

SYNERGY Grant Report: Generating system maps on physical activity to encompass the complex family environment

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The 2023 EHPS Synergy Expert Meeting (EM), entitled 'All we know about physical activity & the social environment: A systems mapping

approach', took place on the 3rd and 4th of September at the Institute for Public Health and Nursing Science, University of Bremen, Germany. It was facilitated by Professor Ryan E. Rhodes (University of British Columbia and University of Victoria, Canada) and Professor Aleksandra Luszczynska (University of Social Sciences and Humanities, Poland and University of Colorado, USA), who both have experience in systems mapping and expertise in physical activity research focused beyond individual psychology. The running of the EM was also supported by Dr Anna Banik and Dr Zofia Szczuka (both University of Social Sciences and Humanities, Poland).

The EM aimed to use a participatory systems mapping approach to go beyond the dominant process-orientated models of physical activity initiation and maintenance, and shift toward a system-based logic of enquiry. The advantage of a systems approach is that it extends well-established socioecological models of behaviour to communicate both actions required for effective physical activity promotion, and the relations between these actions (Rutter et al., 2019). Systems approaches also enable greater appreciation of the causal and contextual influences of behaviour, and the interactions between various intended or unintended outcomes (Nau et al., 2022). Specifically, participatory systems mapping is a research method designed to

create a diagram of factors in a complex system, and the connections between these (figure 1), that involves experts and stakeholders in a participatory way.

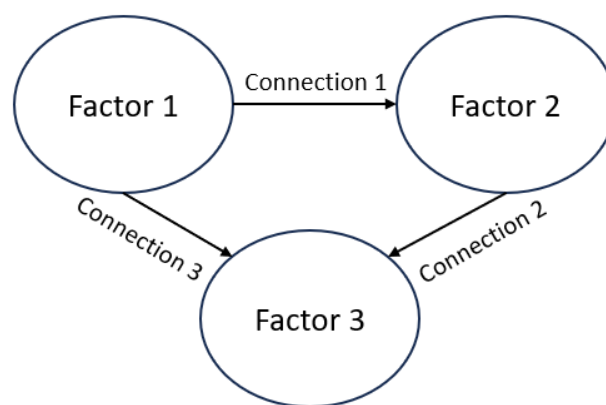


Figure 1. Schematic illustration of the core components of a system map.

A participatory approach enables different expertise to be pooled in map development, explore different mental models of a problem, and encourage joint problem framing and social learning between participants. In the context of this project, we collaborated to generate insight into the relations between complex family environment factors influencing physical activity and sedentary behaviour. For a full introduction to participatory systems mapping, see Blake and Rigby (2024).

EM attendees held expertise in different psychology specialisations (e.g. clinical, cognitive, individual, critical, social, environmental and health) and sports science. Over the two days, participants (steered by the EM facilitators)

developed system maps for determinants of moderate-to-vigorous physical activity (day 1) and sedentary behaviour (day 2) within the context of the family environment. Development of both maps followed the same process, and was guided by established systems mapping scripts (see <https://en.wikibooks.org/wiki/Scriptapedia>). Throughout each stage set out below, consensus was derived through a 'critical friends' approach to discussion, and where necessary votes were taken. First, we established, and aligned expectations around, the boundaries of the map being developed through:

- Definitions of physical activity and sedentary behaviour (MacIntosh et al., 2021; Sedentary Behaviour Research Network, 2012)
- Definition of the family environment as being the social and interpersonal dynamics within a family unit
- The family unit to be focused on was adult partners with or without children.
- The upper (physical environment) and lower (social) limits of factors to be mapped (no individual- or policy-level factors were included in the map)
- Relevance to the social environment dimensions of physical activity (McNeill et al., 2006)

Second, participants each contributed suggestions, in-turn, of key factors considered to influence the behaviour (i.e. physical activity/sedentary behaviour) (step 1) and then the group produced collectively understood and agreed upon labels and definitions for each factor (step 2) through facilitated discussion. Step 1 greatly benefitted from the diversity of academic backgrounds and research domains present. However, this diversity meant that step 2 took longer than facilitators had experienced in similar workshops with other stakeholder groups, given participants' discipline-specific vocabularies and engagement in extensive debate about whether factors were conceptually unique or useful inclusions in the map). The process sped-up as

participants became familiar with the process, and by greater adherence to the set mapping boundaries.

The last step was to create a 'connections circle', where factors (e.g. influences of behaviour) are placed as a circle and connections drawn between them. Creating a connections circle is a way of recording initial connections (including their directionality and polarity) proposed by the group (Mildeová, 2013). The connections circle was then automatically converted into a system map using software*, and participants proposed additional connections and searched for feedback loops. Feedback loops are a way of visualising the balancing or reinforcing effects of change in a system and initiating thoughts about potential areas for intervention (see Barbrook-Johnson and Penn, 2022).

**Factors, definitions, and connections from Step 1 onwards were recorded using STICKE, a user-friendly real-time software package that enables the description, exploration, and visualisation of complex phenomena (Hayward et al., 2020).*

What comes next?

Since the EM, Professors Rhodes and Luszczynska have been consolidating the system maps that were generated. They are utilising the EM participants' expertise in consensus-deriving activities and will be publishing an academic paper reporting the two system maps on physical activity and reducing sedentary behaviour in the context of the family environment.

Who were the grant awardees?

Ben and Lauren (authors of this report) each received an EHPS SYNERGY grant to attend the EM. This grant also enabled Lauren to be in Bremen in her role as Synergy Liaison Officer, to assist with

arrangements during the EM.

Ben works in the field of behavioural science and public health. Much of his research adopts a systems approach to physical activity, and he was keen to contribute these expertise, communicate the value of systems mapping, and learn more from others about the specific social dimensions of physical activity, which were particularly relevant to an ongoing project. It was also Ben's first opportunity to connect with EHPS, enabling him to diversify his interdisciplinary networks.

Lauren works in the field of cancer screening behaviour and was keen to learn from the expertise present, to see how systems mapping and a family dyad approach might apply in this field. Social environmental factors are known to play an influential and interconnected role in cancer screening attitudes and participation, yet this research area is dominated by process-oriented approaches.

The EM offered a great experience to all participants, whether they were familiar with systems or not. As an experienced mapper, Ben found seeing the process 'from the other side' as a participant a valuable opportunity to reflect on his research practice and pick-up ideas for future use (e.g. methodological or technological developments). He has continued to contribute his systems mapping expertise post-EM, and shared ideas and resources with Drs Banik and Szczuka.

Lauren was new to systems mapping and valued experiencing the facilitation process. She observed that systems mapping in cancer screening behaviour research could help visualise and interpret interactions holistically across the complex myriad of interconnected factors influencing screening behaviour (e.g. individual beliefs, societal norms and healthcare system structures), identify potential intervention leverage points, facilitate collaboration and a shared vocabulary across the various stakeholder groups (e.g. screening-eligible populations, patients, healthcare providers, policymakers, and community

organisations), and highlight the weight of systemic issues that could inspire policy and healthcare system change.

As always, the EM was held directly before the EHPS conference, and most participants attended both. This additional time together supports the fostering of strong ties, including with international colleagues. We were both able to meet and build connections with fellow researchers interested in the use of systems mapping and physical activity research. We are grateful to the EHPS for enabling us to attend through the SYNERGY grant, supporting our career development by making these connections possible.

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