Title: Using systems archetypes to understand system behaviour and identify leverage points for change in local obesity prevention in the Netherlands

Authors: Jillian O'Mara, Loes Crielaard, Luc Hagenaars, Karien Stronks, Wilma Waterlander
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Abstract
Participatory system dynamics (SD) approaches view public health problems as the result of a complex system of interactions. However, most public health research makes a direct leap from system mapping –often through causal loop diagrams (CLDs)- to identifying actions for change, without trying to understand the behaviour of the system as a whole and how actions could intervene. This is possibly because robust methods are lacking. This study aimed to explore whether 'systems archetypes' can bridge this gap to (1) better understand system behaviour, (2) identify leverage points (LPs) for change deeper in the system and (3) provide a more structured and traceable analysis. We developed a novel approach using 11 systems archetypes for a post hoc analysis of the LIKE project – a participatory SD project on childhood obesity prevention in Amsterdam, the Netherlands. For each LIKE mechanism we compiled a complete archetype profile, including the storyline, CLD and behaviour over time graph, for which two were cross-checked with empirical data over time. We identified six systems archetypes. The most common was 'fixes that fail', in which a 'fix' applied to a problem creates unintended consequences that reinforce the problem. This can lead to 'shifting the burden' in which resources are siphoned from addressing the root cause of the problem. Compared with the original analysis, we identified LPs deeper in the system and found that systems archetypes structured the process, suggesting that systems archetypes can effectively help public health researchers hypothesize how to change system behaviour**.**