Unfudging nudging: identifying evidence for poorly-specified interventions in public health

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Objective To identify and describe empirical evidence for the impacts of a nebulous set of interventions ('nudging' or 'choice architecture' interventions) on health behaviour, in concert with iterative development of an operational definition and a conceptual typology of interventions

Background

• Despite gaining traction in policy circles worldwide, empirical evidence to support the idea of 'nudging' or 'choice architecture' interventions (interventions that change the physical or social environments within which people make choices) has been limited and a coherent conceptual map of interventions missing
• To address this, we conducted a large-scale, systematic scoping review of primary studies and reviews of the effects of interventions and related conceptual material
• Scoping reviews typically aim to describe and delineate a broad evidence base, often as a preliminary stage to systematic reviews, relaxing the requirement to find every relevant study
• Refined conceptual understanding and operational definition of interventions may become outputs of the scoping process rather than starting points.
• Locating and selecting studies becomes technically challenging, requiring development and application of innovative methods

Challenge 1– Locating evidence

• Highly sensitive electronic searches required as we did not limit by population, comparisons or study design
• Executed in parallel with snowball searches
• We could only confidently limit by outcomes (smoking, alcohol consumption, physical activity, diet, plus proximal determinants and consequences)

- Populations ✗
- Interventions ?
- Comparisons ✗
- Outcomes ✓
- Study design ✗
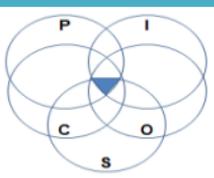
• Intervention studies lacked a common terminology but we attempted to capture a core concept of eligible interventions by including terms that reflected alterations to spatial or quantitative properties (e.g. *change$*, *alter$*, *add$*, *decreas$*)
• Search strategies designed for sensitivity to retrieve studies included in an author-identified body of clearly- and borderline-eligible studies

Results of searches and software transfer

• Over 1.2 million title and abstract records retrieved from 15 databases. This comprised over 800,000 records once de-duplicated. Records transferred from our bibliographic databases to EPPI-Reviewer systematic review software for the eligibility screening process

Challenge 2 – Practical challenges in large-scale record management

• Multiple databases = multiple interfaces and download filters
• Limits on the size of batches of records to be downloaded to bibliographic software, plus software limits for capable handling
• Large-scale, complex process so needs careful documentation
• Exporting EndNote databases into EPPI-Reviewer required development of bespoke code to allow data to be imported

Challenge 3 – Identifying eligible studies through large-scale screening

• Conventional screening methods involve manually screening every retrieved record, but not feasible here
• We used text mining to prioritise title and abstract records for manual screening - aims to prioritise records likely to be eligible for inclusion
• Text mining involves automatic analysis of text contained in a growing pool of screened records to identify patterns of terms that distinguish eligible from ineligible records
• Use of text mining allowed us to reduce manual screening workload by 90%. With conventional methods, we would have needed to screen >430,000 additional records to identify the same number of eligible studies
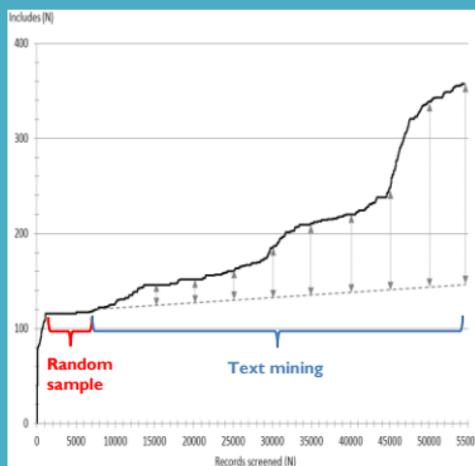
Results of screening and data extraction and using the data

• Over 54,000 abstracts screened for eligibility according to iteratively developed definitions and criteria. Data on interventions and outcomes extracted from 346 eligible full-text studies and included in final analysis
• From extracted data we developed an operational definition and provisional typology of choice architecture interventions. We used this to describe and interpret the empirical evidence

Challenge 4 – Developing a definition and typology of target interventions

• Multiple iterative cycles of study screening and coding, identification of conceptual boundaries, and internal and external discussion were processes employed

Conclusions

• The methods we applied in this review offer feasible solutions to challenges that arise when attempting to identify evidence for poorly-specified interventions
• They provide a useful template for application to scoping or systematic reviews of other complex public health interventions