

How High-Quality Language environments create High-Quality Learning



Kathy Hirsh-Pasek

Temple University

Brookings Institution

BROOKINGS



Everyone is talking about...

- The 30 million word gap
- The grade level reading campaign
- Early learning

The New York Times

Trying to Close a Knowledge Gap, Word by Word

By NOTOKO RICH MARCH 20, 2014

The New York Times

N.Y. / Region

WORLD | U.S. | N.Y. / REGION | BUSINESS | TECHNOLOGY | SCIENCE | HEALTH | SPORTS

BIG CITY

Before a Test, a Poverty of Words

SCIENCE

Quality of Words, Not Quantity, Is Crucial to Language Skills, Study Finds

A Summer of Extra Reading and Hope for Fourth Grade

Literacy Laws Challenge Third Graders and Schools

By NOTOKO RICH AUG. 4, 2014

The Opinion Pages | OP-ED CONTRIBUTORS

The Building Blocks of a Good Pre-K

By SHAEL POLAKOW-SURANSKY and NANCY NAGER OCT. 21, 2014

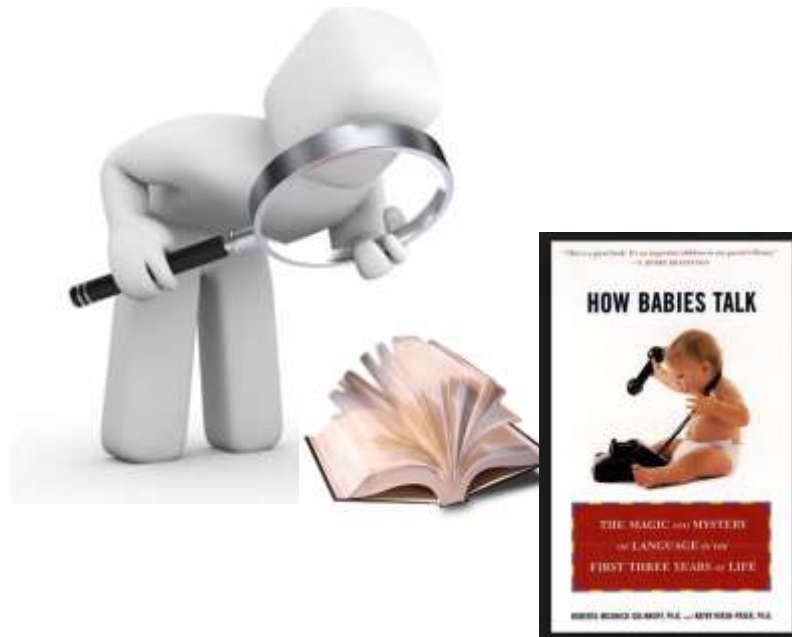
What unites each of these initiatives?

Hmmmm



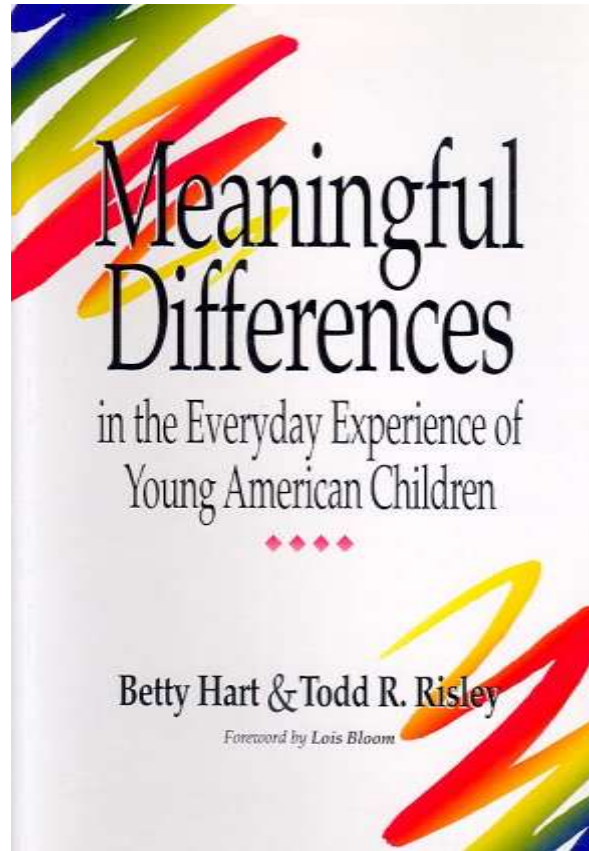
The answer in this presentation??

Each of these initiatives focuses on and relies upon developing strong language skills.



And those language skills come from having high quality language environments where adults and children engage in conversation on a shared topic of interest

Let me show you why: The 30-million word gap



In 1995, Hart & Risley

Examined language input to children
from...

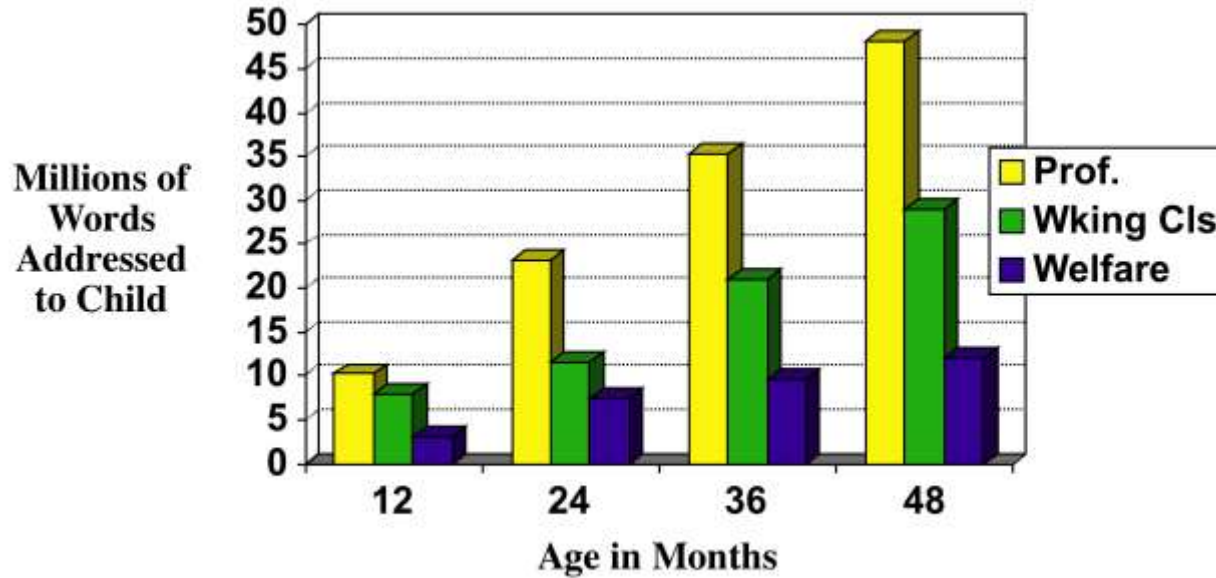
Welfare

Working class

Professional families

(see also Hoff, 2002, 2003, 2013; Rowe et al., 2013;
Pancsofar & Vernon-Feagans, 2010; but see Sperry et
al., 2018; Golinkoff et al., 2018)

Results?



Number of words heard per hour by children in each group:

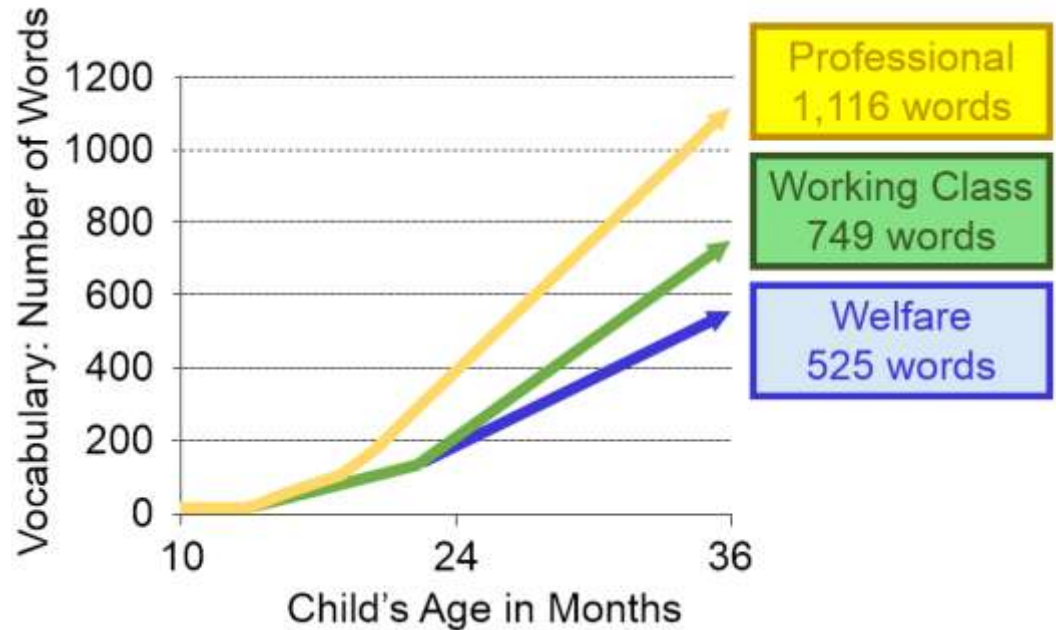
Welfare - 616

Working Class - 1,251

Professional - 2,153

Significance?

Children's vocabulary scores reflect the achievement gap by age 3!



- Vocabulary assessed at age 3 predicted PPVT scores at age 9-10 ($r = .58$) and TOLD (more comprehensive) $r = .72$
- Vocabulary at age 3 correlated with reading comprehension scores on Comprehensive Test of Basic Skills $r = .56$
- By second grade middle class children have 6000 root words; lower income 4000 -- 2 grade levels behind (Dale & O'Rourke, 1981)

They suggested and many have suggested since

That the amount of language spoken to the child coupled with the kind of language (the quality or what they called **“the dance”**) can change that trajectory!



**BUT MANY HAVE FORGOTTEN ABOUT THE QUALITY MESSAGE
AND ONLY REMEMBERED THE QUANTITY OF TALK MESSAGE.**

What about the campaign for grade level reading?



The Casey Foundation reports that...

- More than 80% of 3rd graders from low-income families will not be reading at grade 3 in grade 3
- At least half of the school achievement gap between rich and poor kids starts before kindergarten
- 42 states across the US have started campaigns to reverse this trend



The National Governor's Association recognizes that strong language skills are critical if we are to build strong reading skills!

OCTOBER 2013

A Governor's Guide
to Early Literacy:



Let me show you why.

One second in the mind of a reader



From processing visual print



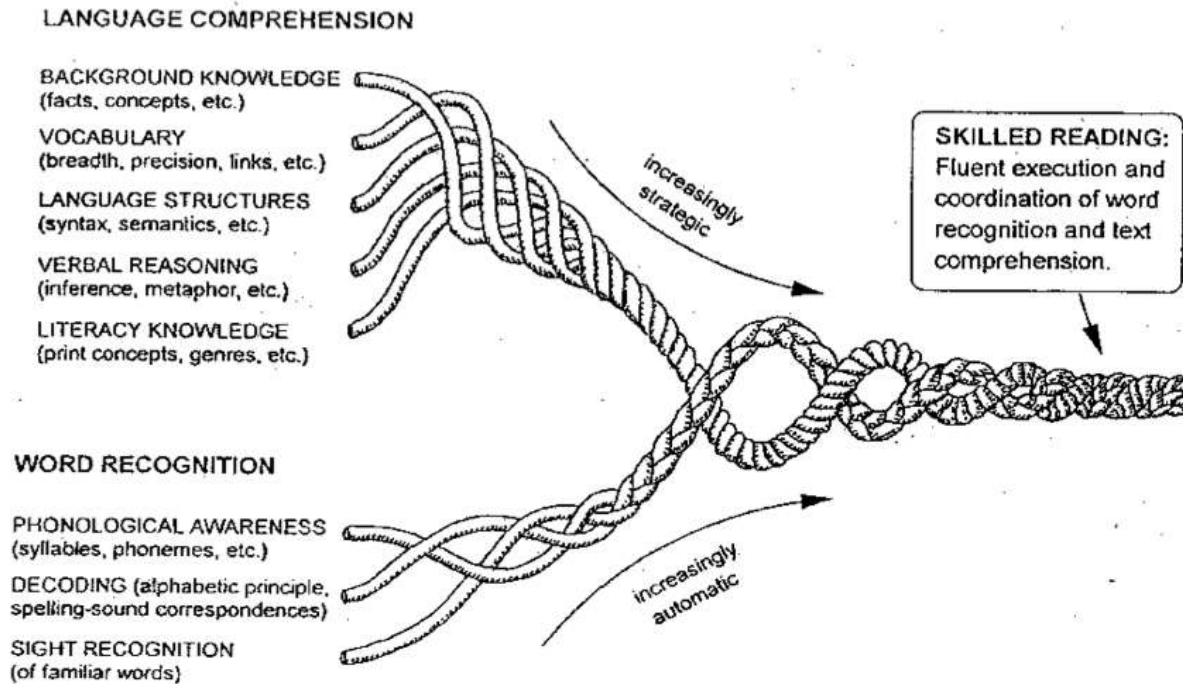
To decoding sights to sounds (B-O-Y = boy)



To infusing text with meaning

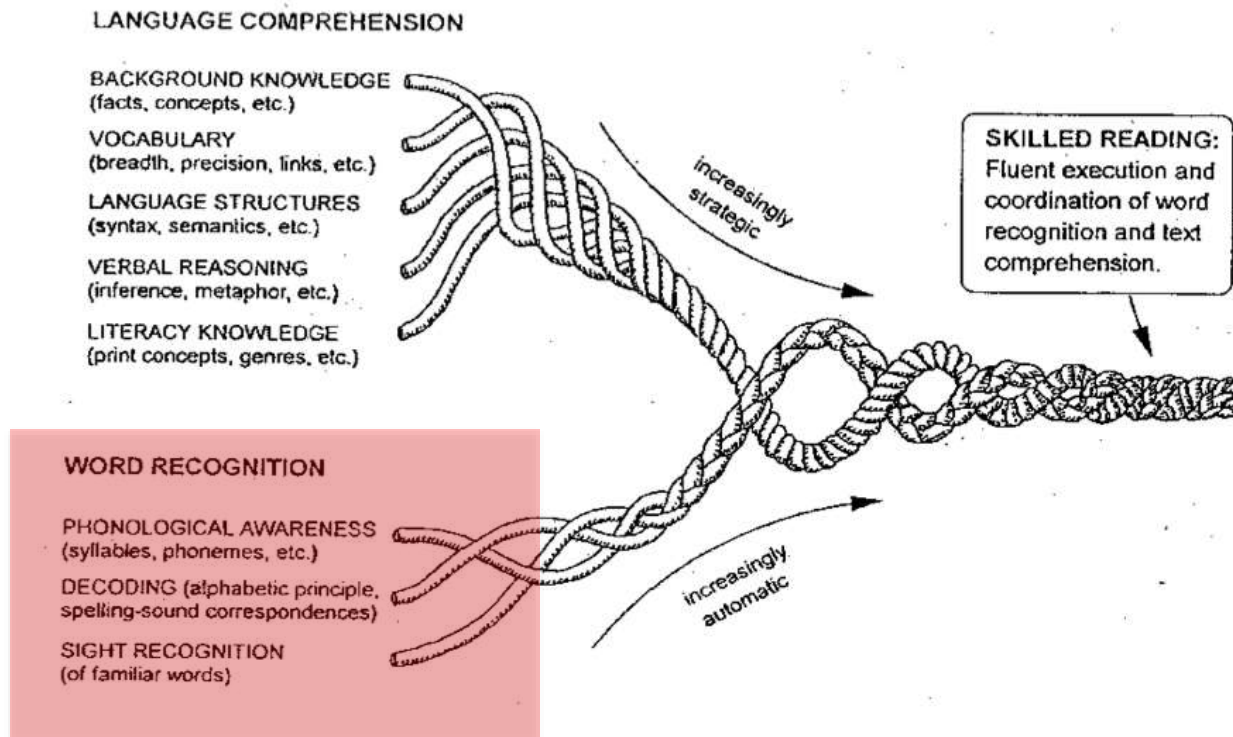
In Scarborough's terms

The Many Strands that are Woven into Skilled Reading (Scarborough, 2001)



We know a tremendous amount about the word recognition or “code” skills

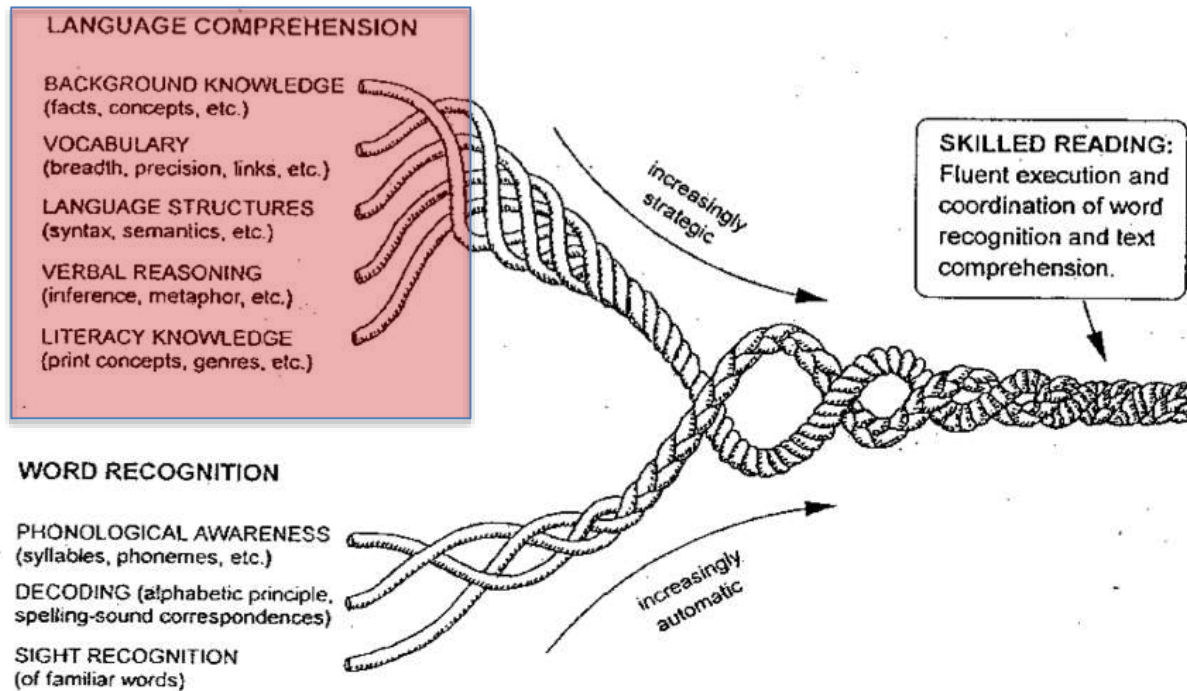
The Many Strands that are Woven into Skilled Reading
(Scarborough, 2001)



And they are critical for learning to read

We know far less about how to support language for reading

The Many Strands that are Woven into Skilled Reading
(Scarborough, 2001)



The Scientific Data show both direct and indirect relationships between language and reading

(NICHD ECCRN, 2002; Dickinson & Tabors, 2001, Lee, 2011, Grissmer, 2011, Munson et al; 2004, 2005; Storkel, 2001, 2003; Whitehurst & Lonigan, 1998, 2001; Silven et al., 2007; Dickinson, Golinkoff & Hirsh-Pasek, 2013)

Thus, as in the 30-million word gap

- Strong language builds strong reading
- And our science has taught us how to build strong language!

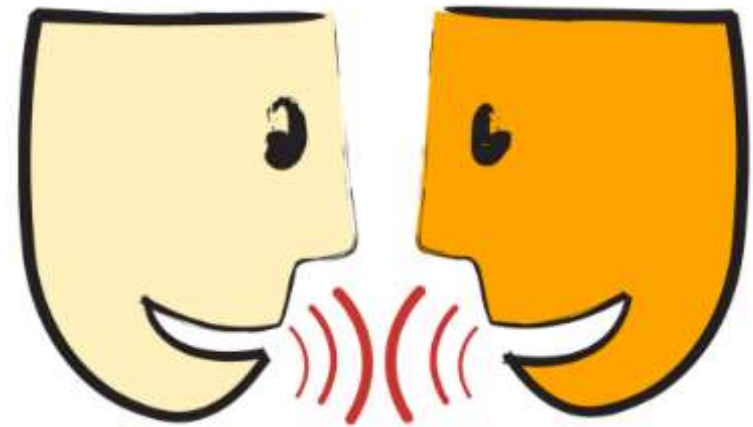


And finally, what about Early Learning?

- **High Quality early education demands that we include high quality talk.**
- **And that high quality talk includes having more conversations and asking more questions**

Our new secondary analyses of the NICHD Child Care data set suggests...

- That language at school entry is the single best predictor school outcomes (reading, math, social skills, later language) in grades 1 and 3
- And of gains in outcomes scores from Grades 1 to 3; 3 to 5



So today, let's talk about how to create high quality language environments for young children: A talk in 2 parts

- **6 Evidence-based principles of language learning that support reading**
- **Implications, outreach and policy**

A Talk in 2 parts

- **6 Evidence-based principles of language learning that support reading**
- **Implications, outreach and policy**



Distilling from the literature, we **boldly** (or was that tentatively) suggest 6 principles of language learning that can be used to enhance language outcomes and the foundation for reading for both monolingual and dual language learners

See Harris, Hirsh-Pasek et al. (2011) for a review; Konishi, et. al. (2014)

The 6 principles

1

Children learn what they hear most

2

Children learn words for things and events that interest them

3

Interactive and responsive environments build language learning

4

Children learn best in meaningful contexts

5

Children need to hear diverse examples of words and language structures

6

Vocabulary and grammatical development are reciprocal processes

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Children learn
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The Evidence

- **Amount matters**
 - Hart & Risley (1995)
- **Amount of speech is important for statistical learning**
 - (Saffran et al., 1996)
- **Amount of speech is important for speed of processing**
 - (Fernald, 2009; Weisleder & Fernald, 2013)

1996: Saffran, Aslin & Newport

The amount of language you hear matters because babies do statistical learning on the input they hear to find patterns of sounds and words!



Fernald (2009): Amount matters because it increases processing speed!

See also Weisleder and Fernald (2013)

Enter “looking while listening”

Looking-while-Listening procedure



Fernald, Zangl, Portillo, & Marchman (2008)

18 months: Distracter-to-Target shift



24 months: Distracter-to-Target shift



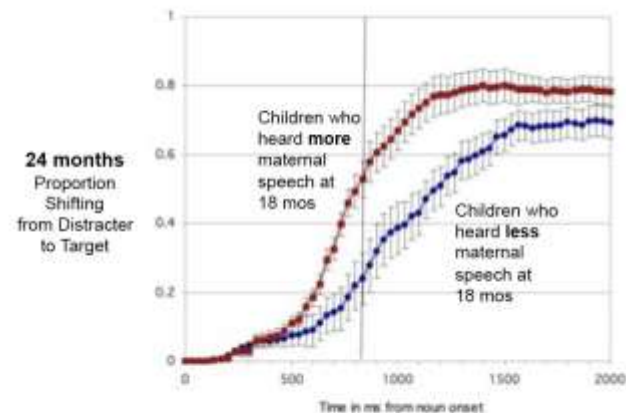
The **amount** of input also affects processing efficiency!

Does input affect *processing efficiency* as well as vocabulary growth?

- Children of mothers who talked with them more heard:
 - 7 times more words
 - 3 times more different words
 - Sentences twice as long
- Children of mothers who talked more at 18 mo had **larger vocabularies at 24 mo** AND **increased more in processing speed**
[controlling for differences in CDI & RT at 18 mo]

Hurtado, Marchman, & Fernald (2008)

Results: Input affects uptake!



Hurtado, Marchman, & Fernald (2008)

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The Evidence?

Children learn words for things and events that interest them

- **L. Bloom's Principle of Relevance**
- **Babies attach labels to interesting not boring objects**
 - Pruden, Hirsh-Pasek, Golinkoff & Hennon (2006)
- **Evidence from babies and toddlers in joint attention**
 - Akhtar, Dunham & Dunham (1991); Tomasello & Farrar (1986)

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What counts as sensitive and responsive interactions?

- Talking *with* not talking *at*
- Expanding on what the child says and does
- Noticing what the child finds interesting and commenting
- Using a label that goes with what you are looking at
- Asking questions rather than just making demands

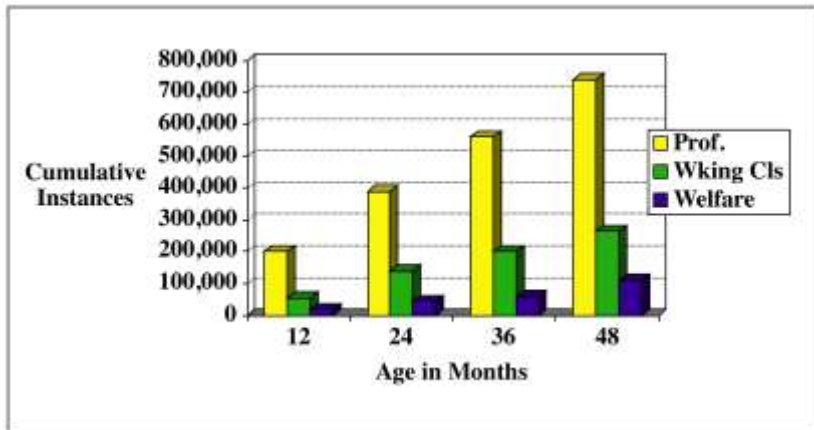
Learning from 10-week old Ellie



Evidence 1: Back to Hart and Risley

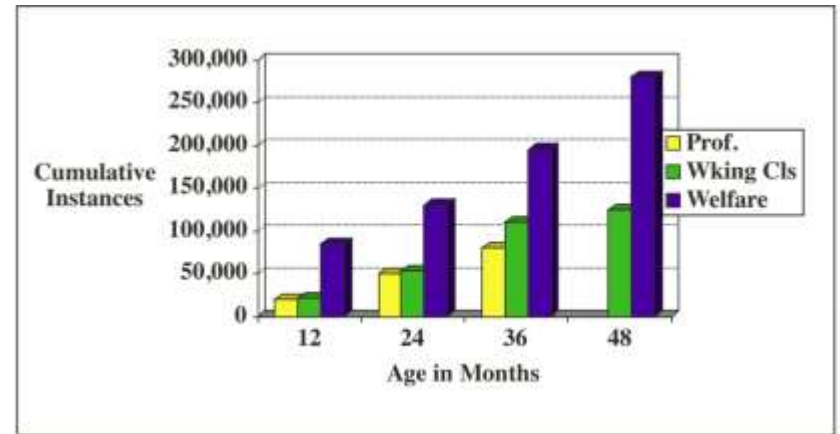
Encouragements

(Praising, Affirmations)



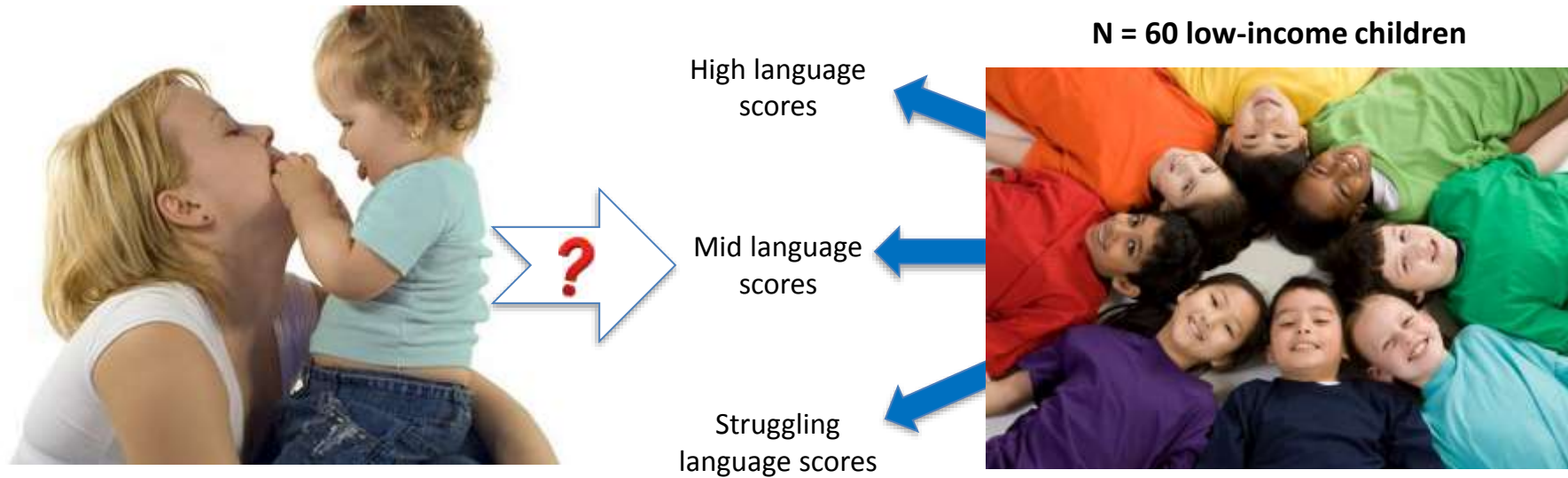
Discouragements

(Prohibitions, negative evaluations)



There is wide variability in the sensitivity and responsivity parents show to child language

Evidence 2: Examining the quality of a Foundation for Communication during parent-child interaction

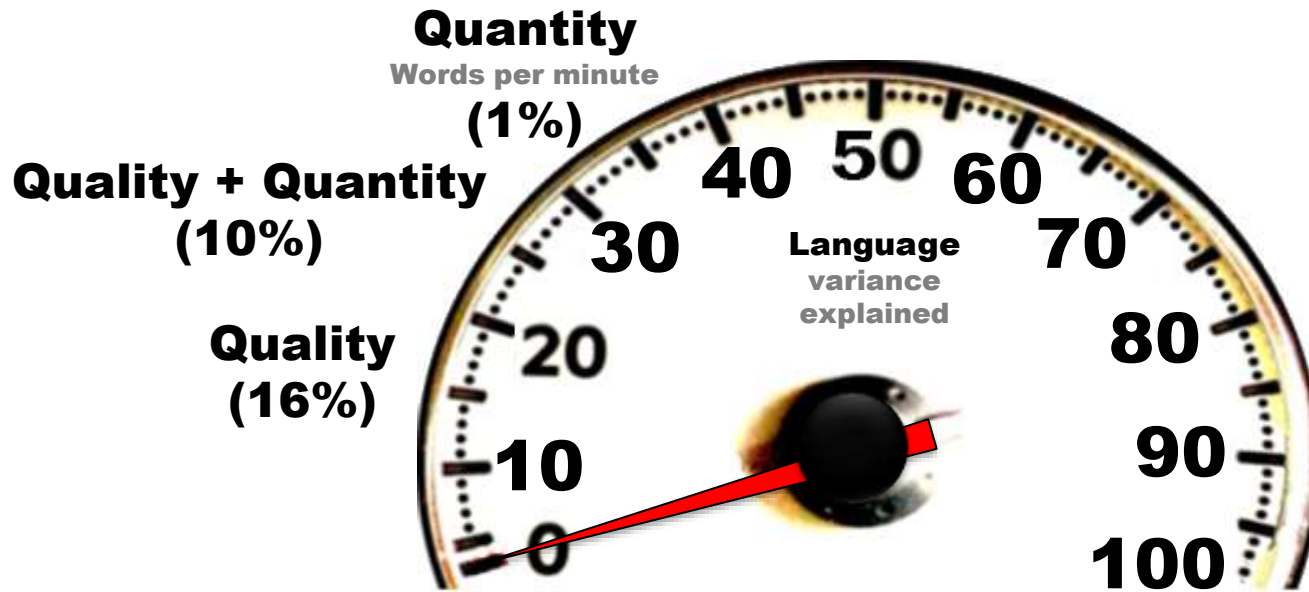


Quality =

- 1) Symbol infused joint engagement (gesture and words)**
- 2) Fluid and connected exchanges (verbal and non-verbal)**
- 3) Playful routines and rituals**

Quantity = number of mother's words per minute

Findings and Implications



1. Quantity of input (amount) and Quality of Foundation for Communication are both important for language growth but “communication foundation” matters more.
2. In our study, it’s not about poverty.
3. Fluid and connected conversations – “Conversational duets” require serve and return, and return and return and return. ...it can’t be a solo performance.
4. It’s “filling the gap” + “building the foundation” – a new metaphor for intervention

Evidence 3: Focus on Hirsh-Pasek & Burchinal (2005) using the NICHD ECCRN Database

Figure 1: Child experienced *maternal* sensitivity: Trajectory groups

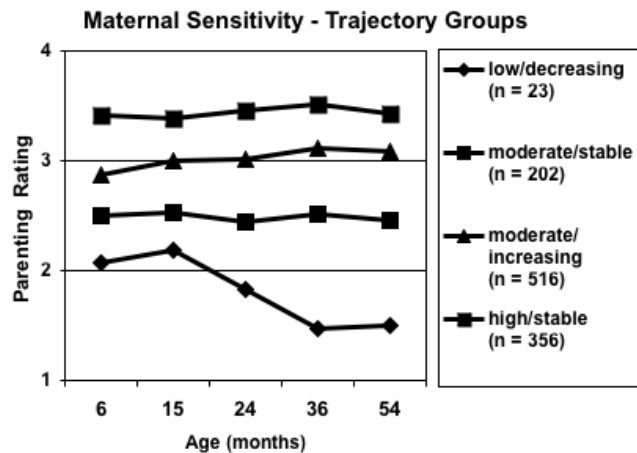
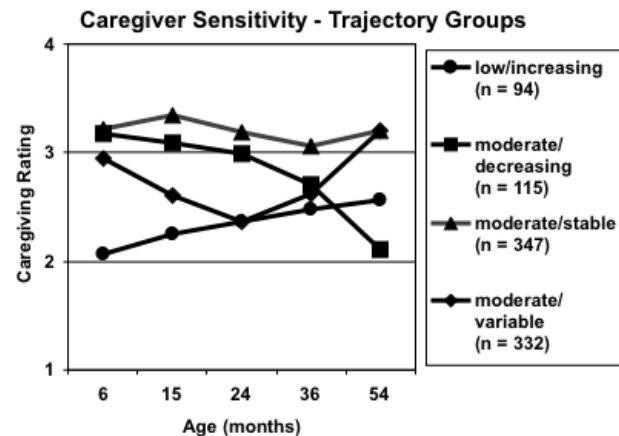


Figure 2: Child experienced care provider sensitivity: trajectory groups



The type of sensitivity pattern children experienced over time related to 54 month outcomes in language and in academic achievement (e.g., reading).

Evidence 4: Video chats vs. TV

Roseberry, Hirsh-Pasek and Golinkoff (2014)

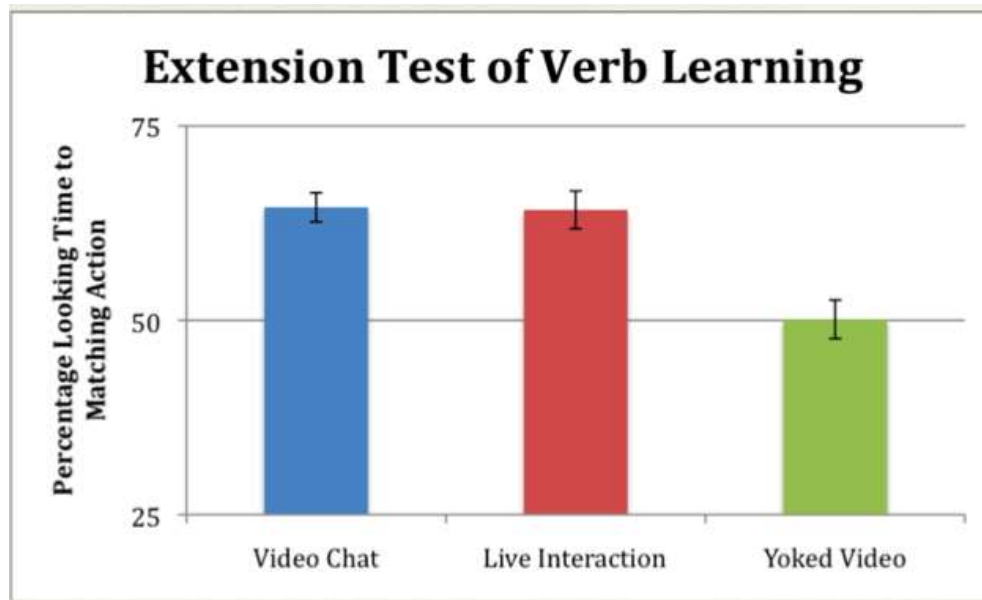
Word learning in 24- to 30-month-olds using:

- **Video Chat Training**
 - (responsive and contingent but 2D)
- **Live Interaction Training**
 - (responsive and contingent 3D)
- **Yoked Video Training**
 - (a pre-recorded video not responsive or contingent)



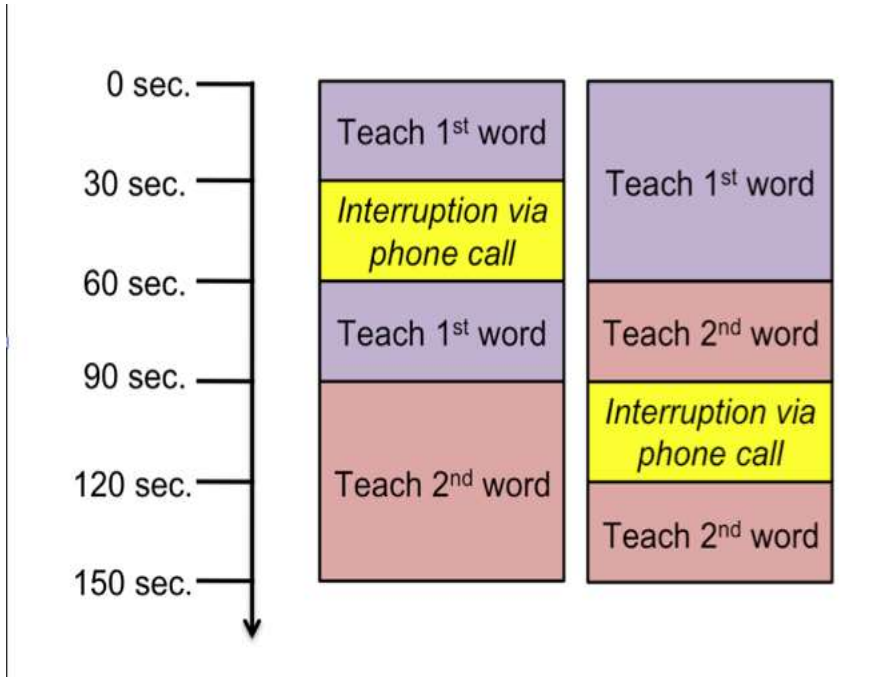
Results – How did children respond to video chats compared to live interactions?

Learning from video chats was more like LIVE than like TV



Example 5: The cell phone study

And what happens to word learning when we BREAK the interaction?



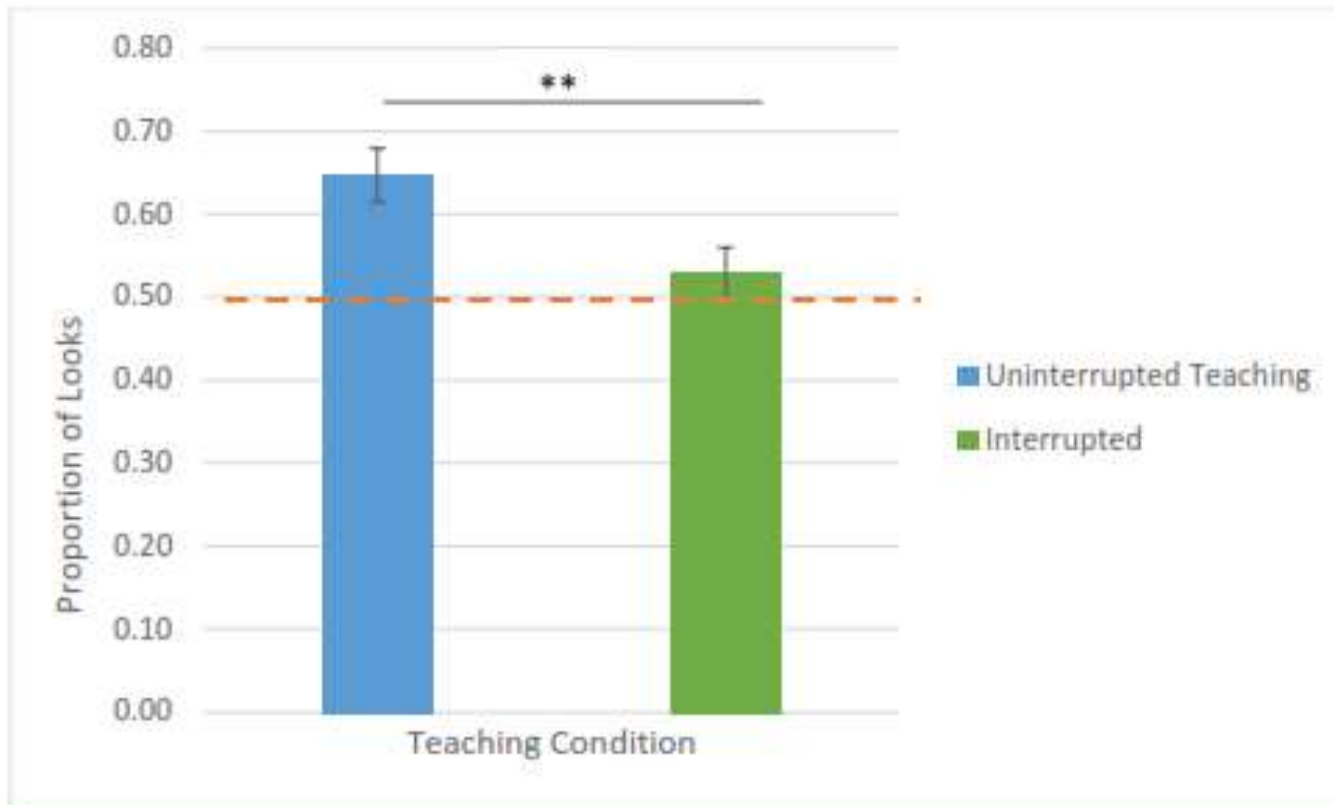
The interruption condition





Results?

Jessa Reed



Note: ** $p < 0.01$. Only the *uninterrupted teaching* condition is significantly different from chance, $t(36) = 4.56$, $p < 0.001$.

And new data continues to flow in on the importance of contingency....

Pediatrics
September 2018
Article

Language Experience in the Second Year of Life and Language Outcomes in Late Childhood

Jill Gilkerson, Jeffrey A. Richards, Steven F. Warren, D. Kimbrough Oller, Rosemary Russo, Betty Vohr

CONCLUSIONS: These data support the hypothesis that early talk and interaction, particularly during the relatively narrow developmental window of 18 to 24 months of age, can be used to predict school-age language and cognitive outcomes. With these findings, we underscore the need for effective early intervention programs that support parents in creating an optimal early language learning environment in the home.



RESEARCH ARTICLE

A year in words: The dynamics and consequences of language experiences in an intervention classroom

Lynn K. Perry^{1*}, Emily B. Prince¹, Adriana M. Valtierra¹, Camila Rivero-Fernandez¹, Mary Anne Ollery², Lynne F. Katz^{1,2}, Brett Laursen³, Daniel S. Messinger^{1,4,5,6}

...language input from peers was positively related to children's in-class language use, both in-the-moment and over the course of each day, as were the number of conversational turns in which children and teachers engaged. Both peer input and conversational turns with teachers were also positively related to children's language development rates, as indexed by increases in vocabulary size.

In fact, this new data suggests that conversations (contingency) are critical for brain growth!



Romeo

- New data by Romeo et al. (2018) shows that contingent interactions (but not the quantity of interactions) actually changes brain activation in Broca's area for 4 to 6 year olds.

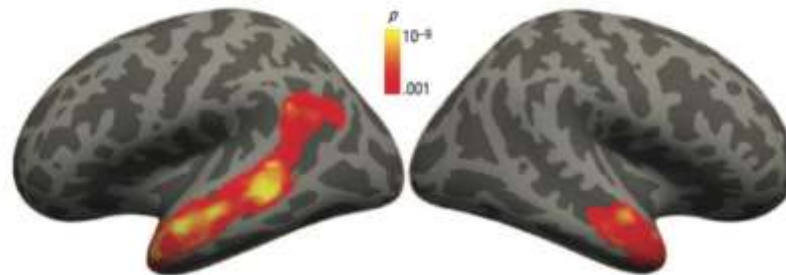


Fig. 4. Regions where activation was significantly greater while listening to forward speech than backward speech, averaged across all participants. Clusters include the whole of the left superior temporal sulcus and the anterior portion of the right superior temporal sulcus.

And that...



Kim Noble

- Early conversations at home for 5 to 7 year olds partially explained disparities in language supporting brain structure and in turn in reading skills.

Merz, et al. 2019

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Vocabulary and grammatical development are reciprocal processes

The evidence: Children learn best in meaningful contexts

Children learn richer vocabulary in playful learning where the information is meaningful than they do in direct instruction methods devoid of meaningful engagement.

- Studies on shape learning with 4-year-olds
 - Fisher, Hirsh-Pasek, Newcombe & Golinkoff (2013)
- Spatial language through block play with 4-year-olds
 - Ferrara, Hirsh-Pasek, Newcombe, Golinkoff, & Lam (2011)



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The Evidence: Children need to hear diverse examples of words and language structures

- **Amount and diversity of verbal stimulation (and gesture-gesture/gesture word combinations) fosters early and rich language outcomes**
 - Beebe, Jaffee & Lachman (1992); Snow (1986); Tamis-LeMonda & Song (2012); Rowe (2012); Goldin-Meadow et al. (2014)
- **Children's vocabulary performance in kindergarten and later in second grade related to occurrence of sophisticated lexical items at age 5, predicted 50% of the variance in children's second grade vocabulary**
 - Weizman & Snow (2000); Huttenlocher et al. (2002)

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The Evidence:

Vocabulary and grammatical development are reciprocal

- **Words and grammar are “developing in synchrony across the first few years of life”**
 - (Conboy & Thal, 2006; p.209)
- **In a bilingual sample, the amount of English words predicts English grammar and amount of Spanish words predicts the onset of Spanish grammar**
 - (Conboy & Thal, 2006)
- **There is a reciprocal relationship between words and grammar: sometimes grammar allows children to learn words**
 - (Naigles, 1990; Gillette, Gleitman, Gleitman & Lederer, 1999; Imai, Li, Haryu, Hirsh-Pasek, Golinkoff, & Shigematsu, 2008; Fisher & Song, 2006)

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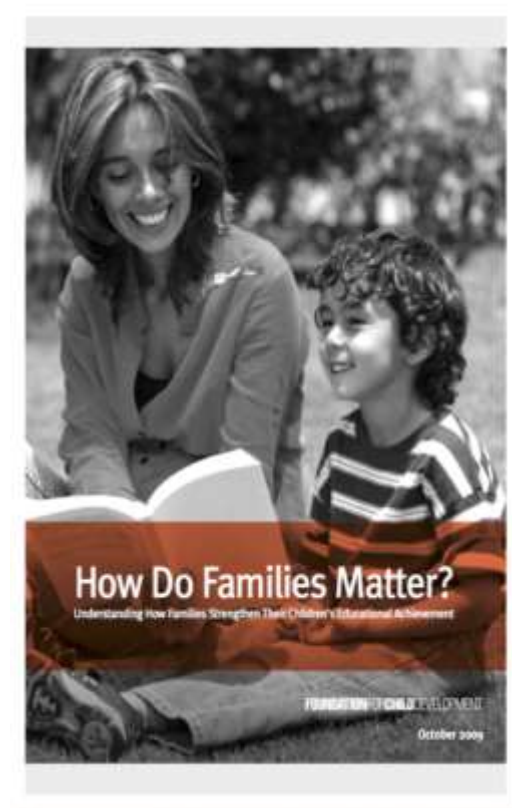
Vocabulary and grammatical development are reciprocal processes

And these hold whether you are learning one language or two!

A Talk in 2 parts

- 6 Evidence-based principles of language learning that support reading
- **Implications, outreach and policy**

The practical challenge: The 6 Principles in practice



Three Mothers and an Eggplant

Foundation for Child Development (2009)



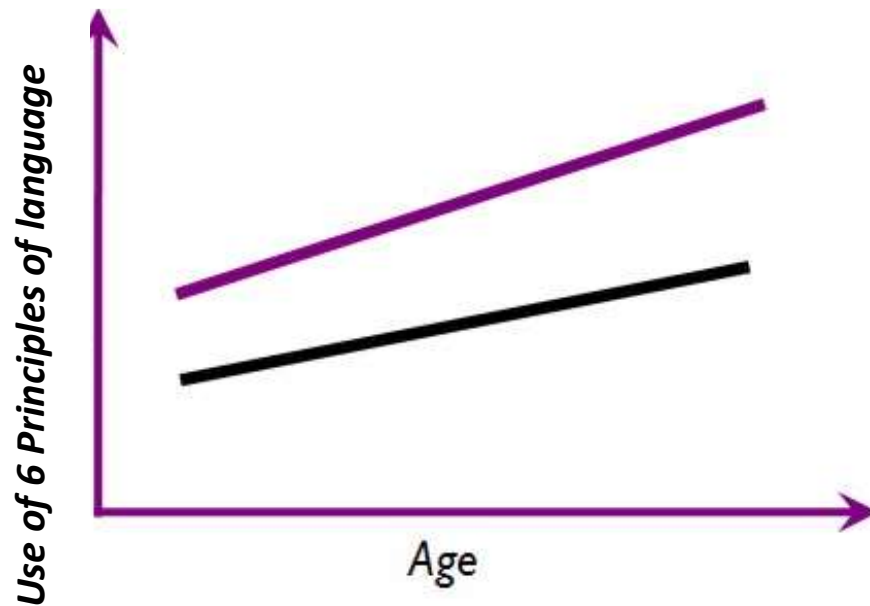
The 6 Language principles in two language styles

	Mother 3	Mother 1
✓ Children learn what they hear most	• yes	no
✓ Children learn words for things and events that interest them	• yes	maybe
✓ Interactive and Responsive environments build language learning	• yes	no
✓ Children learn best in meaningful contexts	• yes	no
✓ Children need to hear diverse examples of words and language structures	• yes	no
✓ Vocabulary and grammatical development are reciprocal processes	• yes	maybe

Can we help parents and teachers become more like mother 3?



We need to systematically manipulate the 6 principles, and change language trajectories for young children by starting early



Language strategies are learnable and malleable!

(Dickinson, Hirsh-Pasek & Golinkoff, 2012)

Three examples of language change
at the:

Family level

The Classroom level

The Community level

The Duet Project

EARLY ENGAGEMENT FUTURE SUCCESS

With...Lauren Adamson, Roger Bakeman, Margaret Owen, Roberta M. Golinkoff

A Community-Based Participatory Research where we are working with the Maternity Care Coalition to design a new evidence-based intervention for families

https://drive.google.com/file/d/0B-_ula1gTtWYcjVvSXg3NmdUSUU/view



Amy Pace



Rebecca Alper



Rufan Luo



Lillian Masek

DUET Mission and Goals

Mission:

Strengthen the developing communication foundation to enhance and predict language learning and school readiness outcomes.

Goals:

- 1. Foster Awareness/Knowledge**
- 2. Empower Caregivers**
- 3. Increase Quality/Quantity of Interactions**
- 4. Improve Outcomes – Language and School Readiness**

What are you pointing at, Ashley?



Oatmeal!



9

You're right, Ashley! These are all oatmeal. Oatmeal has so many different flavors. Which one would you like?



Oatmeal!



10

Ashley, show me which one you want.

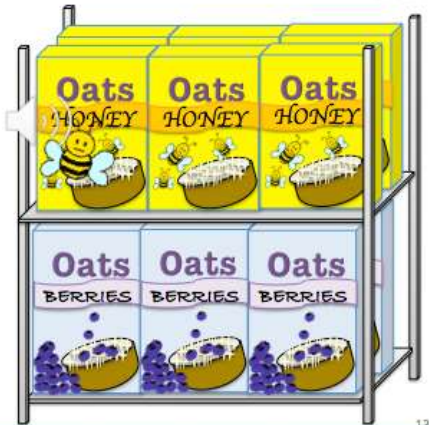


11

That's a bee. This is the honey flavor, because honey is made by bees. Say "bee".

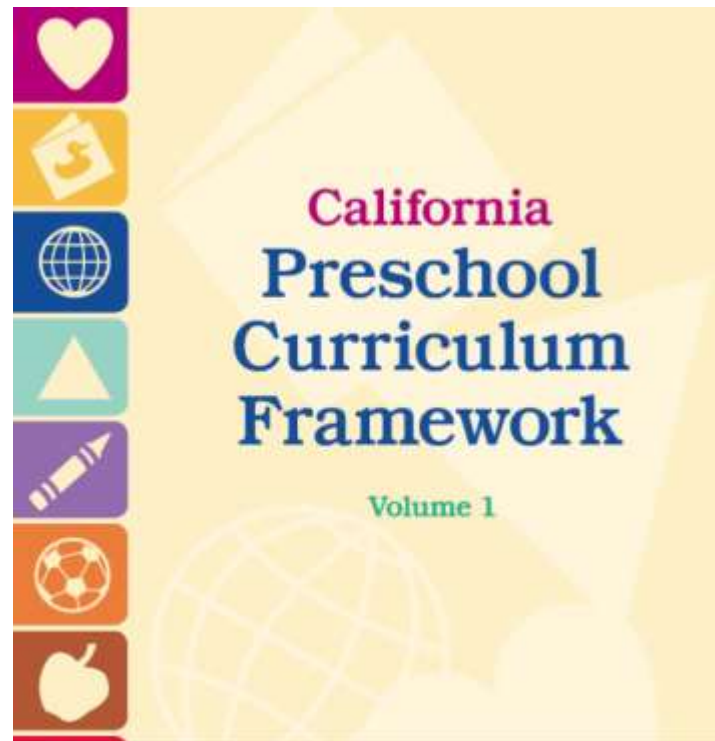


Bee



13

The California Preschool Curricula allowed us to share these principles in the classroom

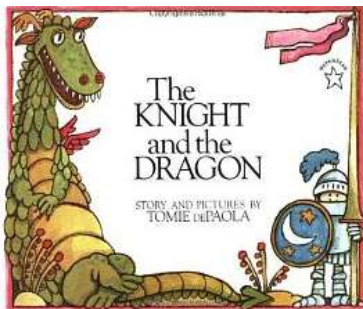


Our research also suggests ways that we can increase vocabulary learning as children learn to read.



Photo from Sheryl Ann Crawford

Adult reads children a book like *The Knight and the Dragon* while highlighting new words (e.g., galloping, shield)



Free play

Directed play

Guided play

No focus, dialogue;
meaning-making; child
initiated and directed

Targeted focus with more closed
questions; adult initiated and
directed, meaning-making

Targeted focus with more open
ended questions; adult initiated,
child directed, meaning-making

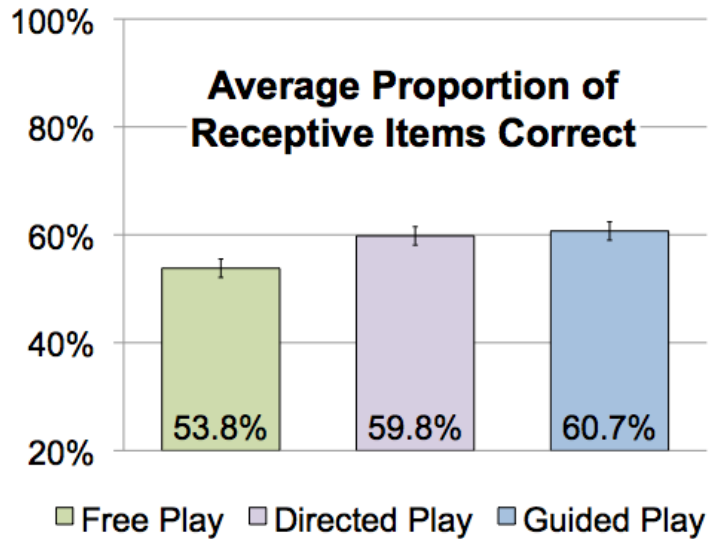
Results?

Children did better post than pre in all conditions

Adult supported play was better than free play in all conditions!

Book reading + adult supported play was also better than book reading plus fun flash cards!

Bottom line? When there is a learning goal – adult supported play (guided or directed) helps children learn!



In our most recent findings....

- We used different play activities – singing, large and small group games, drama and digital.
- Our kids learned target vocabulary as well in all of the play condition as they did in the reading condition!

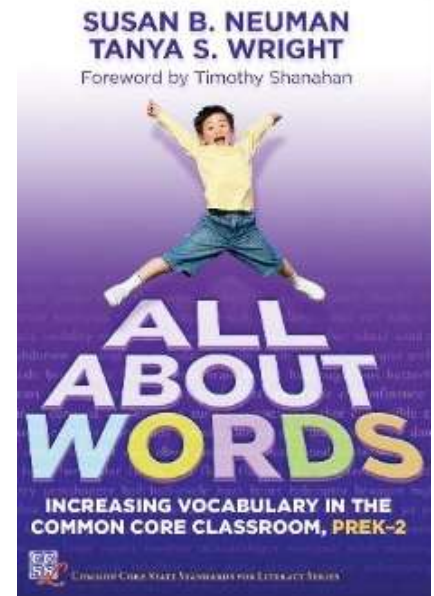
Our research and others suggests that teachers matter and can increase children's language and gesture as they learn about....

- The world

- *All About Words: Increasing Vocabulary in the Common Core Classroom, Pre-k Through Grade 2* (Teachers College Press, 2013)

- And about subjects like space and number:

- Around, on top of...
- 4, 12 or even “counting on”



Goldin-Meadow et al. (2014);
Huttenlocher et al. (2002)

We are also create more quality talk by using the 6 principles to have conversations in the community



Example 1: The Ultimate Block Party

- 28 science inspired activities in Central Park, NY in 2010
- Over 10 million people reached; 50,000 at event itself!
- Results showed increase in parents' attitudes to the play-learning connection, which is a vital component in public awareness. (Grob, Schleisinger, Hirsh-Pasek & Golinkoff, 2017).



Example 2: The Supermarket Study

Ridge, Ilgaz, Weisberg, Hirsh-Pasek & Golinkoff (2015)

- Can the introduction of signs in a supermarket increase caregiver child language interactions?
- Signs up and signs down in middle and low income area supermarkets
- Results show a 33% increase in caregiver - child language when the signs were up in low income neighborhoods.



Example 3: Urban Thinkscape



URBAN THINK SCAPE
TRANSFORMING CITYSCAPES INTO
OPPORTUNITIES FOR PLAYFUL LEARNING



Funding by:



Hassinger-Das, Bustamante, Hirsh-Pasek & Golinkoff, (2018), Bustamante et al., 2019

Results show increases in targeted language interactions of 30% or more



Example 4 Parkopolis

- The Human Sized Board Game designed to foster early mathematical skills and scientific reasoning.



Thanks to Fei Xu, Silvia Bunge and all of our mathematic colleagues!

Results show 47 to 79% more math talk!

Example 5: Playbrary (Free Library Play and Learn)

- Can we even change a library to enhance playful learning and conversation? You bet.
- Initial results show increased interaction among adults and kids that is filled with number and spatial language, less looking at cell phones
- Three-fold increase in library cards and visits





This project is designed to use our science to create more conversations through playful learning cities!

- **With pilots now in Philadelphia, Seattle, Chicago, Tulsa and Johannesburg, South Africa**
- **We are testing a new kind of dissemination that can be used in public spaces and in "trapped spaces" like waiting rooms, supermarkets, laundromats, etc. Places where people wait and where we might increase the contingent conversations in ways that reduce the achievement gap**
- **All through playful learning that speaks to how families use the 80% of their child's waking time when she is not in school or care.**



<https://player.vimeo.com/video/275917850>

Finally, **accountability** is key.

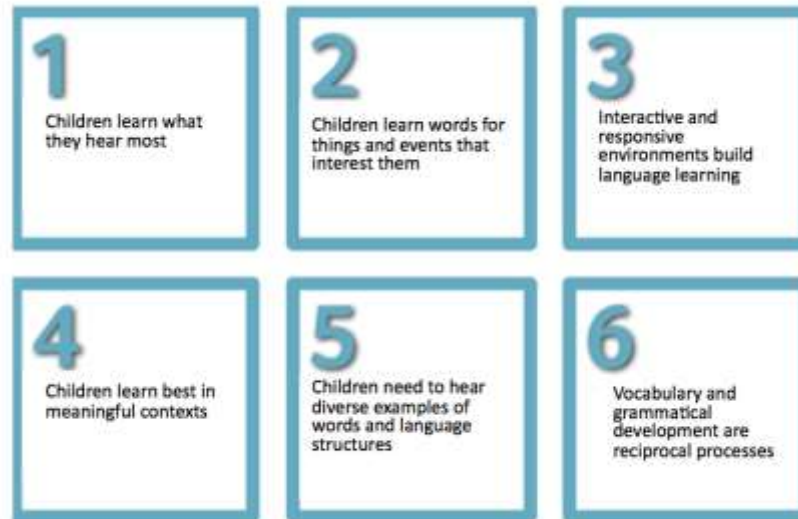


A 15 minute, evidence-based, self-scoring computerized screener that examines known words and grammar, as well as how well children learn language! For children 3-5 – In English and Spanish! Quilscreener.com

Golinkoff, Hirsh-Pasek, de Villiers, Iglesias & Wilson (2017)

The bottom line?

If we build a strong foundation in language, by using the 6 principles in our classrooms, our homes and in our communities,



We can:

Reduce the 30-million word gap

Help children be ready to read by age 5

Increase the quality of the nations preschools



And we can measure our progress!

What might this mean for policy? A few thoughts

- **0-3:** Start early! We need more programs for **zero to 3** if we are to boost the language foundations for school readiness. Preschool is a little late
- **L²:** Think LANGUAGE and literacy not just the 3Rs
- **Home visiting:** Support high quality, language rich home visiting
- **Learning is everywhere:** Not just in schools but in communities
- **> Human to human < screen to human:** especially for younger children
See also new report by Reboot that using more screens in primary schools is not related to better school outcomes: <https://reboot-foundation.org/does-educational-technology-help-students-learn/>

All of these stem from one key idea: We must create environments that encourage folks to engage in language rich conversations



That is how high quality language primes high quality learning!

Thanks to....

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