

Sociocultural Perspectives on Informal Science Learning

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Overview

1. What do I mean by 'sociocultural perspective'?
2. What do I mean by 'informal science learning'?
3. Methods and measures in Sociocultural approach
4. Examples from my research
5. Open questions/Challenges that link to committee's charge

What do I mean by
'Sociocultural Perspective'?

What I mean by 'Sociocultural Perspective'

- Class of theories inspired by Vygotsky
 - Individuals are not separate from their activities
 - Development constitutes and is constituted by social, cultural, historical activities and practices
- AKA 'socio-historical theory' or 'cultural-historical-activity theory'
- NOT a perspective where culture (or context) are seen as *variables* that *influence* development

What I mean by 'Sociocultural Perspective'

Quote from Barbara Rogoff, 2003:

"People develop as participants in cultural communities. Their development can be understood only in light of the cultural practices and circumstances of their communities -- which also change" (pp. 3-4)

- Culture is not just race, ethnicity, country of origin
- Everyday activities, routines, experiences
- Contrast with Constructivist approaches...

Two Theoretical Perspectives on Development

Constructivist

Inspired by Piaget
(Gelman, Wellman,
Gopnik)

Individual as unit of analysis

Development in head

Social context as “input” to
child

Sociocultural

Inspired by Vygotsky
(Rogoff, Cole, Lave)

People in activities as
unit of analysis

Development in activity

Social context as site of
change

Two Theoretical Perspectives on Development

Constructivist

Child as scientist

Development = Acquire concepts, theories to better understand world

Sociocultural

Child as social being

Development = “Making sense” to participate effectively in social world (culture)

How can we bridge the two perspectives?

Insights and Limitations

Constructivist

- Development involves growth in an individual's understanding over time

BUT

- Too much emphasis on development happening in the privacy of the child's mind?

Sociocultural

- Development cannot be understood without attention to social context

BUT

- Too little emphasis on what children take from one social situation and bring to next?

Crucial questions raised by Sociocultural Perspective

Is it essential to think about age-graded differences in learning?

Is it essential to think learning is hierarchically organized (with adult organizing children's learning)?

Are the "milestones" of development really as universal as we think?

What do I mean by
'Informal Science Learning'?

What I mean by “Informal Science Learning”

- Informal --
 - Not necessarily about the setting (informal learning happens in classrooms as well as homes and museums)
 - More about whether focus is on explicit teaching vs learning in everyday activities

What I mean by “Informal Science Learning”

- Science --
 - Implies learning a set of academic disciplines (both content and process)
 - In my work -- more about young children’s early understanding of natural world & ways of using evidence to figure things out
 - Promise of informal science learning -- connect spontaneous with school

Methods and Measures in the Sociocultural Perspective

Methods in Sociocultural Perspective

Sociocultural approach is interdisciplinary and uses many methods

- Participant observation, ethnography, close coding from videotaped interaction, interviews, “laboratory” tasks
- But recognition that ALL methods involve bias and particularly imposed assessments may have very different meaning for different communities

Measures in Sociocultural Perspective

“Outcome measure” is a notion that is somewhat inconsistent with the approach
Not assuming concept is “acquired” -- ongoing negotiation of understanding in activities
Not assuming there is a single (pure) way to “tap” a person’s knowledge -- each method is an activity; knowledge may be brought to bear differently in different settings

Examples from my research on
everyday explanatory conversations
between parents and children

Everyday explanatory conversations between parents and children

- window on children's thinking about rich domains (early curiosity about science?)
- window on process of developmental change?
 - settings where children learn about e.g.,
 - causal explanations for everyday events (including those in science domains)
 - activity of explaining, cultural value of the activity

Sample Diary Questions

(Callanan, Barajas, Goldberg, & Pérez-Granados)

Where does the sky end? (5 years; 6 months)

How come fish are in the water and they don't drown? (4;8)

Why do we dream? (5;8)

Why are the clouds painted black? (3;8)

Why do people get cancer? (5;4)

Methods for studying spontaneous explanatory conversations

- Diary report method
 - *Children's "why" questions and conversations that ensue*
- Natural Observation (Museum studies)
 - *Gender differences in science explanations*
- Focused observation in structured tasks
 - *Conversations about growth, buoyancy, earthquakes*
- Laboratory tasks that test children's understanding of parents' explanations
- Combining research with evaluation -- comparing different types of museum exhibits ('Alice' study)

How might 'Everyday Explanatory Talk' contribute to children's early science learning?

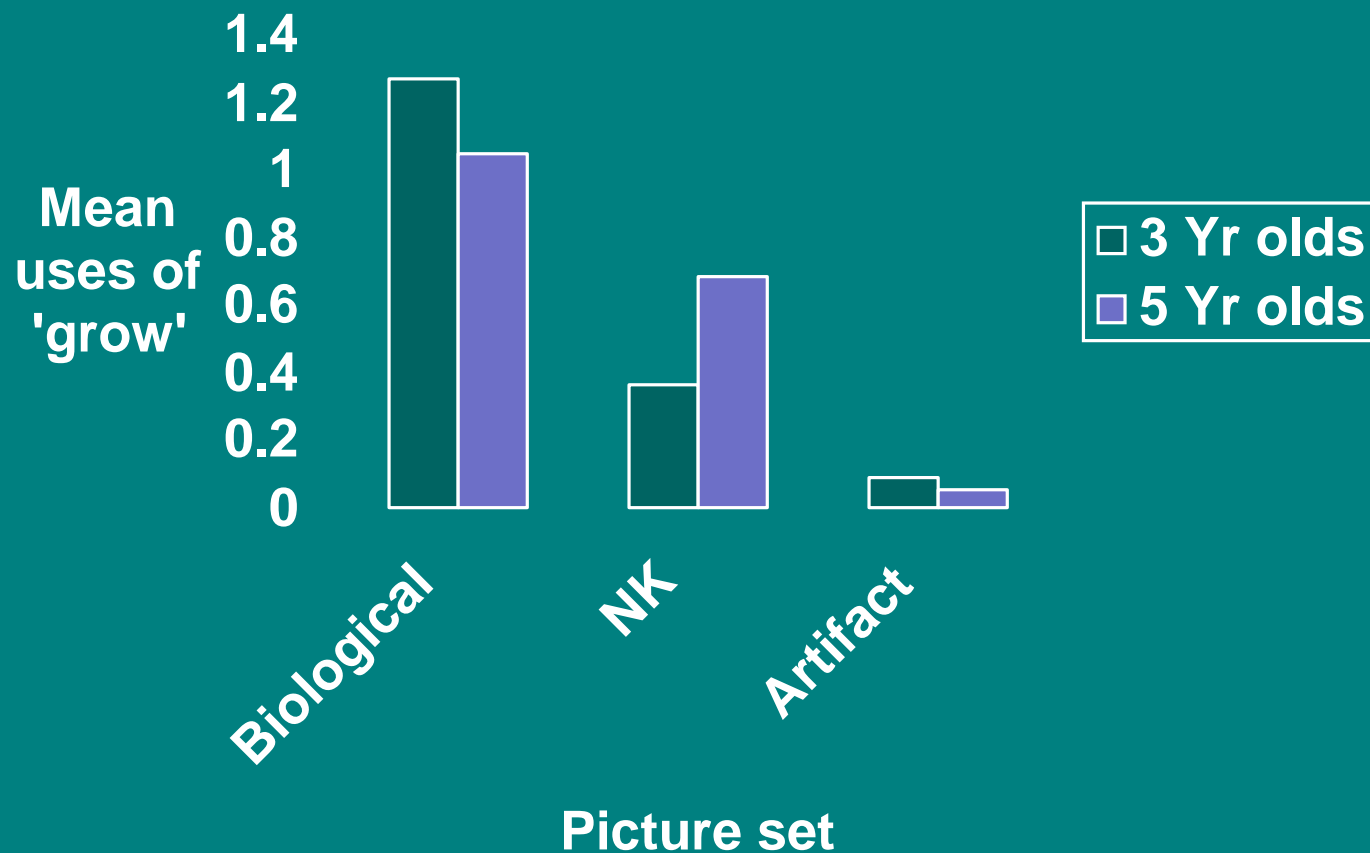
Two important possibilities:

- 'domain-specific' vocabulary may help young child learn how adults carve up experience into domains (e.g., 'gravity,' 'alive')
- causal explanation for events may help children to develop and revise causal "theories"

Example Study: Conversations about growth (Jipson & Callanan)

- Conversations about objects changing in size (biological, non-bio natural, artifact)
 - N=44 children with parents
 - Ages 3 and 5
- Parents mostly limited use of word 'grow' to biological changes
- Often questioned or corrected children's uses of word 'grow' for non-biological changes (62% of the time)

Parents' Use of "Grow" (Jipson & Callanan)



Example of response to child's use of 'grow'

Parent: Yeah, it's a full moon. Do you know why it's getting bigger?

Child: Because it's growing.

Parent: It's growing? Does this grow like mushrooms grow?

Child: Uh. Yeah.

Parent: It grows in the dirt? I've never seen the moon in the dirt! No, the moon is up in the sky!

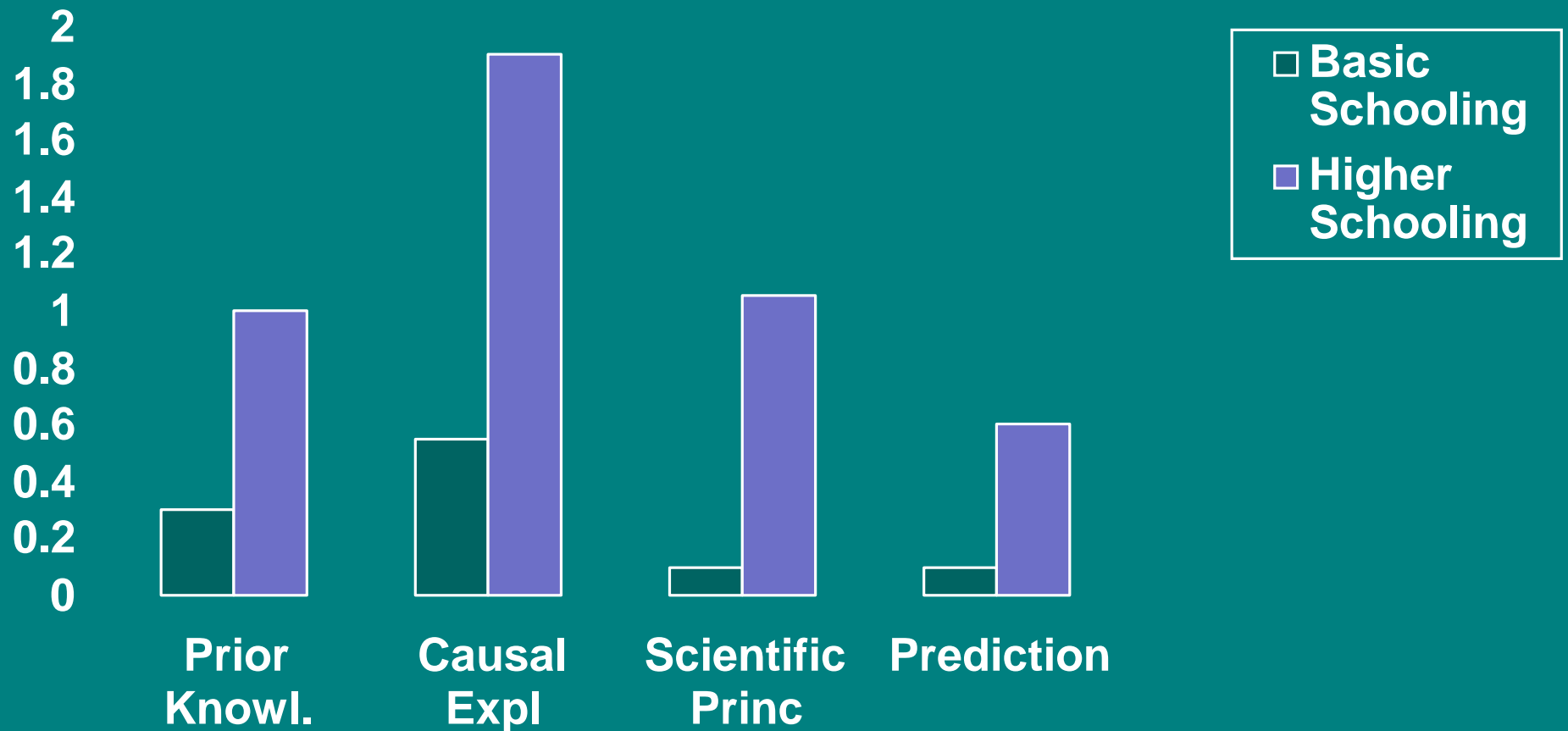
Child: Yeah. Why did they grow up?

Parent: The earth is blocking it. It's a shadow so it gets bigger and bigger.

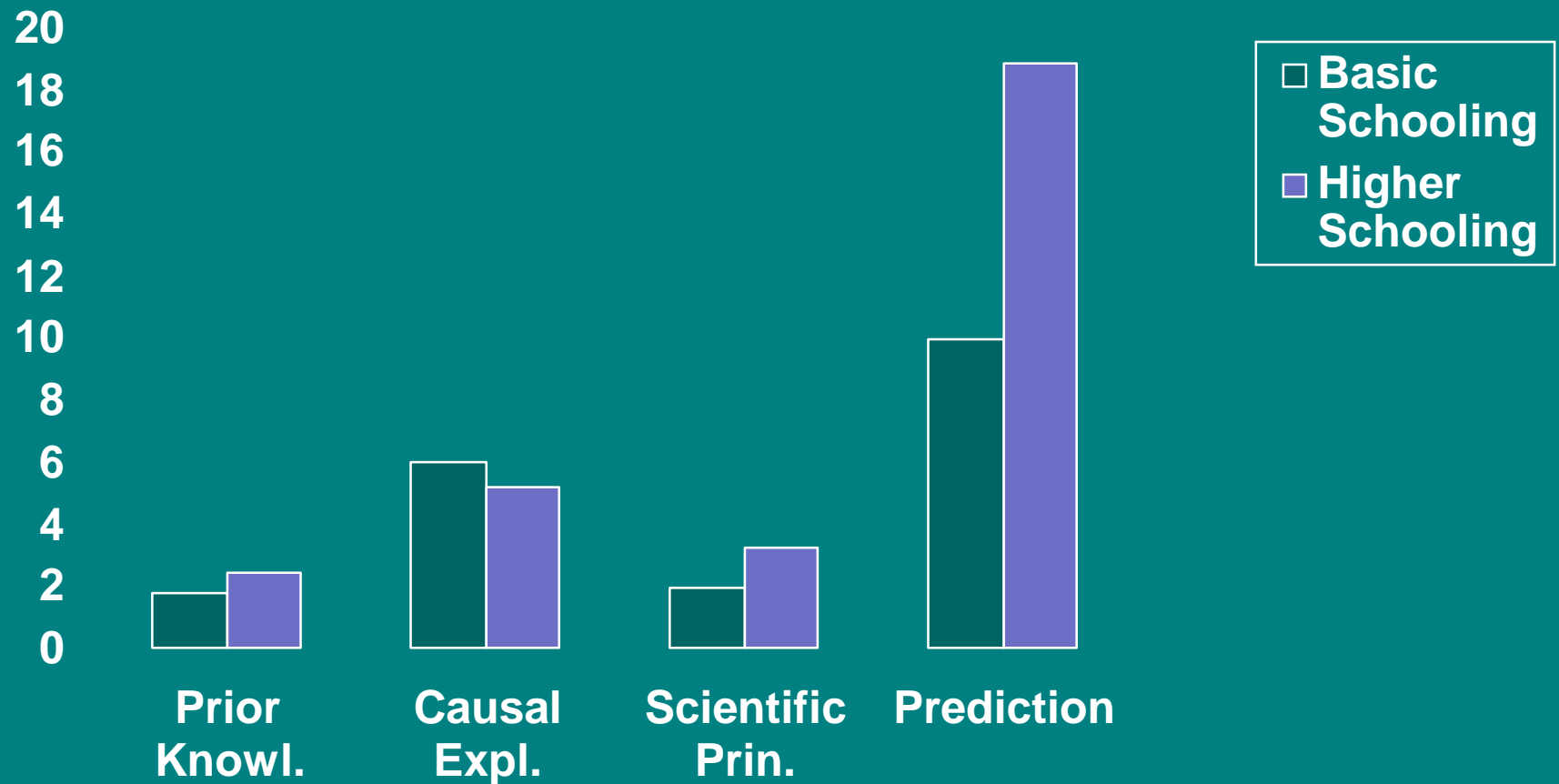
Example study: Do parents from different backgrounds give children different kinds of explanations about science?

- Mexican-descent families
 - Basic schooling -- less than high school (average of 7.5 years)
 - Higher schooling -- at least high school graduation (average of 13 years)
- Conversations at museum exhibits
- Conversations in home task about sinking and floating objects

Explanations in Museum



Explanations in Home Task



What the explanatory conversations look like

- Family conversations engage children in cultural understanding of science topics
- Variations in family experience, activities
 - Is the museum a familiar activity setting?
 - Science as a shared cultural practice
 - e.g. Parents from Engineering vs.Science vs.Humanities backgrounds (Valle)
- Designed environments are shared, interpreted in social context

What can explanatory conversations tell us about children's developing science understanding?

- Problems with testing *effect* of explanations on children's learning
 - Sociocultural perspective -- not expecting immediate conceptual change as result of particular experience
 - Variability in how children are thinking about same topics across situations (Siegler)
- This leads to an open challenge about assessment of learning
 - how to design methods and measures that are true to sociocultural approach -- not separating child from other

Other challenges for the field
and for the committee

Challenges

- How to connect children's early curiosity about scientific topics with later (lack of?) interest in school science
- How to link spontaneous explanatory conversations with school science?
- Need to recognize that designed environments for informal science learning are not part of everyday practices for all learners
- Need to focus on parents -- part of 'public' understanding of science AND part of cultural community guiding children