Harmonizing political interest data with equating

Ranjit K. Singh

2021-07-16

@_R_K_Singh

ranjit.singh@gesis.org
Ex-post harmonizing single question instruments for latent constructs

Two instruments for political interest:

i4 (first use: ISSP 2014)
a5 (first use: ALLBUS 1980)

German ALLBUS–ISSP 2014 data
(same sample!)
How interested would you say you are in politics?

1. Very interested
2. Fairly interested
3. Not very interested
4. Not at all interested

How strongly are you interested in politics?

1. Very strongly
2. Strongly
3. Middling
4. Not very
5. Not at all
Latent construct intensity (i.e., the "true" level of political interest)
Same (average) respondent would choose different response scores.
Linear Stretching is not sufficient to solve this! (i.e., setting minimum and maximum responses as equal and stretching the rest)
Linear Stretching is not sufficient to solve this!
(i.e., setting minimum and maximum responses as equal and stretching the rest)

Mean Bias: $|d| = 0.38$
Instead we want **Equity**: The same construct intensity should result in the same harmonized score!
Observed measurement and latent reality are entwined...
...but with data randomly drawn from the same population, we have **controlled** for true, latent population differences.
By aligning the observed response distributions, the numerical scores become comparable.
Transforming observed response distributions

Observed Score Equating in a random groups design

Data for both instruments randomly drawn from the same population
Linear Equating

- Δ mean ✓
- Δ sd ✓

Equipercentile Equating

- Δ mean ✓
- Δ sd ✓
- Δ Skewness ✓
- Bimodality etc. ✓
Mean bias mitigation

- i4 Stretching: 0.38
- i4 Linear Equating: 0.00
- i4 Equipercenntile Equating: 0.04
Where to get data for equating?

We need data for both instruments drawn from the same population

1. Non-probability web experiment
2. Existing, probability survey data of the same country in the same year
Mean bias mitigation (with non-prob. sample)

- **i4 Stretching**: 0.38
- **i4 Linear Equating**: 0.00, 0.10
- **i4 Equipercentile Equating**: 0.04, 0.07

Cohen's d values for ALLBUS-ISSP Data and Nonprobability Sample.
Data for two instruments drawn from the same Population

National Probability Samples

Timeseries and Panels

Equating in the **same country** in the **same year**
Ruling out inter-survey bias: Harmonizing a$_{5}$ with a$_{5}$

a$_{5}$ instrument data from two German probability samples:

- GLES 2017
- ALLBUS 2016 & 2018 combined ($\approx$ interpolated ALLBUS 2017)
Ideal outcome:

Equating $a_5$ with $a_5$ should result in an identity relationship

$(1 = 1, 2 = 2, \text{etc.})$
The limits of equating:

Equating **does not resolve**:

- **Differences in content**
  (i.e., instruments measuring different constructs)
- **Differences in measurement precision**
  (e.g., differences in reliability / random error)
Summary

- **Ex-post harmonizing** different single question instruments is challenging
- **Linear stretching** is insufficient
- **Equating** works well and is easy to apply
- Getting **Data for equating** is a hurdle, but **non-probability (web-) experiments** or existing **national probability samples** can be used
Additional Ressources

GESIS Blog Series on ex-post Harmonization:
Adventures in ex-post harmonization: Frankenstein‘s’s Creature

Short introduction to equating for survey instruments:

@_R_K_Singh
ranjit.singh@gesis.org
I am looking forward to your questions and comments
Transformed **i4** scores to match **a5** format

**i4 stretching**

**i4 linear equating**

**i4** equipercen terile e.

**a5** target format
Response Distributions $\text{i4}$ and $\text{a5}$

**Mean:**

$\pm 1$SD:
Equipercentile Equating 1: Interpolating Percentile Ranks (e.g., for a5)
Equipercentile Equating 2: 

\( \text{i4 score} \rightarrow \text{Percentile Rank} \rightarrow \text{a5 equivalent} \)

Score 2 in i4 is linked to a score of \( \approx 2.8 \) in a5.
Political interest in German prob. samples
(In six surveys GESIS is involved in.)