

# The Human Behaviour-Change Project: Developing a Behaviour Change Intervention Ontology

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## ABSTRACT

Behaviour change is essential to improve population health, the self-management of illness, chronic conditions and health professional practice. Evidence about behaviour change interventions is currently being produced at such a rate that manual systems for evidence review and synthesis cannot keep up. Neither can they account for all the relevant features of interventions.

The Human Behaviour-Change Project (HBCP) aims to bring together behavioural scientists, computer scientists and system architects to advance progress in behaviour change. It aims to answer variants of the ‘big question’ of behaviour change: ‘What works, compared with what, how well, with what exposure, with what behaviours (for how long), for whom, in what settings, and why?’

The main outputs will be: 1) an ontology of behaviour change interventions; 2) an AI system capable of extracting and interpreting evidence from published literature and making predictions; 3) an interface allowing users (researchers, policy-makers, practitioners) to access the knowledge base and answer specific questions about behaviour change.

## 1 INTRODUCTION

Behaviour change interventions are policies, activities, services or products designed to cause people to act differently from how they otherwise would have done (West & Michie, 2016). They involve enabling change amongst members of the target population (e.g. knowledge, skills, beliefs, feelings or habits) or their social and/or physical environment, or both. Typically, the goal is to achieve change that is sustained over an extended period of time (such as reducing smoking prevalence in the general population or increasing levels of habitual physical activity).

Knowledge of behaviour change interventions tends to be fragmented, generated by studies with variable methods and from partial, unspecified intervention evaluation reports. Evidence about behaviour change interventions is being generated at such a high rate that manual systems for evidence review, interpretation and synthesis cannot keep up (Elliot et al., 2014). For example, systematic reviews of health interventions currently take an average of almost 6

years to finish (Bragge et al, 2011), often making their results outdated by the time of publication.

Advances in organising the fragmented evidence about behaviour change interventions are urgently needed to improve our understanding of behaviour and how to change it. By accomplishing this we can improve our ability to develop behaviour change interventions to solve real-world problems, such as the global burden of disease and unsustainable climate change.

Recent research has developed a method for specifying behaviour change interventions in terms of their component techniques e.g. The Behaviour Change Technique Taxonomy v1 (BCTTv1; Michie et al., 2013) specifies 93 ‘active ingredients’ of behaviour change interventions. To fully understand how interventions have their effects, we need to extend this method of specification to how interventions are delivered, their reach, the target population and intervention setting, the target behaviour and the mechanisms of action of the intervention. (Larsen et al., 2016). *Ontologies*, which are coherent structures for representing knowledge, have been used to unify many areas of science allied to behaviour change, such as for mental disorders and mental functioning (Hastings, 2012; Larsen et al, 2016). The current programme of research seeks to develop an ontology of behaviour change interventions.

### 1.1 Introducing the Human Behaviour-Change Project (HBCP)

The vision of the Human Behaviour-Change Project (HBCP; [www.humanbehaviourchange.org](http://www.humanbehaviourchange.org)) is to synthesise evidence about behaviour change interventions and develop an automated knowledge system to identify patterns in the published literature and generate new, up-to-date evidence. A collaboration of behavioural scientists, computer scientists and system architects to answer variants of the ‘big question’ of behaviour change: ‘What works, compared

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