

# Evaluation of Spillovers from Behavioral Interventions in Food, Energy, and Water Conservation: A Systems Perspective

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## Defining Spillover

- Different names-
  - ‘knock on’, ‘spin-off’, ‘catalyst behavior’, ‘rebound effects’, ‘foot in the door effect’ etc.
- Spillover-Effect of an intervention on subsequent behaviors not targeted by the intervention (Truelove et al,2014)
- Behavioral Spillover- Observable and causal effect that a change in one behavior (behavior 1) has on a different, subsequent behavior (behavior 2) (Galizzi & Whitmarsh,2019)

## Why Important

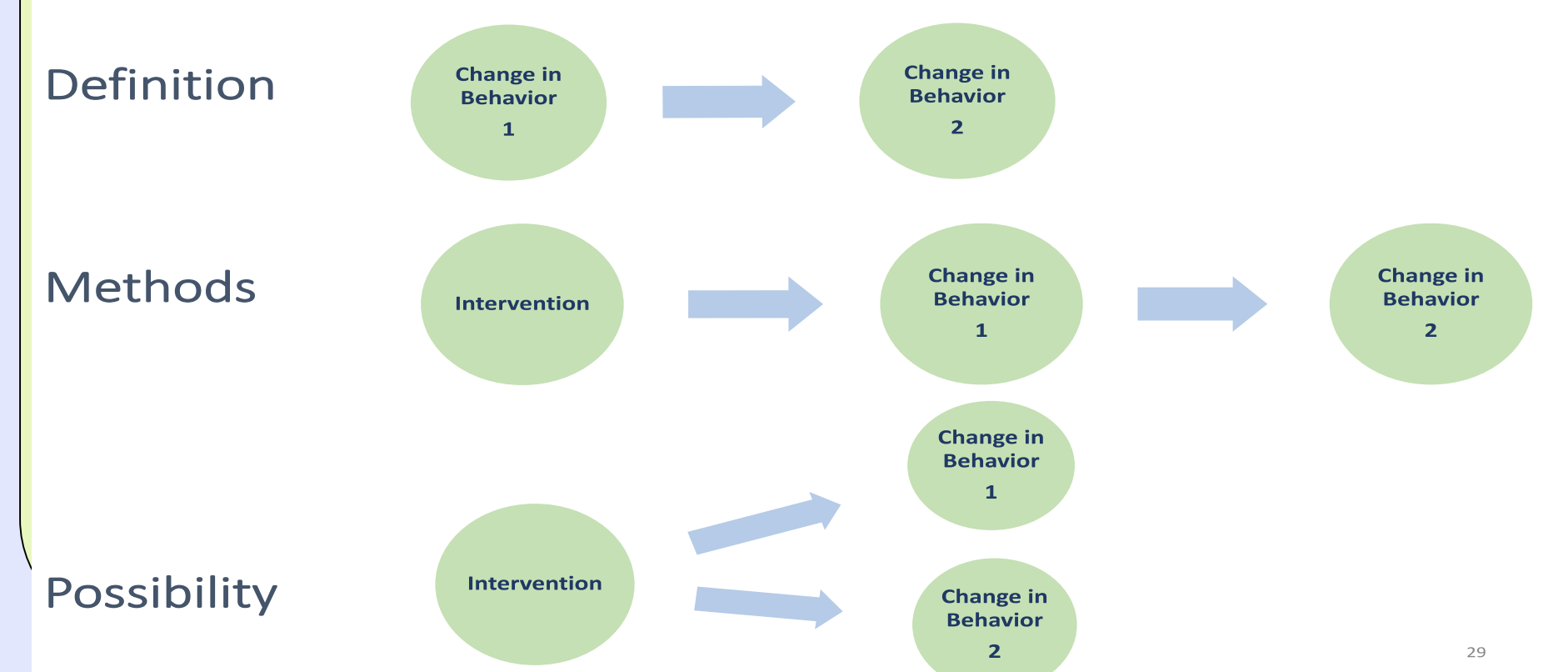
- Failure to account for all possible spillovers –
  - Leaves out valuable information
  - Results in biased and over/underestimates
- Across disciplines - Economics, Marketing, Health, Law, Physical and Social sciences
- Broadly categorized as positive or negative

## Causal Relationships in Spillover

Difference In Difference Experimental Design to Test Behavioral Spillovers (Galizzi & Whitmarsh, 2019)

	Behavior1	Behavior2
Control Group (C)	B1C	B2C
Treatment Group (T)	B1T	B2T
Difference	$\Delta B1$	$\Delta B2$

- Difficult to isolate change in behaviors from Interventions
- Possibility of simultaneous causality



## Research Questions

- How to design testable evaluation framework for behavioral interventions for food, energy, and water consumption activities?
- How to evaluate spillovers from behavioral interventions in a noisy real-world setting?

## Issues and Challenges

- Most studies conducted to assess spillover effects-
  - ✓ Explore the nature and direction of causal relationships between behaviors
  - ✓ Rely on estimation of gross effects
  - ✓ One-time behavioral intervention for conservation of food, energy, or water sectors in isolation
- Assessing impact on climate changes involves aleatory situations in which uncertainty itself is uncertain (Bridges, A.Felder, McKelvey, & Niyogi, 2014)

## Systems Approach in Evaluation

- Core concepts (Williams, 2015)
  - ✓ Interconnections
  - ✓ Multiple perspectives,
  - ✓ Boundaries judgments



Fig.1-Systems Puzzle

Picture Source: OpenLearn. (2015). Managing complexity: a systems approach – introduction. Retrieved from The Open University: <https://www.open.edu/openlearn/science-maths-technology/computing-and-ict/systems-computer/managing-complexity-systems-approach-introduction/content-section-0?active-tab=description-tab>

## Proposed Framework

1. System boundaries, context, and interactions:
  - Residential household as a unit with food, energy, and water conservation behaviors as targeted behaviors

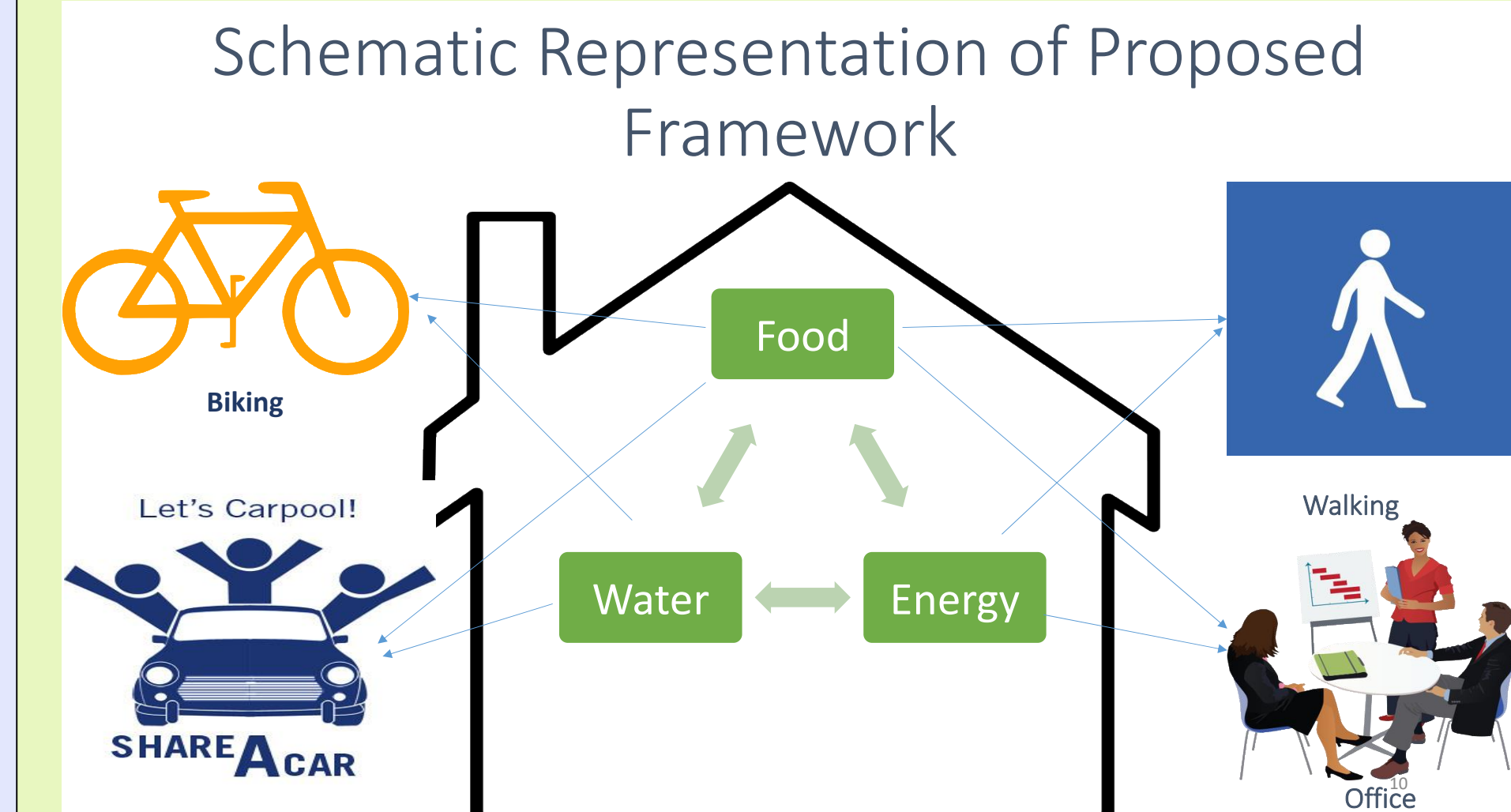


Fig.2- Schematic representation of Evaluating Spillover from Systems perspective

2. Identifying evaluation criteria (OECD, 2019)-Relevance, Effectiveness, Efficiency, Impact, Sustainability, and Coherence
3. Across different geographical regions and cultural settings (Capstick, Whitmarsh, Nash, Haggar, & Lord, 2019) (Nash, et al., 2019).
4. Net effects to capture interactions involving positive and negative spillovers (Tiefenbeck, Staake, Roth, & Sachs, 2013)
5. Lifecycle assessment of impacts on GHG emissions
6. Limitations and Constraints

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