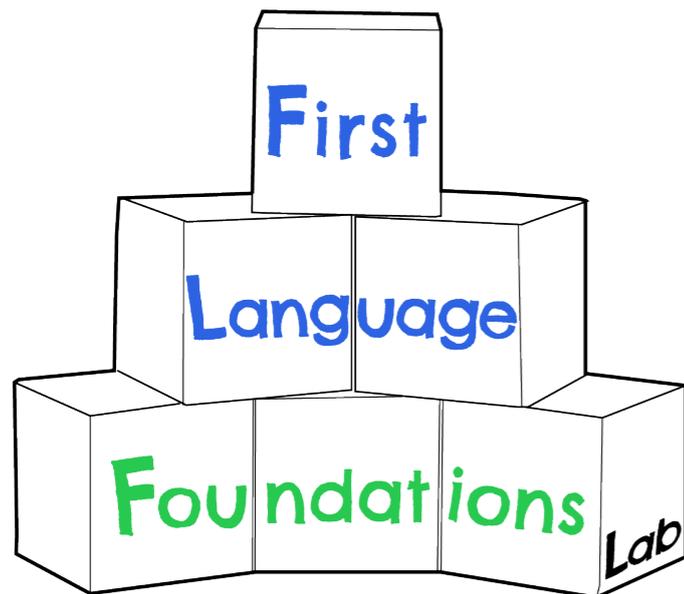


What do you mean, 'language deprivation'?

Matthew L. Hall, Ph.D.

Dept. of Communication Sciences & Disorders

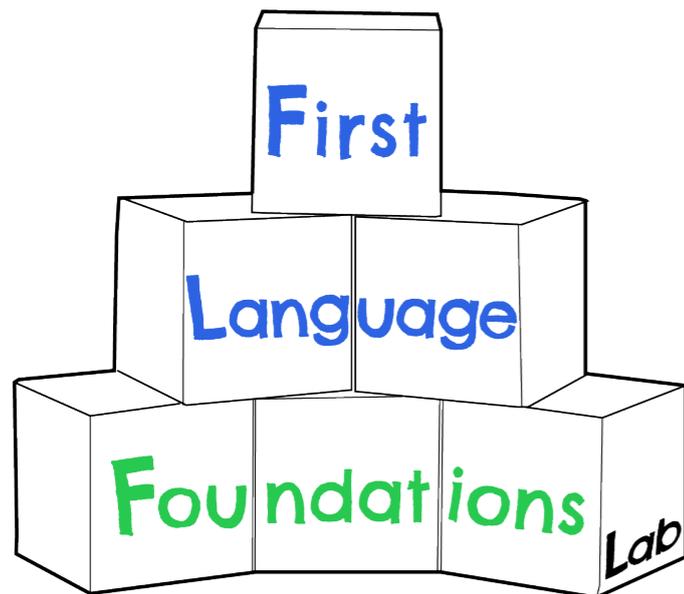


College of Public Health

What do you mean, 'language deprivation'?

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College of Public Health

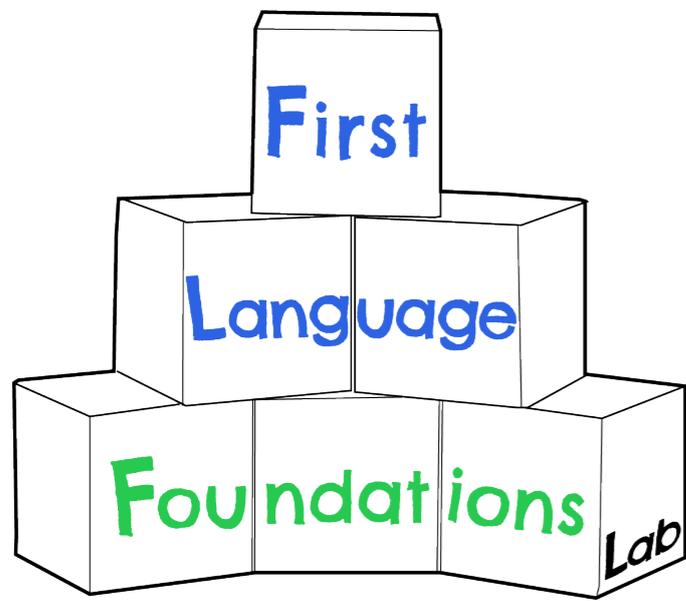
About Me



College of Public Health

- **UC San Diego:** PhD, Cognitive Psychology (2012)
- **UConn:** National Research Service Fellowship, Linguistics (2013-2016)
- **UMass Dartmouth:** Assistant Professor, Applied Developmental Psychology (2017-2019)
- **Temple University:** Assistant Professor, Communication Sciences & Disorders (2019-present)



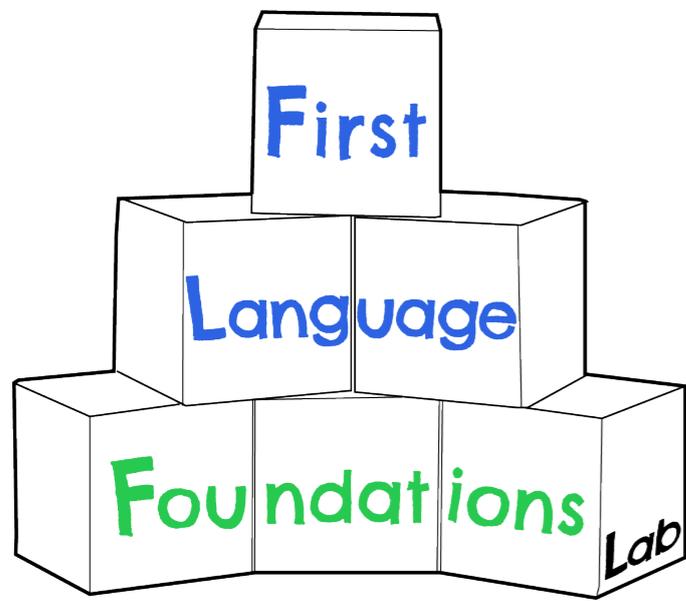


Mission



College of Public Health

Maximizing the developmental potential of d/Deaf and hard-of-hearing children through theoretical and applied research.

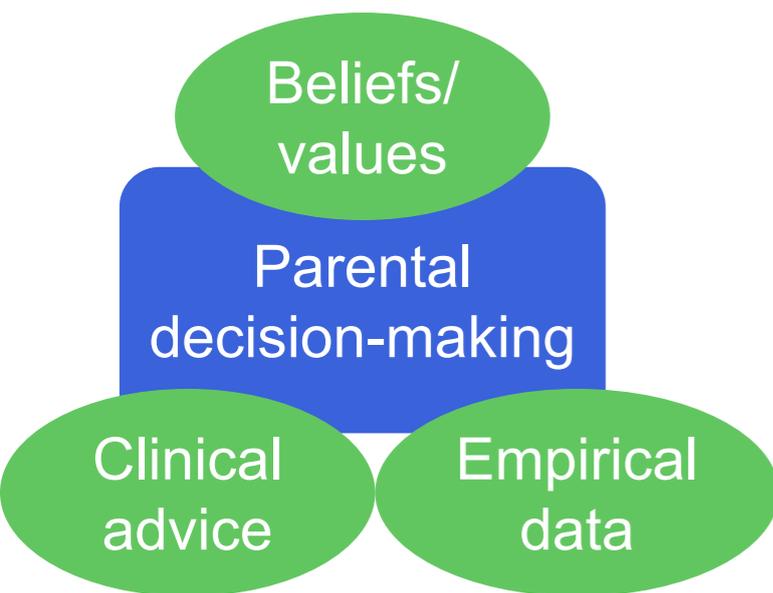


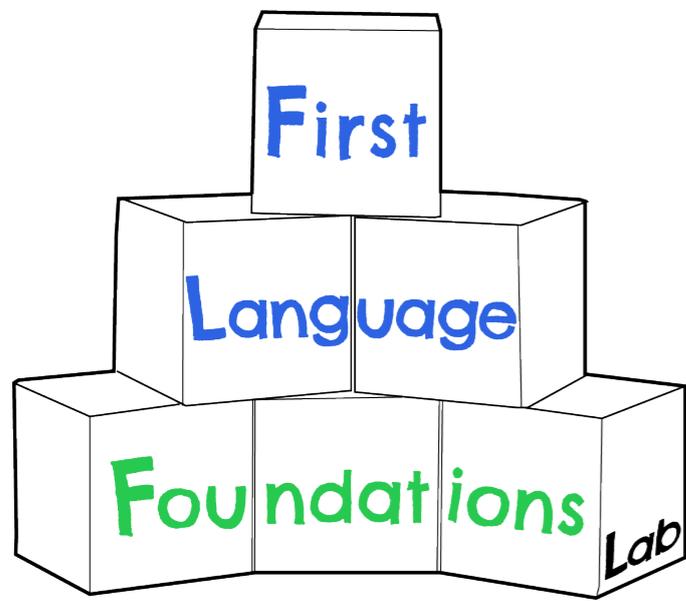
Mission



College of Public Health

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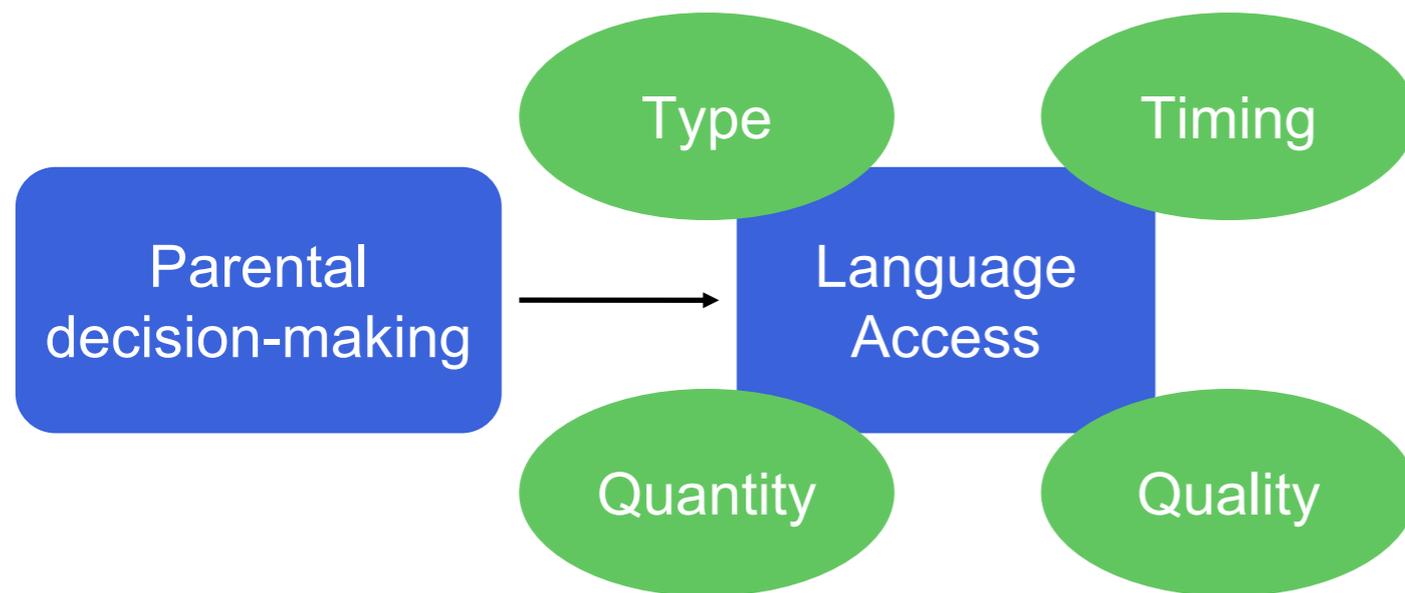


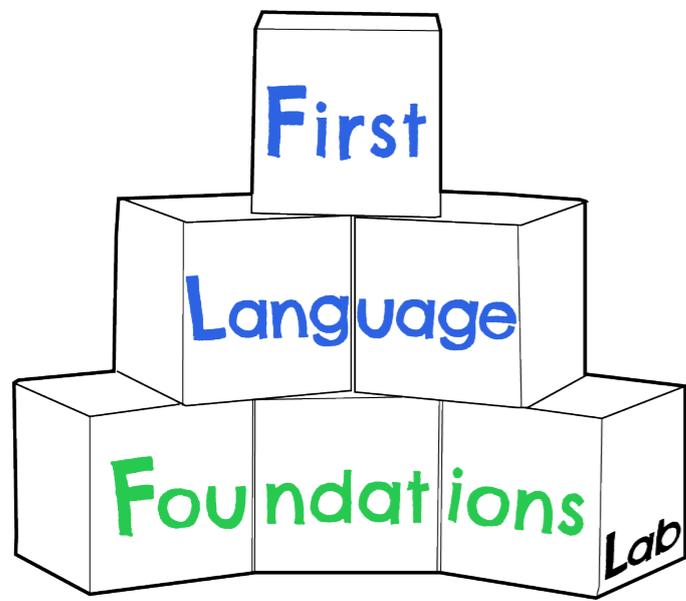
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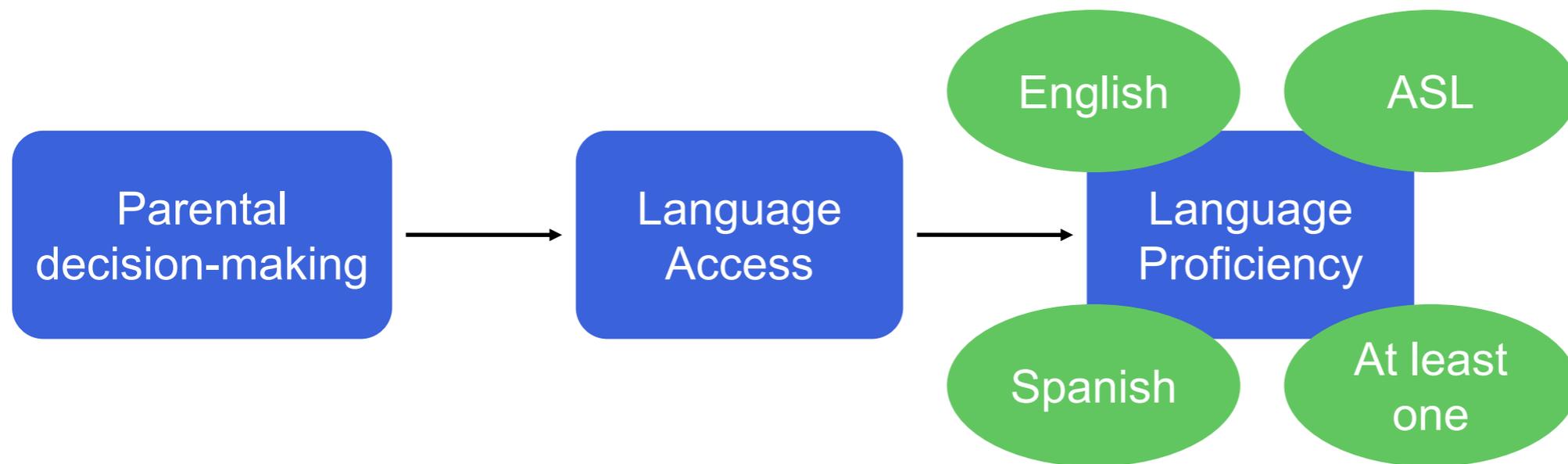


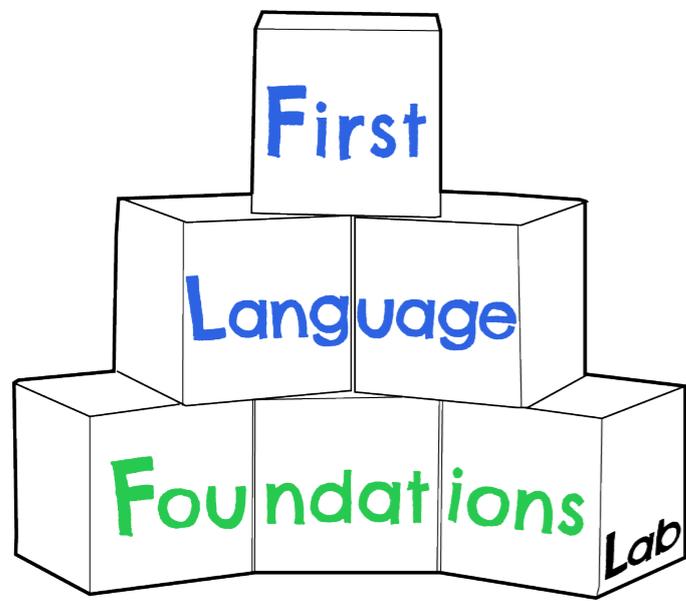
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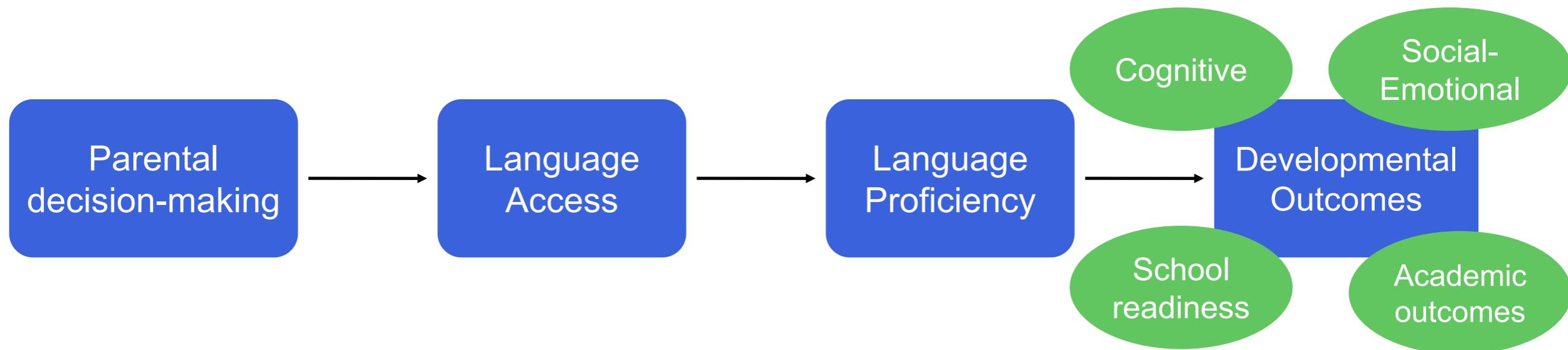


Mission

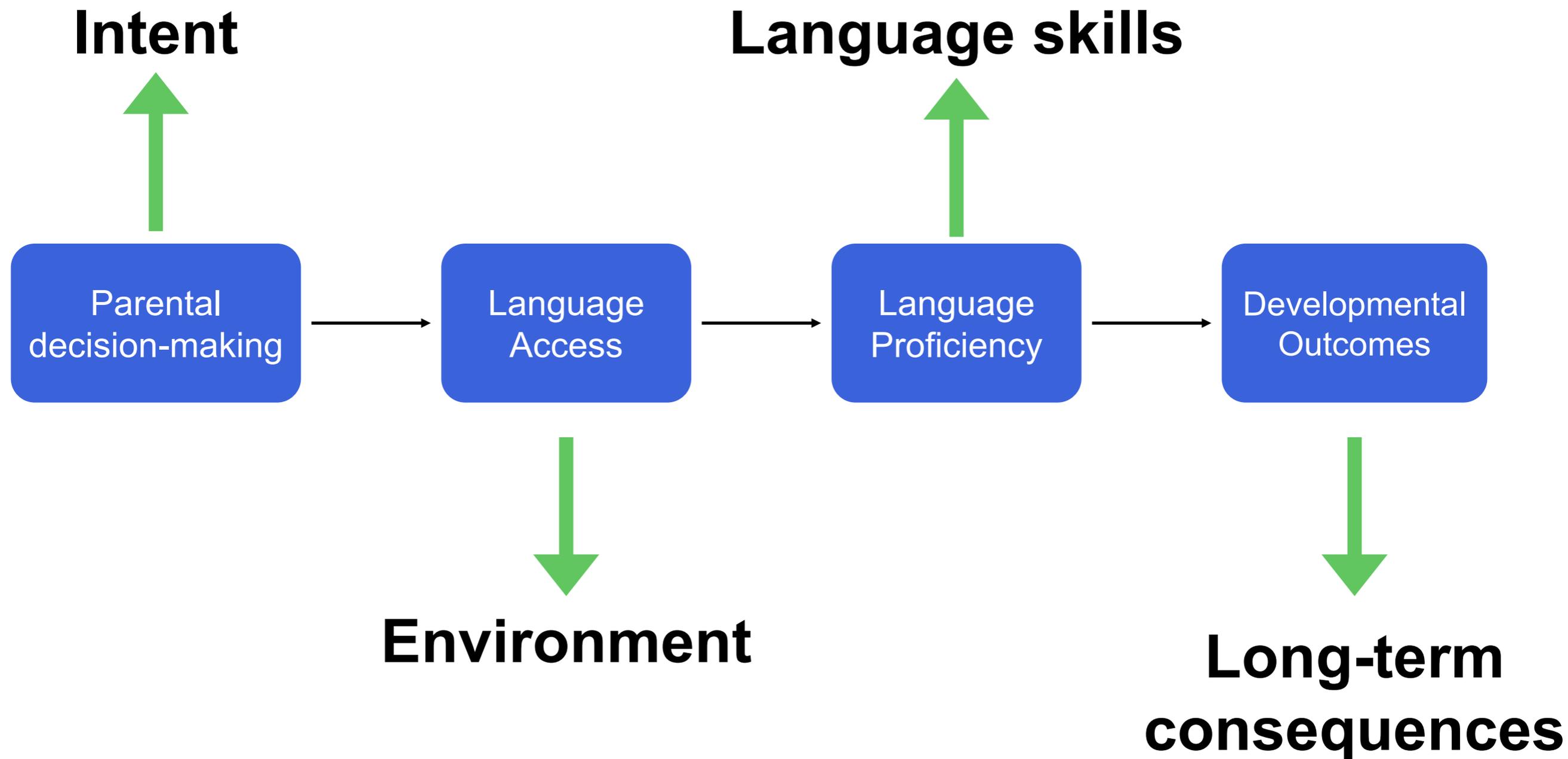


College of Public Health

Maximizing the developmental potential of d/Deaf and hard-of-hearing children through theoretical and applied research.

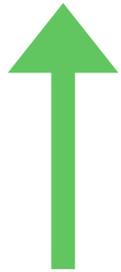


Language Deprivation



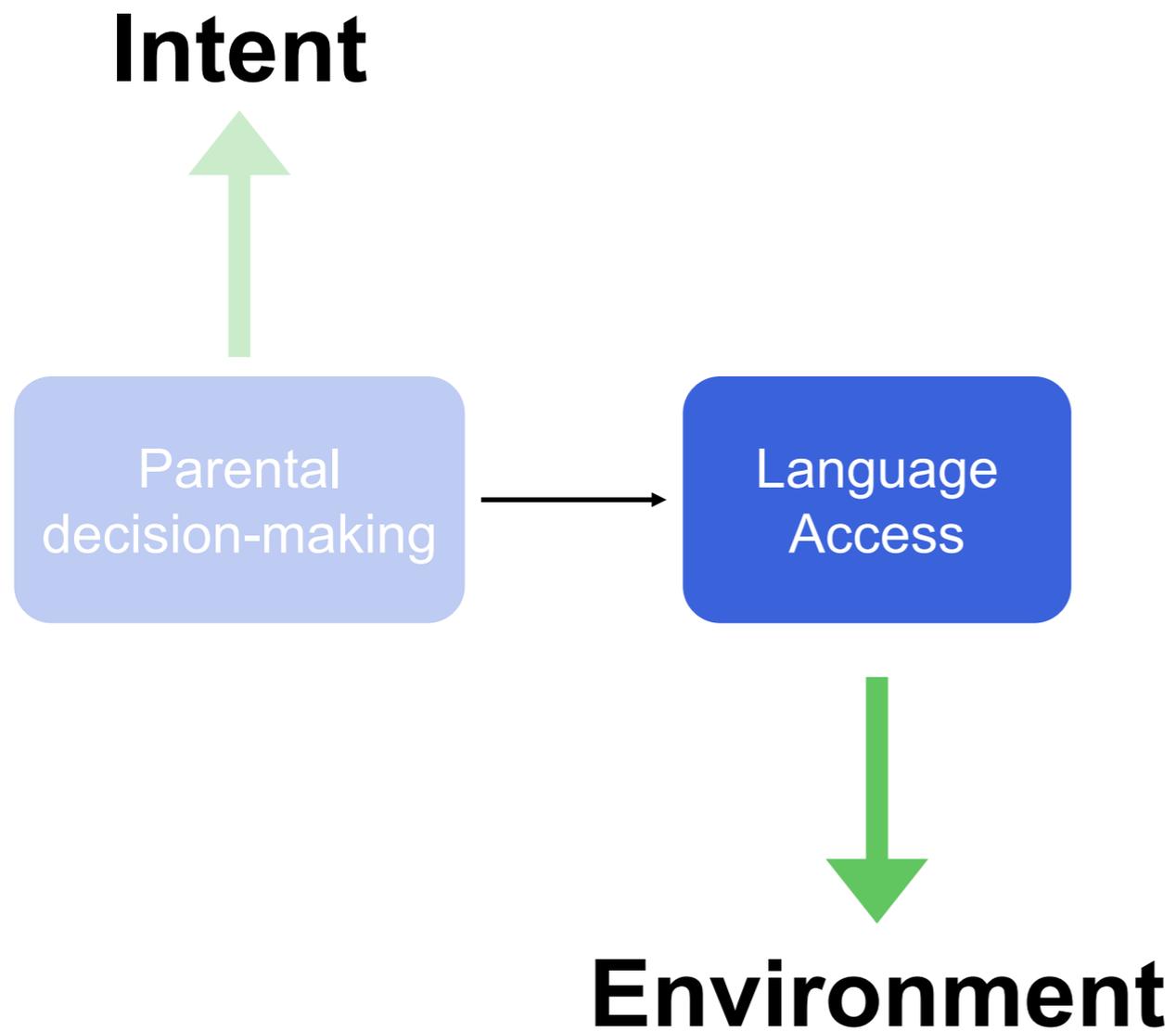
Language Deprivation

Intent

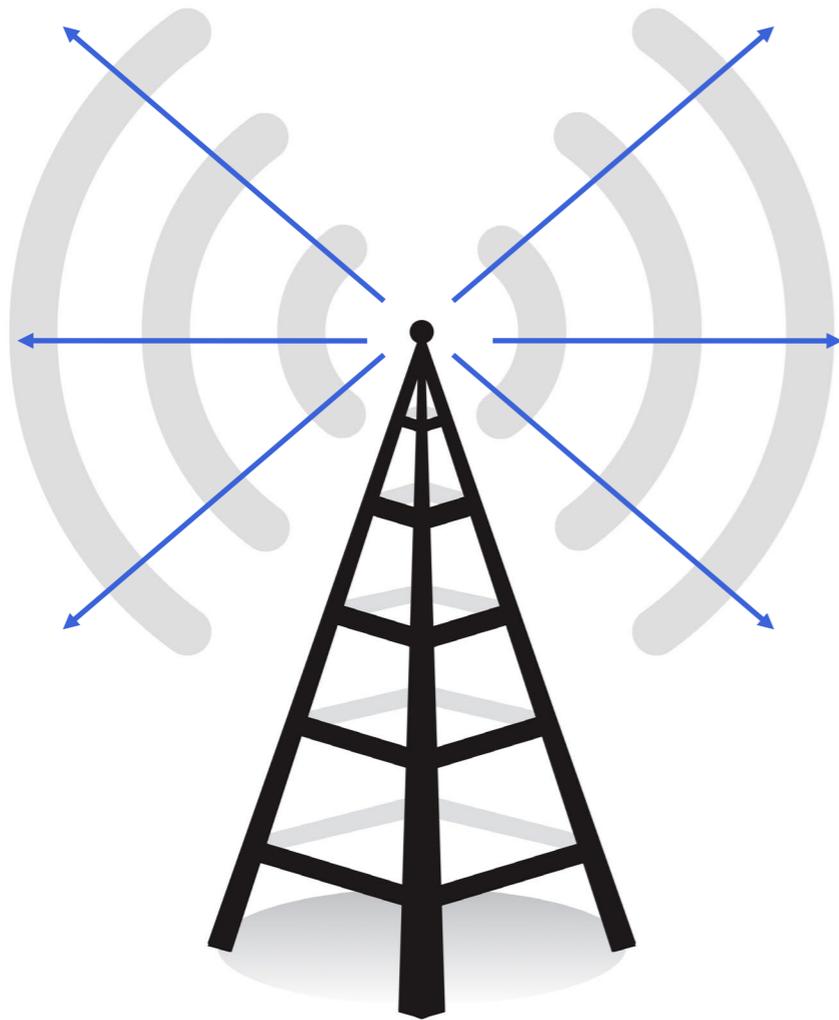


Parental
decision-making

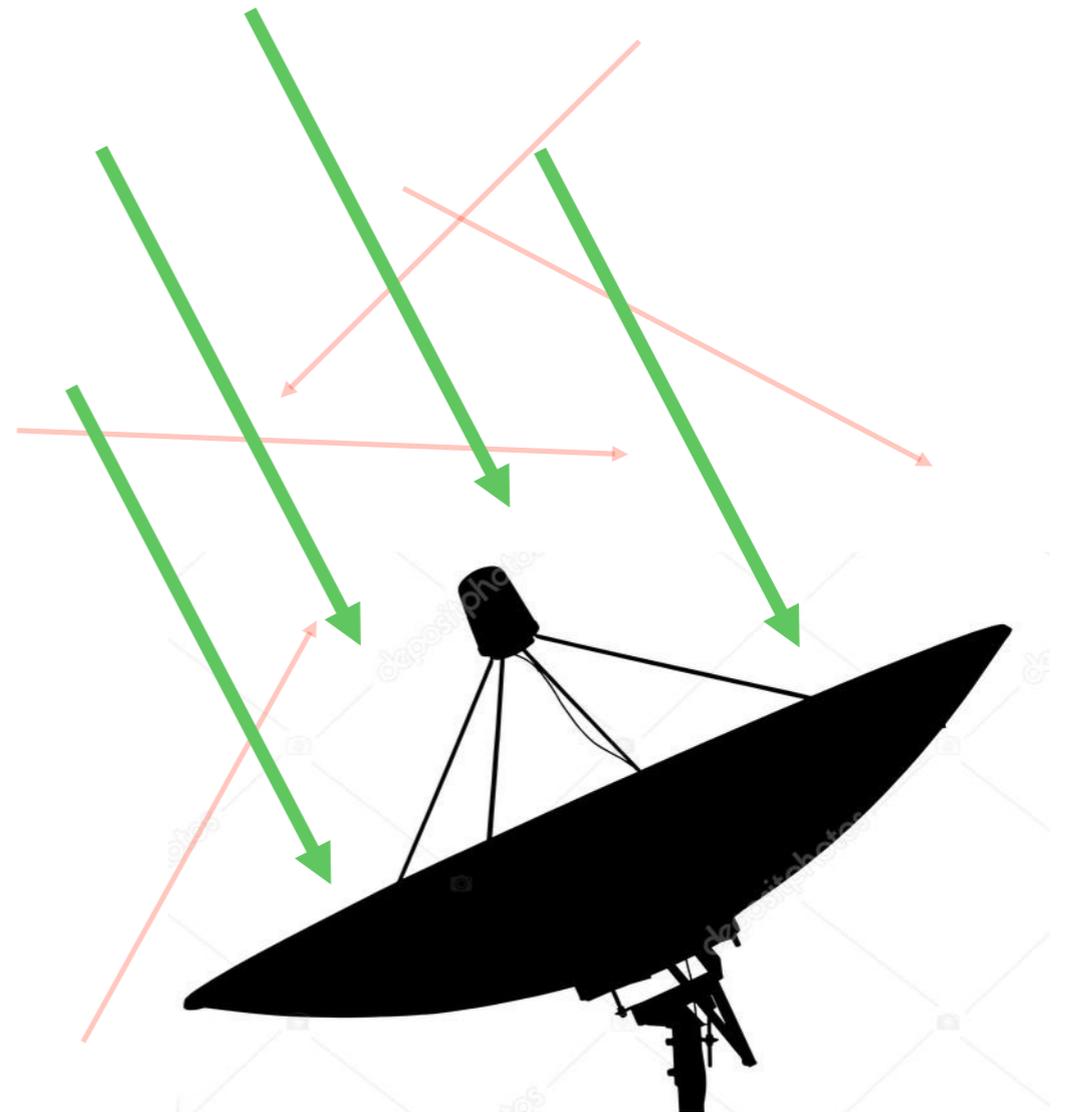
Language Deprivation



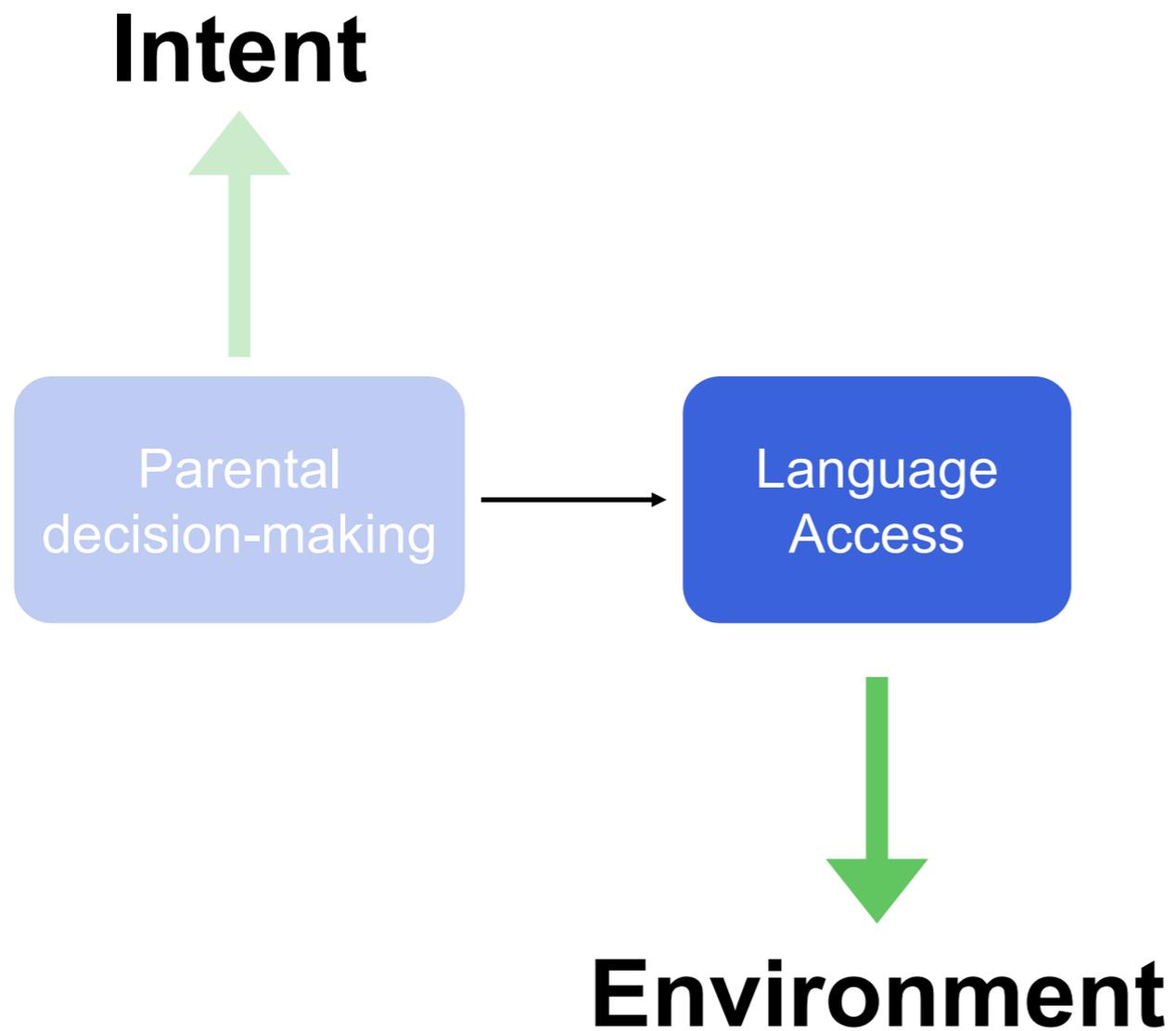
Language **Exposure**



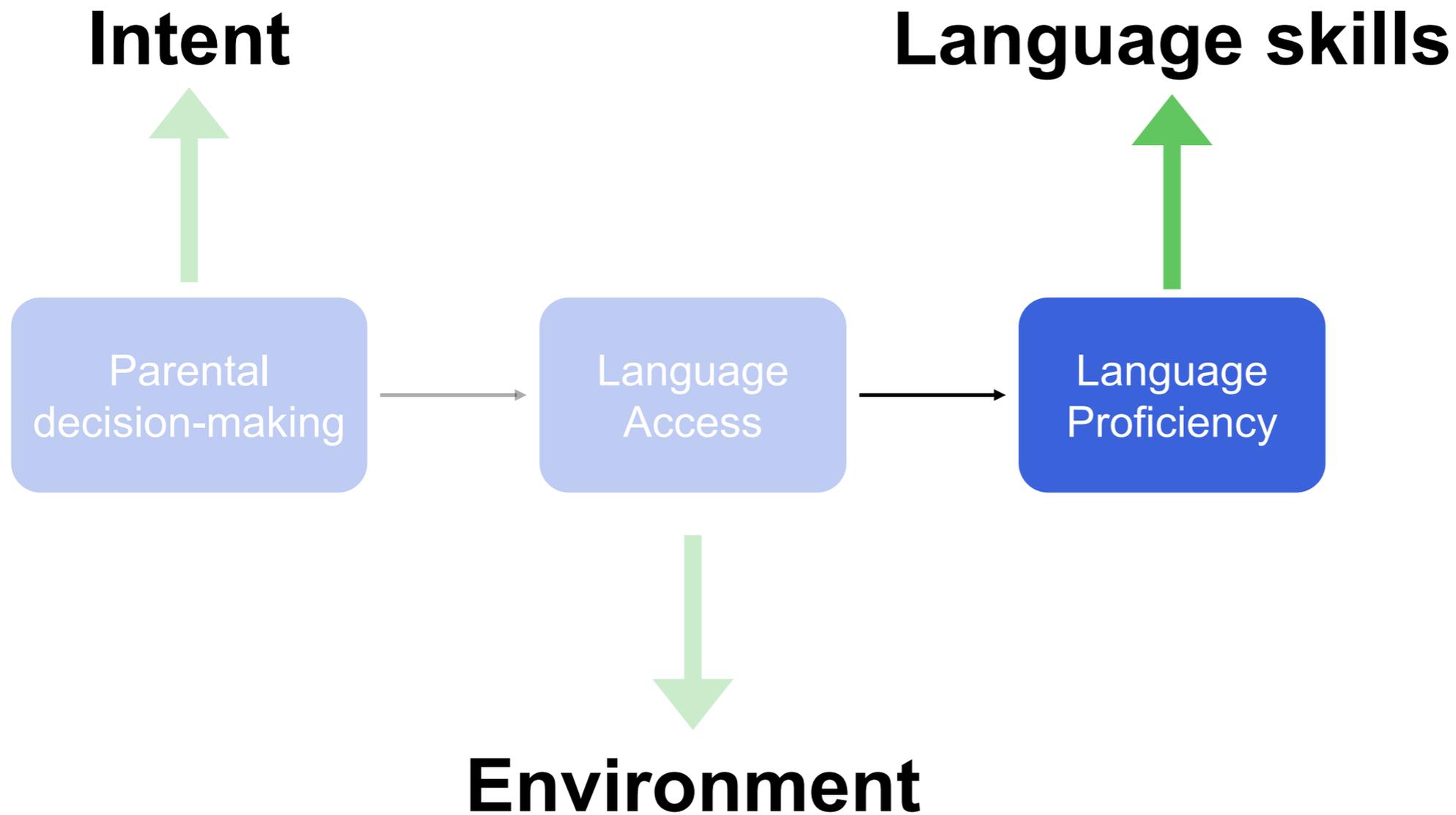
Language **Access**



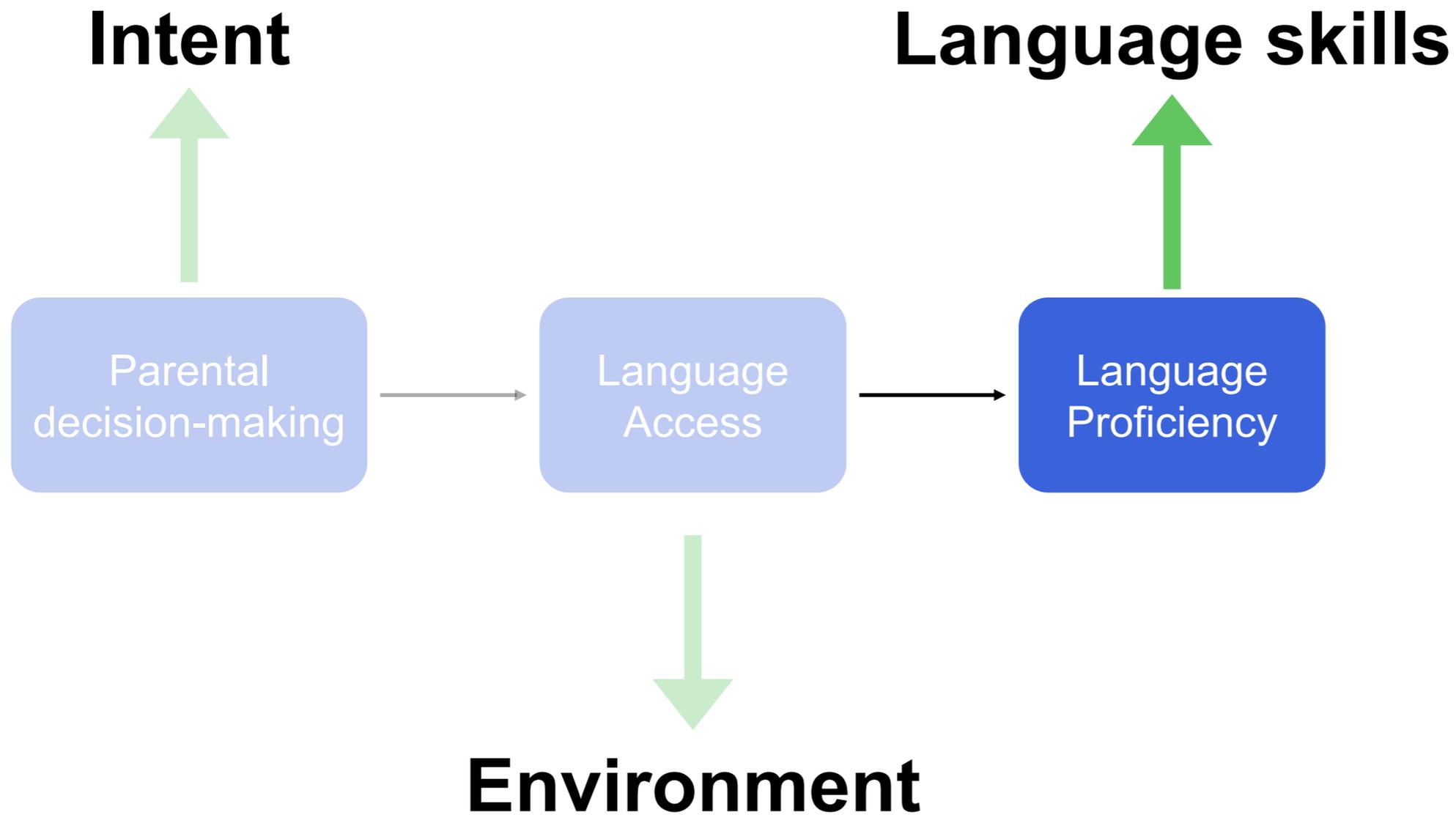
Language Deprivation



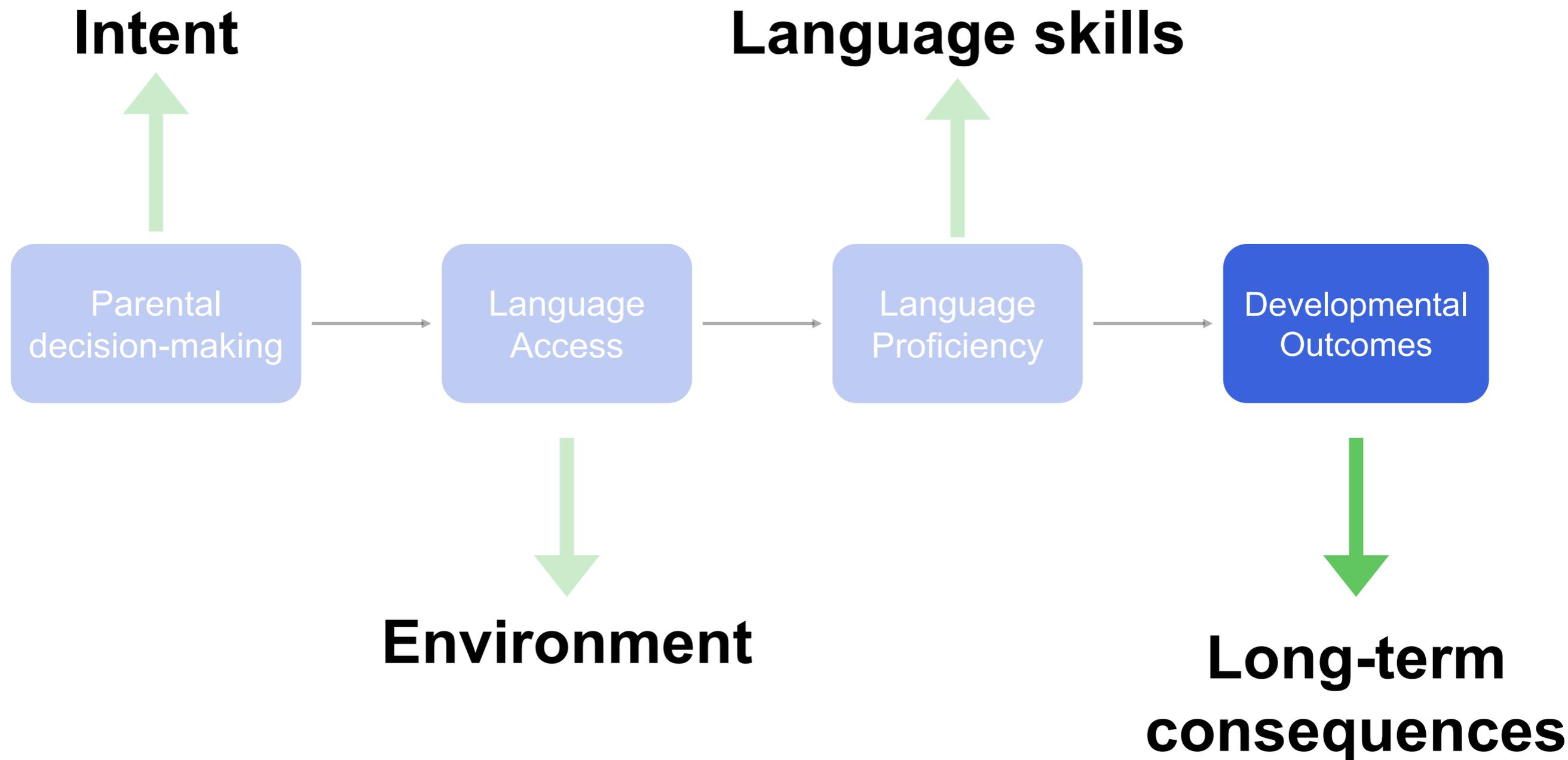
Language Deprivation



Language Deprivation



Language Deprivation



Language Deprivation

Sub-clinical consequences

Subtle but still suboptimal outcomes in one or more domains

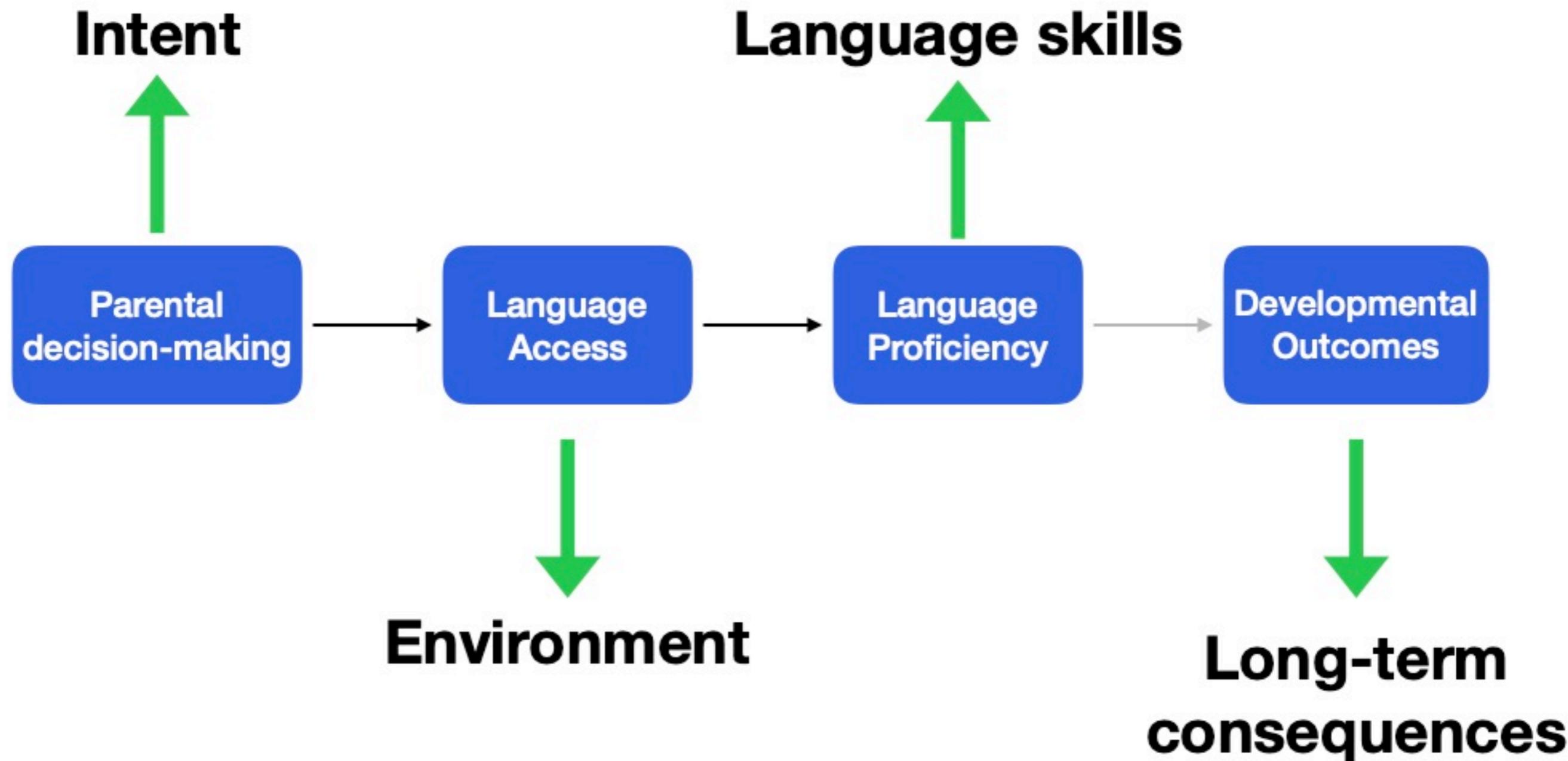
Language Deprivation Syndrome

Severe, clinically-significant problems affecting many domains
(W. C. Hall; Gulati; Glickman)

Developmental
Outcomes

Long-term
consequences

Language Deprivation



What do you mean, “Language Deprivation?”

An informal literature review

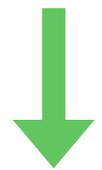
Search



Filter



Classify



Code

What do you mean, “Language Deprivation?”

An informal literature review

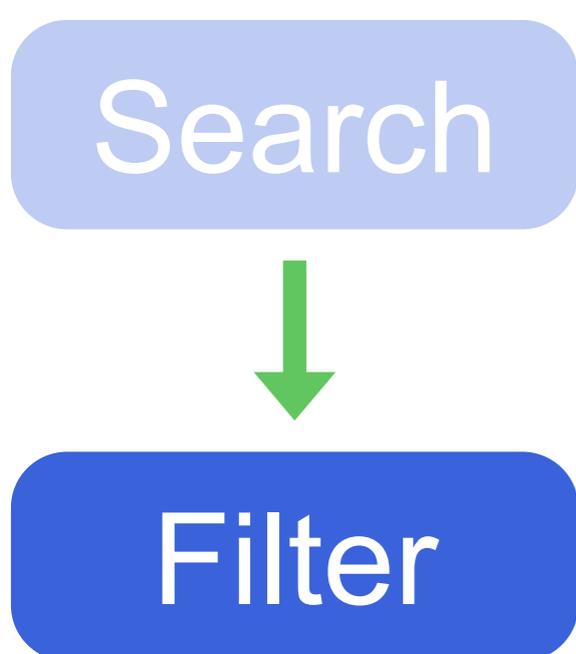
Search

- “Language deprivation”, in English
- Searched online, both scholarly and “generic” sources

What do you mean, “Language Deprivation?”

An informal literature review

Search



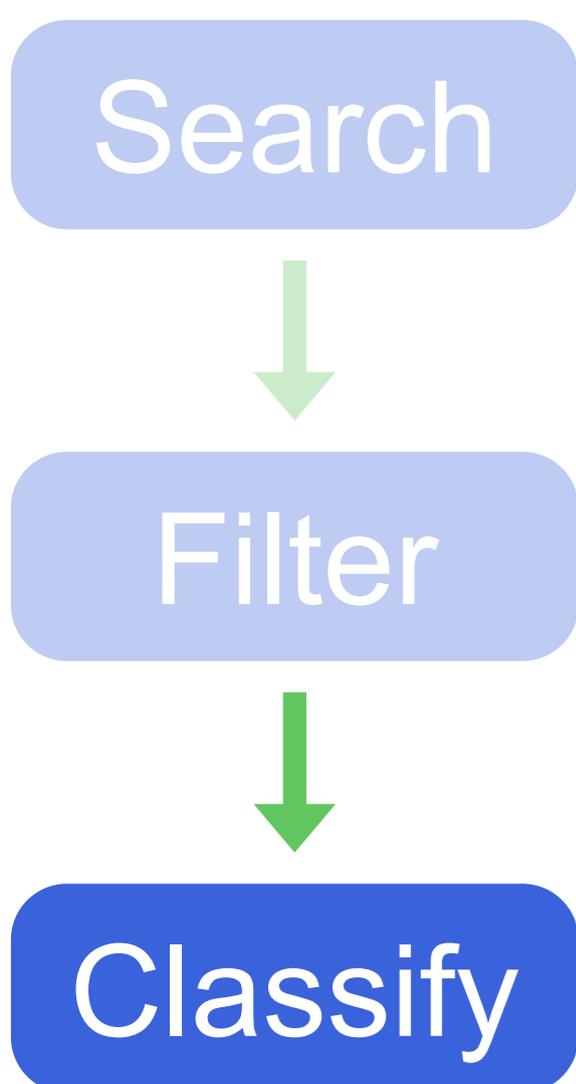
Filter

- Exclude if:
 - Not about DHH populations
 - “Language deprivation” does not appear in content, either in English or ASL
 - Written before 2010
 - Not a duplicate
- Result: 81 data points to code

What do you mean, “Language Deprivation?”

An informal literature review

Search



```
graph TD; Search[Search] --> Filter[Filter]; Filter --> Classify[Classify];
```

Filter

Classify

- Peer-reviewed literature (n = 13)
- “Gray” literature (n = 30)
 - Non-reviewed papers by academics/professionals
 - Official publications by AGBell, ASDC, ASHA, EHDI, Hands & Voices, NAD, NCHAM, etc.
- “Lay” literature: everything else (n = 38)

What do you mean, “Language Deprivation?”

An informal literature review

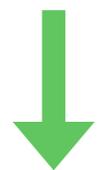
Search



Filter



Classify



Code

Is the term “language deprivation” used...

1. ...in a way that attributes motivation/intention?
Key words: “withhold”, “deny”, “deprive” (as transitive verb), etc.
 2. ...to describe the child’s environment?
 3. ...to describe the child’s proficiency in language?
 4. ...to describe adverse consequences that go beyond language proficiency?
- No definition = “0”
 - Other = “x”
 - Undifferentiated = each attested component

What do you mean, “Language Deprivation?”

An informal literature review

Research Questions

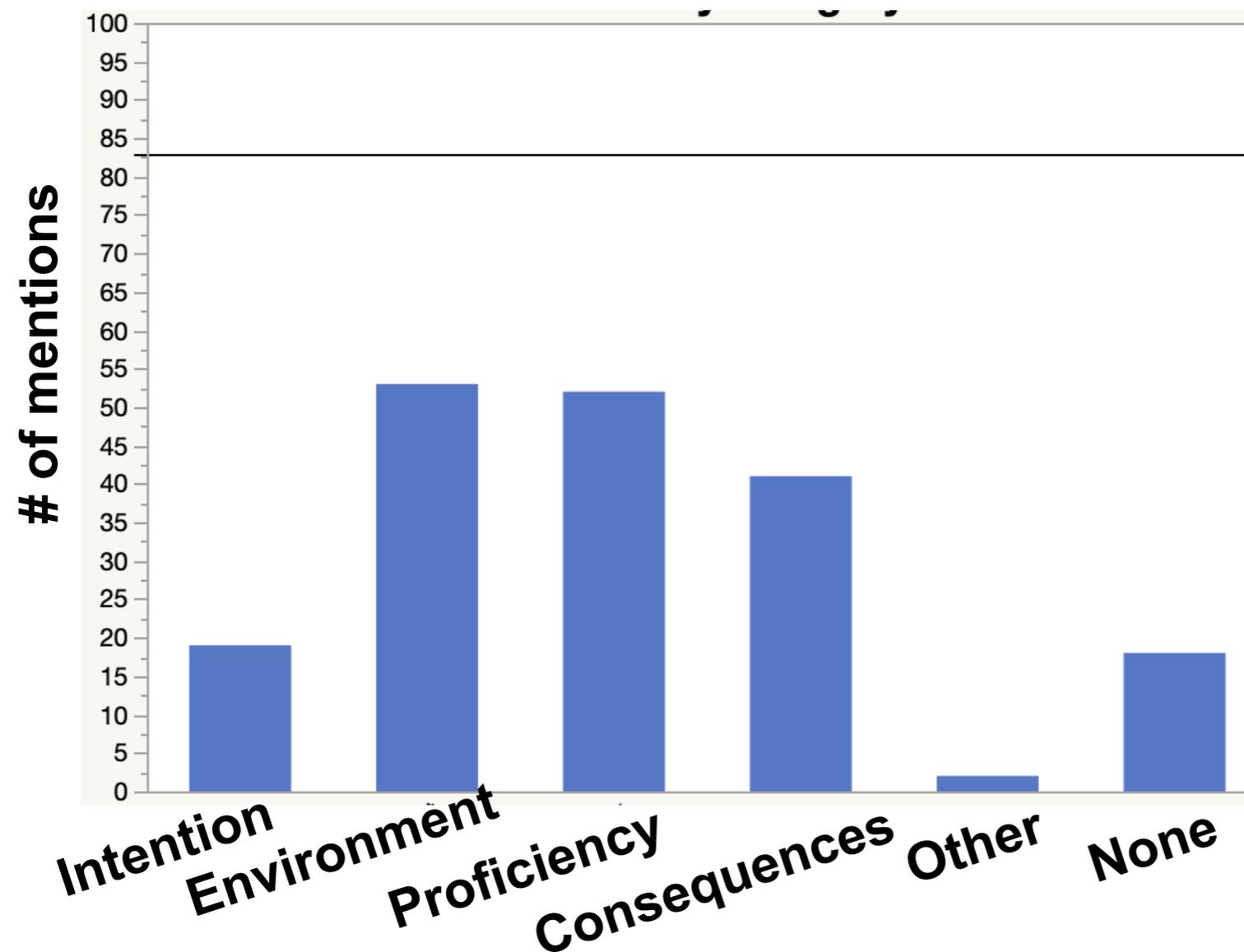
1. Are all 4 senses attested with equal frequency?
2. How many senses does a typical use of the term include?
How well-differentiated are they?
3. To what extent do these patterns differ between peer-reviewed literature, gray literature, and lay literature?

What do you mean, “Language Deprivation?”

An informal literature review

Research Questions

1. Are all 4 senses attested with equal frequency?

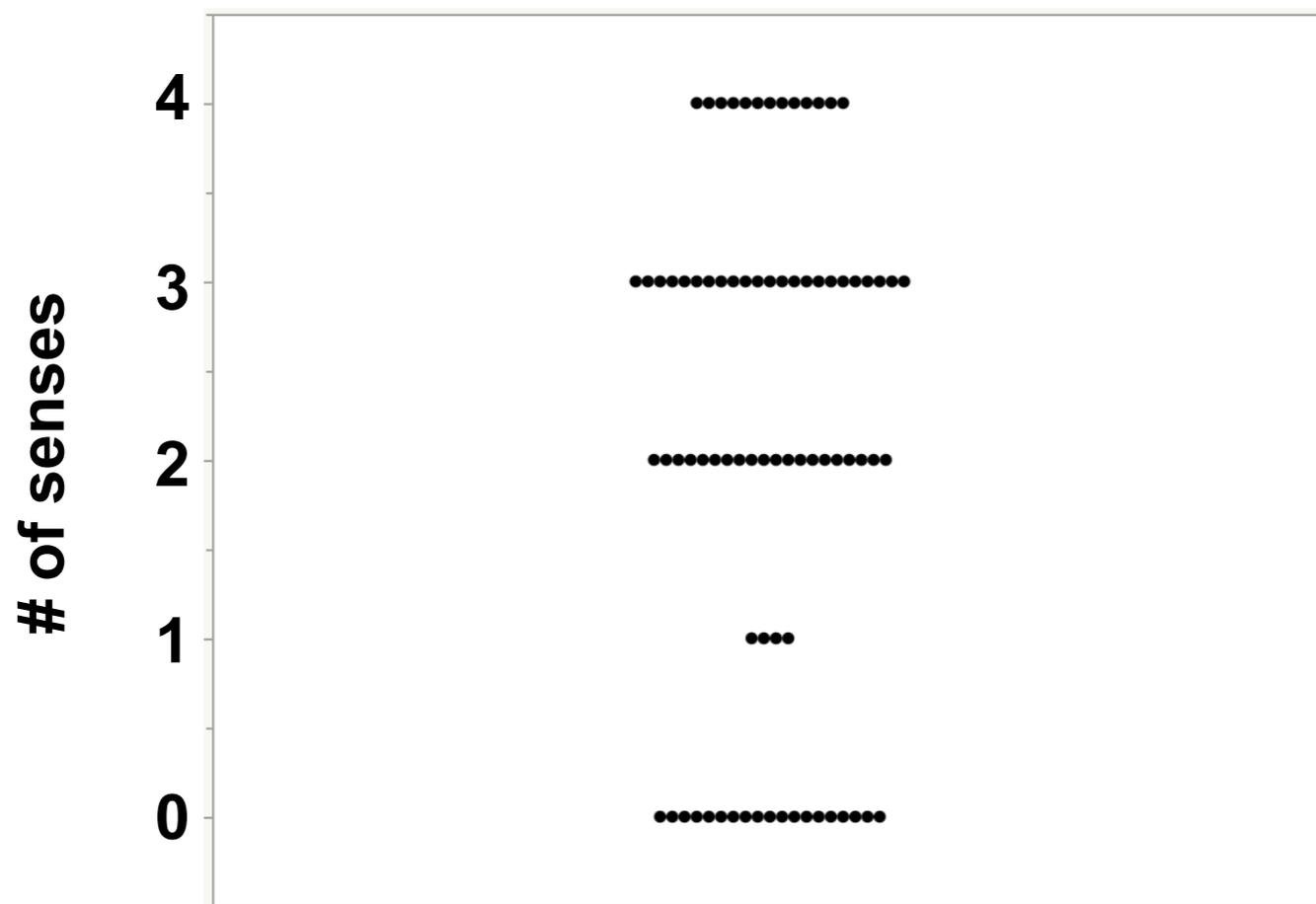


What do you mean, “Language Deprivation?”

An informal literature review

Research Questions

2. How well-differentiated are they?



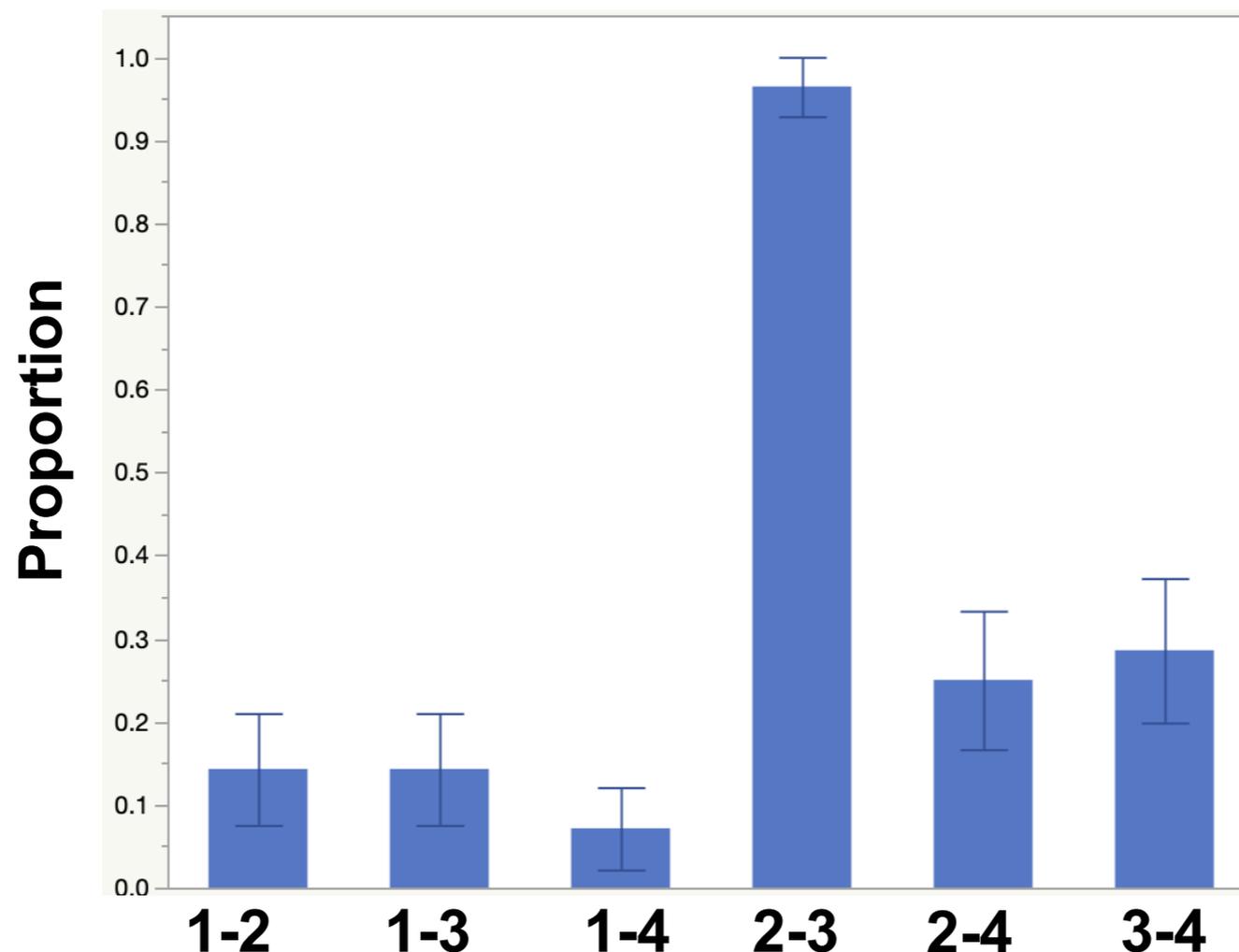
- Mean = median = 2
- Mode = 3
- Min = 1!

What do you mean, “Language Deprivation?”

An informal literature review

Research Questions

2. How well-differentiated are they?



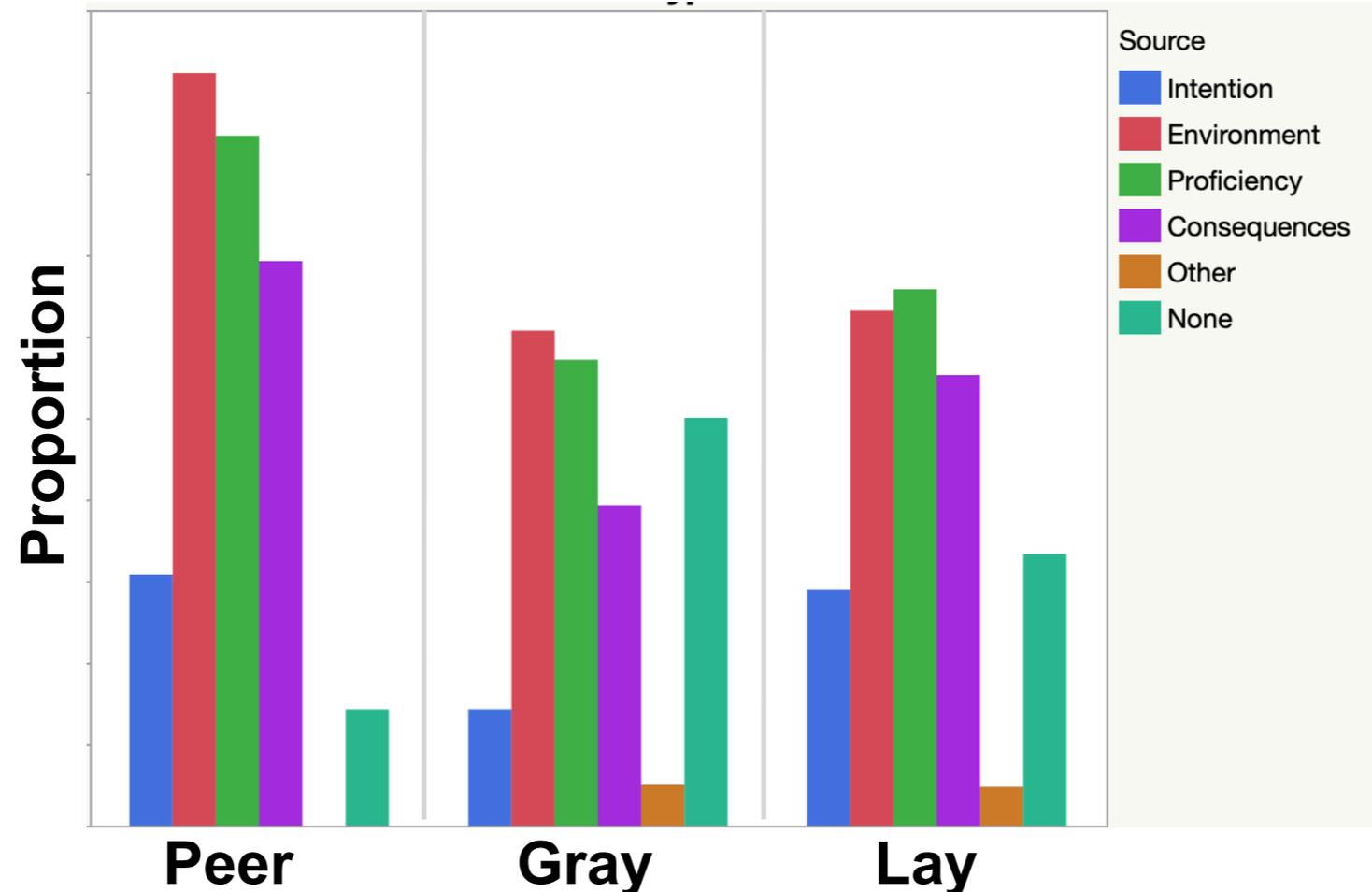
1 = Intent
2 = Environment
3 = Proficiency
4 = Consequences

What do you mean, “Language Deprivation?”

An informal literature review

Research Questions

- To what extent do these patterns differ between peer-reviewed, gray, and lay literature?

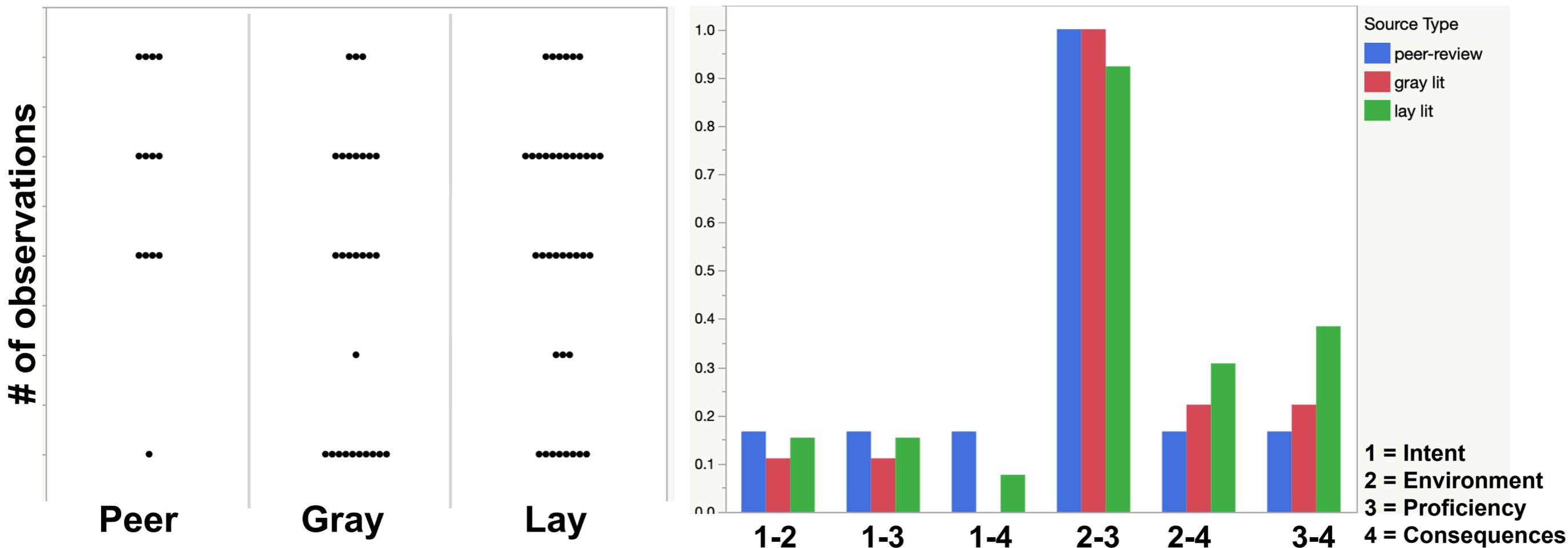


What do you mean, “Language Deprivation?”

An informal literature review

Research Questions

3. To what extent do these patterns differ between peer-reviewed, gray, and lay literature?



What do you mean, “Language Deprivation?”

An informal literature review

Research Questions

1. Are all 4 senses attested with equal frequency?
 - ▶ No: “intention” is least common
2. How many senses does a typical use of the term include?
How well-differentiated are they?
 - ▶ Usage typically blurs at least 2 senses: usually
Environment & Proficiency
3. To what extent do these patterns differ between peer-reviewed literature, gray literature, and lay literature?
 - ▶ Similar patterns in all literature types

“Language Deprivation” in Clinical Care & Public Health



“Language Deprivation” in Clinical Care & Public Health



“Language Deprivation” in Clinical Care & Public Health



#BanLeadPaint

FACT: LEAD IS TOXIC

It is harmful to everyone and
DAMAGES:



BRAIN



KIDNEYS



LIVER



BLOOD



REPRODUCTIVE SYSTEM

Young children

are most vulnerable. Their nervous systems are still developing and they absorb **4-5 times more than adults**, which can cause:

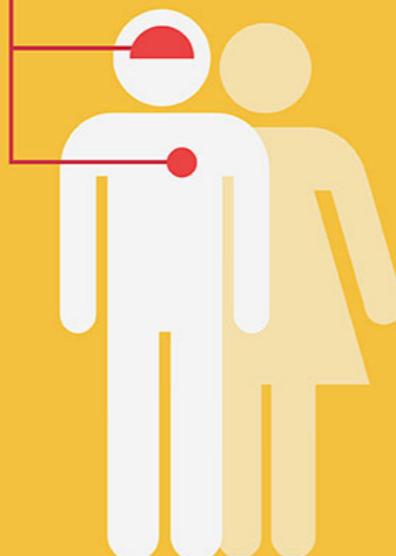
- intellectual disability
- underperforming at school
- behavioural issues



In adults

lead exposure increases the risk of:

- ischaemic heart disease
- stroke



In pregnant women

lead exposure damages many organs but also affects:

- the developing foetus



There is no safe level of lead exposure



World Health Organization

<https://www.who.int/phe/infographics/lead/en/>

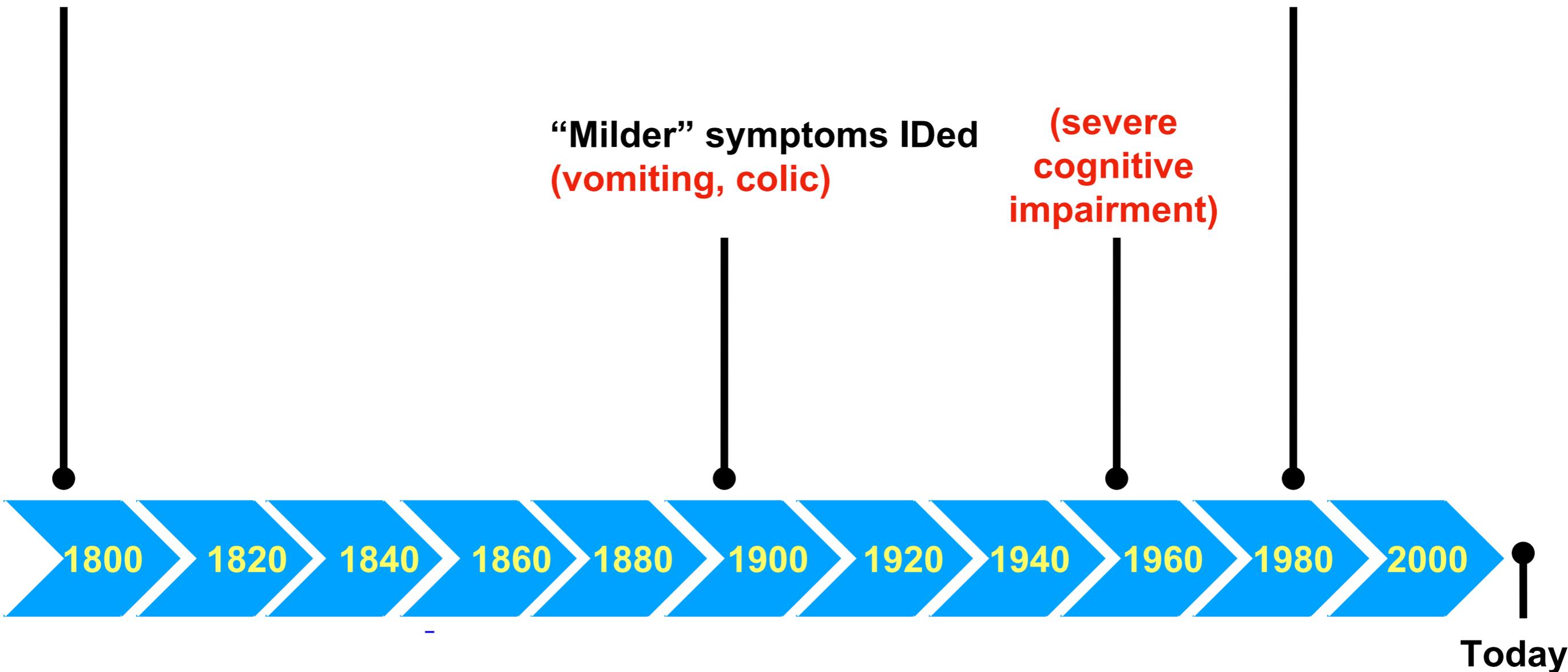
Timeline of lead poisoning

First reports of lead poisoning
in western medicine
(seizures, coma, death)

BAN on lead paint
in 1978.
WHY?

“Milder” symptoms IDed
(vomiting, colic)

(severe
cognitive
impairment)

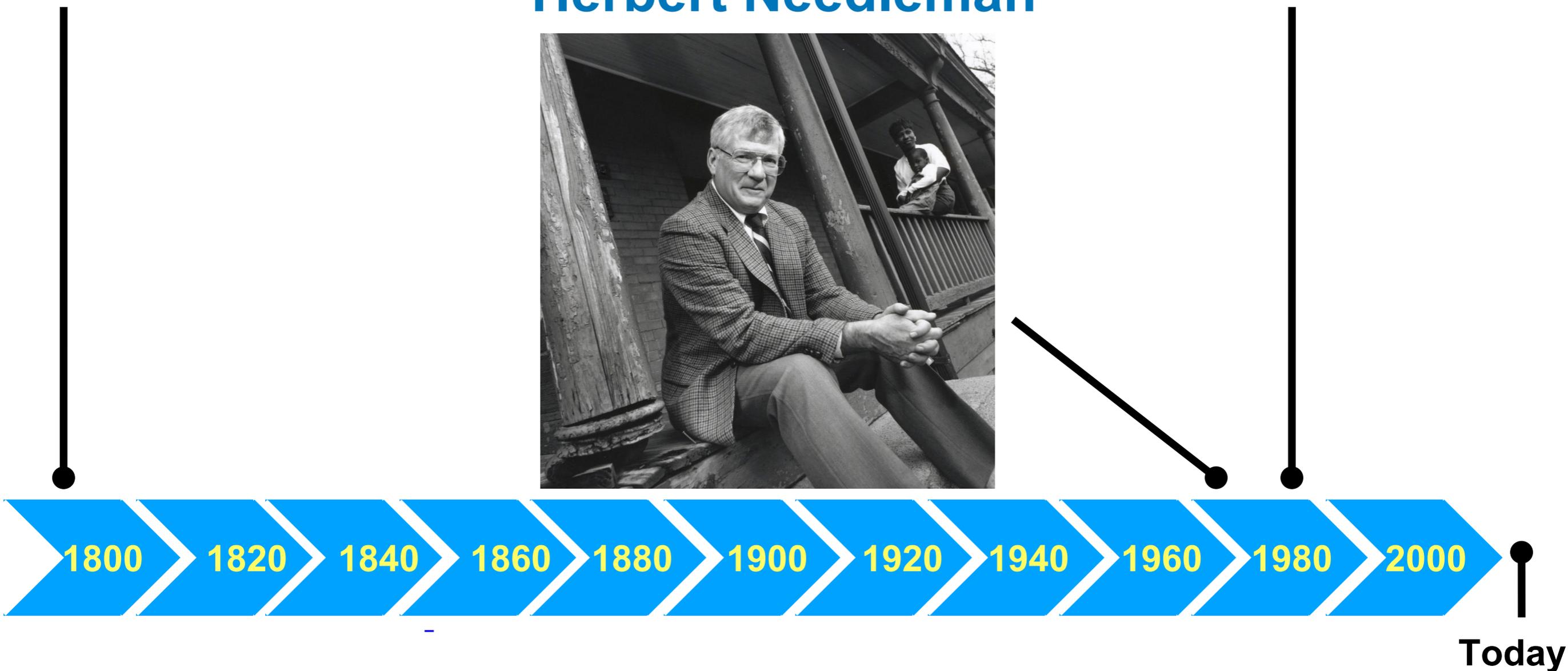
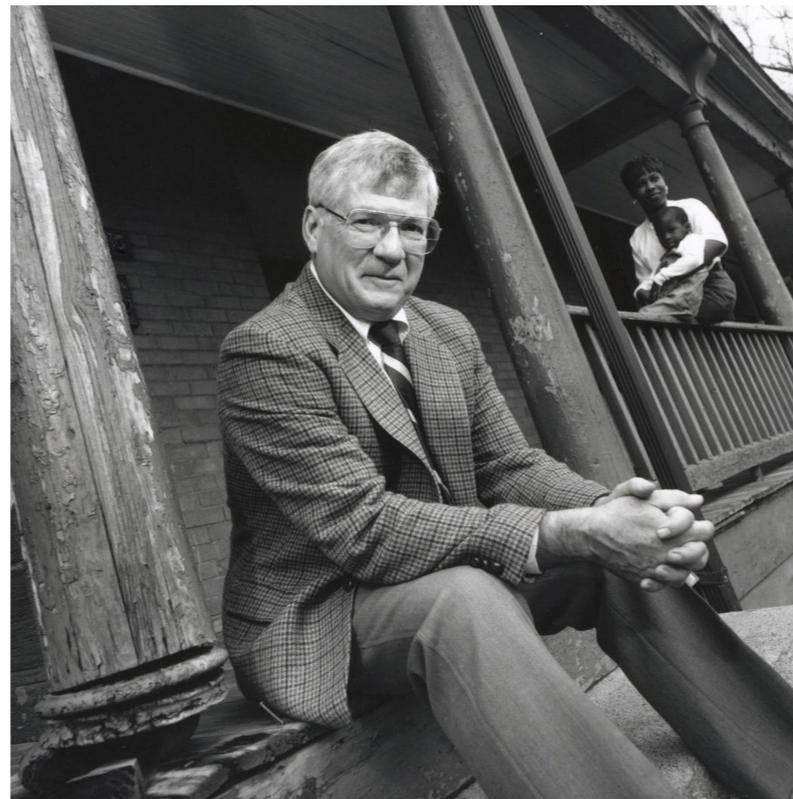


Timeline of lead poisoning

First reports of lead poisoning
in western medicine
(seizures, coma, death)

Herbert Needleman

BAN on lead paint
in 1978.
WHY?



Timeline of lead poisoning



Needleman et al., 1979

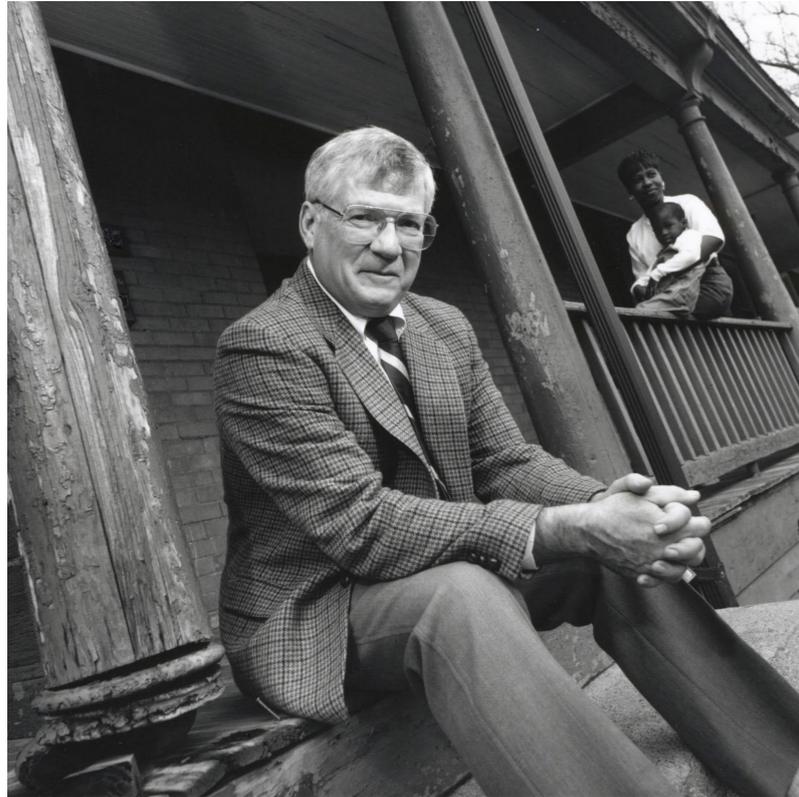
- Measured lead levels in baby teeth from 2335 children
- Identified the 10% with the lowest and highest levels of lead (all sub-clinical!)
- Compared intelligence & other outcomes, controlling for relevant covariates

Low-lead IQ = _____

High-lead IQ = _____

What's your guess?

Timeline of lead poisoning



Needleman et al., 1979

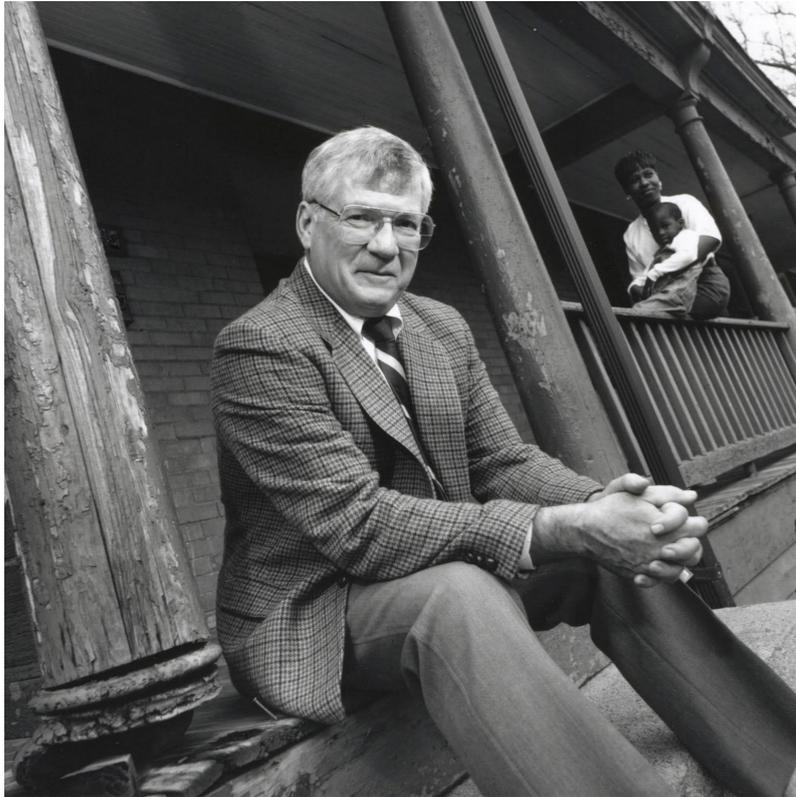
- Measured lead levels in baby teeth from 2335 children
- Identified the 10% with the lowest and highest levels of lead (all sub-clinical!)
- Compared intelligence & other outcomes, controlling for relevant covariates

Low-lead IQ = 106

High-lead IQ = _____

What's your guess?

Timeline of lead poisoning



Needleman et al., 1979

- Measured lead levels in baby teeth from 2335 children
- Identified the 10% with the lowest and highest levels of lead (all sub-clinical!)
- Compared intelligence & other outcomes, controlling for relevant covariates

Low-lead IQ = 106

High-lead IQ = 102

What's your guess?

Timeline of lead poisoning

Table 7. Full-Scale and Subtest Scores of the Wechsler Intelligence Scale for Children (Revised) (WISC-R) for High and Low Lead Subjects.

WISC-R	LOW LEAD (MEAN)	HIGH LEAD (MEAN)	P VALUE*
Full-scale IQ	106.6	102.1	0.03
Verbal IQ	103.9	99.3	0.03
Information	10.5	9.4	0.04
Vocabulary	11.0	10.0	0.05
Digit span	10.6	9.3	0.02
Arithmetic	10.4	10.1	0.49
Comprehension	11.0	10.2	0.08
Similarities	10.8	10.3	0.36
Performance IQ	108.7	104.9	0.08
Picture completion	12.2	11.3	0.03
Picture arrangement	11.3	10.8	0.38
Block design	11.0	10.3	0.15
Object assembly	10.9	10.6	0.54
Coding	11.0	10.9	0.90
Mazes	10.6	10.1	0.37

Low-lead IQ = 106

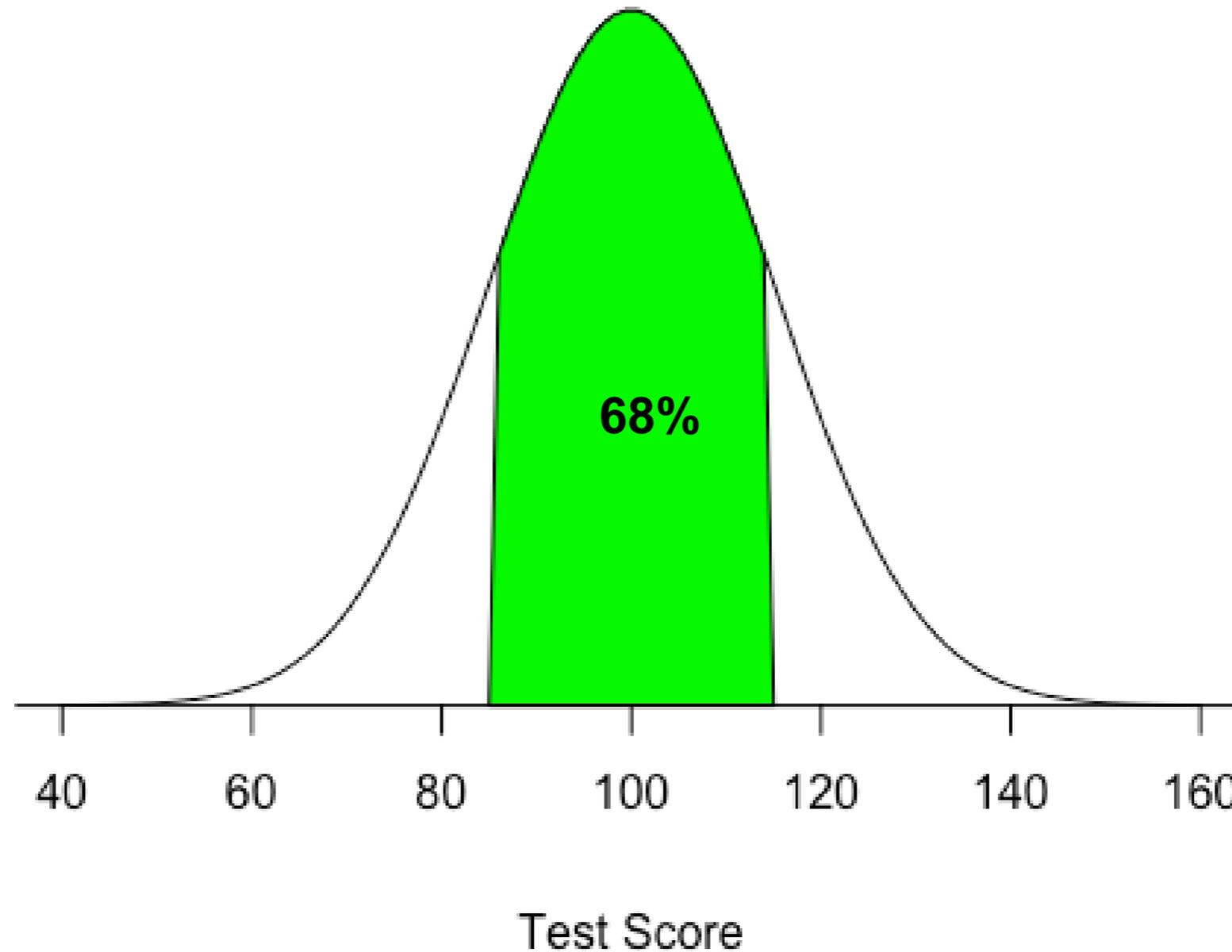
High-lead IQ = 102

Are you surprised?

Understanding Distributions

Normal Distribution

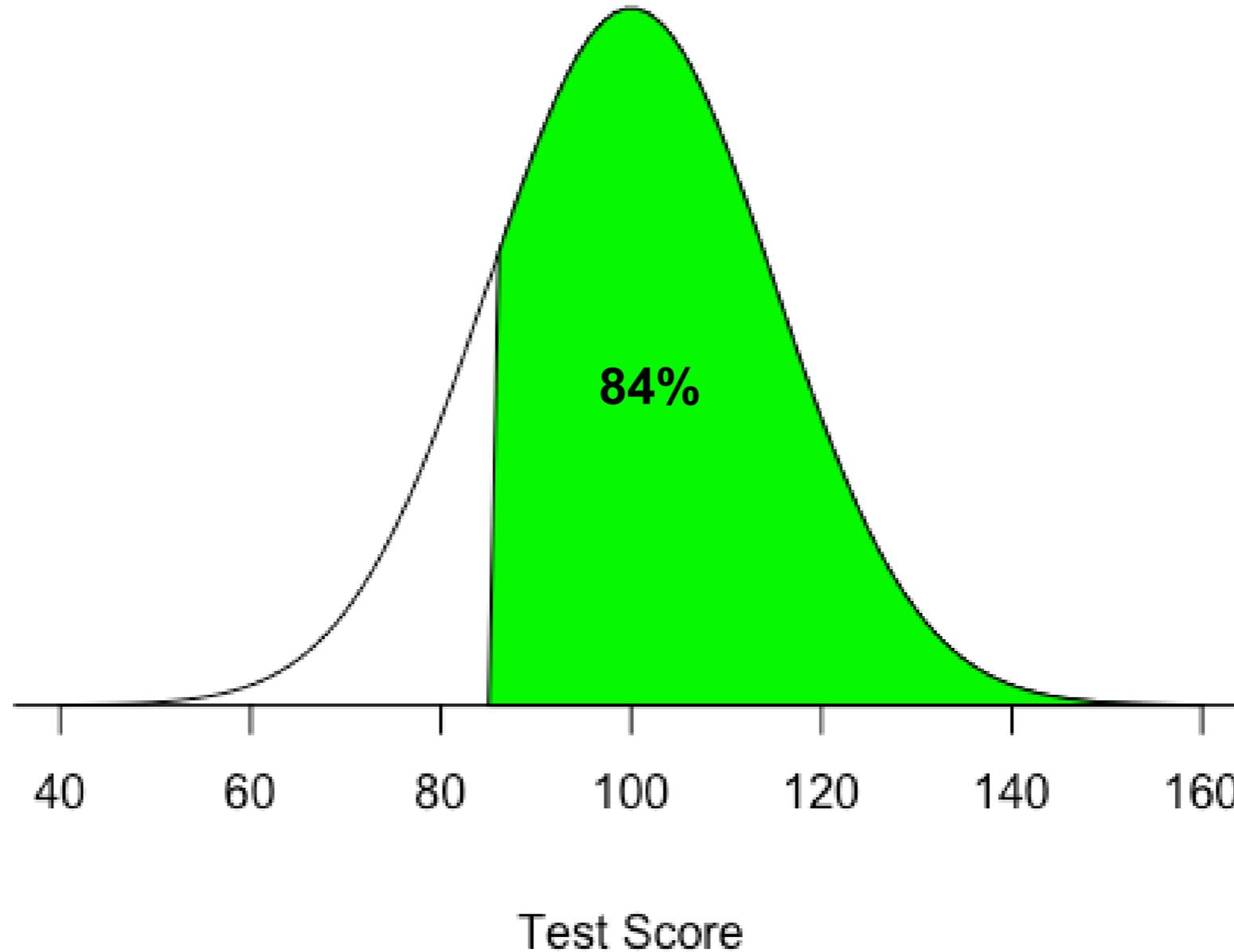
$$P(85 < \text{Test Score} < 115) = 0.683$$



Understanding Distributions

Normal Distribution

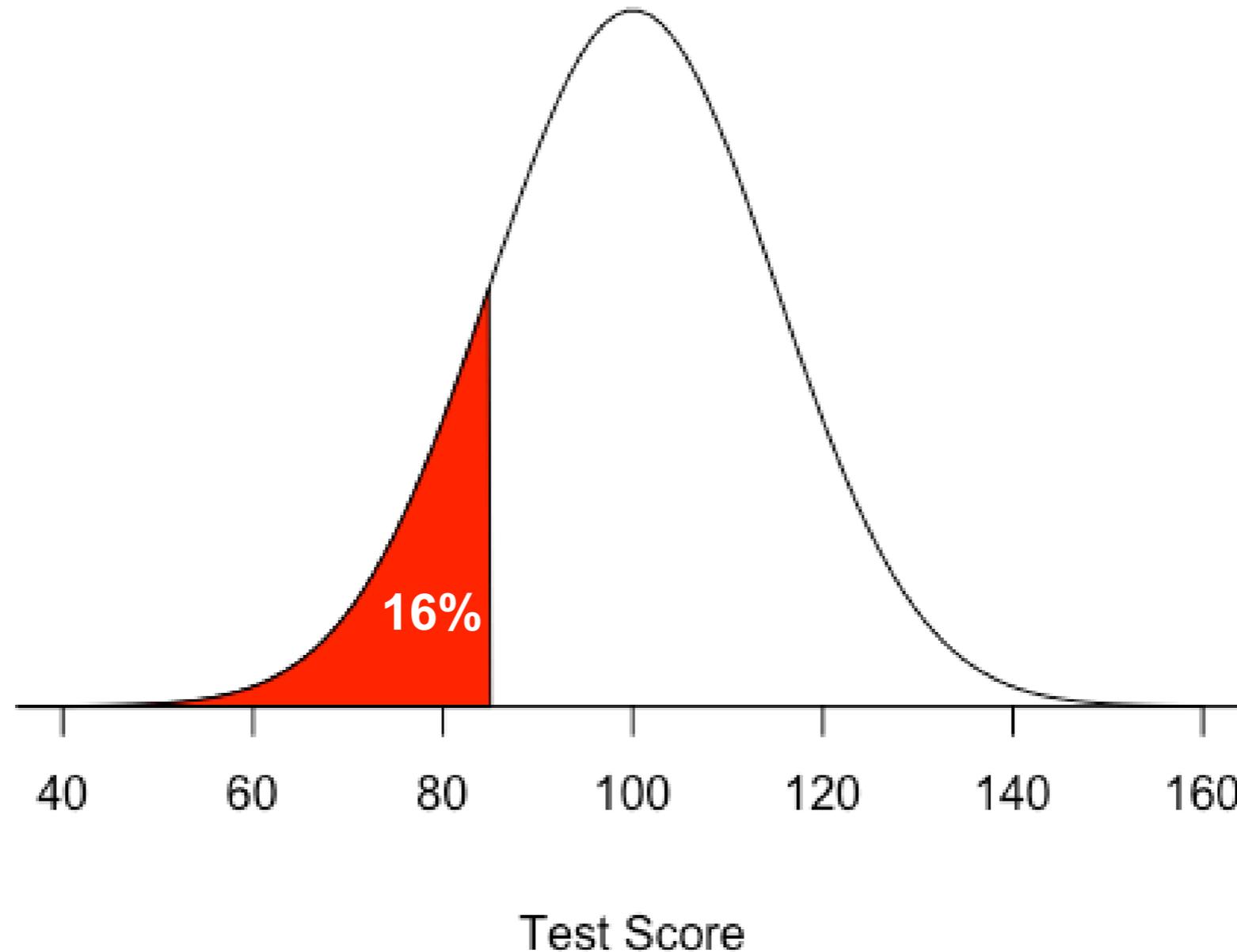
$$P(85 < \text{Test Score} < 160) = 0.841$$



Understanding Distributions

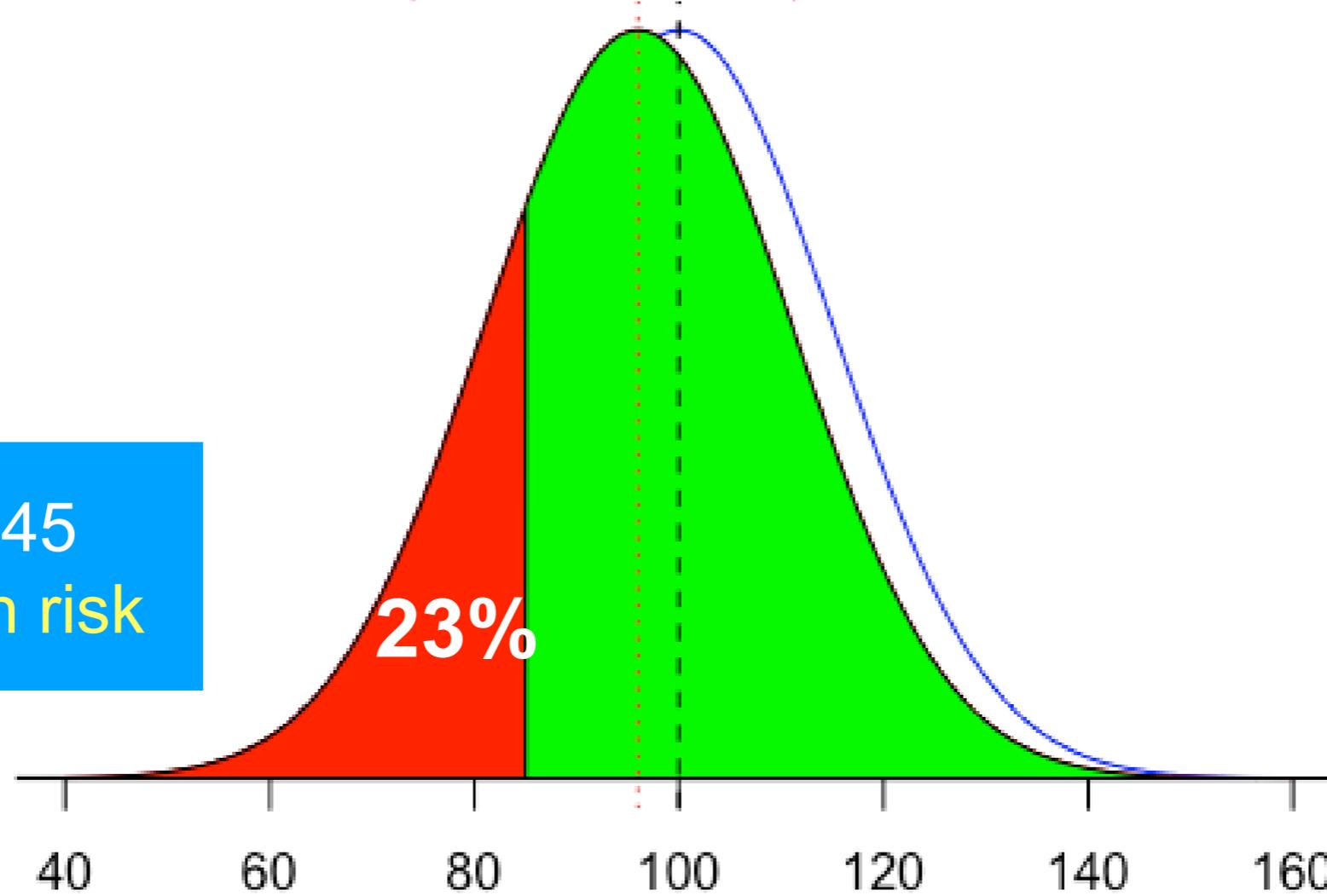
Normal Distribution

$$P(25 < \text{Test Score} < 85) = 0.159$$



Understanding Distributions

$$P(\text{Test Score} < 85) = 0.232$$

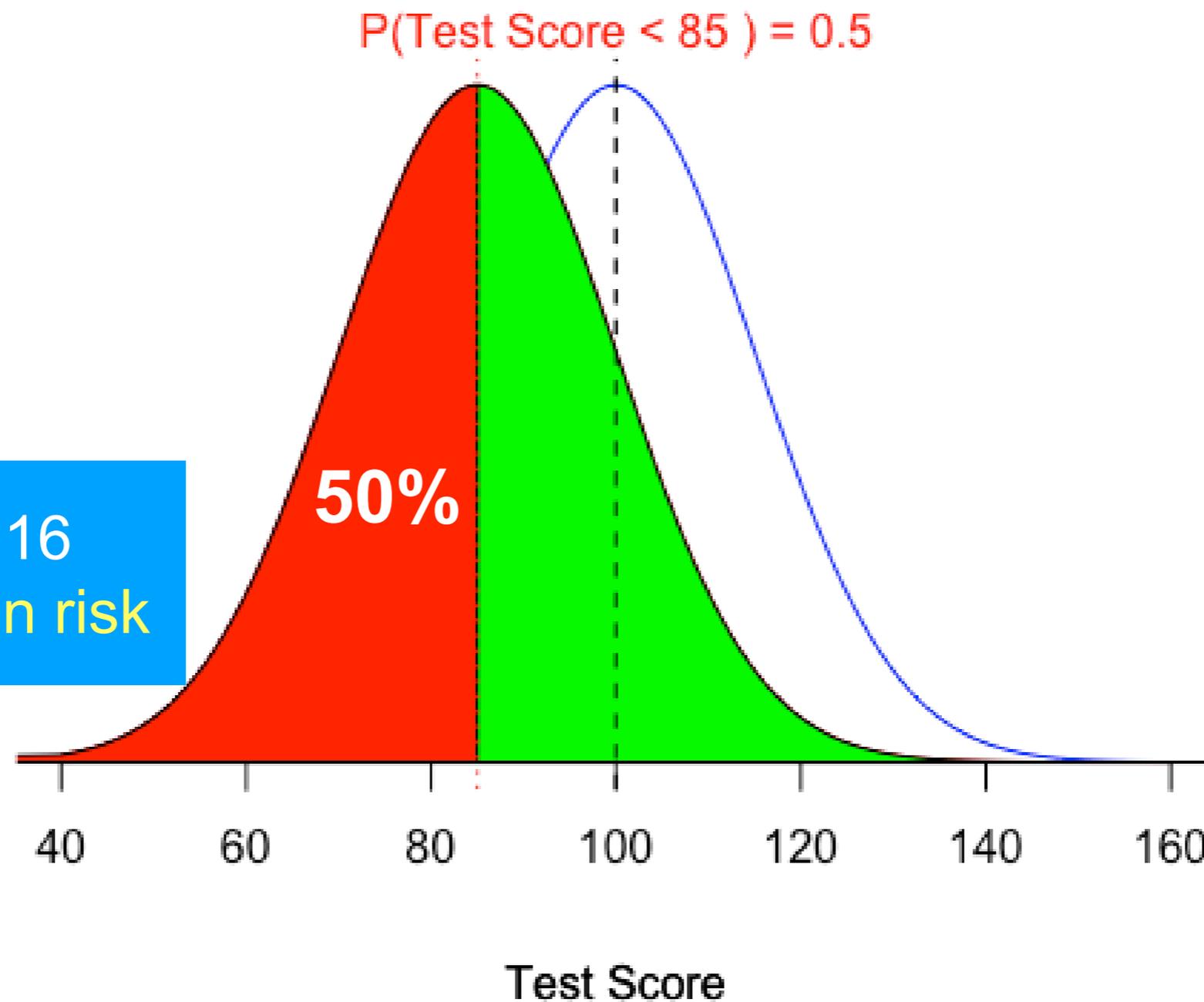


23%

$23/15.84 = 1.45$
45% increase in risk

Test Score

Understanding Distributions

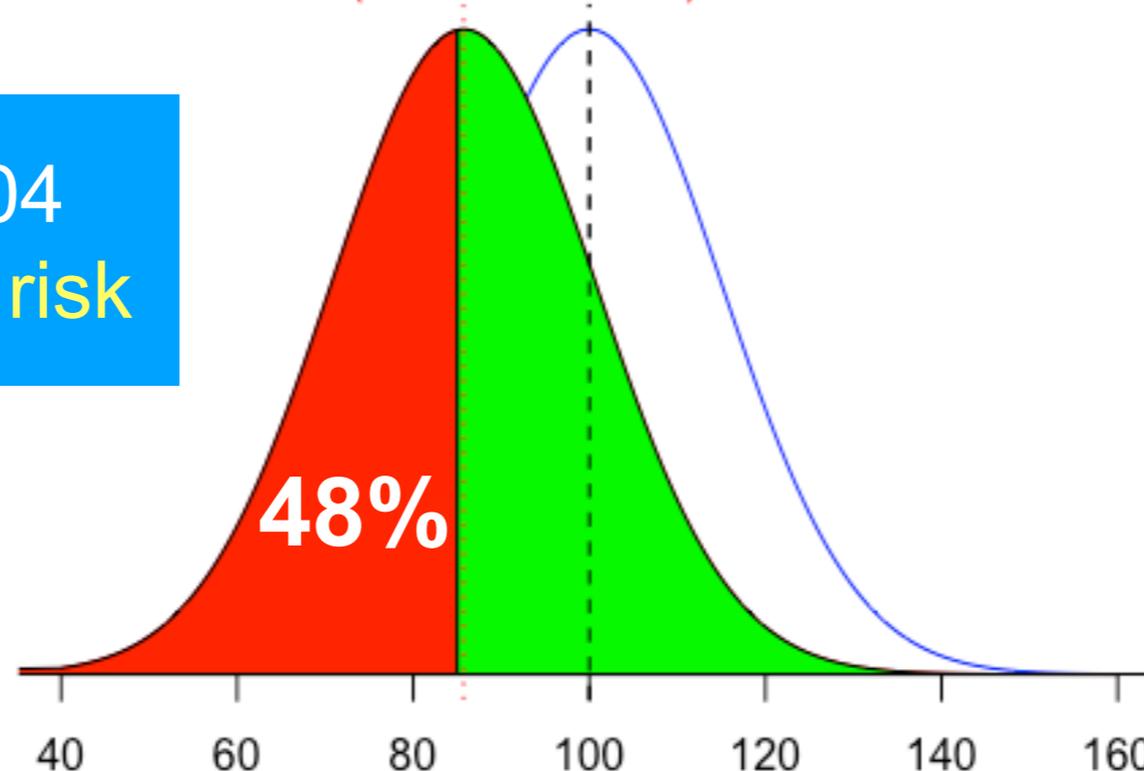


$50/15.84 = 3.16$
216% increase in risk

What about language outcomes in DHH children?

- We don't really know: need population-based data.
- Large-scale studies of language outcomes in DHH children at/near school entry (no additional diagnoses):
 - **OCHL (n=134): 14.3 points below hearing controls**

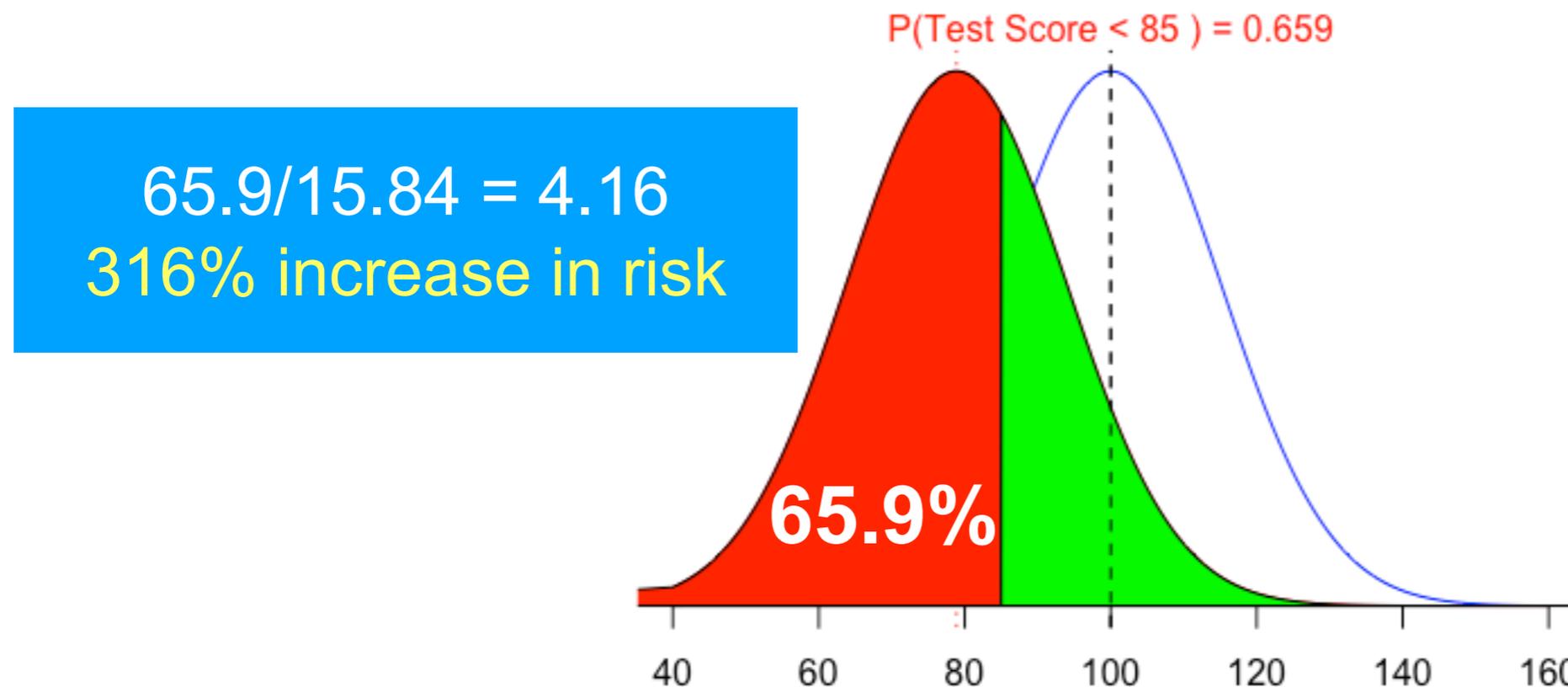
$P(\text{Test Score} < 85) = 0.481$



$48.1/15.84 = 3.04$
204% increase in risk

What about language outcomes in DHH children?

- We don't really know: need population-based data.
- Large-scale studies of language outcomes in DHH children at/near school entry (no additional diagnoses):
 - **CDaCI (n=97): 21.14 points below test norms**



What about language outcomes in DHH children?



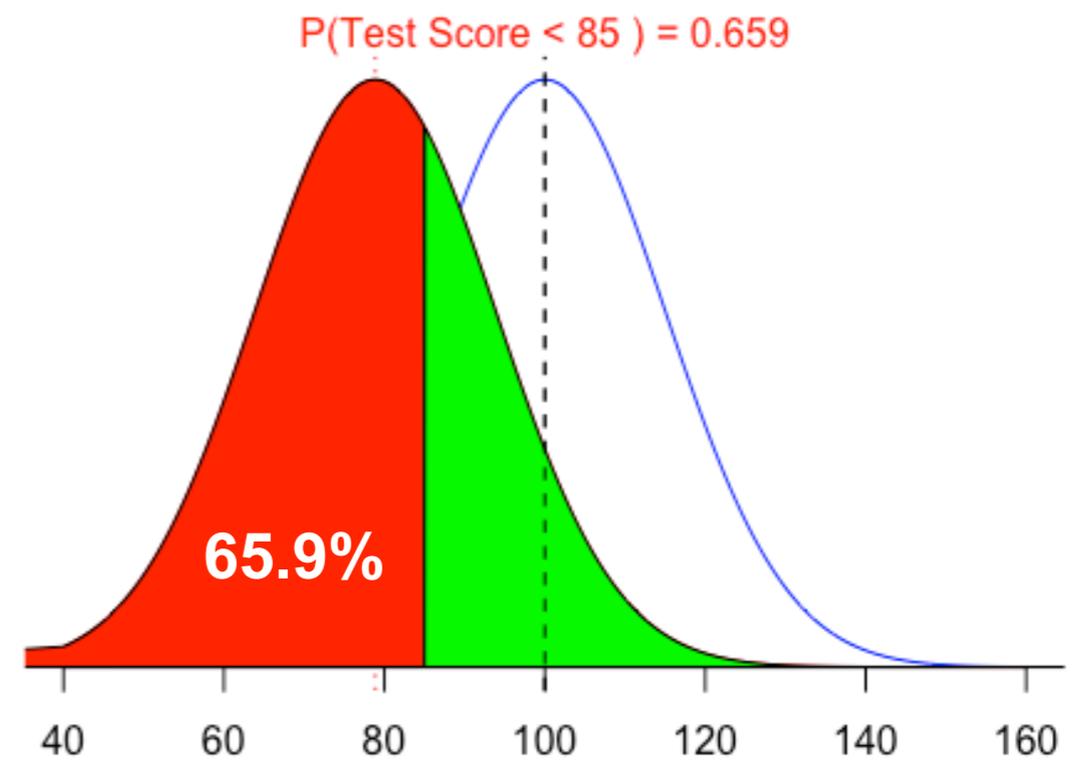
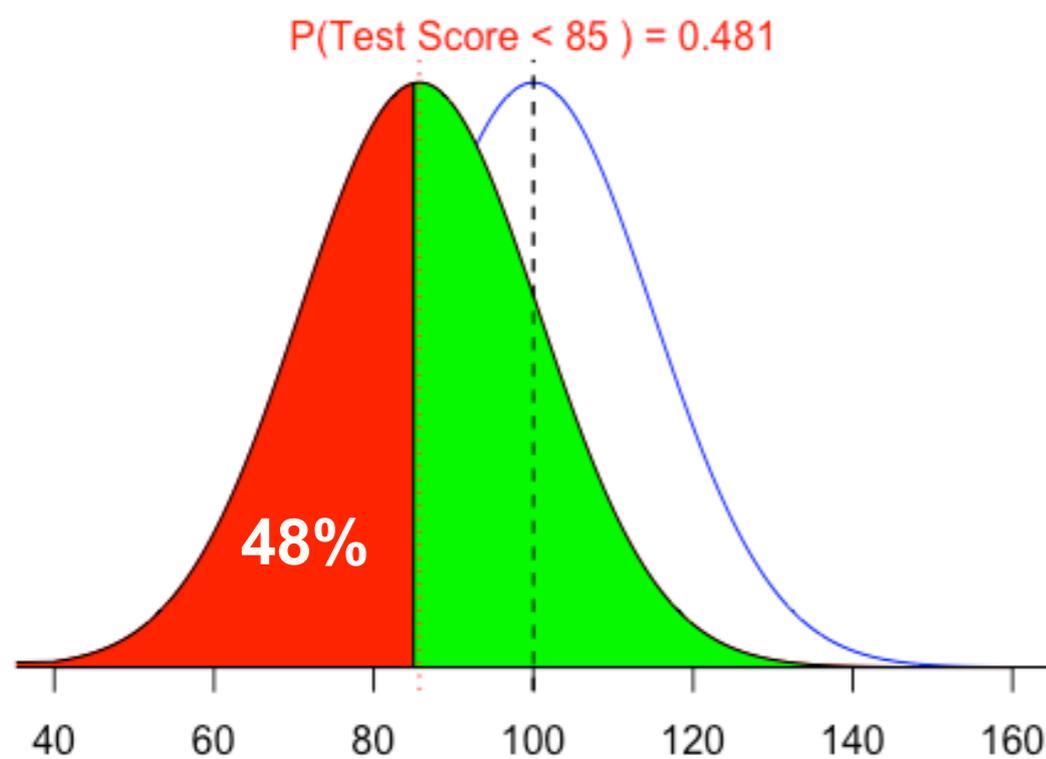
What about language outcomes in DHH children?



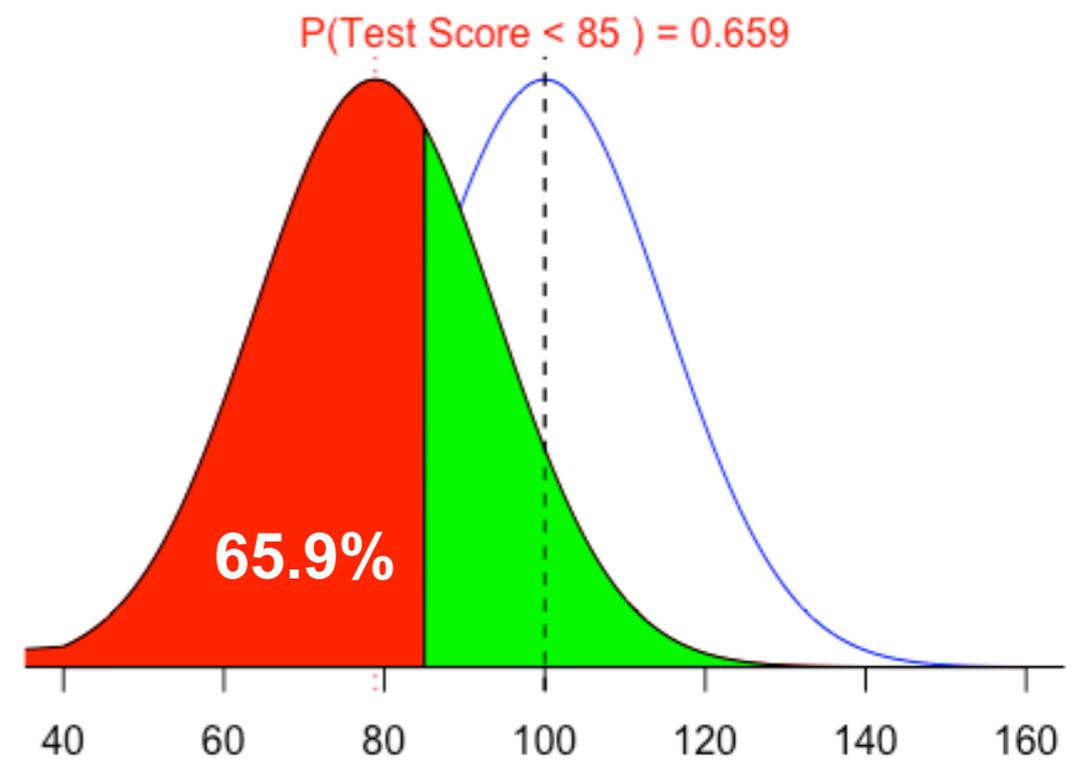
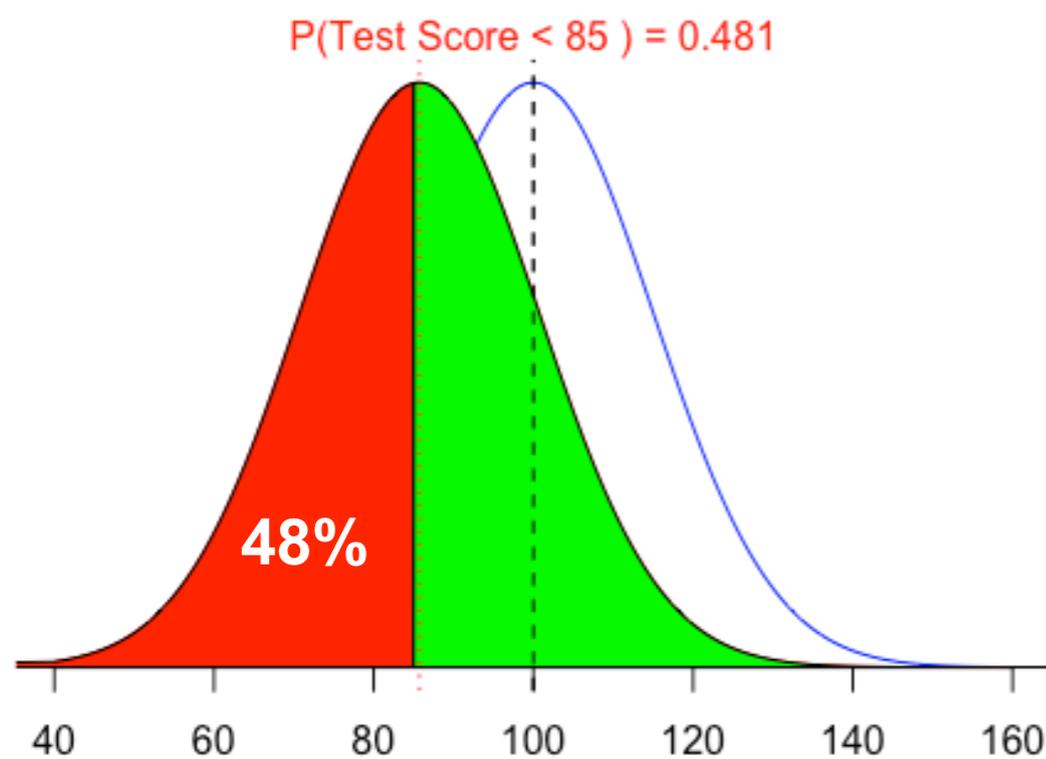
“Language Deprivation” in Clinical Care & Public Health



What about language outcomes in DHH children?



What about language outcomes in DHH children?



What about language outcomes in DHH children?



AUDIOLOGY Information Series

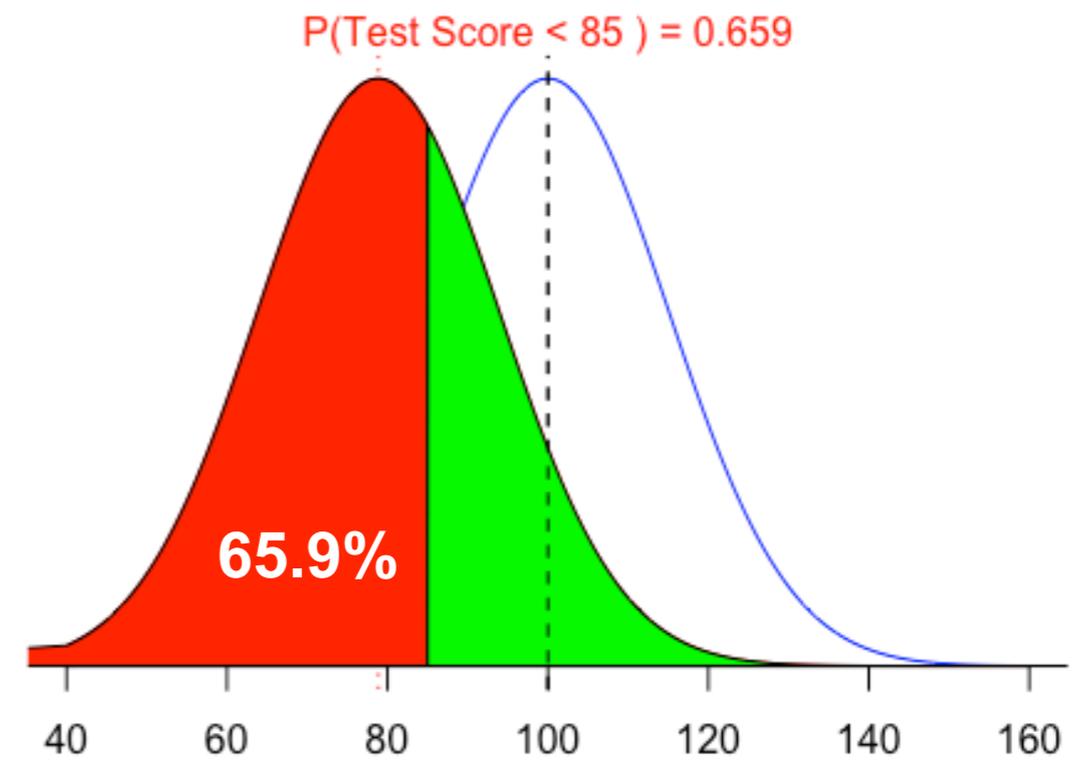
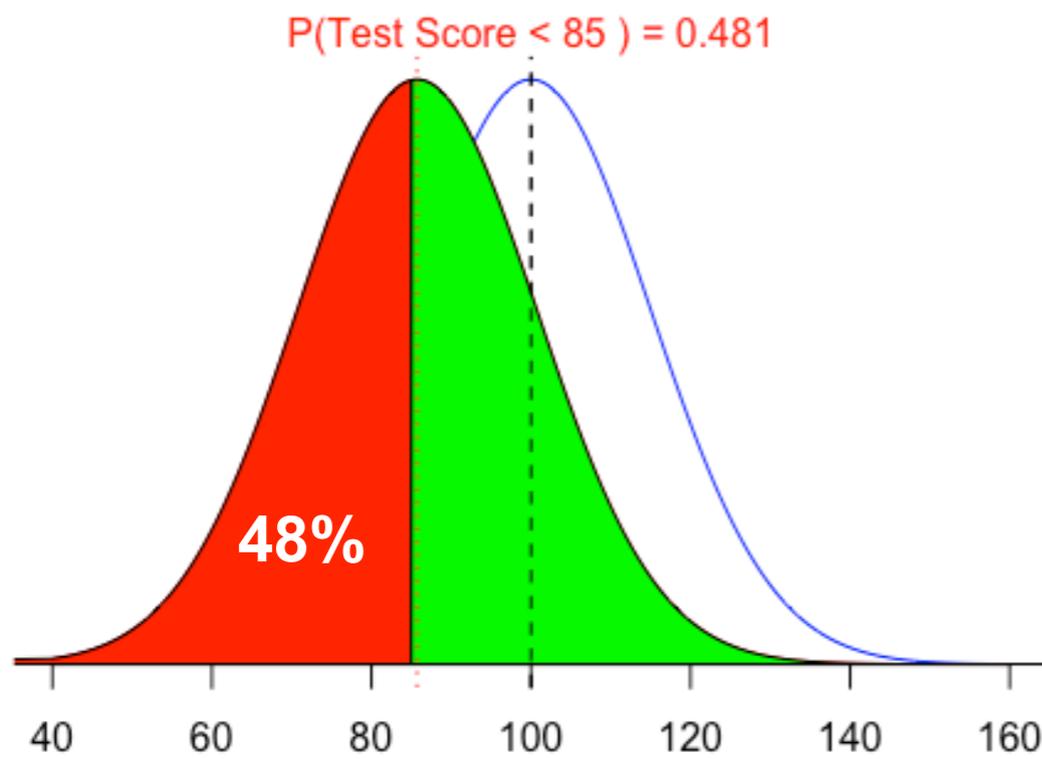
“...infants identified with a hearing loss by age 6 months can be expected to reach language development similar to hearing friends.”

<https://www.asha.org/uploadedFiles/AIS-Hearing-Loss-Childhood.pdf>



“Children with hearing loss who receive these services in a timely way are often able to develop language skills on par with their hearing peers.”

infanthearing.org/components

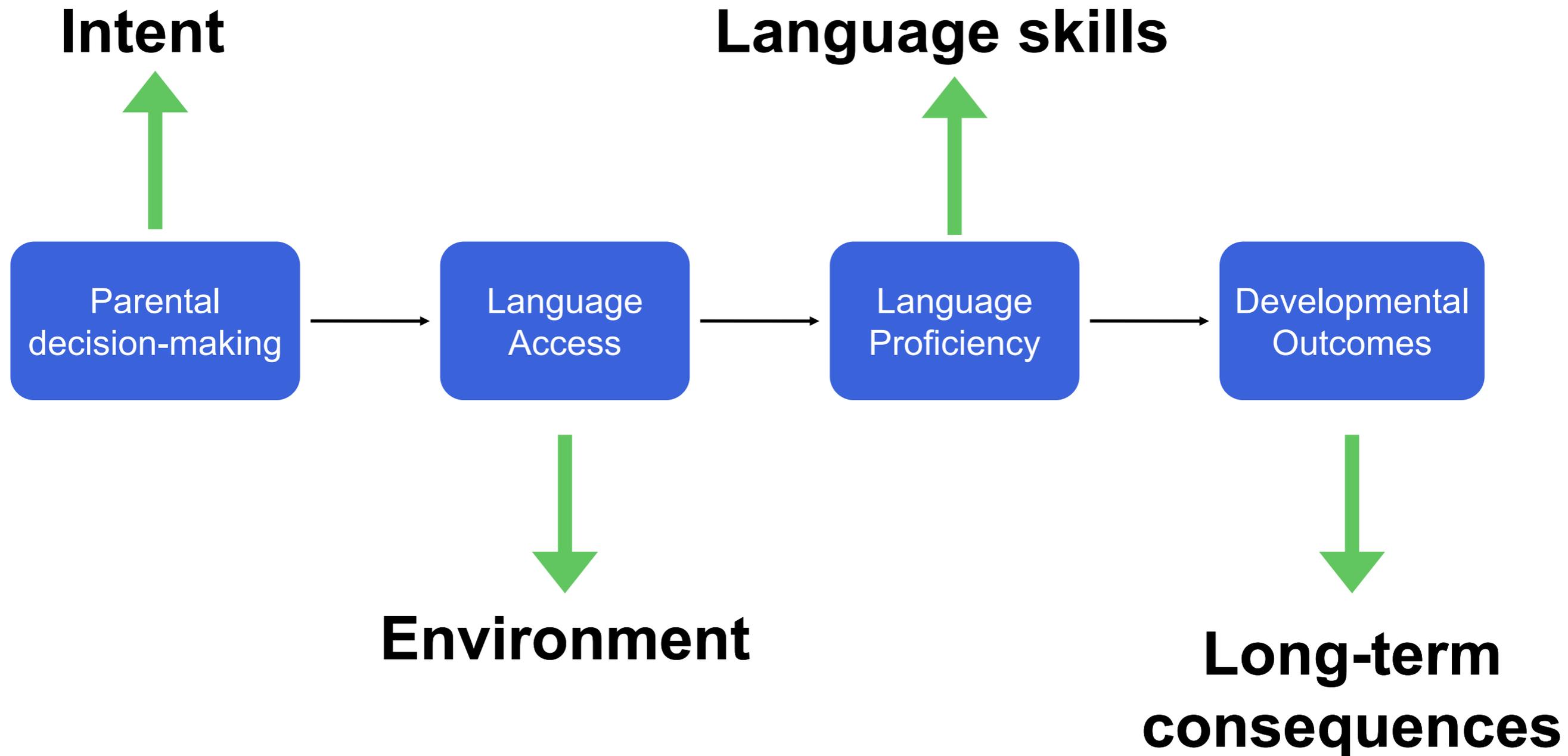




WHAT

NOW?

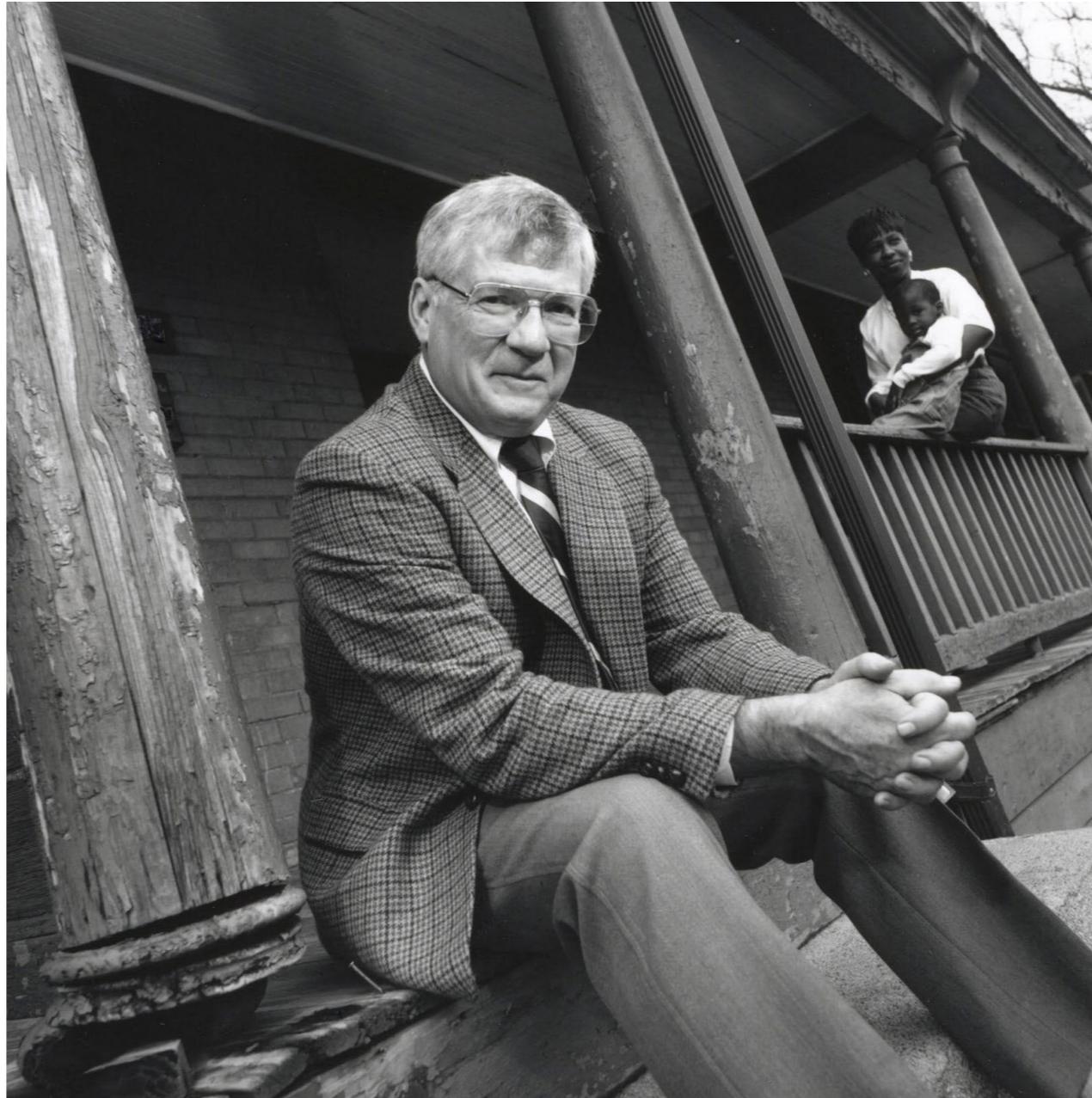
Communicate Clearly.



Be a Lorax.



Find your Needleman.

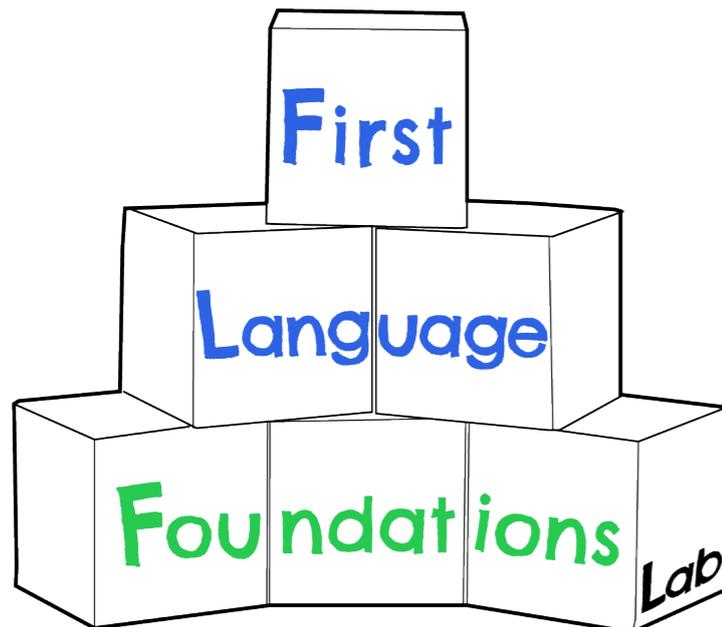


Thank you!

Matthew L. Hall, Ph.D.

Dept. of Communication Sciences & Disorders

matthall@temple.edu



College of Public Health