

Association of early intervention on 3rd grade reading levels for children who are deaf/hard of hearing

Jareen Meinzen-Derr, Elodie Betances, Susan Wiley, Wendy Grove



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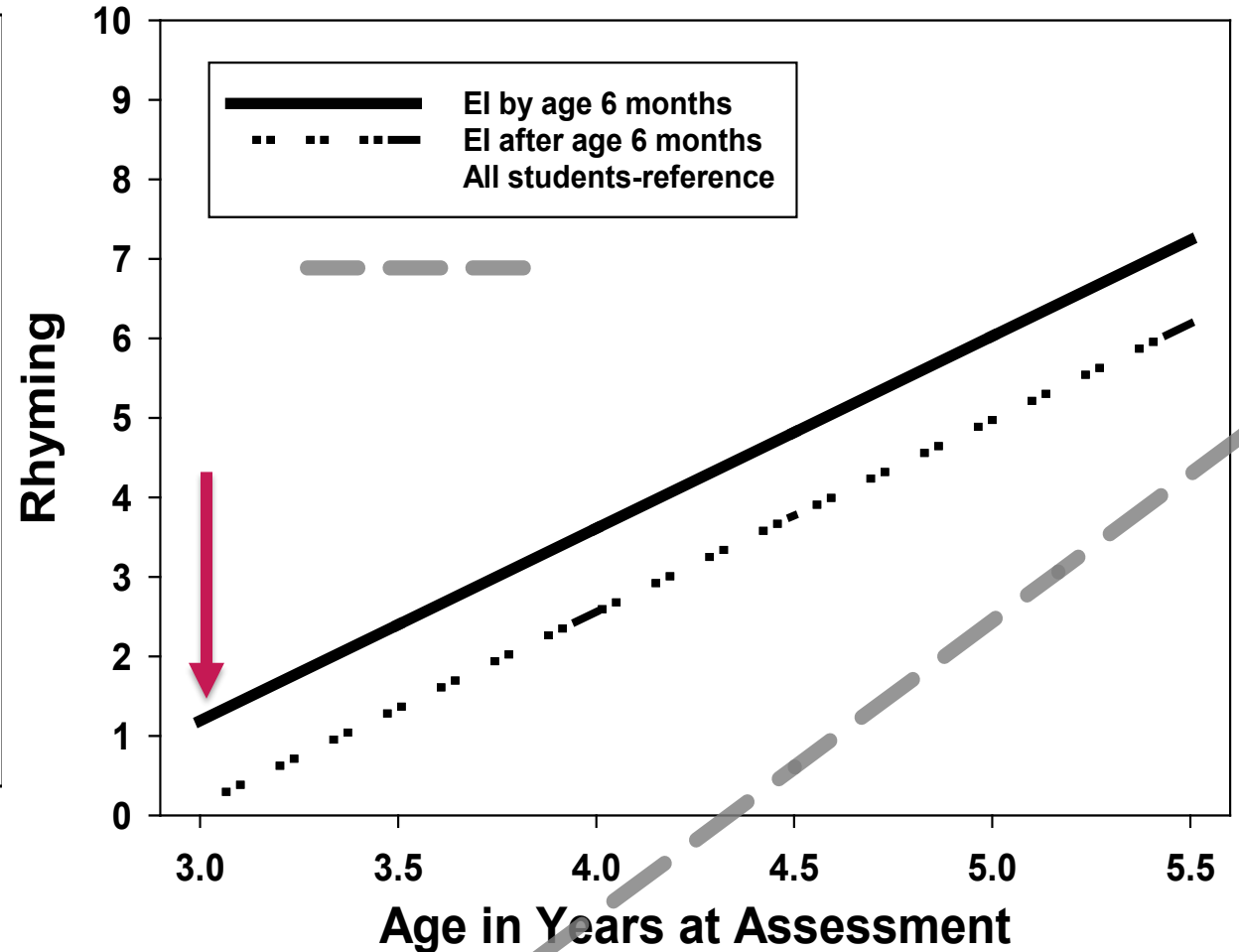
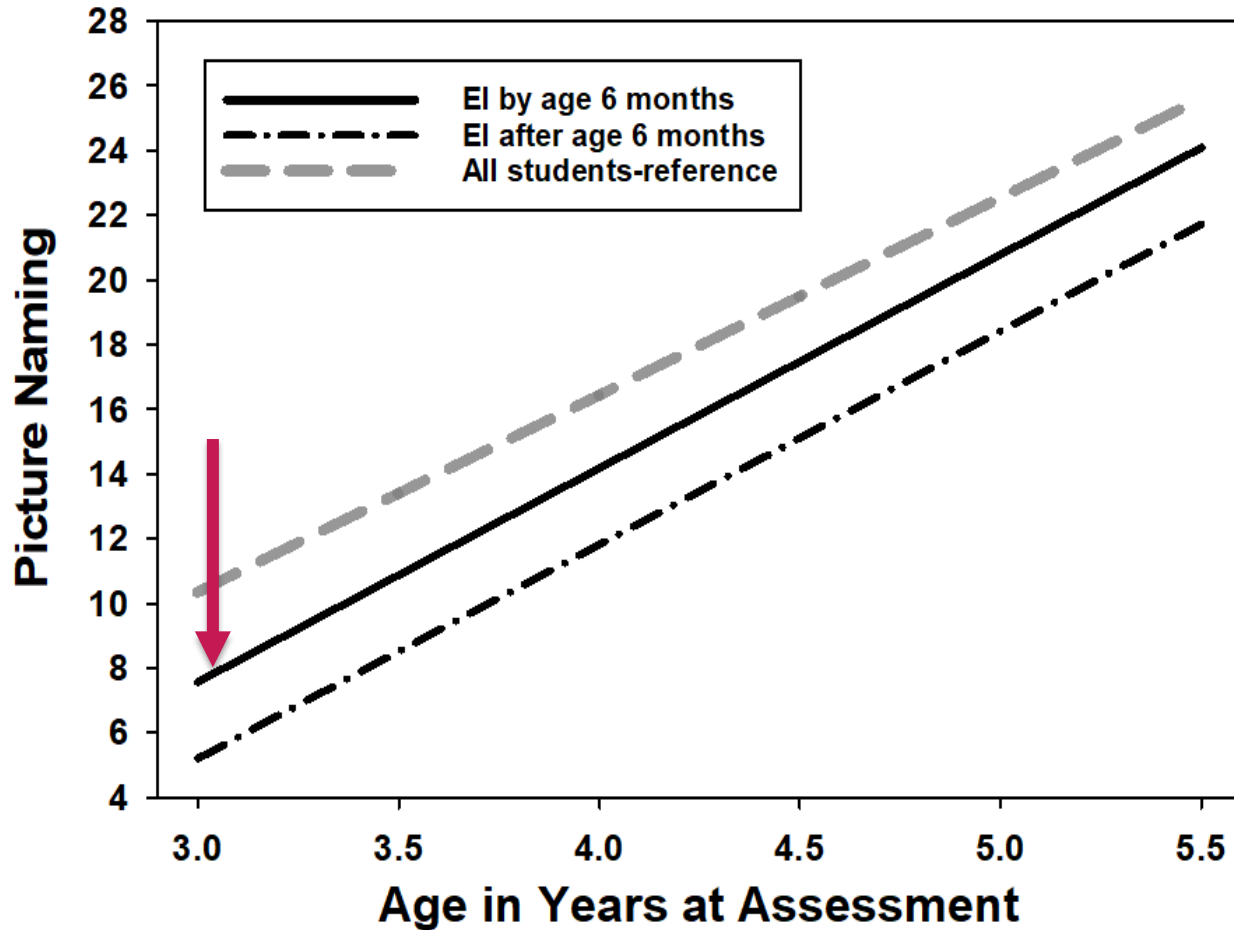
Background

- EHDI benchmarks screening by 1 month, diagnosis by 3 months, Early Intervention (EI) by 6 months
 - Majority of evidence supports early access to EI and language development in first 36 months
 - Emerging evidence suggests early EI enrollment is associated with pre-literacy skills in preschool and kindergarten readiness
 - Literacy is important to access information across all aspects of our lives.
 - Critical for full participation in education and employment
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- Literacy skills need to be taught

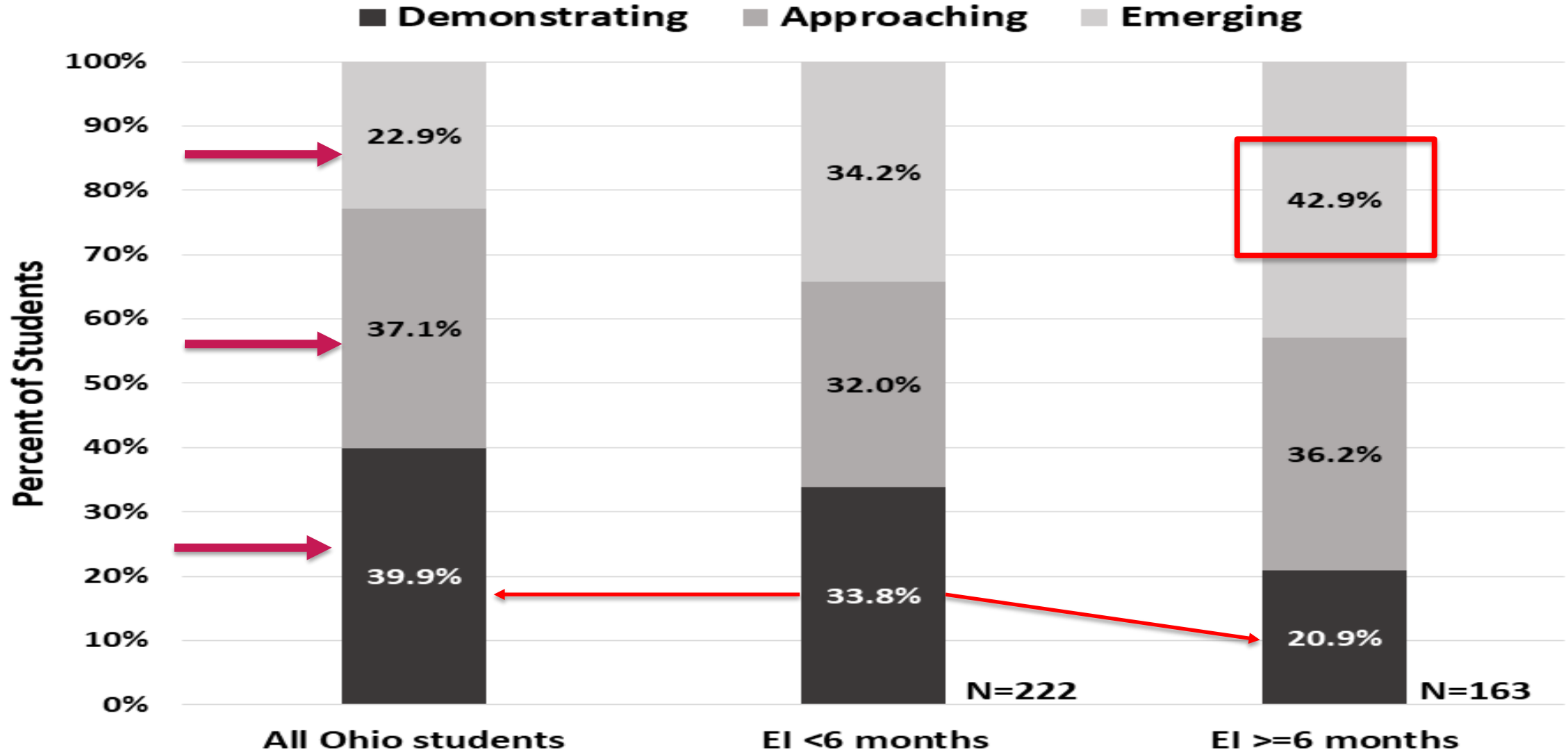
Reading proficiency among young DHH students



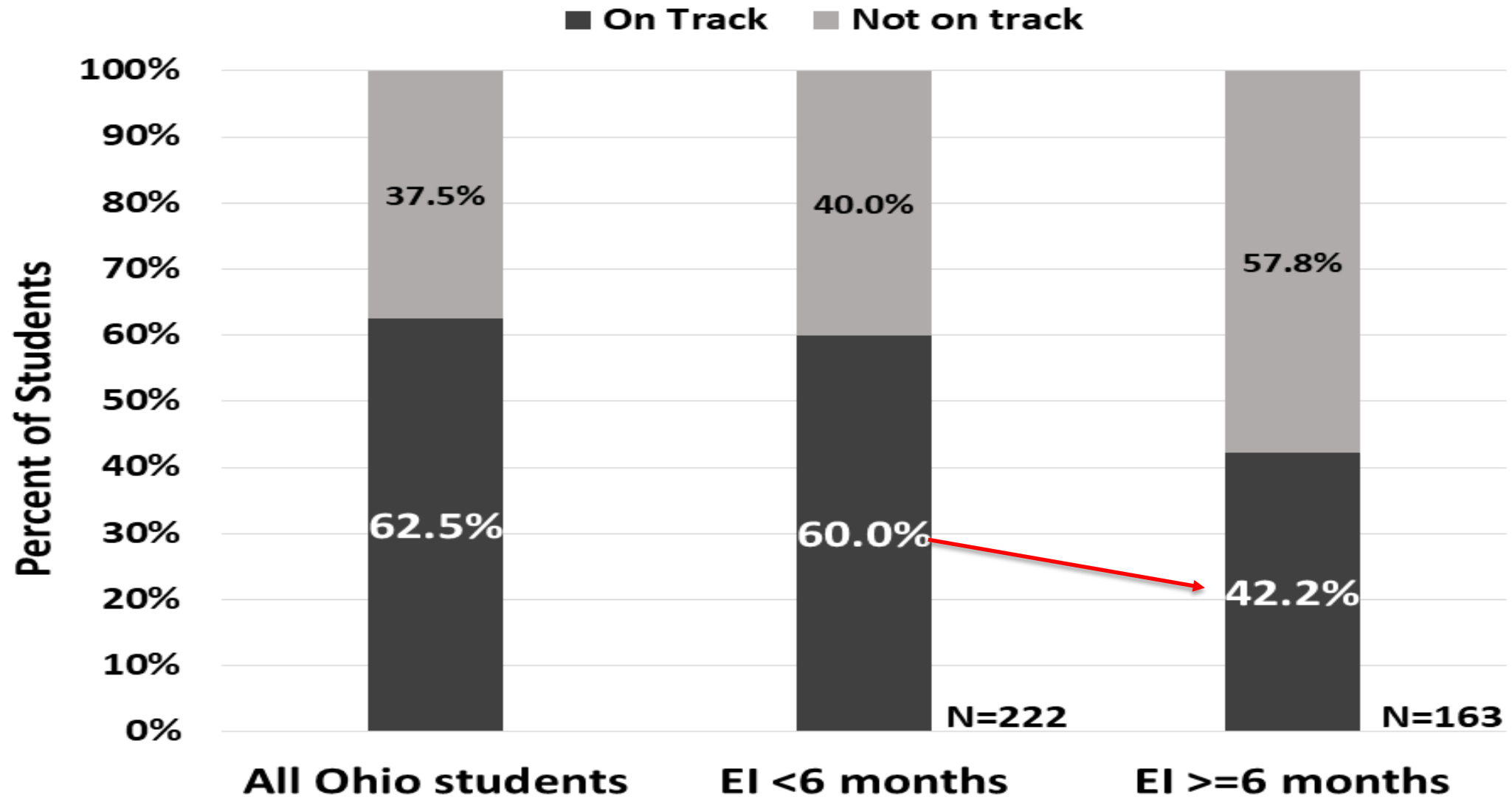
Early EI enrollment impacts pre-literacy



Early EI enrollment impacts kindergarten readiness



Language and Literacy “on track”



Objective

To evaluate the effect of entering (Part C) Early Intervention by age 6 months (early) vs. after age 6 months (later) on reading proficiency among DHH 3rd graders

Methods – Ohio birth cohort

- This study leverages the Ohio EHDI Data Linkage Project of **1262 DHH Infants (born 2008-2014) and enrolled in EI**
 - Hearing screening and birth data
 - EI data
 - Educational records from preschool to 5th grade
- Analysis included data on 417 DHH 3rd graders; 56% (232) who enrolled in EI by age 6 months

Reading proficiency assessment in Ohio

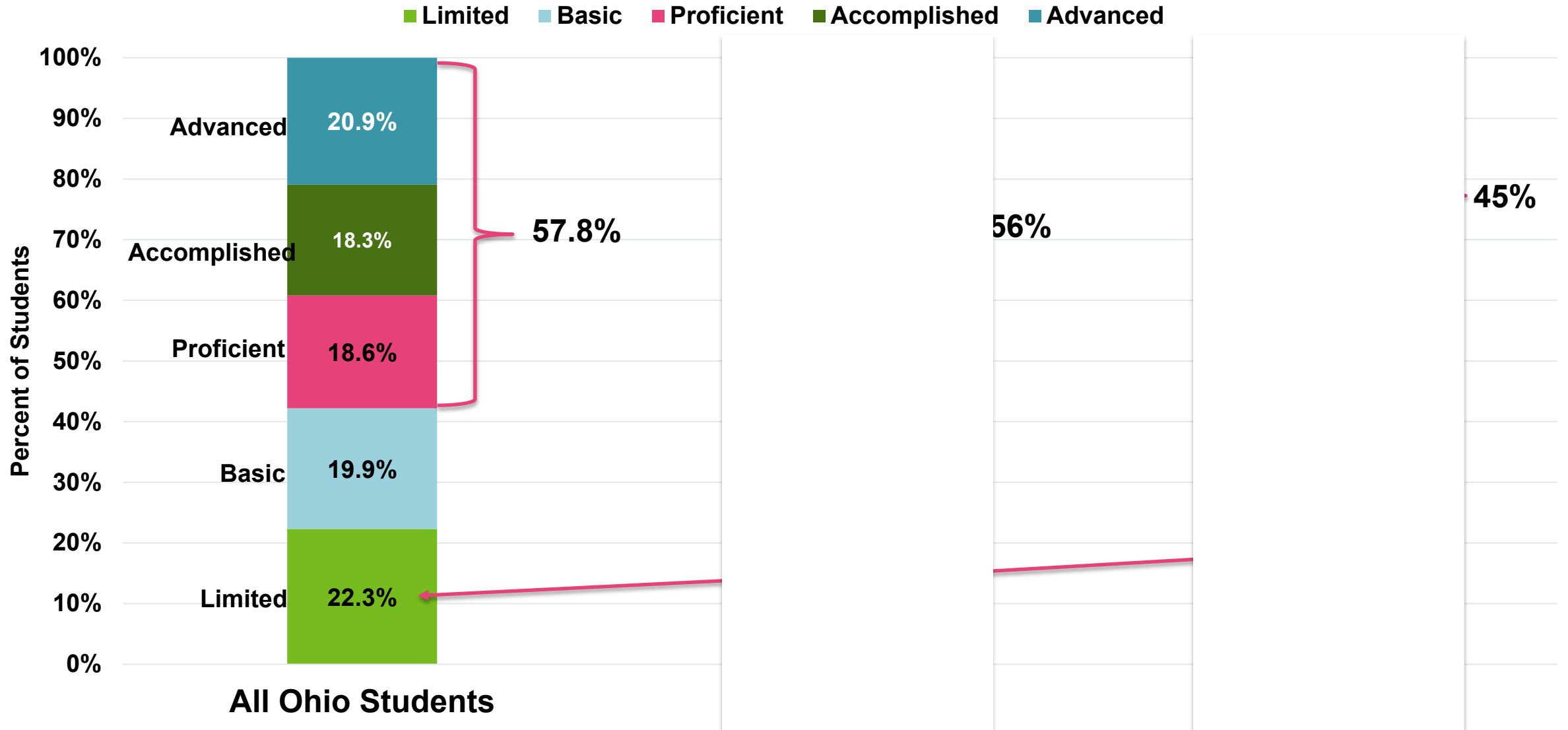
- Every district and school in Ohio must administer standardized reading diagnostic assessment by Sept 30 for grades 1-3 (test is also taken in Spring)
- State-approved list or state-developed diagnostic tool
 - Assess informational and foundational skills
 - Key ideas and details, fluency, phonics and word recognition
- Limited → Basic → Proficient → Accomplished → Advanced

Characteristics of DHH 3rd Graders

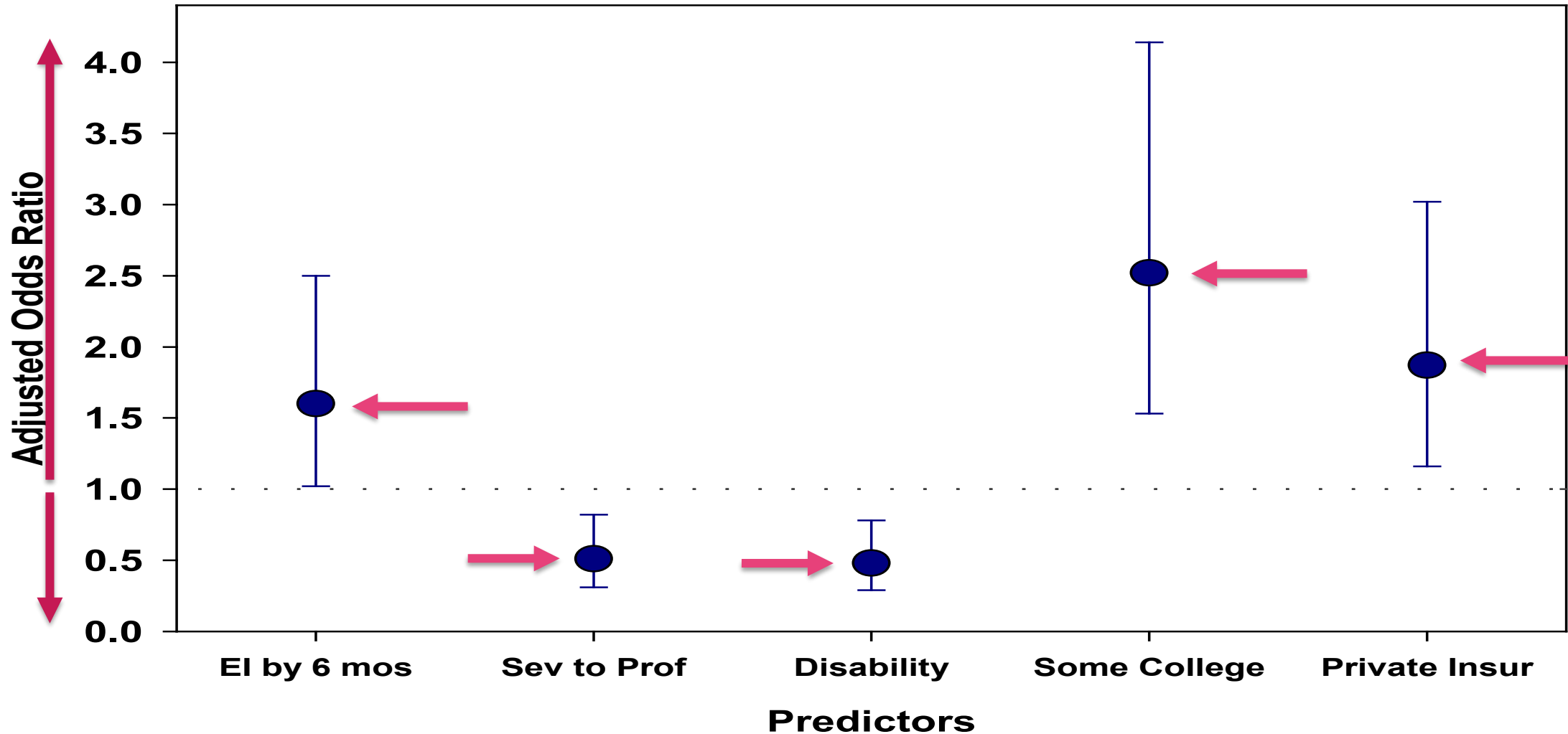
Characteristic	Enrolled EI Early N=232 (55.6%)	Enrolled EI Later N=185 (44.4%)	p-value
Gender at birth, Female – n (%)	104 (44.8%)	90 (48.7%)	0.44
Race			0.12
Black/African American	25 (10.8%)	31 (16.8%)	
White	197 (84.9%)	140 (75.7%)	
Other*	6 (2.6%)	9 (4.9%)	
Unknown	4 (1.7%)	5 (2.7%)	
Ethnicity, Hispanic –n(%)	3 (1.3%)	4 (2.2%)	0.7
Premature birth -n(%)	45 (19.9%)	36 (20.1%)	0.96
Age hearing difference confirmed-median [IQR]	2.3 [1.4-4.4]	6.1 [3.4-13.5]	<0.001
Has risk indicator for hearing difference - n (%)	106 (45.7%)	60 (32.4%)	0.006
Developmental delay in at least one of 5 domains n(%)	41 (17.7%)	48 (26.0%)	0.04
Disability diagnosis -n(%)	82 (35.3%)	33 (17.8%)	<0.001
Parent has some college education – n(%)	155 (66.8%)	84 (56%)	0.002
Receive private insurance -n(%)	142 (63.7%)	86 (48.3%)	0.002
Bilateral hearing difference -n (%)	168 (72.4%)	149 (80.5%)	0.05
Severe to profound hearing levels -n(%)	78 (33.6%)	51 (27.6%)	0.18

*Asian, Middle Eastern, Pacific Islander

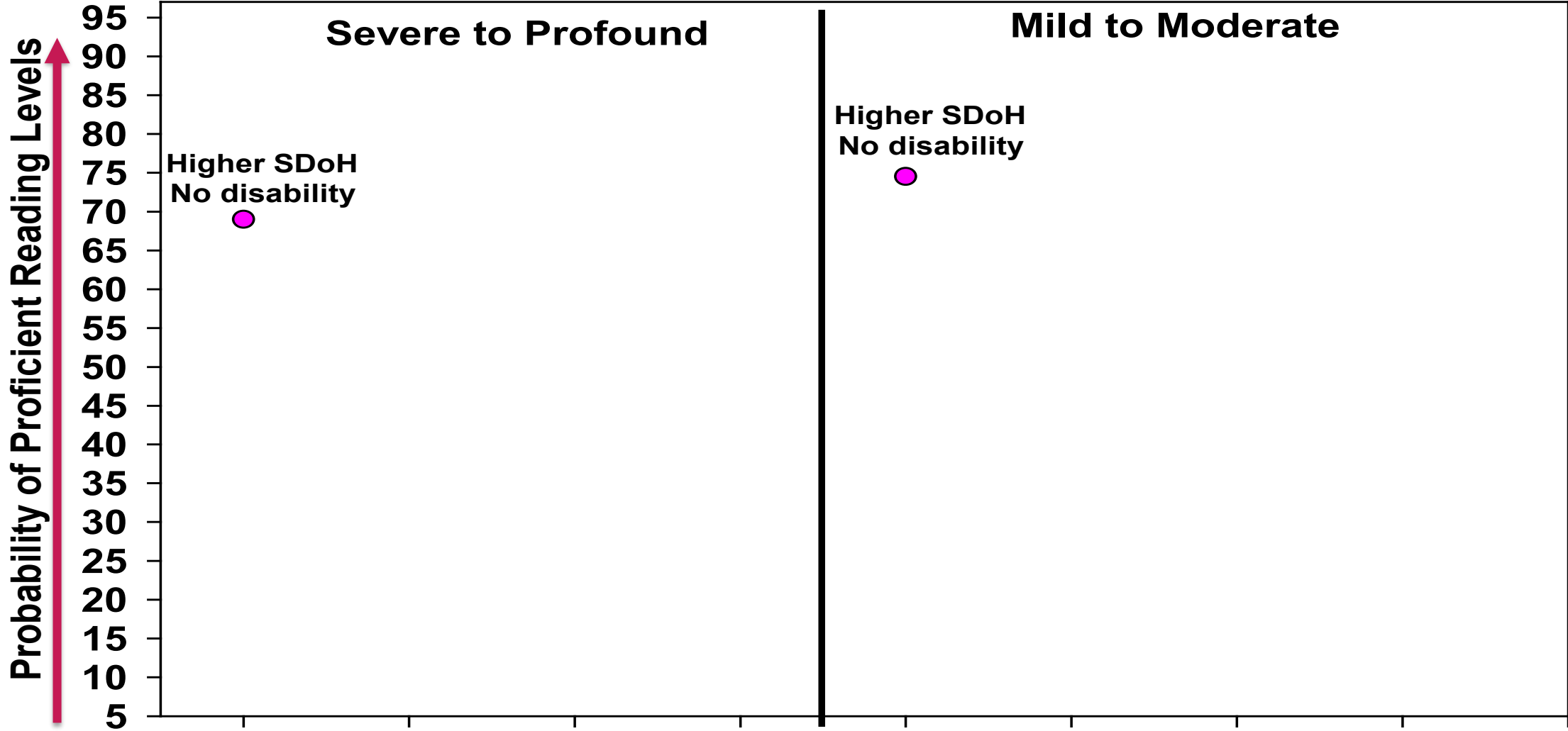
Reading proficiency of DHH 3rd graders who received EI and for all Ohio students



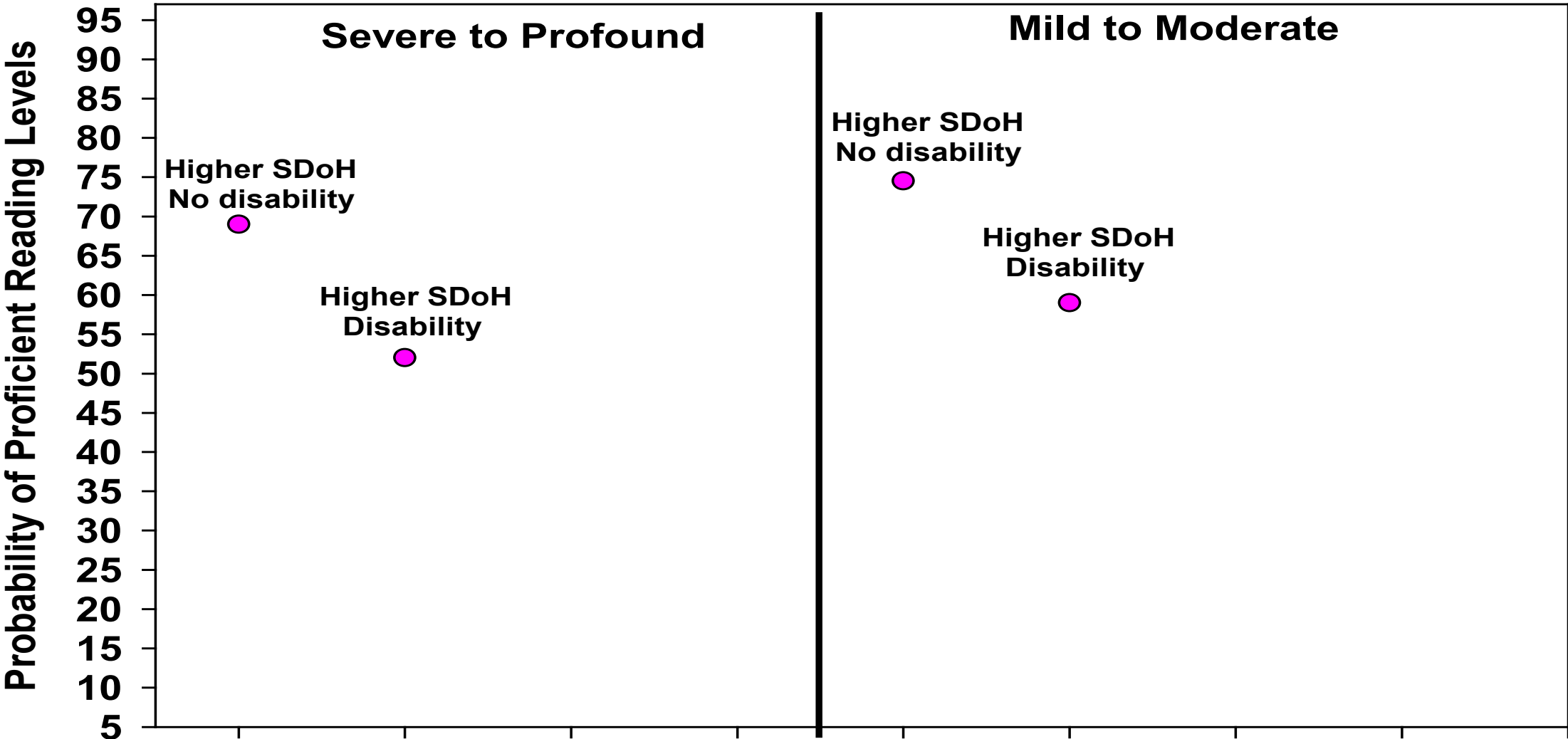
Factors associated with reading proficiency



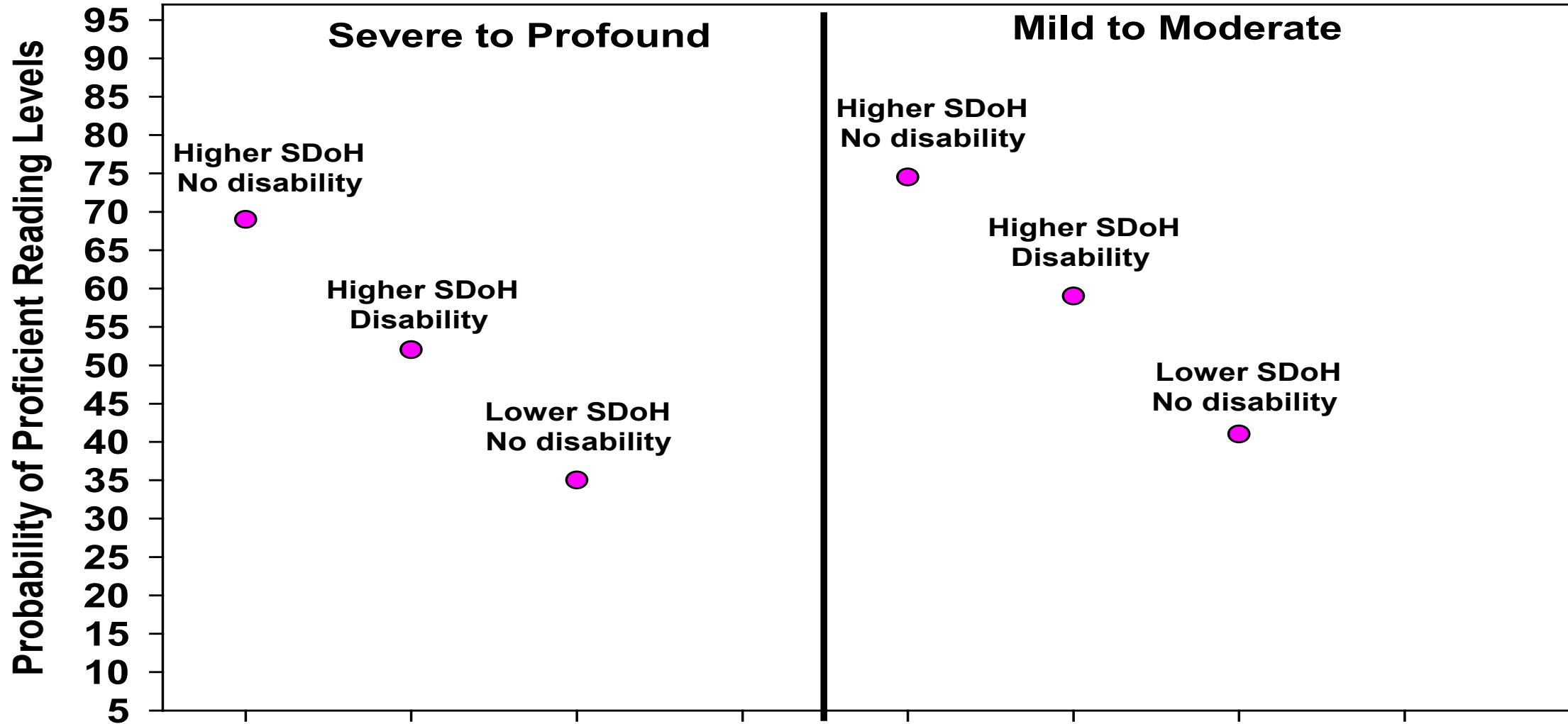
Estimated probabilities of reading proficiency



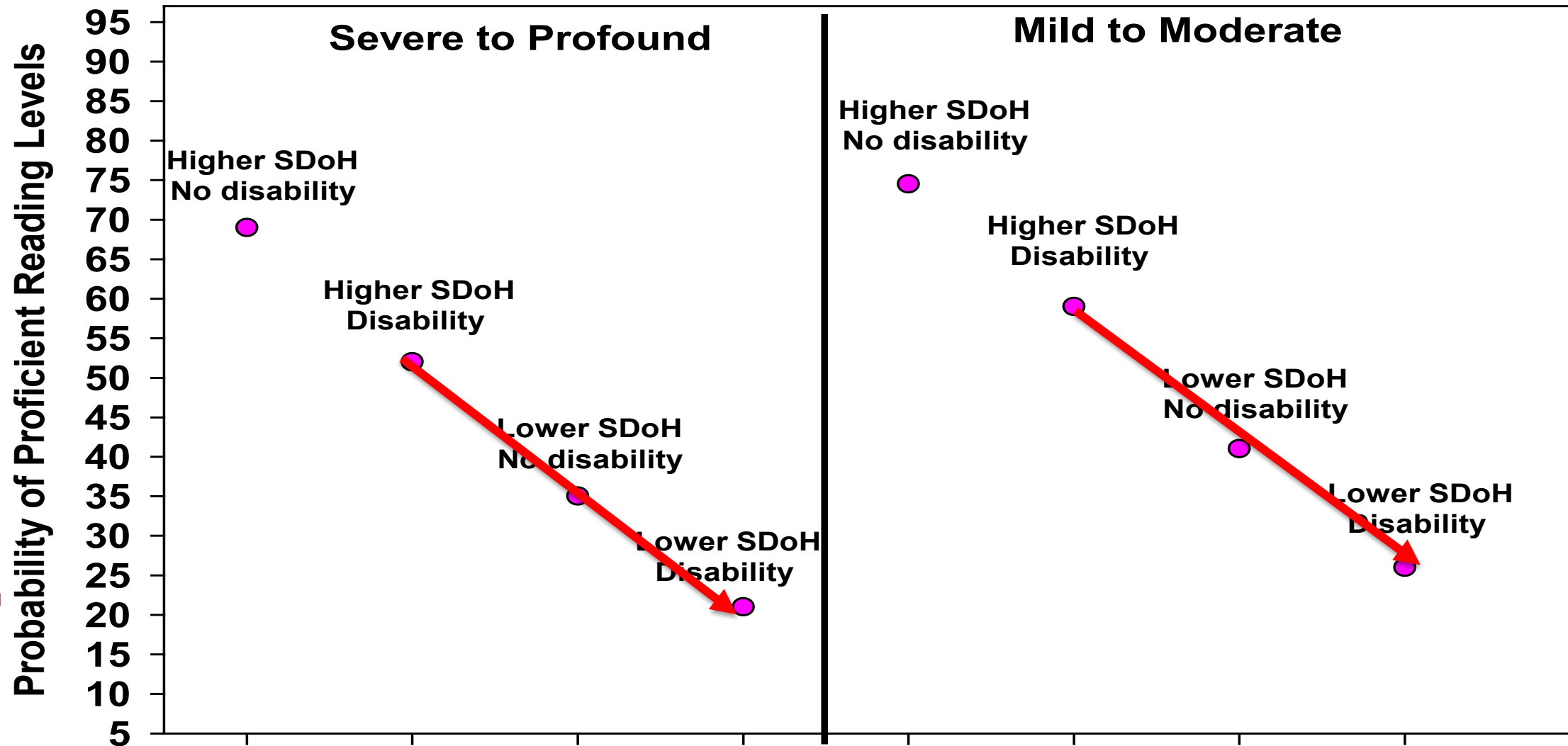
Estimated probabilities of reading proficiency



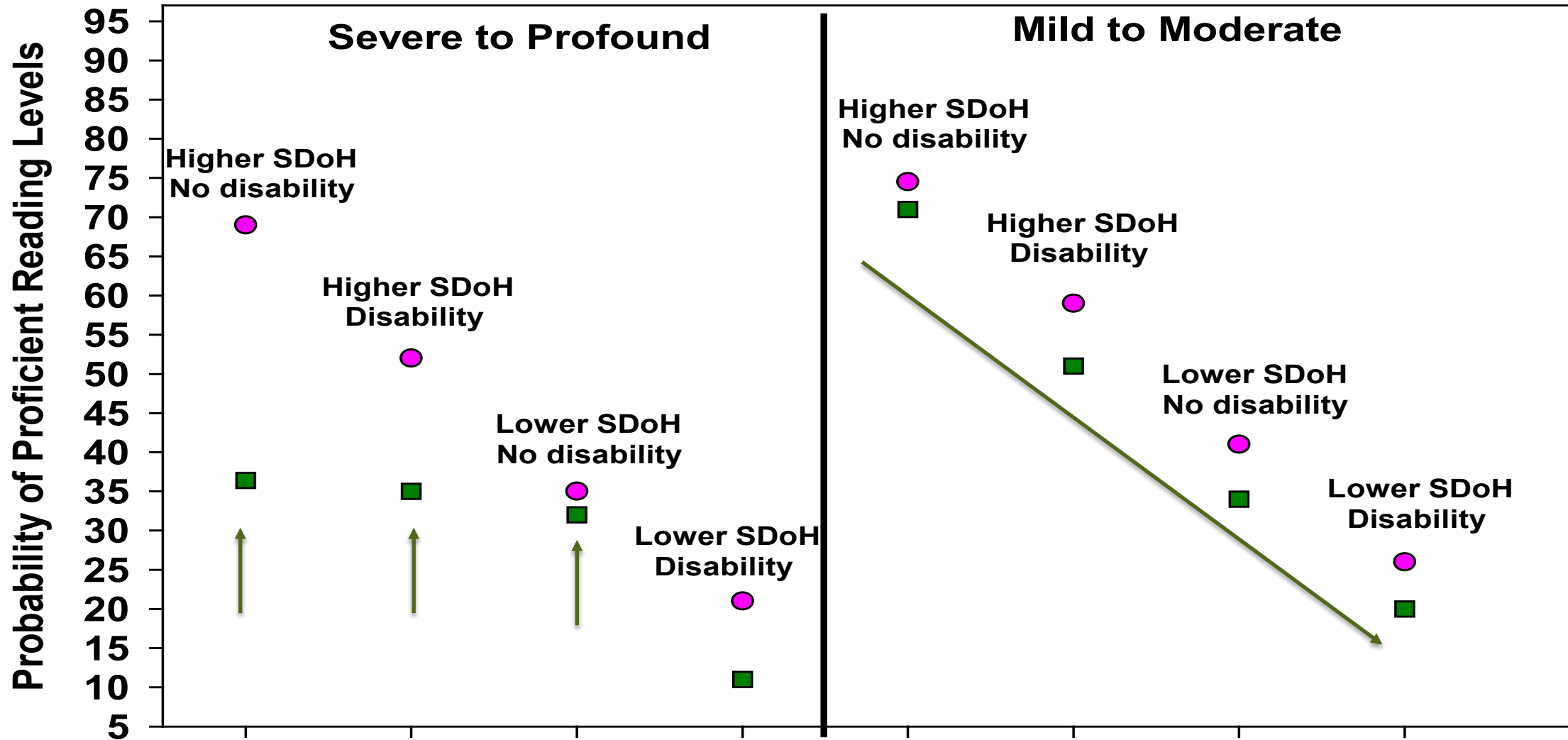
Estimated probabilities of reading proficiency



Estimated probabilities of reading proficiency



Impact of late EI entry



Limitations

- Dichotomized EI entry at 6 months (not look at ideal cutoffs)
- Lacking information on
 - use of hearing technologies
 - classroom specifics
 - Language access
 - Hearing differences
- No great information on true SDoH (just poor proxies with parental education, insurance status)

In summary

- Enrolling in EI by 6 months of age appears to have a lasting impact on reading proficiency in 3rd grade
- Other factors, such as degree of hearing differences, disability, social determinants of health play a role in outcomes
- Evaluating long-term outcomes is vital as gaps may widen

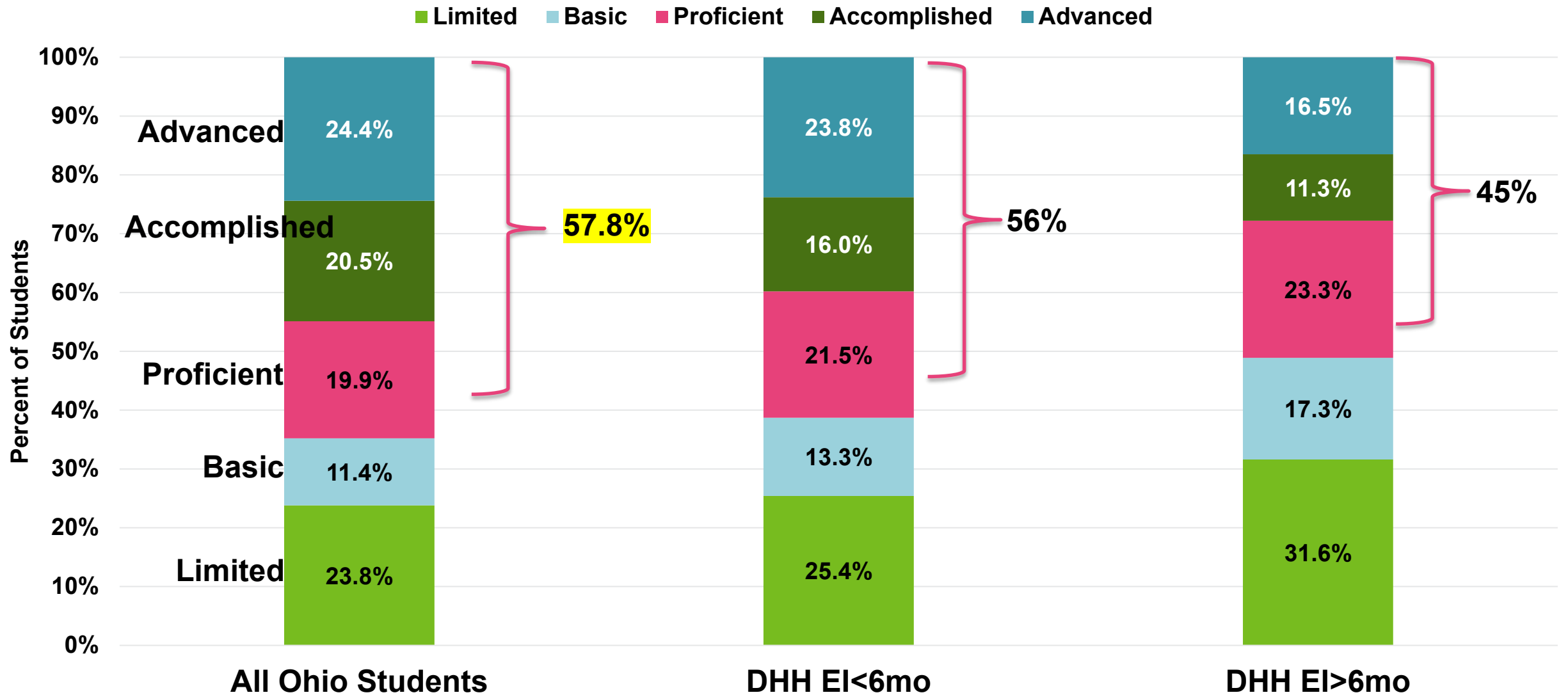
Finally

- Consider what is in our sphere of influence - how can we get more children to benefit from early EI access
- Consider staying curious with families so we can help support families where they are



jareen.meinzen-derr@cchmc.org

Math proficiency of DHH 3rd graders who received EI and for all Ohio students



Odds of 3rd Grade Reading Level of Proficient or Better

Predictor	Adjusted Odds Ratio	95% Confidence Interval
Early EI Entry (Prior to 6 months)	1.60	1.02, 2.50
Disability Diagnosis	0.48	0.29, 0.78
Some Maternal College Education	2.52	1.53, 4.14
Private Insurance	1.87	1.16, 3.02
Severe to Profound Hearing Loss	0.51	0.31, 0.82