important for children's well-being, it is important to investigate how child mobility can become more explicit in the decision-making process of urban renewal plans. Therefore, this research will investigate obstacles and opportunities in the decision-making process for the inclusion of child mobility (e.g. school routes, school zones, cycling paths) in Dutch urban renewal plans.

1.2: Research problem

This research aims to inform about the link between school-related decisions in Dutch cities' urban renewal plans and to what extent child mobility is included in these considerations. In other words, this research's central question is:

To what extent is child mobility incorporated in school-related decisions in Dutch cities' urban renewal plans?

Separately, the link between school-related decisions and urban renewal plans has been made, just as child mobility policy is sometimes taken care of in urban renewal plans (Boarnet et al, 2005). What is missing, however, is a distinct link between how a school-related decision (e.g. type of school) in a renewal plan also considers its impact on child mobility. This research aims to discover this via interviews with local authorities, policy documents and school documents.

The following sub-questions are relevant in this research.

- 1) *How is child mobility incorporated in Dutch municipalities' mobility policy?*

This question is relevant as most municipalities often have an overarching municipal mobility policy for urban renewal projects, but it is questionable to what extent child mobility is explicit in these policy documents. The mobility policy might contain some notions about pedestrian zones (especially around schools), bicycle lanes or parks without explicitly linking this to children.

- 2) *How do schools in urban renewal projects themselves deal with child mobility and how are they stimulated by the municipality to do so?*

This question is relevant as it provides information about the extent to which local governmental policy is stimulating schools to do something about safe mobility, and how it is actually written down in school documents. Some schools might (naturally) do more than other schools in this respect, but an inclusive urban renewal plan or child mobility policy can stimulate this.

- 3) *What are barriers or chances to the incorporation of child mobility in school-related decisions in urban renewal plans?*

The identification of barriers or chances to the incorporation of child mobility in renewal plans is interesting as an analytical tool as it will provide a certain checklist relevant to see how cities perform different compared to each other. Aarts (2011) already provides some barriers, but different barriers may be found in this research.

- 4) *What is the difference between Dutch major cities in integrating child mobility in school-related decisions in urban renewal plans?*

This reflective question will try to shed light on differences between cities on this topic and will argue how city approaches to this topic are different and how cities can learn from each other.

1.3: Structure

Chapter 2 will be a discussion of the theoretical background. This section will elaborate into what the topics child mobility and school-related decisions entail, and what results will be expected based on the literature. Chapter 3, the methodology, will address information about the data acquisition and analyzation and will briefly discuss research ethics. Chapter 4 will present the results of this research per case study. Chapter 5 will summarize these results and will try to answer the sub-questions. The final section includes a discussion section and recommendations for further research.

2: Theoretical framework

2.1: Theoretical background

Child mobility trends and ecological systems theory

First, it is important to understand what child mobility entails. Mobility covers the number of trips of individuals (volume), mode choice (the composition of traffic and transport) and distance (space) (van Wee et al., 2013). Trips of children are often made between home (start-end points), school, out-of-school centres and leisure activities (Christensen et al., 2011).

In this research, child mobility refers to child active mobility and child independent mobility. *Child active mobility* is about the importance of children going to their destinations via physical active transportation modes (cycling and walking). This has health benefits. Children are increasingly restricted in their everyday movement (Pooley et al., 2005; Stark et al., 2018). They are increasingly guarded by adults and day-care instances that limit *children's independent mobility* because they are (juridically) responsible for them. Safe school zones can reduce this guarding influence. Objectively safe school zones (where few accidents occur) can, however, be regarded by parents as subjectively unsafe (how parents feel it), which stimulates these parents to take the car (Gemeente Rotterdam, 2019). If more parents take the car, this stimulates even more parents to take the car, again rising out of subjective safety (Kearns and Collins, 2006). Thus children's 'independent mobility' is limited increasingly (Van Loon and Frank, 2011), which is undesirable regarding safe child mobility.

Acknowledging the above-mentioned mechanism and the importance of promoting active and independent child mobility, municipalities can influence this. Before looking into how this can be done, it is first important to understand that child mobility is influenced by multiple factors, which can be incorporated into an ecological model to highlight how these factors are related to each other. A widely adopted ecological model is Bronfenbrenner's 'ecological systems theory' (Bronfenbrenner, 1979). Bronfenbrenner mentions in his theory several scales that influence child development (Williams et al., 2009). The **microsystem** is the immediate setting of children (e.g. their home or their school). The **mesosystem** concerns the interactions between different microsystems (like the interaction between children and their parents). The **exosystem** is a system which children do not influence themselves but it nevertheless influences them. An example are the neighbourhood characteristics. Finally, the **macrosystem** is the larger societal system, e.g. culture and policies (Williams et al., 2009).

All these systems are relevant to this research. For example, the exosystem (neighbourhood characteristics) and microsystem (for example safe school surroundings) are stimulants for children's opportunities and how these can be reached. Following this reasoning, children's opportunities impact their mobility patterns. Broberg et al. (2013) link physical opportunities with child mobility in their Bullerby model. They mention: "the actualization of affordances motivates further exploration and mobility" (Broberg et al, 2013, p. 113). This implies that if there are no amenities available, then there is no reason to travel. However, there is more to the link between opportunities and mobility. Badland et al. (2016) mention that amongst others build environment, parents perceptions and school policies limit child 'independent mobility', and limit children's opportunities (Bronfenbrenner's mesosystem). The link between child opportunities and child mobility is important for how to shape safe cities regarding child mobility (Williams et al., 2009).

The neighbourhood design (exoscale) is very important for child mobility. An urban renewal plan starts with policy documents (macroscale) issued by municipalities. These policy documents (for example municipal mobility documents) are extensively investigated in this research. Designs that are stimulating for child mobility involve how a child reaches his/her destinations, but these designs should also consider how parents perceive the neighbourhood, as they have a big influence on their children's mobility (Bronfenbrenner's mesoscale).

Responsibilities of local authorities and multidisciplinary cooperation

To increase children's independent mobility and their ability to choose "slow modes", a neighbourhood's design can stimulate this. Van Loon & Frank (2011) explain that the built environment can enhance children's physical activity in several ways, notably regarding access and design of the built environment. The *design side* includes the design of streets and parks and playgrounds. Infrastructure improvements like sidewalks, wide bicycle lanes and zebra crossings potentially make physical active transportation more attractive (Boarnet et al., 2005). The *access side* includes density, mixed land use and access to specific uses. The more dense a neighbourhood is, the more active transportation modes are favoured by children and their parents or caretakers (Van Loon & Frank, 2011), and the more social control or "eyes on the street" (Jacobs, 1961) there is. A mixed land-use design concerns the proportions of commercial, residential and other land uses and is expected to increase active transportation. Access to specific uses as proximity to schools and playgrounds also impacts child active mobility. This is also explained by Broberg et al. (2013), who argue that a child-friendly environment is one where children can realize many affordances independently. These elements of the built environment can stimulate a child-friendly physical design.

Municipalities can also state in policies to stimulate schools themselves to teach children at a young age in cycling so that children and perhaps, more importantly, their parents (being guardians) (Zinnecker, 1990) might consider the bicycle as a safe option and will therefore substitute the car for the bicycle. The responsibility of a local authority thus **seems** twofold: (physically) designing neighbourhoods and stimulating schools to enhance safe child mobility. Every municipality performs urban renewal in its own way, within an institutional framework laid down by higher authorities. It is up to individual local governments to decide how and to what extent child mobility is incorporated in urban renewal plans. It is also up to municipalities to decide to what extent child mobility is part of an overarching municipal mobility policy.

It is important that local authorities integrate multiple departments to cooperatively create an urban renewal plan. Safe child mobility stimulating neighbourhoods are best off when departments as public health, sports and education and spatial planning cooperate (Aarts, 2011). However, Aarts also mentions that there are barriers that hamper this multi-level cooperation. Examples of these barriers are lack of time, lack of resources, lack of support of the other domains or lack of awareness. Snowdon et al. (2010) argue that a design will be realized if it is politically, technically, culturally, cost and legally feasible. Aarts (2011) argues that for a child-friendly design especially political, cultural and cost barriers are most important. Awareness of the benefit of a multi-disciplinary collaboration could be improved via cost-benefit analysis or training of politicians (Aarts, 2011). The identification of these barriers or opportunities will be central to this research, as these highlight where cities might improve in in the context of safe child mobility.

A decision some governments explicitly make about schools is the desired type of school. A recent trend in school policy in renewal plans is the inclusion of a 'Vensterschool'. These 'Community Schools' are situated in buildings which also facilitate day-care and other neighbourhood facilities as libraries and sports facilities (du Bois-Reymond, 2009). The main goal of these schools is to enhance education, especially for children with little (Western-) cultural capital. By offering multiple facilities and disciplines in a single location, the aim is that staff members can learn from each other's expertise, thereby increasing educational and other possibilities for children (Wiekens, 2010). These schools are also implemented in the case studies in this research. This trend of bigger schools can partly be explained by the "foundation" and "maintaining" norms of schools in Dutch municipalities, which reflect the number of children necessary to maintain or to be able to find a new school. These numbers are increasing (VNG, 2008); (Ministerie van Onderwijs, Cultuur en Wetenschap, 2018). However, on some occasions, child mobility then becomes at stake, as Van der Klis also acknowledges (2013). More sizable schools might attract more parents by cars at peak moments like 8:15 a.m. (Van der Klis, 2013), thereby adding to the relative unsafe school environments and potentially more children being brought to schools by cars (Kearns & Collins, 2006). It is questionable whether this increase in size of schools has been accounted for (financially or spatially) in urban renewal plans.

2.2: Conceptual models

The model in figure 2 builds upon ecological systems theory from Bronfenbrenner (1979) and the ecological model of Williams et al. (2009). An important difference in figure 2 with the ecological model by Williams et al. (2009) is the explicit mentioning of the macro- and exoscale. Neighbourhood characteristics or 'local community' (Williams et al., 2009) are allocated to the exoscale, as children themselves do not influence the neighbourhood (e.g. its traffic or its playgrounds) but are nonetheless influenced by this.

The child's home situation influences child mobility in a way that is hard to influence by policies directly. Examples of this are having access to a car or being allowed to go to school by bike (Williams et al., 2009). As mentioned before, parent perceptions are important in a child's mobility, and these can be addressed via solid neighbourhood design or training, which is something where schools can play a role in.

The neighbourhood design plays an important role in the amenities within a child's range, or as Broberg (2013) mention, the neighbourhood design plays a role in the affordances a child can actualize. Furthermore, a neighbourhood design also plays a role in the social contacts of children.

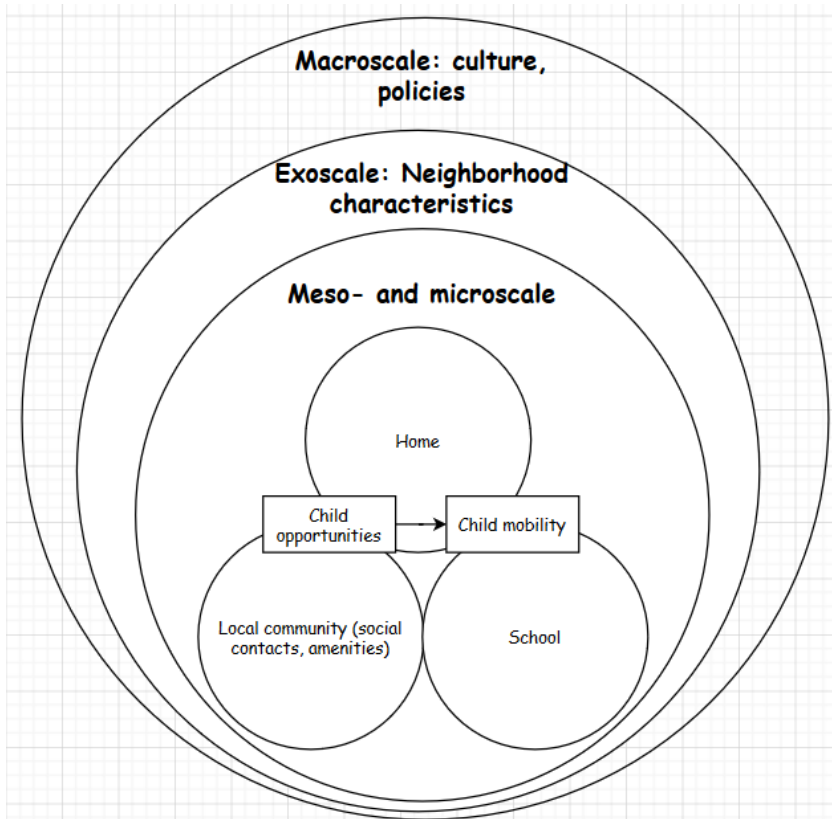


Figure 2: *Conceptual model: the embeddedness of this research in ecological systems theory.*

Next to that, especially important in this research, policies (Bronfenbrenner’s macroscale) are important in defining how schools impact children’s mobility. Figure 3 shows that urban renewal (or revitalisation) influences child mobility and school considerations. For example, the amenities a renewal project provides influence children’s mobility, which explains the direct link between urban renewal and child mobility. Child mobility might also influence urban renewal backwards, as a situation considered unsafe might spark the development of new urban renewal plans. As shown in figure 2, schools also influence a child’s mobility. This happens for example via training or via acquired social contacts via schools.

It is important that the links between child mobility and schools and urban renewal on a macro- (policy) scale are dashed in figure 3. This illustrates that in urban renewal plans there is some link, but the extent to this is vague, and often not explicit, which is the topic of this research.

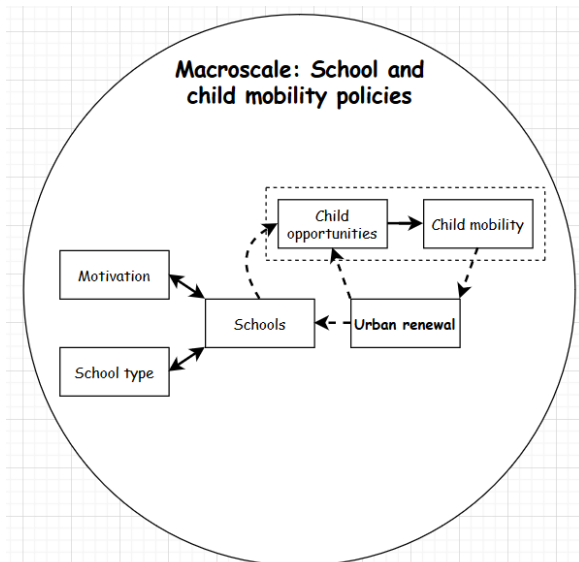


Figure 3: Conceptual model highlighting the link between urban renewal, school considerations and child mobility. Dashed arrows indicate vague linkages.

2.3: Hypothesis

It is expected that most studied renewal plans provide information on how the urban renewal plan would deal with mobility, and also on how an urban renewal plan would deal with school considerations. However, it is unclear to what extent **child** mobility specifically is taken up in municipalities' mobility policy and, furthermore, it is questionable to what extent that child mobility policy is incorporated in school-related decisions. This is expected not to be that apparent, at least not explicitly. It might be that some municipalities have an overarching policy about motivating schools to promote cycling to children. This would imply that there is a concern in that municipality over safe mobility for children. However, this doesn't imply that an urban renewal plan in that same municipality has child mobility as one of its main priorities. This might be explained by the expected fragmentation of child mobility in municipalities, as child mobility in itself is often an implicit topic considered by multiple municipal departments in their own way (e.g. education, mobility).

3: Methodology

3.1: Methods

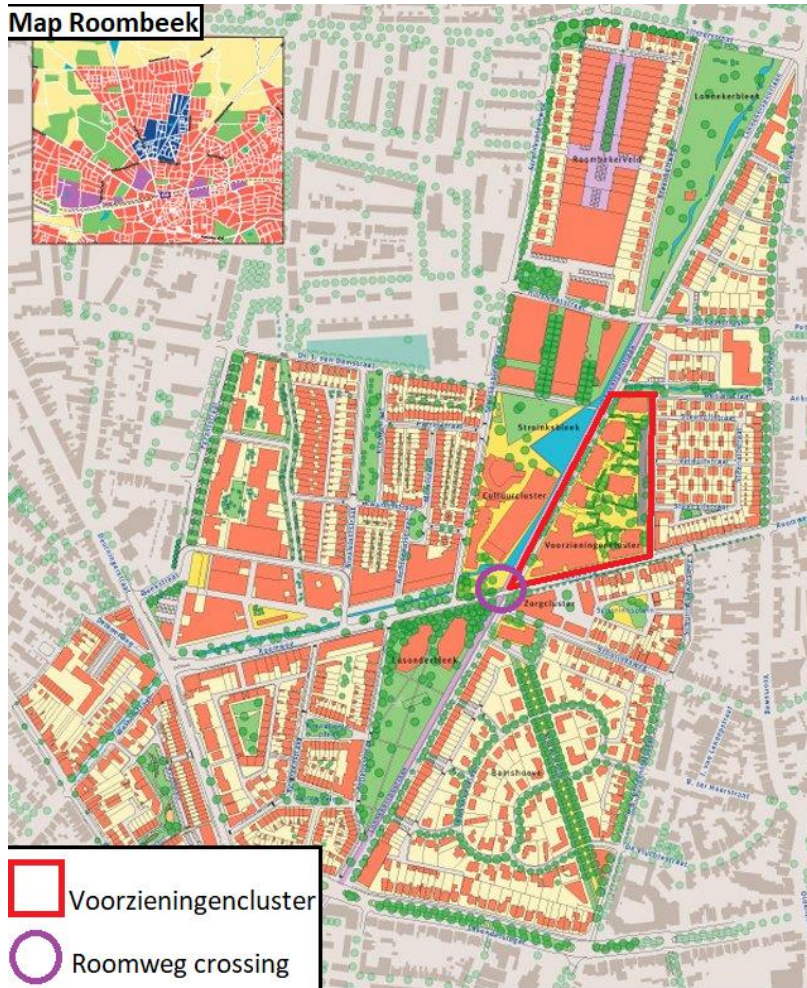
The main research question and its sub-questions will be answered using document analysis and via interviews with civil servants of municipalities. Document analysis and interviews together provide insight into this research's topic, an approach called 'triangulation' (Bowen, 2009). These qualitative methods are chosen because the aim of this research is foremost to discover underlying mechanisms about child active and independent mobility instead of backing already discovered mechanisms.

Document analysis will be useful to discover how schools motivate children to use active transportation (school documents) and how municipalities try to stimulate this (municipal documents). The interviews will be most important to investigate barriers and opportunities for safe child mobility and how the municipalities in question are different in respect to child mobility and school-related decisions.

3.2: Background of the dataset

The urban renewal locations investigated in this research are located in the municipalities of Groningen, Utrecht, Rotterdam and Enschede. These municipalities are all major Dutch cities. The specific urban renewal projects in this research are the Nieuwe Merwedewijk in Utrecht (Gemeente Utrecht, n.d.-1), the Groenewei in Groningen (Gemeente Groningen, 2019-2), Park 16 Hoven in Rotterdam (Gemeente Rotterdam, n.d.) and the Roombeek neighborhood in Enschede (roombeek.nl, n.d.), which are all large-scale urban renewal projects. All urban renewal projects incorporate 'Vensterscholen'.

Map Roombeek





-  Voorzieningencluster
-  Roomweg crossing

Figure 4: Map of the Roombeek neighbourhood with its amenities cluster (which includes two primary schools) and the busy Roomweg crossing (Adapted from: De Kolonisten, 2008).

Map Groenewei



-  Planned school

Figure 5: Future map of the Groenewei neighbourhood with its school location (Adapted from: Gemeente Groningen, 2019-2).



Figure 6: Future map of the Nieuwe Merwedewijk and its potential school search areas (Adapted from: Gemeente Utrecht, 2019).

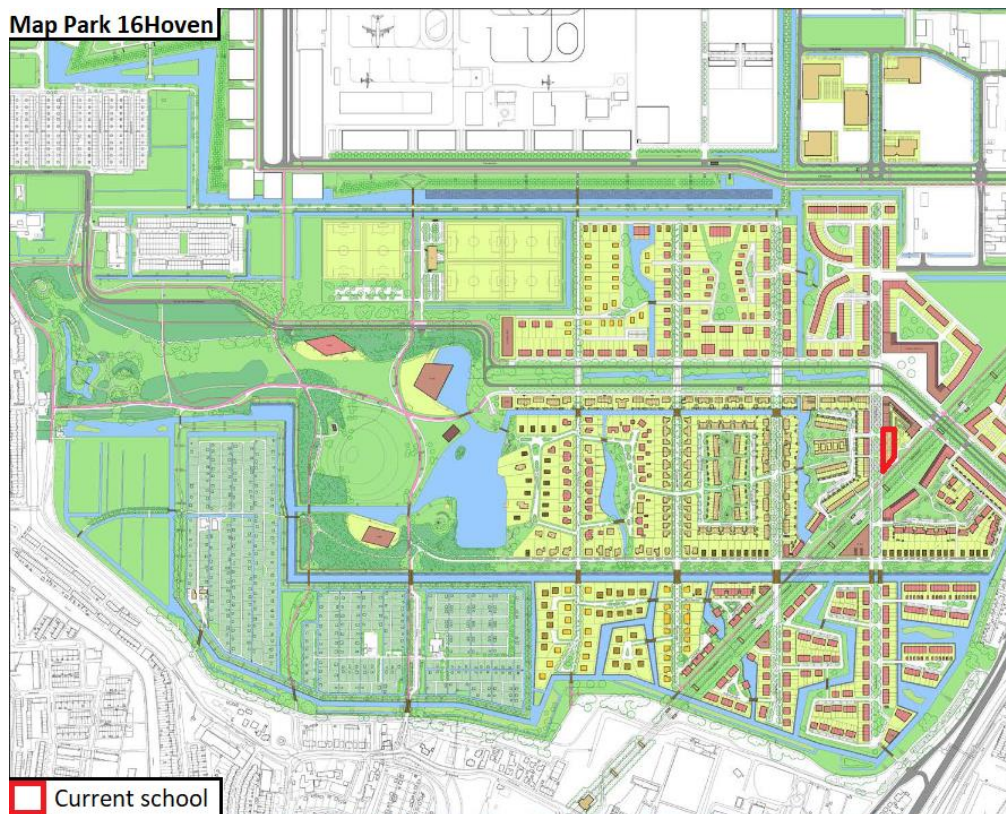


Figure 7: Future map of Park 16Hoven and its current school (Adapted from: Integraal projectteam Park 16Hoven, 2017).

Renewal project	Location	Project phase	Initiated	Finished
Roombeek (Enschede)	Close to the city centre	Realised	2000	2019
Nieuwe Merwedewijk (Utrecht)	Close to the city centre	Decision-making/preparation	2017	-
Park 16Hoven (Rotterdam)	Edge of the city	Partly realised, partly under construction	2007	-
Groenewei (Groningen)	Edge of the city	Under construction	2017	-

Table 1: General information about the neighbourhoods in this research (Timmerman et al., 2004; Gemeente Groningen, 2019-2; ds+V Juridische Zaken & team Bestemmingsplannen, 2007; Gemeente Utrecht, 2019).

Renewal project	School location	Type of schools	Infrastructure connecting it
Roombeek (Enschede)	Central	BS school-like	Bus stop, separated bicycle lane and street with Kiss-and-Ride provision (that can be used as a school square after kiss-and-ride function)
Nieuwe Merwedewijk (Utrecht)	Potentially central	BS school-like	Potentially: cycling and pedestrian connection.
Park 16Hoven (Rotterdam)	Central	BS school-like	Separated bicycle lane and busy street network (especially early-morning)
Groenewei (Groningen)	Edge of the neighbourhood	BS school-like	Separated bicycle lane, Kiss-and-Ride provision and dead-end street connection

Table 2: Information about the schools in the neighbourhoods (Timmerman et al., 2004; Gemeente Groningen, 2019-2; ds+V Juridische Zaken & team Bestemmingsplannen, 2007; Gemeente Utrecht, 2019).

Figures 4-7 show maps of the renewal projects involved in this research. Table 1 and 2 provide information about these neighbourhoods and the schools in these neighbourhoods. The renewal projects are selected for this research because they are sizable and under development or recently developed.

From these projects, 6 interviews have taken place (at least one with each municipality) with traffic experts ('verkeerskundigen'), landscape architects or project managers directly involved in the urban renewal projects (appendix 1). The traffic experts provided insights in child mobility considerations (in general and in relation to schools) and in barriers why their ideals would not always be realised. The landscape architects provided insights into the neighbourhood characteristics (for example into their playfulness or safety). The project manager involved revealed how different interests (including child mobility) were balanced in urban renewal projects.

The interviews lasted 30 – 45 minutes. The interviews contained semi-open questions. Acquiring a deep understanding of child mobility in urban renewal projects requires open questions, not closed questions. However, some questions will be asked to all

interviewees. These fixed questions (making the interview semi-open) are important to enable cross-case comparison.

3.3: Collected data

Interviews

The interview structure for the semi-open interviews is adapted from Rucker (2017). It consists of 1) setting the stage, 2) warm-up questions, 3) sensitive questions close to the participant, 4) and closing questions. Points 1 and 4 of the interview guide are relatively stable. The body of the interview guide is more flexible. The fixed questions used in the interviews are mentioned in appendix 2.

Based on the research questions, the interviews mostly focus on: (1) how municipalities accommodate child mobility in their physical designs, and how they make links with school-related decisions (location, type, function) and child mobility?; (2) barriers and opportunities for the inclusion of child active and independent mobility for urban renewal plans; (3) how municipalities stimulate schools to promote child active and independent mobility; and (4) how unique the relevant urban renewal plans are in the stimulation of child mobility (there might be interesting changes with the past) compared to other neighbourhoods.

Document analysis

The document analysis will be performed on two types of documents: municipal and school documents. The municipal policy documents (the municipal mobility plans and the mobility plans in the relevant urban renewal projects) will be used to investigate how child mobility is incorporated in municipalities' mobility policy.

School documents are investigated to see how schools motivate children to use active transportation. Combined with insights from the interviews on how schools are stimulated by the municipality to motivate children to use active transportation, these school documents will shine a light on to what extent (different) approaches by municipalities to stimulate schools to motivate active transportation succeed (when they are taken up by the schools themselves). Appendix 3 shows all used documents in the document analysis.

3.4: Data analysis

Interviews

After transcribing the interviews, these will be analysed with ATLAS.ti, a program enabling easy coding and memoing of documents (atlasti.com, n.d.). The coding will ensure that the separate interviews can be compared with each other based on codes, which is especially relevant for comparing cities. For example, the code "barriers" will resemble all parts of the text about barriers to the inclusion of school considerations and child mobility in urban renewal plans. This brings clarity to the transcribed texts.

The coding strategies applied in this research come from Patel (2014) and Saldaña (2013). A detailed example of the way of coding is highlighted in appendix 4, and it follows the following logic: Coding in qualitative analysis consists of 2 cycles. The first cycle is the start, the second cycle is a reorganization of the first initial analytical details (Patel, 2014). The coding strategies from the first cycle that this research will apply are magnitude coding and descriptive coding. Magnitude coding counts the frequency of used terms in a text (Patel, 2014), and will be relevant to illustrate how important certain topics are according to

the interviewees. Descriptive coding, which is more prominent in this research, means the categorization of text in a few words (Patel, 2014). The coding strategy most prominent in the second cycle is pattern coding, a strategy comparable to structural coding that summarizes smaller descriptive codes into a single group summary (Patel, 2014). Another used coding strategy, focused coding, is similar to magnitude coding (first cycle) and is used to investigate how often these bigger groups come forth in the analysis (Patel, 2014).

The different (types of) codes provide input for summaries made from each interview and each municipality. Finally, these summaries are compared with each other and with the summaries of the document analysis. This information has been taken up in chapter 4.

Document analysis

Bowen (2009) argues that document analysis consists of 2 types: content and thematic analysis. Content analysis means the organization of information into categories related to the central research questions. An example of this would be to highlight all parts related to child mobility. Thematic analysis refers to a deeper analysis to recognize patterns within data (Bowen, 2009), for example by combining descriptive codes into bigger group categories (pattern coding) (Patel, 2014).

3.5: Ethical considerations

The interviewees' names will be anonymized. The interviewees are only mentioned in forms as: 'interview 1 mentions...', to guarantee the anonymity of interviewees. The transcribed interviews have been approved by the interviewees. The data will be deleted a few months after finishing this research.

4: Results

Roombeek, Enschede

Child mobility in municipal mobility documents

The municipality focusses on liveability and slow modes (especially cycling) (Keypoint, 2017). Traffic safety is regarded as a precondition for economic functioning, durability and physical activity (Gemeente Enschede & Goudappel Coffeng, 2019). The municipality tries to achieve this by following the national Duurzaam Veilig approach, which focuses on education, communication (street or crossings design) and surveillance. The municipality supports schools with traffic education programs. The municipality desires to via design (Bronfenbrenner's exosystem) keep Enschede accessible by all transport modes, including the car (Keypoint, 2017). However, the municipality also desires to reduce cars on secondary roads in the neighbourhoods (Gemeente Enschede, 2004). Improved cycling routes towards the city centre will make neighbourhoods more child friendly as well.

The neighbourhood

School zones and direct cycling routes are implemented in Roombeek. Furthermore, car-free parks, walking paths and speed-reducing measures also enhance liveability in Roombeek (interview 1). By devoting attention to the busy Roomweg crossing near the schools, the municipality sees the school environment as more than school zones alone. This crossing was mostly designed out of urban design interests. From a traffic safety perspective, the crossing is however undesirable (interview 1 and 2). This illustrates multiple interests and the communicative barrier.

Schools and child mobility

The schools in Roombeek recognize that parents strongly influence children's mobility behaviour, so they want to stimulate them as well, for example with the school's traffic commission. However, the busy Roombeek crossing and traffic around the Kiss-and-Ride zones (interview 2) stress the importance of substantiating the municipalities' facilitating role with ongoing conversations with schools to address subjective safety so that both the municipality and the schools do not shift attention away from this (interview 2).

Reflection

Spatial, organizational and communicative barriers are most important in this renewal project. According to interview 2, the organizational situation continues to improve, but there is still room to improve communication between departments to enhance safe child mobility especially while starting new projects.

Nieuwe Merwedewijk, Utrecht

Child mobility in mobility documents

Public transport and slow modes are prominent in keeping Utrecht accessible by all transport modes (Gemeente Utrecht, 2012). The recognized benefits of slow modes concern liveability, durability, accessibility and space uptake. Children are more explicitly recognized as target group (not only as vulnerable group) for mobility measures compared to the other municipalities. Children are in transition phases (making them sensitive to behavioural changes) and might stimulate parents to use slow modes (Gemeente Utrecht, 2016).

Behaviour of schools and users (like parents parking their cars at undesirable locations) are regarded as important in relation to safe child mobility. Similar to Enschede, the municipality therefore cooperates with schools and neighbourhoods (Gemeente Utrecht, 2015). Much responsibility is given to schools regarding traffic education and managing safe school environments (Gemeente Utrecht, n.d.-2).

The neighbourhood

The Nieuwe Merwedewijk will be green, walkable and bicycle-friendly. This promotes child active mobility. The almost car-free neighbourhood will be therefore very child-friendly, although crossings at the biggest streets and direct cycling routes are attention points (interview 3).

Schools and child mobility

Schools in the neighbourhood will be located not directly adjacent to but near the direct cycling routes due to the large number of cyclists passing these direct routes (interview 3). As the schools are hardly accessible by cars, managing the safety situation around school routes and school zones by the schools themselves will be relatively easy compared to other neighbourhoods.

Reflection

Most important barriers regarding child mobility in this case are financial (according to interview 3 schools conflict with real estate value) and communicative. There is even political opportunity because of the “active councillor” (interview 4) regarding child mobility. The municipalities’ multi-disciplinary aim already mentioned in their mobility documents (Gemeente Utrecht, 2015) might explain why child mobility has reasonably been considered in the renewal project (interview 3). Increased transparency in communication might promote active child mobility even more.

Groenewei, Groningen

Child mobility in mobility documents

The municipality recognizes that slow modes have benefits regarding durability, physical health and liveability (Gemeente Groningen, 2017). Similar to other municipalities, Groningen focuses on safe infrastructure, behaviour and surveillance to enhance liveability and physical activity (Gemeente Groningen, 2017). Children are recognized as vulnerable, and education is important so that children and their parents appreciate slow modes. The municipality cooperates with schools and citizens regarding unsafe crossings and safe school environments (Gemeente Groningen, 2017). The municipality desires green school zones on walking distance with sufficient bicycle-sheds to stimulate slow modes (Gemeente Groningen, 2019-1). Similar to Utrecht, the municipality deliberately desires to replace car parking with public space (Gemeente Groningen, 2019-1).

The neighbourhood

Cars will be important in the Groenewei because of its location at the edge of Groningen. Therefore, the Groenewei applies speed reduction measures, shared space and parks (‘Groene Hoven’) acting as physical barriers for cars (not for slow modes) that pushes them towards the bigger road adjacent to the neighbourhood (Gemeente Groningen & Goudappel Coffeng, 2019). Although school routes are not mentioned in the municipal mobility

documents, a cycling route in the Groenewei passing through the 'Groene Hoven' is essentially a school route (interview 5).

Schools and child mobility

The planned school is located at the edge of the Groenewei so that its feeding area is extensive (it also borders other neighbourhoods). This limits school traffic from other neighbourhoods through the Groenewei (interview 5). Schools in Meerstad (the city part that includes the Groenewei) are generally active regarding the promotion of slow modes and safe school environments. They actively cooperate with the municipality. As the school in the Groenewei is part of the same organization, this can also be expected here.

Reflection

This active cooperation between municipalities and schools but also between municipal departments can be partially explained by the municipalities' project team Meerstad ('Bureau Meerstad'). By working in an integrated project team, it becomes easier to integrate child mobility in the design. This might explain that the communicative barrier was less apparent than compared to other municipalities (interview 5).

Park 16Hoven, Rotterdam

Child mobility in mobility documents

The municipality recognizes the benefits of slow modes (liveability, durability and physical activity) but also acknowledges that Rotterdam needs to remain accessible by car. (Gemeente Rotterdam & Goudappel Coffeng, 2017). Like other municipalities, Rotterdam applies Duurzaam Veilig, which focuses on infrastructure (networks and black-spots), behaviour (steering by design and education) and surveillance (Stadsregio Rotterdam, 2003).

Children are vulnerable but not regarded as the most important target group to address behavioural change. School zones and school routes are considered as prerequisites of child independent mobility (Gemeente Rotterdam, 2019). Schools themselves are responsible for informing the municipality about unsafe traffic situations.

The neighbourhood

Park 16Hoven is somewhat comparable to the Groenewei: it is relatively green, located on the edge of the city and cars have a relatively prominent position (ds+V Juridische Zaken & team Bestemmingsplannen, 2007). The green, physical barriers in Park 16Hoven are more avoidable than in the Groenewei. The permanent school is located on a relatively busy street. The school is also accessible via a separate cycling path, but there are tensions where cars and cyclists meet (interview 6).

Schools and child mobility

The neighbourhood contains one permanent primary school and some temporary schools. The municipality actively cooperates with the permanent school about the safe school environment. The traffic commission stimulates parents to not park their cars next to the school, but this creates undesirable traffic elsewhere in the neighbourhood (interview 6), a similar tension that interview 2 (Enschede) also acknowledges. For reaching the temporary schools, children have to cross a busy street. Attention to this crossing can be seen as an indication of school route considerations (interview 6).

Reflection

The communicative barrier is most apparent. Other interests than child mobility might explain that the school is located in a busy street. Although this school location highlights the need for early involvement of traffic safety, interview 6 mentions that continuous participation with schools can mediate this. The municipality currently shifts attention from cars to slow modes, but this is not fully reflected in Park 16Hoven because of its location, its intended (middle-income) residents, and because the design has been developed earlier than this shift in attention (interview 6).

Table 3 summarizes the strengths and attention points mentioned in the results section.

Renewal project	Strengths	Attention points
Roombeek (Enschede)	<ul style="list-style-type: none"> – Car-free parks and room for slow modes makes slow modes attractive – Separated cycling path from the main road near the primary school 	<ul style="list-style-type: none"> – Tensions at the busy Roombeek crossing (subjective safety complaints) – Organizational barrier: room for improved communication and early involvement of child mobility in school considerations
Nieuwe Merwedewijk (Utrecht)	<ul style="list-style-type: none"> – Almost entirely car-free and green neighbourhood – Political opportunity (active councillor) for the inclusion of child mobility – Development of the neighbourhood with an integrated team, in which child mobility appears to be taken up extensively from the start 	<ul style="list-style-type: none"> – Potentially unsafe crossings with the direct East-West cycling routes – Busy East-West main road cutting through the neighbourhood – Communicative barrier: Transparency can be improved and political games are apparent
Groenewei (Groningen)	<ul style="list-style-type: none"> – Development of the neighbourhood with an integrated team, in which child mobility appears to be taken up extensively from the start – Physical barriers (parks) impermeable for cars – Green (school) environment 	<ul style="list-style-type: none"> – The car has a prominent function in the neighbourhood – The larger road around the neighbourhood makes the neighbourhood isolated from the rest of the city. This road might be relatively

	<ul style="list-style-type: none"> – School located at the edge of the neighbourhood, so that the least amount of traffic goes through the neighbourhood itself – Slow mode route (school route) throughout the whole neighbourhood. 	hard to cross for children
Park 16Hoven (Rotterdam)	<ul style="list-style-type: none"> – Green character and room for slow modes makes slow modes attractive – Attention for both school zones and school routes (somewhat) – Separated cycling path from the main road near the primary school – Active traffic commission at the primary school 	<ul style="list-style-type: none"> – Permanent primary school located at a relatively busy street – Communicative barrier: lack of early involvement of child mobility in the planning process – The car has a prominent function in the neighbourhood

Table 3: Strengths and attention points per renewal project.

5: Conclusion

This research intended to clarify the following:

To what extent is child mobility incorporated in school-related decisions in Dutch cities' urban renewal plans?

This research incorporated document analysis and interviews in four case studies. In short, child mobility and school-related decisions separately (without being considered in connection with each other) were considered in all four projects. However, these two topics were often not approached in an integrated fashion. Involvement of child mobility from the start in planning is crucial to improve child mobility in renewal projects. The following paragraphs clarify this further.

The incorporation of child mobility in Dutch municipalities mobility policies

Municipalities desire to stimulate slow modes because of liveability, safety and durability benefits (Gemeente Groningen & Goudappel Coffeng, 2019). The municipalities recognize the importance of slow modes, especially for children. Some municipalities recognize that children are the parents of the future and are involved in transition phases and therefore an important target group to steer behaviour (Gemeente Utrecht, 2016).

School routes are not explicitly mentioned in the municipal mobility documents, although this focus generally shifts (interview 2). School routes in the neighbourhoods investigated are however somewhat considered, as all municipalities agree that schools should be located at least near the main cycling network. Although some projects in this research appear at first glance to be more child-friendly than others, it should be noted that location, intended target group and time of development are very important mediating macro-factors that influence this (Williams et al., 2009). Slow modes are recently getting increasing attention, and they can easier be stimulated when a neighbourhood is located close to the city centre.

Stimulation of schools of child mobility

The municipalities have a facilitating role (for example via traffic education) towards schools to stimulate child mobility. Schools are increasingly responsible for informing the municipality about unsafe traffic situations. Continuous participation (initiated by the municipality) with schools is required to keep school environments safe (interview 2).

Barriers and opportunities to incorporate child mobility in school-related decisions

In this research, the political (e.g. political colour) and cultural (e.g. planning culture) barriers following Aarts (2011) and Snowdon et al. (2010) were apparent. The financial barrier that these authors mention was however not as apparent as they suggested, although examples exist about school considerations that do not always match with real estate (interview 4). But the most mentioned barrier in this research (not by Aarts and Snowdon et al.) is the organizational or communicative barrier.

Integration of departments especially early in planning is required since the urban fabric is hard to change after development. This can be mediated by continuous cooperation with schools (interview 2). Nevertheless, the planning phase is still the best phase to ensure that school environments are safe, which requires a balancing of interests.

As (Venster) schools are getting increasingly sizable (VNG, 2008), this does not mean that more budget is becoming available to increase the infrastructure's safety to accommodate the people (potentially coming by car) that go to these schools. This might put extra pressure on the traffic safety situation around these schools. This tension might be created by some interviewees notions that it takes sometimes a lot of effort to get in touch with other relevant departments (the organizational barrier). It might be even that departments without communicating with other departments go to the municipal council too early to deliberately put their plans through, which is undesirable considering mutual trust (interview 4). It is therefore advisable for municipalities to improve communication early on in the planning process to enhance child mobility in urban renewal projects in an integral fashion. For sizable renewal projects in sizable municipalities, working in multidisciplinary teams as in the Groenewei case (Bureau Meerstad) might provide a solution to this. This may require a change in planning culture (macrosystem) (Williams et al., 2008).

Reflection

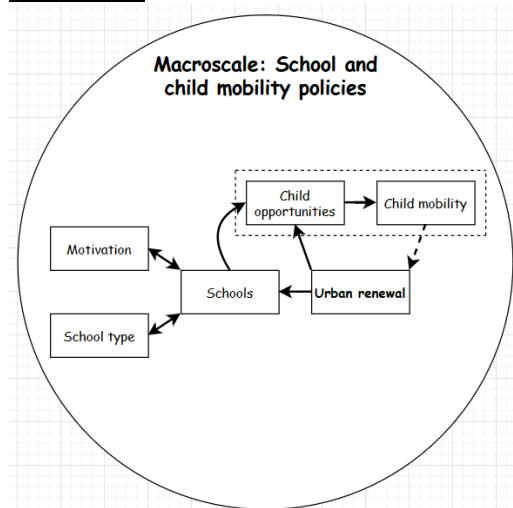


Figure 8: Conceptual model highlighting the link between urban renewal, school considerations and child mobility. Dashed arrows indicate vague linkages (adapted from figure 3).

Figure 8 is an updated version of figure 3, in which three previously dashed lines are made solid. (1) An urban renewal plan involves school considerations (location, size). (2) It also influences children's opportunities and child mobility via the neighbourhood's design (Bronfenbrenner's exosystem). (3) Schools influence children's opportunities and child mobility (Bronfenbrenner's mesosystem), for example via active traffic commissions.

However, the impact of child mobility on urban renewal is still vague. Although municipalities understand the impacts of a school's location and size on the child mobility situation it seems that child mobility is often only marginally considered in these school-related decisions. Mediating factors as other interests and lack of communication influence to what extent child mobility is leading in urban renewal projects.

Consequently, safe neighbourhoods are best off when multiple departments cooperate especially early on in the planning process to overcome this communicative or organizational barrier (Aarts, 2011). For larger municipalities, it is suggested to develop neighbourhoods in a similar vein as the Groenewei with their separate bureau Meerstad which involved most relevant parties. But also outside the context of renewal plans, it might be beneficial to improve communication between relevant departments so that also in case of ordinary new school plans child mobility is considered.

6: Discussion

It would have been useful to see for myself how the projects stimulate child mobility, but unfortunately, the Covid-19 situation made it impossible to visit all renewal projects. Future research could include interviews with schools themselves because during the interviews in this research it became clear that schools do more about child mobility than written in their school documents. School interviews might substantiate the findings of this research about how schools themselves are stimulated and how schools stimulate child mobility.

An attention point in this research was the lack of an equal composition of participants' disciplines. This was partly the result of time constraints due to the Covid-19 situation, which evoked an anything-goes approach regarding participant acquisition. A more equal composition of participants based on their disciplines (for example by interviewing one mobility expert at every municipality) might have reduced the "disciplinary bias".

This research can be substantiated with information about the link between child mobility and school-related decisions in smaller (foreign) municipalities. But still, the purpose of this research, insight into how and why child mobility and school decisions simultaneously come to the fore, has been extensively covered.

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8: Appendices

Appendix 1: Amount of interviewees per municipality

Name municipality:	Interview:	Function participant
Enschede	1	Landscape architect
	2	Traffic expert ('verkeerskundige')
Utrecht	3	Traffic expert (external)
	4	Area manager
Groningen	5	Landscape architect
Rotterdam	6	Traffic expert

Table A2-1: Participants per municipality interviewed in this research.

Appendix 2: Interview guide

The following semi-open questions have been more or less followed during the interviews.

1) Setting the stage:

- Consent: it is very nice that you are willing to participate.
- Explain that I will record for analysis if the participant allows me to.
- Introducing the topic: I am interested as a researcher in how urban renewal plans consider child mobility and school considerations like if a school must have a very prominent function in neighbourhoods like in the case of 'Vensterscholen'. I am interested in how these topics are linked to each other in urban renewal plans, for example how a consideration to design Vensterscholen in an urban renewal project also implies that for example constructing ample cycling paths are constructed.

2) Warm-up questions

- What is your role in the development of the relevant neighbourhood?
- I'm curious what schools are in the considered area, can you show on this map the schools? Why are they situated over there?
- How is attention given to schools in the renewal plan? Are considerations about school kind or school function (e.g. being a central location or being a 'Vensterschool') made explicit?
- Are (and how are) schools involved in motivating children in promoting slow modes (e.g. bike or travelling on foot)?
- How do you think the urban renewal plan stimulates child mobility? Does it provide for example parks or playgrounds? (can you point them out on the map) Does it provide bicycle lanes or speed-reducing methods?

3) Sensitive questions close to the participant

- What was your role as a planner in stimulating child mobility, was it a hot topic? What kind of departments were involved in the process?
- What do you think went well or what went not well during the design process in stimulating safe child mobility?

- Do you think that more could've been done to stimulate safe child mobility? Do you think that the urban renewal plan has done enough on this topic?
- If yes, why do you think this hasn't been done?

4) Closing questions

- Is the urban renewal project do you think unique in this municipality in stimulating safe child mobility? Or unique in the functions (like Vensterschool or central hub) that schools in urban renewal plans perform? Or is it just similar to working in the past (never change a winning team)?
- Is there anything else that you still would like to mention?
- Thank you for your participation!

Appendix 3: Documents in document analysis

The following documents have been used in the document analysis in this research. If these documents are used in the main text, they can also be found in the reference list.

Rotterdam

Municipal mobility documents

- Gemeente Rotterdam, Goudappel Coffeng (2017). *Slimme bereikbaarheid voor een gezond, economisch sterk en aantrekkelijk Rotterdam, Stedelijk Verkeersplan Rotterdam*. 23 Januari 2017. Gemeente Rotterdam: Rotterdam.
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Documents Park 16Hoven

- ds+V Juridische Zaken, team Bestemmingsplannen (2007). *Bestemmingsplan Polder Zestienhoven*. Onherroepelijk. Gemeente Rotterdam ds+V: Rotterdam.
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School documents

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Utrecht

Municipal mobility documents

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Documents Nieuwe Merwedewijk

- Gemeente Utrecht (2019). *Deel 2: Uitwerking van de Ruimtelijke Agenda – Omgevingsvisie Merwedekanaalzone*. Concept, 17 December 2019. Gemeente Utrecht: Utrecht.
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School documents

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Enschede

Municipal mobility documents

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Groningen

Municipal mobility documents

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Appendix 4: Example of interview coding

Evert-Jan: Voor de gemeente Utrecht is kind mobiliteit belangrijk. Op welke manieren denkt u dat de Nieuwe Merwedewijk (veilige) kind mobiliteit stimuleert? Waar denkt u aan bij kind mobiliteit in de Nieuwe Merwedewijk?

Participant: Specifiek denk ik dan aan het autoluwe karakter van de wijk. Het doel is om in de wijk obstakels op wandel en fietsroutes zo veel mogelijk te vermijden. Goede loop- en fietsroutes zijn van belang voor het stimuleren van deze modaliteiten voor kinderen. Een goed voorbeeld van fietsroutes zijn bijvoorbeeld de Oost-West verbindingen, die met fietsbruggen in verbinding staan met de rest van de stad.

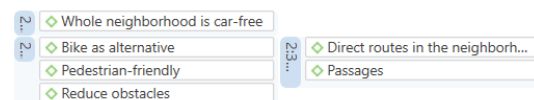


Figure A3-1: Example of a piece of one of the transcribed interviews and its attached codes.

Figure A3-1 illustrates how coding took place. Descriptive codes as “the whole neighbourhood is car-free” can be seen in figure A3-1.

Search Codes		Search Code Groups		2: Transcript... 21		
	Name		Name			Totals
<input checked="" type="checkbox"/>	<input type="radio"/> 30 km zones	<input type="checkbox"/>	Behavioural measures	<input type="radio"/>	Visible co... 2	0
<input checked="" type="checkbox"/>	<input type="radio"/> 30 km/h as prerequisite for	<input type="checkbox"/>	Interests/barriers	<input type="radio"/>	Vlekkenplan 0	0
<input checked="" type="checkbox"/>	<input type="radio"/> Accessibility vs livability	<input type="checkbox"/>	Involved departments	<input type="radio"/>	Vluchtheuv... 1	1
<input checked="" type="checkbox"/>	<input type="radio"/> Accessible location	<input type="checkbox"/>	Key topics	<input type="radio"/>	Vulnerable... 2	1
<input checked="" type="checkbox"/>	<input type="radio"/> Alert	<input type="checkbox"/>	Other child decisions	<input type="radio"/>	Walking p... 1	0
<input checked="" type="checkbox"/>	<input type="radio"/> Also school responsibility	<input type="checkbox"/>	Physical measures	<input type="radio"/>	We want t... 2	0
<input checked="" type="checkbox"/>	<input type="radio"/> Also smaller routes consid	<input type="checkbox"/>	School complaints	<input type="radio"/>	Whole nei... 8	3
<input checked="" type="checkbox"/>	<input type="radio"/> Amenities central function	<input type="checkbox"/>	School decisions	<input type="radio"/>	Woonerven 1	0
<input checked="" type="checkbox"/>	<input type="radio"/> Amenities on walking dista	<input type="checkbox"/>	Slow modes			
<input checked="" type="checkbox"/>	<input type="radio"/> Attractive park					
<input checked="" type="checkbox"/>	<input type="radio"/> Attractive public space					
<input checked="" type="checkbox"/>	<input type="radio"/> Attractive safe mobility					
<input checked="" type="checkbox"/>	<input type="radio"/> Balancing require school					

Figure A3-2: Example of magnitude coding for some codes attached to one of the interviews.

Figure A3-2 shows an example of magnitude coding from 1 of the 6 interviews. For example in the column on the right, it can be seen that the code “the whole neighbourhood is car-free” has been mentioned 3 times in this interview, but this is relatively frequent considering it is mentioned 8 times in all the 6 interviews.

Also, figure A3-2 shows in the middle some code groups used for the identification of pattern coding as mentioned by (Patel, 2014). These groups again can be counted in a similar vein as in figure A3-2 (focused coding). This information has been summarized in a summary document.