

# MEASURING IMPLEMENTATION OUTCOMES

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# Learning Objectives

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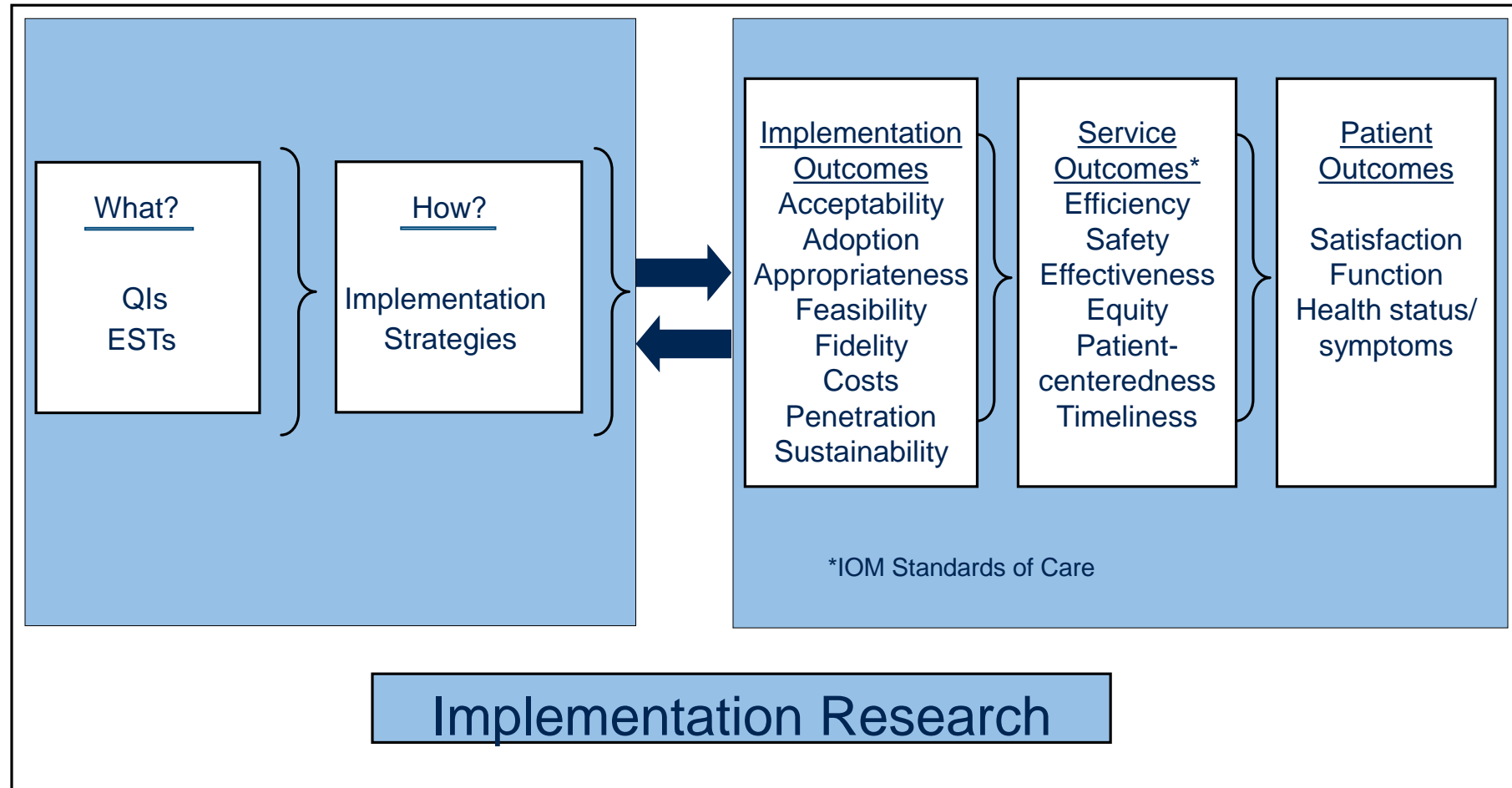
- Delineate key implementation outcomes
- Summarize the state of the science for measurement of implementation outcomes
- Articulate critical parameters of implementation outcome measurement

# Evaluation Framework: Example 1 – RE-AIM



Glasgow, R. E., Vogt, T. M., & Boles, S. M. (1999). Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American Journal of Public Health*, 89(9), 1322-1327.

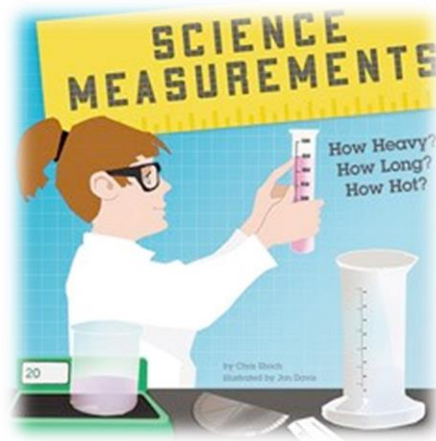
# Evaluation Framework: Example 2 - IR in MH



# Instrument Review Project (IRP)

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- “Science is measurement” (Siegal, 1964)



## INTRODUCTION TO SELF-REPORT MEASURES

- What are self-report measures?
  - A type of method commonly used in social science where individuals express their attitudes, feelings, beliefs or knowledge about a subject or situation.
- Why consider self-reports?
  - Emphasize individuals' perceptions and subjective experiences of their engagement with technologies.
- Self-report methods may be discrete, dimensional, and free response. (Lopatovska & Arapakis, 2011)

...but is measurement necessarily scientific?

# State of Implementation Science Measurement

## SYSTEMATIC REVIEW

Open Access

### Outcomes for implementation science: an enhanced systematic review of instruments using evidence-based rating criteria



Cara C. Lewis<sup>1,2\*</sup>, Sarah Fischer<sup>1</sup>, Bryan J. Weiner<sup>3</sup>, Cameo Stanick<sup>4</sup>, Mimi Kim<sup>5,6</sup> and Ruben G. Martinez<sup>7</sup>

Systematic Review

Open Access

### Are there valid proxy measures of clinical behaviour? a systematic review

Susan Hrisos<sup>\*1</sup>, Martin P Eccles<sup>1</sup>, Jill J Francis<sup>2</sup>, Heather O Dickinson<sup>1</sup>, Eileen FS Kaner<sup>1</sup>, Fiona Beyer<sup>1</sup> and Marie Johnston<sup>3</sup>

## ORIGINAL PAPER

### Measures for Predictors of Innovation Adoption

Ka Ho Brian Chor · Jennifer P. Wisdom ·  
Su-Chin Serene Olin · Kimberly E. Hoagwood ·  
Sarah M. Horwitz

### Systems Antecedents for Dissemination and Implementation: A Review and Analysis of Measures

Karen M. Emmons, PhD<sup>1</sup>, Bryan Weiner, PhD<sup>2</sup>,  
Maria Eulalia Fernandez, PhD<sup>3</sup>, and Shin-Ping Tu, MD, MPH<sup>4</sup>

## Review

### Conceptualization and Measurement of Organizational Readiness for Change

#### A Review of the Literature in Health Services Research and Other Fields

Bryan J. Weiner  
Halle Amick  
Shoou-Yih Daniel Lee  
*University of North Carolina at Chapel Hill*

## SYSTEMATIC REVIEW

Open Access

### Measuring factors affecting implementation of health innovations: a systematic review of structural, organizational, provider, patient, and innovation level measures

Stephenie R Chaudoir<sup>1,3\*</sup>, Alicia G Dugan<sup>2,3</sup> and Collin HI Barr<sup>3</sup>

### Fidelity of Intervention Implementation: A Review of Instruments

Sarah Ibrahim<sup>1</sup>, Souraya Sidani<sup>2</sup>

# State of implementation science measurement

**Only 2 studies** evaluated measures' content validity.

*(Lewis, Proctor, & Brownson, 2017)*

**56% and 58.14%** of measures had established content validity evidence.

**Nearly half** had not ensured that the items represented all facets of a known construct.

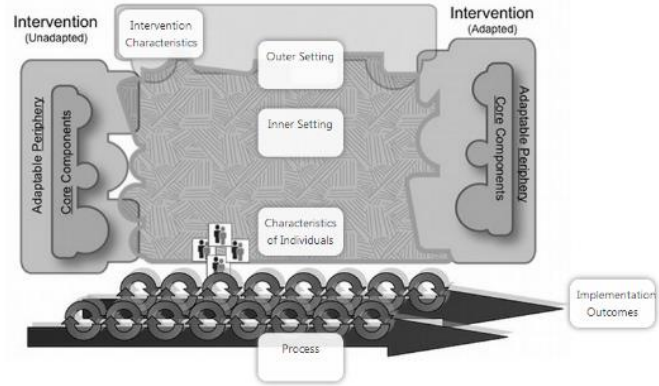
- It's more common for studies to **report broadly on psychometric strength of the measures**—for example, “yes” or “no” with respect to reliability or validity
- Constructs are rarely defined

# Measurement Theory

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- Aims to describe, categorize, and evaluate the quality of measures
- Improve usefulness, accuracy, and meaningfulness of measurement
- Propose methods for developing new, higher quality measures
- Classical Test Theory: Reliability & Validity – fundamental attributes of measures necessary for confidence in meaning of findings



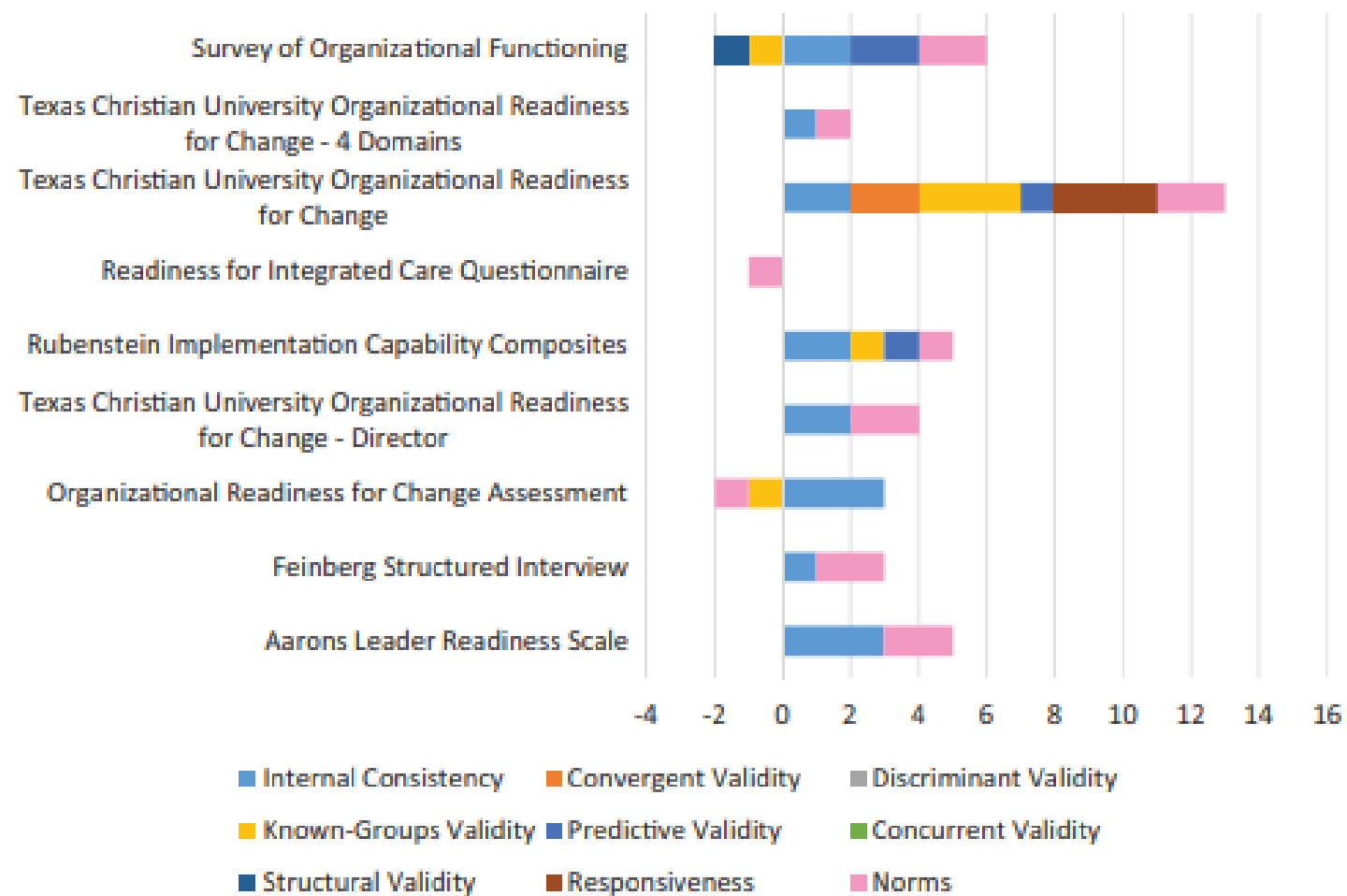
CFIR Domains	Construct	Outcomes	Construct
Characteristics of Individuals	Knowledge & Beliefs about Intervention Individual Stage of Change Individual Identification with Organization Other Personal Attributes Self-Efficacy	Implementation Outcomes	Acceptability Adoption Appropriateness Feasibility Penetration
Inner Setting	Culture Implementation Climate Networks and Communications Readiness for Implementation Structural Characteristics	Client Outcomes	Sustainability Fidelity Cost Satisfaction
Intervention Characteristics	Adaptability Complexity Cost Design Quality and Packaging Evidence Strength and Quality Intervention Source Relative Advantage Triability	<div> <h3>Consolidated Framework for Implementation Research</h3>  </div>	
Outer Setting	Cosmopolitanism External Policy and Incentives Patient Needs and Resources Peer Pressure		
Process	Engaging Executing Planning Reflecting and Evaluating		

**33 Total Constructs**

## QUALITY ASSESSMENTS

- **Psychometric and Pragmatic Evidence Rating Scale (PAPERS)**
  - Coded information on 9 key properties rated on 5-point scale
  - Total score range: -9 to 36
  - Higher score = higher quality





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## Measuring implementation outcomes: An updated systematic review of measures' psychometric properties

Kayne Mettert , Cara Lewis , Caitlin Dorsey, more...

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## Abstract

### Background:

Systematic reviews of measures can facilitate advances in implementation research and practice by locating reliable and valid measures and highlighting measurement gaps. Our team completed a systematic review of implementation outcome measures published in 2015 that indicated a severe measurement gap in the field. Now, we offer an update with this enhanced systematic review to identify and evaluate the psychometric properties of measures of eight implementation outcomes used in behavioral health care.

### Methods:

The systematic review methodology is described in detail in a previously published protocol paper and summarized here. The review proceeded in three phases. Phase I, data collection, involved search string

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# Outcomes: Measure Search Results

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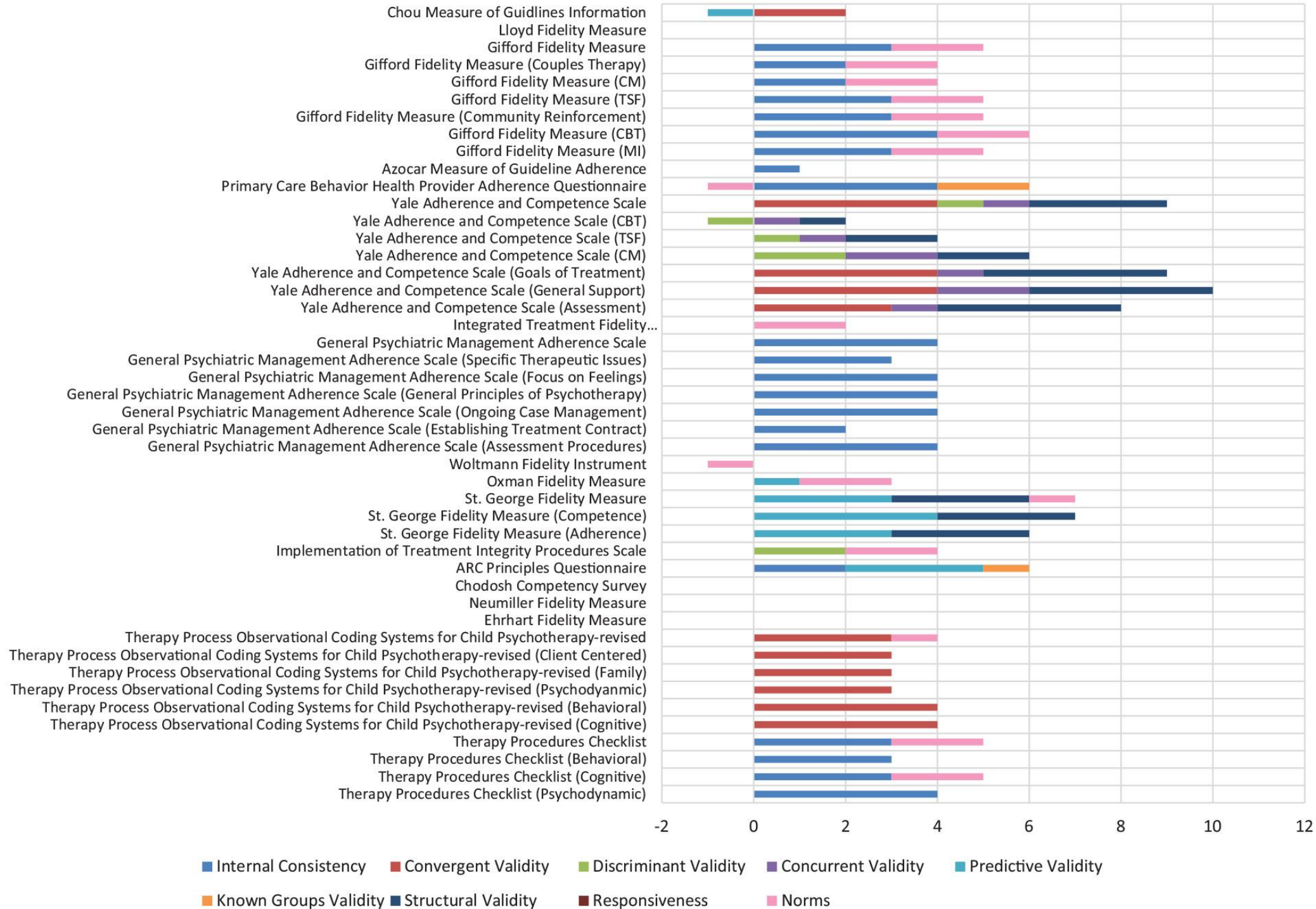
Outcome	Number of Measures
Acceptability	32
Adoption	26
Appropriateness	6
Cost	31
Feasibility	18
Fidelity	18
Penetration	23
Sustainability	14

Total of 150 unique measures; 66 were new in the last 2 years

# Outcomes: Quality Rating Results

Construct	# of Measures	Score Range
Acceptability	32	(-1 to 14)
Adoption	25	(-1 to 12)
Appropriateness	6	(0 to 14)
Cost	0	-
Feasibility	18	(-1 to 6)
Fidelity	18	(-1 to 10)
Penetration	9	(-1 to 6)
Sustainability	13	(-1 to 12)

- No measures contained data on all 9 psychometric properties





## Systematic Reviews of Methods to Measure Implementation Constructs

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### Measuring characteristics of individuals: An updated systematic review of instruments' psychometric properties



Cameo Stanick , Heather Halko, Kayne Mettert , Caitlin Dorsey, Joanna Moullin, Bryan Weiner, Byron Powell , Cara C Lewis

Implementation Research and Practice, vol. 2, First Published March 23, 2021.

[Abstract](#)[> Preview](#)

### A systematic review of measures of implementation players and processes: Summarizing the dearth of psychometric evidence



Caitlin N Dorsey, Kayne D Mettert , Ajeng J Puspitasari, Laura J Damschroder, Cara C Lewis

Implementation Research and Practice, vol. 2, First Published April 6, 2021.

[Abstract](#)[> Preview](#)

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Dissemination and Implementation Outcome	Level of Analysis	Theoretical Basis	Other terms in the Literature	Salience by D & I Phase Informed by the EPIS Model <sup>26</sup>	Latent Variable Y/N	Example Method of Measurement
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Dissemination and Implementation Outcome	Level of Analysis	Theoretical Basis	Other terms in the Literature	Salience by D & I Phase Informed by the EPIS Model <sup>26</sup>	Latent Variable Y/N	Example Method of Measurement
Fidelity	Individual	RE-AIM: part of implementation	Delivered as intended Adherence Integrity Quality of program delivery	Implementation and Sustainment	N	Observation Checklists Content analyses Self-report
Cost	Individual Organization Policy	RE-AIM TCU Program Change Model: costs and resources	Marginal cost Cost effectiveness Cost benefit Economic evaluation	Primarily Exploration and Secondly Implementation and Sustainment	N	Administrative data
Penetration	Organization Policy	RE-AIM necessary for reach	Spread Access to services Level of utilization	Primarily Implementation and Secondly Sustainment	N	Surveys Case studies Key informant interviews
Sustainability	Organization Policy	Rogers: confirmation RE-AIM: maintenance	Maintenance Institutionalization Continuation Sustained use Standard of practice or care	Primarily Sustainment and Secondly Exploration	Y	Surveys Case studies Record & policy reviews Key informant interviews

# Pragmatic measures for implementation research: development of the Psychometric and Pragmatic Evidence Rating Scale (PAPERS)

Cameo F Stanick ✉, Heather M Halko, Elspeth A Nolen, Byron J Powell, Caitlin N Dorsey,  
Kayne D Mettert, Bryan J Weiner, Melanie Barwick, Luke Wolfenden,  
Laura J Damschroder, Cara C Lewis

*Translational Behavioral Medicine*, ibz164, <https://doi.org/10.1093/tbm/ibz164>

**Published:** 20 November 2019



## Subjective (stakeholder facing)

- Acceptable
- Offers relative advantage over existing methods
- Completed with ease
- Appropriate
- Fits organizational activities
- Informs clinical or organizational decision making



## Objective (from the literature)

- Low cost
- Uses accessible language
- Low assessor burden (training + scoring/interpretation)
- Brief

# Additional Resources

SHORT REPORT

Open Access

## Measurement resources for dissemination and implementation research in health



Borsika A. Rabin<sup>1,2\*†</sup>, Cara C. Lewis<sup>3†</sup>, Wynne E. Norton<sup>4</sup>, Gila Neta<sup>4</sup>, David Chambers<sup>4</sup>, Jonathan N. Tobin<sup>5</sup>, Ross C. Brownson<sup>6,7</sup> and Russell E. Glasgow<sup>2</sup>

- 17 measures resources
  - 12 static reviews
  - 5 web-based resources
  - 14 of 17 publicly available
  - 10 focused on quantitative measures
  - 9 provided the actual measures
  - 6 included reliability and validity info

# Instrumentation Issues Revealed

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- Non-use of theories and frameworks
- Homonymy, synonymy, and instability
- Minimal psychometric testing, reporting, and strength
- Frequent use of home-grown, use-once measures
- Over-reliance on self-report, common methods
- Lack of attention to pragmatic relevance
- Redundant development across teams
- Level of analysis
- Criterion-related validity

# Acknowledgements for Measures Research

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Cameo Stanick, PhD  
Byron Powell, PhD



# Thank you!

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