MEDICAL SCHOOL
UNIVERSITY OF MICHIGAN

LEARNING HEALTH SCIENCES

Precision Feedback

MPOG Retreat
October 18, 2024

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Acknowledgements

- *Project team members:* Nirav Shah, Allison Janda, Allen Flynn, Anjana Deep Renji, Yidan (Eden) Cao, Hana Chung, Patrick Galante, Peter Boisvert, Mark Dehring, Kate Buehler, Gan Shi, Andrew Krumm, Kelley Kidwell
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  - 1K01LM012528 (PI: Landis-Lewis)
  - 1R01LM013894 (PI: Landis-Lewis)

My perspective: Health informatics

- *Developing infrastructure for health care improvement*
- *Evaluation of information tools to understand impact*
- *Individual-level, cognitive, clinician-focused interventions*
- *Information and knowledge-centric lens*

We need better tools for practice-based learning

- Healthcare professionals must learn continually in many ways
- We have a wealth of clinical practice data to support learning
- However, tools that provide feedback about clinical practice are not good at keeping up

Landis-Lewis Z, Cao Y, Chung, H, Boisvert P, Renji AD, et al. Modeling Precision Feedback Knowledge for Healthcare Professional Learning and Quality Improvement. 2024 AMIA Annu Symp Proc. *Accepted 28 June 2024.*

Audit and feedback (A&F)

- Defined as the delivery of a performance summary to healthcare professionals or teams

- An implementation strategy that is commonly used and studied

- 2012 systematic review showed **wide variation in effectiveness**
  - 140 randomized controlled trials
  - 4.3% median absolute increase in desired practice
  - Interquartile range: 0.5% to 16%

Ivers N, Jamtvedt G, Flottorp S, Young JM, Odgaard-Jensen J, French SD, O'Brien MA, Johansen M, Grimshaw J, Oxman AD. Audit and feedback: effects on professional practice and healthcare outcomes. Cochrane Database Syst Rev. 2012 Jun 13;2012(6):CD000259.

Audit and feedback (A&F), continued

- Growing recognition that evidence has not changed for decades
- Dramatic increase in trials of A&F
  - 25% (75/293) of all A&F trials (since the 1970s) were published between 2016-20
- 15 best practices established (Brehaut 2016)
- Formation of the A&F Metalab to build a cumulative science

Brehaut JC, Colquhoun HL, Eva KW, Carroll K, Sales A, Michie S, Ivers N, Grimshaw JM. Practice Feedback Interventions: 15 Suggestions for Optimizing Effectiveness. Ann Intern Med. 2016 Mar 15;164(6):435-41. doi: 10.7326/M15-2248. Epub 2016 Feb 23. PMID: 26903136.

Grimshaw JM, Ivers N, Linklater S, Foy R, Francis JJ, Gude WT, Hysong SJ. Reinvigorating stagnant science: implementation laboratories and a meta-laboratory to efficiently advance the science of audit and feedback. BMJ quality & safety. 2019 May 1;28(5):416-23.

Ivers N. Updating the Cochrane Audit & Feedback Review - Completing a decade long odyssey [Internet]. International Audit & Feedback Summit 2022; 2022 Oct 26 [cited 2024 Sep 3]; Virtual Conference. Available from: https://vimeo.com/765774137

A&F research challenges

- Quality dashboards are everywhere, but infrequently used
- Growing interest in studying *how and when* different kinds of feedback are effective
- Growing interest in understanding engagement and tailoring of feedback

Keeping complexity in focus

People are different

Context matters

Things change

Source: https://www.pchalliance.org/news/how -do-you-change-behavior

Precision Feedback

- Prioritizes **coaching** and **appreciation** messages
- Uses estimates of the **motivational potential** of feedback messages
- Supports performance **improvement** and **sustainment**

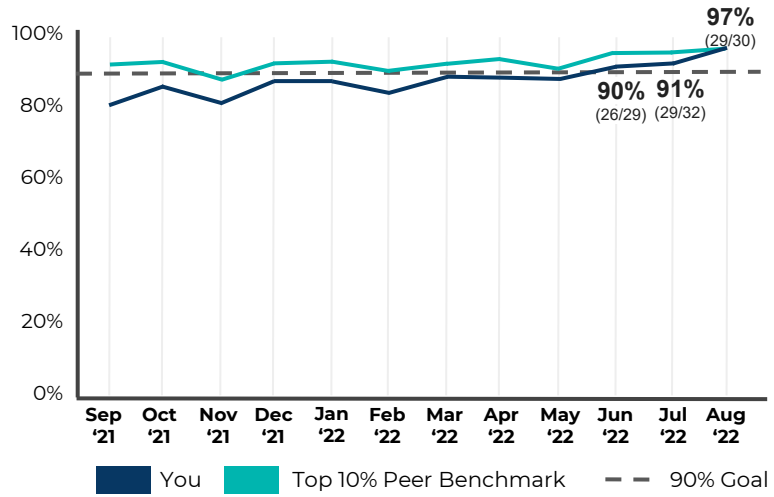
Landis-Lewis Z, Janda AM, Chung H, Galante P, Cao Y, Krumm AE. Precision feedback: A conceptual model. Learn Health Syst. 2024 Apr 9;8(3):e10419. doi: 10.1002/lrh2.10419. PMID: 39036537; PMCID: PMC11257058.

Precision feedback: Example 1

Dear Dr. Jane,

You reached the top 10% peer benchmark for the measure

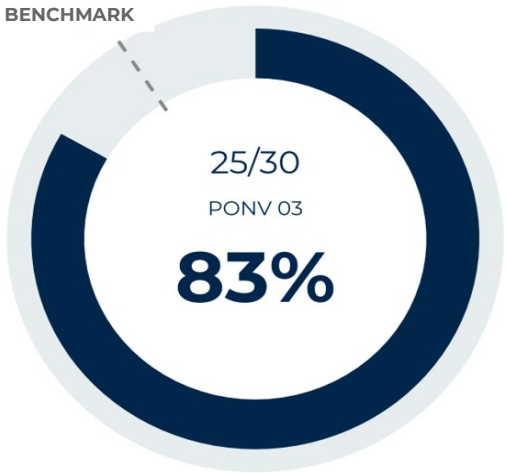
PUL-01: Protective Tidal volume, 10mL/Kg PBW.



Precision feedback: Example 2

Hello Dr. Jane,

You are not a top performer for avoiding postoperative nausea and vomiting (PONV-03):

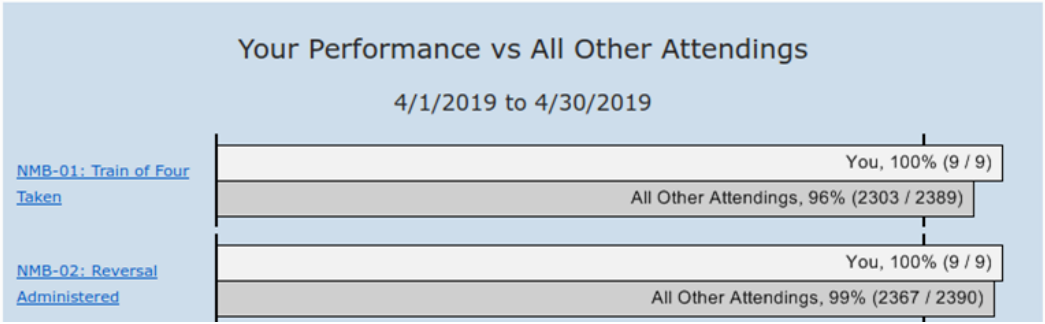


Precision feedback: Example 3

Hello Dr. Jane,

Congratulations on your high quality of care for the measure PUL-01: Protective Tidal volume, 10mL/Kg PBW. Your performance was 97% (29/30), in the top 10% of your peers.

Below is your MPOG quality performance report. For a case-by-case breakdown of any measures' result, click on the link at left to visit your quality dashboard.

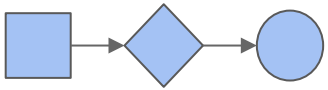


Precision feedback system

Precision feedback system

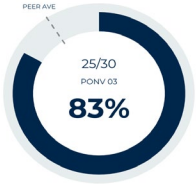
Feedback with high *motivational potential*

Precision feedback system



How and when does feedback work?

Feedback with high *motivational potential*



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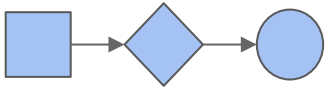

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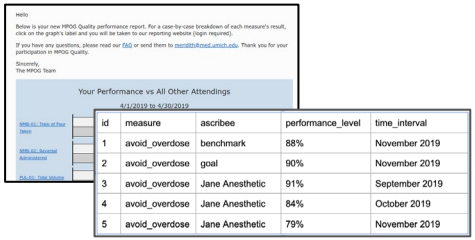

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If you have any questions, please read our FAQ or send them to meridith@med.umich.edu. Thank you for your participation in MPOG Quality.

Sincerely,
The MPOG Team

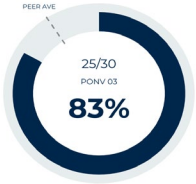
Your Performance vs All Other Attendings

4/1/2019 to 4/30/2019

id	measure	ascribee	performance_level	time_interval
1	avoid_overdose	benchmark	88%	November 2019
2	avoid_overdose	goal	90%	November 2019
3	avoid_overdose	Jane Anesthetic	91%	September 2019
4	avoid_overdose	Jane Anesthetic	84%	October 2019
5	avoid_overdose	Jane Anesthetic	79%	November 2019

What data and messages are available?

Feedback with high *motivational potential*



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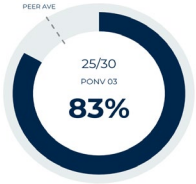

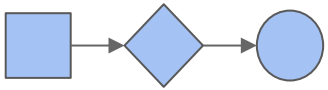

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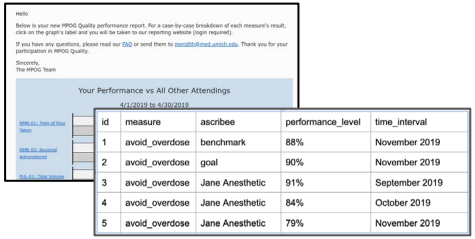

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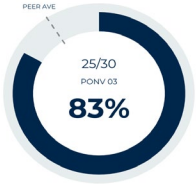
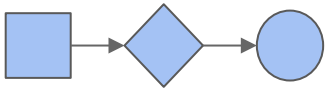
What data and messages are available?

What does the feedback recipient prefer?

Precision feedback system

Feedback with high *motivational potential*





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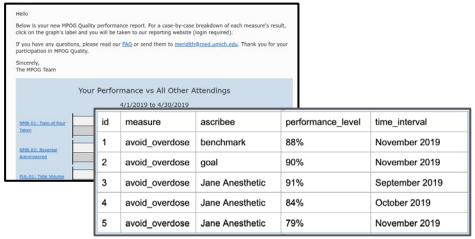

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What data and messages are available?

+

What does the feedback recipient prefer?

+

What is optimal in the recipient's context?

Evaluation feedback

- “Standard” audit and feedback
- Show current standing / performance level
- Compare performance
- Show change in performance

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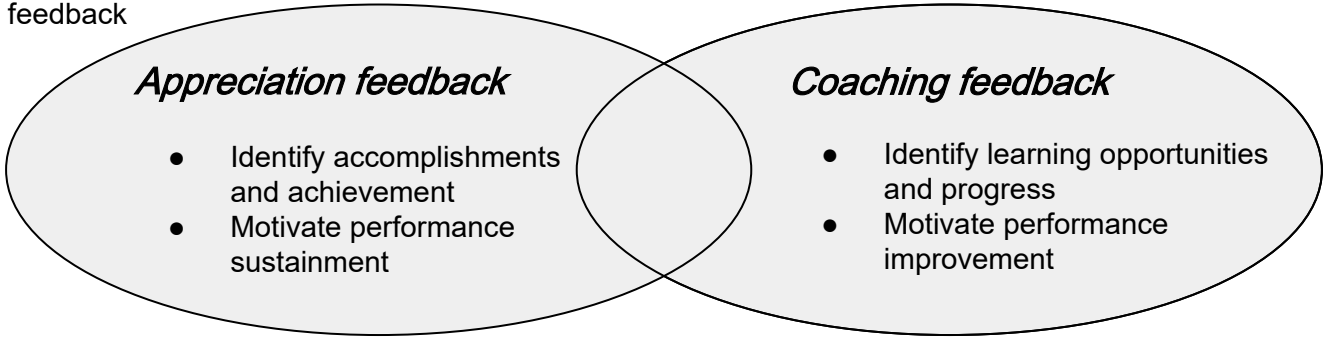

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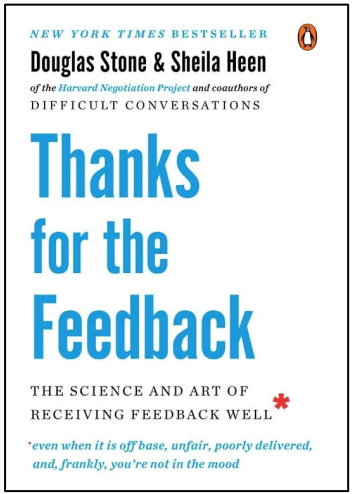

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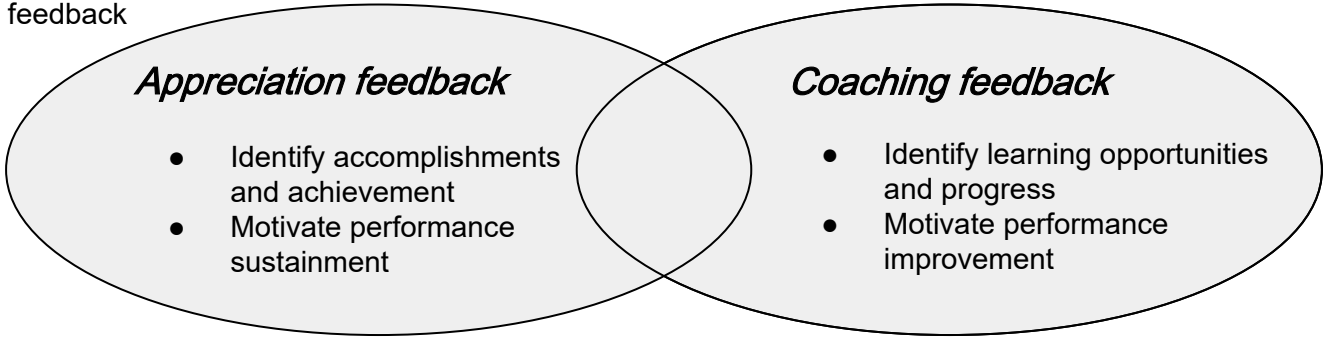

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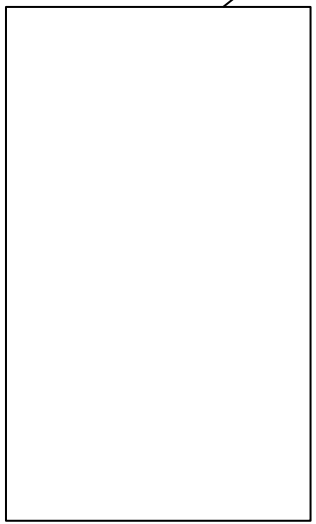
High performance



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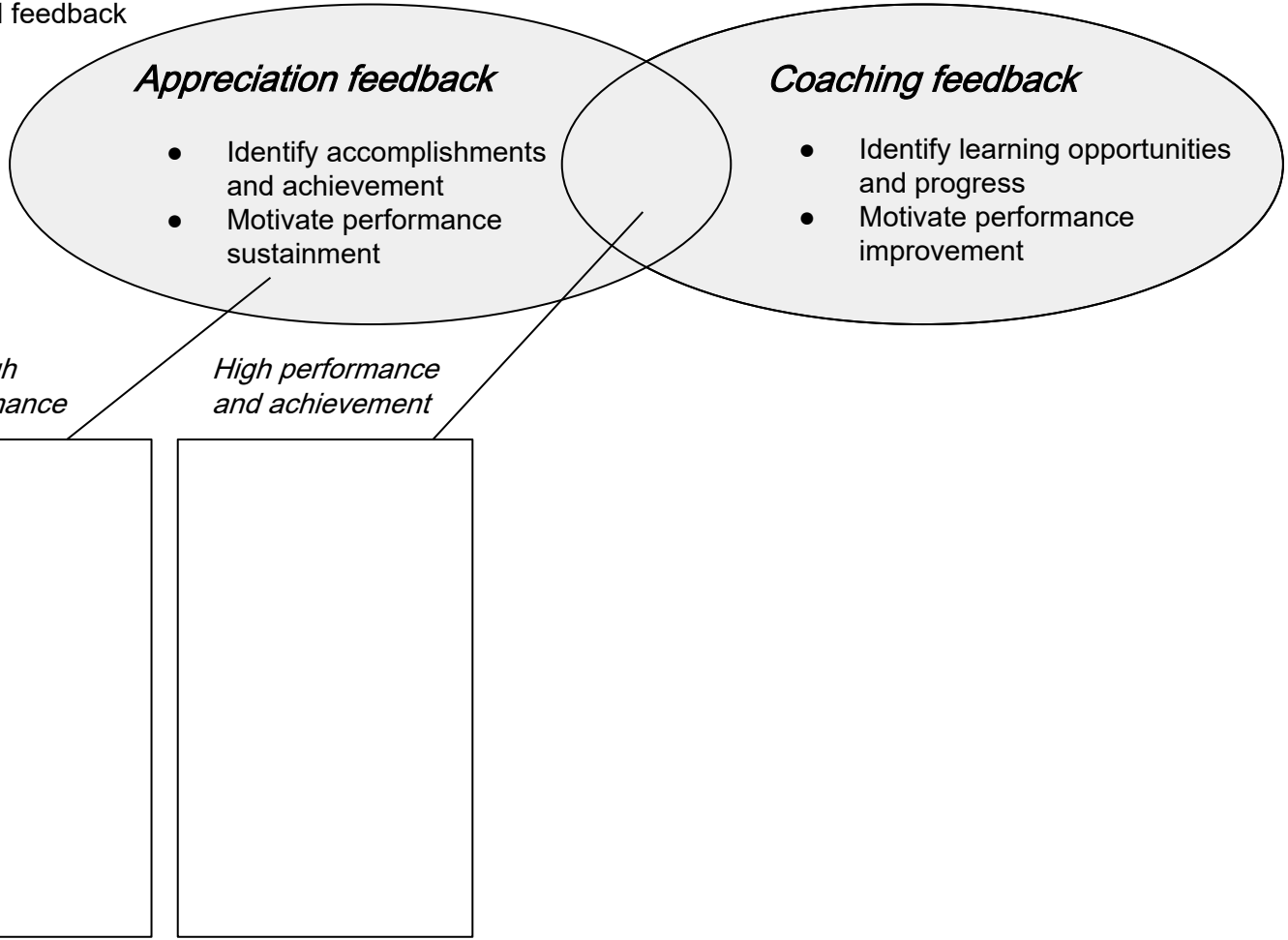

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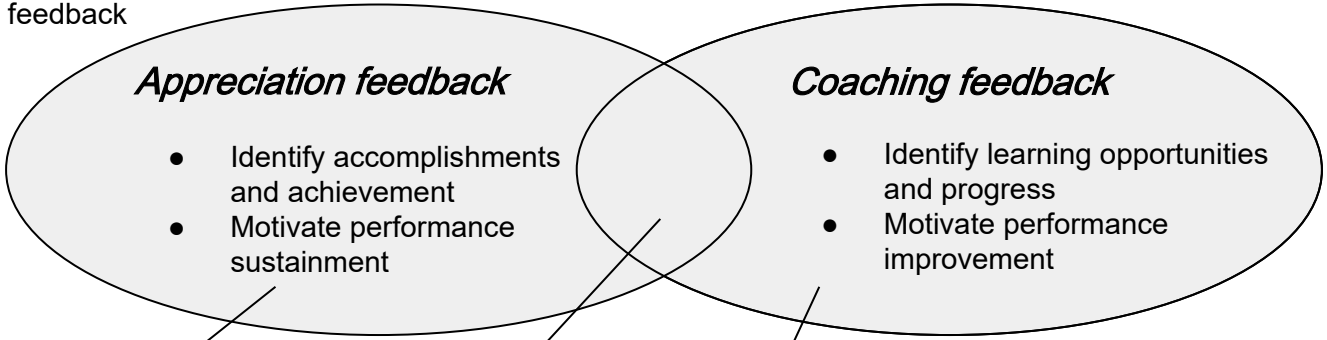
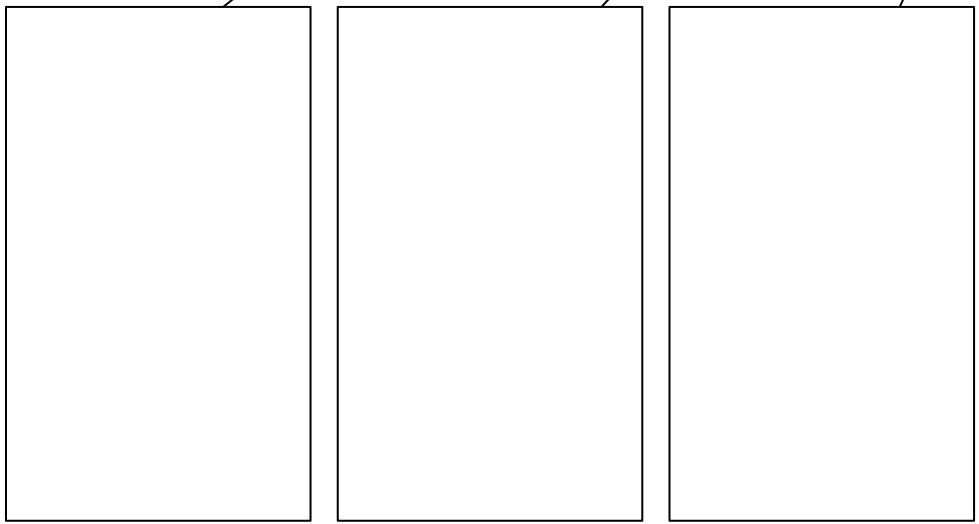


High performance

High performance and achievement

Low performance



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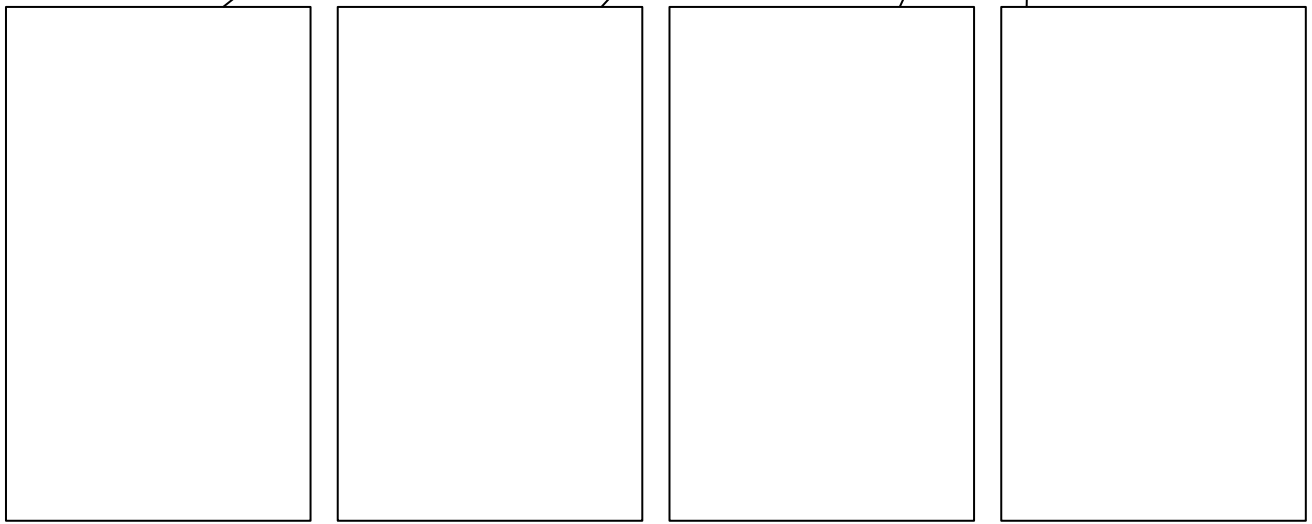

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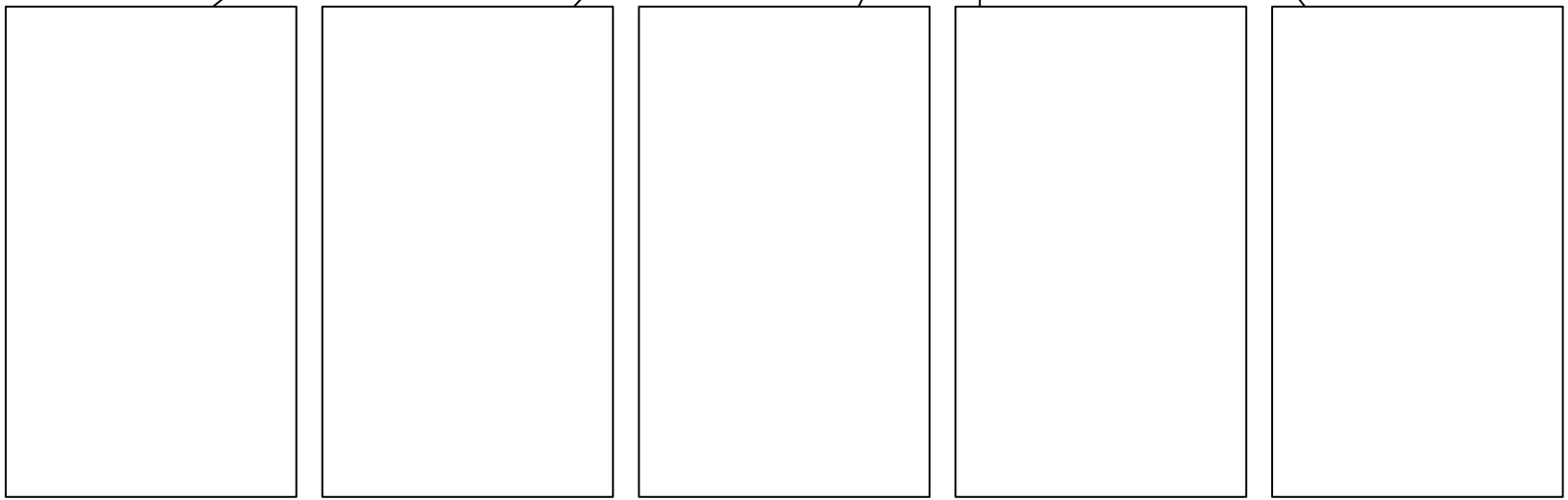

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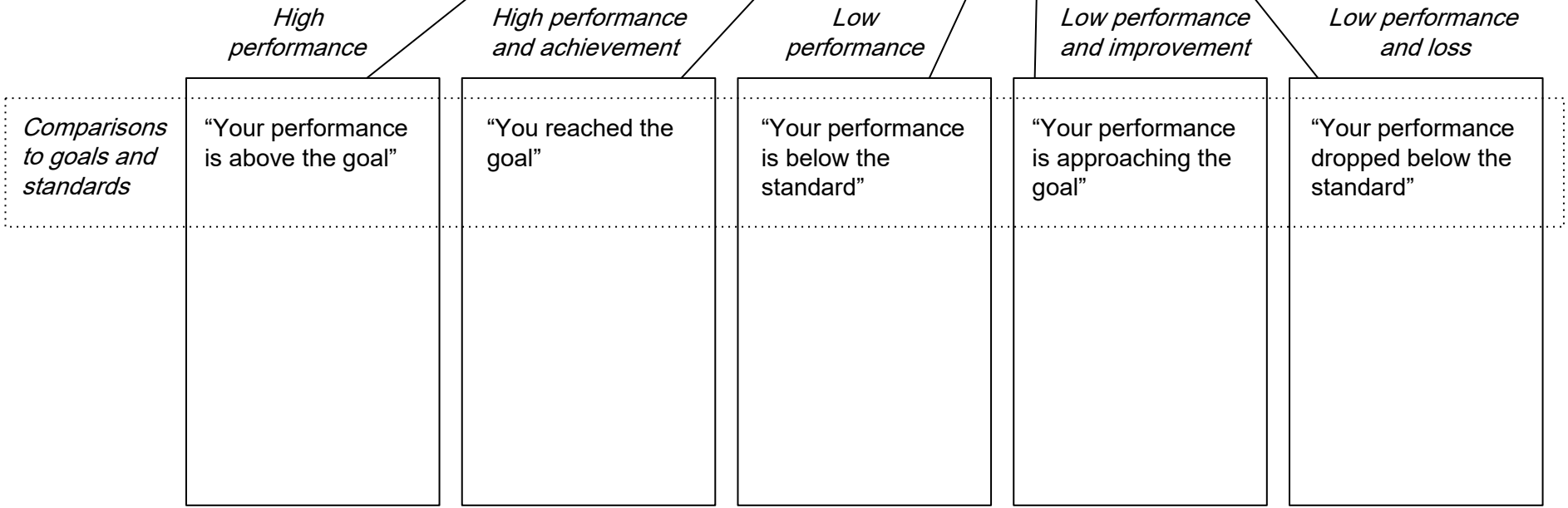

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	High performance	*High performance and achievement*	*Low performance*	*Low performance and improvement*	*Low performance and loss*
Comparisons to goals and standards	"Your performance is above the goal"	"You reached the goal"	"Your performance is below the standard"	"Your performance is approaching the goal"	"Your performance dropped below the standard"
Social comparison	"You are a top performer"	"You reached the top performer benchmark"	"You are not a top performer"	"Your performance is approaching the benchmark"	"Your performance dropped below average"

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	High performance	*High performance and achievement*	*Low performance*	*Low performance and improvement*	*Low performance and loss*
Comparisons to goals and standards	"Your performance is above the goal"	"You reached the goal"	"Your performance is below the standard"	"Your performance is approaching the goal"	"Your performance dropped below the standard"
Social comparison	"You are a top performer"	"You reached the top performer benchmark"	"You are not a top performer"	"Your performance is approaching the benchmark"	"Your performance dropped below average"
Comparator not specified	"Congratulations on your consistently high performance"	"You reached a new high performance level."	"You may have an opportunity to improve"	"Your performance is improving"	"Your performance has dropped"

Motivational potential of a feedback message

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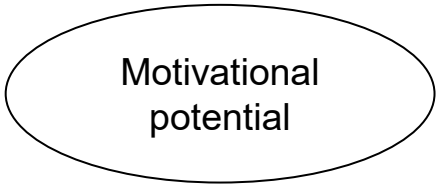

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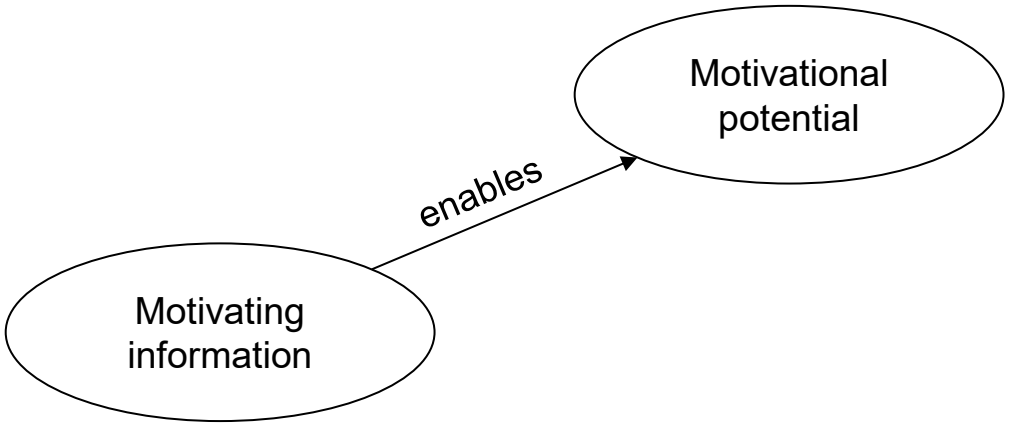

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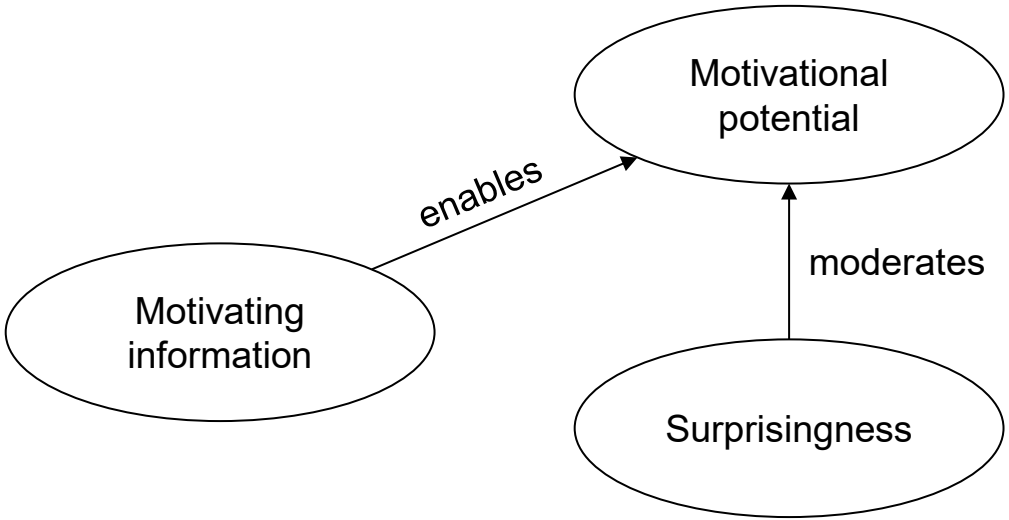

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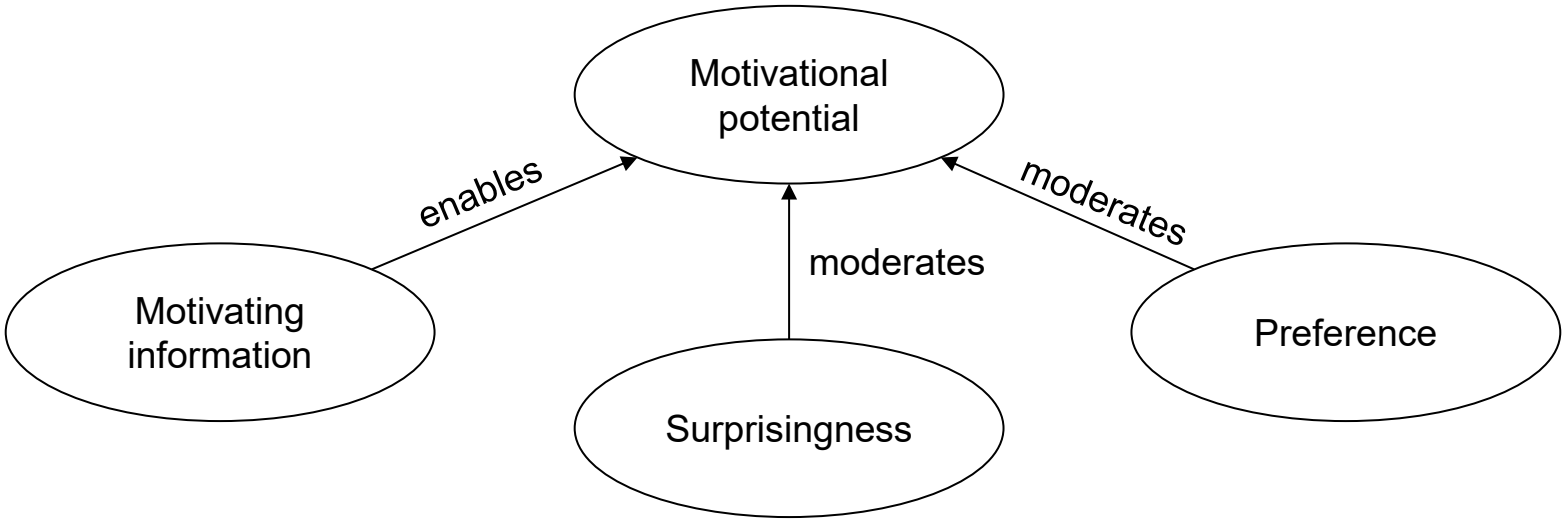
Motivational potential of a feedback message



Landis-Lewis Z, Janda AM, Chung H, Galante P, Cao Y, Krumm AE. Precision feedback: A conceptual model. Learn Health Syst. 2024 Apr 9;8(3):e10419. doi: 10.1002/lrh2.10419. PMID: 39036537; PMCID: PMC11257058.

Precision feedback knowledge base

Causal pathways: 10

Message templates: 22

Personas: 8

Vignettes: 10

https://github.com/Display-Lab/knowledge-base

Landis-Lewis Z, Cao Y, Chung, H, Boisvert P, Renji AD, et al. Modeling Precision Feedback Knowledge for Healthcare Professional Learning and Quality Improvement. 2024 AMIA Annu Symp Proc. *Accepted 28 June 2024.*

Cluster-randomized trial (May - Oct 2024)

- *Comparison:* Precision feedback-enhanced email vs standard feedback email
- *Primary outcome:* Measure success rate (*M*) for operative cases of anesthesia providers
- We calculate *M* as follows:

Numerator: *Sum of all operative case measurement successes*

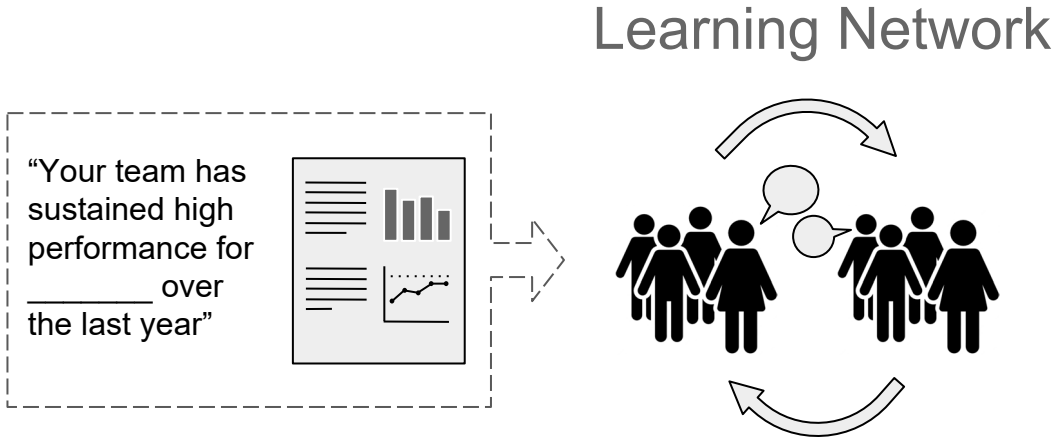
Denominator: *Number of all operative case measurements*

Cluster-randomized trial, continued

- *Hypothesis:* Providers receiving precision feedback will increase
  a) measure success rate
  b) email engagement (click-through and dashboard login rates)

  when compared with providers receiving standard A&F emails
- We will also assess unintended consequences in a mixed-methods process evaluation
- Opt-out recruitment goals met, currently enrolled ~11,440 providers
- Data collection ending in November 2024

Future work and research opportunities



- Analysis of clinical data to identify coaching and appreciation opportunities
- Precision feedback reporting for teams, supporting quality improvement
- Accommodating preferences of feedback recipients, sources, and messengers
- Appreciation feedback as a motivator for performance sustainment

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LEARNING HEALTH SCIENCES

Thank you!

Precision Feedback

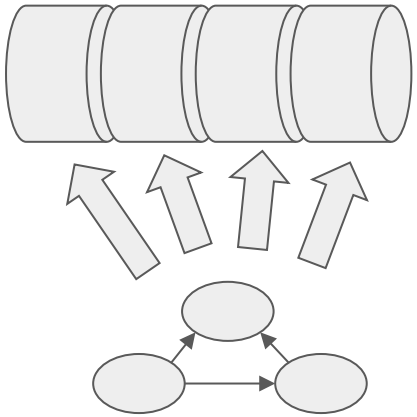
MPOG Retreat
October 18, 2024

Zach Landis-Lewis, PhD, MLIS
zachll@umich.edu

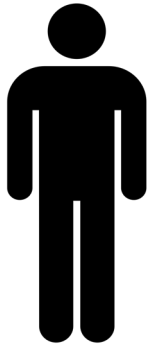
Performance data

Precision Feedback Pipeline

Feedback Recipient



"You are a top performer for _____"



Required inputs

Recipient ID

Performance metric ID

Time intervals

Performance levels

Recipient

Individual

Team

Comparator

Benchmarks

Goals

Optional inputs

Recipient preferences

Knowledge base

Descriptive models:

Performance metrics

Feedback message templates

Causal pathway models

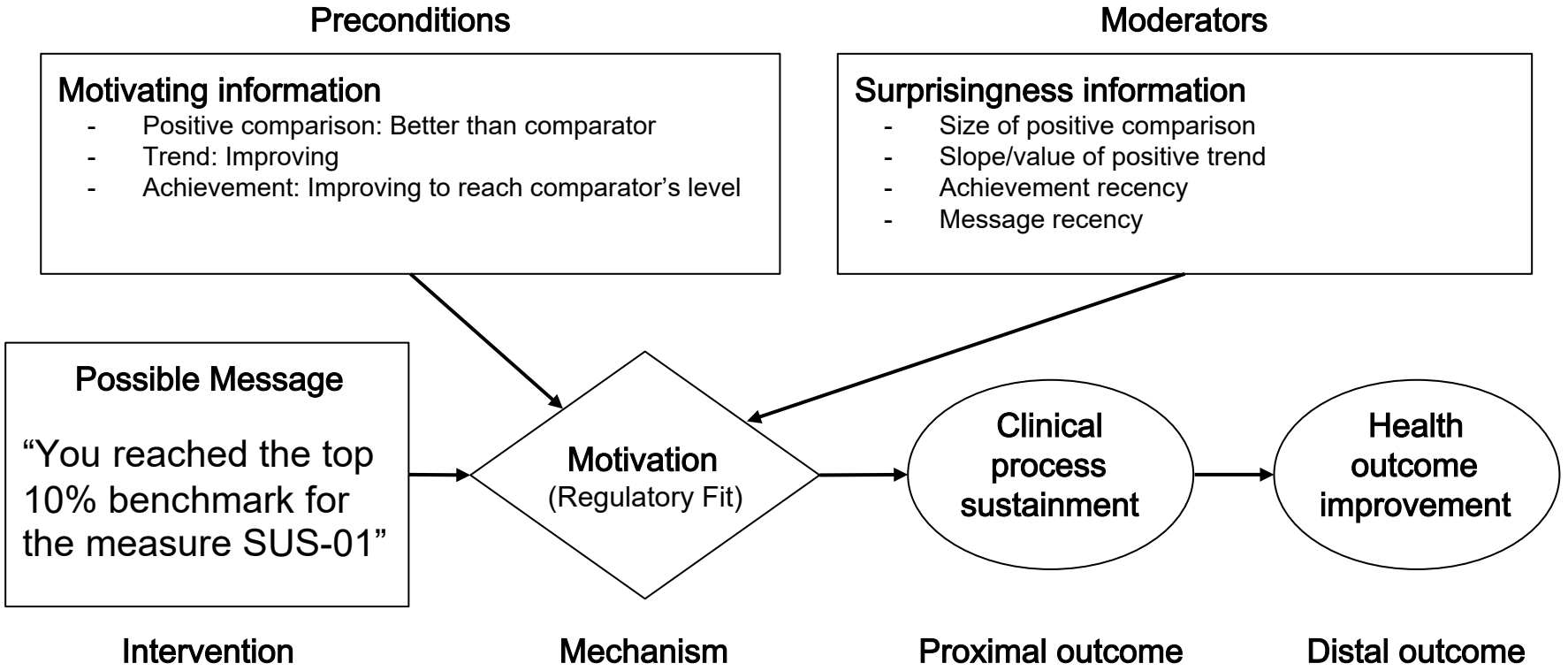
Algorithms:

Signal detectors

Prioritization algorithms

Landis-Lewis Z, Cao Y, Chung, H, Boisvert P, Renji AD, et al. Modeling Precision Feedback Knowledge for Healthcare Professional Learning and Quality Improvement. 2024 AMIA Annu Symp Proc. *Accepted 28 June 2024.*

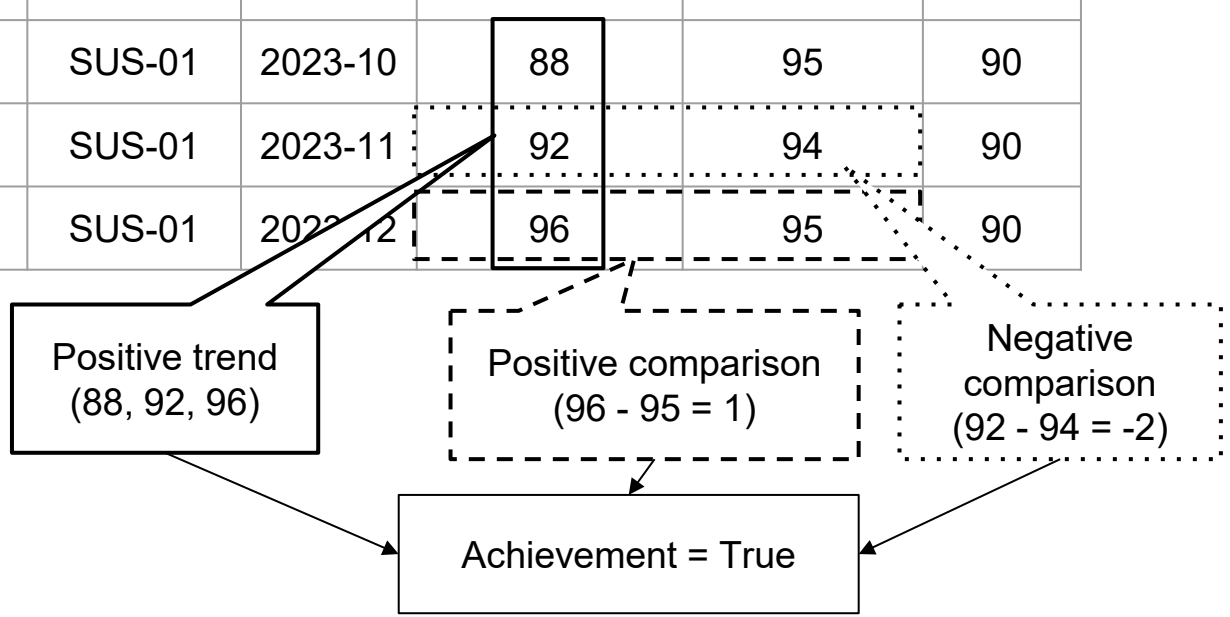
Causal pathway model: “Social gain”



Performance data

id	measure id	time interval	provider performance	top 10% benchmark	Goal
1	SUS-01	2023-08	88	94	90
2	SUS-01	2023-09	89	96	90
3	SUS-01	2023-10	88	95	90
4	SUS-01	2023-11	92	94	90
5	SUS-01	2023-12	96	95	90

Motivating performance information



Possible message:

“You reached the Top 10% benchmark for the measure SUS-01”