

visual analogue scales (VASs)

no problems caused by invisible response options on small screens (see Couper, Tourangeau, Conrad, & Crawford, 2004)



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visual analogue scales (VASs)

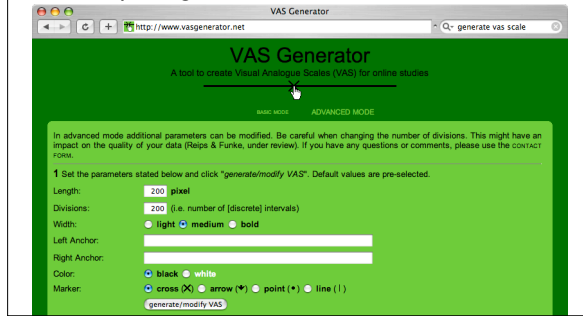
disadvantages

- no lowtech implementation (for possible problems see Buchanan & Reips, 2001; Funke, Reips, & Thomas, 2011; Stieger, Görizt, & Voracek, 2011)
- more dropout, more item nonresponse, longer RT (Couper et al., 2006; **but:** confound with technology)

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visual analogue scales (VASs)

free Web service to generate VASs:
<http://vasgenerator.net>

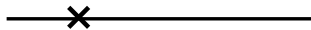


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Web experiment – design

- experimental between subjects design
- factor *rating scale*:

- VAS with 250 response options



- radio button scale with 5 discrete options



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Web experiment – design

questionnaire:

- 40 items: Big Five personality test (<http://pip.ori.org>)
- design: 1 item per screen
- no mandatory items
- seriousness check (Reips 2000, 2008)
- individual code

sample:

- $N = 829$ students reached experiment
- $N = 506$ (61%) indicated seriousness
- $N = 467$ (92%) met technological requirements

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Web experiment – design

paradata:

- response latency per page
- frequency of changing ratings
- technological variables (e.g., JavaScript)

respondent behavior:

- dropout
- lurking
- item nonresponse

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Web experiment – results

missing data:

- break-off:
2.9% ~~—~~
4.1%

n.s.

- lurking:
1.6% ~~—~~
0.5%

n.s.

- item nonresponse (without lurker):
0.45% ~~—~~
0.59%

n.s.

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Web experiment – results

respondent behavior 1:

- response time (seconds for 40 items):
 $M = 7:30''$ $Q2 = 5:42''$ ~~—~~
 $M = 6:57''$ $Q2 = 5:19''$

n.s.

respondent behavior 2:

- changing answers (changes for 40 items):
9.8 ~~—~~
4.5

$F(1, 245) = 23.05, p < .001, \eta^2 = .086$

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Web experiment – results

substantial answers:

- mean ratings for all 40 item: $p \geq .09$
⇒ It's not about bias
- 34 out of 40 SDs smaller with VASs
⇒ It's about error: VASs lower formatting error (see Funke 2010, Schwarz & Oyserman, 2001)

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Web experiment – results

standard error of the mean (SEM):

– SEM = $\frac{SM}{\sqrt{n}}$

– SEM:

1.70 ~~X~~

1.90 ●●●●●

$F(1, 79) = 16.30, p < .001, \eta^2 = .173$

Web experiment – results

effect sizes (ANOVA, independent variable = sex):

– mean η^2 for all 40 items

.016 ~~X~~

.012 ●●●●●

– η^2 for each personality trait

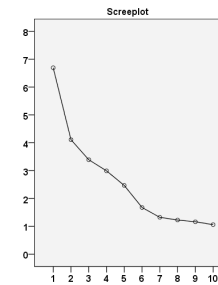
~~X~~ ●●●●●

openness	.015	.023
conscientiousness	.023	.001
extraversion	.006	.002
agreeableness	.043	.025
neuroticism	.022	.007

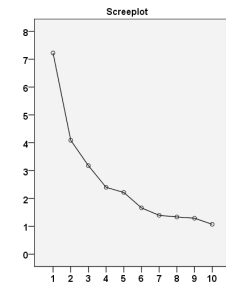
Web experiment – results

factor analysis:

●●●●●



~~X~~



Web experiment – results

factor analysis:

– explained variance by 5 factors (higher is better)

49% ~~X~~

48% ●●●●●

– mean loadings on predicted factors (higher is better)

.63 ~~X~~

.62 ●●●●●

– mean loadings on unpredicted factors (lower is better)

.00 ~~X~~

.04 ●●●●●

conclusion

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feasibility

in contrast of previous studies:
tendency for less dropout and fewer nonresponse

conclusion

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question answer process

more changes with VASs:
respondents take advantage of new possibilities

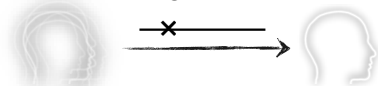
conclusion

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data quality

no bias

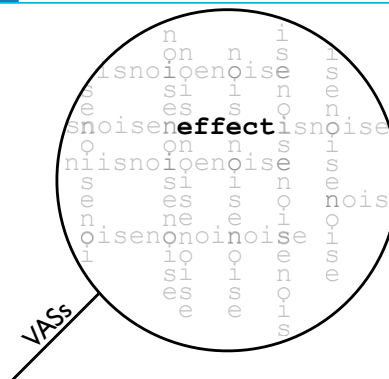
smaller SEM & greater effect sizes



but: no influence on factor analysis

conclusion

effect



**ES
RA**

thank you

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