Designs to Support Better Visual Data Communication

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Cindy Xiong, Assistant Professor
UMass Amherst CICS

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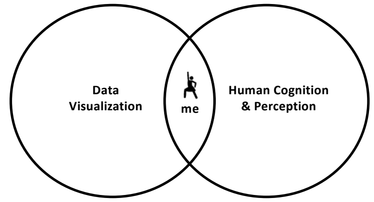

2

Xiong → 

"shown/-tion"
visualization
visualizaXiong (Lab)
cogniXiong
percepXiong
human deciXiong-making

3

Design choices can lead to powerful and intuitive insights, or leave important patterns obscured and misunderstood.

4

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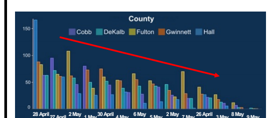

Misleading decreasing trend.

(Georgia Department of Public Health, 2020; Burns, Xiong, Cairo, Franconeri & Mahyar, 2020)

5

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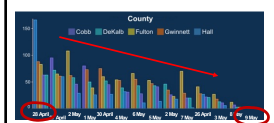

Notice which day had the most/least # of cases.

(Georgia Department of Public Health, 2020; Burns, Xiong, Cairo, Franconeri & Mahyar, 2020)

6

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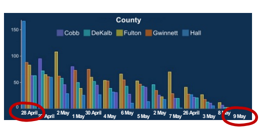

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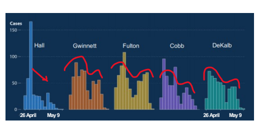

Notice the change in # of cases as time passes.

(Georgia Department of Public Health, 2020; Burns, Xiong, Cairo, Franconeri & Mahyar, 2020)

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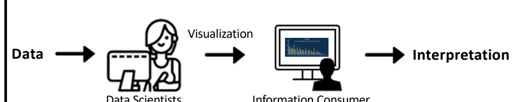

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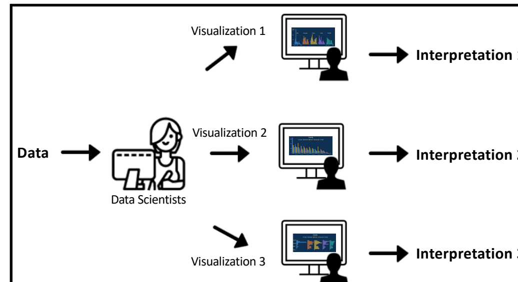

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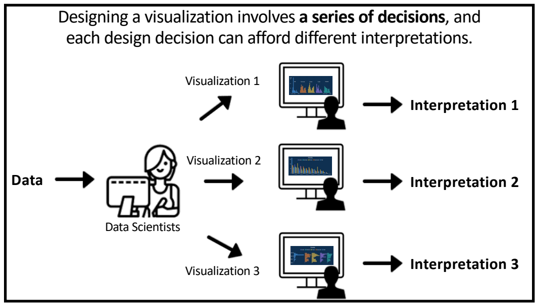

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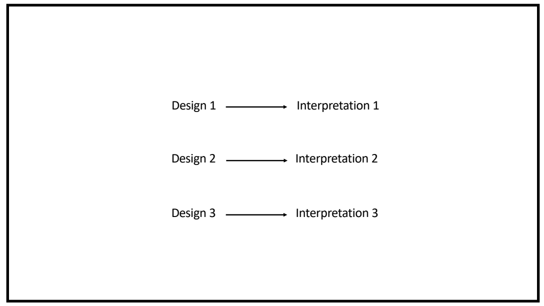

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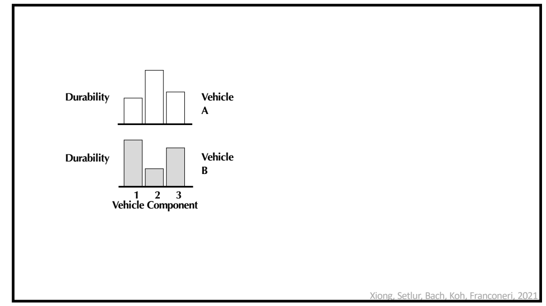

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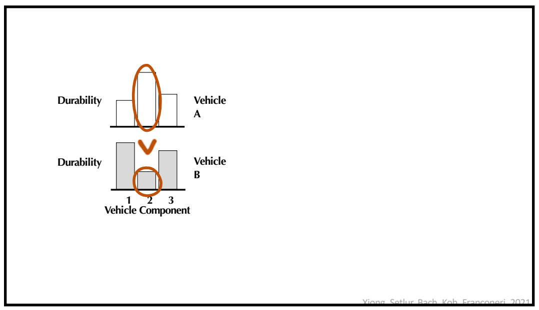

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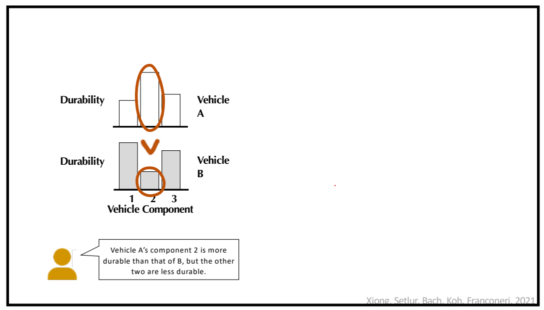

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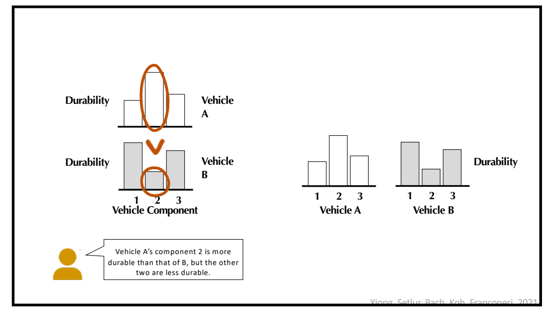

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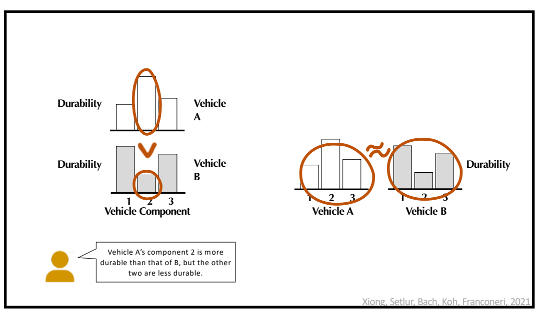

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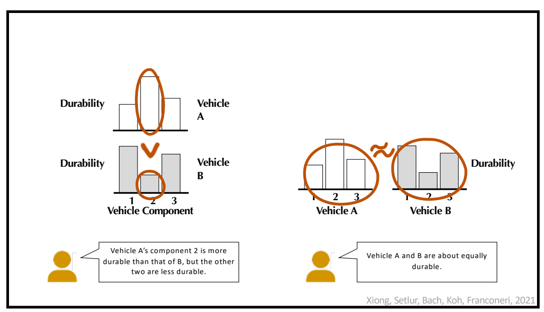

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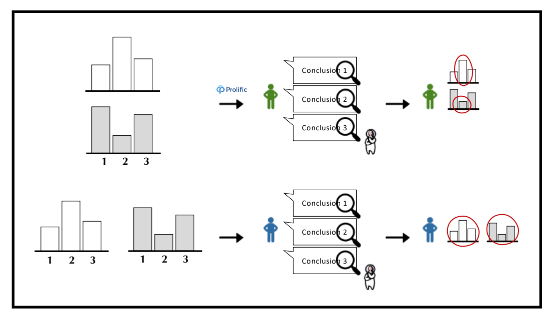

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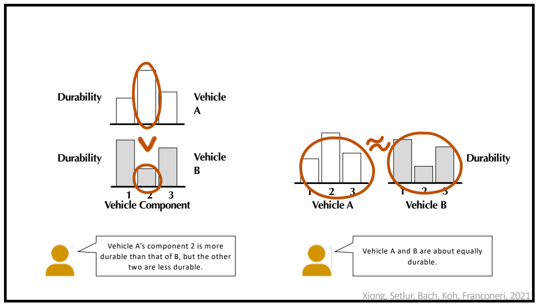

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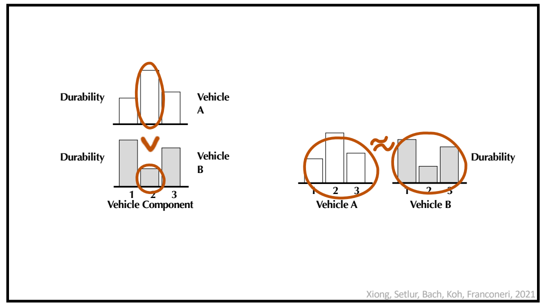

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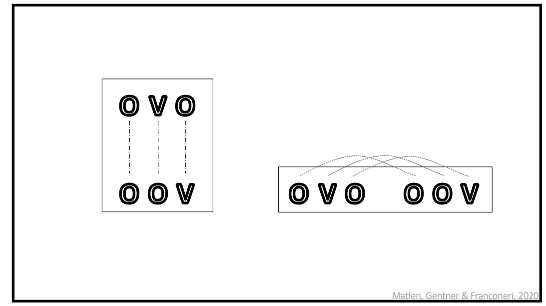

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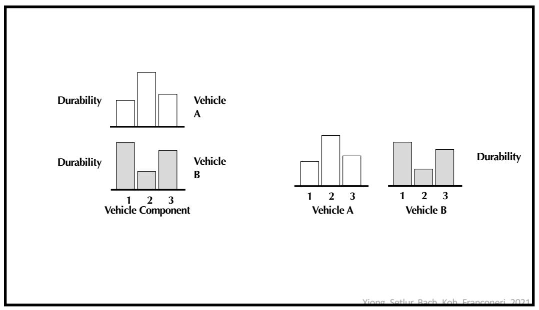

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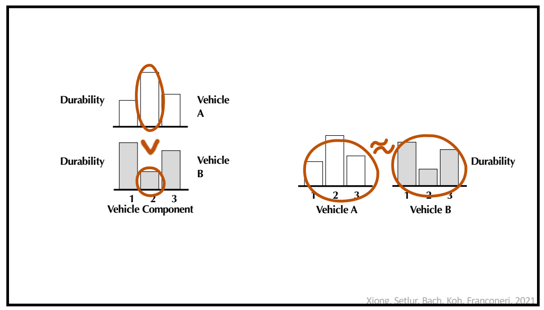

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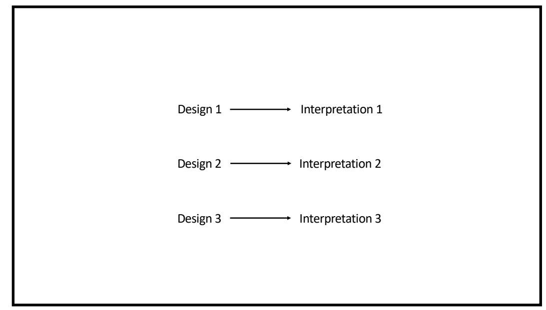

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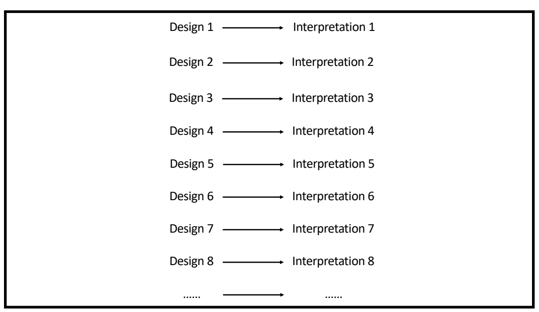

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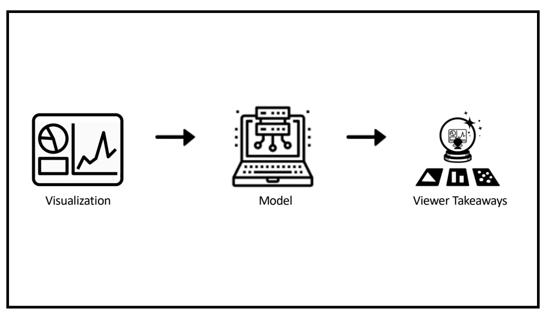

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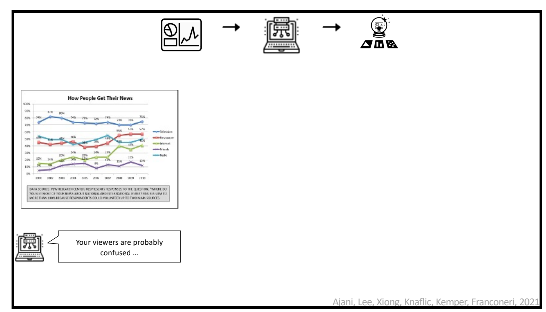

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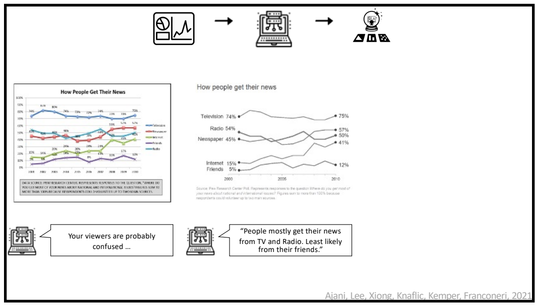

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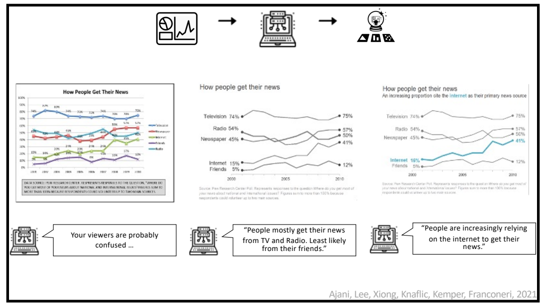

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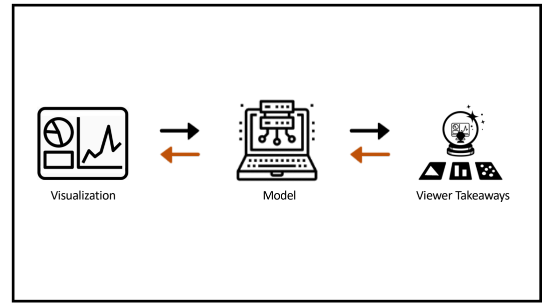

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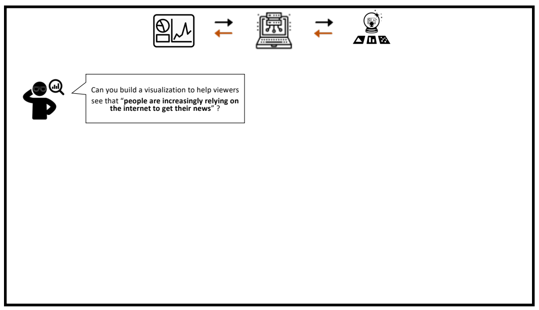

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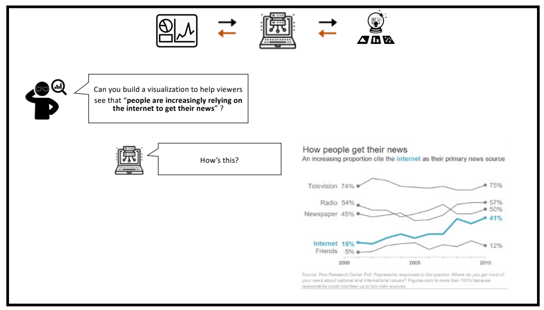

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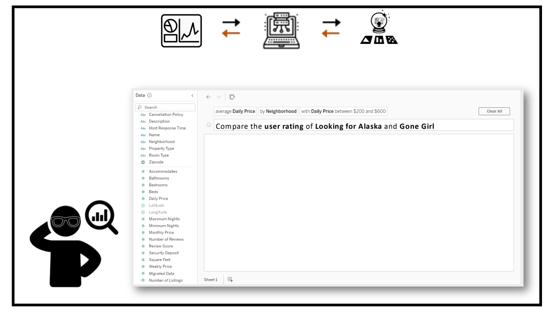

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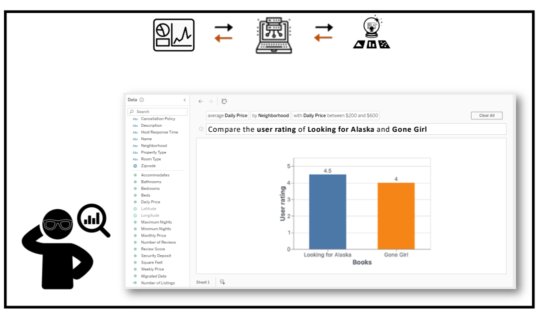

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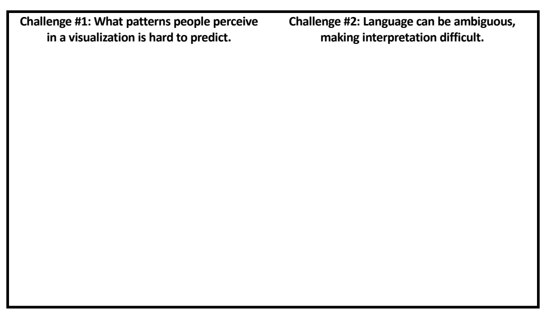

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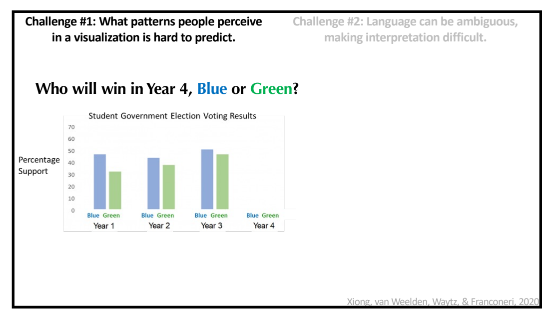

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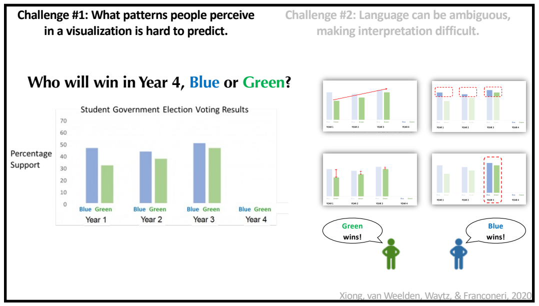

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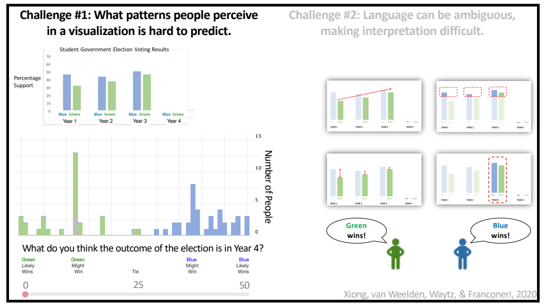

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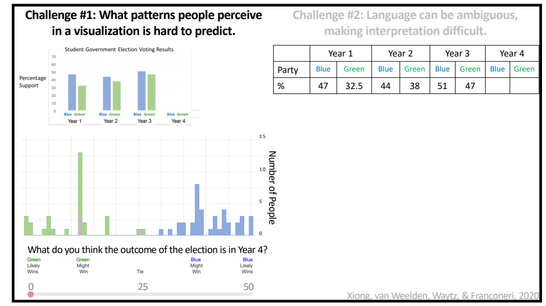

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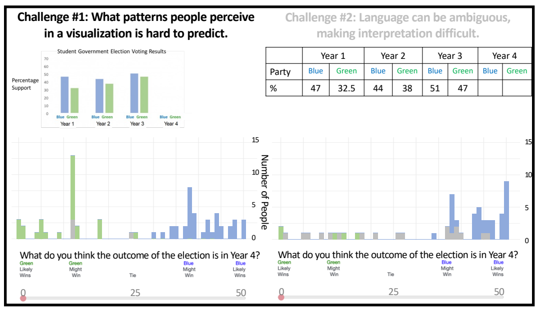

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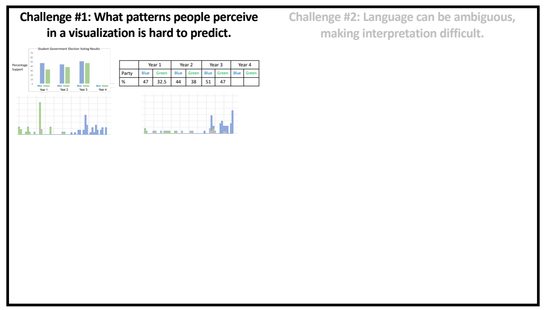

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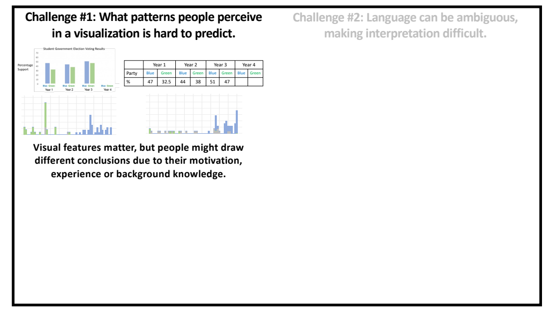

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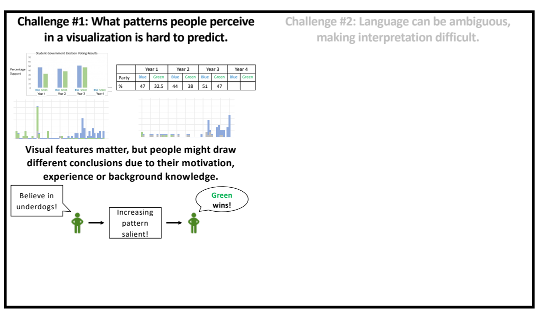

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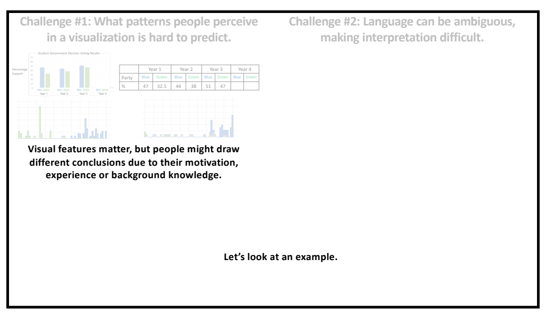

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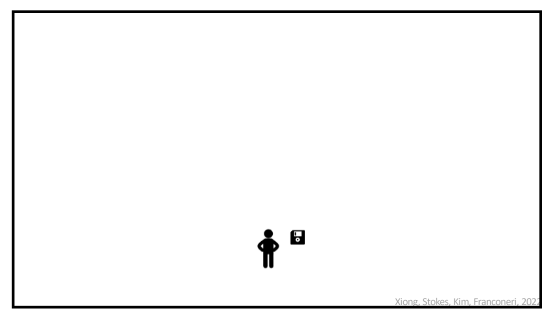

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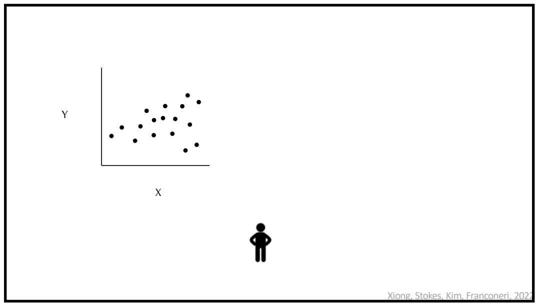

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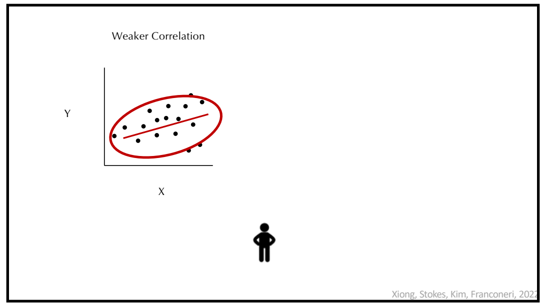

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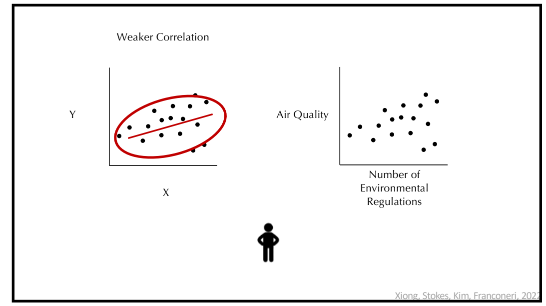

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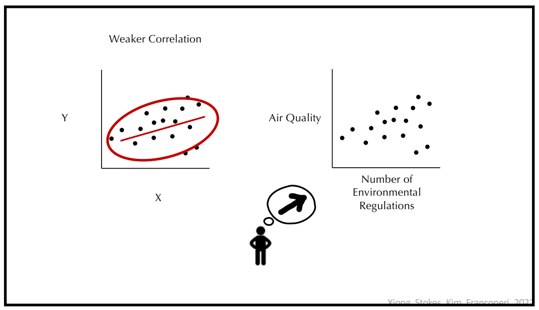

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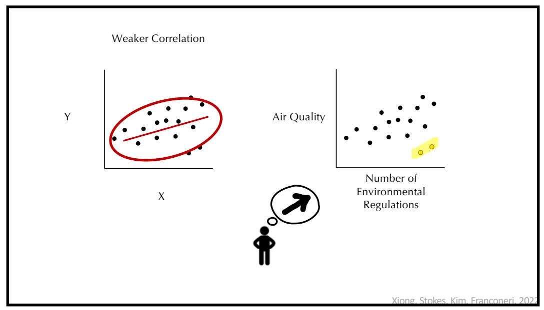

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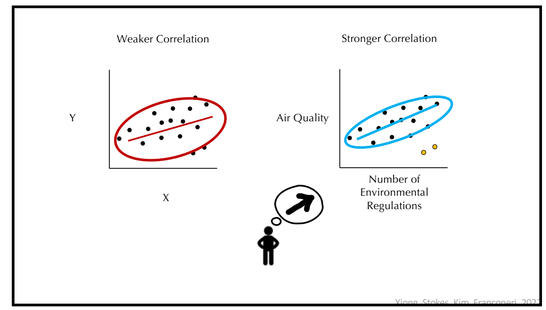

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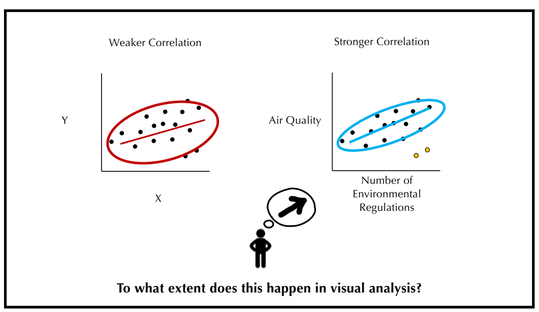

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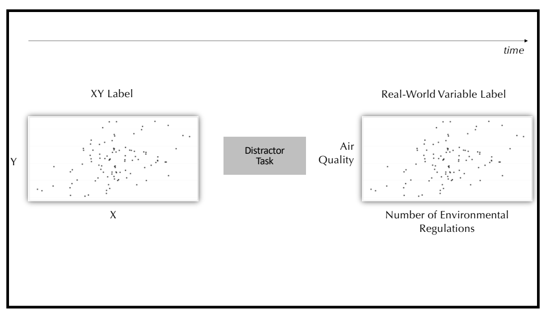

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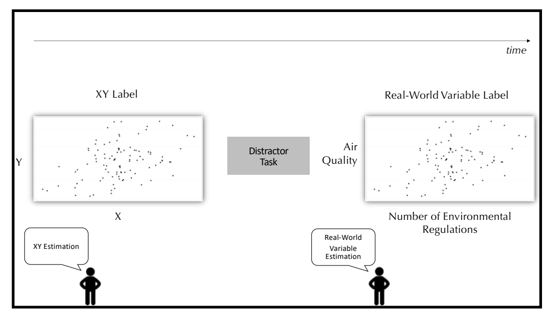

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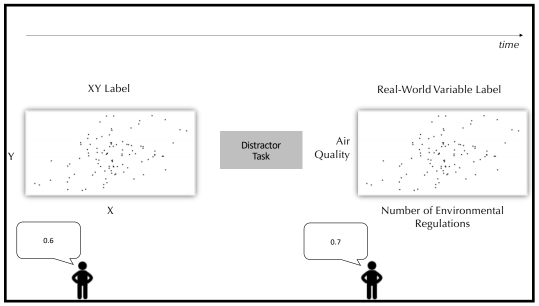

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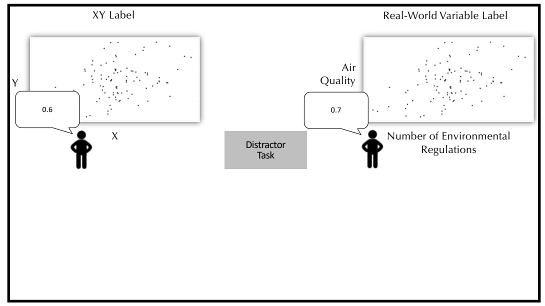

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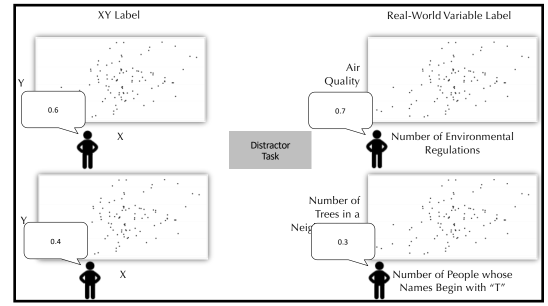

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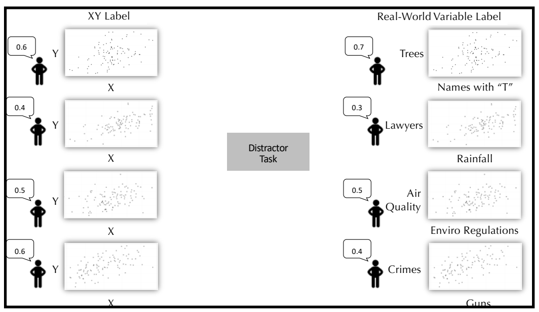

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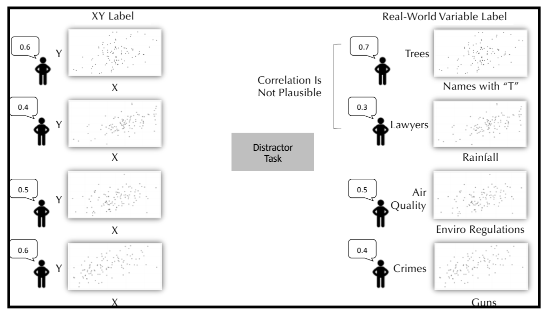

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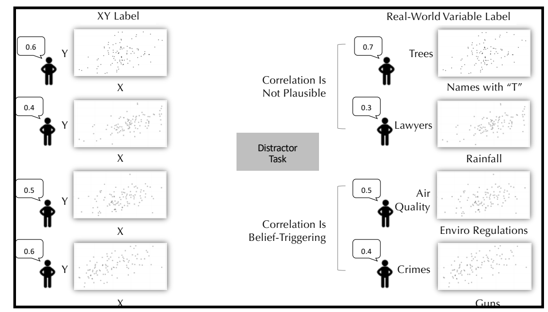

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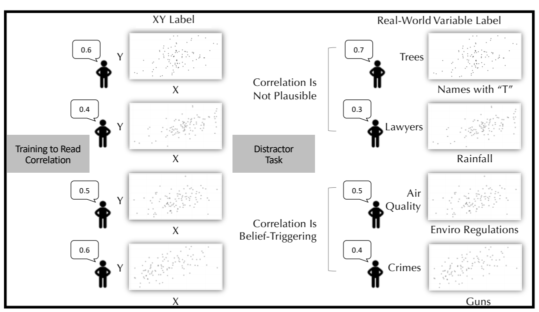

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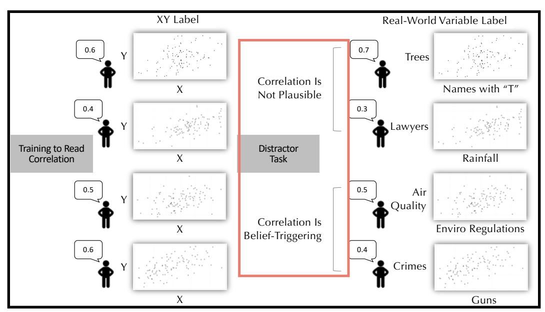

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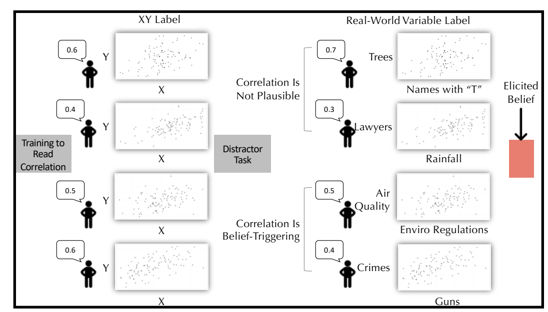

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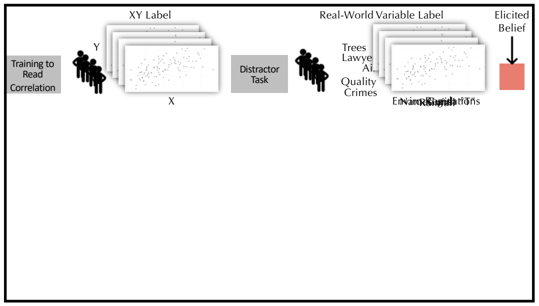

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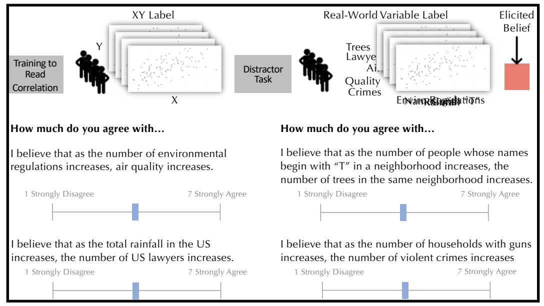

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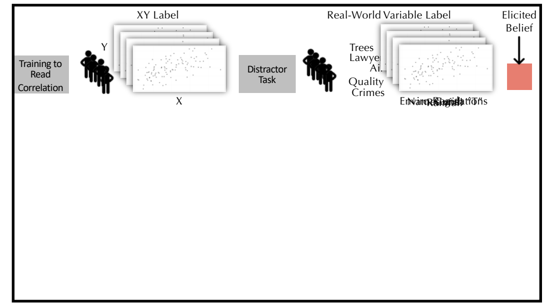

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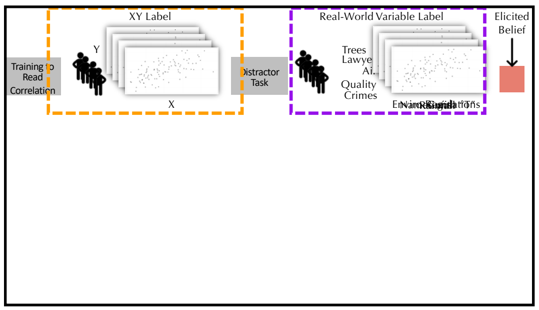

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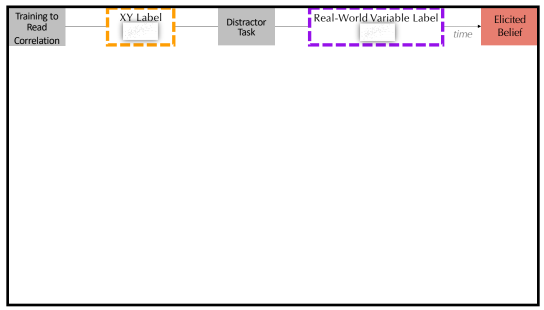

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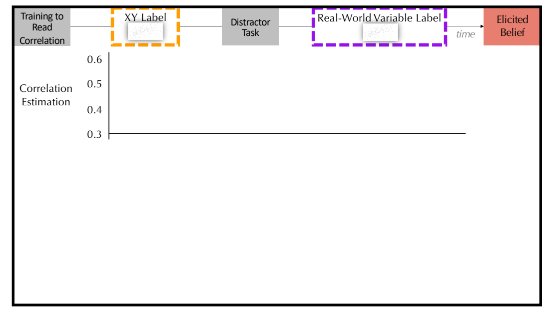

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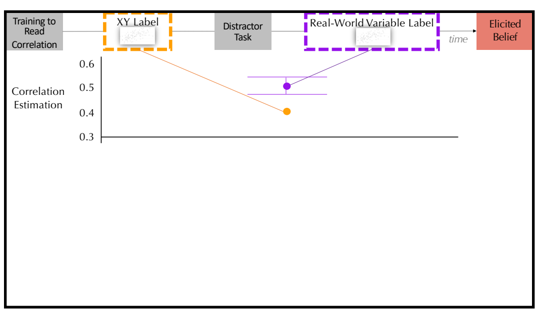

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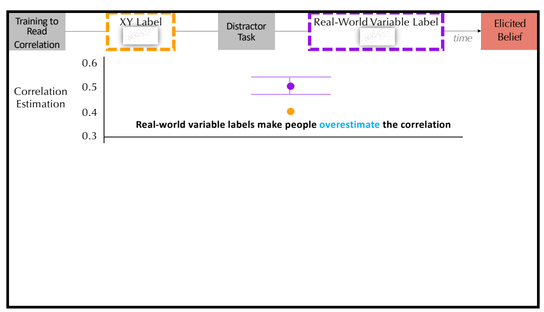

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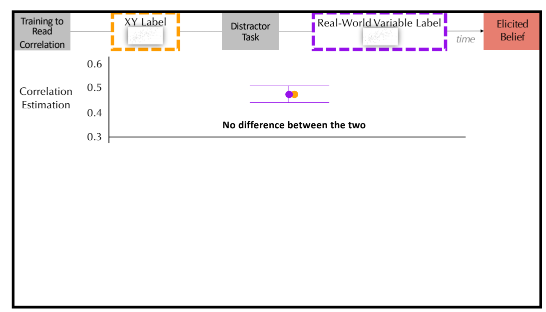

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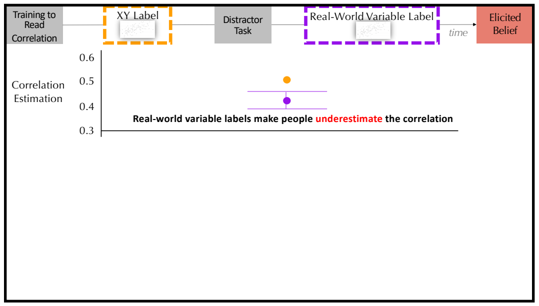

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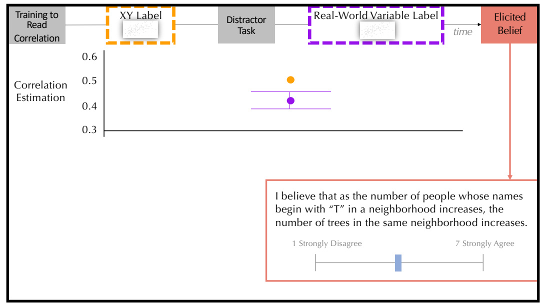

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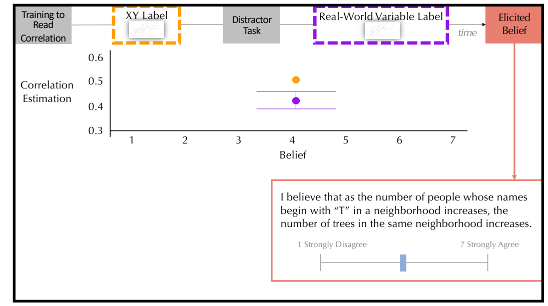

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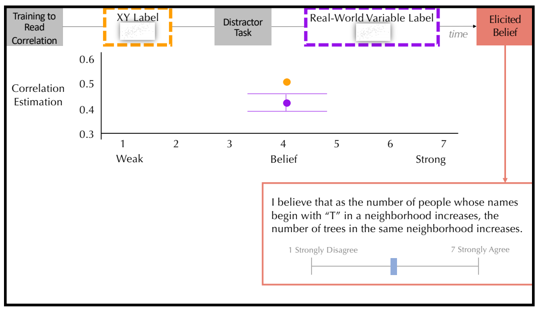

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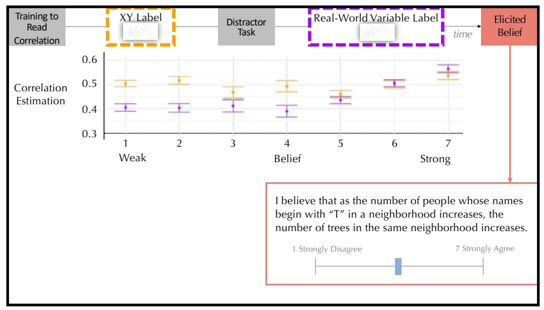

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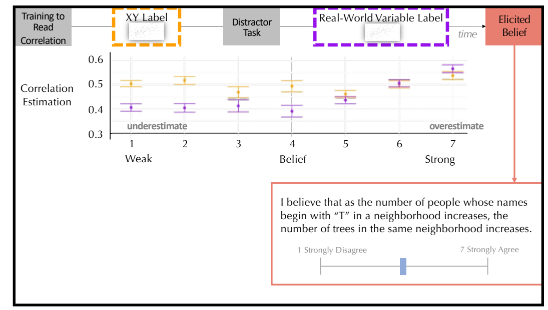

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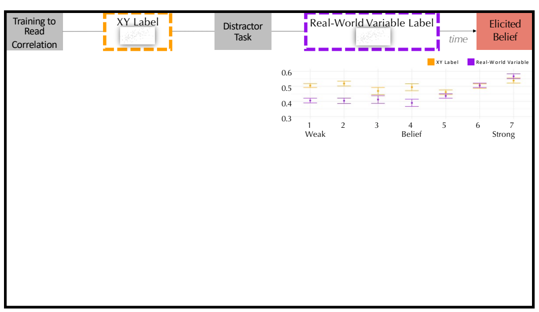

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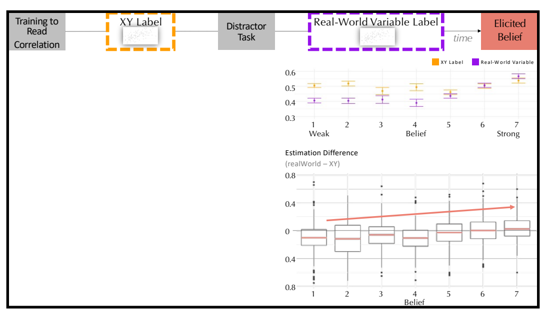

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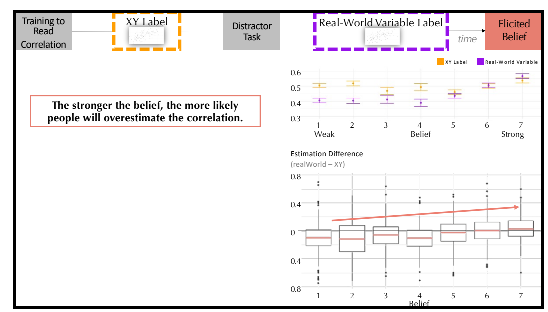

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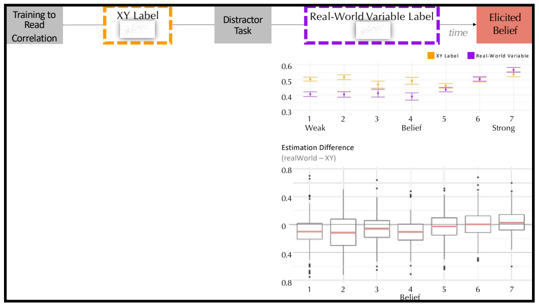

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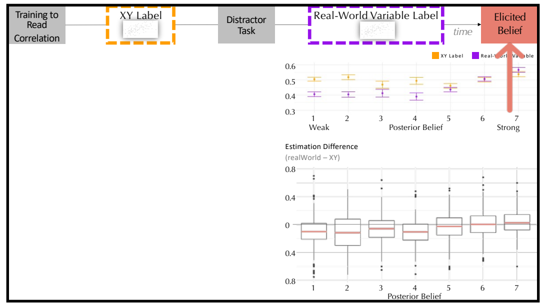

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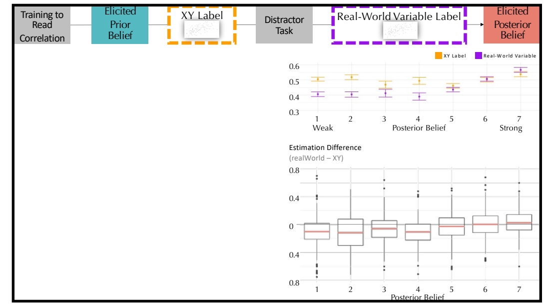

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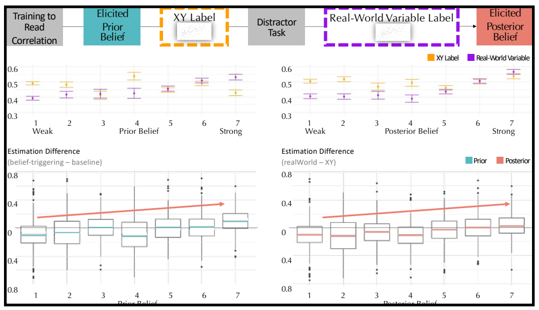

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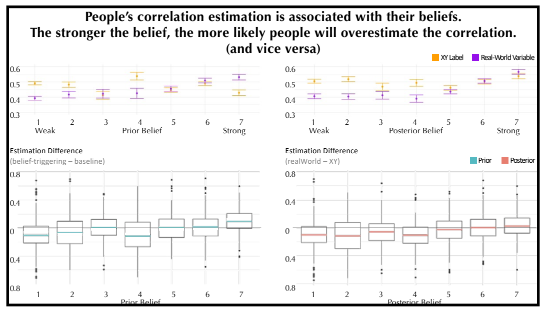

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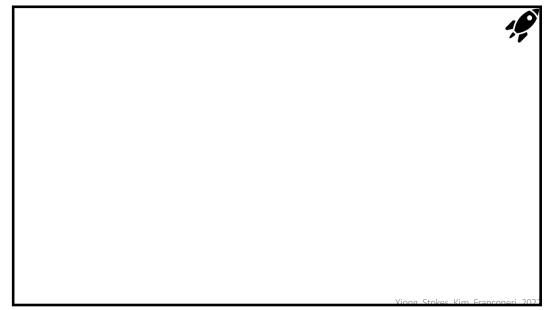

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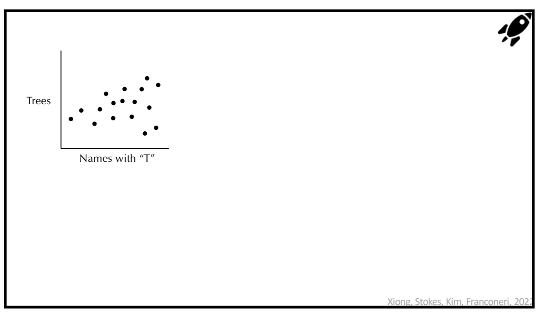

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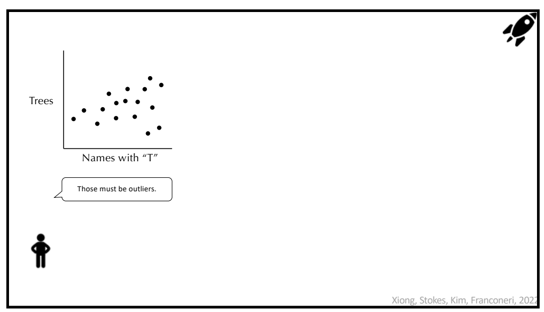

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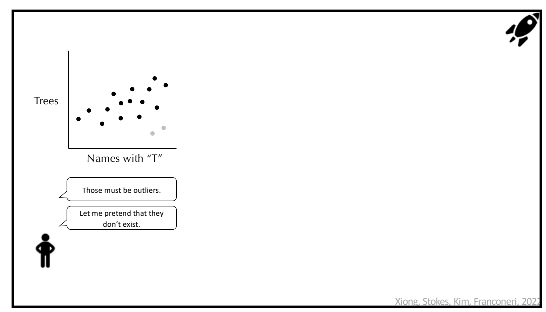

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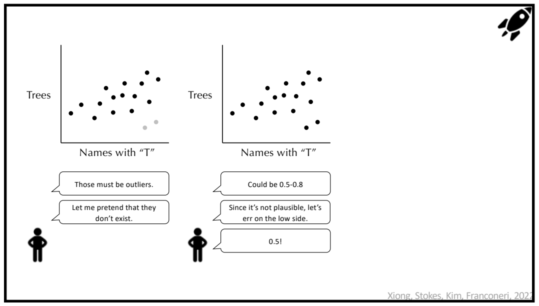

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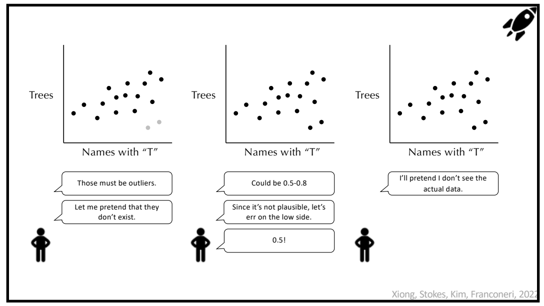

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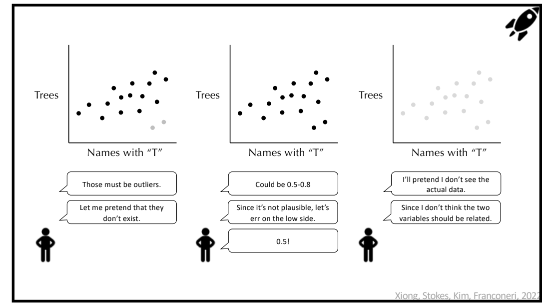

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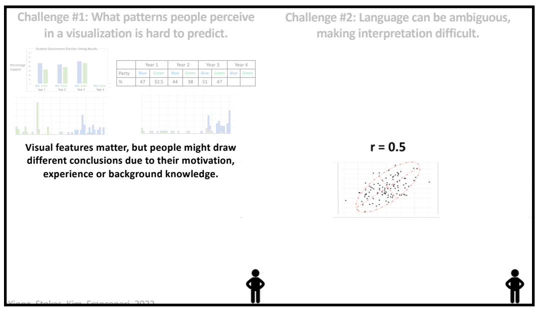

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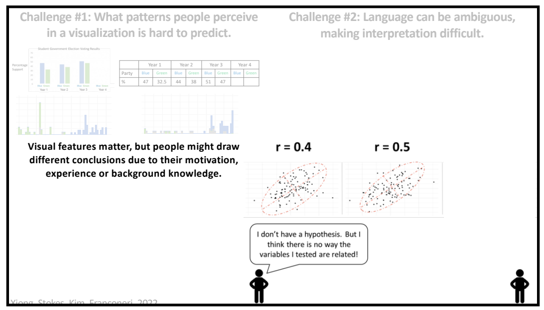

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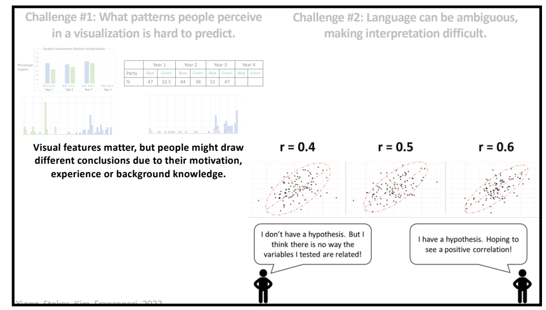

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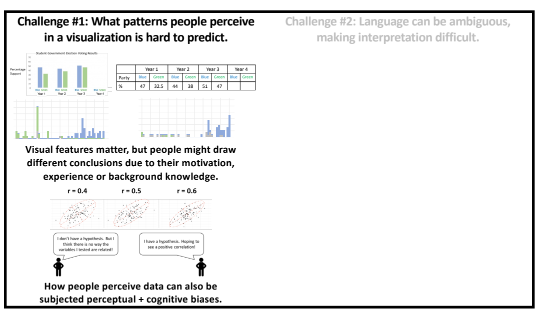

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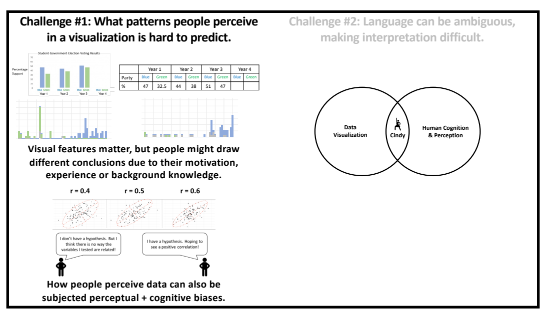

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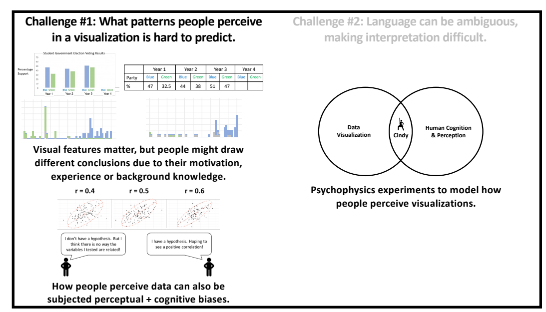

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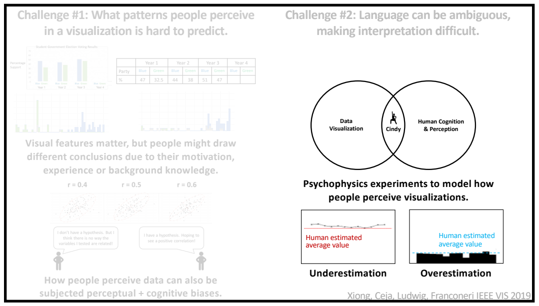

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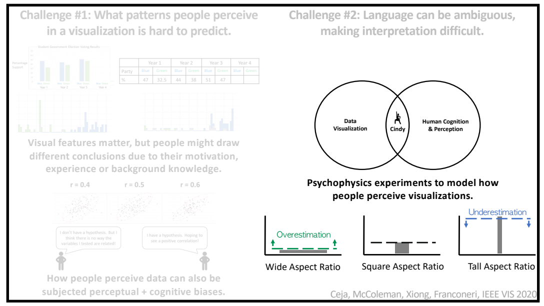

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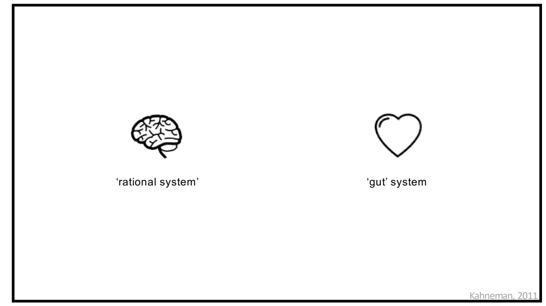

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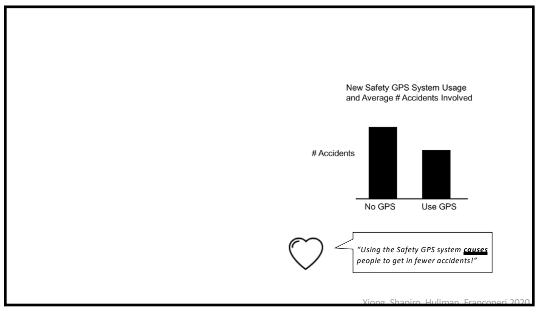

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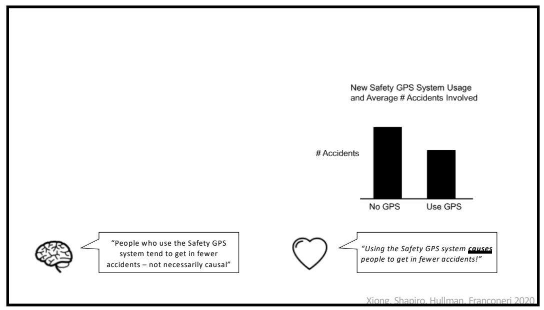

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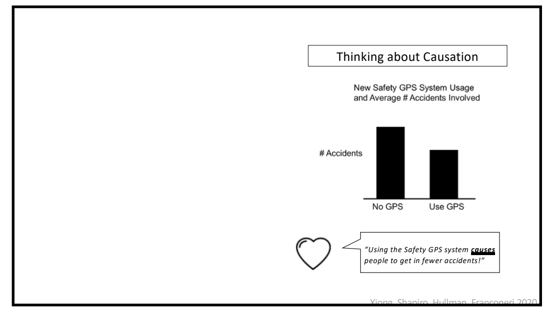

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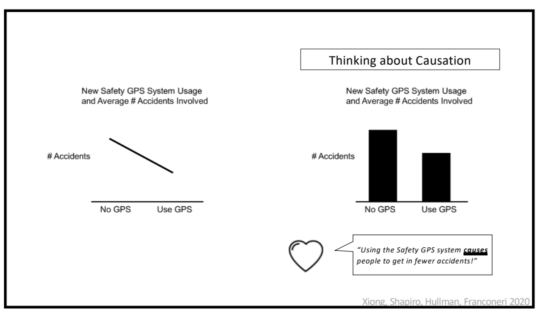

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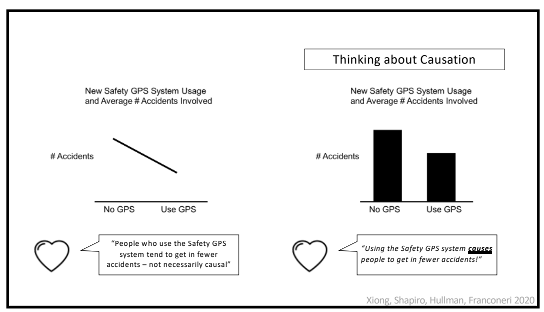

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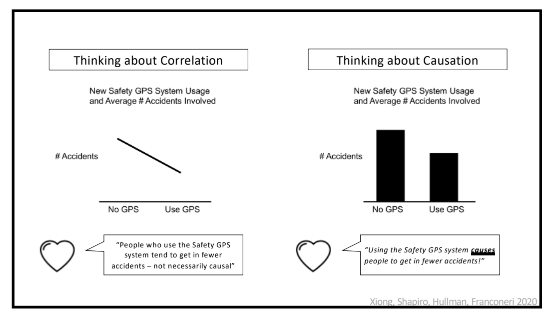

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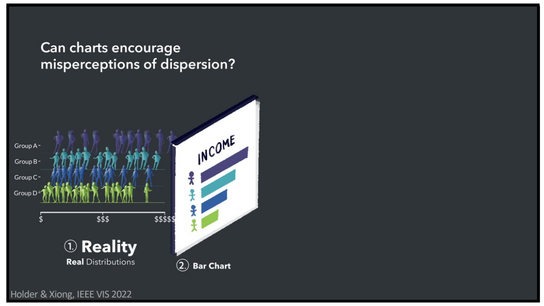

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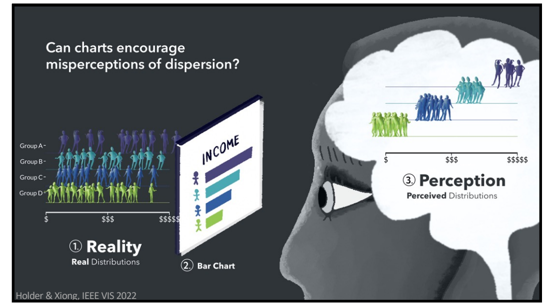

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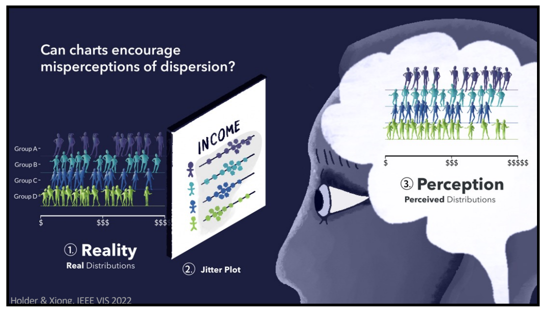

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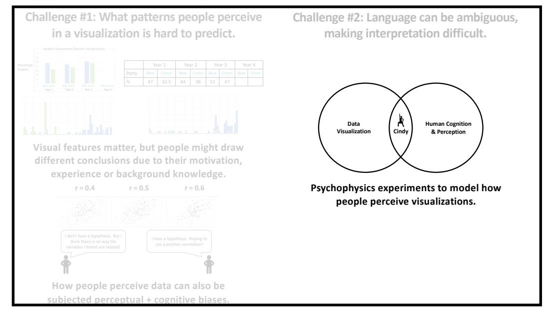

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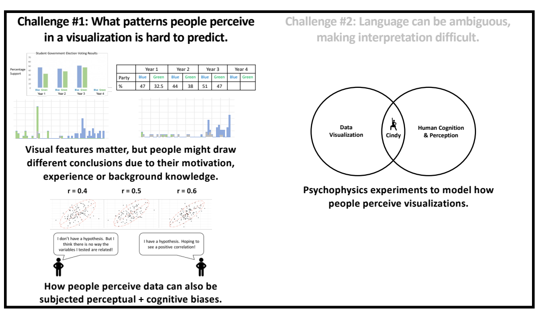

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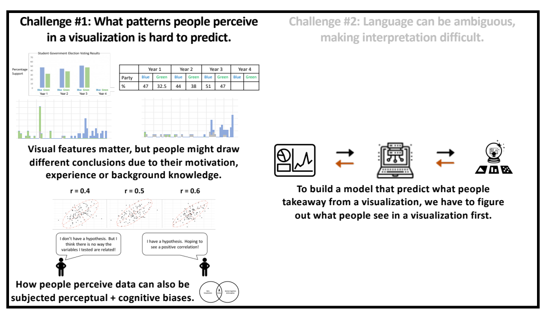

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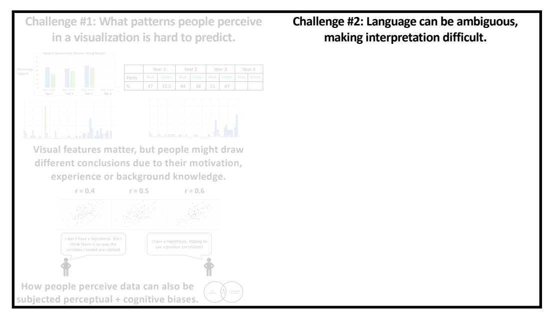

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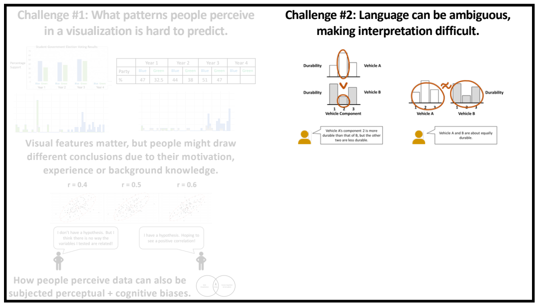

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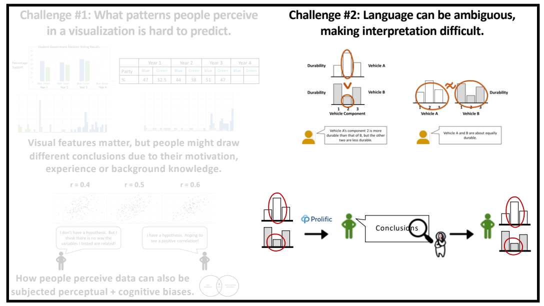

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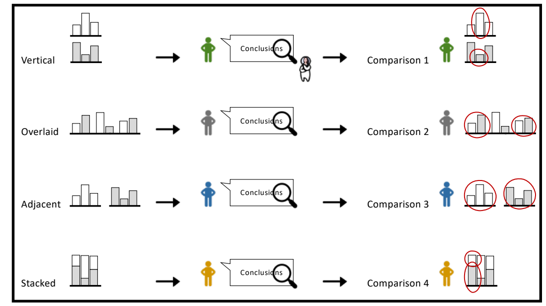

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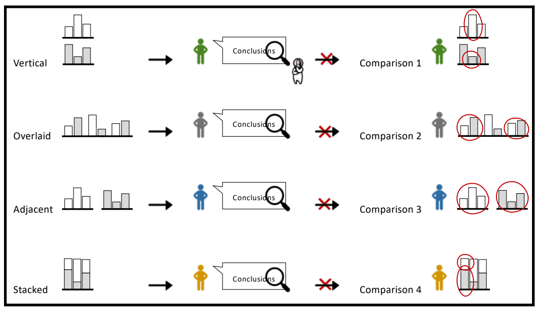

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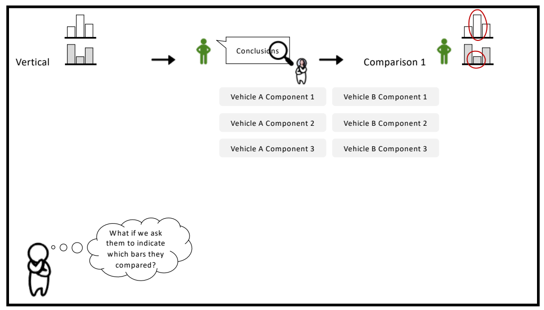

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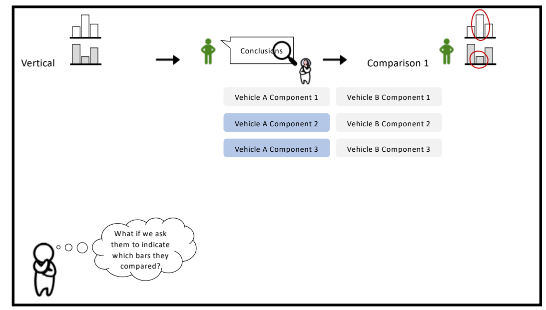

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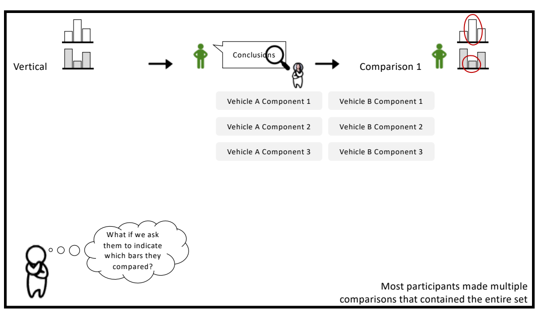

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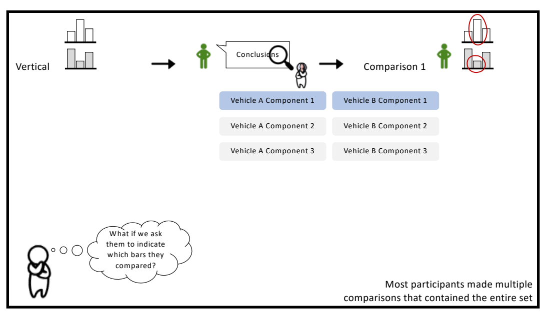

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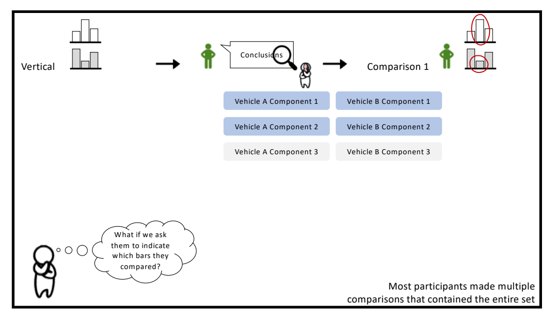

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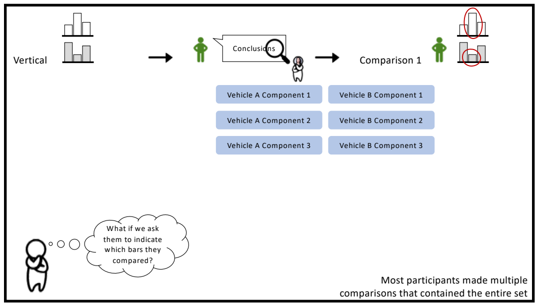

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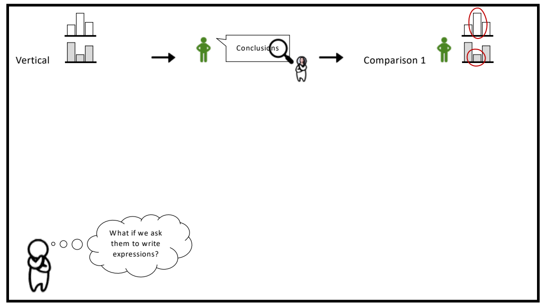

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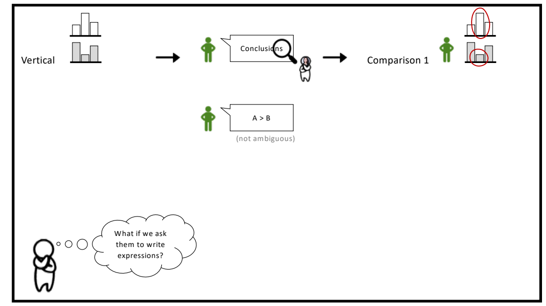

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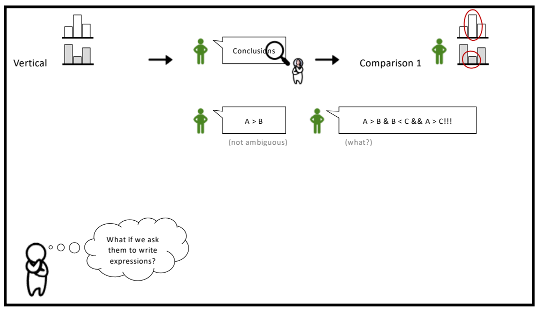

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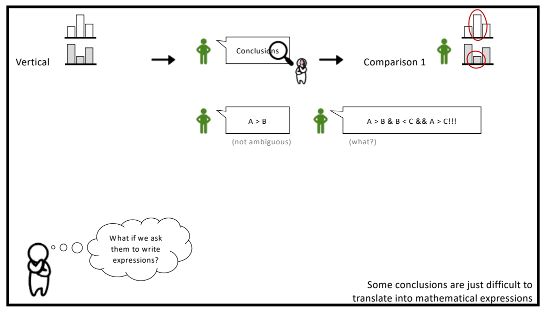

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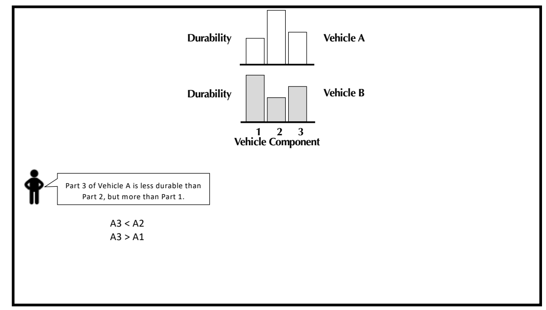

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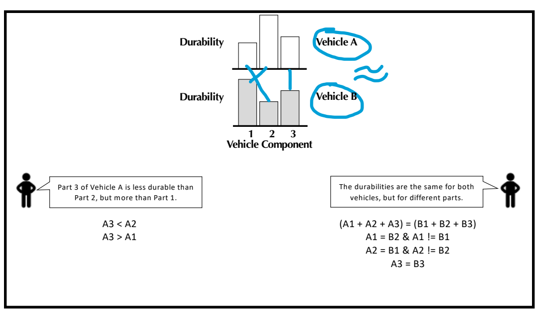

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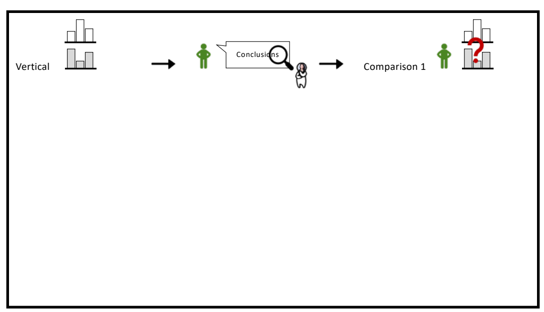

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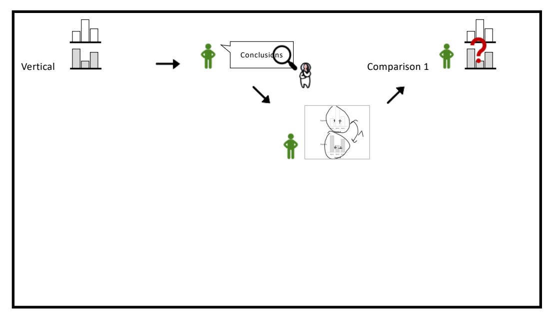

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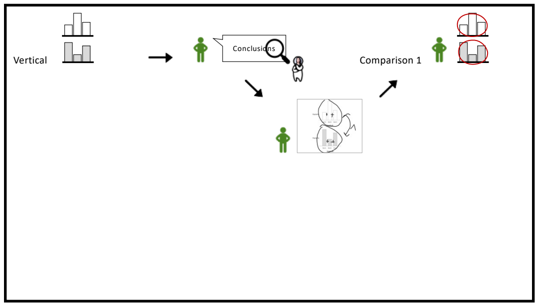

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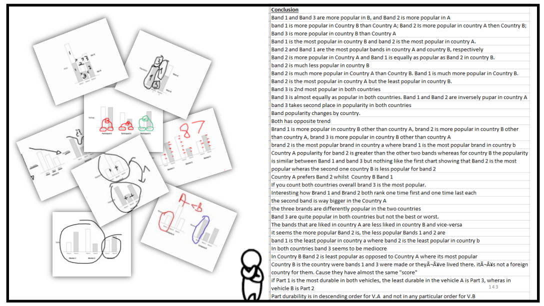

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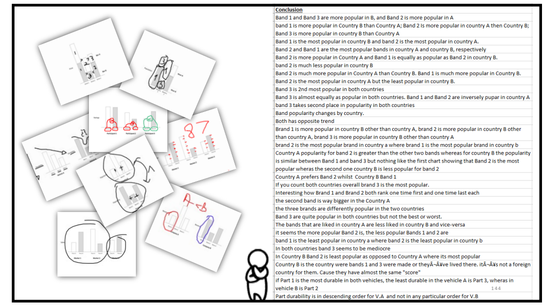

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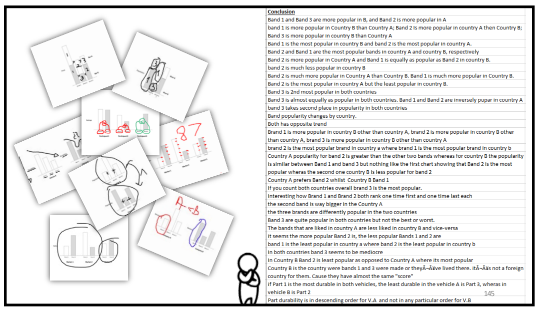

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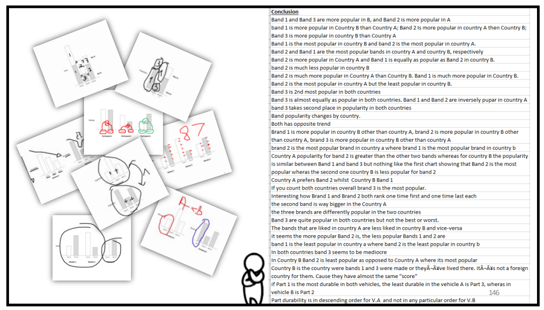

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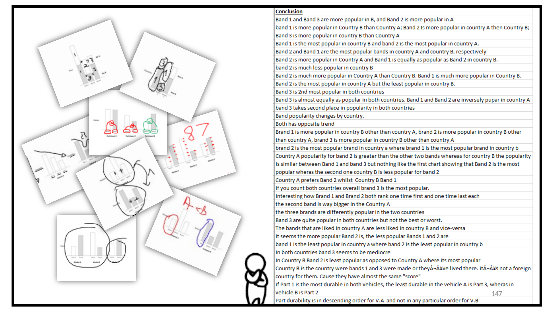

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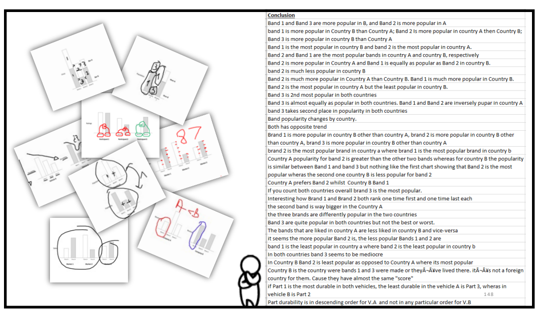

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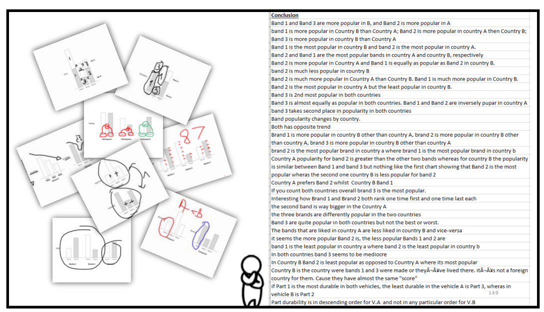

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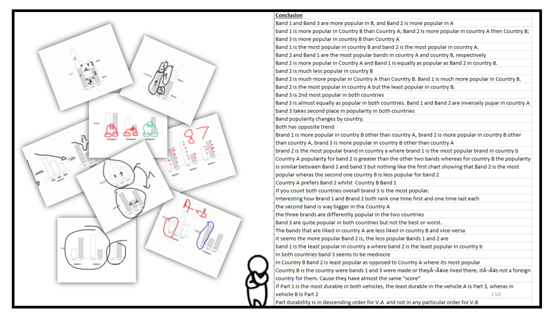

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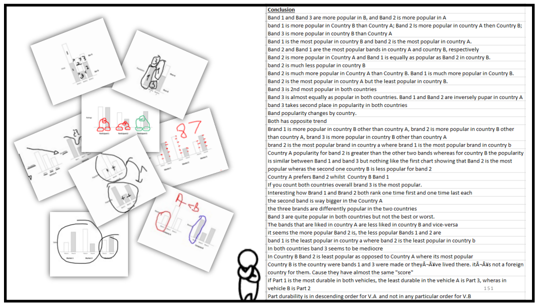

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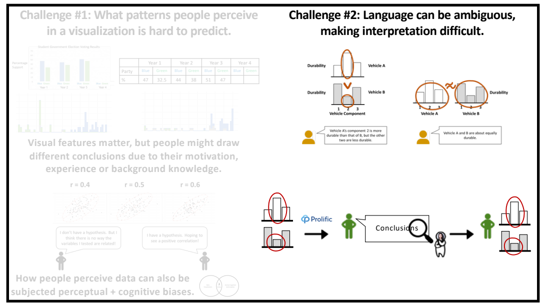

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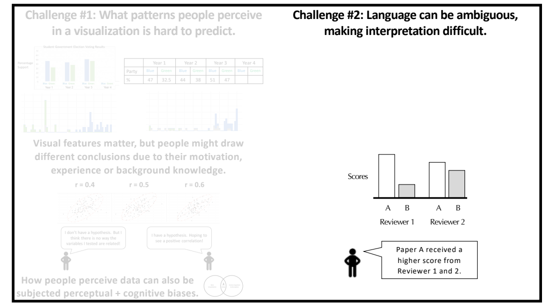

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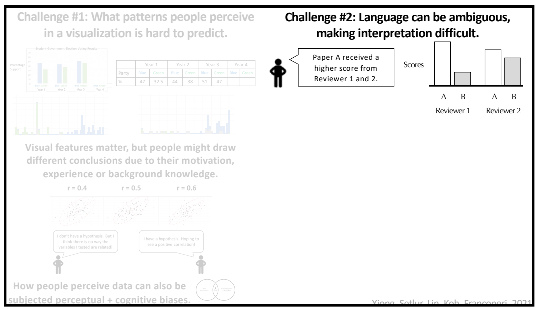

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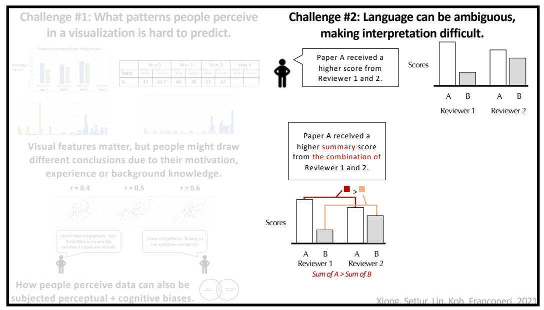

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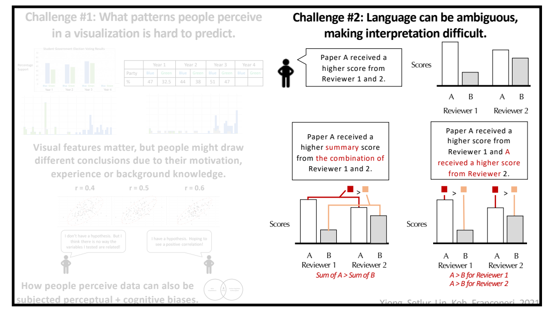

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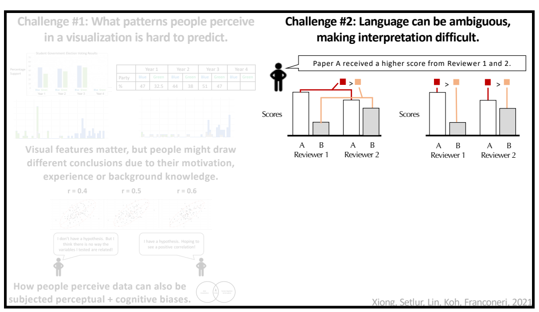

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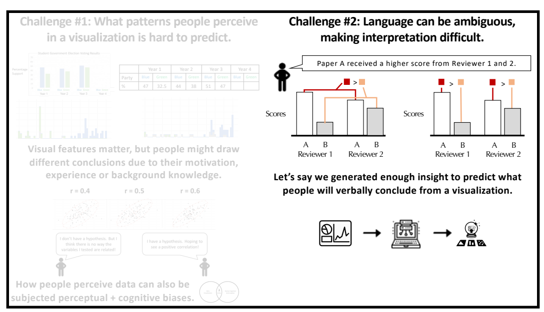

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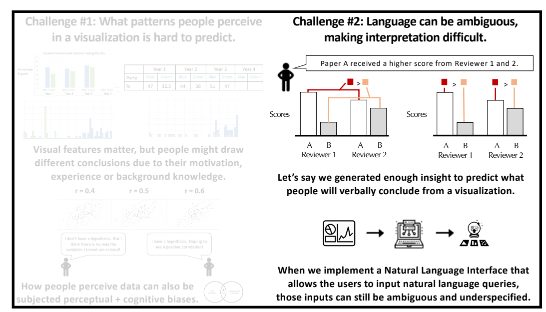

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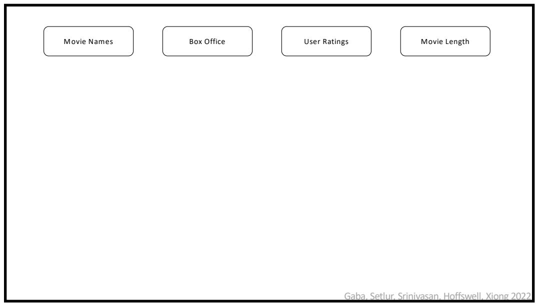

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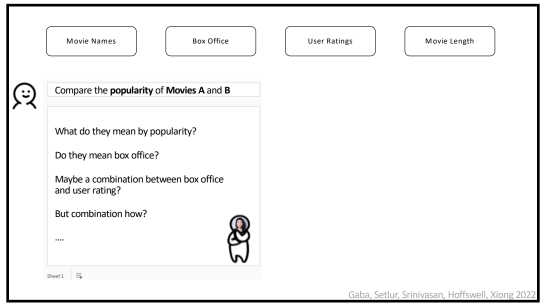

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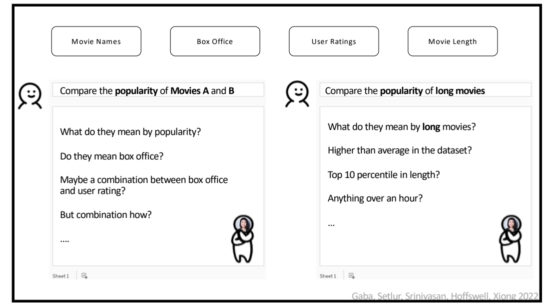

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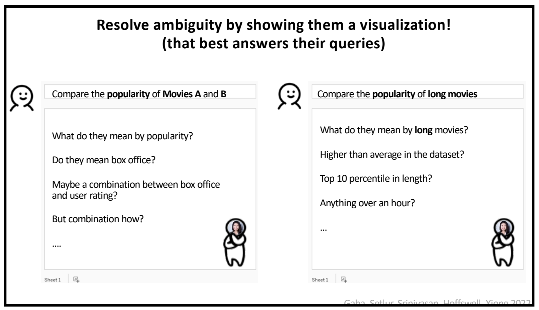

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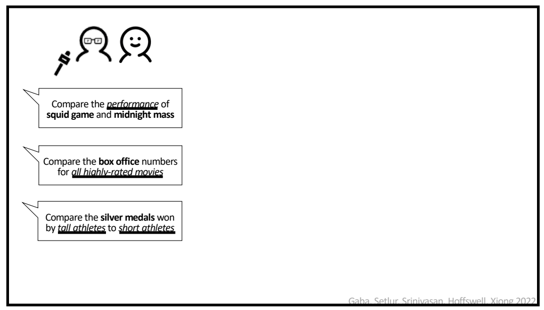

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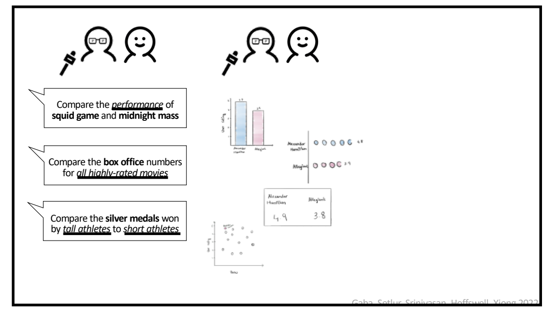

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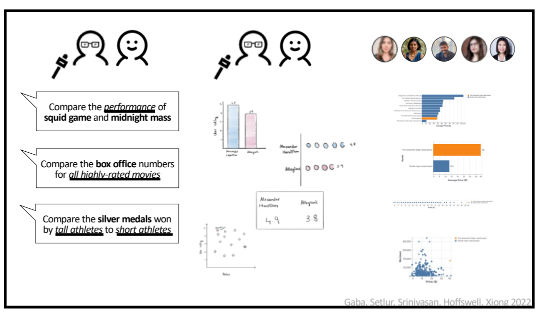

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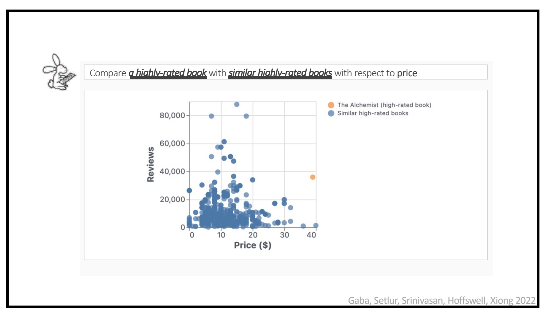

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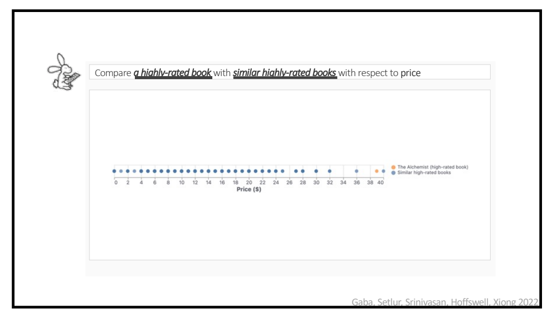

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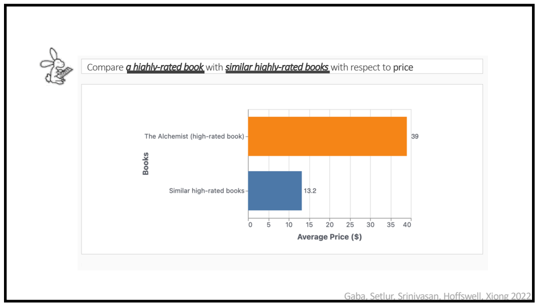

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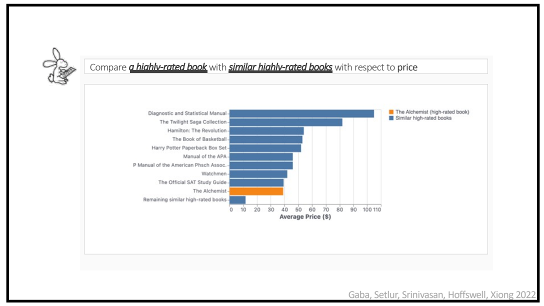

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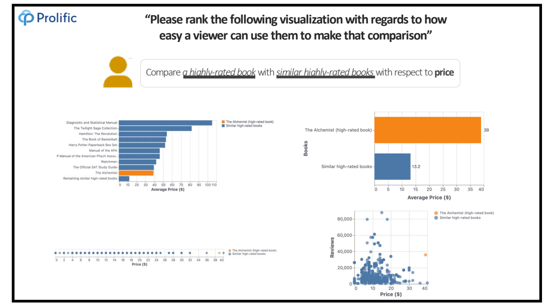

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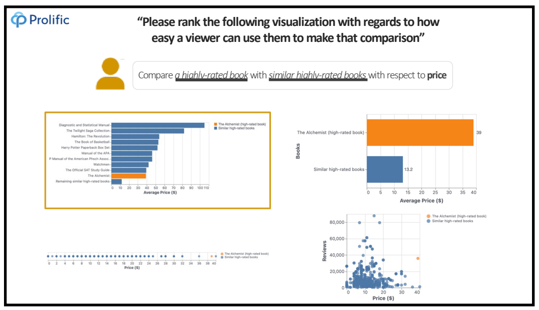

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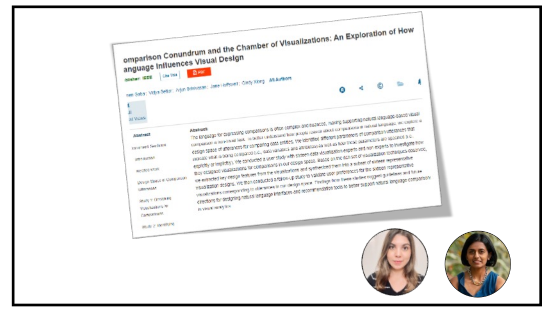

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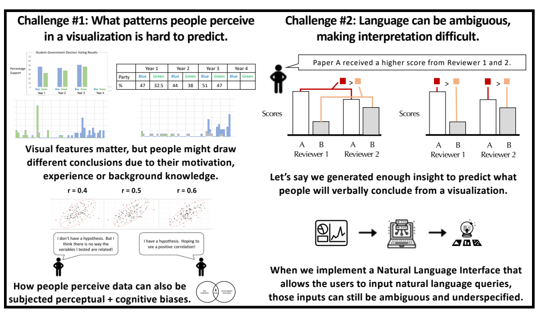

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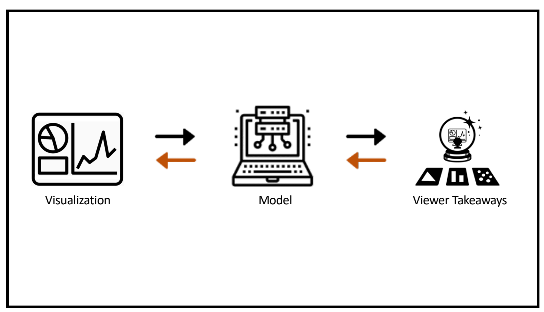

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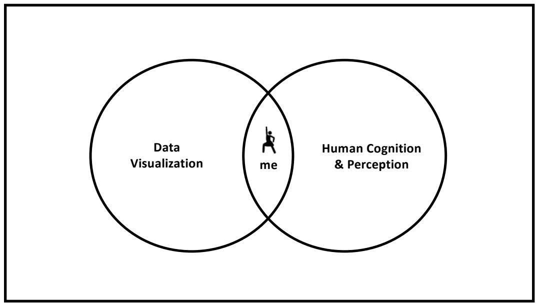

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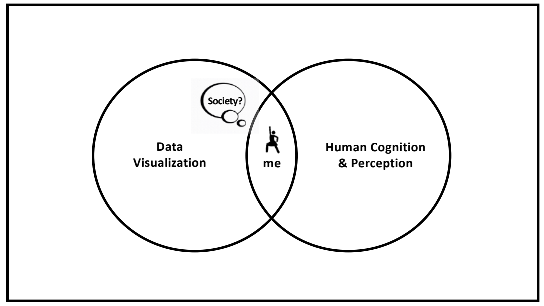

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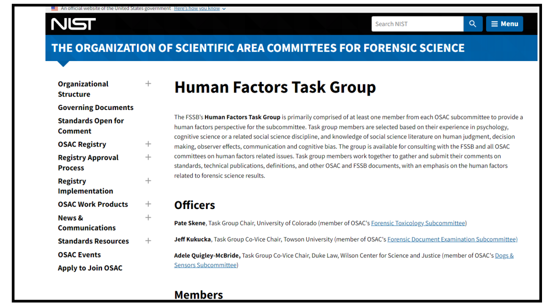

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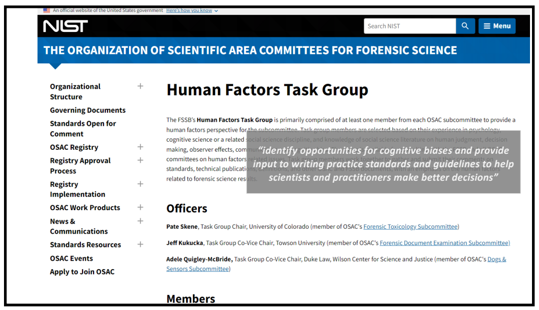

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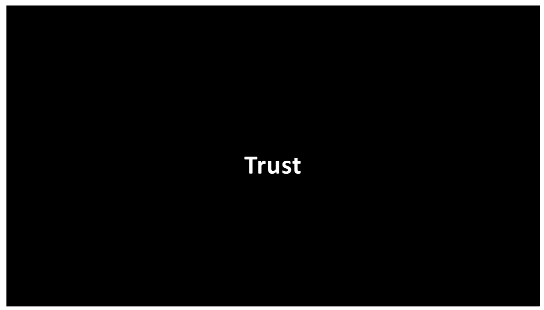

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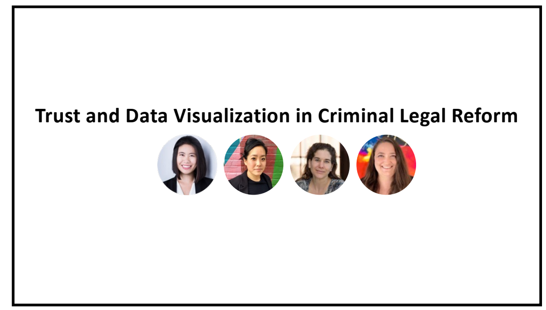

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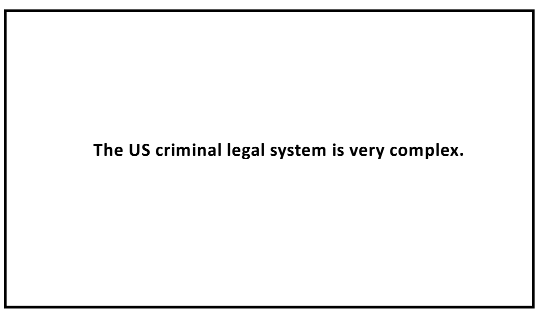

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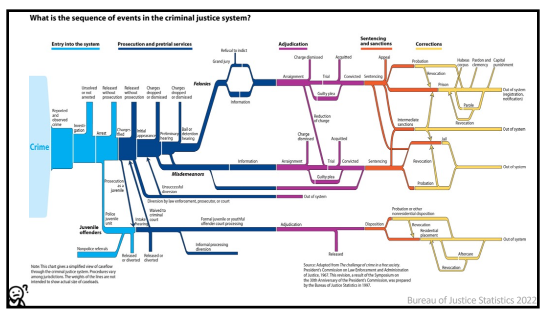

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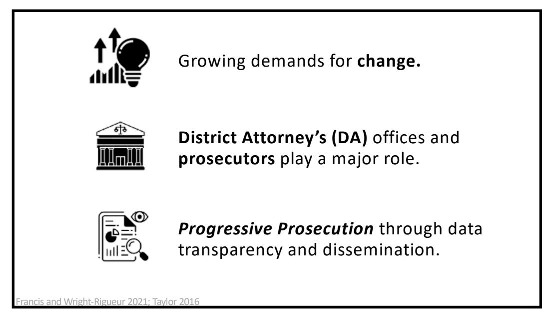

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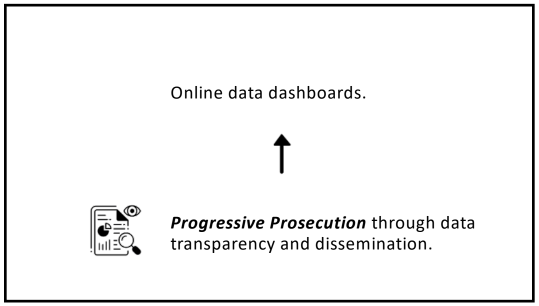

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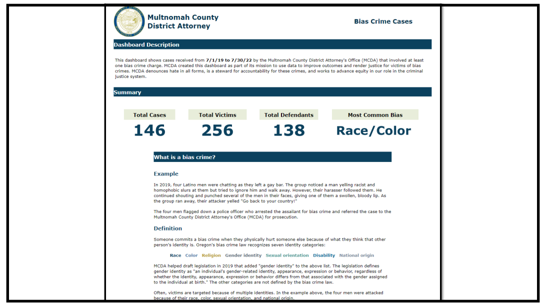

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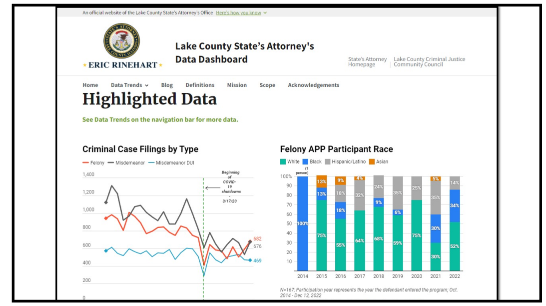

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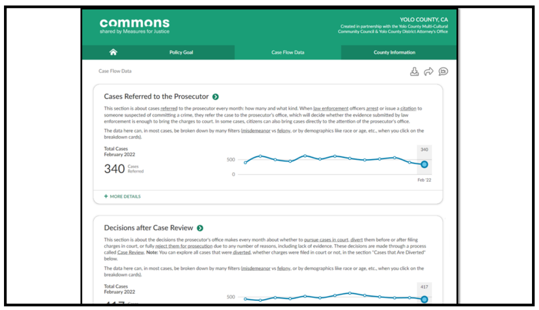

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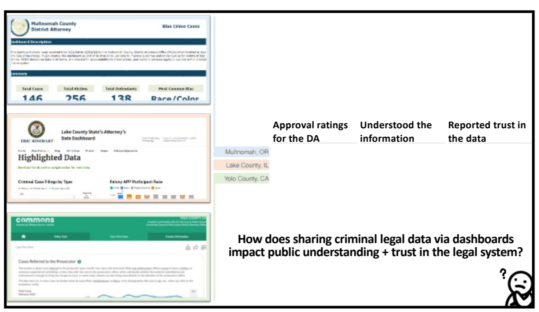

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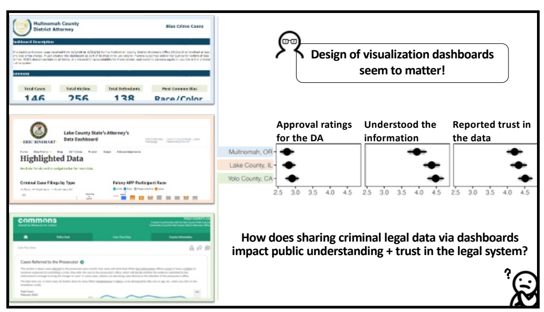

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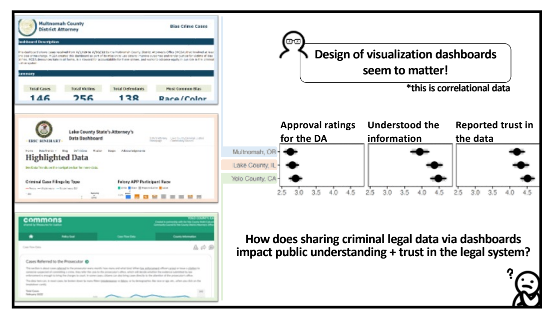

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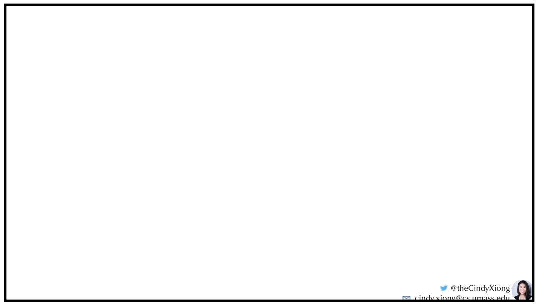

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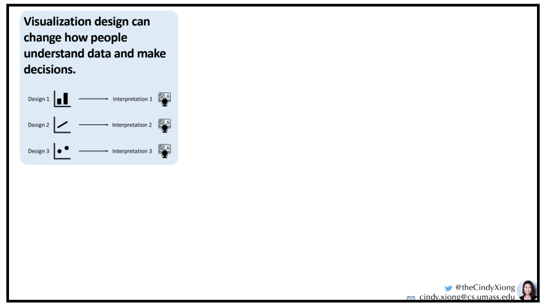

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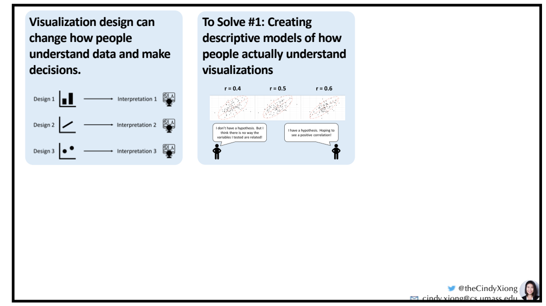

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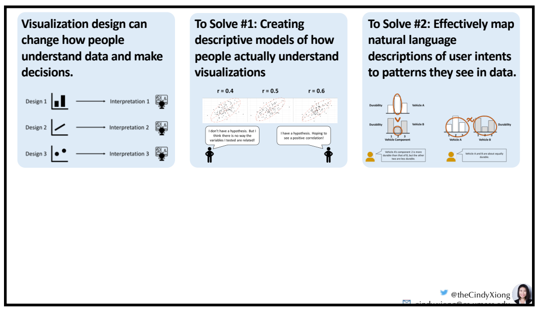

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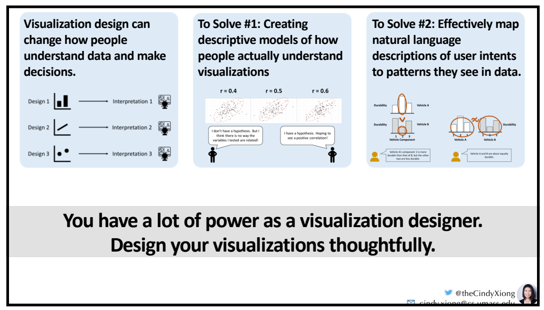

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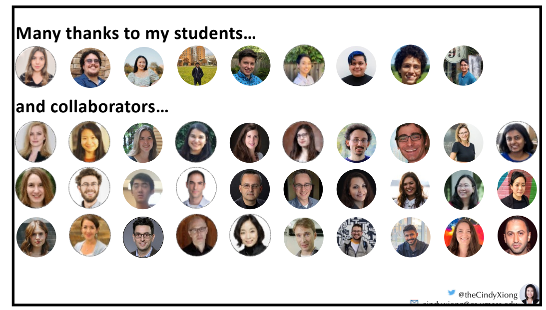

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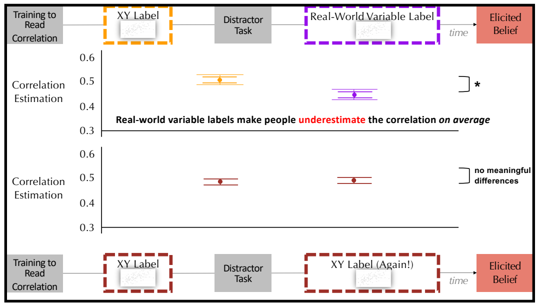

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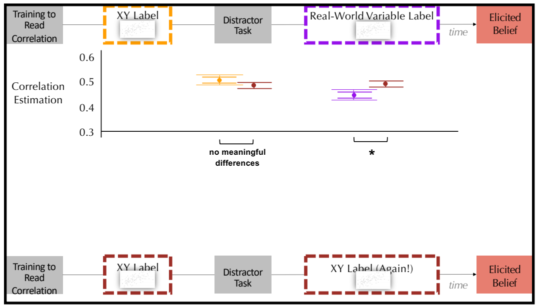

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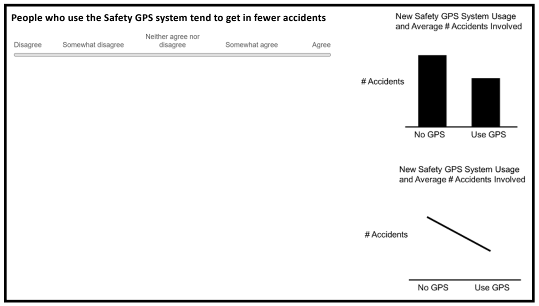

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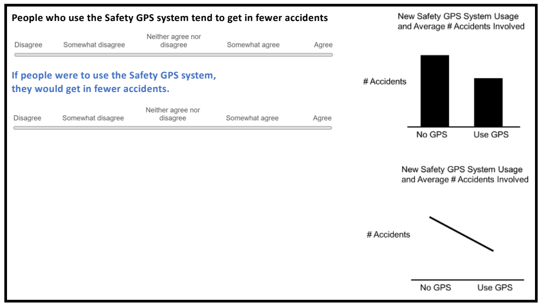

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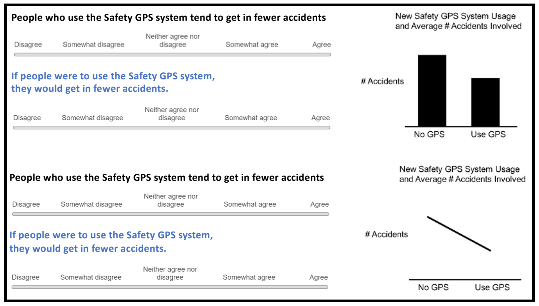

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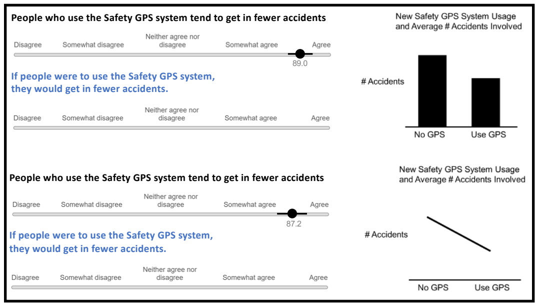

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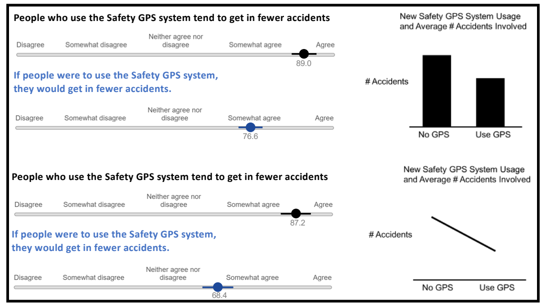

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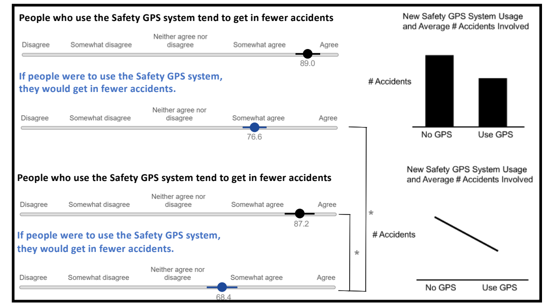

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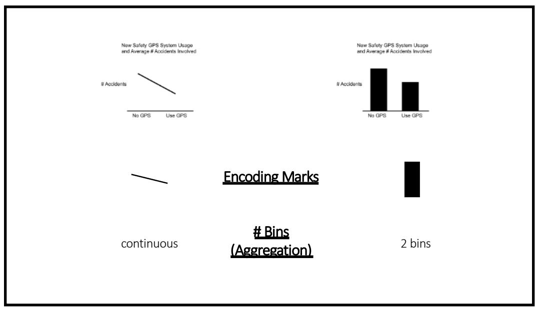

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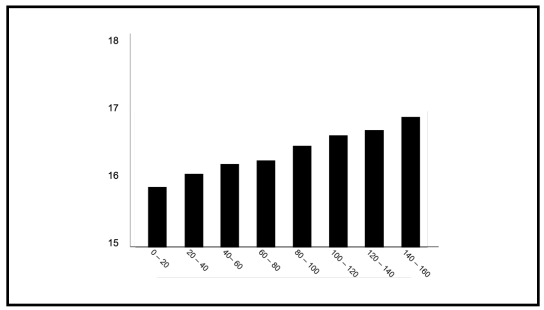

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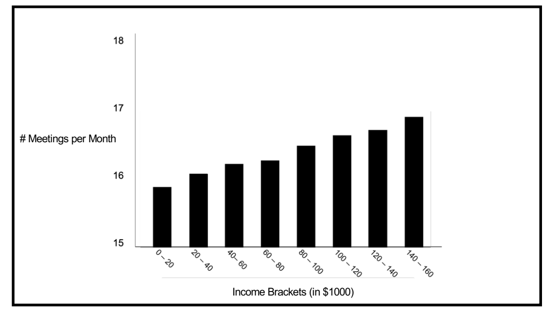

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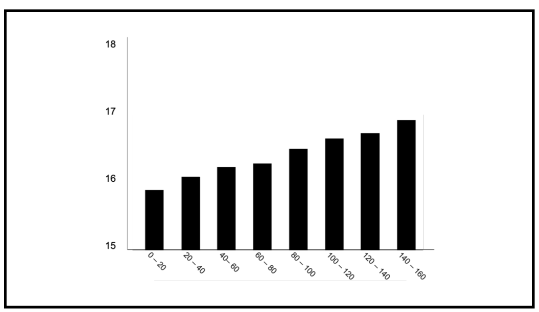

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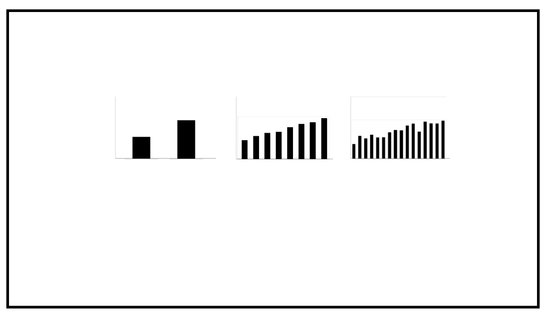
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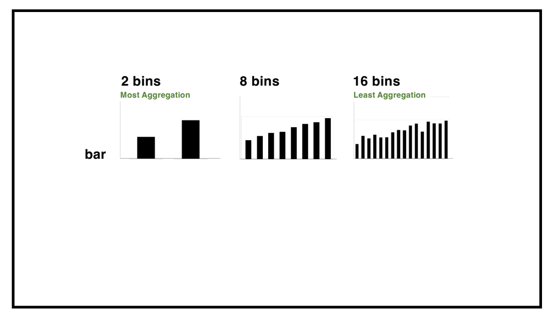

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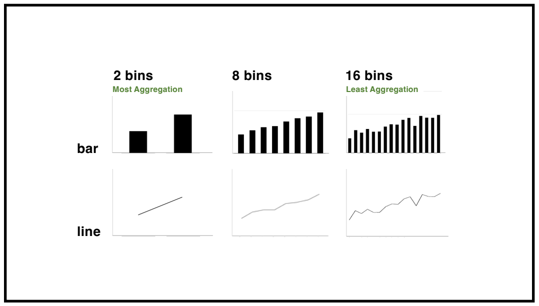

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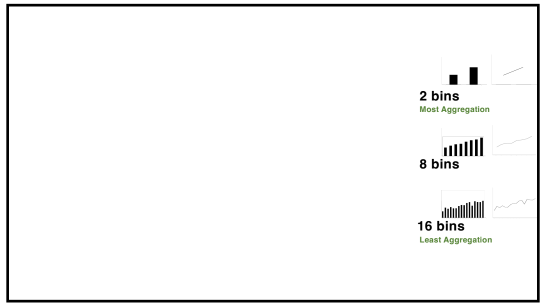

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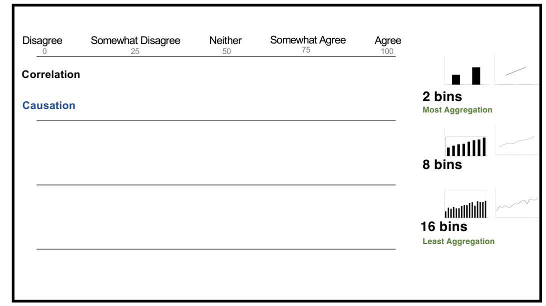

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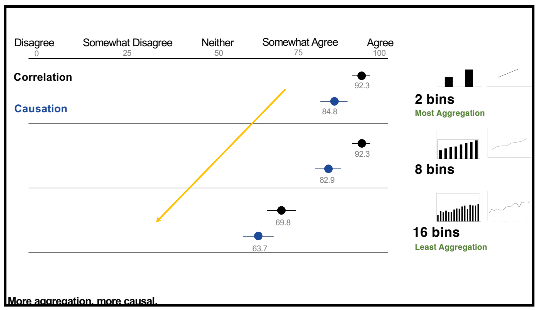

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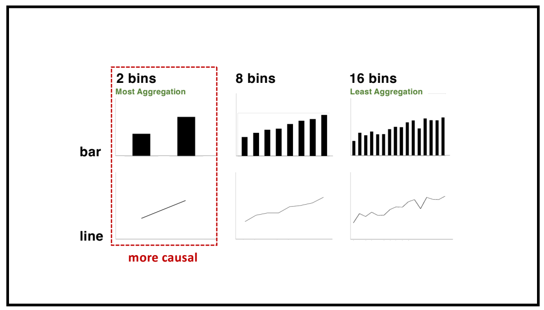

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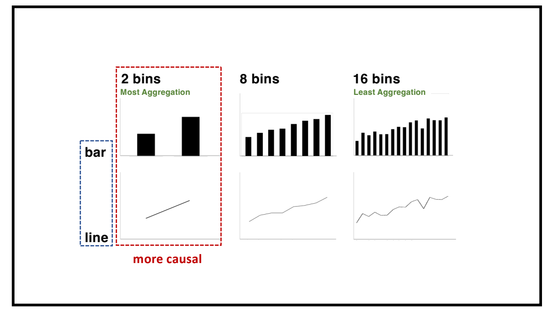

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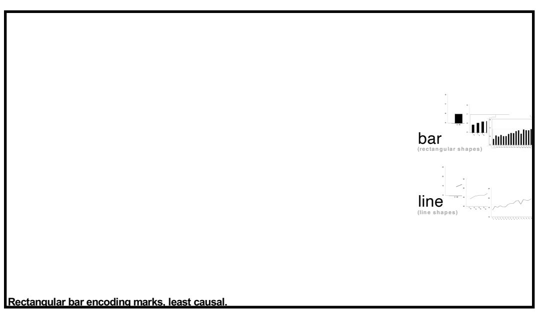

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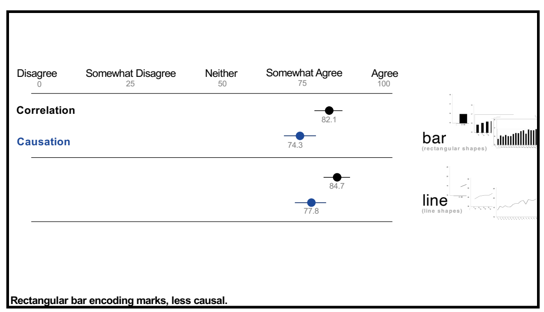

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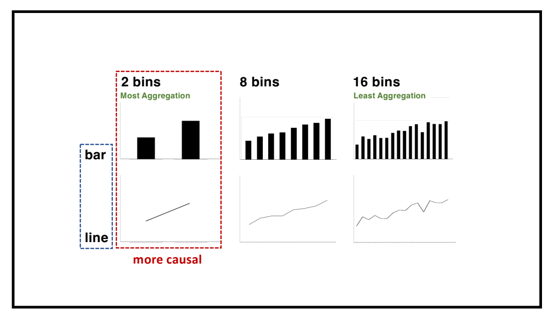

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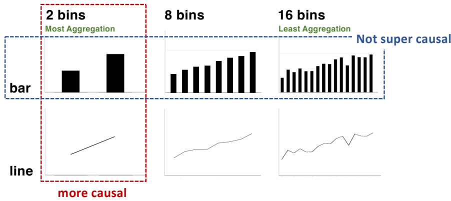

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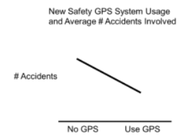

Bar charts appear more causal because they **group data into two bins**.

Xiong, Shapiro, Hullman, Franconeri 2020

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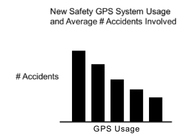

Consider dis-aggregating data to reduce misguided causal conclusions.

Bar charts appear more causal because they **group data into two bins**.

Xiong, Shapiro, Hullman, Franconeri 2020

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Categorical Prototype Effects

Actual Stimulus Value ↘ Category Prototype ↙

Bias Toward the Prototype

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Categorical Prototype Effects

Actual Stimulus Value

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Categorical Prototype Effects

Category Prototype

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Categorical Prototype Effects

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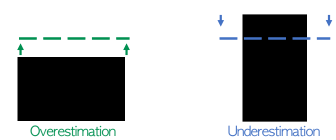
Categorical Prototype Effects



Bias Toward the Prototype

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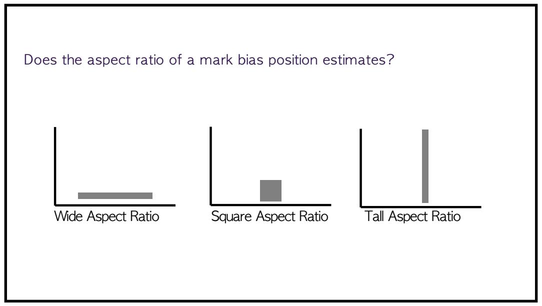

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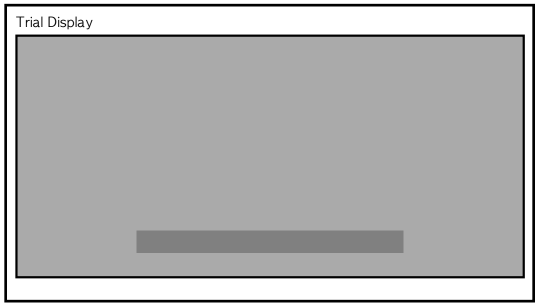

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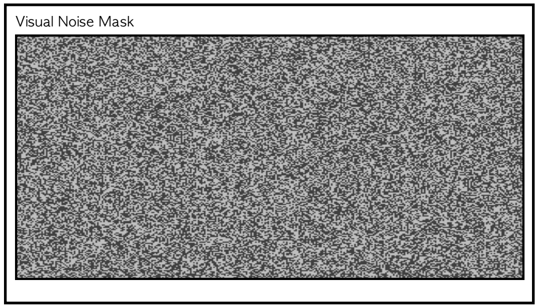

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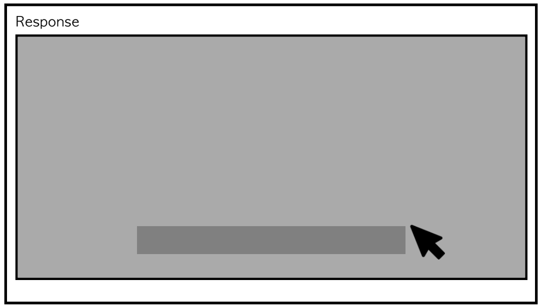

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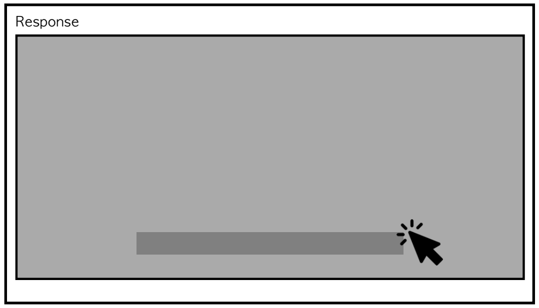

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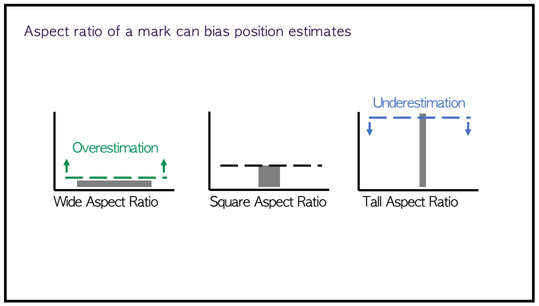

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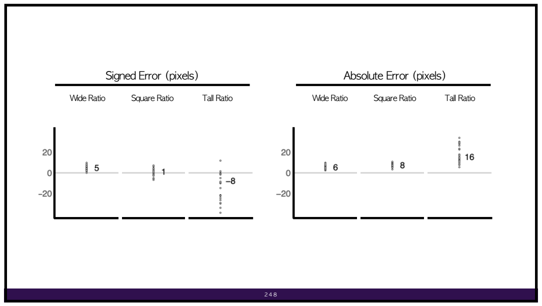

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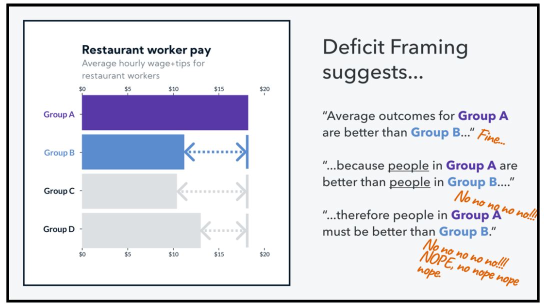

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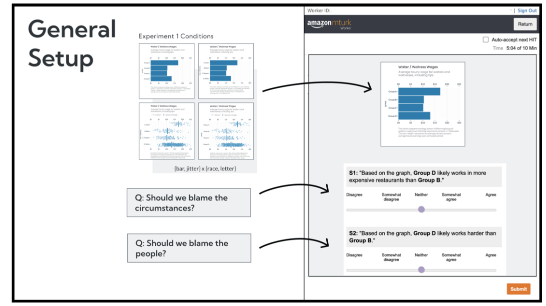

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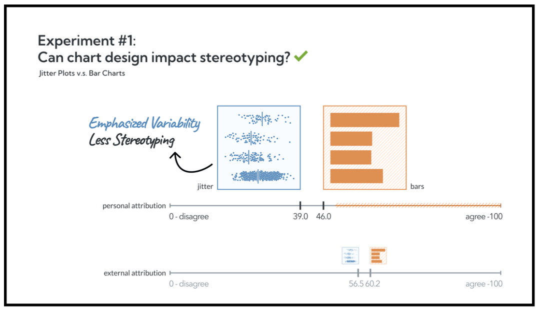

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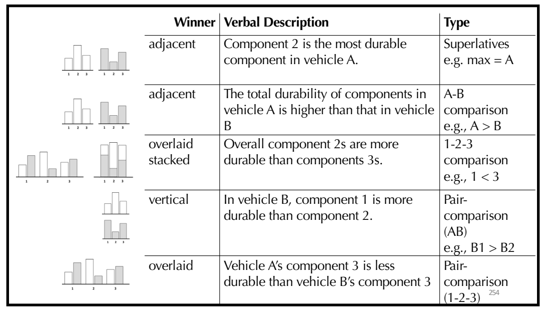
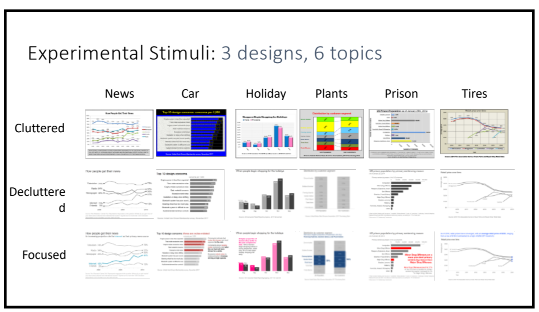


	Winner	Verbal Description	Type
	adjacent	Component 2 is the most durable component in vehicle A.	Superlatives e.g. max = A
	adjacent	The total durability of components in vehicle A is higher than that in vehicle B	A-B comparison e.g., A > B
	overlaid stacked	Overall component 2s are more durable than components 3s.	1-2-3 comparison e.g., 1 < 3
	vertical	In vehicle B, component 1 is more durable than component 2.	Pair-comparison (AB) e.g., B1 > B2
	overlaid	Vehicle A's component 3 is less durable than vehicle B's component 3	Pair-comparison (1-2-3)

254

255



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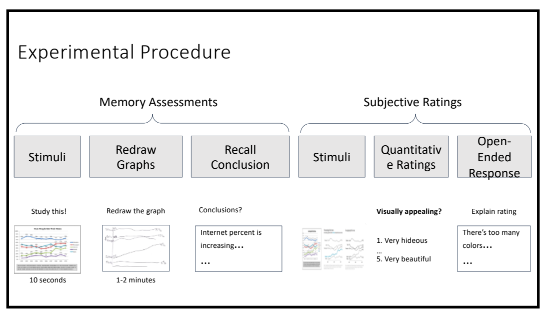

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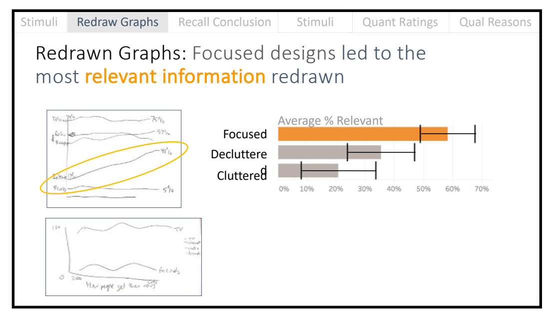

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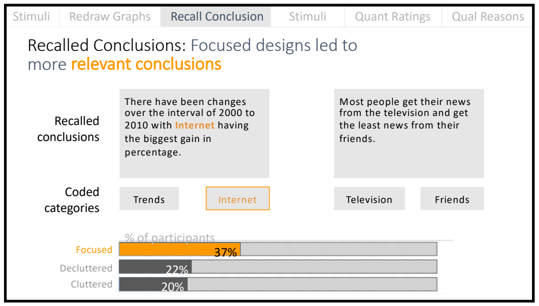

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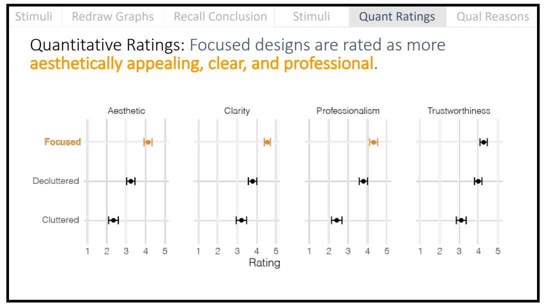

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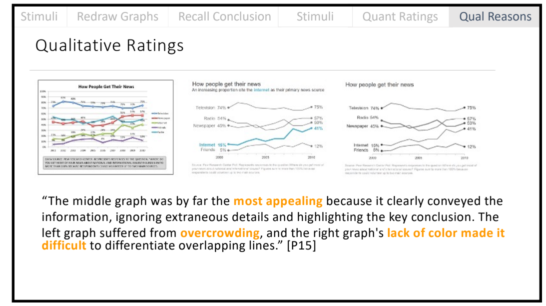

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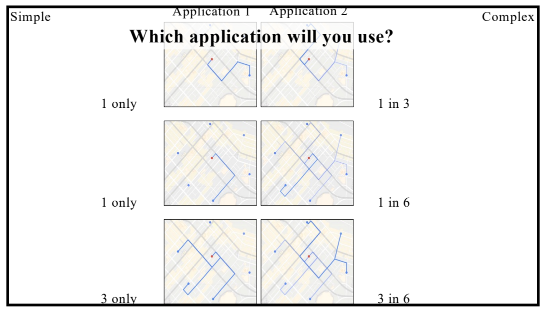

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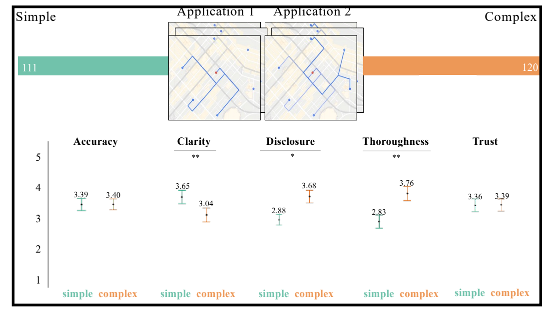

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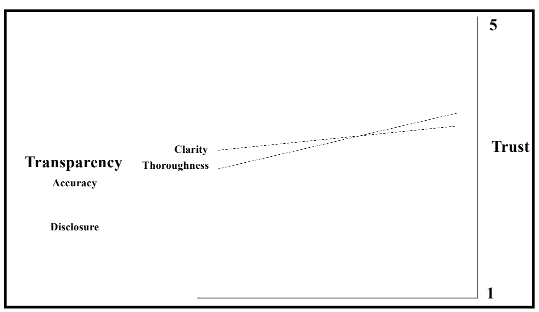

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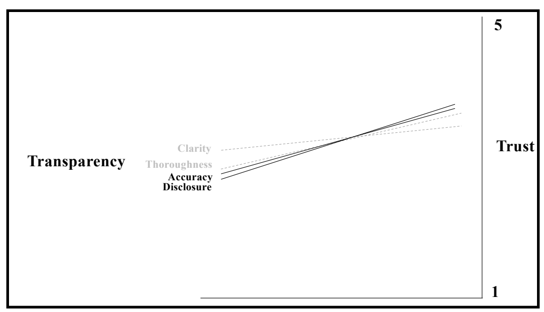

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