Realist RCTs of complex public health interventions

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Evaluating complex public health interventions

Complex interventions = “where sum is more than parts” (hopefully)

Default = identify what works and replicate it (Craig, Dieppe et al., 2008).

‘Accredit’ intervention ‘products’ (Farrington & Ttofi, Blueprints for Violence Prevention).
The problem with focusing on products

Many interventions (especially in UK public health) poorly theorised and mechanisms unclear

Chaotic diversity of components and contexts being evaluated

Interest in external validity has lagged behind interest in internal validity
The realist critique (Pawson & Tilley 1997)
Realist philosophy

Objects of knowledge exist independently of our minds
  e.g. the Gulf War really did happen / people really do smoke cigarettes

Unobservable objects and structures can exert causal influence
  e.g. processes leading to gulf war / peer education reducing smoking involve interplay of structure and agency not all of which is directly observable
Realist view of scientific method

Argue against “successionist” view of causality – causation assessed by constant conjunction of events

Assert value of “generativist” approach

-theorise the mechanism of causation e.g. Huygens’ theory of pendular motion
-test hypotheses arising e.g. Huygen’s experiments (N.B. no counterfactual control group)
Realist view of social science and causation

RCTs are positivist and therefore inappropriate for social science.

Realists theorise the mechanism of intervention, focusing on the interplay of structure (context, intervention) and agency/meaning.

Derive testable hypotheses about context-mechanism-outcome configurations.

Test these using naturally occurring data (no control groups).
Example – CCTV in car parks

Mechanisms by which CCTV might cut car thefts
- enable arrest and removal of offenders
- increase use of car parks and ‘natural surveillance’
- symbolize commitment and therefore deterrence

Context
- in spots where few offenders critical, arrest/removal mechanism explains reduced thefts
- in spots where natural surveillance already high, CCTV is less effective
What’s useful about realism?

Helps us think what form theory should take – mechanism, context, agency and meaning

Helps us focus our qualitative research on examining these mechanisms – open the black box

Helps us to focus some of our quantitative analyses on examining contextual interactions and mediators
What’s wrong with realist critique of RCTs?

(1) “Real” science does use control groups where manipulation of all factors is impossible c.f. pendulums

  e.g. agriculture  
  [http://www.povertyactionlab.org/agriculture](http://www.povertyactionlab.org/agriculture)  
  e.g. ecology  
  e.g. medicine  
  [http://www.cochrane.org](http://www.cochrane.org)
What’s wrong with realist critique of RCTs?

(2) Trials are not inherently positivist, it depends on the trialist

Positivism = various tenets e.g. objective observation, focus on cause and effect, law like conclusions (Blaikie 1993)

c.f. Interpretivism = understanding meanings of actors, analysis of interplay of structure and agency, impossibility of laws of human action (Giddens 1984)
Research is characterised by fluid constellations of ideas not fixed paradigms (Hammersley 1995)

Trialist can believe:

- interventions underpinned by human interpretation and agency which need elucidation
- quantitative data are constructs that crudely measure participant meanings; need to informed/complemented by qualitative data
- trials need to examine how effects differ by place and person
- trial finding are descriptive and don’t offer certain predictions: need to think about contextual factors
What’s wrong with realist critique of RCTs

(3) Distinction between successionism of RCTs and generativism of realist evaluation is not so clear in practice

RCTs don’t try to control all aspects of context and agency - they just provide comparable variation within each arm

Primary analyses of trials do look at the constant conjunction between intervention and outcome as one window on understanding causality

But other analyses can explore how effects are moderated by person and place and what mechanisms mediate in different contexts in order to take a generativist perspective

Thus trials do not assume linearity in the association between variables as realists contend
And realist evaluations do actually sometimes involve constant conjunctions

Even where this is not explicit e.g. impact of Simon Fraser Prison Education Program – actual success in different subgroups of prisoners was compared with predicted success but latter is generated from historical data (Pawson and Tilley 1997: 112)
What’s wrong with realist critique of RCTs

(4) Non-random comparisons + theoretical plausibility ≠ attribution

CCTV associated with reduced car crime in sites with a few, persistent offenders but not where there is already natural surveillance – might be result of biases reflecting other differences in the particular sites chosen e.g. random disappearance of a few offenders / greater police focus in the former

Can do the same type of comparisons but using randomisation...
What’s wrong with realist critique of RCTs

(5) Not clear what is their view on RCTs

“Realist evaluation ... is method neutral”
“Realist RCTs are an oxymoron”
(Marchal et al 2013)

What about when “naturally occurring” data are randomised (e.g. evaluations of Charter schools subject to entrance lottery)?
What would a realist RCT look like?

(1) Theories of change and qualitative research inform hypotheses about context-mechanism-outcome configurations

Existing logic models and process evaluations generally too focused on inputs and outputs

Need to focus on how intervention interacts with context and engages with human agency and meaning
What would a realist RCT look like?

(2) Moderator analyses test these hypotheses

Use natural variation in each arm to examine how effects of intervention vary/interact with effects of contextual factors

e.g. cardiac rehabilitation effects being moderated by community based settings (Byng et al 2008) could have been examined thus

Limiting factor is that factor in question may not have been measured at baseline rather than anything to do with randomisation
Already happens in some RCTs (Strange et al., 2002) – sex education less effective when peer educators did not deliver participatively and in schools with more disadvantaged students.

Systematic reviews also examine moderation by context e.g. review examined how effectiveness of youth offender rehabilitation interventions varied by sector (Lipsey, 2009).
What would a realist RCT look like?

Mediator analyses examine hypotheses

If >1 pathways are hypothesised, can examine which ones account for intervention effects overall or in specific contexts

Again already happens e.g. Gardner et al., 2006 – parenting intervention effects more mediated by impacts on knowledge than by impacts on social support
Conclusions

Current realist critique of trials is flawed – misunderstands epistemology of trials and what these do with context

But realism offers really useful pointers for how RCTs could better use theory and undertake moderator and mediator analyses to test effects of interventions by place and person

Many RCTs already embracing this but step change required

This requires coordination between teams and more strategy: “market model” of evaluation doesn’t work?
References


Byng R 2008 Exposing the key functions of a complex intervention for shared care in mental health: case study of a process evaluation. BMC Health Services Research 8,274


