

VIEWPOINT

Measuring change without seeing the system: A call for epistemic humility in intervention evaluation

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In behavioral and applied food system research, intervention studies aimed at improving practices such as healthy eating are often evaluated as if the systems in which they operate are stable and closed. Success is usually measured through specific behavioral outcomes, based on the assumption that observed changes can be attributed primarily to the intervention itself. However, eating behaviors do not occur in isolation. They are shaped by income, housing conditions, time constraints, cultural norms, food environments, and policy contexts that extend far beyond any single program. Intervention design already includes assumptions about how the system works, and evaluation frameworks follow those assumptions. Therefore, what evaluation can observe, measure,

and interpret is limited before the evaluation even begins.

This problem resonates with recent discussions in food systems scholarship about how a narrow focus on methodological rigor shapes what can be known in complex systems, including JAFSCD's winter 2025 introduction to a special section of articles on triple rigor (Budowle & Porter, 2025). The introduction highlights the limits of epistemological rigor alone and argues for making space for uncertainty as a condition for more humble and generative knowledge production in complex food systems. This commentary is informed by engagement with and review of intervention research in food systems, nutrition, and community development settings.

These epistemological limits become visible in evaluation practice. The assumptions embedded in intervention design influence not only what is measured, but also how results are interpreted. Measuring behavioral outcomes such as food consumption is not the problem in itself. The problem arises when these outcomes are treated as sufficient evidence of intervention effectiveness, without

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accounting for how system level forces shape, sustain, or constrain those changes. Evaluation timelines and indicators often prioritize outcomes that fit program goals and funding expectations, while effects that appear slowly, differ across groups, or fall outside the immediate scope of the intervention are excluded. At multiple points in the evaluation process, results become biased toward showing success, not because of intentional misconduct, but because design and reporting choices favor internal coherence over interaction with broader social and economic conditions. Outcomes that do not align with expectations are often described as implementation problems or contextual noise, rather than as information about how the system responds to intervention.

To be clear, evaluation cannot and should not be expected to capture every dimension of a complex social system. Some degree of simplification is necessary to make analysis possible and to support meaningful interpretation of results. The concern raised here is not about the existence of boundaries, but about how rarely those boundaries are made explicit or examined. When the openness of social systems is treated as a methodological inconvenience rather than a defining feature of eating behavior, rigor becomes associated with control within artificial limits. This may strengthen internal validity, but it can weaken explanatory power. Precision in measurement is then mistaken for understanding of how and why change occurs.

This limitation becomes visible in common evaluation scenarios. For example, the study of an intervention may report increased consumption of fruits and vegetables during the program period. Evaluation records this as success. However, the analysis may not examine whether the change depended on temporary food subsidies, shifts in household stress, changes in work schedules, or reductions in other food expenditures. The measured outcome is real, but the conditions that produced and supported it remain unclear. Without

attention to these conditions, it is difficult to know whether the intervention itself was effective, for whom it worked, or whether similar results would occur under different circumstances.

Some of the concerns raised here are already being discussed in fields such as systems-informed evaluation, realist evaluation, and implementation research. This commentary does not dismiss those efforts. Rather, it suggests that closed system assumptions remain common in practice, particularly in behavioral food system interventions where evaluation is closely tied to predefined program goals. Intervention design defines the system boundary, evaluation operates within that boundary, and institutional incentives often reward clear and positive findings. These levels are related but distinct, and each contributes to shaping what evaluation can see.

Taking a step back from individual outcomes helps clarify what is at stake. If evaluation only asks, “Did consumption change?”, learning often stops there. The intervention is labeled effective or ineffective, and attention shifts to replication or scale. When evaluation instead asks, “Under what system conditions did consumption change, and for whom?”, the focus moves from confirmation to understanding. This shift does not require abandoning behavioral interventions or evaluation as a practice. It requires greater humility about what evaluation findings can claim, given the assumptions built into intervention design.

Viewing food systems as open and adaptive does not weaken evidence. It reframes evidence as partial, context-dependent, and provisional. Without this reframing, evaluation risks confirming what intervention design has already assumed, rather than contributing to meaningful learning. Making space for uncertainty, uneven effects, and structural influences is not a failure of rigor. It is a necessary condition for producing more honest knowledge about how behavior change unfolds within real-world food systems. 

Reference

- Budowle, R., & Porter, C. M. (2025). Triple rigor: An introduction to the special section celebrating Christine Porter's Work and life. *Journal of Agriculture, Food Systems, and Community Development*, 15(1), 5–12.
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