

Building Better Mousetraps: Use of Trap Questions and Data Quality

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Introduction



- **Concerns over data quality due to unmotivated or inattentive respondents.**
- **Optimal responding vs. sub-optimal responding.**
- **Several methods to identify suboptimal responses that might impact data quality:**
 - **Speeding**
 - **Item nonresponse**
 - **Grid non-differentiation or straightlining**
 - **Consistency checks**
 - **Compliance trap questions, attention checks, red-herrings**
- **One form of sub- optimal response may not be strongly predictive of other forms of sub optimal response simultaneously and may be influenced by very different causes (Thomas, 2011).**

- **Our study uses an experimental design to assess the relationship between data quality and use of trap questions.**
- **We tested different types of trap questions as well as respondents' reactions to trap questions.**
- **Furthermore, we also tested whether order of response options or asking respondents to select a negative or positive response made a difference.**



Study Design

- We conducted a study between *January 14 and February 11, 2022*, utilizing the KnowledgePanel, one of the largest online probability-based panels in the U.S.
- Mode: Web-based
- Sample Type: General Population
- n= 3,539 completes.

Experimental Study: 3x2x2 Design

TRAP TYPE

- 1 Straightforward
- 2 Disguised
- 3 No Trap

ORDER OF RESPONSES

- 1 A-E
- 2 E-A

POSITIVITY

- 1 Agree/Disagree
- 2 Sometimes True/
Very often true

Study Design-Continue



REACTIONS TO TRAPS

- **Overall reaction (rated: Positive, Neutral, Negative).**
- **Confusion about the purpose of the question.**

CONSISTENCY CHECK

- **Asked two similar questions to check the correlation between consistency and trap failure.**

BENCHMARK COMPARISON

- **We removed the sub-optimal responses and looked at their impact to determine the extent of bias in the sample.**

Trap Conditions



Straightforward

Disguised

TRAP 1

1. To show that you are still reading these questions, please select the [randomly assigned: “Disagree” or “Agree”] response below.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

TRAP 2

2. This is an open item to confirm correct response presentation – please select the [“Sometimes true” or “Very often true”] response below.

- Not at all true
- Sometimes true
- Often true
- Very often true
- Always true

1. **Political issues are important to many people.** To show that you are still reading these questions, please select the [randomly assigned: “Disagree” or “Agree”] response below.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

2. **People’s experiences in the U.S. vary.** This is an open item to confirm correct response presentation – please select the [“Sometimes true” or “Very often true”] response below.

- Not at all true
- Sometimes true
- Often true
- Very often true
- Always true

Assessment by Trap Type

- ✔ More people failed the first trap compared to the second trap.
- ✔ More people failed the disguised trap compared to the straightforward trap.

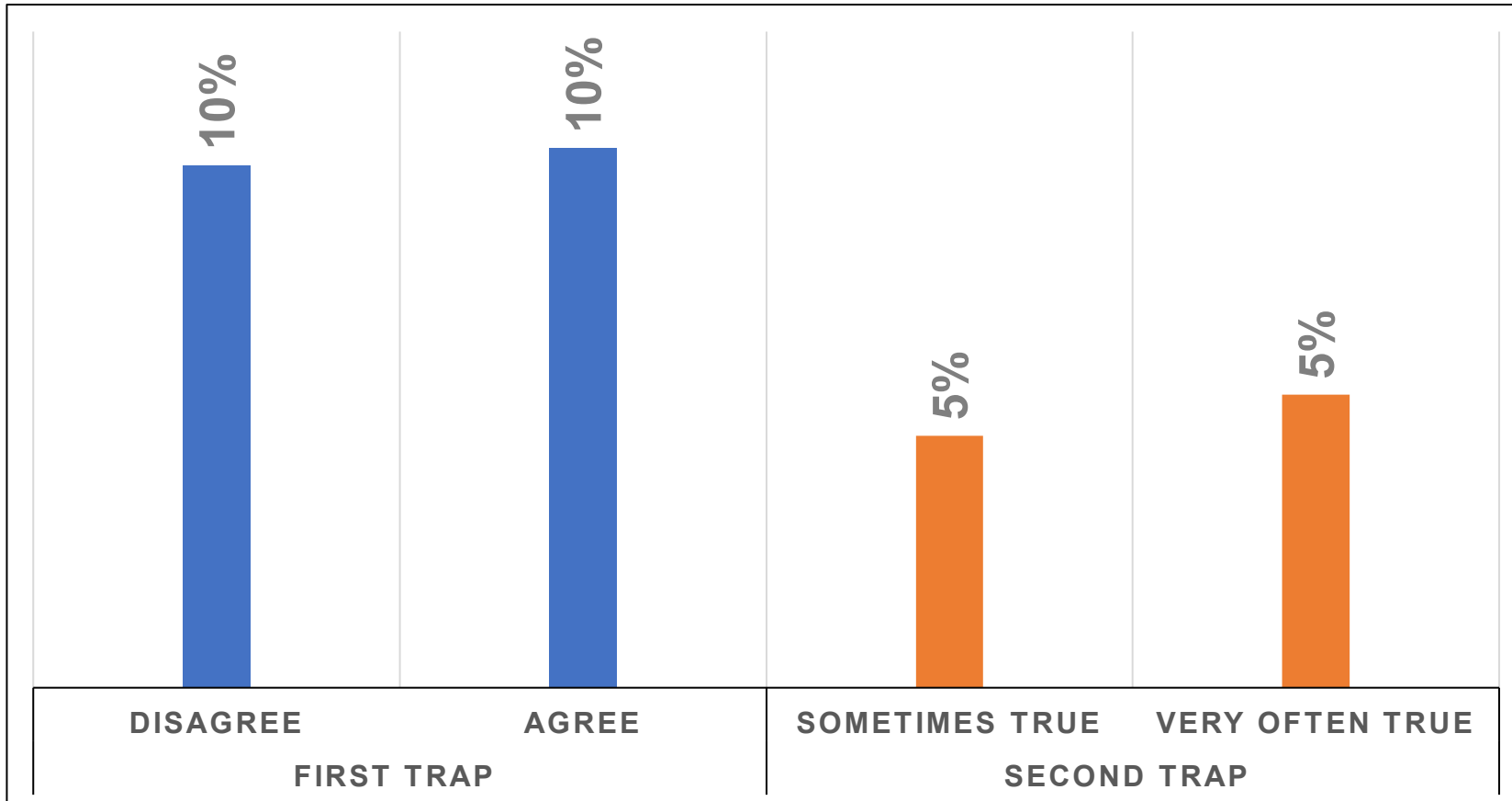
Traps	Straightforward	Disguised
Failed First	7%	13%
Failed Second	3%	8%
Failed at least one	5%	9%
Failed both	2%	6%

Trap Type and Positive vs. Negative Response Experiment



POSITIVITY

1 Agree/Disagree or 2 Sometimes true/Very often true



No difference by the response category they were assigned.

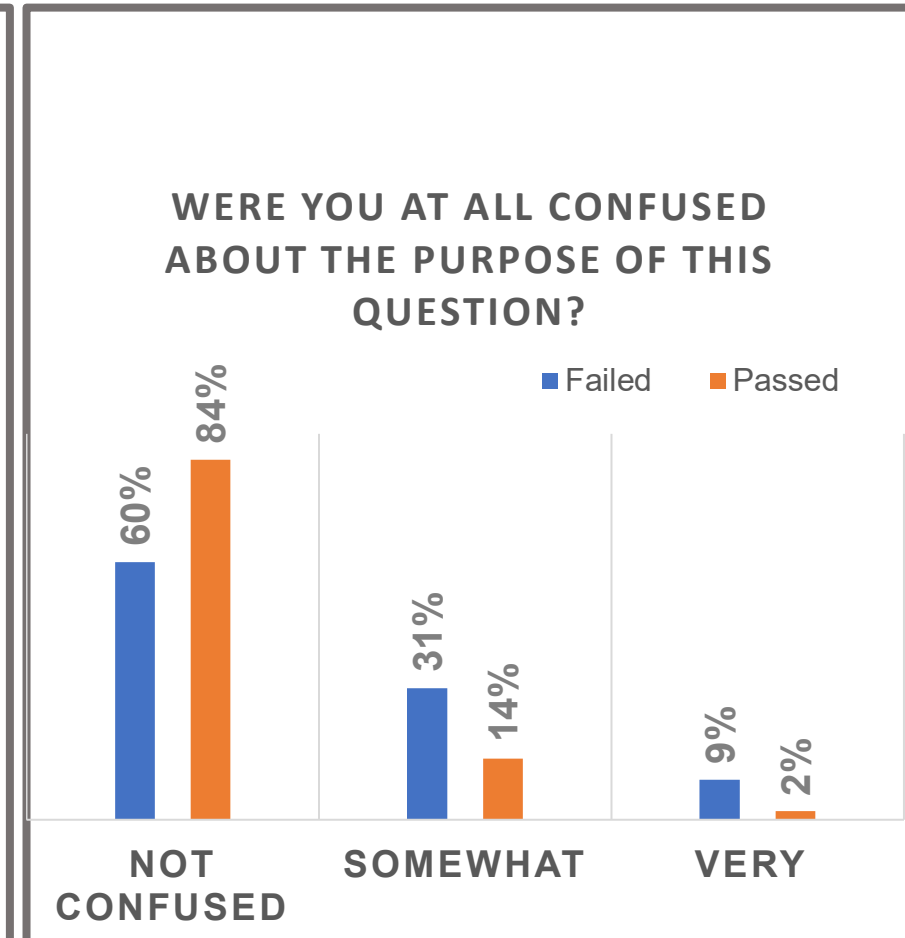
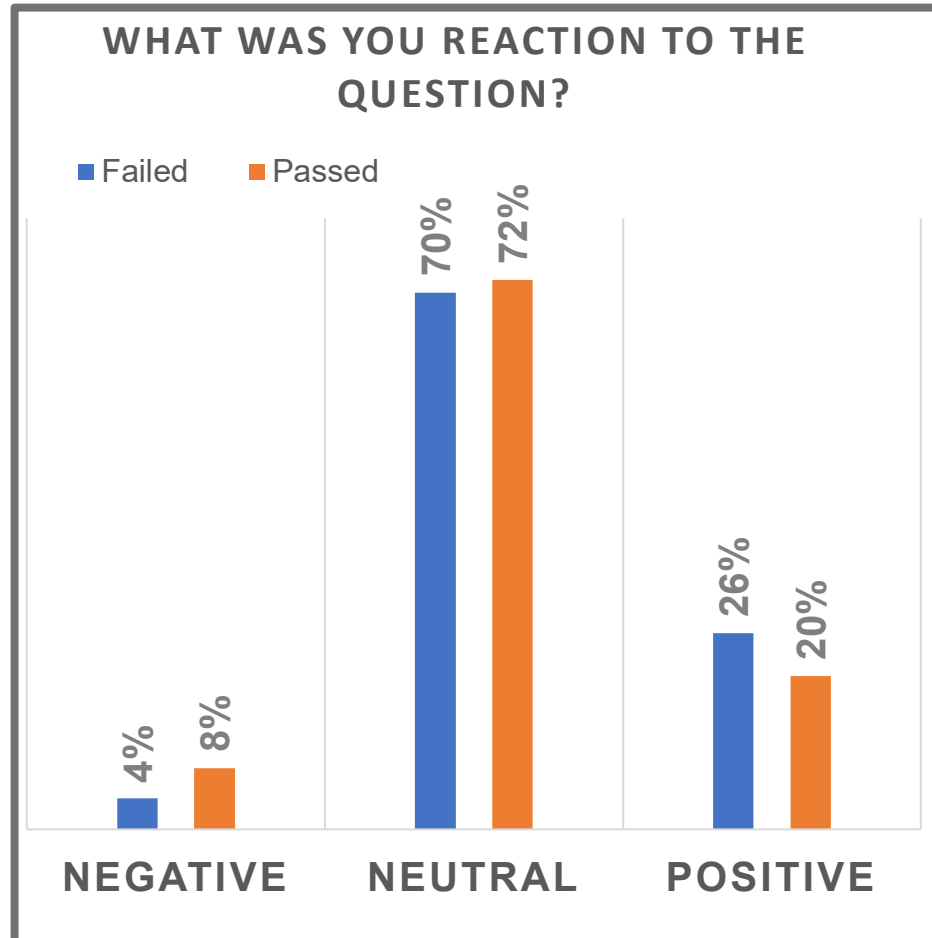
Reactions to Trap Questions –Trap 1



First Trap Question

[Political issues are important to many people.] To show that you are still reading these questions, please select the “Disagree”/”Agree” response below.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree



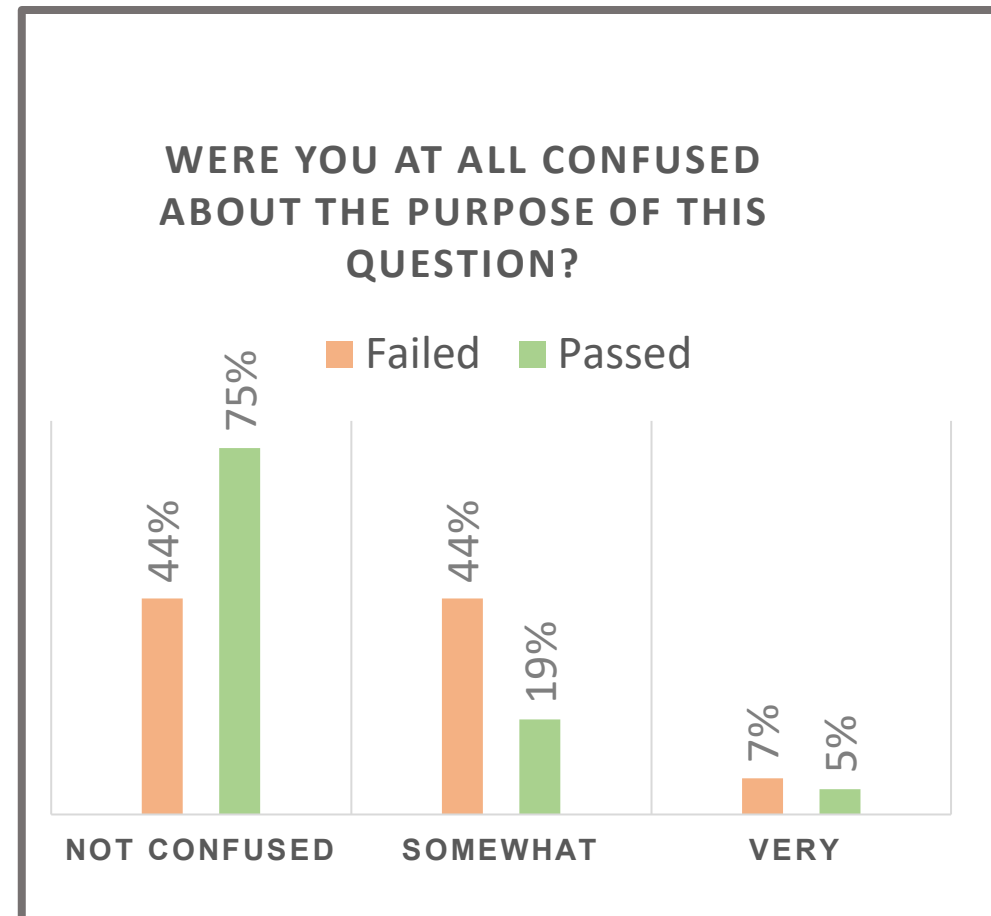
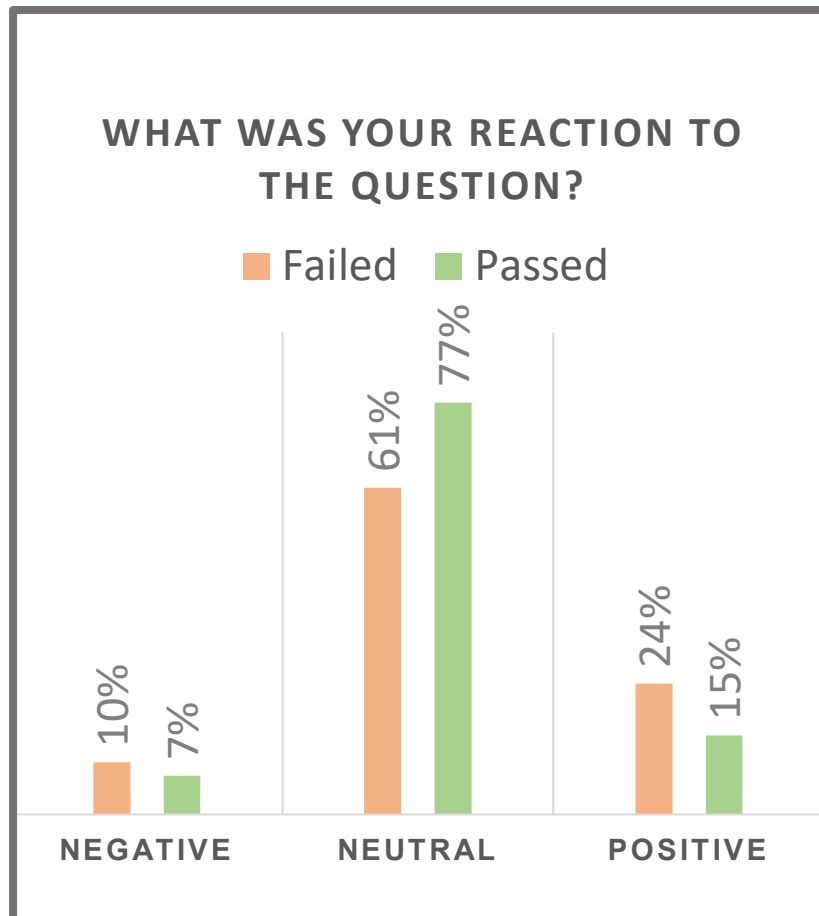
Reactions to Trap Questions –Trap 2



Second Trap Question

[People's experiences in the U.S. vary.] This is an open item to confirm correct response presentation – please select the "Sometimes true"/ "Very often true" response below.

- Not at all true
- Sometimes true
- Often true
- Very often true
- Always true



Is speeding correlated with failure?



We broke down the speeders by:

- **Bottom 2.5%**
- **Next 2.5%**
- **Next 5 %**
- **Next 10 %**
- **Slowest 80%**

Fastest

	FAILED NONE	FAILED AT LEAST ONE	FAILED BOTH
FASTEST 2.5%	78%	10%	12%
NEXT 2.5 %	93%	5%	2%
NEXT 2.5%	95%	3%	3%
NEXT 10%	95%	3%	1%
SLOWEST 80%	88%	8%	4%

Consistency Check and Trap Failure

Consistency Check 1

All things considered, how satisfied are you with your life overall?

- A. Very dissatisfied
- B. Somewhat dissatisfied
- C. Neither satisfied nor dissatisfied
- D. Somewhat satisfied
- E. Very satisfied

Consistency Check 2

How would you rate your overall life satisfaction?

- A. Very poor
- B. Poor
- C. Fair
- D. Good
- E. Very Good

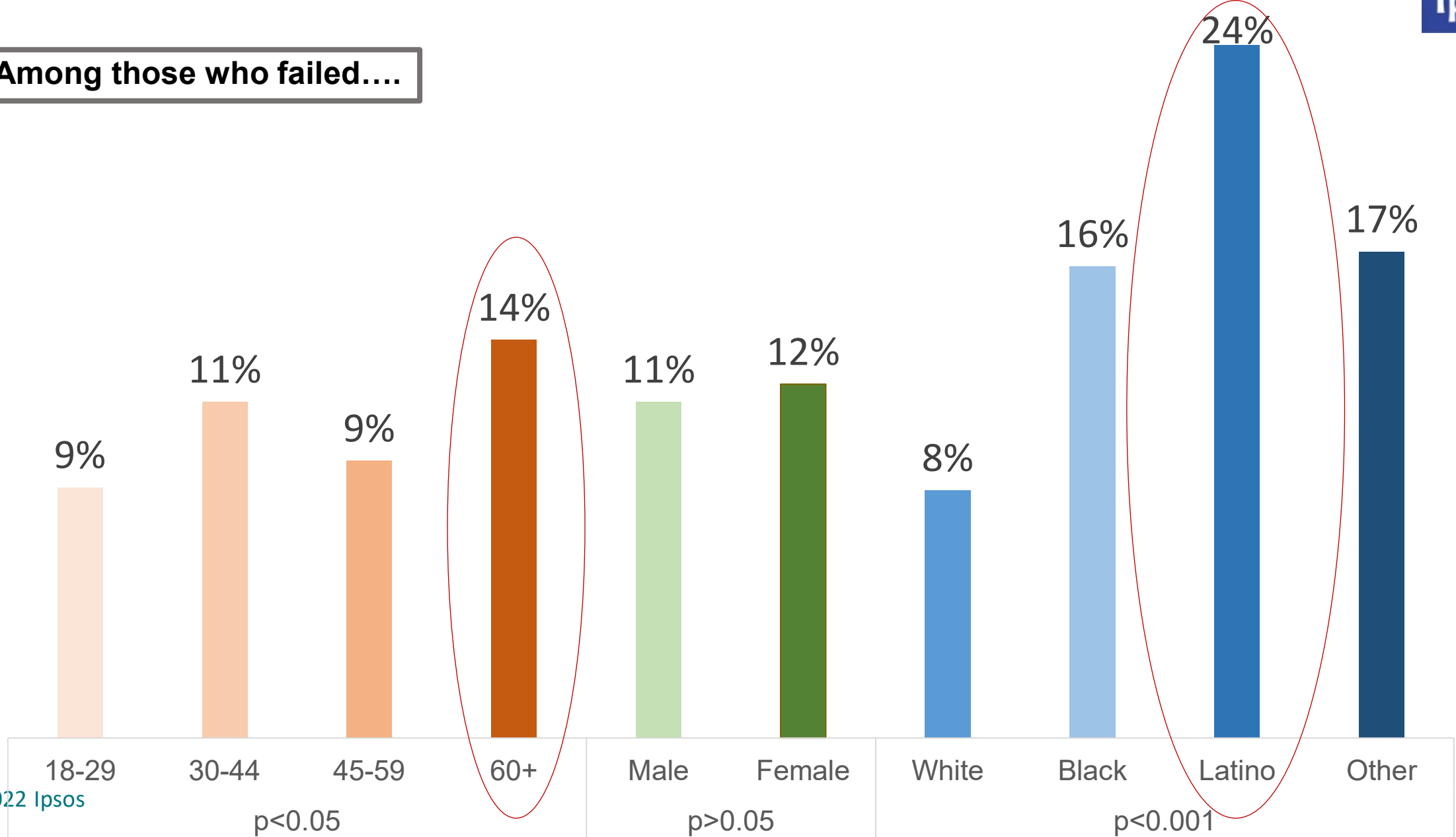
Only 10% not consistent

(> 0.05)	Failed Trap	Passed Trap
Not consistent	10.3%	11.6%
Consistent	89.7%	88.4%

Failure by Demographics- Age, Gender, Race/Ethnicity



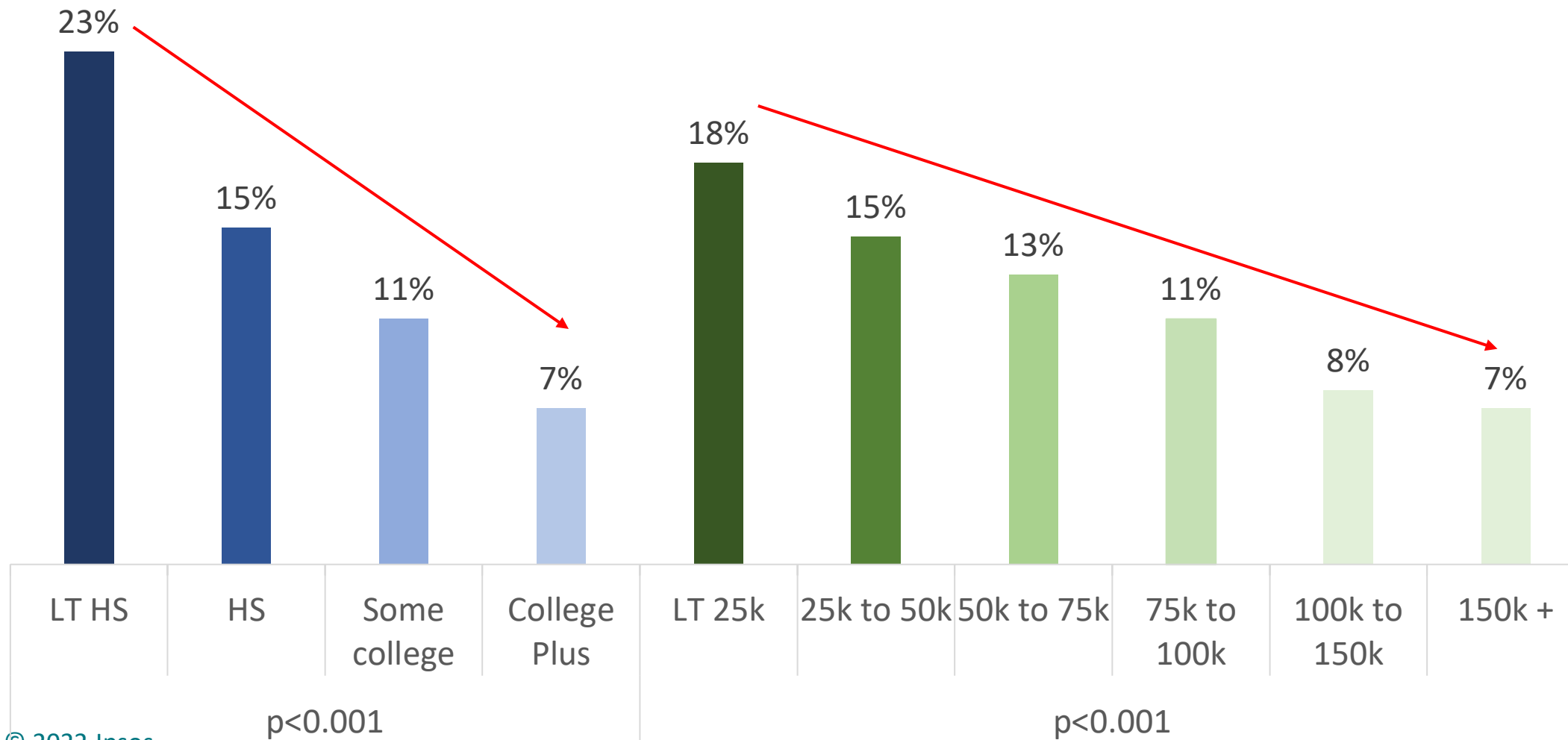
Among those who failed....



Failure by Demographics- Education, Income



Among those who failed...



Research
Question:

If we remove sub optimal respondents, how much bias we are introducing?

- **We have 4 groups of sub-optimal respondents:**
 - Those who failed 2 compliance traps only
 - Those who failed 1 or 2 compliance traps
 - Those who failed the consistency trap only
 - Those who either failed at least 1 compliance trap or failed consistency trap
- **Removed them from the dataset one group at a time and reweighted the data.**

Benchmark Comparison

- **We asked a number of questions that had national benchmark values:**
 - **Right Direction**
 - **Excellent or very good health**
 - **Married**
 - **Citizen**
 - **2 or more people living in the household**
 - **At least 1 child under 18 in HH**
 - **Own home**
 - **3 bedrooms or more in House**
 - **Moved in house more than 5 years ago**
 - **2 or more vehicles one ton or less**
 - **Has landline phone**
 - **Speaks other than English at home**

Benchmark Comparison -Average Absolute Deviation



To assess bias, we calculated the average absolute deviation:

- **Reweighted the data after removing each sub optimal group.**
- **Calculated the difference between the benchmark and weighted benchmark distributions for each subset.**
- **Took the absolute value for each difference.**
- **Averaged the total absolute difference for each of the 12 benchmarks to obtain the average absolute deviation against the national benchmarks.**

Benchmark Comparison -Results



Benchmark Questions	National Benchmark	ALL Weighted	No Trap Presented	Failed both trap	Passed at least 1 trap	Passed both traps	Passed consistency check	Passed both consistency and compliance
Right Direction	29.2%	0.3%	2.6%	0.9%	1.5%	2.0%	0.0%	0.5%
Excellent or very good health	57.4%	14.0%	13.0%	14.5%	14.7%	14.4%	11.0%	11.4%
Married	54.7%	4.2%	6.1%	3.3%	3.3%	2.9%	3.7%	2.8%
Citizen	92.0%	3.5%	3.8%	3.4%	3.4%	3.9%	3.3%	4.0%
2 or more in HH	85.6%	0.9%	0.6%	1.1%	0.7%	0.6%	0.9%	0.8%
At least 1 child under 18 in HH	33.2%	0.6%	3.5%	2.5%	2.7%	2.8%	2.5%	3.5%
Own home	70.1%	3.5%	3.5%	3.5%	3.7%	3.8%	4.0%	4.8%
3 bedrooms or more in HH	69.6%	3.3%	4.9%	2.5%	2.7%	2.9%	3.3%	3.6%
Moved in house more than 5 years ago	60.8%	5.2%	6.2%	4.8%	4.6%	5.1%	5.3%	5.5%
2 or more vehicles one ton or less	70.1%	1.4%	1.8%	1.2%	1.6%	1.8%	1.9%	2.1%
Has landline phone	37.3%	2.0%	2.3%	1.8%	1.3%	1.2%	1.7%	0.6%
Speaks other than English at home	21.9%	1.5%	1.8%	1.4%	1.9%	2.5%	1.6%	2.8%
Average Deviation		3.4%	4.2%	3.4%	3.5%	3.7%	3.3%	3.5%

Takeaways

Conclusions and Discussion



- **Disguised trap question caught more sub optimal respondents.**
- **Failing trap may not always indicate sub optimal response.**
- **Sub optimal identifications may not be correlated.**
- **Removing suboptimal responses did not impact the data quality.**
- **We will repeat this research with a longer questionnaire.**

Thank you!

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GAME CHANGERS 

