


An Eye-tracking Study of Scale Direction Effect

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Westat AAPOR 2021 — A Deep Dive into Data

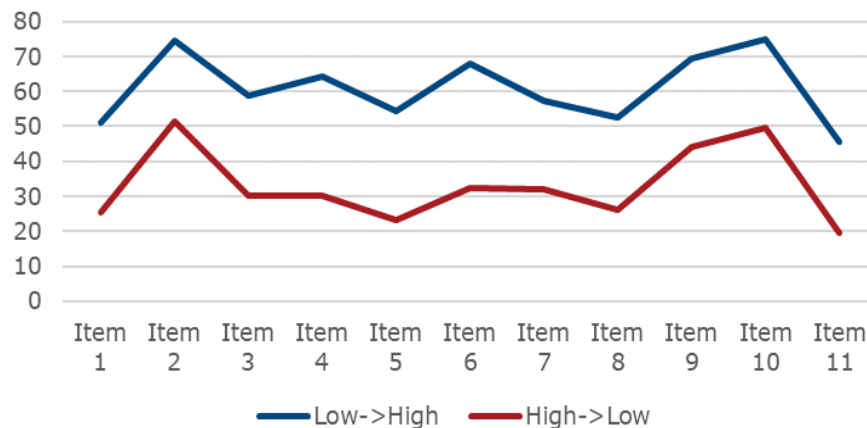
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Scale Direction Effect

- › Impact of scale direction on answers, holding other scale features constant (Yan and Keusch, 2015)
 - Primacy effects across all modes

% Selecting from the Low Side of the scale (Keusch and Yan, 2018)



Scale Direction Effect (2)

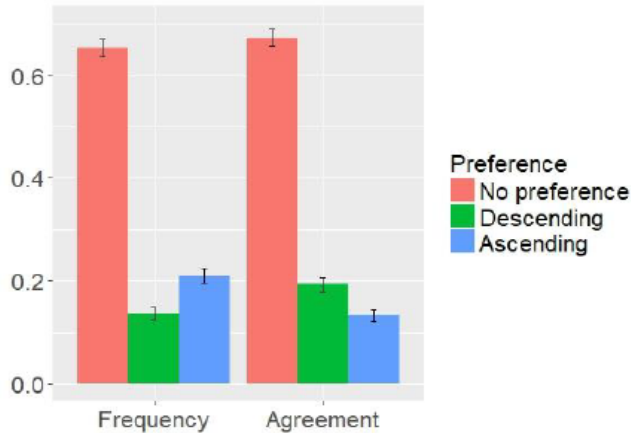
› Stronger effect for

- Longer scales (Yan, Keusch, and He, 2018)
- Items asked early in the survey (Yan, Keusch, and He, 2018; Carp, 1974)
- Rs with less knowledge (Yan and Keusch, 2015)
- Speeders (Keusch and Yan, 2018)

Scale Direction Effect (3)

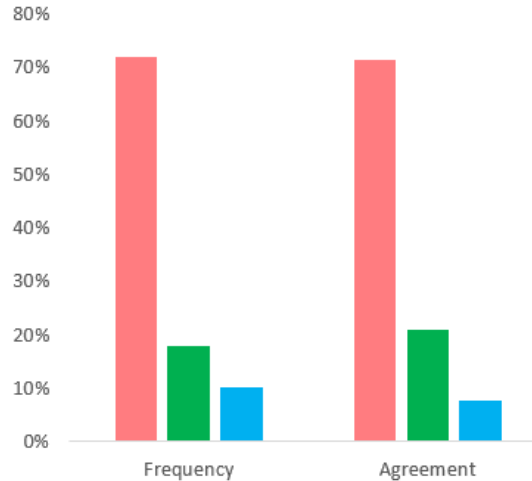
- › Inconclusive evidence for mechanisms
 - Satisficing (Krosnick and Presser, 2010; Krebs and Homeyer-Zlotnik, 2010)
 - A special case of response order effect
 - But, can't fully account for scale direction effects (Keusch and Yan, 2018)
 - Anchoring and adjustment (Yan and Keusch, 2015)
- › No agreed-upon best practices nor industry standards
 - Scale direction considered to be “a matter of taste” (Rammstedt & Krebs, 2007, p33)
- › What direction do respondents prefer?

Which Scale Direction do Respondents Prefer?



Keusch and Yan (2017): Dutch Respondents

- Frequency scale:
 - Descending: Always->Never
 - Ascending: Never->always
- Agreement scale:
 - Descending: Strongly agree-> Strongly disagree
 - Ascending: Strongly disagree-> Strongly agree



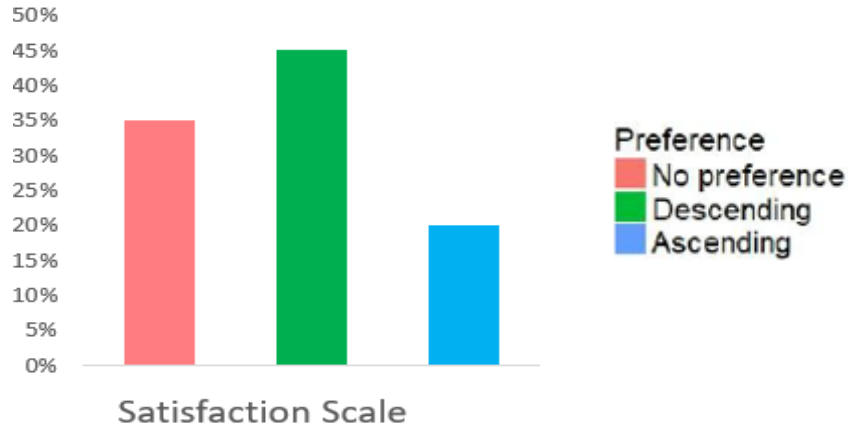
Yan and Hu (2016): American Respondents

-Majority people have no preference

-More preferred agreement scale to start with agreement options

-More Americans preferred frequency scale to start with "Always," but more Dutch with "Never"

Which Scale Direction do Respondents Prefer?



-More Chinese preferred satisfaction scale to start with "satisfaction"

-about one-third had no preference

Yan and Zhang (2017): Chinese Respondents

- Satisfaction scale:
 - Descending: Very satisfied-> very dissatisfied
 - Ascending: Very dissatisfied-> very satisfied

Which Scale Direction is More Difficult For Respondents to Use?

- › This talk attempts to assess which direction is more difficult for people to use
- › Eye-tracking to assess difficulty by
 - Dilation
 - Consistent and reliable indicator of cognitive load, cognitive difficulty, cognitive burden (Kahneman and Beatty, 1966; Beatty, 1982)
 - Larger dilation → more difficult
 - Fixation counts and duration
 - Typical measure of attention and cognitive processing (Galesic and Yan, 2011; Höhne et al., 2020)
 - More fixations and longer fixations → more difficult

Eye-tracking Study

- › Conducted in January 2016
- › 20 participants recruited from Washington, DC metropolitan area
 - A mix of respondents across age, gender, education, race
- › ASL Mobile Eye-XG eye-tracking glasses were used for recording eye tracking videos
- › 34 target questions with debriefing items
 - One question per screen
- › Scale direction experiment
 - 2 scales
 - 13 items



Scale Direction Experiment: Satisfaction Scale

How satisfied are you with your...

1. Health?
2. Diet?
3. Grocery store where you shop the most often?
4. Neighborhood?
5. City?

> Descending

- Very Satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very Dissatisfied

Vs.

> Ascending

- Very Dissatisfied
- Dissatisfied
- Neutral
- Satisfied
- Very Satisfied



Scale Direction Experiment: Frequency Scale

Now thinking about the past 12 months, how often did you drink...?

1. Beer?
2. Wine or wine coolers?
3. Liquor or mixed drinks?
4. Coffee, caffeinated, or decaffeinated?
5. Iced tea, caffeinated, or decaffeinated?
6. Milk?
7. Orange juice?
8. Apple juice?

> Descending

- Very Often
- Pretty Often
- Not too often
- Seldom
- Never

vs.

> Ascending

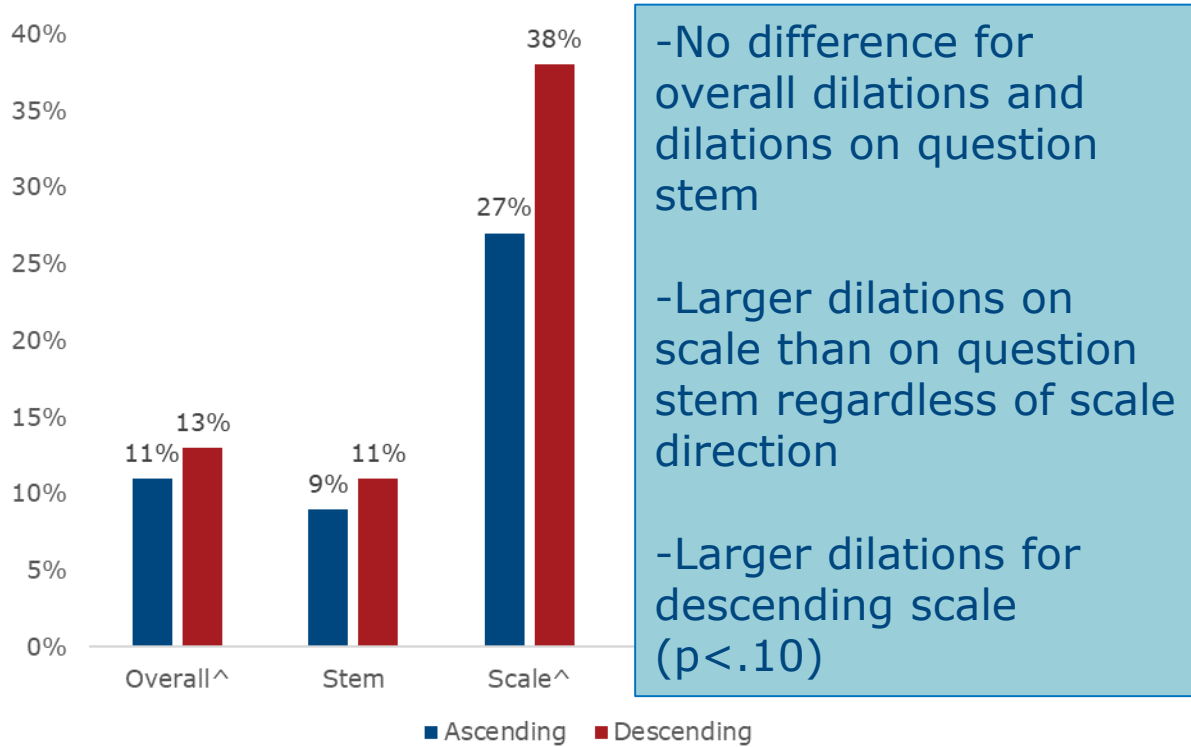
- Never
- Seldom
- Not too often
- Pretty Often
- Very Often



Eye-tracking Measures

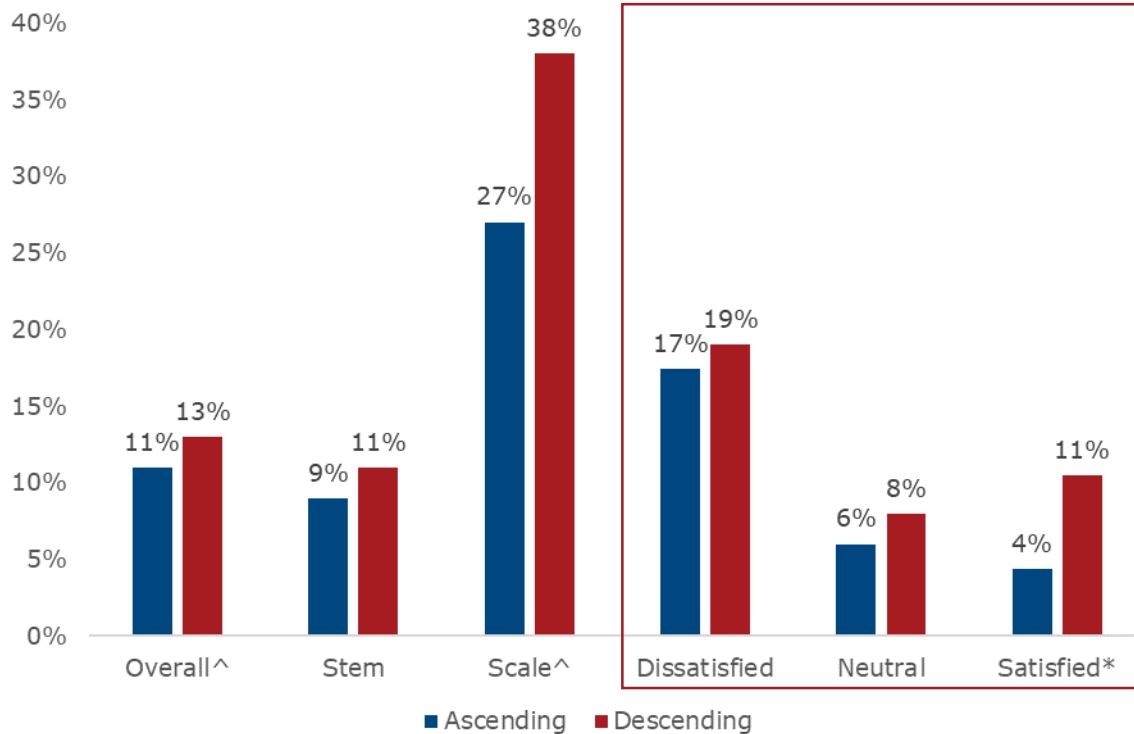
- › For each survey item
 - Overall, question stem, whole scale, top part of scale, bottom part of scale, middle part of scale
 - Average dilation
 - Fixation counts and fixation duration
- › Compare by scale direction, scale type

Results on Satisfaction Scale: Average Dilations



- > Ascending scale
 - Very Dissatisfied
 - Dissatisfied
 - Neutral
 - Satisfied
 - Very Satisfied
- > Descending scale
 - Very Satisfied
 - Satisfied
 - Neutral
 - Dissatisfied
 - Very Dissatisfied

Results on Satisfaction Scale: Average Dilations

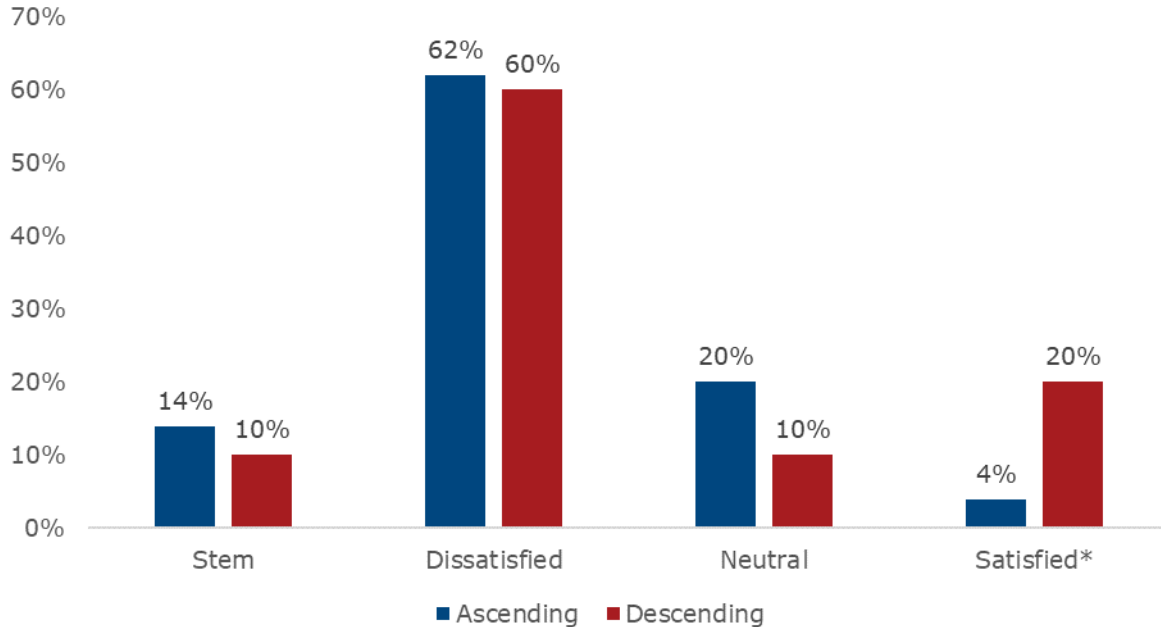


-Larger dilations for "dissatisfied" options than for other options regardless of scale direction ($p < .01$)

-Larger dilations for "satisfied" options when presented first (in the format of descending scale) ($p = .003$)

Results on Satisfaction Scale: Peak Dilation

› % of respondents with peak dilation at...



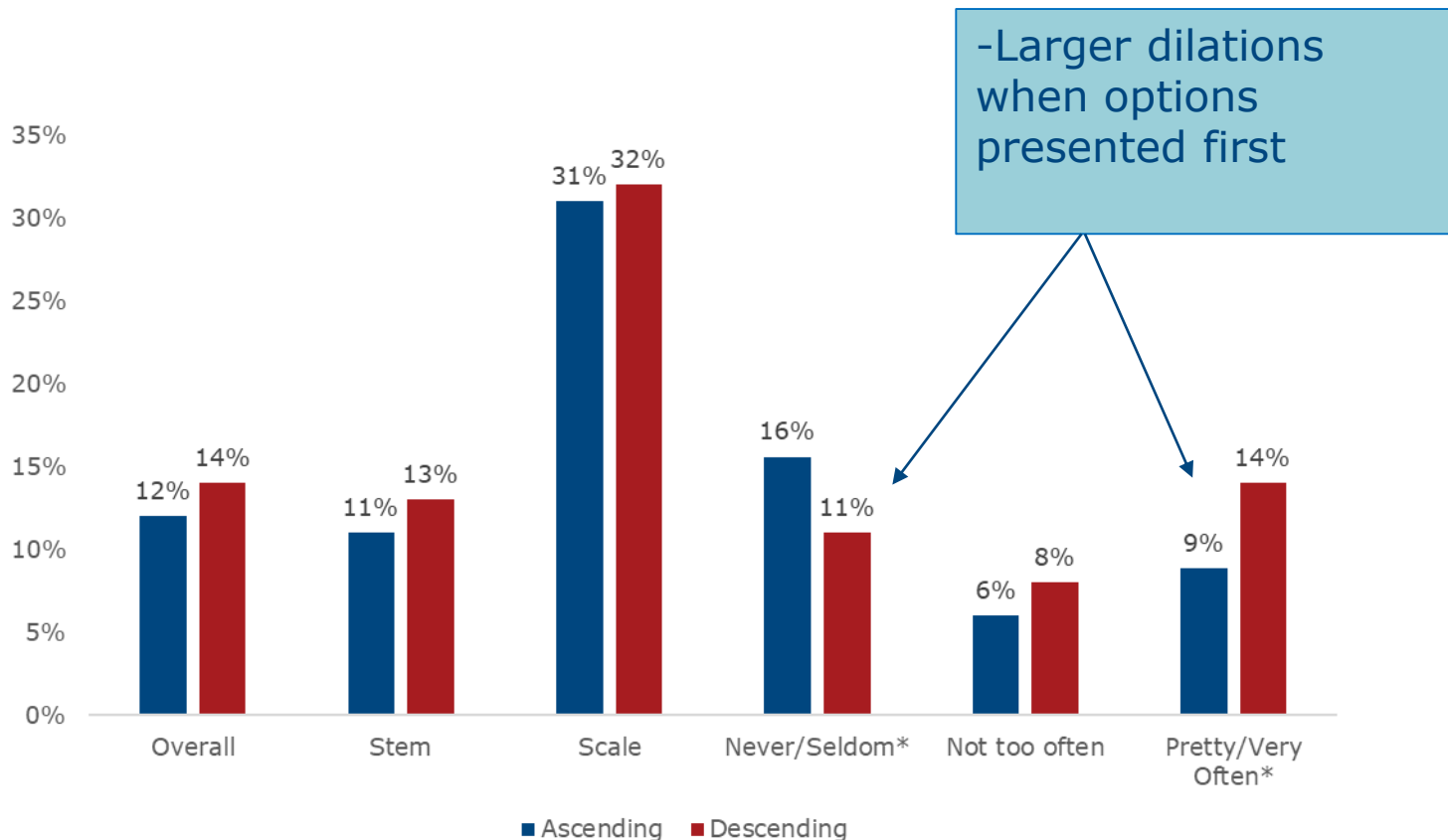
-Majority people peaked at "dissatisfaction" options regardless of scale direction

-More people peaked at "satisfied" options when presented first (in the format of descending scale) ($p = .01$)

Results on Satisfaction Scale: Summary

- › “Dissatisfied” options cognitively more difficult
 - Larger dilations
 - More peak dilations
 - More fixations, Longer fixations
 - Even when they were presented later
- › “Satisfied” options more difficult when presented first
- › Descending scale starting with “satisfied” options somewhat more difficult than ascending scale

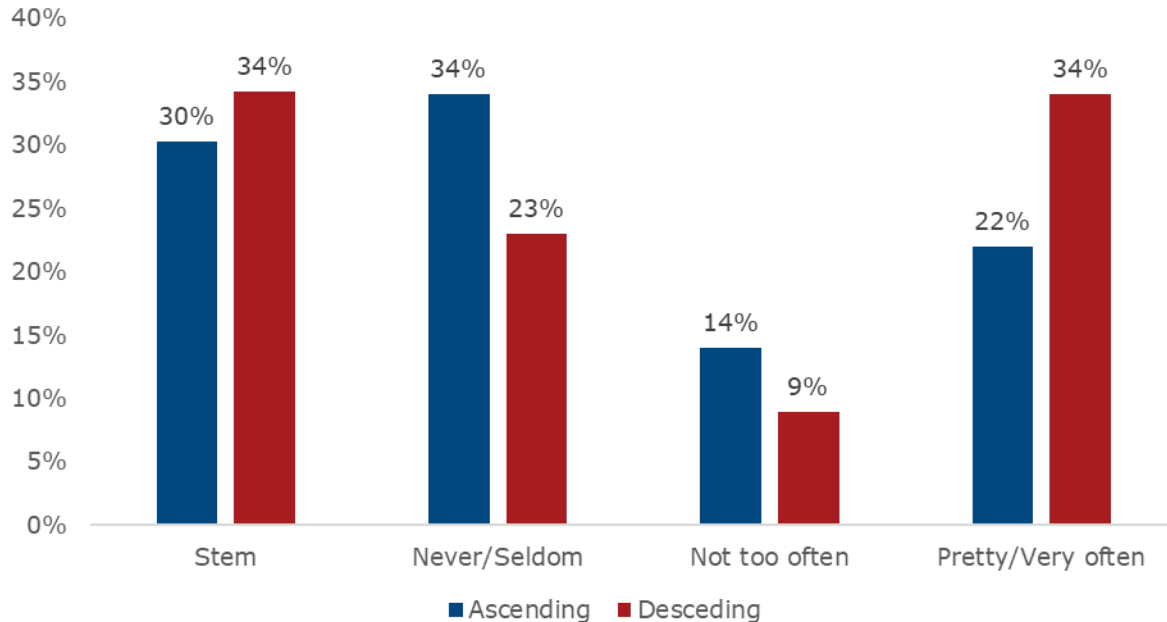
Results on Frequency Scale: Average Dilations



- › Ascending scale
 - Very Often
 - Pretty Often
 - Not too often
 - Seldom
 - Never
- › Descending scale
 - Never
 - Seldom
 - Not too Often
 - Pretty Often
 - Very Often

Results on Frequency Scale: Peak Dilation

› % of respondents with peak dilation at...



-No difference across scale direction

-1/3 peaked at question stem

-1/3 peaked at first options

Results on Frequency Scale: Summary

- › No differences in average dilation and peak dilation by scale direction
- › Larger dilations when options presented first than when presented last
- › More fixations and longer fixations for ascending scale
- › More fixations and longer fixations for 'never/seldom' options when presented first

Conclusions

- › I attempted to understand which scale direction is more difficult for respondents to process and to use
- › Satisfaction scale starting with “very satisfied” seems to be more difficult
 - Larger dilations, more fixations, longer fixations
- › Frequency scale starting with “never” seems to be more difficult
 - More fixations, longer fixations
- › Regardless of scale direction
 - “Dissatisfaction” options are difficult to process
 - Satisfaction scale more difficult than frequency scale

Discussion

- › Eye-tracking provides a window to survey response process
- › Dilation measures reveal what is difficult and where people struggle
 - Complementing the usual fixation measures
- › Use for question testing and evaluation

Thank You

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