



WEBINAR

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1 - 2 PM CT / 2 - 3 PM ET

Why and How a Behavioral Intervention Works: A Panel Discussion Exploring Mechanisms





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4-Part Guidance Document Series: Mechanisms of Action

- Part 1: **Mechanisms Of Action** In Behavioral Interventions For Dementia Family Caregivers
- Part 2: The Relationship Between **Fidelity** and Mechanisms In Behavioral Intervention Research
- Part 3: **Tailoring** And Mechanisms In Caregiver Intervention Research
- Part 4: Testing Mechanisms Of **Technology**-driven Interventions For Dementia Family Caregivers

Learning Objectives

1. Define mechanisms of action and distinguish them from intervention components and outcomes
2. Identify core mechanisms, theoretical frameworks, and validated measures used in dementia caregiver intervention research
3. Apply guidance on specifying, measuring, and reporting mechanisms — including considerations for fidelity, tailoring, and technology-driven interventions

What is a Mechanism of Action?

A mechanism of action (MoA) explains *how and why* an intervention works.

Mechanisms are the causal processes through which an intervention produces change in outcomes, i.e., the active ingredients that drive effectiveness.

Key distinction:

- **Component:** What the intervention does (e.g., strengthening social support services)
- **Mechanism:** How and why it works (e.g., perception of emotional support)
- **Outcome:** What changes as a result (e.g., reduced caregiver depression)

Mechanisms are theory-driven, measurable, and generalize across populations and contexts.

Why Understanding Mechanisms Matters

Specifying mechanisms of action is essential for advancing caregiver intervention science:

- Strengthens theoretical rigor and reproducibility
- Identifies the active ingredients that drive effectiveness
- Supports optimization, adaptation, and real-world scaling
- Meets expectations of funders
- Facilitates translation from efficacy to effectiveness research
- Enables meaningful adaptation for diverse populations
- Guides interventionist training and fidelity monitoring

"Even if not formally testing a mechanism, it is important to include a conceptual model and propose the presumed mechanism in NIH grant applications."

— EMBRACE Guidance Document, 2026

Aligning Components, Mechanisms, and Outcomes

Every intervention component should map to at least one mechanism, and each mechanism should connect to proximal and distal outcomes.

THE PATHWAY:

Intervention Component → Mechanism → Outcomes

Example:

- Components: 6 sessions focused on strengthening social support services via individual and family counseling, support group participation, and on-call telephone consultations
- Mechanism: Increases satisfaction with social support network
- Outcome: Depressive symptoms measured via Geriatric Depression Scale (GDS) and burden, measured with the Zarit Caregiver Burden Scale

Tip: Minimize intervention components that do not map to a clear mechanism.

Causal Pathway Diagram

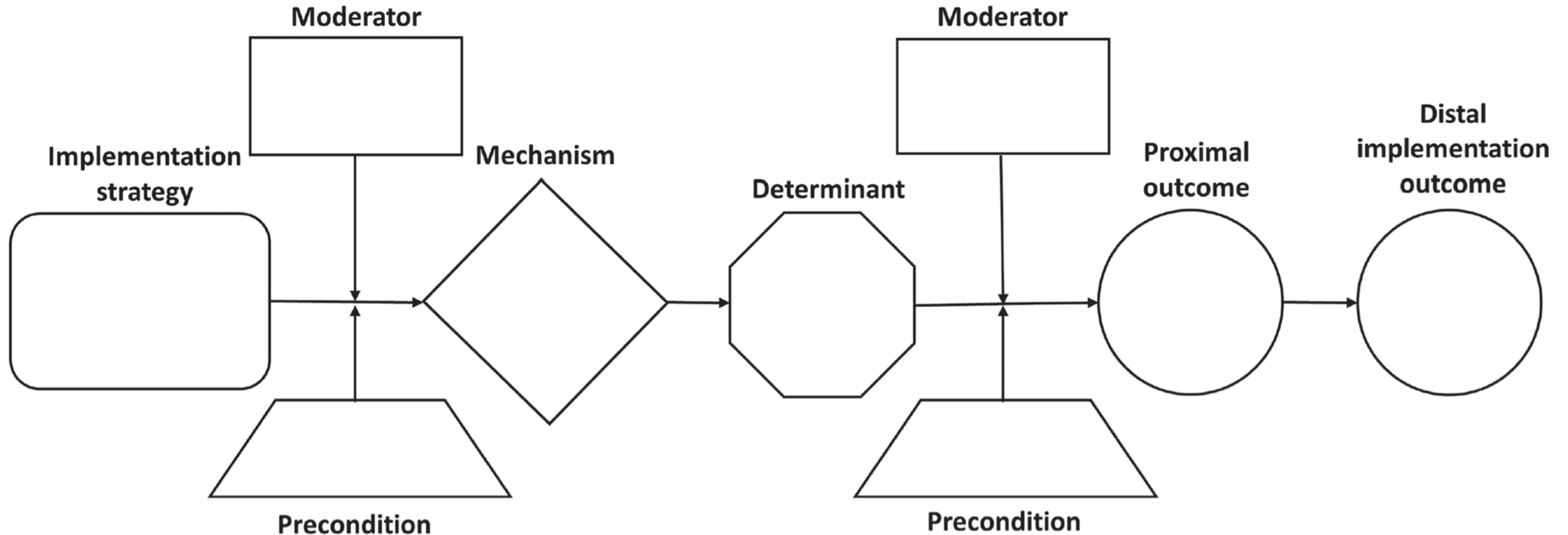


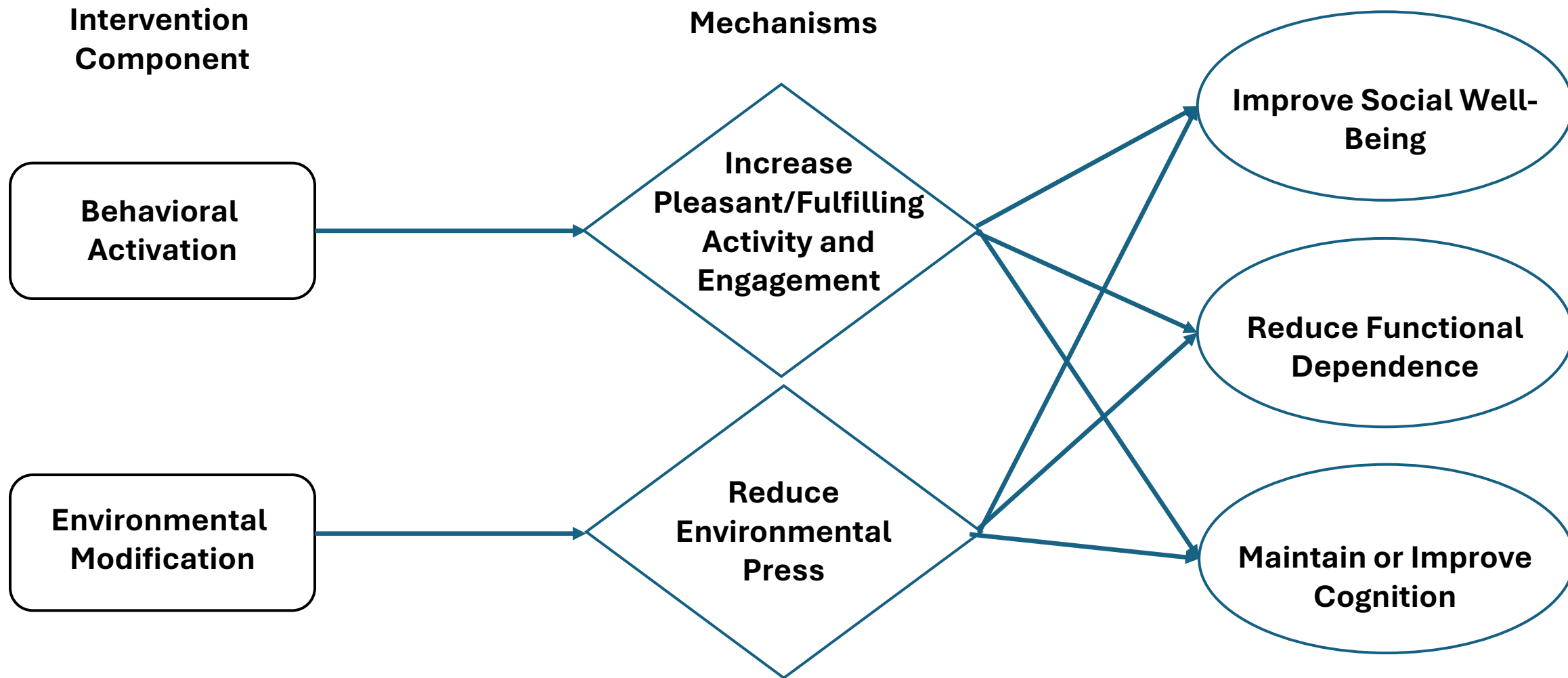
Figure 10.1 Causal pathway diagram.

Key Definitions

Table 10.1 Causal pathway diagram: terms and definitions.

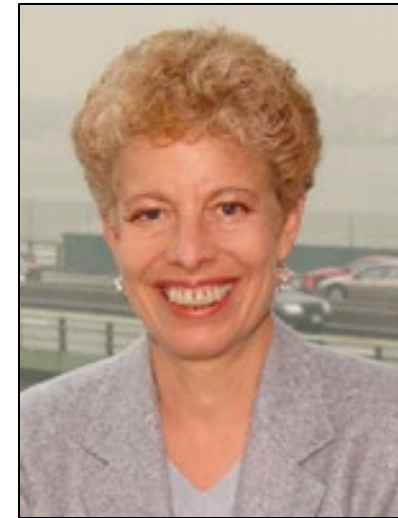
<i>Term</i>	<i>Definition</i>
Implementation strategy component	Methods used to improve the adoption, fidelity, or sustained use of an evidence-based treatment, practice or service
Mechanism	The process through which an implementation strategy operates to affect an implementation outcome
Determinant	Commonly referred to as barriers or facilitators, a factor that has an enabling or hindering influence on an implementation outcome; determinants are often the targets that implementation strategies are intended to affect
Proximal outcome	The most immediate, observable outcome of an implementation strategy
Distal implementation outcome	The downstream implementation outcome that the implementation strategy is ultimately intended to achieve
Precondition	A factor that is necessary for an implementation strategy to exert its influence on an implementation outcome
Moderator	A factor that can strengthen or weaken the influence of an implementation strategy

Home Alone: R21AG080744 Example



NYU Caregiver Intervention Study (M. Mittelman, PI)

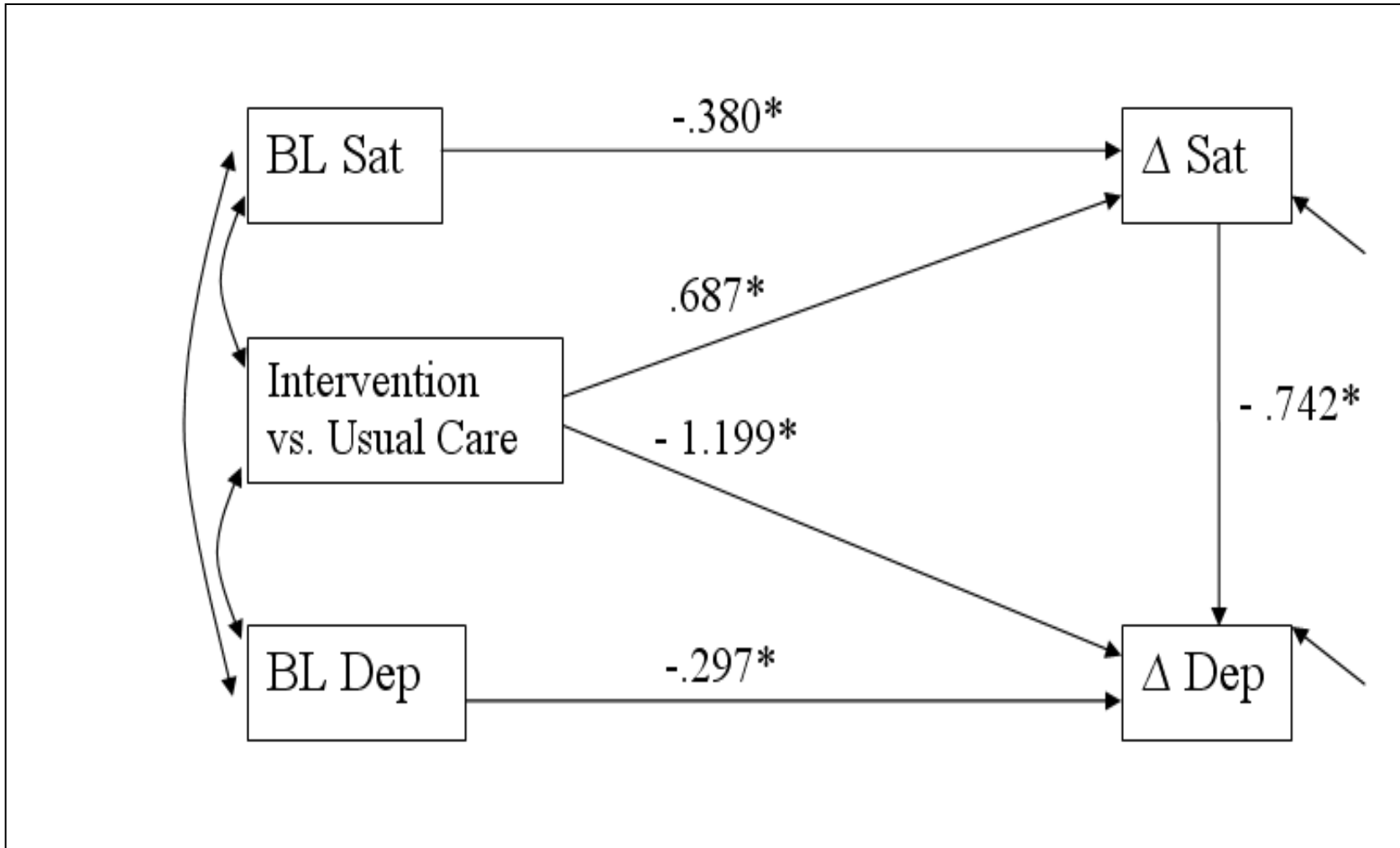
- Randomized controlled trial of 406 spouse caregivers of dementia patients. Dyads were randomly assigned to an intervention condition or a usual care control group.
- The intervention involved strengthening social support resources (e.g., support group services, other family members). Usual care participants received information and access to standard services.
- 312 spouse caregivers provided care in the home for at least one year after randomization.
- Changes in social support were hypothesized to be important proximal outcomes and mediators of change in caregiver depression and patient nursing home placement rate.



Satisfaction with Social Support in the NYU Caregiver Intervention Study

Likert-type ratings were obtained on how satisfied spouse caregivers were with their social support networks (1 = very dissatisfied, 6 = very satisfied).

- “In **general**, how satisfied are you with your social network?”
- “How satisfied are you with the **assistance** you get with daily activities (help with chores, patient care)?”
- “How satisfied are you with the **emotional** support you get from your social network?”



% mediated = 30%

Common Theoretical Frameworks

Stress Process Model (Pearlin et al.):

Primary stressors → Subjective Appraisal → Caregiver outcomes

Social Cognitive Theory (Bandura):

Skill acquisition → Mastery experiences → Enhanced self-efficacy

Cognitive Behavioral Theory:

Identify automatic thoughts → Challenge distortions → Behavioral activation → Improved mood

Competence-Environmental Press Framework:

Environmental demands exceed abilities → Environmental modifications → Improved PLWD functioning → Decreased caregiver burden

Dyadic Care Models:

Improve communication → Enhanced mutual understanding → Better dyadic coping → Improved relationship quality

Measuring Mechanisms: Key Principles

Select measures that match your hypothesized mechanism(s) and are sensitive to change.

- Use proximal, mechanism-specific measures — not just global outcomes
- Establish temporal ordering: mechanism change should precede outcome change
- Test mediation or moderated mediation where feasible
- Use validated measures with demonstrated sensitivity to change in caregiver populations
- Match measurement level (individual, dyadic, environmental) to the hypothesized mechanism

Measuring Mechanisms: Some examples

- Self-Efficacy: Revised Scale for Caregiving Self-Efficacy (RSCSE)
- Knowledge: Alzheimer's Disease Knowledge Scale (ADKS)
- Coping/Emotion Regulation: Perceived Stress Scale (PSS); CERQ
- Social Support: Medical Outcomes Study Social Support Survey (MOS-SSS)
- Dyadic Relational Processes: Dyadic Relationship Scale (DRS)

Frequently Asked Questions

Can you have more than one mechanism?

Yes. Multi-component interventions often map each component to a different mechanism. Different mechanisms may also explain effectiveness for different subgroups.

At what NIH stage should mechanisms be tested?

Mechanisms can be examined at any stage: Stage 0 (identify MoAs and assess feasibility of measurement) through Stage 4 (evaluate implementation processes and relationship to mechanisms)

Are mechanisms required in NIH grant applications?

Yes. Even without formal mechanism testing, include a conceptual model and propose the presumed mechanism.

Should mechanisms appear in main trial outcome publications?

Yes. State hypothesized mechanisms even if not formally tested in the main trial outcome paper.

Key References

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