Investigating Direction Effects Across Rating Scales with Five and Seven Points in a Probability-based Online Panel

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Introduction I

- Questions with rating scales are frequently used in attitude measurement.
  - *American National Election Study (ANES).*
  - *European Social Survey (ESS).*
- Design of rating scales can impact answer behavior.
  - *Inducing systematic measurement errors.*
  - *Reducing measurement quality.*
- For instance, rating scales can follow two directions:
  - *Decremental (Dec): applies completely – applies not at all.*
  - *Incremental (Inc): applies not at all – applies completely.*

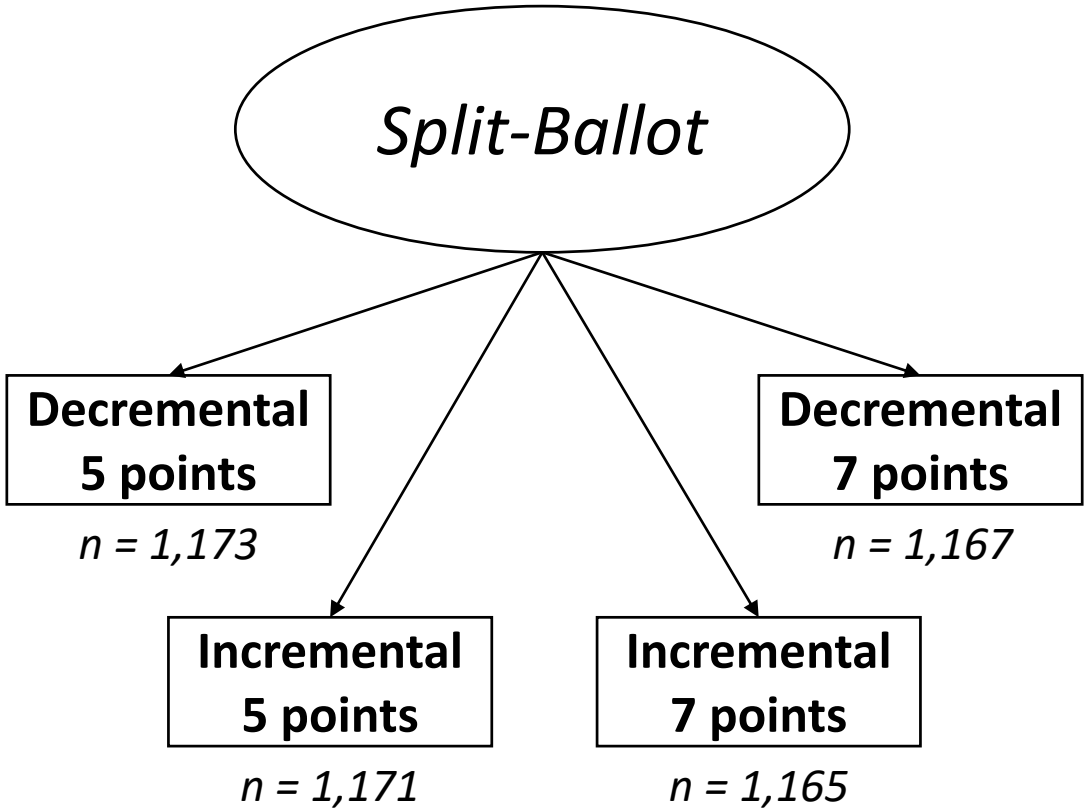
Introduction II

- Occurrence of primacy effects in rating scales.
  - *Answers pile up at the beginning.*
- Primacy effects seem to be more pronounced in longer rating scales.
  - *Improper distinction between scale points.*
- Respondents point attention to rating scale beginning.
  - *Beginning serves as reference point: anchor-and-adjustment heuristic.*
- Few studies on direction effects across scales of different lengths.
  - *Most analyses remain on observational level (e.g., answer distributions).*
  - *Analyses on latent level are scarce (e.g., latent means).*

Research Questions (RQs)

- Do decremental and incremental rating scales with five and seven points shift respondents' answers to the beginning of the scale? **(RQ1)**
- Can measurement invariance be obtained for decremental and incremental rating scales with five and seven points? **(RQ2)**
- If measurement invariance can be obtained, do decremental and incremental rating scales with five and seven points result in latent mean differences? **(RQ3)**

Method: Design and Survey Questions



- Five questions on achievement motivation.
  - *One question per page.*
- End verbalization.
  - *Dec: applies completely – applies not at all.*
  - *Inc: applies not at all – applies completely.*
- Vertical alignment.
- No numeric values.
- Optimized survey layout.
  - *No horizontal scrolling.*

Method: Sample Characteristics

The experiment was conducted in the probability-based German Internet Panel in July 2019.

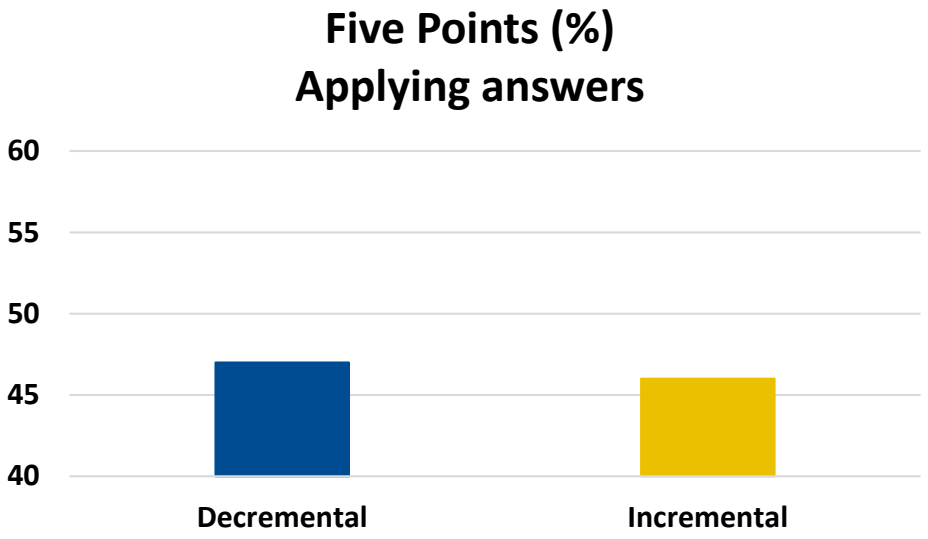
Final sample size:	*N = 4,676*
Gender:	*48% female*
Age (in years):	*Mean = 50*
Education:	*15% lower secondary school*
	32% intermediate secondary school
	53% at least college preparatory secondary school

Note. Chi-square tests revealed no significant differences between the four experimental groups regarding gender, age, and education.

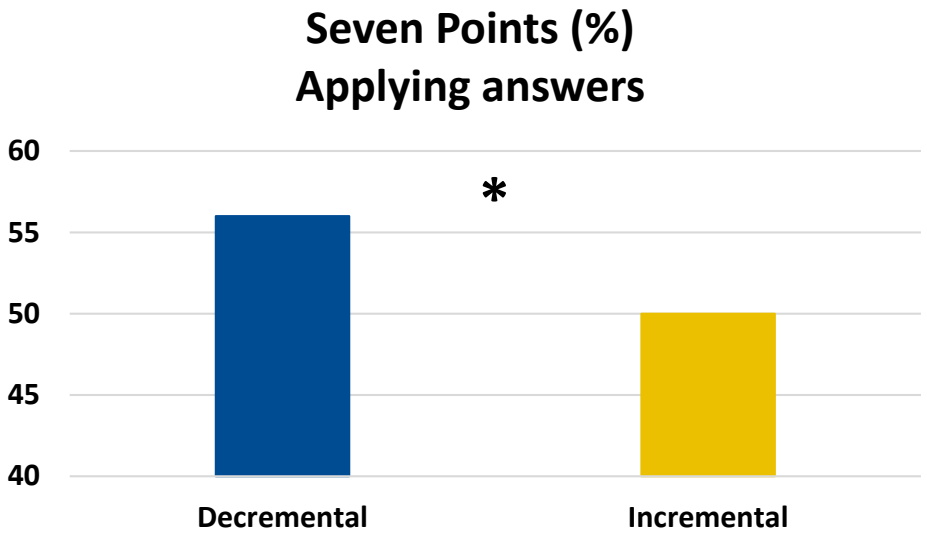
Method: Analytical Strategy

- RQ1: Comparing answer distributions (Z-tests).
  - *First two (five points) and first three (seven points) answer options.*
  - *Average proportion for the five questions on achievement motivation.*
- RQ2: Testing for measurement invariance.
  - *Multi-Group Confirmatory Factor Analysis (MG-CFA).*
  - *Notion of strong (scalar) measurement invariance.*
- RQ3: Testing for latent mean shifts.
  - *Only for invariant groups.*
- Data are available via GESIS Data Archive (DOI: 10.4232/1.13465).

Results: Research Question 1



***Note.* *p < 0.005.**



***Note.* *p < 0.005.**

Results: Research Question 2

Invariance level (Five points)	χ^2-value	df	RMSEA	CFI	χ^2 difference test
Configural	22.9 (1.5)	8	0.04	0.99	
Metric	31.8 (1.3)	13	0.04	0.99	7.53
Scalar	40.5 (1.2)	18	0.03	0.99	7.86

Note. *p < 0.005. The results are based on MLR estimation. Scale correction factors are in parentheses.

Invariance level (Seven points)	χ^2-value	df	RMSEA	CFI	χ^2 difference test
Configural	27.2 (1.5)	8	0.04	0.99	
Metric	37.4 (1.3)	13	0.04	0.99	8.45
Scalar	57.2 (1.2)	18	0.04	0.99	20.80*

Note. *p < 0.005. The results are based on MLR estimation. Scale correction factors are in parentheses.

Results: Research Question 3

	Estimate	Standard error	Critical ratio	P-value
Five points	-0.03	0.04	-0.68	0.50

Note. Reference group: decremental.

Discussion and Conclusion

- Primacy effects in seven- but not in five-point rating scales.
  - *This is indicated by the answer distributions.*
- Measurement invariance for five- but not for seven-point rating scales.
  - *Lack of scalar invariance points to systematic measurement errors.*
- No latent mean differences in five-point rating scales.
  - *Supports the results of answer distributions.*
  - *Cannot be tested for seven-point rating scales.*
- Overall, five-point scales seem to be more robust against direction effects.

Many thanks for your attention!

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