Realist Synthesis: Unpacking the complexity of public health interventions

Health Promotion Capacity Building & Research and Ethics

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Introductions

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Webinar Features

- Adobe Connect technology
- Use landline for audio
- Chat function to ask questions or if you need help
- Lecture mode
Learning Objectives

At the end of this session you will be able to:

• Recognize philosophical underpinnings of a realist synthesis
• Recognize the significance of realist syntheses in public health and implementation science
• Discuss types of review questions it answers
• Describe key characteristics and stages of a realist synthesis
• List key benefits and limitations
Review Process vs. Synthesis Stage of Review

- **Review**: whole process bringing together a body of evidence
- **Synthesis**: stage of a review when evidence extracted from individual sources is brought together
- What distinguishes a type of systematic review is the type of synthesis method.
Kastner et al.² identified a number of synthesis methods that can be used to analyze mixed method evidence.
“A realist synthesis (or realist review - these terms are synonymous) applies realist philosophy to the synthesis of findings from primary studies that have a bearing on a single research question or set of questions...reviewers seek out the contextual (C) influences that are hypothesized to have triggered the relevant mechanism(s) (M) to generate the outcome(s) (O) of interest...This in turn provides guidance about what policy makers or practitioners might put in place to change the context or provide resources in such a way as to most likely trigger the right mechanism(s) to produce the desired outcome.” ³
Let’s get real!
Philosophy underpinning realist synthesis

**Positivism “Truth”**
- The world is out there and through experimental testing we can discover the truth\(^4\)

**Realism**
- The world is out there and we can observe it, but must also acknowledge that the truth is observed from our own unique perspective\(^5\)

**Social constructivism**
- The world is out there but since all knowledge is socially constructed, there is not one truth but rather our own relative truths \(^6\)
How are realist syntheses relevant to public health and implementation science?
<table>
<thead>
<tr>
<th>Action</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>Something should be done</td>
<td>This particular intervention should be implemented</td>
<td>How an intervention should be implemented</td>
</tr>
<tr>
<td>Data</td>
<td>Burden and nature of problem</td>
<td>Effectiveness of intervention</td>
<td>Implementation of intervention</td>
</tr>
<tr>
<td>E.g. of studies</td>
<td>Surveillance, Prevalence, etiologic</td>
<td>e.g. RCTs, pre-post, quasi-experimental</td>
<td>e.g. process evaluations, participatory research</td>
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<tr>
<td>Availability of evidence</td>
<td>++++++++</td>
<td>+++</td>
<td>++</td>
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Domains influencing EIPH\textsuperscript{7}, Example 1

Figure has been adapted from Brownson et al (2009)\textsuperscript{7}
Domains influencing EIPH\textsuperscript{8}, Example 2
What is important to note about EIPH decision making?

- Cannot separate decision making from context\textsuperscript{9}

- Increasing emphasis on context in both public health and implementation science\textsuperscript{2,10}
What kinds of questions can a realist synthesis answer?
<table>
<thead>
<tr>
<th><strong>Realist Review</strong></th>
<th><strong>Conventional Systematic Review</strong></th>
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<tbody>
<tr>
<td><strong>Type of Intervention</strong></td>
<td>Complex</td>
</tr>
<tr>
<td><strong>Focus</strong></td>
<td>EXPLANATORY – how and why X works</td>
</tr>
<tr>
<td><strong>Relevant Types of Evidence</strong></td>
<td>Wide range of research and (i.e., both quantitative and qualitative) non research</td>
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<tr>
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<td>Peer reviewed journal literature, policy reviews, stakeholder analysis, focus groups, gray literature (reports, conference proceedings)</td>
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<tr>
<td><strong>Method</strong></td>
<td>Uses conventional systematic review steps as a useful departure with more sub-stages. Steps are not sequential but overlapping and iterative.</td>
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<td><em>Interpretive/Theory-driven synthesis:</em> deconstructs intervention into component theories. Context data retained and basic theory is refined concerning applicability in context.</td>
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<tr>
<td><strong>Results</strong></td>
<td>Identification of mechanisms and underlying theory that facilitates success</td>
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</table>
**Types of Review Questions**

**REALIST**
Can combine both types!

**WHAT WORKS, FOR WHOM, IN WHAT CIRCUMSTANCES, IN WHAT RESPECTS AND HOW**

**EFFECTIVENESS**
- What is the effect of a public health intervention?
- Which intervention works best?
- How effective is the benefit of an intervention?

**IMPLEMENTATION**
How do political challenges of targeted social media campaigns impact the successful implementation of a health promotion program?
It’s complicated...
What are complex interventions?

7 key features

- Involves theory or theories
- Actions of people
- Chain of steps or processes
- Often steps or processes are not linear
- Embedded in social systems
- Prone to modification
- Are open systems and change through learning
Synthesizing public health evidence is challenging due to the level of complexity.

Evidence – Based Public Health

Low complexity

- More certainty
- Controlled settings
- Uniform

High complexity

- Less certain
- More variable settings
- Complex

Context

Individual

Sociocultural

Interpersonal

Organizational

Political and economical
What else adds complexity?

Evidence – Based Public Health

Low complexity

• Single intervention
• Access to RCTs
• Quantitative
• Homogeneity in population, interventions, outcomes

High complexity

• Blending of interventions
• Variety of designs
• Quant & qual
• Heterogeneity in population, interventions, outcomes

Evidence sources
Key elements of a realist synthesis
Theory-driven approach

• Makes program theory (or theories) explicit

• **THEORY**: the underlying assumptions about how an intervention is meant to work and what impacts it is expected to have.

• **MIDDLE-RANGE THEORY**: not abstract to the point of being disconnected from the actual on the ground realities of the intervention, yet not specific to the point of being relevant to only one type of program\(^\text{12}\)

• Must be both usable and testable\(^\text{13}\)

• **EXAMPLE**:
  
  - *If you provide health care providers with ongoing training and easily accessible IPV referral resources, providers feel more confident to screen patients for IPV leading to an increase in screening and referral rates.*
Successionist: $x \rightarrow y$

- Causality is established when the cause $X$ is switched on (experiment/intervention) and effect $Y$ follows.

Theory-generating/generative: Involves unpacking the causal mechanisms by which an intervention works (or fails to work) by looking at the interactions between CMOS.

- To infer a causal outcome ($O$) between two events ($x$ and $Y$), one needs to understand the underlying mechanism ($M$) that connects them and the ($C$) in which the relationship occurs.
Realist Model of Causal Relationships

CONTEXT + MECHANISM = OUTCOMES

CONTEXT:
- Social, economic and political structures
- Individual capacities
- Interpersonal relationships
- Influences provider and participant choices
  - E.g., funding for resources, political values or ideologies

MECHANISM:
- Hidden
- Sensitive to variations in context
- Operate in contexts to generate outcomes
- Work through human agency:
  - E.g., practitioner confidence, patient empowerment/values

OUTCOMES:
- Effect or impact of the intervention (success or failure)
  - E.g., change in health behavior or status
How is program theory generated?¹³

1. Programme activities

Mechanisms

Not

Mechanisms

Resource constraint

Opportunity

2. E.G. Reasoning, preferences, norms, collective beliefs

Decisions choices

3. Programme outcomes
From rough to refined theory

1. Initial rough theory
2. Review of evidence
3. Refined theory

Evidence about...
- specific program elements
- implementation
- outcomes
- how mechanisms generate outcomes
- how contexts affect mechanisms and outcomes

Explanation of pattern of CMOs
So what does the ideal theory look like?13

- contexts in which, populations for which, and main mechanisms by which particular outcomes are achieved (description of CMO configurations)

- one or more *middle-range theoretical explanation(s)* of how and why particular mechanisms generate certain outcomes within certain contexts

- a middle-range theoretical *explanation of the pattern of outcomes* – why the pattern of CMOs looks the way it does. (usually draws on formal theory in the domain in which the review is being carried out)
Key review stages of a realist synthesis
Maybe it's just me, but you seem a little too disorganized to be the future.
1. Define the scope of the review
2. Search for & appraise evidence
3. Extract and synthesize findings
4. Draw conclusions and make recommendations
1. Define scope of the review

- Identify the intervention (program, intervention, policy)
- Clarify the purpose(s) of the review or the review question
- Find and articulate program theories
Point of interest – definition of theory for realist synthesis

Refers to an explanation that consists of CMO configurations
Clarify the purpose(s) of the review

- Theory integrity – does the intervention work as predicted?
- Theory adjudication – which theories about the intervention seem to fit best?
- Comparison – how does the intervention work in different settings, for different groups?
- Reality testing – how does the policy intent of the intervention translate into practice?
Appraisal considerations

- *Program description quality (thick/thin):* whether studies presented “thick” or “thin” descriptions of the program components, mechanisms and context

- Consider whether the evidence is *good enough* and *relevant enough* for inclusion\(^\text{14}\)
2. Search for and appraise evidence

Be transparent!

"I think you should be more explicit here in step two."
3. Extract and synthesize evidence

• Extract
  • Data extraction form
  • Populate your evaluative framework

• Synthesize
  • Compare and contrast findings
  • Confirmatory and contradictory examples
  • After reviewing all CMOs, identify demi-regularities:
    o Semi-predictable, re-occurring patterns in the data
    o Human choice or agency manifests in a semi-predictable manner
    o Variations in patterns can be attributed to contextual differences
3. Extract and synthesize evidence

• Refine the initial theory based refined CMOs and develop a what is known as a “middle-range theory”

• **End product** → an evidence-based theory of HOW the intervention “actually” works.

• **Generalizability** → theory and can allow for intervention applicability and transferability in various settings.
4. Draw conclusions & make recommendations

- Involve knowledge users

- Draft and test conclusions and recommendations with KUs

- Disseminate findings with conclusions and recommendations
Key benefits and challenges

- Draws benefits of established review methods
- Addresses complexity
- Answers questions like ‘how’, ‘for whom’, ‘why’, and ‘in which contexts’
- Involves KUs
- Provides results that can be applied in various contexts

- Does not yet have a host of established tools and resources
- Requires critical thinking to unpack CMO configurations
- Involves KUs (potential complexity as a result of ++ actively participating)
- Requires expert judgment to assess ‘good enough’ and ‘relevant enough’
RAMESES publication standards: realist syntheses

Geoff Wong1*, Trish Greenhalgh1, Gill Westhorp2, Jeanette Buckingham3 and Ray Pawson4

Abstract

Background: There is growing interest in realist synthesis as an alternative systematic review method. This approach offers the potential to expand the knowledge base in policy-relevant areas - for example, by explaining the success, failure or mixed fortunes of complex interventions. No previous publication standards exist for reporting realist syntheses. This standard was developed as part of the RAMESES (Realist And MEna-narrative Evidence Syntheses: Evolving Standards) project. The project’s aim is to produce preliminary publication standards for realist systematic reviews.

Methods: We (a) collated and summarized existing literature on the principles of good practice in realist syntheses; (b) considered the extent to which these principles had been followed by published syntheses, thereby identifying how rigor may be lost and how existing methods could be improved; (c) used a three-round online Delphi method with an interdisciplinary panel of national and international experts in evidence synthesis, realist research, policy and/or publishing to produce and iteratively refine a draft set of methodological steps and publication standards; (d) provided real-time support to ongoing realist syntheses and the open-access RAMESES online discussion list so as to capture problems and questions as they arose; and (e) synthesized expert input, evidence syntheses and real-time problem analysis into a definitive set of standards.

Results: We identified 35 published realist syntheses, provided real-time support to 9 on-going syntheses and captured questions raised in the RAMESES discussion list. Through analysis and discussion within the project team, we summarized the published literature and common questions and challenges into briefing materials for the Delphi panel, comprising 37 members. Within three rounds this panel had reached consensus on 19 key...
Example of a Realist Synthesis
Review question: What is the effectiveness of school feeding programs for improving physical and psychosocial health for disadvantaged school pupils?

- Cochrane Systematic Review\textsuperscript{15}
- Type of synthesis method: Meta-analysis
**Population:**
- Socio-economically disadvantaged school pupils
- Children and adolescents, in any country, aged 5 to 19, who attended primary or high school.

**Intervention:**
- School feeding programs (feeding had to be done in the school environment)
- Study Design (Quantitative): (RCTs), non-randomised controlled clinical trials (CCTs), controlled before and after studies (CBAs), and interrupted time series studies (ITSs)

**Control:**
- Either “no-treatment” (lunch or breakfast at home or no feeding/fortification) or placebo (e.g. low energy glucose syrup at school)

**Outcomes:** Physical and psychosocial health related outcomes
Realist review to understand the efficacy of school feeding programmes

A recent Cochrane review found that school feeding programmes significantly improve the growth and cognitive performance of disadvantaged children. **Trisha Greenhalgh**, **Elizabeth Kristjansson**, and **Vivian Robinson** look more closely at the highly heterogeneous trials to see what works, for whom, and in what circumstances.

Our Cochrane review of school feeding programmes in disadvantaged children included trials from five continents and spanned eight decades. Although we found that the programmes have significant positive effects on growth and cognitive performance, the trials had many different designs and were implemented in varying social contexts and educational systems.

<table>
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<tr>
<th>Box 1</th>
<th>Process factors that seem to enhance efficacy of school feeding programmes</th>
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<td><strong>Strong process evidence across many trials</strong></td>
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<td>- Target group has clear nutritional deficiency (usually, inadequate energy intake) and trial is oriented to correcting this rather than to short term hunger relief</td>
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<td>- Well organised schools that form part of an efficient</td>
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Box 1 | Process factors that seem to enhance efficacy of school feeding programmes

Strong process evidence across many trials

- Target group has clear nutritional deficiency (usually, inadequate energy intake) and trial is oriented to correcting this rather than to short term hunger relief
- Well organised schools that form part of an efficient distribution chain for the supplement
- Intervention developed with local teams rather than designed by distant experts
- Supplement is piloted to exclude intolerance and confirm palatability and acceptability
- Measures are in place to ensure that the food supplement is consumed (e.g. close supervision of eating)
- In disaffected young people, attention is paid to social aspects of the meal

Limited process evidence from one or few trials

- Use of local ingredients and cooking methods
- In extreme poverty, intervention is designed so that attending school is more economically viable than keeping children at home
- Intervention seeks to induce a change in home diet by educating or inspiring children

Possible factors that might be tested in future studies

- Better nutrition and health literacy in this generation reduces intergenerational cycle of poverty
Please let us know what you thought by completing a short evaluation survey that will be emailed to you after the event.

Feel free to contact Kara or Charoula with questions:

Kara.decorby@oahpp.ca
Charoula.tsamis@oahpp.ca


15. Greenhalgh T, Kristjansson E, Robinson V. Realist review to understand the efficacy of school feeding programmes. BMJ. 2007;335(7625):858-61. Available from: http://www.bmj.com/content/335/7625/858