Strategies for causal attribution

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Causal attribution is an essential part of impact evaluation

There are different types of causal relationships

There are a range of strategies for causal attribution:

- **Counterfactual**
- **Regularity**
- **Ruling out alternatives**

An essential part of impact evaluation

UNICEF activities

Impacts for children

Sometimes the causal chains between activities and impacts are fairly short and clear

Images: UNICEF Guinea ‘UNICEF and partners teach orphans how to protect themselves against Ebola throughout the capital, Conakry’

An essential part of impact evaluation

UNICEF activities

Impacts for children

Sometimes the causal chains between activities and impacts are longer but still fairly clear

Images: Julien Harneis 'Community Based Maternal Care Kit' and 'Focus Group'

An essential part of impact evaluation

UNICEF activities

Impacts for children

Sometimes the causal chains between activities and impacts are long and complicated – with many stages, different causal strands, and multiple contributing agencies and factors

Images: Julien Harneis 'UNICEF Bunia, office meeting' and ''Students at the secondary school'

ERRORS TO AVOID:
failure to systematically address causal attribution

EXAMPLE

- An evaluation acknowledged that it had not investigated causal relationships but ...
- claimed that the programme had been effective - since the intended change (increased service usage) had been achieved.

Different types of causal relationships

Necessary
and sufficient

Example of types of causal relationships

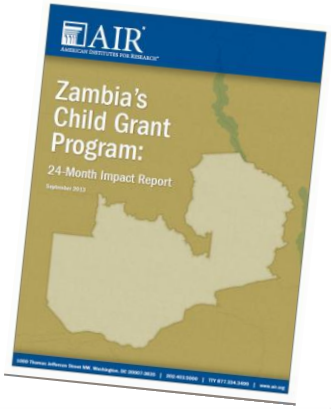


Figure 1. Conceptual Framework for Impact Evaluation of Child Grant Program

Moderators

- Distance/quality of facilities
- Prices
- Shocks
- Infrastructure
- Maternal literacy

Cash Transfer

Household

Consumption
- Food Security
- Material well-being

Investment
- Crop production
- Livestock

→ Income

Time-use
- Use of services
- Caring practices
- Work

→ Income

Mediators
- Women's empowerment
- Patience

Young Child
- Feeding
- Nutrition
- Morbidity
- School readiness

Older Child
- Schooling
- Morbidity
- Material well-being
- Work

Adult care-giver
- Self-assessed well-being

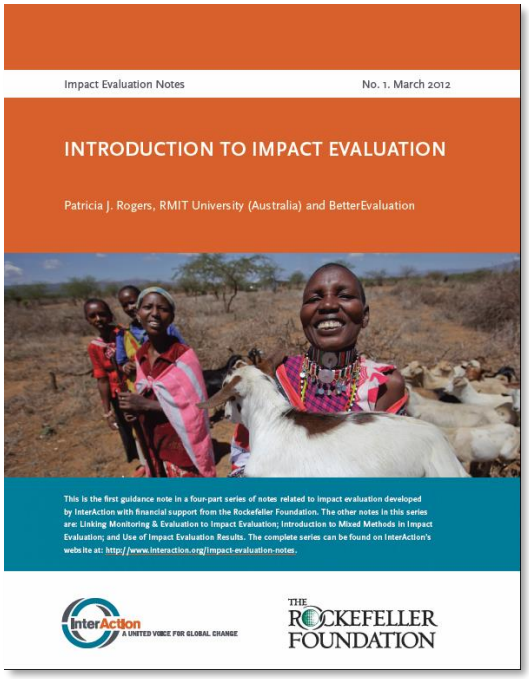
A single strategy for causal attribution?

"The USAID Automated Directives System (ADS) 203 defines impact evaluations as those that measure the change in a development outcome that is attributable to a defined intervention.

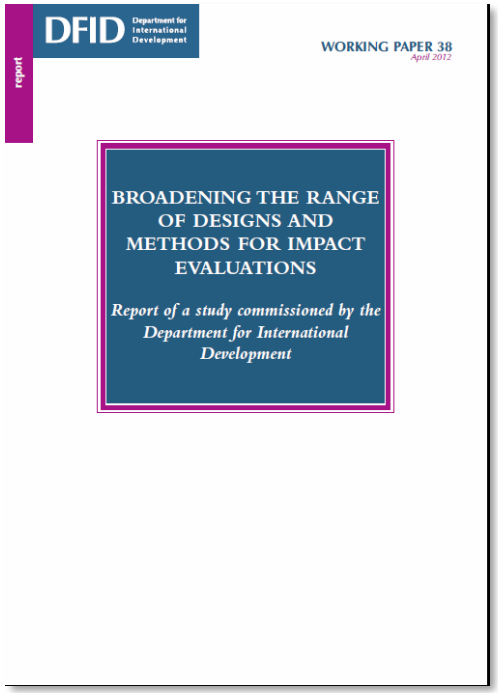
Impact evaluations are based on models of cause and effect and **require a credible and rigorously defined counterfactual** to control for factors other than the intervention that might account for the observed change."

A range of strategies for causal attribution

2012



2013



2015

Counterfactual strategies

TREATMENT GROUP

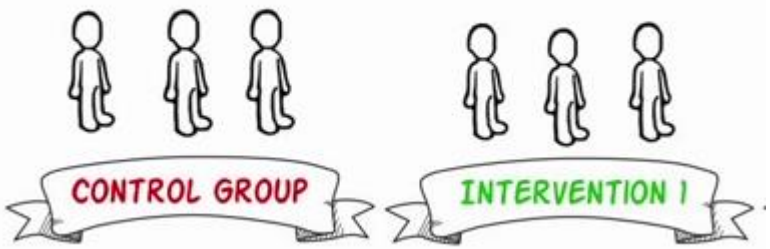
Programme or policy → Impacts

CONTROL GROUP

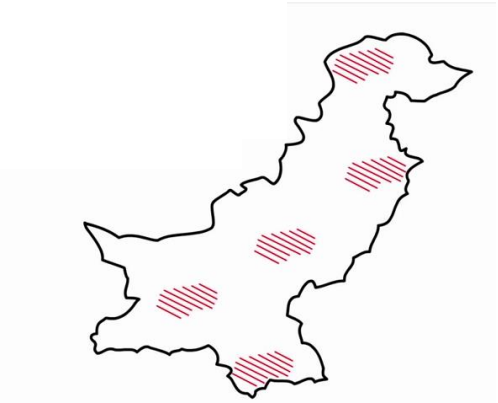
Absence of this programme or policy → Impacts not achieved

Experimental Designs (Randomised Controlled Trials)

RANDOM ASSIGNMENT OF INDIVIDUALS OR HOUSEHOLDS



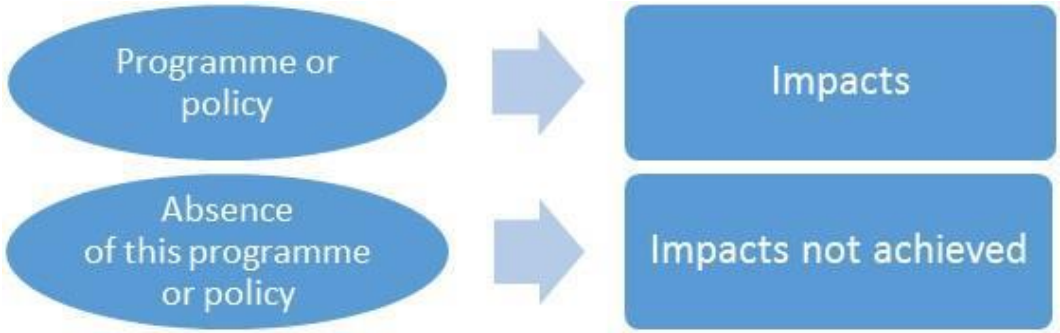
RANDOM ASSIGNMENT OF SITES OR REGIONS



Counterfactual strategies

TREATMENT GROUP

COMPARISON GROUP



Quasi-Experimental Designs

JUDGEMENTAL MATCHING

MATCHED COMPARISONS

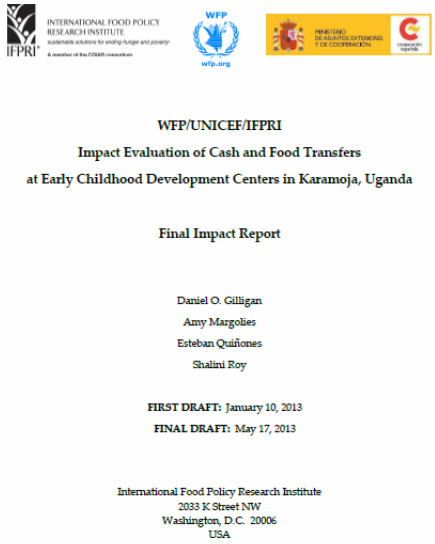
SEQUENTIAL ALLOCATION

REGRESSION DISCONTINUITY

PROPENSITY SCORE MATCHING

Example of counterfactual strategy

- Impact Evaluation of Cash and Food Transfers at Early Childhood Development Centers in Karamoja, Uganda
- Cluster-randomized controlled design
- 98 villages containing ECD centers randomly assigned in one of three intervention arms: food, cash, or control.



WFP/UNICEF/IFPRI

Impact Evaluation of Cash and Food Transfers

at Early Childhood Development Centers in Karamoja, Uganda

Final Impact Report

Daniel O. Gilligan
Amy Margolies
Esteban Quiñones
Shalini Roy

FIRST DRAFT: January 10, 2013
FINAL DRAFT: May 17, 2013

International Food Policy Research Institute
2033 K Street NW
Washington, D.C. 20006
USA

Example of counterfactual strategy

- Food transfers affected very few outcome measures
- Cash transfers had broad impacts across a range of outcomes.
- These weak effects of food transfers on food security and frequency of child consumption are due in part to:
  - the composition of the food rations, which were limited to three goods
  - to nature of the food security and food frequency indicators, which measure the degree of variety in the diet
  - problems in targeting the food transfers that led roughly half of all food beneficiaries in the evaluation sample to fail to receive their food rations for the first three cycles of food transfers

ERRORS TO AVOID:
failure to describe the type and quality of counterfactual used

EXAMPLE

- An evaluation referred to “control sites” – but these were actually comparison sites constructed using quasi-experimental techniques rather than random assignment and..
- it failed to provide any information about how they had been selected or constructed or if their comparability to the “experimental sites” had been checked.

Regularities strategies

- achievement of intermediate outcomes
- check results against expert predictions
- check timing of impacts.
- comparative case studies
- dose-response patterns .
- check consistency with existing literature
- interview key informants to explain causal processes
- modus operandi
- process tracing

Ruling out alternative explanations

Identify possible alternative explanations for observed changes through:

- Previous research
- Key informants
- Observation
- Analogy

Ruling out alternative explanations

Rule out possible alternative explanations for observed changes through:

- Additional data collection
- Disaggregated data analysis
- Statistical modelling to control for various factors
- Investigating possible technical explanations (eg selection bias)

Example of using regularities and ruling out alternative explanations

Introduction of new law requiring motor cycle helmets in Vietnam

- "Major hospitals report the number of patients admitted for traumatic brain injuries in the two days after the law's enactment was much lower than on previous weekends.
- In Ho Chi Minh City alone, serious traffic accident injuries fell by almost 50 percent compared with pre-helmet weekends." Asia Injury Prevention Foundation

Image: Jonas Hansel 'Saigon Rush Hour'

Source: Patton, M. Q. (2014). *Top Ten Developments in Qualitative Education over the Last Decade with Dr. Patton* [Webinar]. SAGE talks. Slides 17-32. Retrieved from: http://www.slideshare.net/sagepublications/patton-top-ten-qual-web-ppt-120114-final

Other data were consistent with the theory of change

"Nearly 100% of Vietnam's motorbike users left home wearing a helmet. It was an unbelievable sight with a near instantaneous effect".

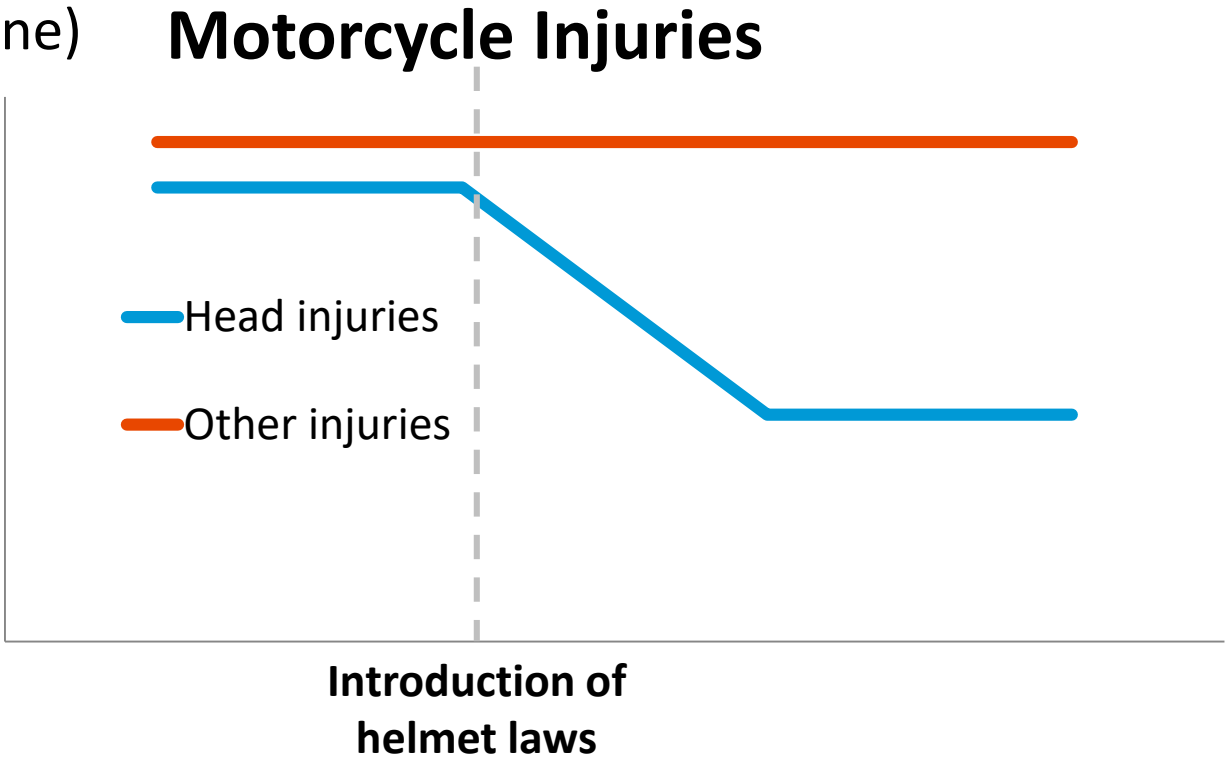
BEFORE

AFTER

Source: Patton, M. Q. (2014). *Top Ten Developments in Qualitative Education over the Last Decade with Dr. Patton* [Webinar]. SAGE talks. Slides 17-32. Retrieved from: http://www.slideshare.net/sagepublications/patton-top-ten-qual-web-ppt-120114-final

Ruling out alternative explanations

- Reduction in head injuries might be due to decreased rate of using bikes
- Could rule out with data about prevalence of bike riding
- Or with data about total injuries (non-head injuries would not decline)



Evaluation of Paris Declaration on Aid Effectiveness

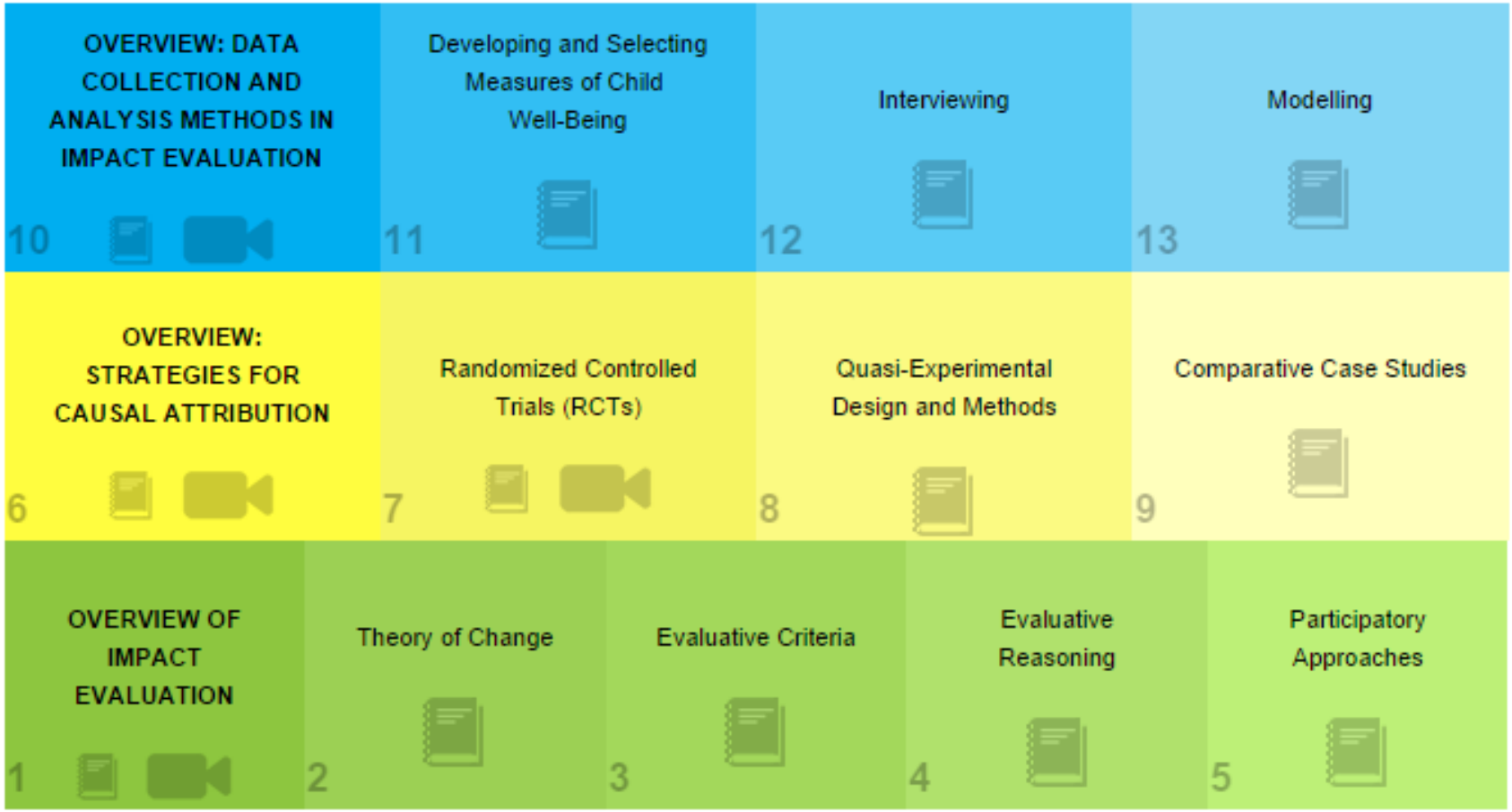
- Example of **systematic causal attribution** where it was not possible to identify or construct a credible counterfactual
- Emphasis put on:
  - the structured way the evaluation teams were to use a **mixed methods approach** to assess "plausible contributions" made by the Paris Declaration to development results in each context
  - on providing "**clear evidence** of any changes and connections observed and any other plausible explanations".
- A **comprehensive evaluation framework** set out:
  - the **types of evidence** that evaluators should look for
  - the **methods or forms of analysis** that could be applied
  - a **rating system** to indicate
    - the relevance of the evidence found to key evaluation questions, the extent to which it could be triangulated and therefore considered reliable, the degree to which data were from recent, credible sources
    - the extent to which data collection methods and analysis provided a reasonable basis for the findings and conclusions drawn.

ERRORS TO AVOID:
failure to seek out or try to explain evidence that does not fit the theory of change

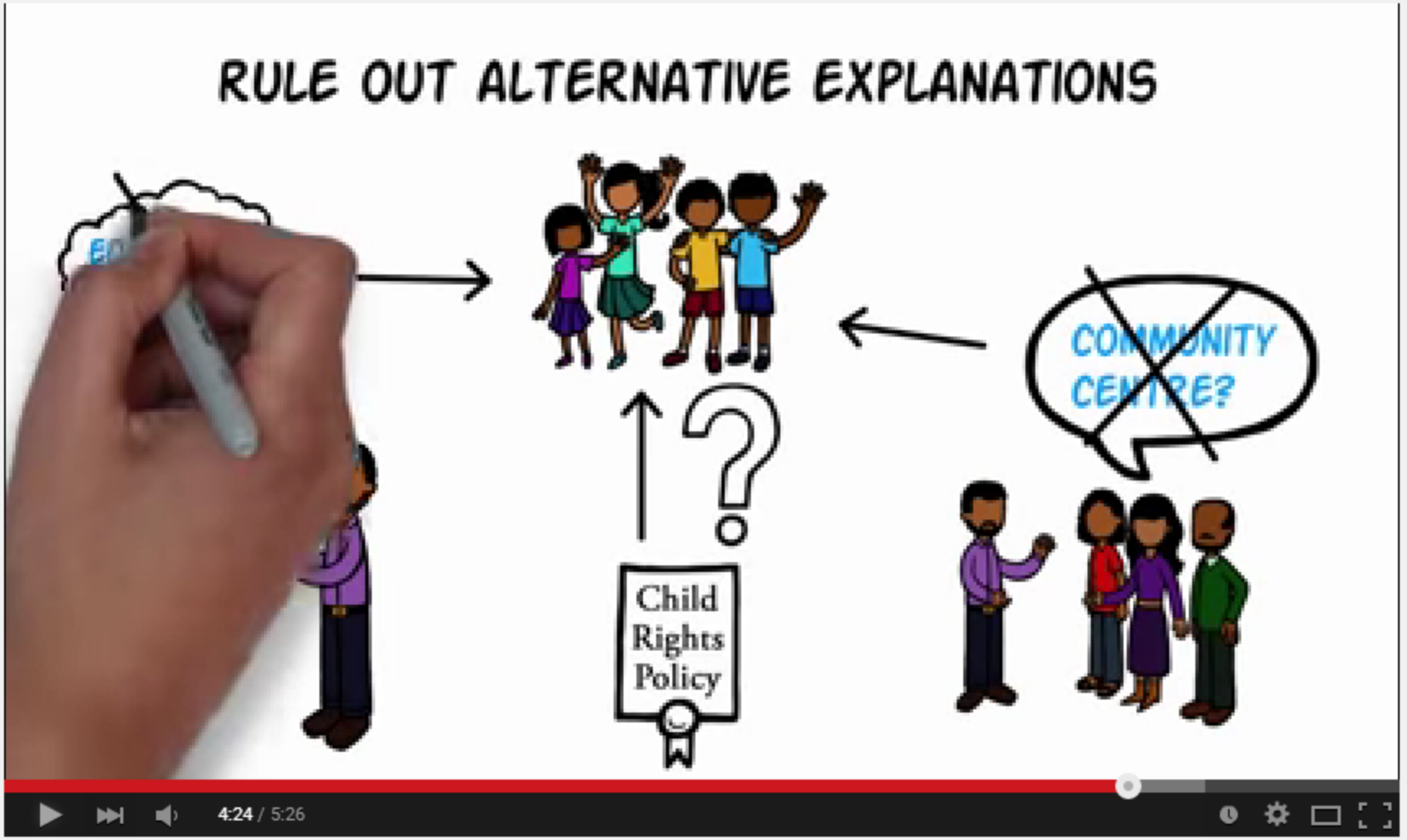
EXAMPLE

- An evaluation claimed that a capacity-building programme had produced certain impacts within an organization, but...
- This was not plausible causal attribution as it also reported that :
  - the programme officer had spent little time with the organization and had not provided any assistance to the staff or management, and ...
  - another programme had provided the organization with training that was seen to have developed its capacity.

UNICEF impact evaluation briefs and animated videos



Available at www.UNICEF-IRC.org



Strategies for Causal Attribution

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Understand Causes

Most evaluations need to investigate what is causing the outcomes and impacts of an intervention. (Some process evaluations assume that certain activities are contributing to intended outcomes without investigating these).

*Download a summary of the tasks, options, and approaches associated with **understanding causes of outcomes and impacts**.*

Sometimes it is useful to think about this in terms of 'causal attribution' – did the intervention cause the outcomes and impacts that have been observed? In many cases, however, the outcomes and impacts have been caused by a combination of programs, or by a program in combination with other factors.

In such cases it can be more useful to think about "causal contribution" – did the intervention contribute to the outcomes and impacts that have been observed?

Share

Manage Evaluation
Define
Frame
Describe
Understand Causes
Synthesise
Report And Support Use

Resources

Models of Causality and Causal Inference

Causal inference:Nuts and

Options

Gathering additional data

- Key Informants Attribution: providing evidence that links participation plausibly with observed changes.
- Modus operandi: drawing on the previous experience of participants and stakeholders to determine what constellation or pattern of effects is typical for an initiative.
- Process tracing: focusing on the use of clues within a case (causal-process observations, CPOs) to adjudicate between alternative possible explanations.

Analysis

- Check dose-response patterns: examining the link between dose and response as part of determining whether the program caused the outcome.
- Check intermediate outcomes: checking whether all cases that achieved the final impacts achieved the intermediate outcomes.
- Check results match a statistical model: comparing results with a statistical model to determine if the program caused the outcome.
- Check results match expert predictions: making predictions based on program theory or an emerging theory of wider contributors to outcomes and then following up these predictions over time.
- Check timing of outcomes: checking predicated timing of events with the dates of actual changes and outcomes.
- Comparative case studies: using a comparative case study to check variation in program implementation.
- Qualitative comparative analysis: comparing the configurations of different cases to identify the components that produce specific outcomes.
- Realist analysis of testable hypotheses: Using a realist program theory (what works for whom in what circumstances through what causal mechanisms?) to identify specific contexts where results would and would not be expected and

Resources


Models of Causality and Causal Inference


Causal inference:Nuts and bolts


Overview: Strategies for Causal Attribution


The Qualitative Method of Impact Analysis


Development Impact Evaluation Initiative

1 2 3 4 5 next › last »

Suggest a Resource

BetterEvaluation

Understand Causes of outcomes and impacts

Collect and analyze data to answer causal questions about what has produced outcomes and impacts that have been observed.

1. Check the results support causal attribution

How will you assess whether the results are consistent with the theory that the intervention produced them?

Gathering additional data:

Asking Key Informants to Attribute Causality: providing evidence that links participation plausibly with observed changes.

Modus Operandi: drawing on the previous experience of participants and stakeholders to determine what constellation or pattern of effects is typical for an initiative.

Process Tracing: focusing on the use of clues (causal-process observations, CPOs) to adjudicate between alternative possible explanations.

Analysis:

Check Dose-Response Patterns: examining the link between dose and response as part of determining whether the program caused the outcome.

Check Intermediate Outcomes: checking whether all cases that achieved the final impacts achieved the intermediate outcomes.

Check Results Match a Statistical Model: comparing results with a statistical model to determine if the program caused the outcome.

Check Results Match Expert Predictions: making predictions based on program theory or an emerging theory of wider contributors to outcomes and then following up these predictions over time.

Check Timing of Outcomes: checking predicated timing of events with the dates of actual changes and outcomes.

Comparative Case Studies: using a comparative case study to check variation in program implementation.

Qualitative Comparative Analysis: comparing the configurations of different cases to identify the components that produce specific outcomes.

Realist Analysis of Testable Hypotheses: Using a realist program theory (what works for whom in what circumstances through what causal mechanisms?) to identify specific contexts where results would and would not be expected and checking these.

Approaches: the following approaches combine some of the above options together with ruling out possible alternative explanations:

Contribution Analysis, Collaborative Outcomes Reporting, Multiple Lines and Levels of Evidence (MLLE), Rapid Outcomes Assessment. See below for definitions.

2. Compare results to the counterfactual

How will you compare the factual with the counterfactual - what would have happened without the intervention?

Experimental options (or research designs):

Control Group: comparing an untreated research sample against all other groups or samples in the research.

Quasi-experimental options (or research designs):

Difference in Difference (or Double Difference): the before-and-after difference for the group receiving the intervention (where they have not been randomly assigned) is compared to the before-after difference for those who did not.

Instrumental Variables: a method used to estimate the causal effect of an intervention.

Judgemental Matching: a comparison group is created by finding a match for each person or site in the treatment group based on researcher judgements about what variables are important.

Matched Comparisons: participants are each matched with a non-participant on variables that are thought to be relevant. It can be difficult to adequately match on all relevant criteria.

Propensity Scores: statistically creating comparable groups based on an analysis of the factors that influenced people's propensity to participate in the program.

Sequential Allocation: a treatment group and a comparison group are created by sequential allocation (e.g. every 3rd person on the list).

Statistically Created Counterfactual: developing a statistical model, such as a regression analysis, to estimate what would have happened in the absence of an intervention.

Regression Discontinuity: comparing the outcomes of individuals just below the cut-off point with those just above the cut-off point.

Non-experimental options:

Key Informant: asking experts in these types of programmes or in the community to predict what would have happened in the absence of the intervention.

Logically constructed counterfactual: using the baseline as an estimate of the counterfactual. Process tracing can support this analysis at each step of the theory of change.

Approaches: Randomized Controlled Trial (RCT): creating a control group and comparing this to one or more treatment groups to produce an unbiased estimate of the net effect of the intervention.

3. Investigate possible alternative explanations

How will you investigate alternative explanations?

Force Field Analysis: providing a detailed overview of the variety of forces that may be acting on an organizational change issue.

General Elimination Methodology: this involves identifying alternative explanations and then systematically investigating them to see if they can be ruled out.

Key Informant: asking experts in these types of programmes or in the community to identify other possible explanations and/or to assess whether these explanations can be ruled out.

Process Tracing: ruling out alternative explanatory variables at each step of the theory of change.

Ruling Out Technical Explanations: identifying and investigating possible ways that the results might reflect technical limitations rather than actual causal relationships.

Searching for Disconfirming Evidence/Following Up Exceptions: Treating data that don't fit the expected pattern not as outliers but as potential clues to other causal factors and seeking to explain them.

Statistically Controlling for Extraneous Variables: where an external factor is likely to affect the final outcome, it needs to be taken into account when looking for congruence.

Approaches: these approaches combine ruling out possible alternative explanations with options to check the results support causal attribution.

Contribution Analysis: assessing whether the program is based on a plausible theory of change, whether it was implemented as intended, whether the anticipated chain of results occurred and the extent to which other factors influenced the program's achievements.

Collaborative Outcomes Reporting: mapping existing data against the theory of change, and then using a combination of expert review and community consultation to check for the credibility of the evidence.

Multiple Lines and Levels of Evidence (MLLE): reviewing a wide range of evidence from different sources to identify consistency with the theory of change and to explain any exceptions.

Rapid Outcomes Assessment: assessing and mapping the contribution of a project's actions on a particular change in policy or the policy environment.

Find options (methods), resources and more information on these tasks and approaches online at http://betterevaluation.org/plan/understandcauses

Questions or comments?

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There are different types of causal relationships

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- Counterfactual
- Regularity
- Ruling out alternatives