

Look Before Leaping: *Considerations for evaluating population health interventions*

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Traditional Territories Acknowledgement

The University of Manitoba campuses are located on original lands of Anishinaabeg, Cree, Oji-Cree, Dakota, and Dene peoples, and on the homeland of the Métis Nation.

We respect the Treaties that were made on these territories, we acknowledge the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

Full-Day Kindergarten - Populations Studied

Targeted program – School Divisions A and B

FDK classrooms in
schools in low SES
since 1998

Compared FDK kids in
Division A to matched
HDK kids in Division B

Universal program – School Division C

FDK introduced in 1999
but implemented
gradually across division
over 5 years

Compared same schools
before and after FDK



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Evaluation Framework in PATHS

- Rubin's Potential Outcomes Framework



Evaluation Framework in PATHS

Rubin's Potential Outcomes Framework

- Every child has two potential outcomes
 1. Outcome when receive Healthy Baby Benefit
 2. Outcome when not receive Health Baby Benefit
- Difference between two outcomes if the “effect” of the program

**Cannot observe both outcomes:
Fundamental Problem**

Evaluation Framework in PATHS

Strategies to address fundamental problem

- Randomization
 - Can provide unbiased estimate of causal effect
 - Not always feasible in applied research
- “Quasi-Randomization” – Instrumental Variables
 - Can provide estimates which approximate results from randomized studies
 - Difficult to identify a “good instrument”

Evaluation Framework in PATHS

Strategies to address fundamental problem

- Create comparable groups using adjustment
 - Similar based on observable variables
 - Do not know whether groups are similar based on unobservable variables

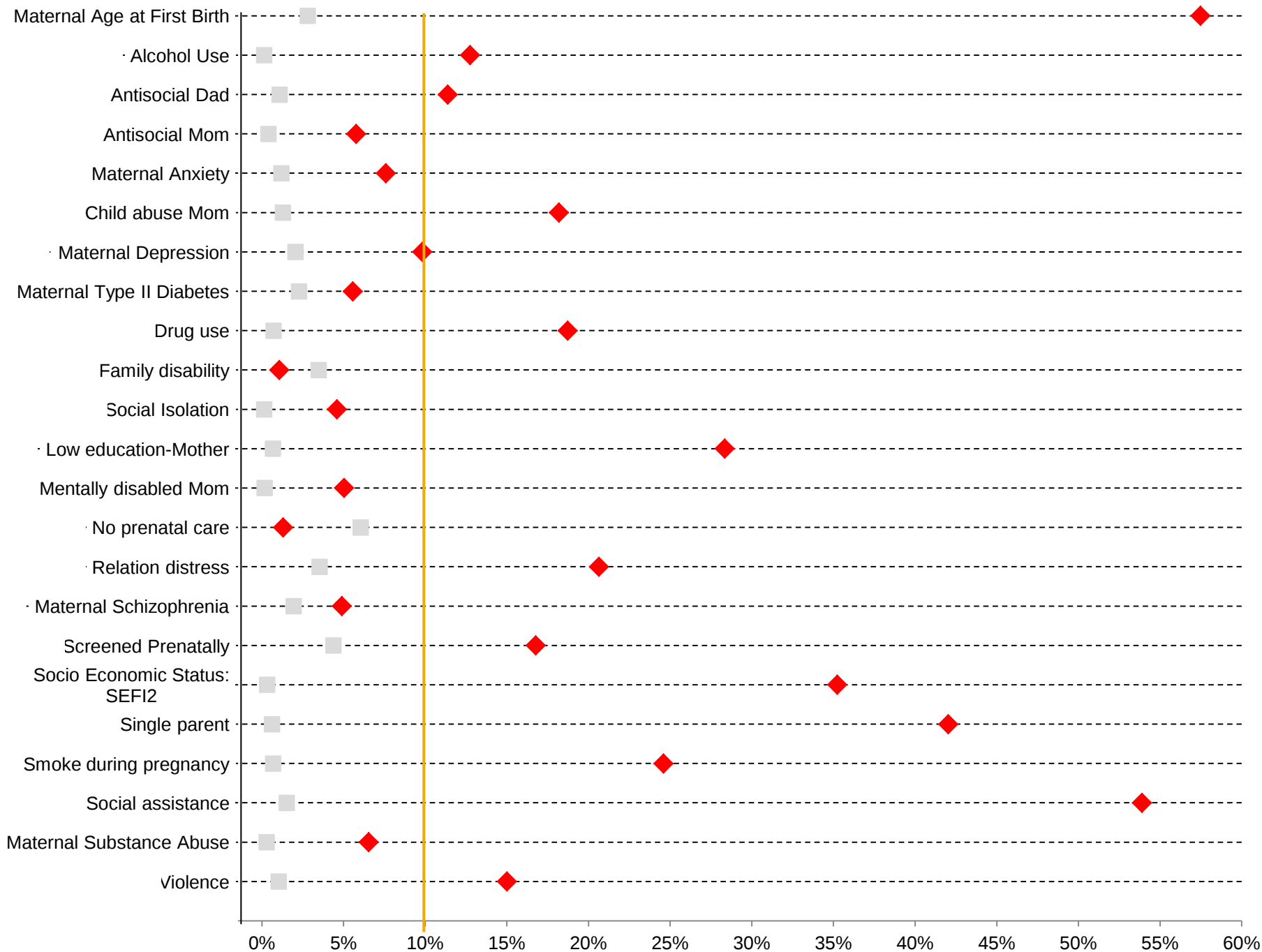


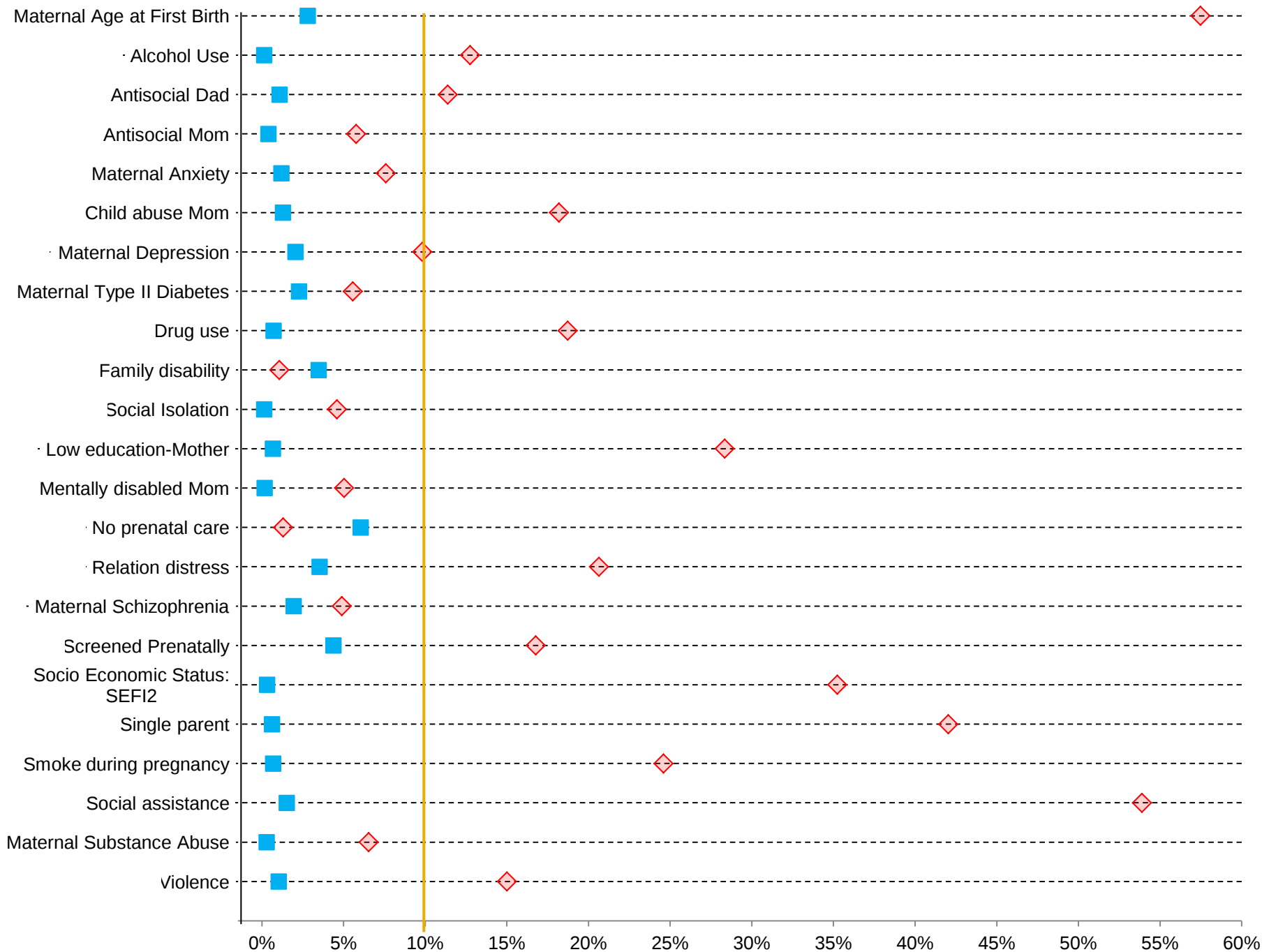
Creating Comparable Groups

- Used propensity score to adjust for many confounding variables
 - **Full Day Kindergarten:** propensity score used to match children
 - **Healthy Baby & Families First:** propensity score used to construct “*Inverse Probability of Treatment*” weights
- Apply the propensity scores to the data

Did the Propensity Score Work?







Significant Findings

		Grade 3 Reading	Grade 3 Numeracy	Grade 7 Math	Grade 7 student Engage't	Grade 8 Reading /Writing	Grade 9 Achieve't
Targeted	SES*K	ns	Middle SES	Low SES	High SES	ns	ns
	Sex*K	ns	ns	Girls	ns	Boys	ns
Universal	SES*K	-	-	ns	ns	ns	ns
	Sex*K	-	-	ns	Girls	ns	ns



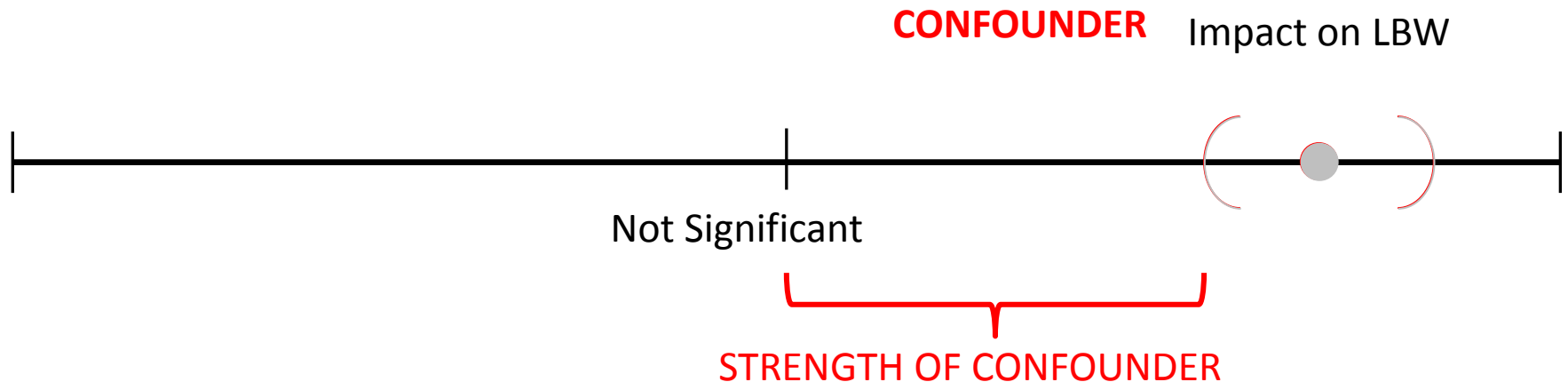
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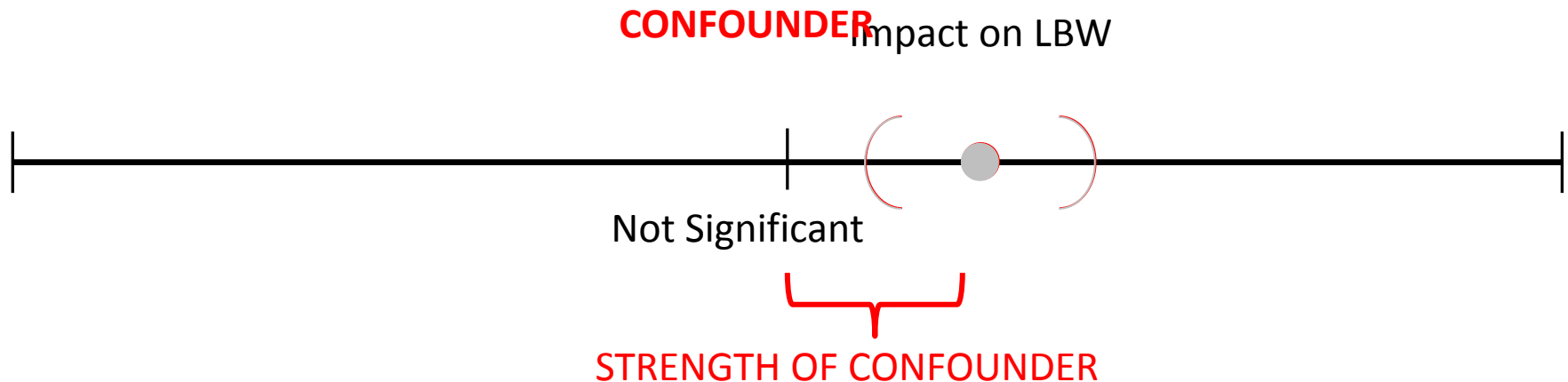
Can we hang our hat on these results?

- Likely, there exists some unmeasured confounding.
- How much confounding is needed to nullify our findings?



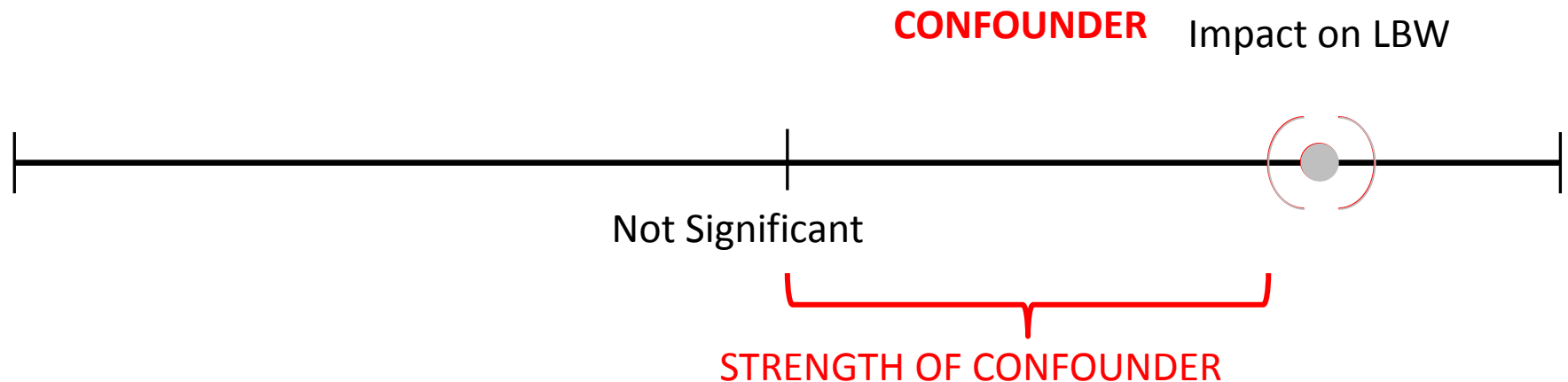
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Can we hang our hat on these results?

- Sensitivity Test quantifies the strength of this unmeasured confounding
- How strong of a confounder will nullify findings?
 - If a strong confounder is needed: robust to confounding
 - If a weak confounder is needed: sensitive to confounding
- Strength is a function of two things:
 - Size of the relationship FDK → Improved Education Outcomes
 - Precision of the relationship FDK → Improved Education Outcomes

Robust, Significant Findings

		Grade 3 Reading	Grade 3 Numeracy	Grade 7 Math	Grade 7 student Engage't	Grade 8 Reading /Writing	Grade 9 Achieve't
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Universal	SES*K	-	-	ns	ns	ns	ns
	Sex*K	-	-	ns	Girls	ns	ns



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Considerations

- Did the adjustment strategy create similar groups?
- Are statistically significant results sensitive to unmeasured confounding?

Thank You / Questions



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“The results and conclusions are those of the authors and no official endorsement by the Manitoba Health, Healthy Living and Seniors or other data providers are intended or should be inferred.”

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CHALLENGER DEFENDER VISIONARY
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