

# Using Sequential Analysis to Quantify Interaction Patterns Between Teachers and Students Who Engage in Challenging Behavior

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# Presentation Roadmap

- Introduction
  - Background
  - Research Questions
- Methods
  - Participants and Setting
  - Data Collection Procedures and Target Behaviors
  - Observer Training and Reliability
- Results
  - Target Behavior Counts
  - Sequential Associations
  - Correlations
- Discussion
  - Summary of Findings and Practical Implications
  - Limitations and Future Directions

# Sequential Analysis

## What We Know

- Interactions between students and teacher
- Negative reinforcement cycle
- Impact of OTRs on challenging behavior
- Importance of momentary interaction

(Bakeman & Quera, 1995; Carr et al., 1991; Common et al., 2019; Gunter & Coutinho, 1997)

Previous

- Correlation
- Sampling
- Focused on challenging behavior
- Calculated conditional probabilities

(Shores et al., 1993; Sutherland et al., 2002; Van Acker et al., 1996; Wehby et al., 1995)



## What We Know

- Interactions between
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## Previous Sequential

- Conducted in self
- Sample: Students
- Focused on challe
- Calculated condition

(Shores et al., 1993; Sutherland et al., 2016)

# Sequential Analysis

Method used to quantify moment-to-moment interactions between people

	OTR present	OTR absent
CB present	A	B
CB absent	C	D

(Bakeman & Quera, 1995; Lloyd et al., 2016; Yoder et al., 2018; Yule & Kendall, 1957)

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# What We Know

- Interaction
- Negative re
- Impact of C
- Importance

(Bakeman & Quera, 1995)

# Sequential Analysis

## Previous Sequential Analysis Research

- Conducted in self-contained classrooms
- Sample: Students with E/BD
- Focused on challenging behavior
- Calculated conditional probabilities

(Shores et al., 1993; Sutherland et al., 2002; Van Acker et al., 1996; Wehby et al., 1995)

moment-  
between

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(Bakeman & Quera, 1995; Lloyd et al., 2016; Yoder et al., 2018; Yule & Kendall, 1957)

## **Our Study**

- Gap in research
- Interactions in general education
- New sequential analysis method
- More accurate index of sequential association

# Research Questions

1. Are there negative sequential associations between:  
Opportunities to Respond → **Challenging Behavior**  
**Challenging Behavior** → Opportunities to Respond  
Active Responding → **Challenging Behavior**
2. Are there significant sequential associations between:  
**Active Responding** → Teacher Praise  
**Active Responding** → Opportunities to Respond  
Opportunities to Respond → Teacher Praise

# Participants and Setting

## Participants

- 20 students referred for FBA/BIP
  - Grades K – 6
  - No disability (n = 6); OHI (n = 4); Developmental delay (n = 3); Emotional disturbance (n = 3); Not reported (n = 2); Autism (n = 1); Speech impairment (n = 1)
  - Black (n = 9); White (n = 8); Not reported (n = 2); Hispanic (n=1)

## Setting

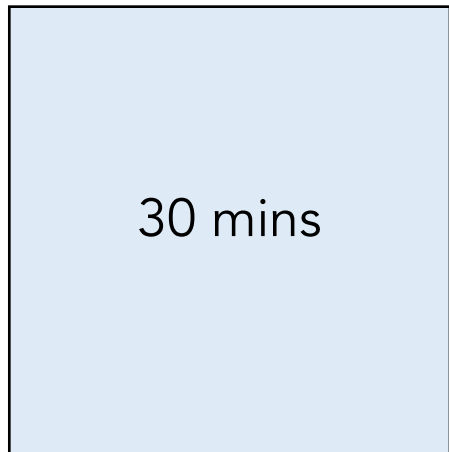
- 11 schools in local school district
- 19 general education classrooms

# Data Collection Procedures

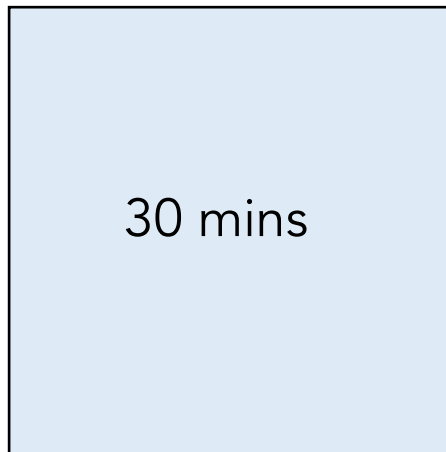
## Classroom Observation

- All students were observed in their typical classrooms
- Scheduled during activities that teachers reported evoked challenging behavior

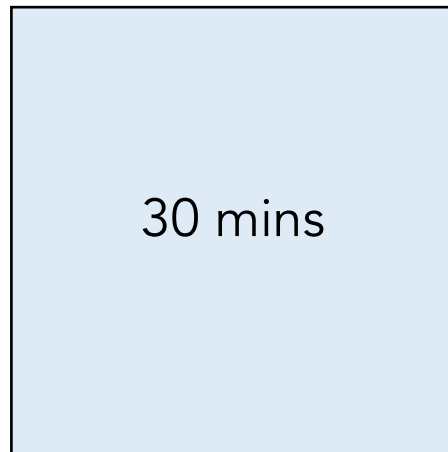
Observation 1



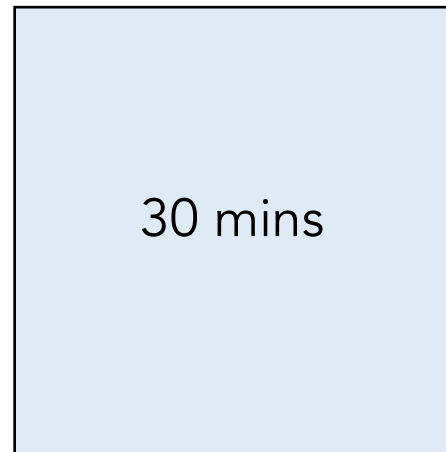
Observation 2



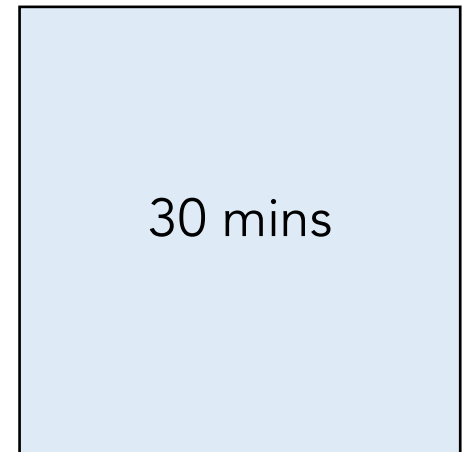
Observation 3



Observation 4



Observation 5



# Data Collection Procedures

## Classroom Observation

- All students were observed in their typical classrooms
- Scheduled during activities that teachers reported evoked challenging behavior

**150 Minutes**

# Target Behaviors

## High-Risk Problem Behavior

Behavior that poses a physical threat to the student or others.

Examples: physical aggression toward others, self, and property; elopement.

## Low-Risk Problem Behavior

Behavior that disrupts instruction or learning but does not introduce a threat to the safety of self or others.

Examples: inappropriate vocalizations, active noncompliance, and disruptions.

# Target Behaviors





# Target Behaviors

## Active Response

Student response (or initiation of response) within 10 s of any verbal prompt or instructional question from a teacher or peer during peer-led instruction.

## Opportunities to Respond

Any verbal directive, instructional question, or instructional stimulus directed to the target student (or group that includes target student) that specifies an observable student response and is related to an instructional activity.

## Teacher Praise

A verbal statement that indicates approval of behavior to the individual student that is over and above an evaluation of adequacy or acknowledgment of a correct response to an instruction.

# Target Contexts

**Large Group Instruction**

**1:1 Instruction**

**Downtime/Transition**

**Small Group Instruction**

**Independent Work**

**Gone**

# Observer Training and Data Collection

Seven graduate students were trained to collect data

1. Reading the coding manual and reviewing with the primary investigator
2. Scoring 90% or higher on a written quiz on coding manual content
3. Achieving 85% or higher agreement on two practice videos
4. Achieving 85% or higher agreement on two sessions in the research setting

## Data Collection

- Timed-Event frequency recording
- Timed-Event duration recording
- MOOSES (Tapp, 1995)

# Reliability

Behavior	Inter-Observer Agreement	
	Mean	Range
Challenging Behavior	81%	50% - 100%
Active Responding	88%	60% - 94%
Opportunities to Respond	90%	75% - 98%
Teacher Praise	83%	42% - 100%

# Descriptive Data

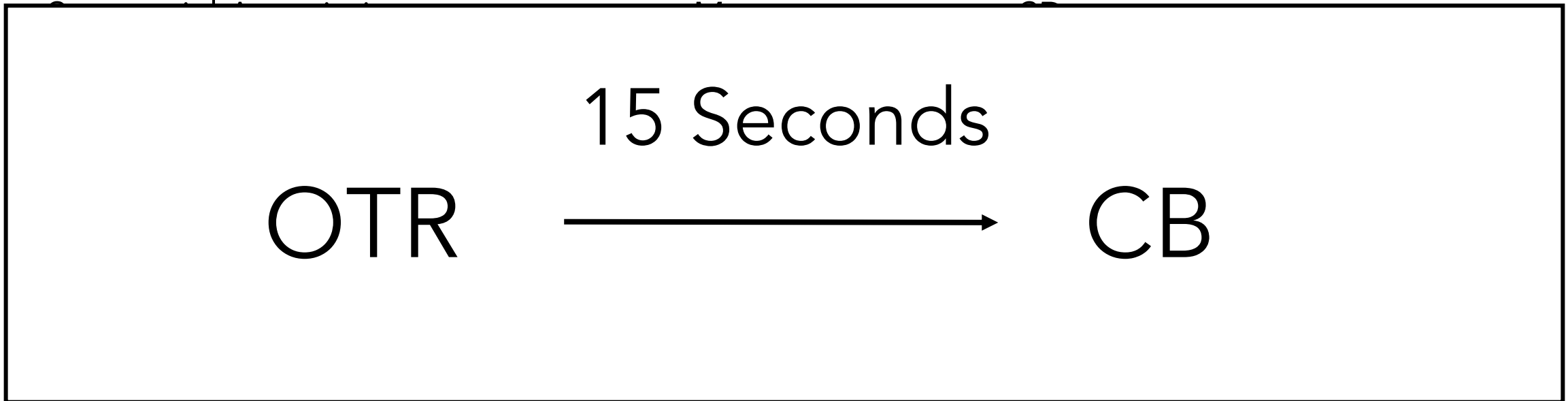
Variable	<i>M</i>	<i>SD</i>
Teacher Behaviors		
Opportunities to Respond	28.52	14.06
Teacher Praise	2.35	4.69
Student Behavior		
Active Responses	13.10	8.73
Challenging Behavior	10.86	8.59
Instructional Contexts (%)		
Large Group	47.93	21.50
Independent Work	31.96	19.40
Downtime/Transition	12.62	8.91
Small Group	5.45	8.32
One-on-One	2.47	8.15
Gone	0.93	1.63

# Sequential Associations: 10 Seconds



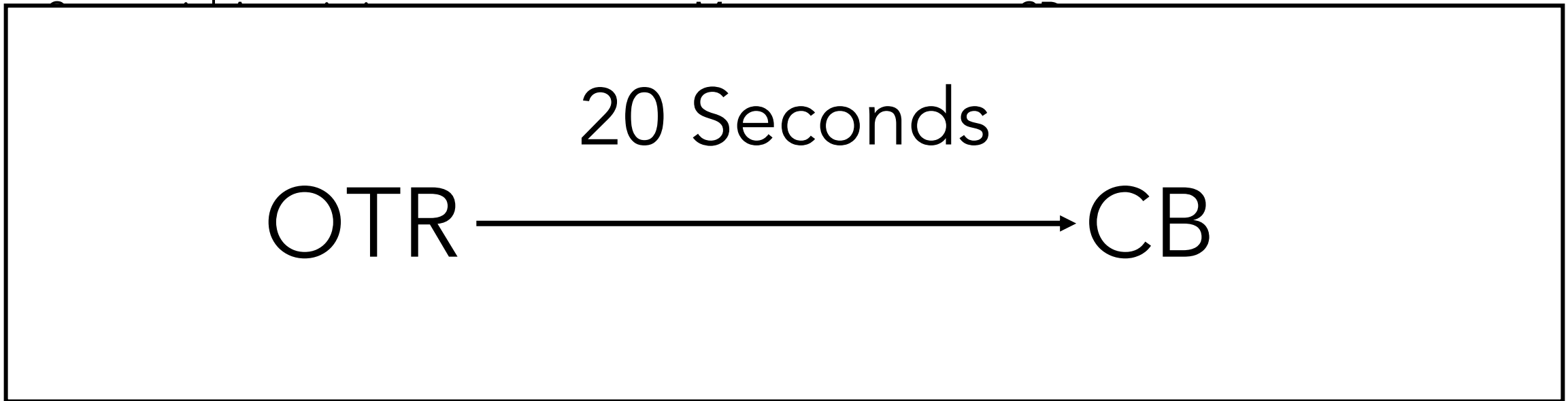
Note. = one-tailed t-test. OTR = opportunities to respond, CB = total problem behavior, AR = active response, TP = teacher praise.

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# Sequential Associations: 10 Seconds

Sequential Associations	<i>M</i>	<i>SD</i>	<i>p</i>
OTR → CB	-0.57	0.37	.000*
CB → OTR	-0.50	0.28	.000*
AR → CB	-0.75	0.24	.000*
AR → TP	0.12	0.57	.402
AR → OTR	0.28	0.41	.006
OTR → TP	-0.04	0.53	.729

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# Sequential Associations: 15 Seconds

Sequential Associations	<i>M</i>	<i>SD</i>	<i>p</i>
OTR → CB	-0.55	0.39	<.001
CB → OTR	-0.43	0.32	<.001
AR → CB	-0.69	0.25	<.001
AR → TP	0.22	0.55	.111
AR → OTR	0.28	0.40	.006
OTR → TP	0.12	0.54	.360

Note. OTR = opportunities to respond, CB = total problem behavior, AR = active response, TP = teacher praise.

# Sequential Associations: 20 Seconds

Sequential Associations	<i>M</i>	<i>SD</i>	<i>p</i>
OTR → CB	-0.47	0.33	<.001
CB → OTR	-0.41	0.29	<.001
AR → CB	-0.64	0.28	<.001
AR → TP	0.33	0.57	.026
AR → OTR	0.31	0.41	.003
OTR → TP	0.24	0.53	.069

Note. OTR = opportunities to respond, CB = total problem behavior, AR = active response, TP = teacher praise.

# Correlation: Pearson's r

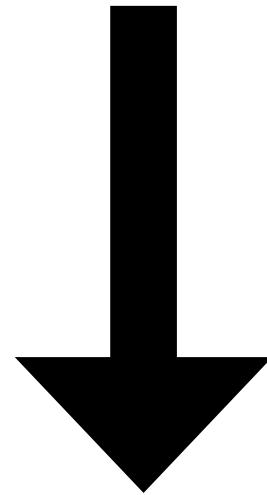
Behavior	1	2	3	4
1. Challenging Behavior	-	.159	-.026	.011
2. Active Response	-	-	.731**	.726**
3. Opportunities to Respond	-	-	-	.758**
4. Teacher Praise	-	-	-	-

Note. N = 20. \*\*Correlation is significant at the 0.01 level (2-tailed).



# Primary Findings and Practical Implications

Challenging  
Behavior

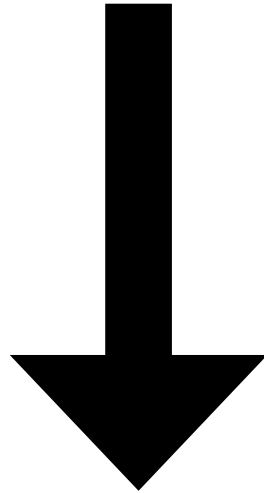


OTR

# Primary Findings and Practical Implications

OTR

Active Response

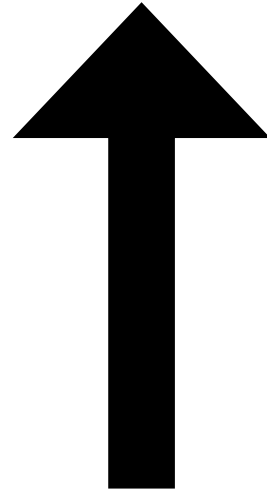


Challenging  
Behavior

# Primary Findings and Practical Implications

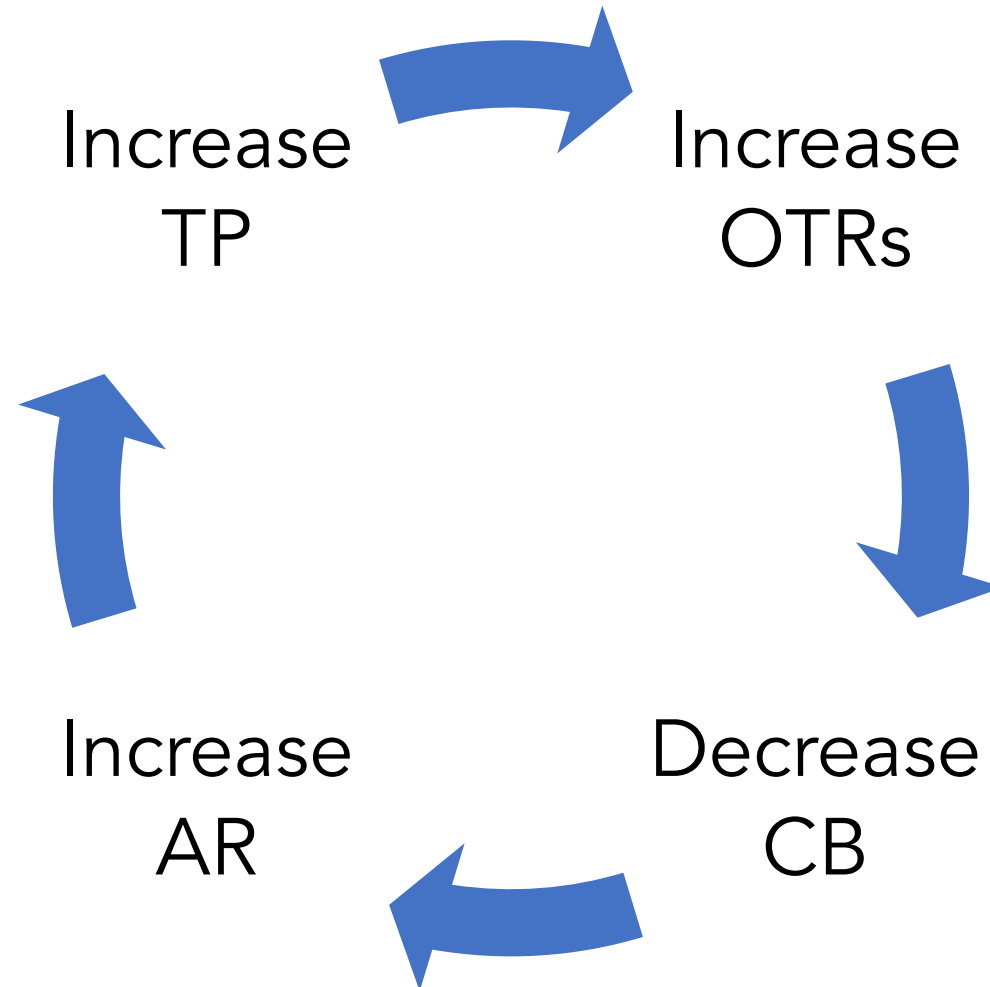
OTR

Active Response

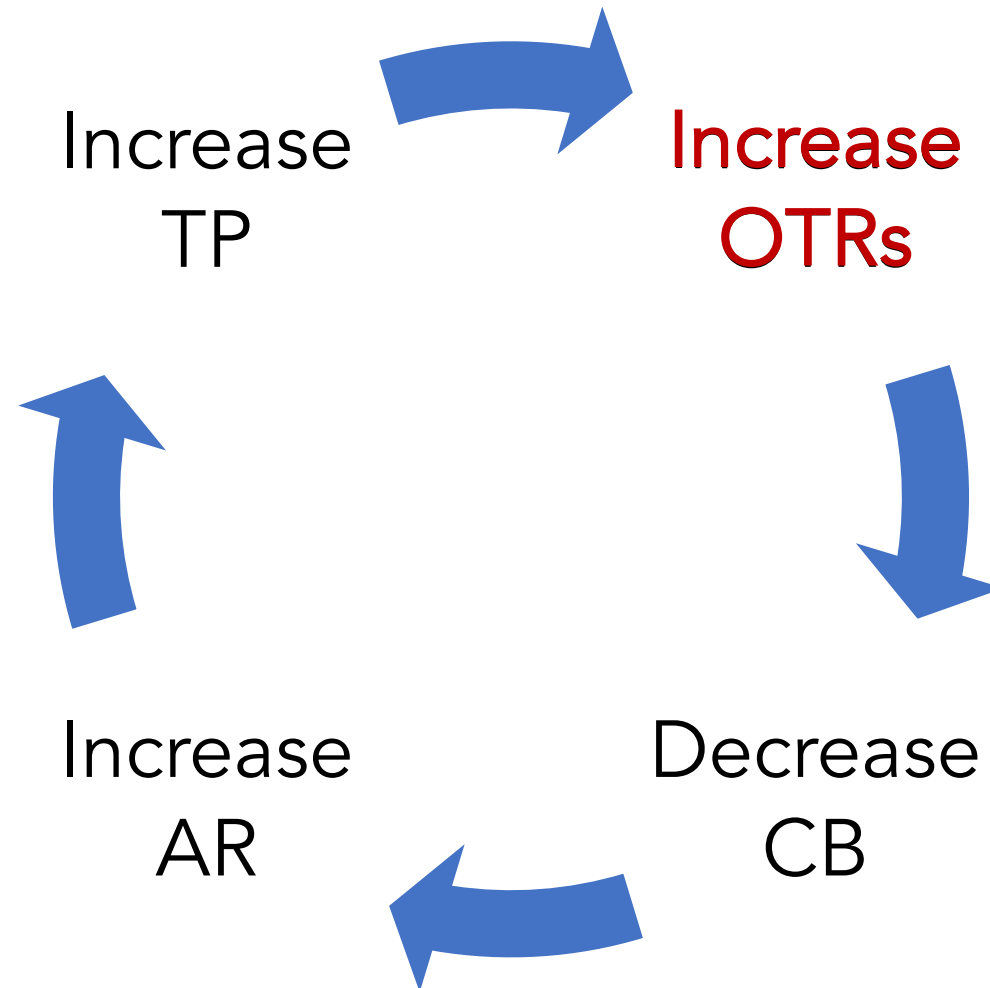


Teacher Praise

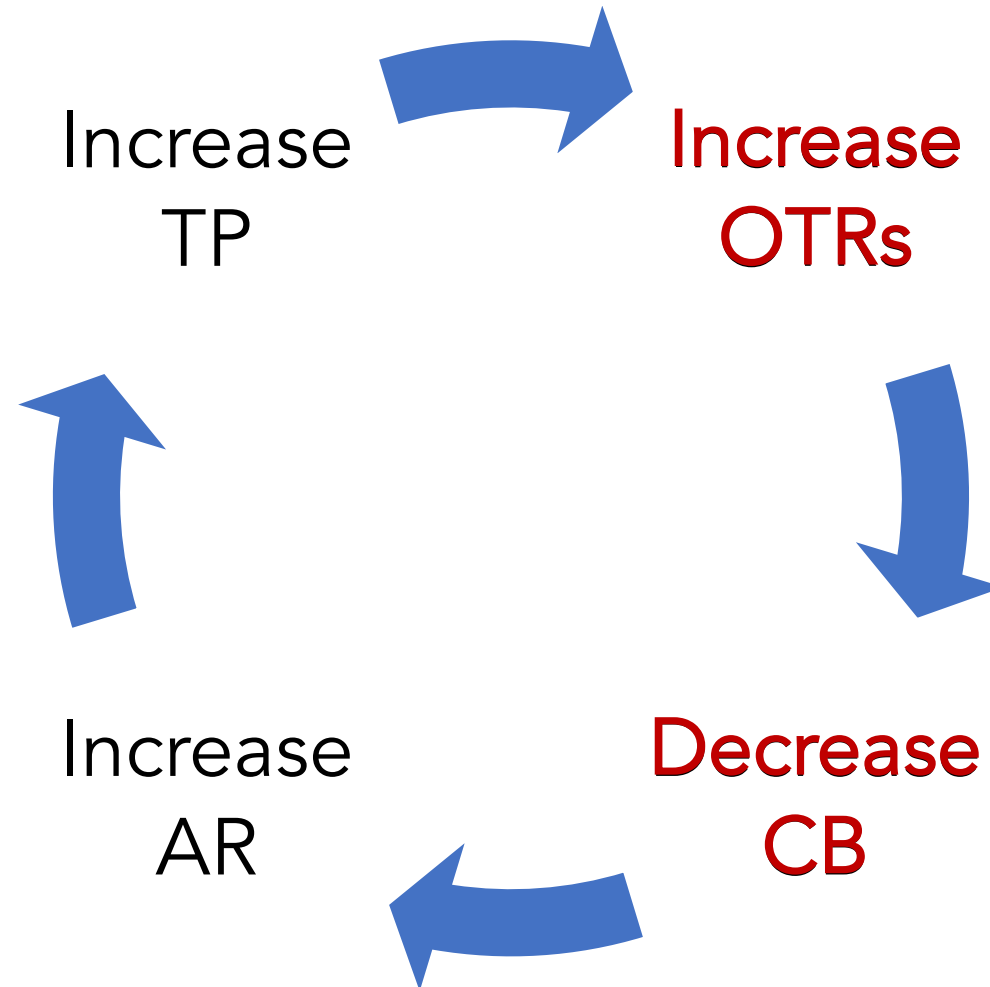
# Primary Findings and Practical Implications



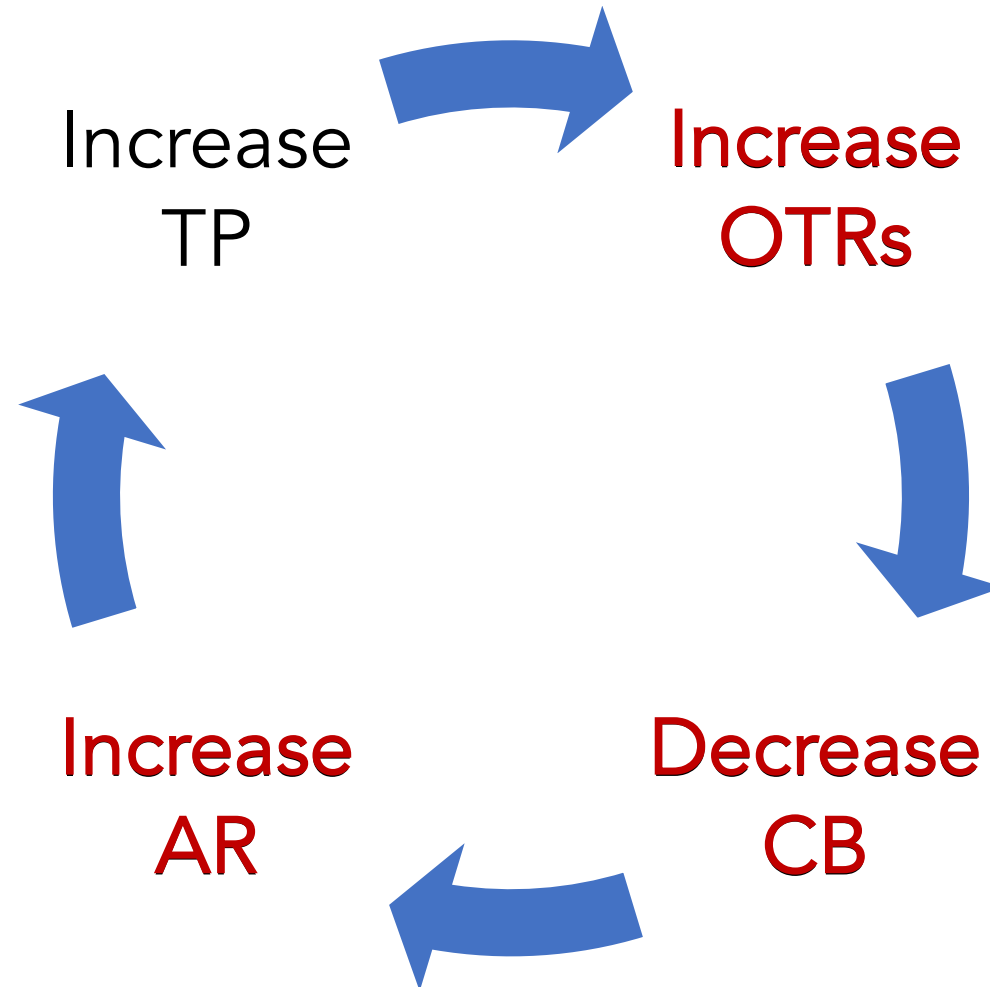
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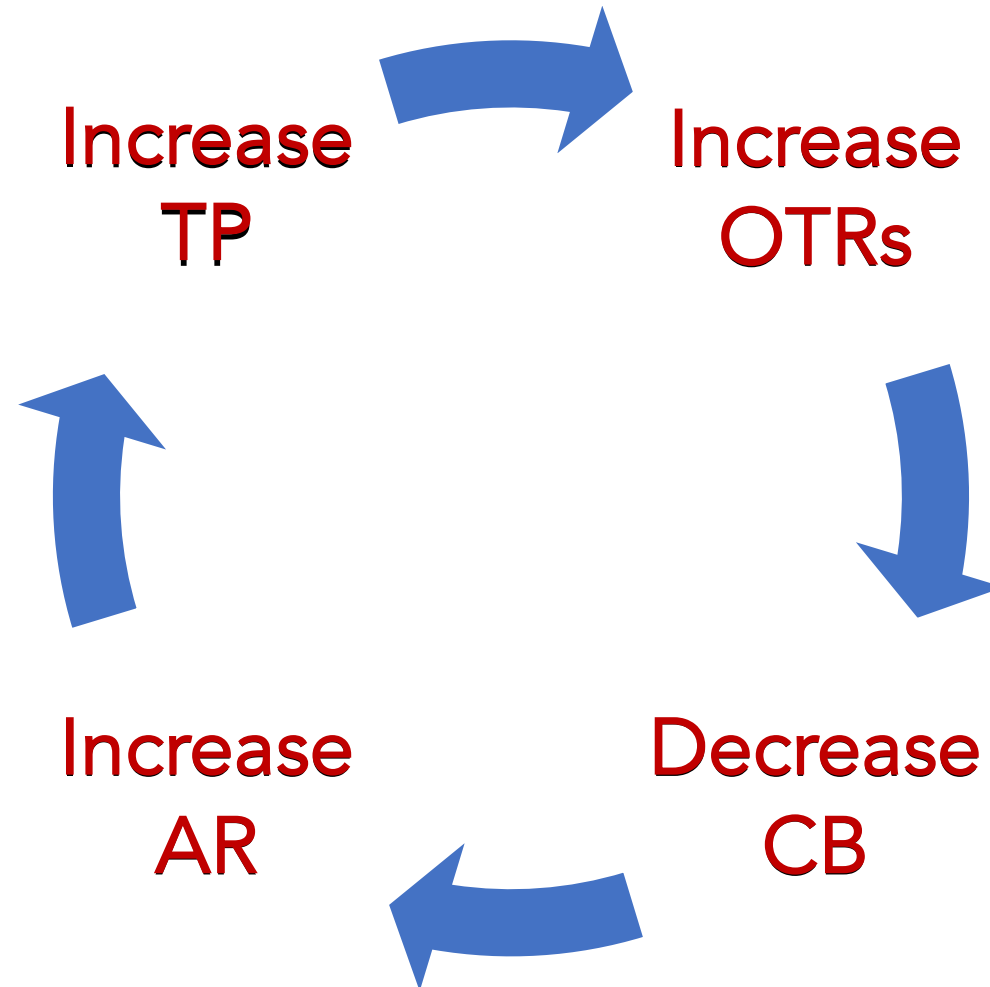
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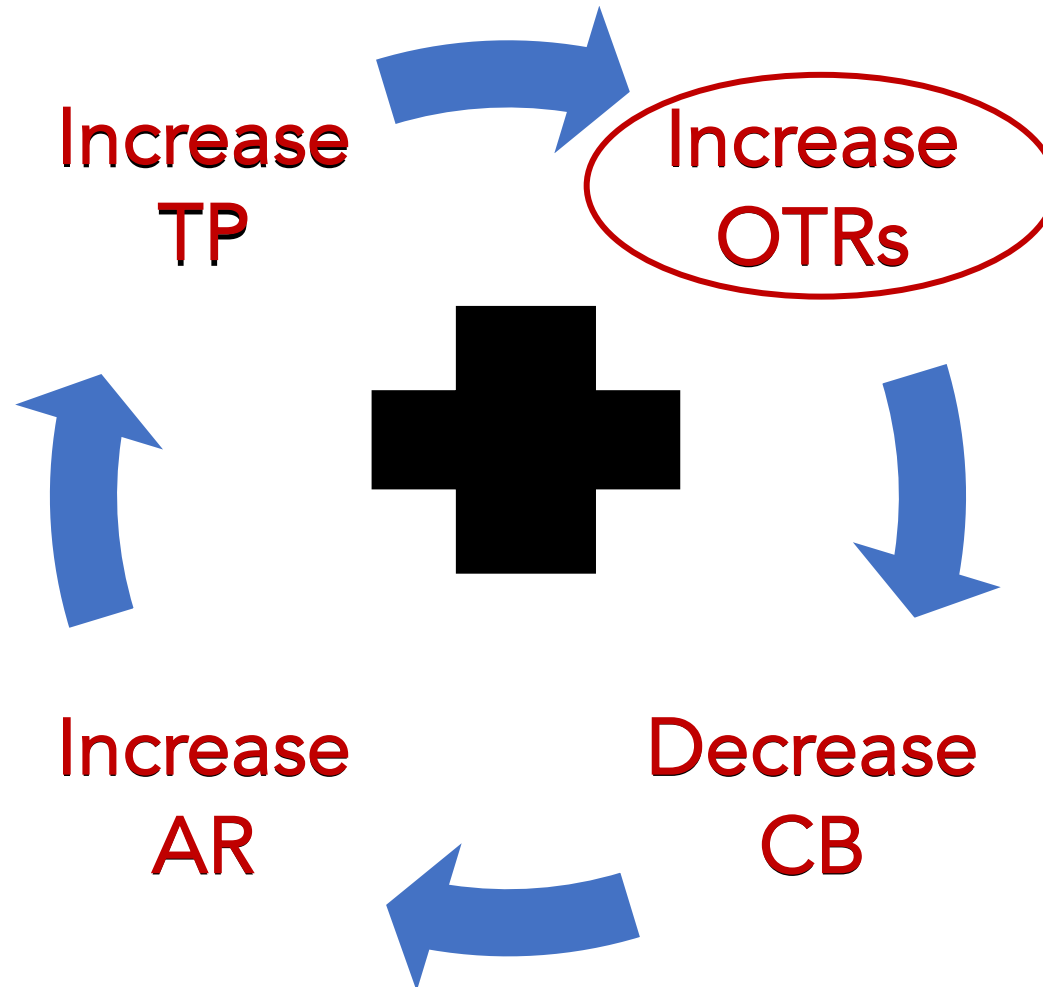


# Primary Findings and Practical Implications





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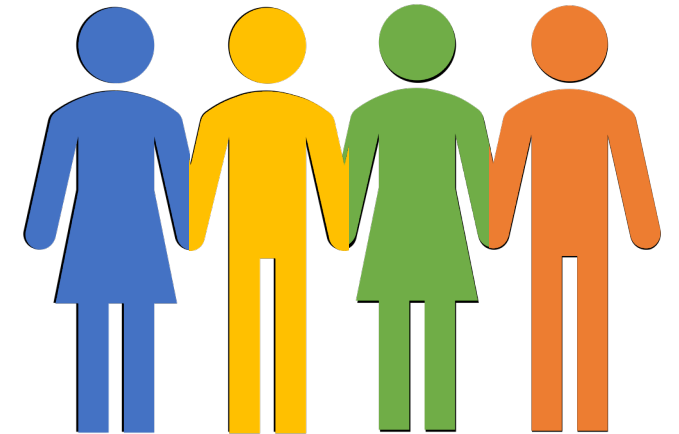
# Limitations



Low base rates

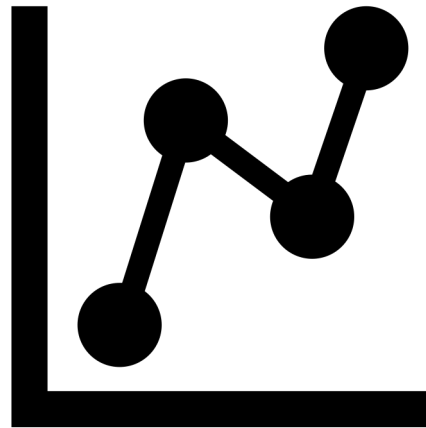
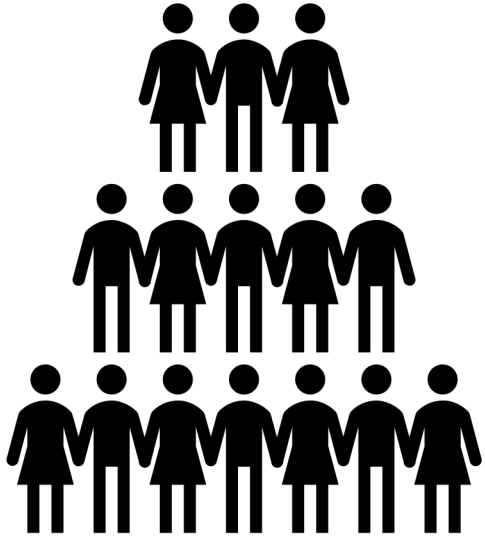
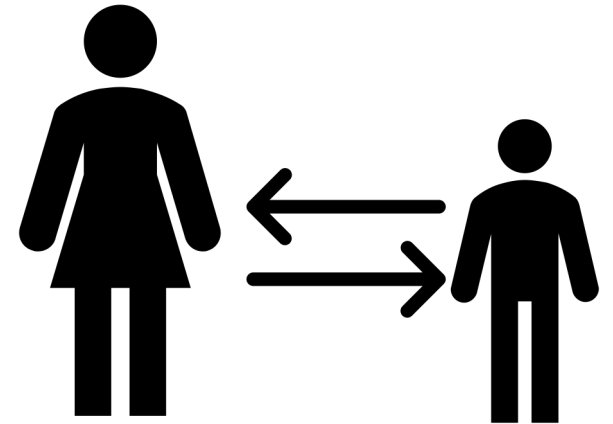


Wide ranges of agreement



Small and varied sample

# Future Directions

A black calendar icon with a grid of 12 cells. Several cells contain a red 'X' mark, indicating specific dates or events.

# Thank you!

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