

Introduction

Physical risks like environmental noise, air pollution, reduced access to green spaces, and social risks cumulatively affect children's health and cognition¹. During the first year of schooling, rapid developmental changes in children's cognition and social-emotional competencies occur, predicting academic achievement and social and cognitive competencies later on². Therefore, this period is important for the cognitive and socio-emotional development later in life (Fig. 1)

As part of the EU Horizon 2020 project Equal-Life, we conduct a study on children's mental health and cognition in the transition from kindergarten (preschool) to primary school in Belgium and Germany. Here, we refer to the German part of the study.

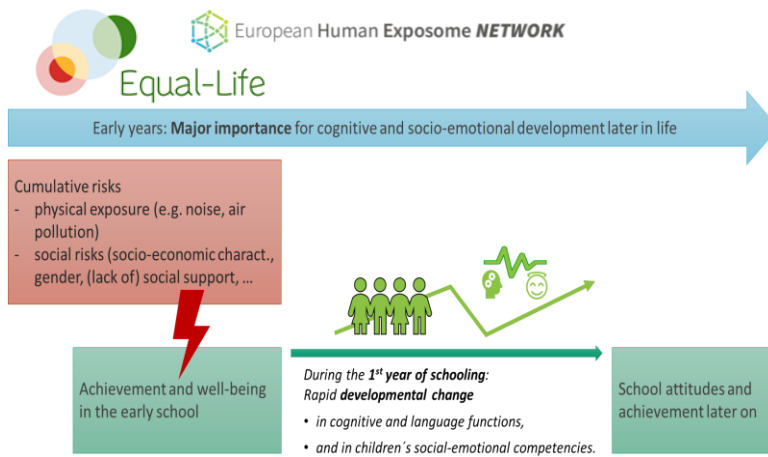


Fig. 1: Cumulative risks to children's mental health and cognition at the transition from pre- to primary school

Methods of the preschool study

Fig. 2 presents the design of the preschool study (German part).

Sites: We recruited children in kindergartens from sites lower vs. higher exposed to road traffic noise in 3 German Ruhr area cities.

Measurements: Cognitive tests and EEG measurements³ with preschoolers; parental questionnaires about children's mental health and exposure to several social and physical factors.

Physical exposure: housing/neighborhood quality, environmental noise (L_{Aeq}/NAT), air pollution (NO_x) at home and at (pre-) school - based on modeling, indoor measurements of noise and air quality during testing in the kindergarten, and parental reports.

Follow-up: Measurements repeated 1 year later at the end of the children's 1st year in primary school – the study is ongoing.

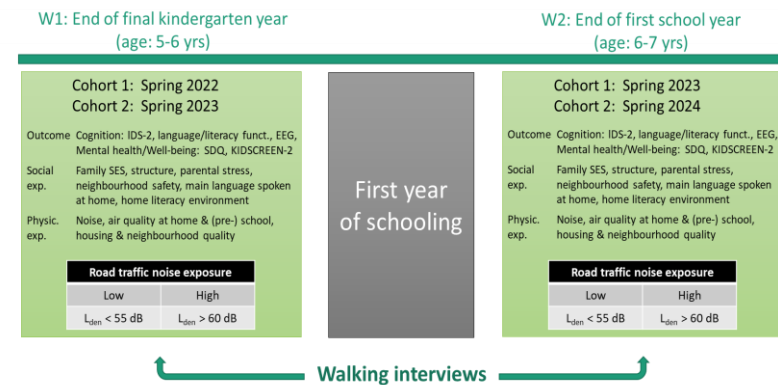


Fig. 2: Study design of in-depth preschool study (German part)

Procedure of walking interviews

Walking interviews supplement the quantitative assessments of the children's physical and social exposures, cognition, and mental health⁴⁻⁵. In the interviews, we assess the children's perception of the physical environment in their neighborhood 'on the move' (Fig. 3).

Accompanied by a researcher and 1-2 care persons, a child walks around in its neighborhood. The child shows the important places in its neighborhood, both liked and disliked. The child decides where to go and guides the parents/care persons and the researcher.

The walking interview also contains guided open questions as to why those places are liked/disliked and what is liked/disliked about the neighborhood in general.



Fig. 3: Procedure of walking interviews

References:

- Evans, G.W., Li, D. & Whipple, S.S. Cumulative Risk and Child Development. *Psychol Bull* 2013;139(6):1342-96.
- Brod G, Bunge SA, Shing YL. Does One Year of Schooling Improve Children's Cognitive Control and Alter Associated Brain Activation? *Psychol Sci* 2017;28:967-78.
- Näätänen R, Pakarinen S, Rinne T, Takegata R. The mismatch negativity (MMN): towards the optimal paradigm. *Clin Neurophysiol* 2004;115:140-4.

- Evans J, Jones P. The walking interview: Methodology, mobility and place. *Appl. Geogr* 2011;31:849-58.
- Ergler CR, Freeman C, Guiney T. Walking with preschool-aged children to explore their local well-being affordances. *Geogr Res* 2020;1-9.
- International Organization for Standardization. ISO 12913-1:2014 Acoustics — Soundscape — Part 1: Definition and conceptual framework. Geneva Switzerland: ISO; 2014.



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