Early Environmental quality and life course mental health and cognitive effects: the role of noise

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ABSTRACT

The EU funded Equal-Life project, part of the European Human Exposome Network, employed the exposome concept in an integrated study of multiple exposures in relation to a child's development and mental health over their life course. The exposome, the totality of exposures from conception onwards, is emerging as an approach to studying the role of the environment in human disease. The Equal-Life project is exemplary for this trend, studying the long-term and cumulative effects of combined environmental and social exposures early on in life in an integrated and multidisciplinary way - bringing together researchers from different disciplines and different scientific languages to work towards a common goal.

The project typically used a mixed method research methodology, combining non-targeted and targeted analysis on big data sets and smaller scaled tailored in-depth studies with more qualitative approaches. The project performed a study into the time activity patterns of children in different age-groups and accompanying noise measures, a series of experimental studies addressing school acoustics in relation to cognition. Equal-Life explored several noise models with high granularity, validated a propagation model (outdoor/indoor) and explored a set of noise indicators relevant for sleep, stress and restoration as part of the exposome. Also, a review was prepared of noise indicators from different sources to predict non-auditory health-effects in children. Exposure data at a high spatial and temporal resolution was used and combined physical and social aspects to attempt to examine how these exposures influence mental health and cognitive development of children at different ages and developmental stages. Data was used from almost 250.000 children in Europe from eight large birth cohorts and three cross-sectional school studies. Non-targeted machine learning techniques on single and combined data sets (meta-analysis) and structural equation models (SEM) on the pooled harmonised data were used. This keynote will summarise the key findings of the project with specific focus on environmental noise.

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