

The effects of the built environment on physical activity and health

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IMPACT PARAGRAPH

The research in this dissertation assessed the effects of the built environment on physical activity, sedentary behavior, active transport and health-related quality of life in adults. A natural experiment evaluated the effects of the Green Carpet in Maastricht, which is a newly built infrastructure prioritized for pedestrians, cyclists and recreation, built on a tunnel that replaced a cross-town highway. The studies in this dissertation showed significant intervention effects on transport-based physical activity and also changes in physical activity behavioral patterns were identified. No significant changes on health-related quality of life, social activities and meaningfulness were found, but trends were positive for the inhabitants living close to the intervention area, compared to individuals living further away. This paragraph reflects on the scientific and societal impact of these findings.

Scientific impact

This is one of the first research projects that investigated the effects of the environment on physical activity and active transport using device-based methods with a follow-up time of two to three years. The results showed intervention effects for transport-based physical activity levels, and effects increased over time. This shows that for such large infrastructural projects, it takes a large amount of time to result in measurable behavioral changes. However, if changes occur, these are likely to be sustainable over time. Future research should consider follow-up times of at least two years when investigating large infrastructural projects. Also, another unique characteristic of this dissertation is the broad range of research methods that was applied to investigate the broader system in which the Green Carpet was implemented and evaluated. The evaluation of the context and the addition of an ethnographic and participatory research approach resulted in a better understanding of the results of the quantitative evaluation and showed the complexity of the relationship between environment and behavior. Future research should continue to evaluate intervention, implementation and context in interaction, by applying a systems approach. Lastly, our cross-sectional analyses showed differences in the relationship between perceptions of the environment and behavior for less and more vulnerable individuals in society. It is clear that the environment is not a one-size-fits-all solution for behavioral change. Even though this is highly relevant in the light of reducing socioeconomic health inequalities, these subgroups are rarely studied. Our studies showed that despite the differences in the relationship between perceptions of the environment and behavior, an integral approach targeting both barriers and facilitators of physical activity in the environment can lead to equal use of new infrastructures by different subgroups in society.

Most studies presented in this dissertation are published in international, peer reviewed, scientific journals. In addition, the results of the studies were presented at various (inter) national scientific conferences, such as the conference of the International Society of Behavioral Nutrition and Physical Activity, the conference of the International Society of Physical Activity and Health, and at the International Conference on Ambulatory Monitoring of Physical Activity and Movement. Also, the research in this dissertation was used for educational activities in the master of Health Education and Promotion of Maastricht University.

Societal relevance

The tunneling of the highway A2 and the construction of the Green Carpet had an impact on the lives of inhabitants living in the neighborhoods bordering the former highway. The livability in these neighborhoods improved with better air quality, noise reduction and decreased traffic congestion. Also, the connectivity with the city center was enhanced and new facilities at the Green Carpet such as fitness equipment, restaurants and bars improved the liveliness in the area. The results of the studies in this thesis showed that these changes in the environment resulted in changes in physical activity behavioral patterns and changes in active transport. However, the highway was not only a physical barrier between the neighborhoods east and west of it, but also a social barrier. Although the physical barrier is broken, the social barrier seems to be still in place. The communities that were separated for years seem to struggle to reconnect. As the social environment is equally relevant for health and health behaviors as the physical environment, local governments should put effort in the reconnection of the neighborhoods in a social sense. Inhabitants of one of the neighborhoods bordering the Green Carpet already acted on that. This neighborhood did not benefit from the implementation the Green Carpet and used the output of the ethnographic research and inhabitants meeting as an input for a grant application for the local government, to improve the livability in this specific neighborhood.

In the future, the new Environment and Planning act of the Netherlands (Omgevingswet) will be implemented. This new act simplifies the existing system of legislation for the development and management of the living environment. This will be done by bundling dozens of laws and hundreds of rules into one new law. One of the societal objectives of this new law is creating a healthy physical environment. It is stated that a healthy living environment invites healthy behavior and protects against negative environment influences. The current research project can help to inform local, regional and national governments about the relationship between the environment and health (behaviors) in the Dutch context, to include health in their future developments. The present dissertation underlines that infrastructural changes do not only impact the esthetics and attractiveness

of a city or region. They can have a significant impact on the health of people. The Green Carpet may serve as an example of how environmental restructuring can be a powerful tool for (local) governments to increase the health and well-being of its inhabitants.

The results of our studies are presented to the public via various ways. A residents meeting was organized to discuss the results with inhabitants of a specific neighborhood in Maastricht. Results were also presented to inhabitants and other interested parties during the Pleasure Arts and Sciences Festival in Maastricht (2022). Further, results were disseminated to other researchers and policymakers during a symposium of the ZonMw consortium Maak Ruimte voor Gezondheid.