



# Enhancing Preschool Teachers' Reflection on Science Teaching and Learning in the U.S. and Brazil

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# Collaborators

## Preschool Science Talk in Action and Reflection (PreSTAR) Team

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- Anna Burton, M.Ed./M.S.
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- Patricia Pastorello
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# Reflection

- “the deliberate, purposeful, metacognitive thinking and/or action in which educators engage in order to improve their professional practice” (Sellars, 2017, p. 2).
- A meta-cognitive process that implies **an awareness of what one is doing or thinking** (Marcos et al., 2009)
- Critical to make behavioral changes **by changing the lens** through which teachers view their practices (Larrivee, 2000)
- Hierarchically organized (Lundren & Poell, 2016)

# Facilitation of Reflection

- Sharing reflection with someone else who understands the circumstances but has **a different frame of reference, perspective, or lens** (Larrivee, 2000)
- An experienced facilitator with higher levels of knowledge and skills could make the reflective process more efficient and productive by **prompting educators to think in new ways and eliciting behavioral as well as perspective changes** (Baker, 2014; Foong et al., 2018).
- Reflective questioning aligned well with hierarchical levels of reflection = increased levels of confidence and competence (Wilson et al., 2006)

# Objectives

To investigate:

How **levels of teacher reflection** were different across four reflection sessions when provided individualized facilitation

How **levels of facilitators' questions** were sequentially associated with **the levels of teacher reflection**

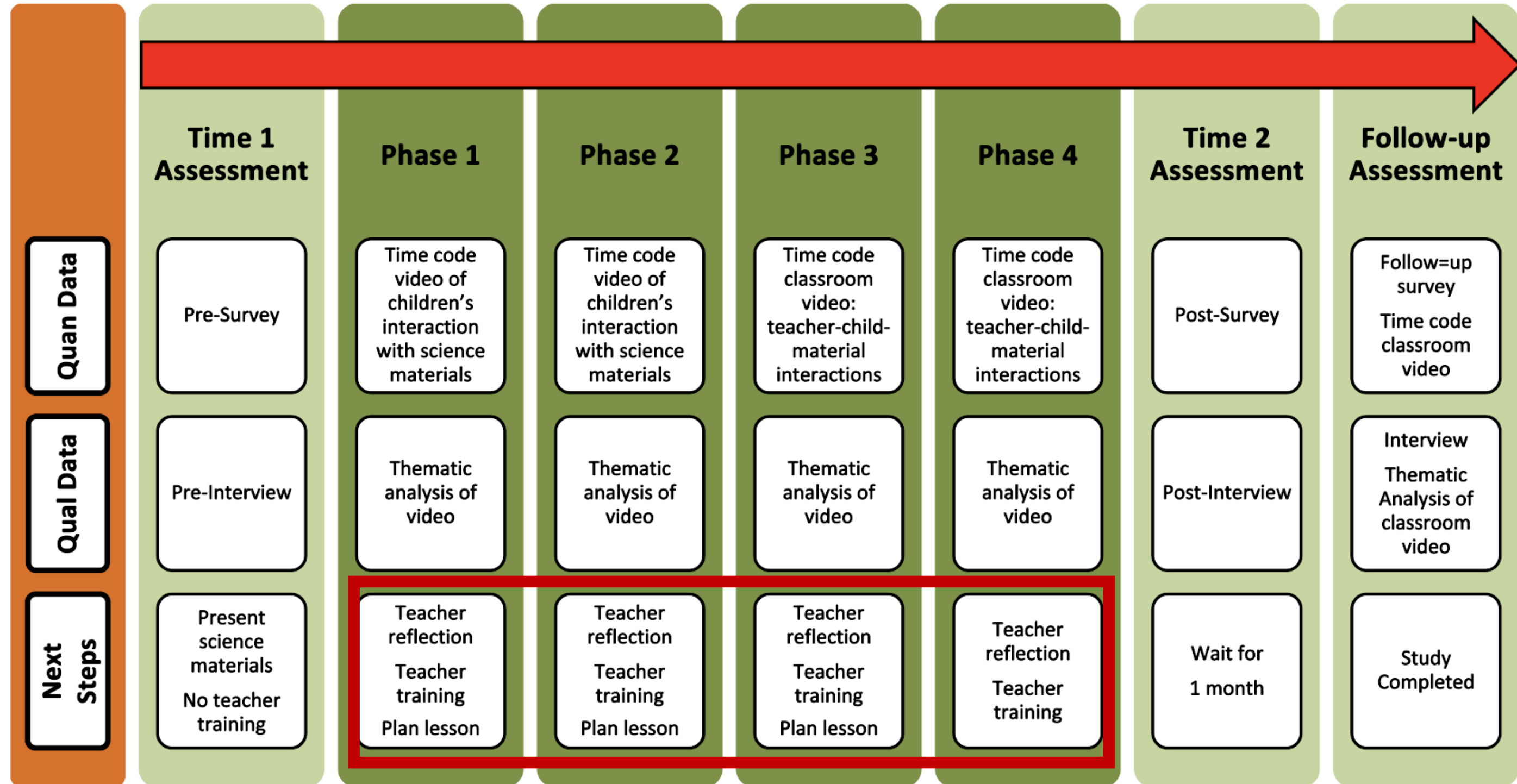
How **cultural and educational contexts** were associated with **the facilitation-reflection patterns** across reflection sessions

# Participants

	Nebraska	São Paulo
<b>Teachers</b>	4 early childhood teachers	4 early childhood teachers
<b>Education</b>	1 w/ associate degree in Child Dev. 1 w/ bachelor's degree in ECE 2 w/ mater's degree in Physical Ed./Special Ed.	4 Pedagogas ("educators")
<b>ECE Settings</b>	3 Head Start classrooms 1 community child care classroom	2 public preschools 2 private preschools
<b>Focus</b>	Physical science	Life science
<b>Facilitators</b>	1 w/ master's degree in ECE 1 w/ master's degree in ECSE Both w/ extensive EC teaching experience	1 w/ Ph.D. in ECE and extensive EC teaching and coaching experience

# Procedure

Multi-phase Concurrent Mixed Methods Design (PreSTAR)



# Procedure

Phases	Videotaped Interactions	PD and Reflection Sessions
<b>All Phases</b>	15-minute videos	Cycle of Inquiry, <b>Teacher narration</b> of videotaped observation (pre-selected clips) with <b>facilitated reflection</b> (30-40 minutes)
<b>Phase 1</b>	Children + Materials	Display of materials, documentation, science standards and objectives
<b>Phase 2</b>	Children + Materials	Projects in EC classrooms, Inductive Thinking Framework (ITF), Activity/lesson plan
<b>Phase 3</b>	Children + Materials + Teachers	ITF, Identifying children's interest, Activity/lesson plan
<b>Phase 4</b>	Children + Materials + Teachers	ITF, Identifying children's interest, Activity/lesson plan



# Measure: Teacher Reflection

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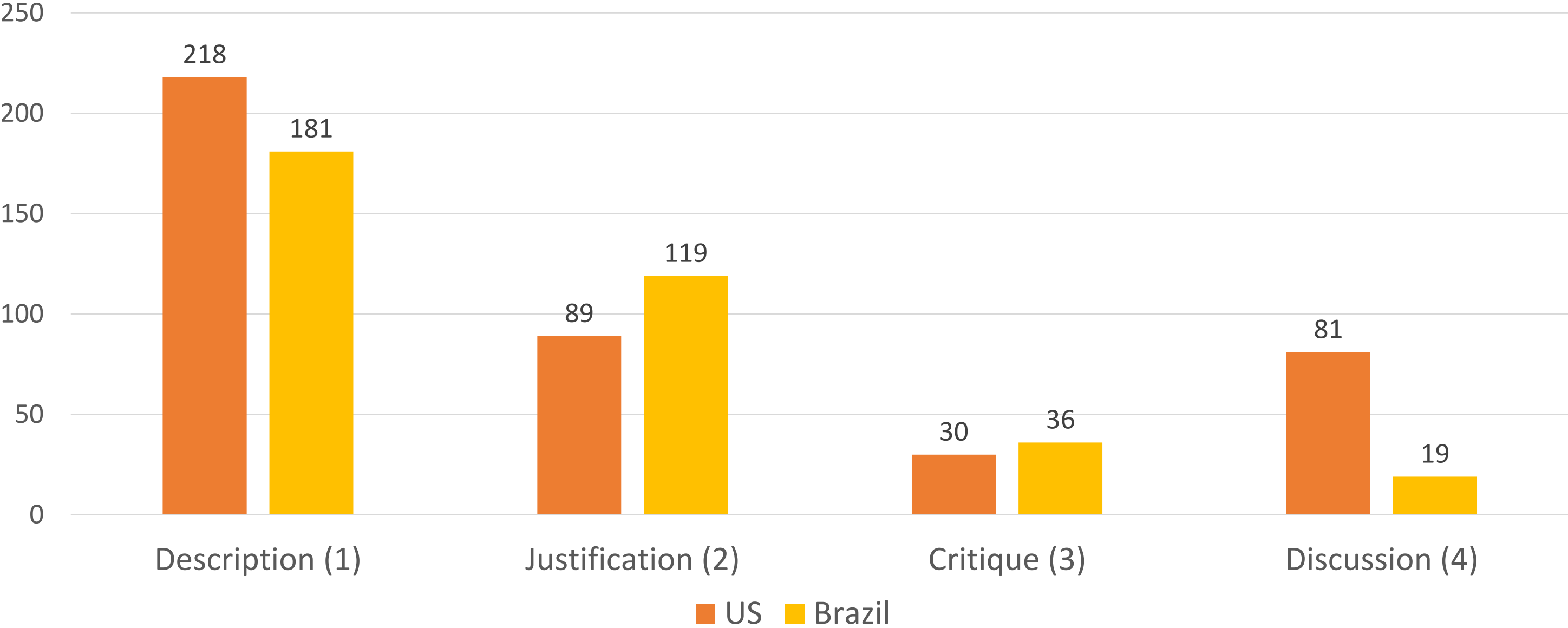
Level of Reflection	Description
1. Description	<b>Lowest-level reflection;</b> Providing mere description of actions and thoughts
2. Justification	Providing a rationale or logic for materials, actions, or viewpoint
3. Critique	Providing an evaluation for an aspect and explaining why that explanation was given
4. Discussion	<b>Highest-level reflection;</b> Pointing out what could be done to initiate changes and why changes are needed in the first place

# Measure: Facilitation Questions

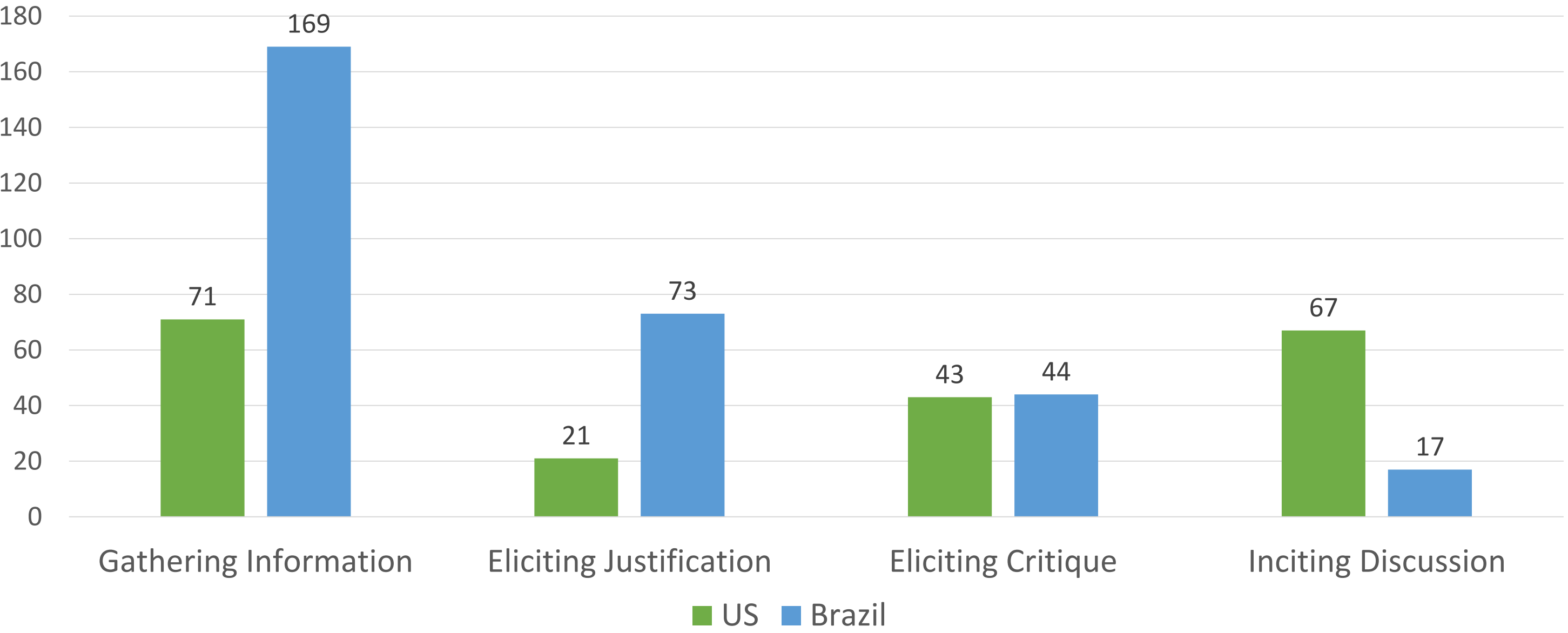
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Level of Facilitation	Description
1. Gathering Information	Solicit descriptive and straightforward information from teachers
2. Eliciting Justification	Ask teachers to further elaborate and justify their thinking and teaching practices
3. Eliciting Critique	Encourage teachers to analyze, critique, and evaluate their thinking and teaching practices
4. Inciting Discussion	Encourage teachers to discuss alternative actions and future planning based on their reflection on their teaching practices

# Frequency: Teacher Reflection



# Frequency: Facilitation Questions

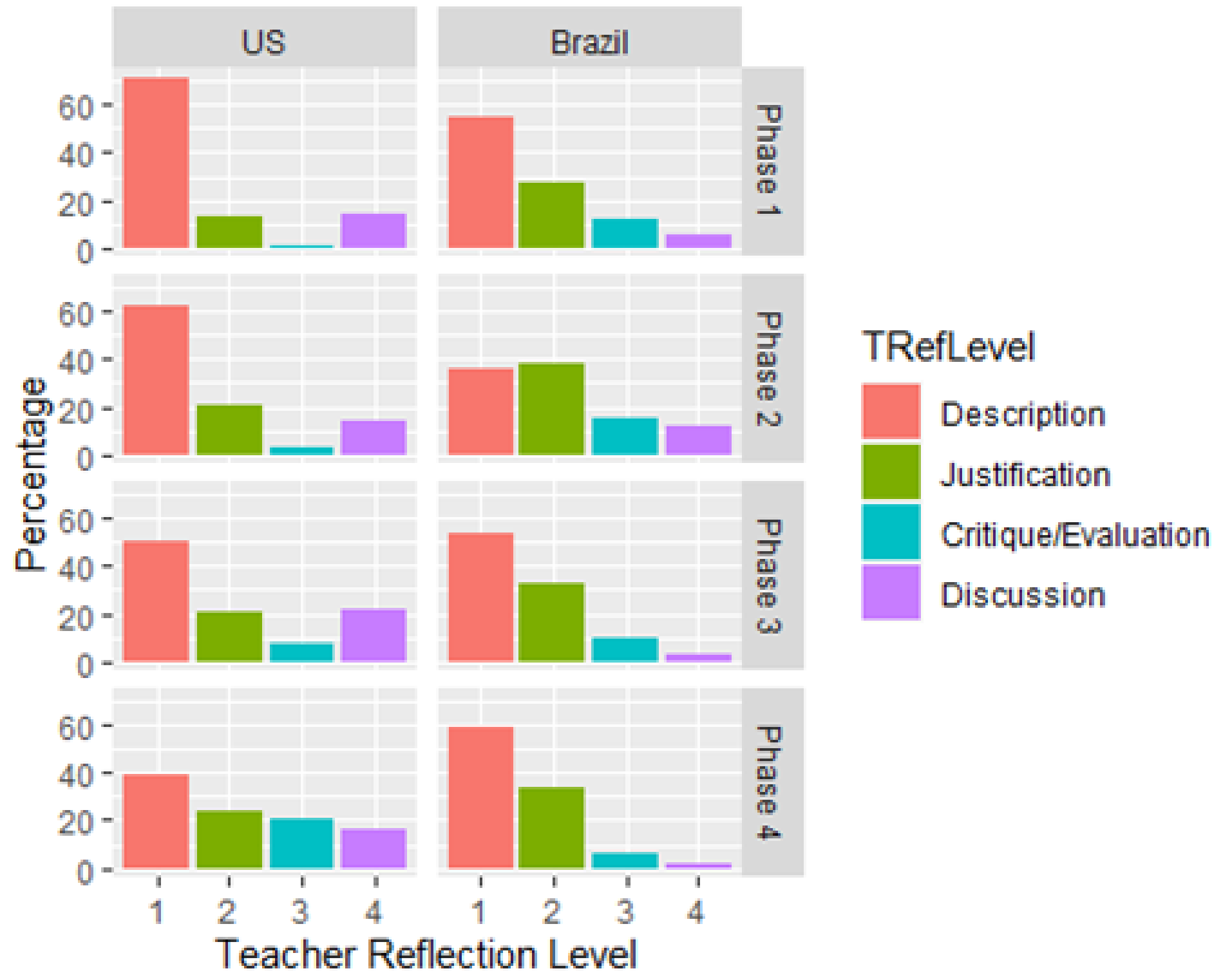




# Results

Significantly different levels of reflection across the four reflection sessions

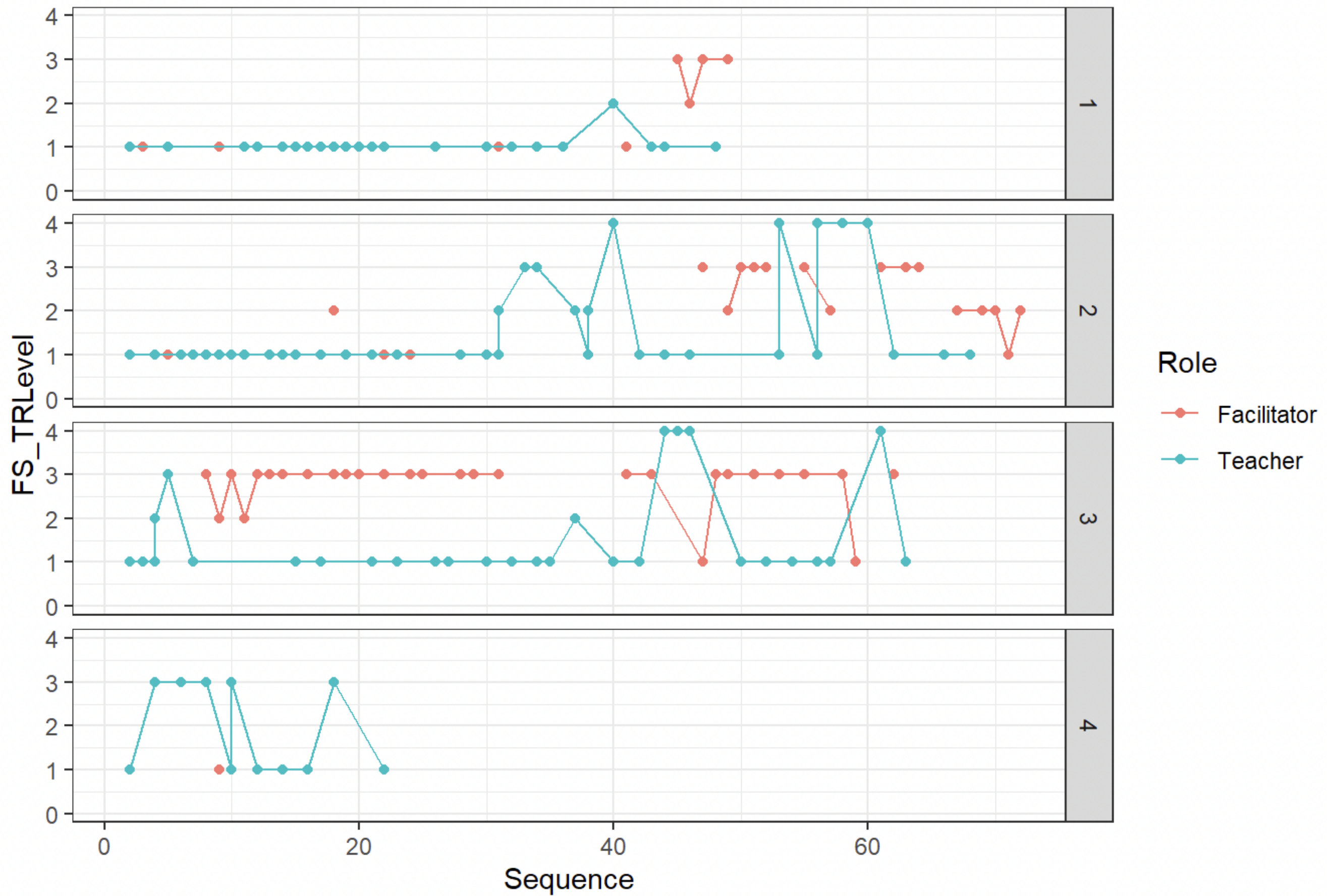
- US:  $F(3,494) = 6.66^{**}$
- Brazil:  $F(3,350) = 6.22^{**}$





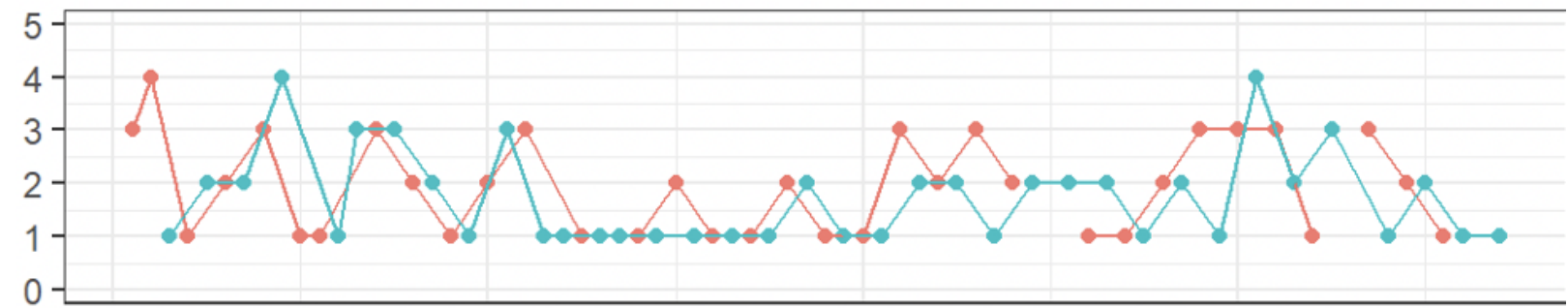


# Results





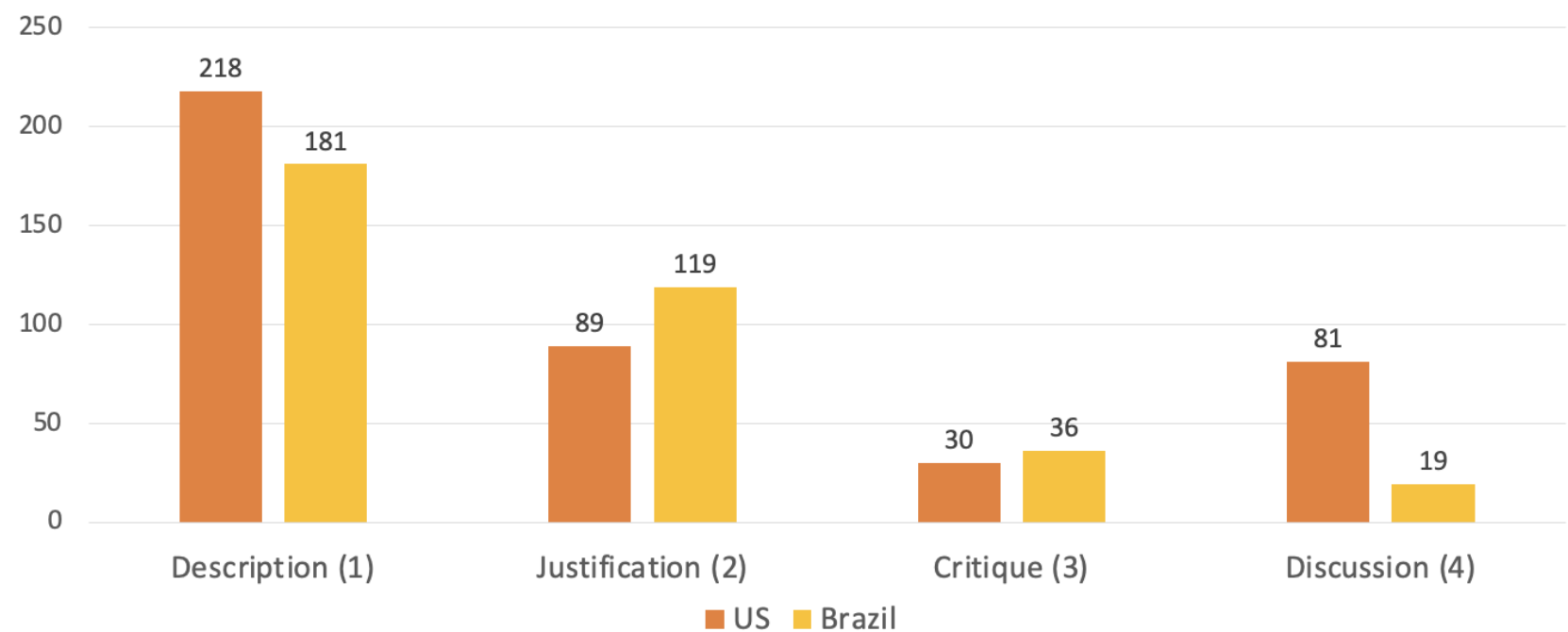
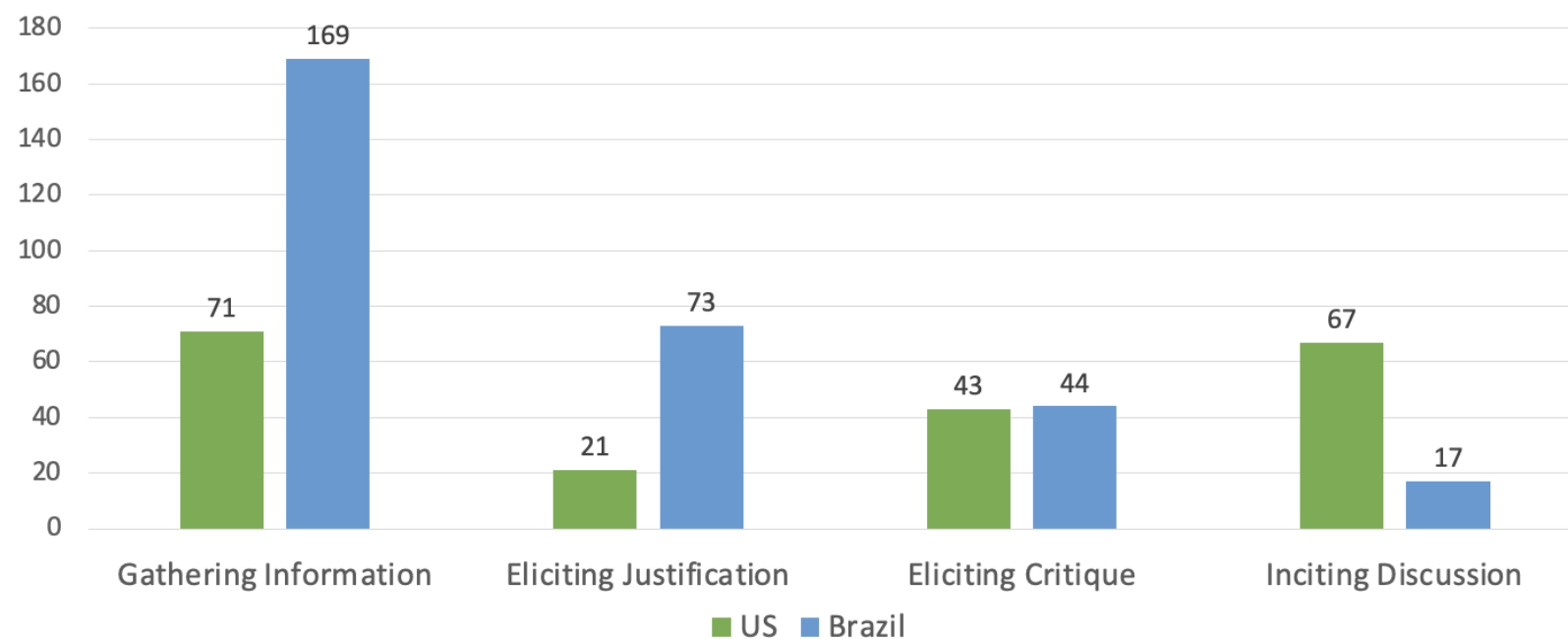
# Results



- Preschool teachers were more likely to use higher-level reflections when provided with higher-level facilitation questions in facilitator-teacher reflection sessions (both in the US and in Brazil).
- Synchrony in the facilitation-reflection pattern: Brazil > U.S.
- Increase in levels of reflection across sessions: U.S. > Brazil
- Cultural contexts matter.
  - Brazil: Focus on Description and Justification
  - U.S.: Focus on Justification and Critique

# Discussion

- Facilitation-reflection (facilitator-teacher) synchrony
- Quality and quantity of reflection sessions
- Teachers' science pedagogical content knowledge
- Contextual understanding
- Children's science outcomes







**Thank you! Questions?**

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