



Are We Doing What We Planned? Measuring Fidelity in Implementation Science

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What We Will Cover Today



What is Implementation Fidelity?



Why is it Critical for Your Research?



Common Measurement Challenges



Practical Solutions & Best Practices



Key Take-Home Messages



Q & A

The "Black Box" of Implementation



Without looking inside the "black box," we only know what **program** went in and what **results** came out. We cannot explain **why** the results occurred, making it impossible to reliably replicate success

Key Question: Are your results due to the program itself, or how it was delivered?

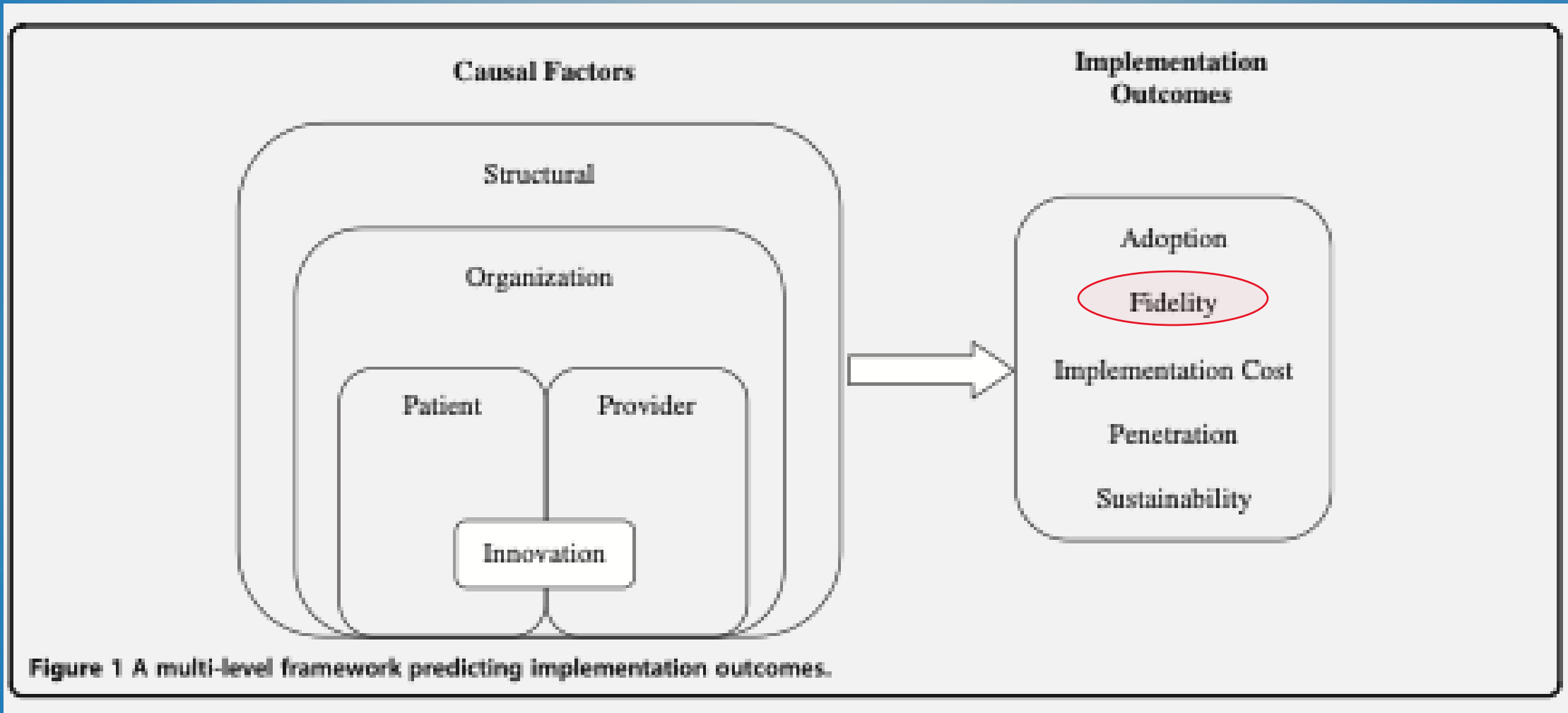


Figure 1 A multi-level framework predicting implementation outcomes.

A Deeper
Look: The
Carroll et al.
(2007)
Framework

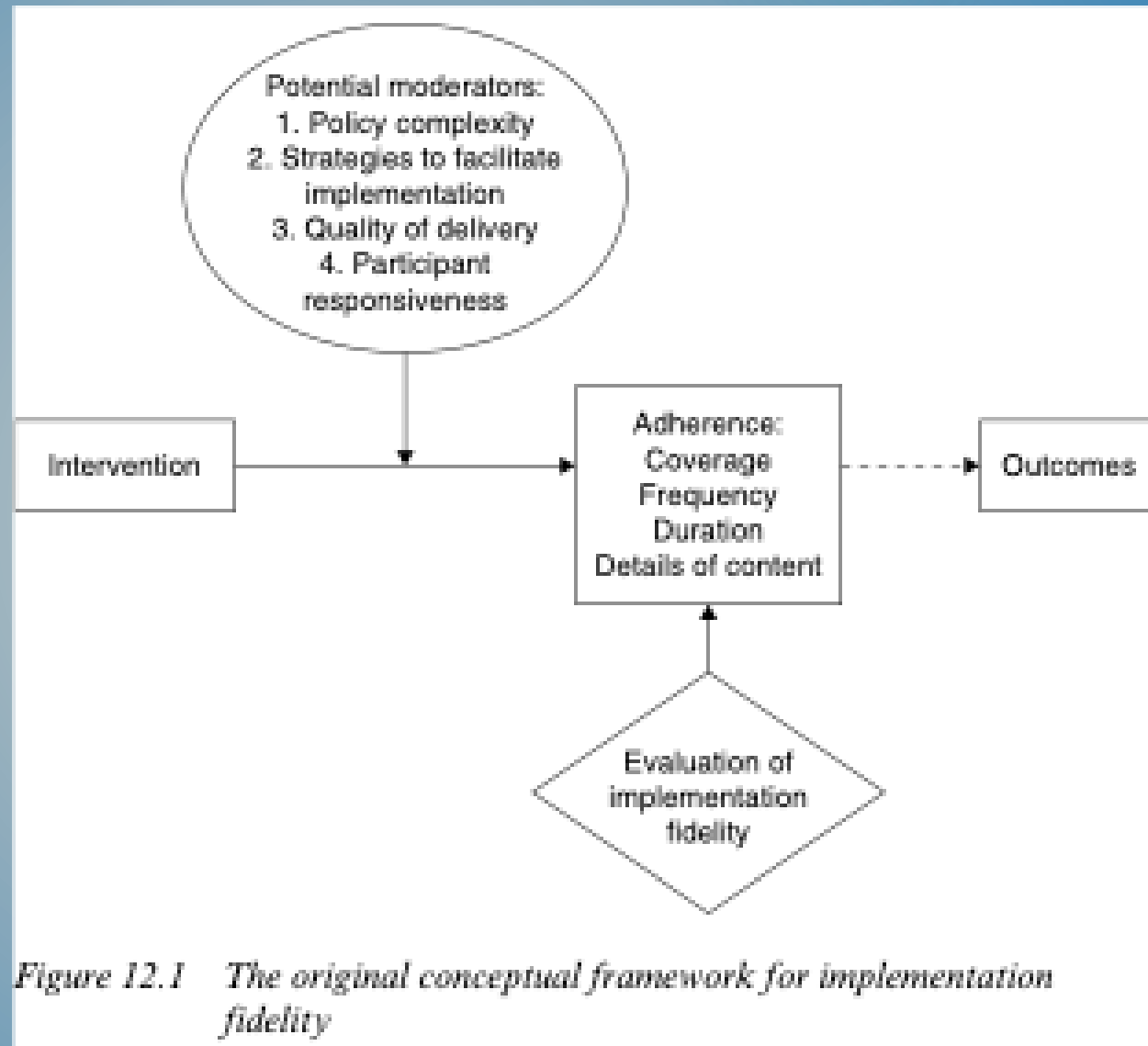


Figure 12.1 The original conceptual framework for implementation fidelity

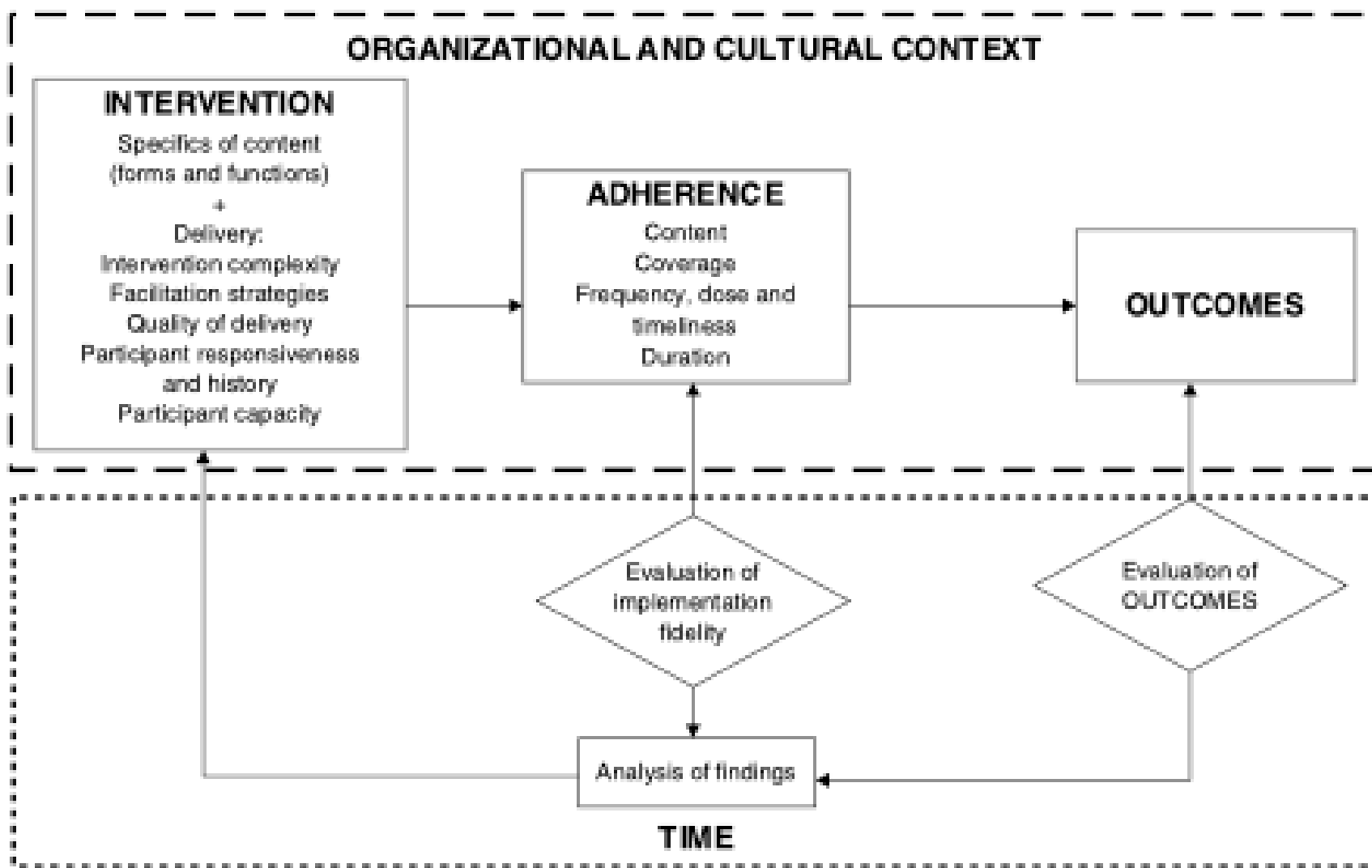
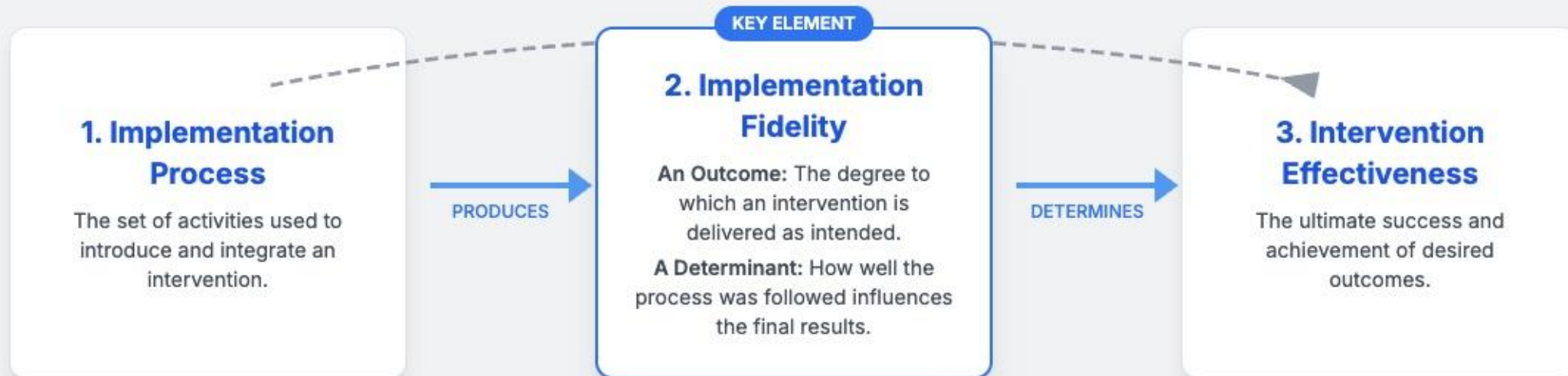


Figure 12.2 An updated implementation fidelity framework

The Dual Role of Implementation Fidelity



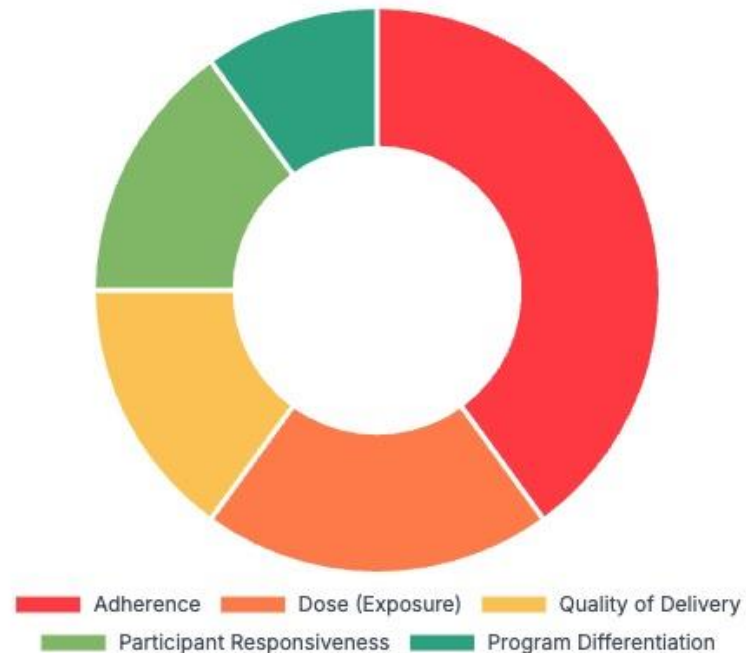
This cycle shows that **Implementation Fidelity** is not just a checkpoint, but a critical bridge. It is the direct **outcome** of the implementation process, and at the same time, the primary **determinant** of whether the intervention achieves its goals.

Defining Fidelity: The Core Components

Implementation fidelity is the degree to which an intervention is delivered as it was intended. It's not a single metric, but a multi-faceted concept. Research has identified five key dimensions that must be measured to get a complete picture of fidelity.

Fidelity Component Breakdown

This chart shows a conceptual breakdown of the five core components of fidelity. While 'Adherence' is often the largest focus, a comprehensive assessment must consider all five to understand the full implementation story.



1. Adherence

Were core program components delivered as prescribed? This includes content, activities, and methods.

2. Dose (Exposure)

Was the correct amount of program delivered? Considers number, frequency, and duration of sessions.

3. Quality of Delivery

How well was the program delivered? Assesses provider skill, enthusiasm, and preparedness.

4. Participant Responsiveness

How did participants engage with the program? Measures interest, involvement, and enthusiasm.

5. Program Differentiation

Were the program's critical features distinguishable from other ongoing programs or standard care? This ensures the observed effects are attributable to the specific intervention.

Why is Fidelity Important for Your Research?

Implementation fidelity is not just a procedural step; it's the foundation for valid, useful, and impactful findings.



To Confidently Interpret Outcomes

Fidelity data is essential for **internal validity**. It allows you to distinguish between an intervention that failed and an intervention that was failed by poor implementation.



To Guide Program Improvement & Training

Fidelity assessment provides invaluable feedback. It can identify components that are consistently implemented poorly, highlighting areas where practitioners need more training or where the program itself needs to be **modified for easier use**.



To Test Theoretical Assumptions

It allows you to examine the "**active ingredients**" of your program. By linking fidelity levels of specific components to outcomes, you can test theories about what truly drives change.



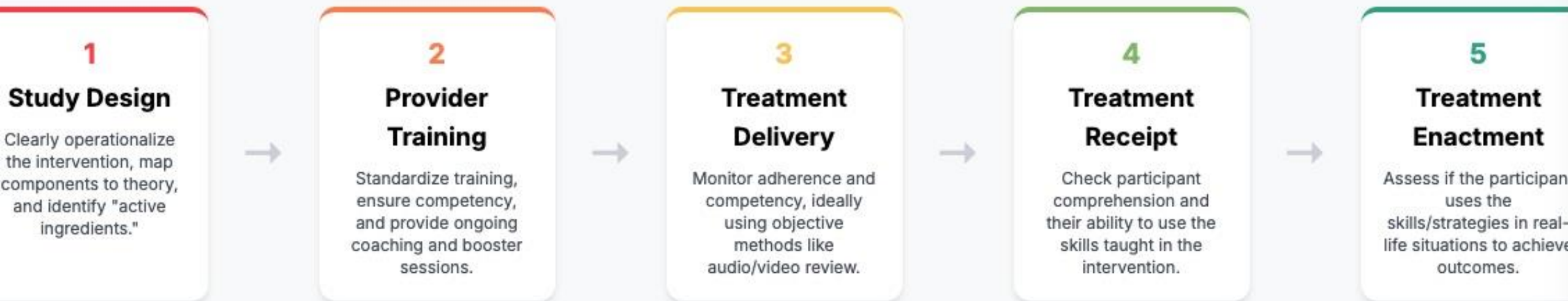
To Advance Implementation Science

Understanding the degree of fidelity achieved—and the reasons for any deviations—helps us understand what it takes to **transport effective programs** to new, real-world settings and what level of fidelity is needed to ensure effectiveness.

Maximizing Treatment/Intervention Fidelity for Health Trials

A Practical Roadmap for Fidelity

Based on the Borrelli (2011) Best-Practice Framework



Methods of Enhancing Treatment Fidelity: Study Design

- 1 Explicitly identify and use a theoretical model as a basis for the intervention, and ensure that the intervention components and measures are reflective of underlying theory. Use a protocol review group.
 - 2 Pilot test the intervention and use feedback from participants and providers to refine adherence to the theoretical model and improve acceptability, feasibility, and potential effectiveness of the intervention.
 - 3 Determine a priori the number, length, and frequency of contacts, and develop a monitoring plan to maintain consistency in dose.
 - 4 Develop a plan for how adherence to the protocol will be monitored (audiotaping, videotaping). Monitor both intervention delivery and assessment administration (to ensure consistency of measurement).
 - 5 Develop a plan to record protocol deviations (dose, treatment content) across all conditions and method of providing timely feedback to providers.
 - 6 Develop a user-friendly scripted curriculum or treatment manual (print or via computer/handheld device) to ensure consistency of delivery and adherence to active ingredients of the treatment.
 - 7 Plan for implementation setbacks (e.g., attrition of treatment providers). Videotape the trainings to ensure consistency for future trainings.
-

Methods of Enhancing Treatment Fidelity: Training

- **Hiring:** Hire providers with similar credentials and experience. Ensure “buy in” to treatment, theory, and randomization. Consider matching providers to key characteristics of the population.
- **Standardize training:** Use the same trainers over time, use certified trainers, train all providers together, use standardized training materials, use video or audio tapes of expert delivery, develop a manual of training procedures and videotape trainings in case of provider attrition and need for future trainings.
- **Accommodate Learner Differences:** Design training for diverse learning styles, train providers to deal with different types of participants, consider more intensive training and follow-up for less experienced providers.
- **Assess skill acquisition:** Use role plays with standardized patients followed by feedback to provider, score provider adherence to both intervention content and process using validated performance criteria, have a written exam pre and post training, develop criteria for initial certification.
- **Prevent skills drift:** Booster sessions, patient exit interviews, periodic re-certification, audio or video record all encounters and code for treatment adherence, provide timely feedback, monitor patient drop-out rates of each provider.
- **Enhance buy-in from providers:** Foster provider self-efficacy and perception of organizational support. Explain the study design and rationale, the principles of research, and why it is important to prevent contamination and omission or addition of components not specified by the intervention.

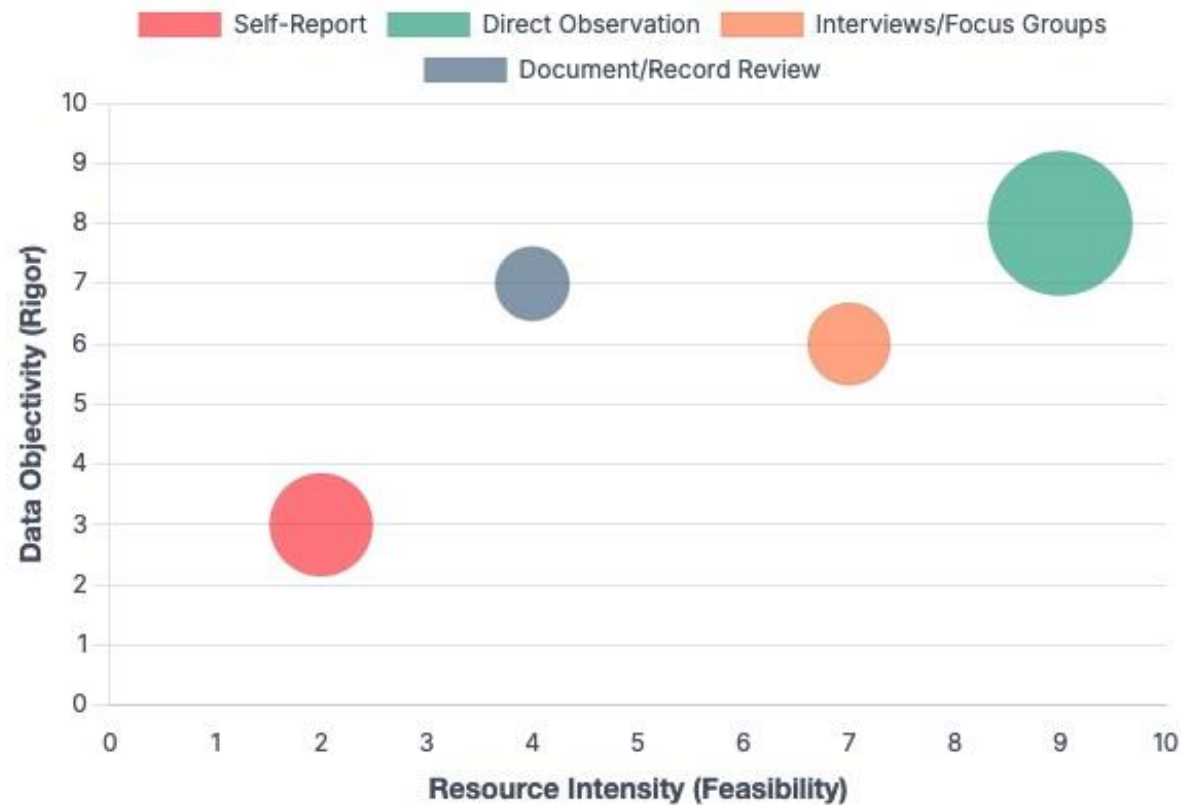
- Create relationships with providers to increase their comfort for reporting deviations (collaborative vs. hierarchical integrity monitoring).
- Use a scripted curriculum or treatment manual.
- Assess non-specific effects through multiple methods and on an ongoing basis (patient exit interview, audiotape and code sessions, monitor participant complaints, provide feedback to provider).
- Minimize differences within treatments and maximize differences between treatments: manuals, frequent supervision to catch mistakes early, limit contact between providers of different treatment conditions, monitor provider expectations about treatment.
- Ensure adherence to the protocol (content, dose, and process): audio or videotaped encounters, provider self-monitoring and patient exit interviews.
- Check for errors of commission and omission, degree to which treatment components were delivered, and non-specific factors.
- Establish minimum competency levels, below which providers are given remedial training (e.g., adherence to $\geq 80\%$ of the components).
- Coders should be independent of the study, and blind to treatment assignment, participant progress and outcomes, and provider identity.
- Use an independent group to review taped sessions and guess the treatment condition.

- Administer pre-post tests of client knowledge.
- Present material in engaging manner.
- Ensure that written materials have appropriate health literacy.
- Materials should be culturally relevant in terms of surface structure (photos) and deep structure (deeper cultural values).
- Provider should repeat information using multiple formats (verbal, pictures, written)
- Participant should be queried for their understanding of the material covered in the visit.
- Patients should role play the skills and receive coaching and feedback.
- Assess patients' confidence to apply the skills delivered.
- Structure the intervention around achievement-based objectives.
- Collect and review self-monitoring data (e.g., brushing diary).
- Schedule follow-up visits and telephone calls to check in on understanding of the skills learned in treatment and level of adherence to recommendations.

How is Fidelity Measured?

There is no single "best" way to measure fidelity. A multi-method approach is crucial for a robust assessment. Different methods have unique strengths and are better suited for capturing different fidelity components. The choice of method often involves a trade-off between rigor and feasibility.

Comparing Common Fidelity Measurement Methods



A Guide to Fidelity Measurement Methods

The best approach often involves combining methods to balance reliability with feasibility.

Checklists / Self-Report

Measures Best:

Adherence, Dose

Pros:

Low cost, easy to administer, low burden.

Cons:

Subject to social desirability and recall bias; tends to overestimate fidelity.

Direct Observation

Measures Best:

Quality of Delivery, Adherence, Competence

Pros:

Objective, detailed, rich data; considered a "gold standard."

Cons:

Very resource-intensive; observation can influence provider behavior.

Interviews / Focus Groups

Measures Best:

Participant Responsiveness, Reasons for Adaptation

Pros:

Provides deep qualitative insights into the "why" behind the numbers.

Cons:

Time-consuming to collect and analyze; requires skilled facilitators.

Document / Record Review

Measures Best:

Dose, Exposure, Adherence

Pros:

Objective, unobtrusive, uses readily available data.

Cons:

Data may lack context or detail; may not capture implementation quality.

Challenges in Fidelity Measurement

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Measuring fidelity is not without its difficulties. Researchers and practitioners face several common challenges that can impact the quality and utility of fidelity data. Recognizing these challenges is the first step toward overcoming them.

#1

Defining Core Components

Program manuals are often unclear about what is essential versus what is adaptable. Without this clarity, measurement is impossible.

#2

Burden of Measurement

"Gold standard" methods like direct observation are resource-intensive, leading to reporting fatigue and potentially inaccurate data.

#3

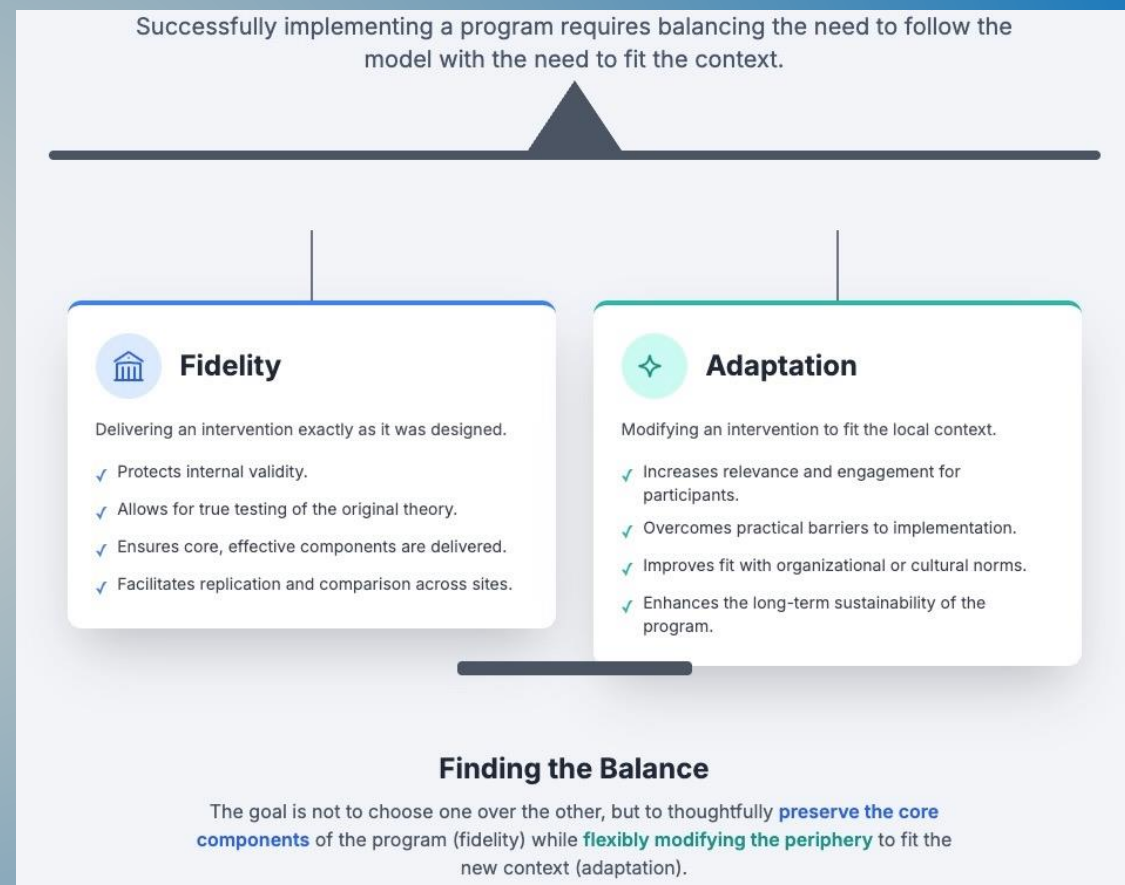
Lack of Validated Tools

Fidelity measures are often intervention-specific, so validated, "off-the-shelf" tools are rare, raising questions about reliability.

The Core Tension: Fidelity vs. Adaptation

Program adaptation is the deliberate or unintentional modification of a program through:

- (1) deletions or additions (i.e., enhancements) to program components (e.g., to content, materials, activities)
- (2) modifications to the nature of the components
- (3) changes in the manner of administration or intensity (i.e., amount or duration) of program components



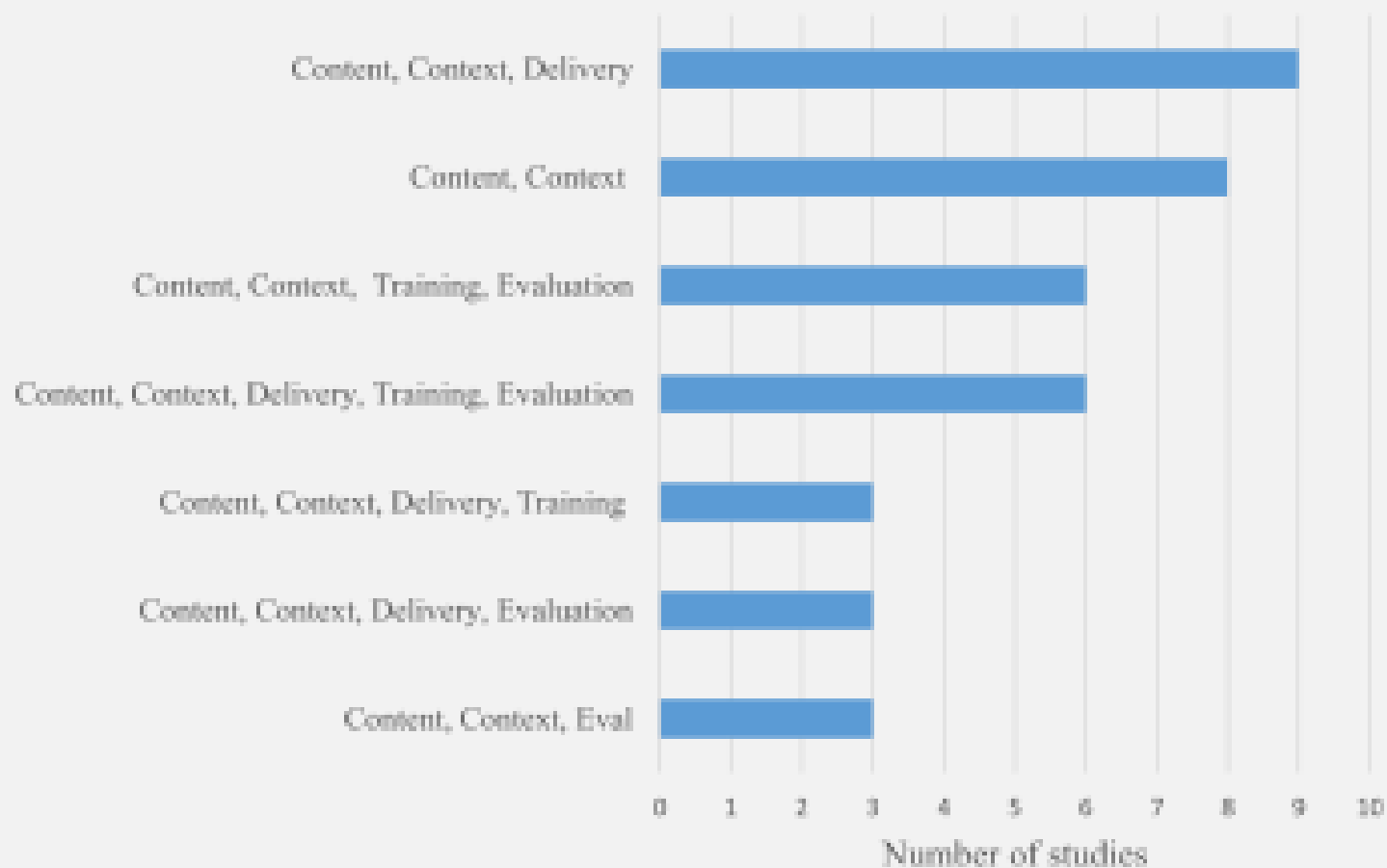


Fig. 2 Common patterns of types of adaptations across studies

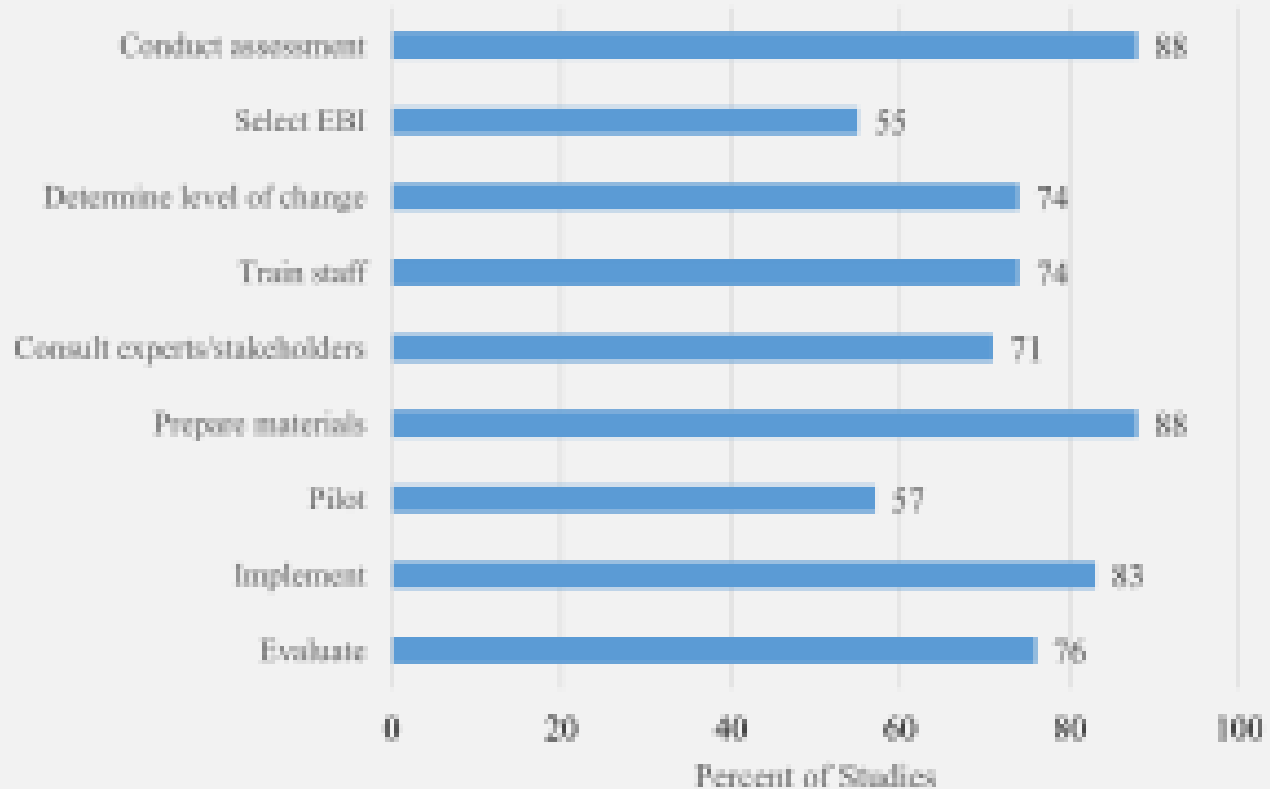


Fig. 3 Steps taken in the adaptation process across studies

Fidelity Measurement: Summary of Findings

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Substantial Heterogeneity: Studies show a wide and inconsistent variety of methods for measuring fidelity.



Observational Methods are Reliable but Costly: Structured checklists and direct observation provide the most reliable data, but are highly resource-intensive.



Self-Report is Feasible but Less Reliable: Self-report and participant measures are easier to implement but were consistently reported as less reliable.



Lack of Consensus: Multi-method approaches and context-specific adaptations are increasingly common, but the field lacks agreed-upon standards and thresholds for what constitutes "good" fidelity.



Validation is a Recurring Limitation: The systematic development, validation, and transparent reporting of fidelity measures—including their psychometric properties—were infrequently described in the reviewed studies.

A Practical Workflow for Fidelity Assessment

1. Start with a Logic Model

Before implementation, create a clear logic model or theory of change. This forces you to define your key activities, which become your core components for fidelity measurement.

2. Use Pragmatic, Mixed Methods

You don't always need the "gold standard." Combine methods to get a fuller picture with less burden. For example, use implementer self-report checklists for adherence and dose, supplemented by brief, targeted observations for quality.

3. Plan for & Document Adaptations

Don't treat adaptation as a surprise. Plan for it. Use a framework to systematically document what was adapted, why, and what the impact was. This turns adaptation from a threat into a valuable data point.

Putting It All Together

A Concrete Example: A School Nutrition Program

The Intervention

A 10-session curriculum designed to improve healthy eating habits, delivered by teachers in the classroom.

The Fidelity Plan: A Multi-Method Approach



Adherence/Dose

A simple **teacher self-report log** tracks if each of the 10 sessions was delivered.

Example Question: "Did you deliver Session 5 this week? (Yes/No)"



Quality

A researcher uses a **simple quality checklist** during direct observation of 2 random sessions for each teacher.

This provides a more objective measure of how well the content was delivered.



Adaptations

Teachers use a dedicated **log to note any changes** they make to the curriculum.

Example Note: "I used local fruits as examples instead of the ones in the book to make it more relevant for the students."

Key Takeaways

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1. Interpret Your Results

Fidelity is essential for interpreting your research results. It answers the "why" behind your outcomes.



2. Aim for "Good Enough" Data

Measurement doesn't have to be perfect. Aim for pragmatic, **mixed-methods approaches** that give you the most useful data for your resources.



3. Plan for Fidelity & Adaptation

Plan for both from the start. They are not enemies; they are **two sides of the same coin** needed for real-world success.

► Thank You & Q&A

