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Harmonizing political interest data with equating

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Ex-post harmonizing single question instruments for latent constructs

Two instruments for political interest:

i4 (first use: ISSP 2014)

a5 (first use: ALLBUS 1980)

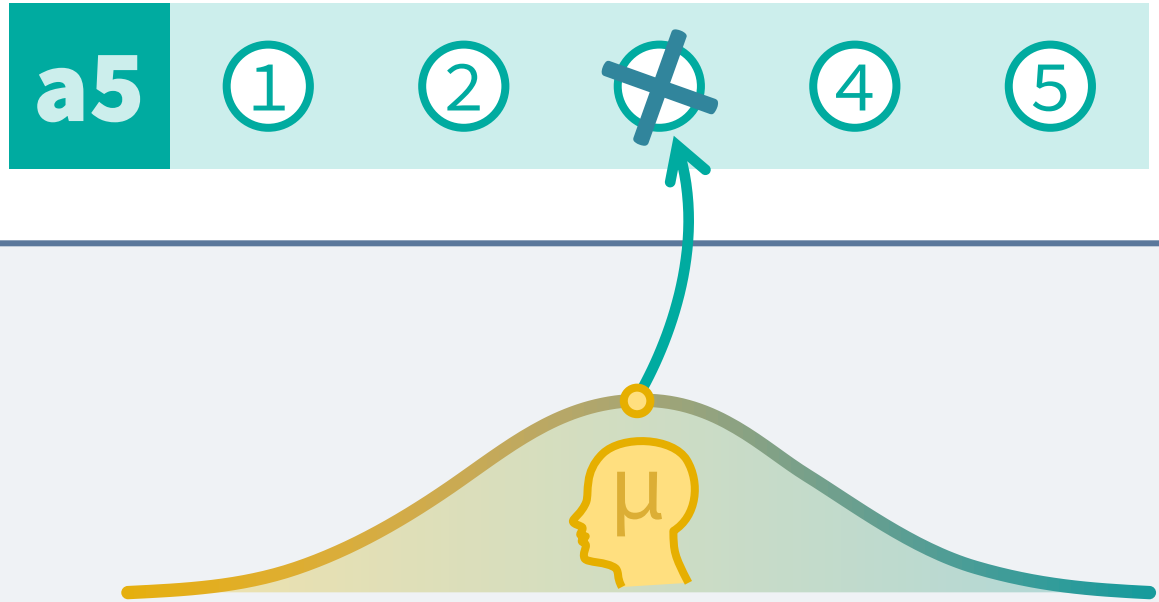
German ALLBUS–ISSP 2014 data
(same sample!)

i4 How interested would you say you are in politics?

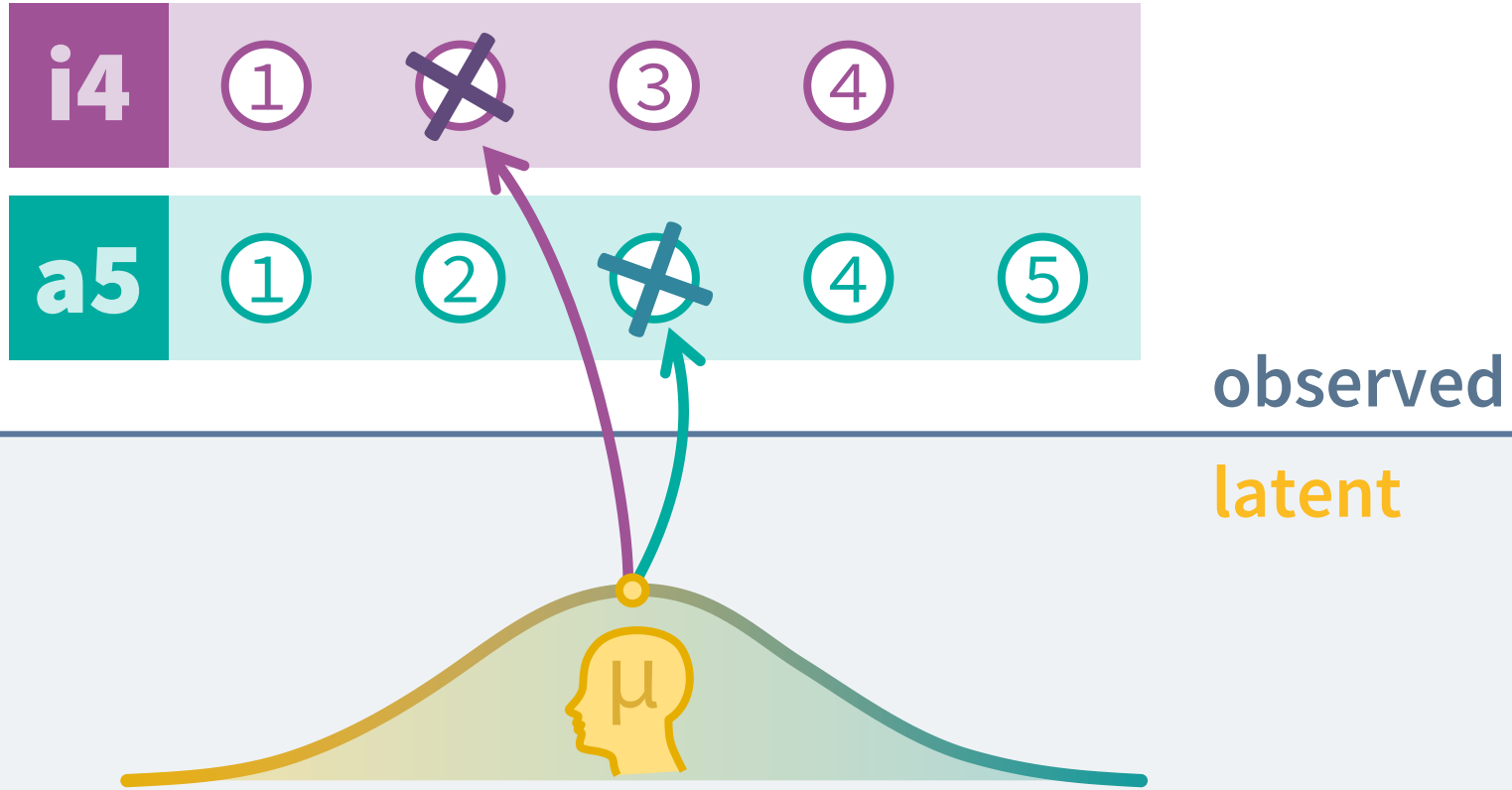
1	2	3	4
Very interested	Fairly interested	Not very interested	Not at all interested

a5 How strongly are you interested in politics?

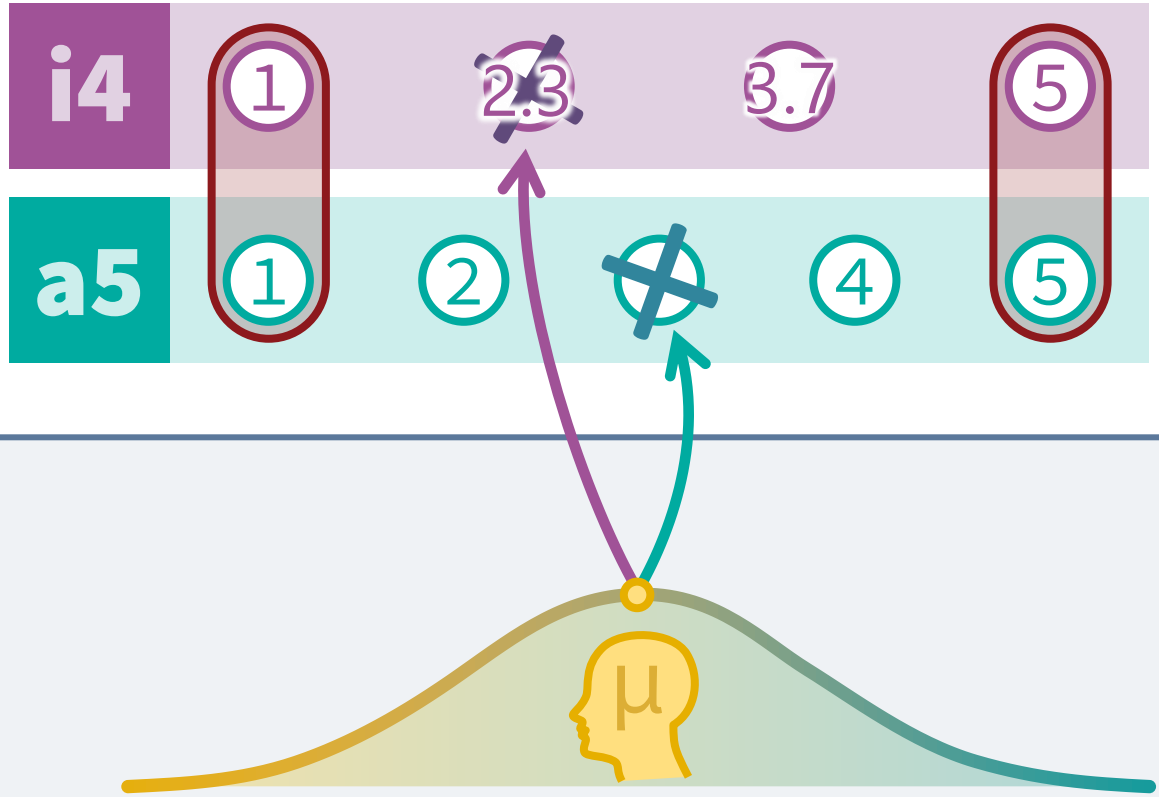
1	2	3	4	5
Very strongly	Strongly	Middling	Not very	Not at all



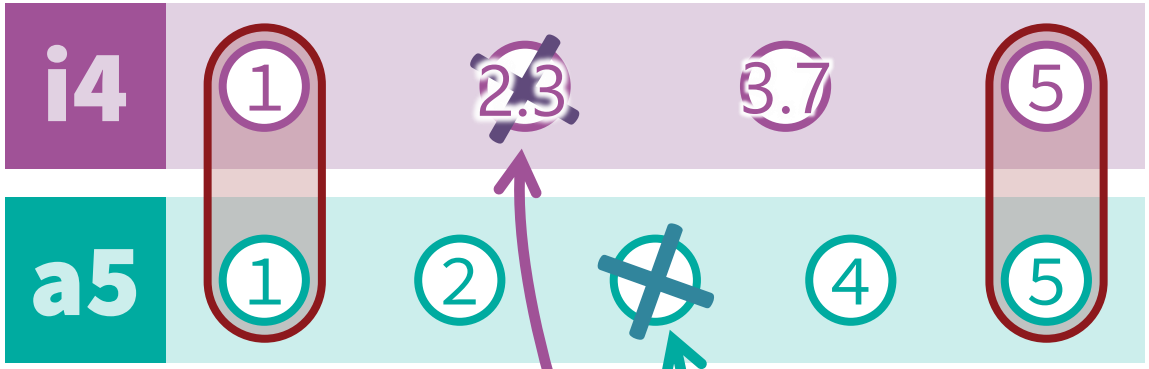
Latent construct intensity
(i.e., the „true“ level of political interest)



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 stretchig the rest)



observed

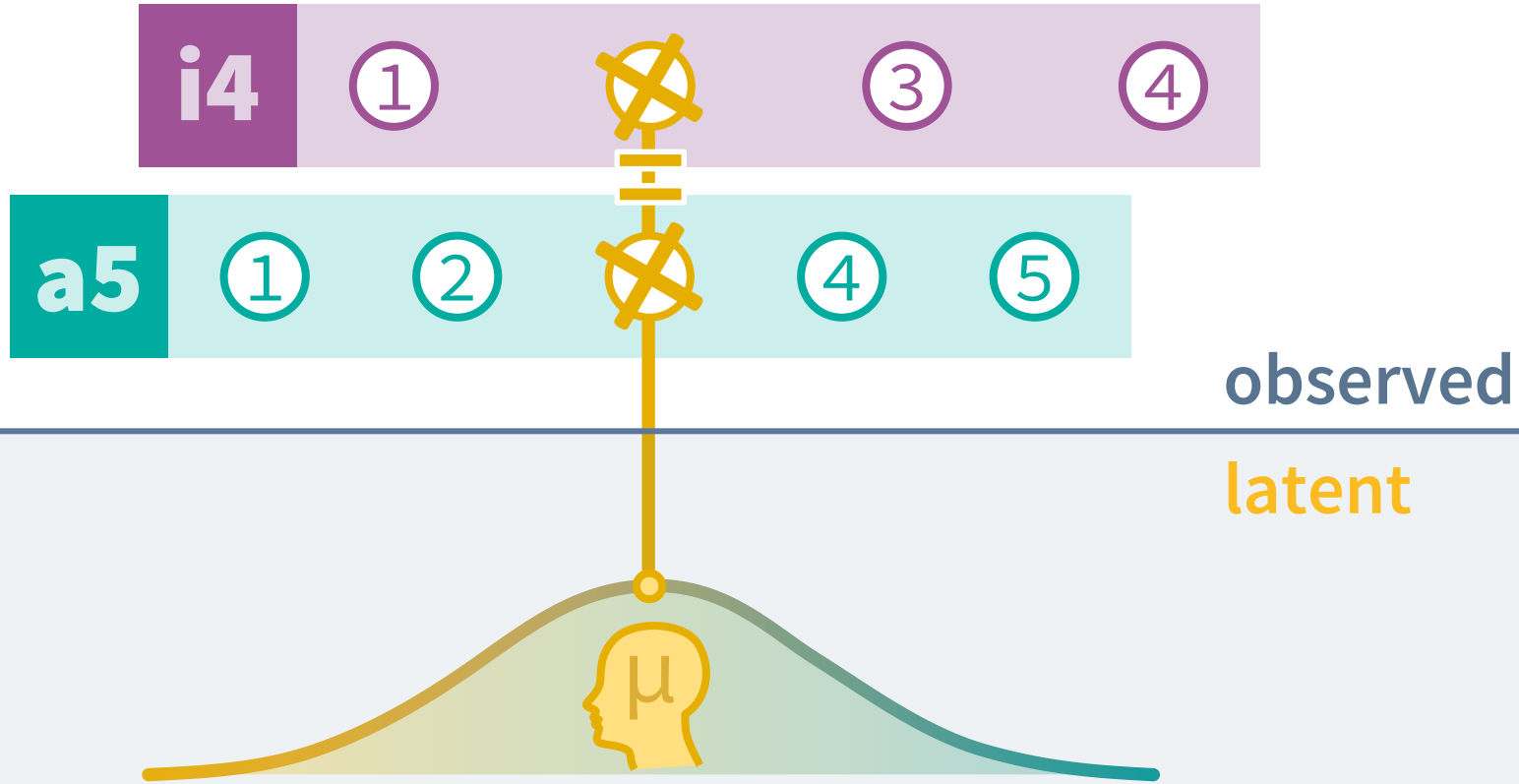
latent

Mean Bias:

$$|d| = 0.38$$

Linear Stretching is not sufficient to solve this!

(i.e., setting minimum and maximum responses as equal and stretchig the rest)



Instead we want **Equity**:

The same construct intensity should result in the same harmonized score!

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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**.

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Transforming observed response distributions

Observed Score **Equating** in a random groups design

Data for both instruments
randomly drawn from the same population

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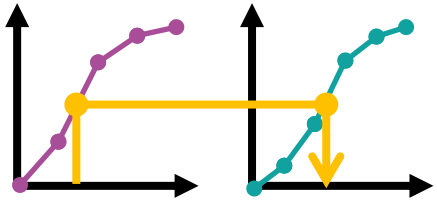
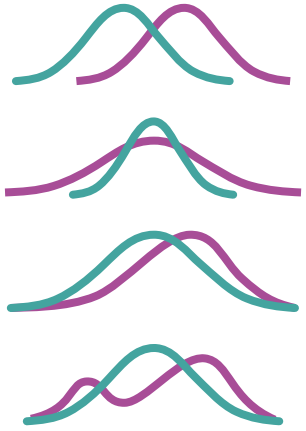


Linear Equating

Δ mean ✓

Δ sd ✓



Equipercentile Equating

Δ mean ✓

Δ sd ✓

Δ Skewness ✓

Bimodality etc. ✓

Blogpost ↗

Blogpost ↗

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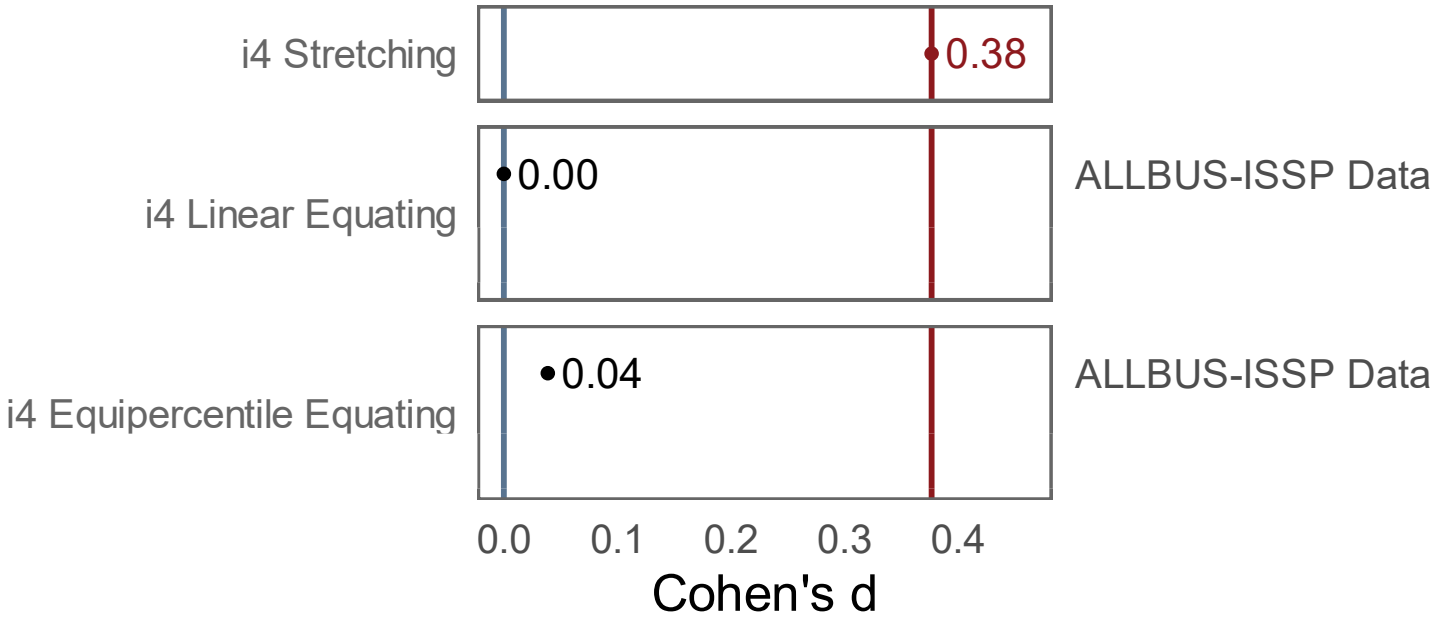
Mean bias mitigation



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

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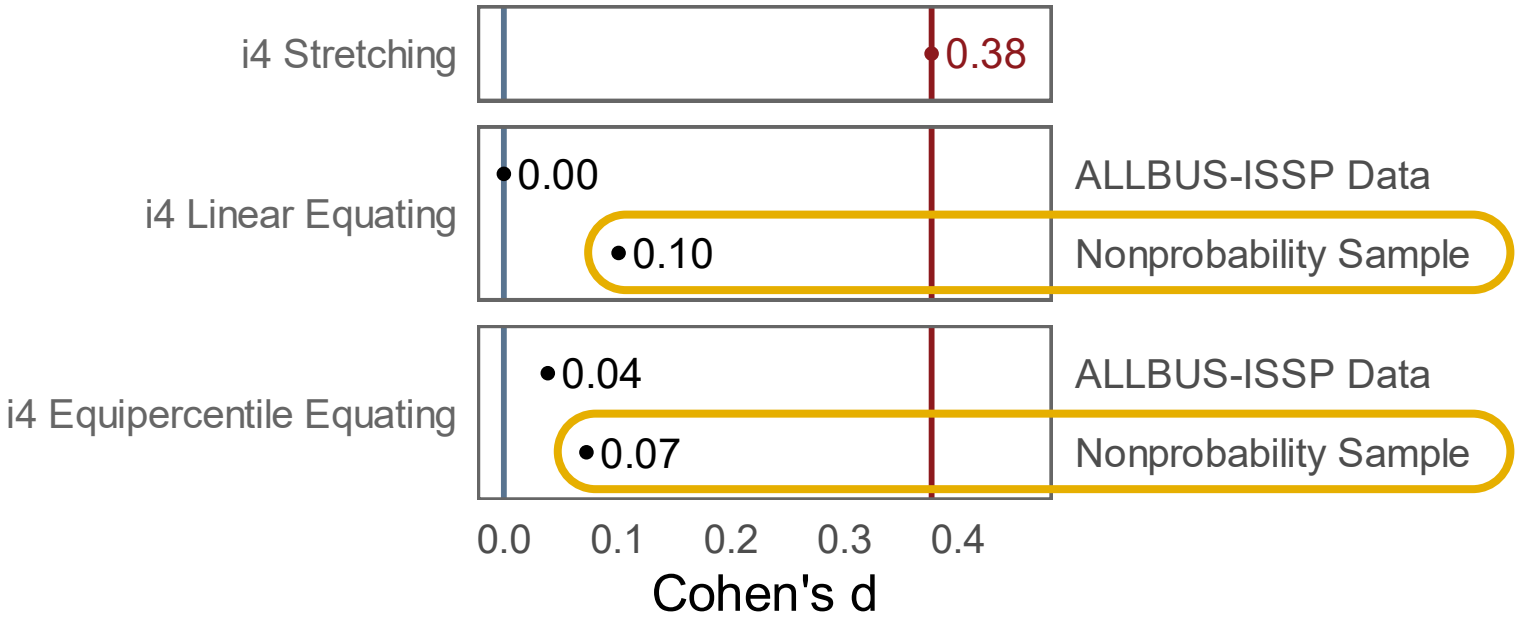
Mean bias mitigation (with non-prob. sample)



Data for two instruments drawn from the same Population

National Probability Samples

Timeseries and Panels

Equating in the **same country** in the **same year**

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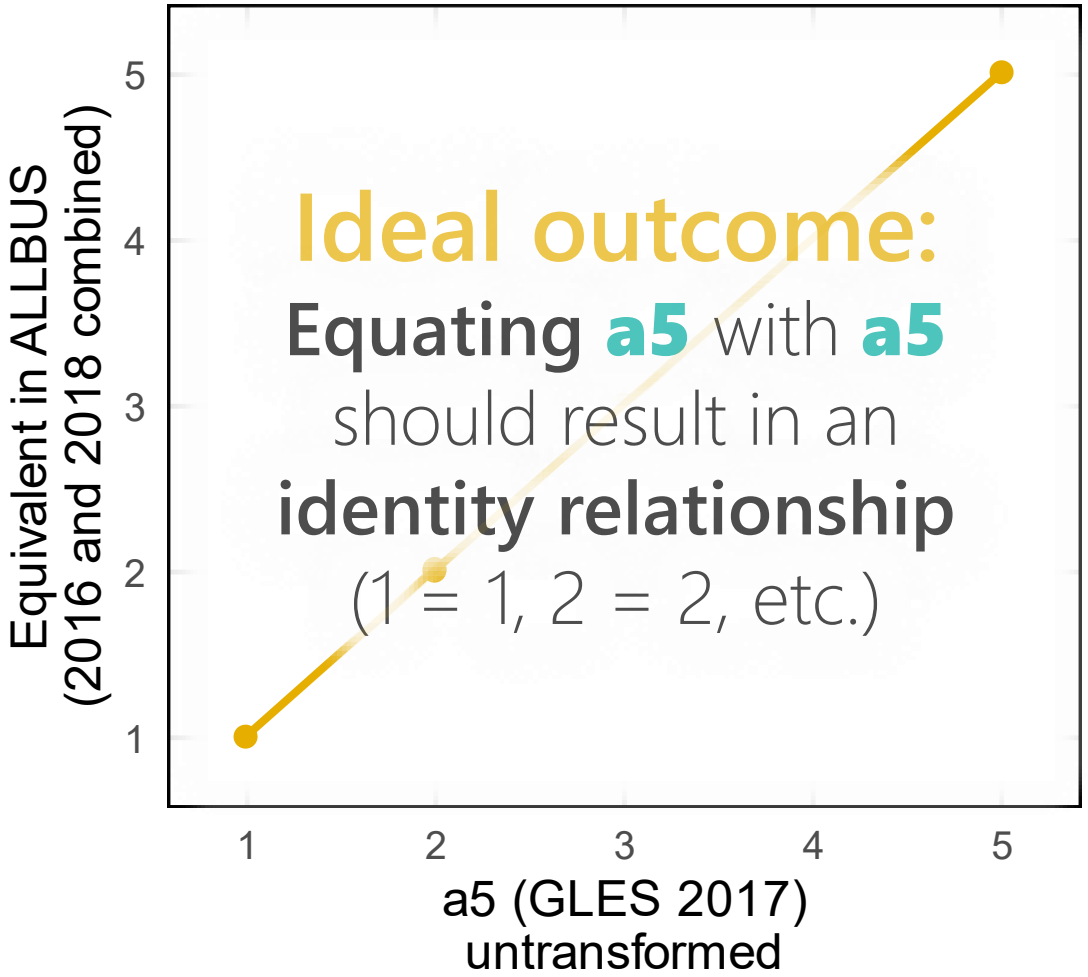
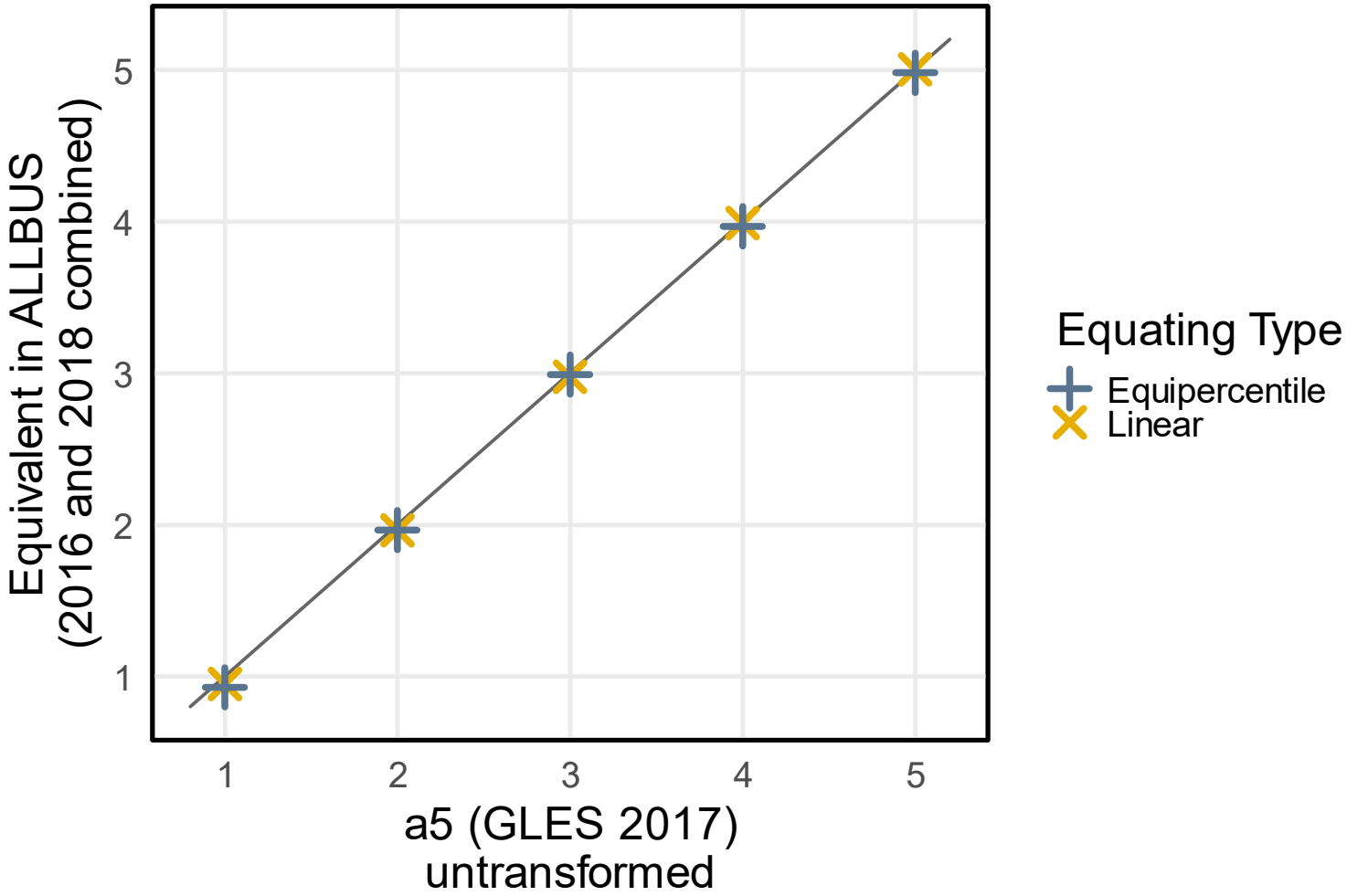
Ruling out inter-survey bias: Harmonizing a5 with a5

a5 instrument data from two German probability samples:

- GLES 2017
- ALLBUS 2016 & 2018 combined (≈ *interpolated ALLBUS 2017*)


Ideal outcome:
Equating a5 with a5
should result in an
identity relationship
(1 = 1, 2 = 2, etc.)
Equivalent in ALLBUS
(2016 and 2018 combined)
1
2
3
4
5
1
2
3
4
5
a5 (GLES 2017)
untransformed


Equivalent in ALLBUS
(2016 and 2018 combined)
5
4
3
2
1
1
2
3
4
5
a5 (GLES 2017)
untransformed
Equating Type
Equipercentile
Linear

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

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Additional Ressources

GESIS Blog Series on ex-post Harmonization:

Adventures in ex-post harmonization: Frankenstein‘s Creature

Short introduction to equating for survey instruments:

Singh, R. K. (2020). Harmonizing Instruments with Equating.
Harmonization Newsletter on Survey Data Harmonization in the Social Sciences

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I am looking forward to your questions and comments

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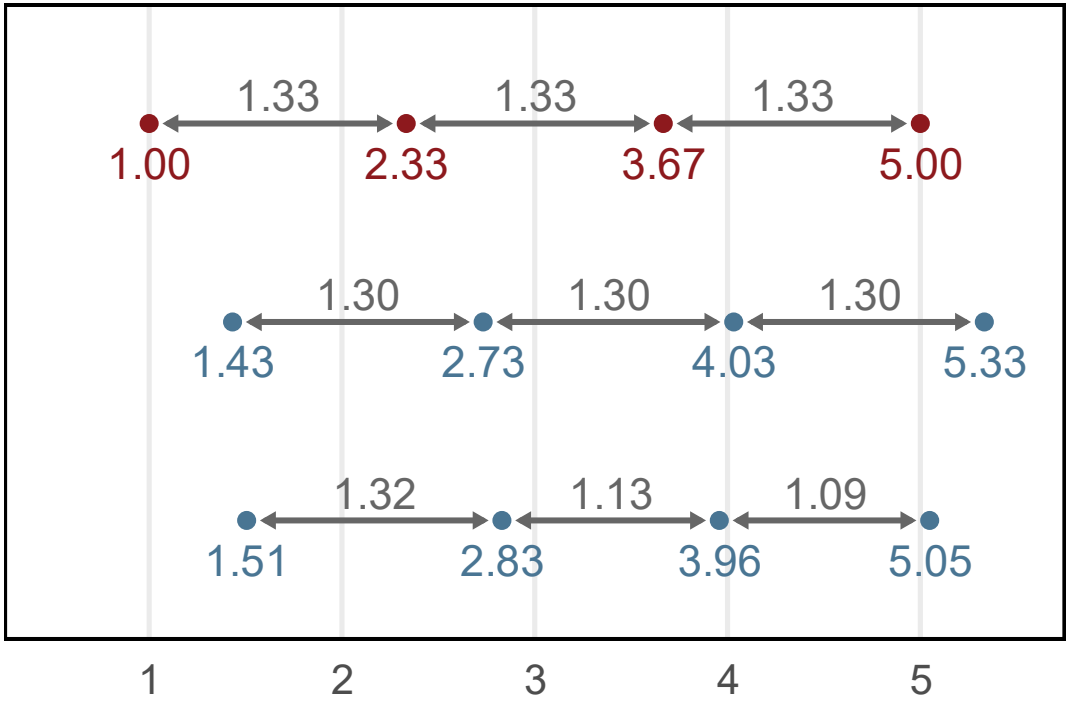
Transformed **i4** scores to match **a5** format



i4 stretching

i4 linear equating

i4 equipercentile e.

a5 target format

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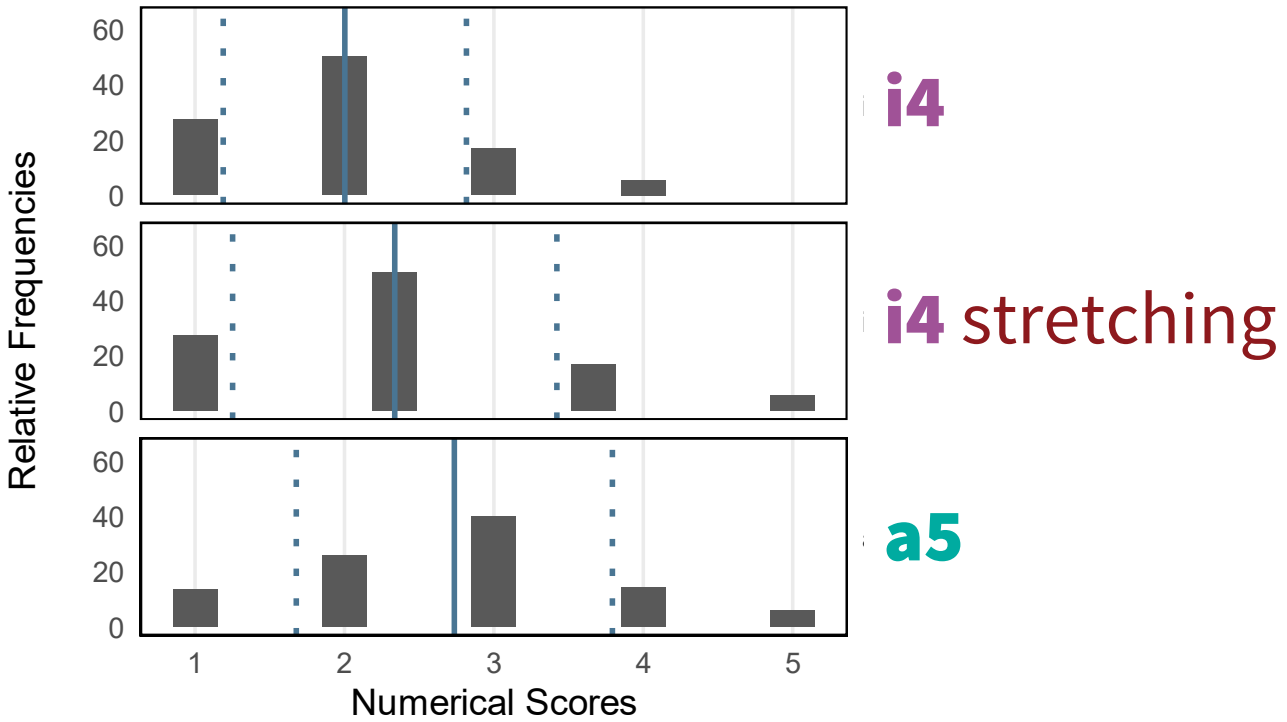
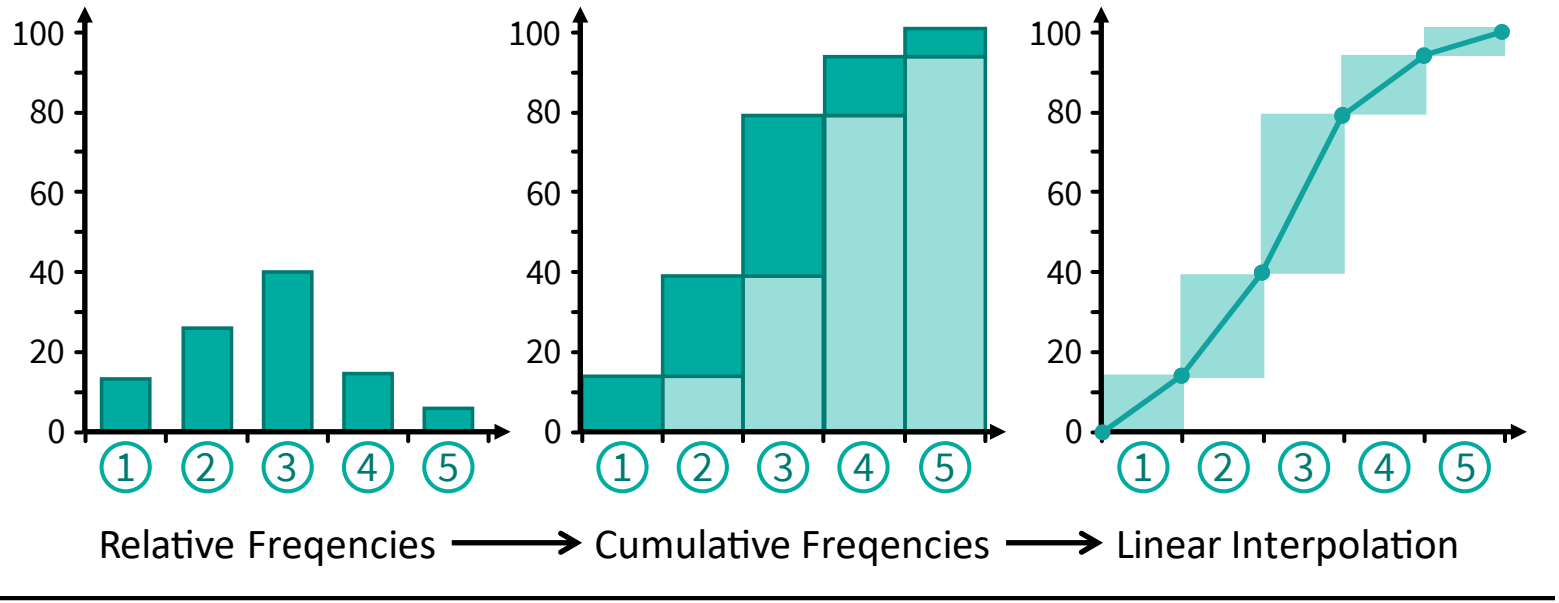
Response Distributions **i4** and **a5**

Mean:

±1SD:

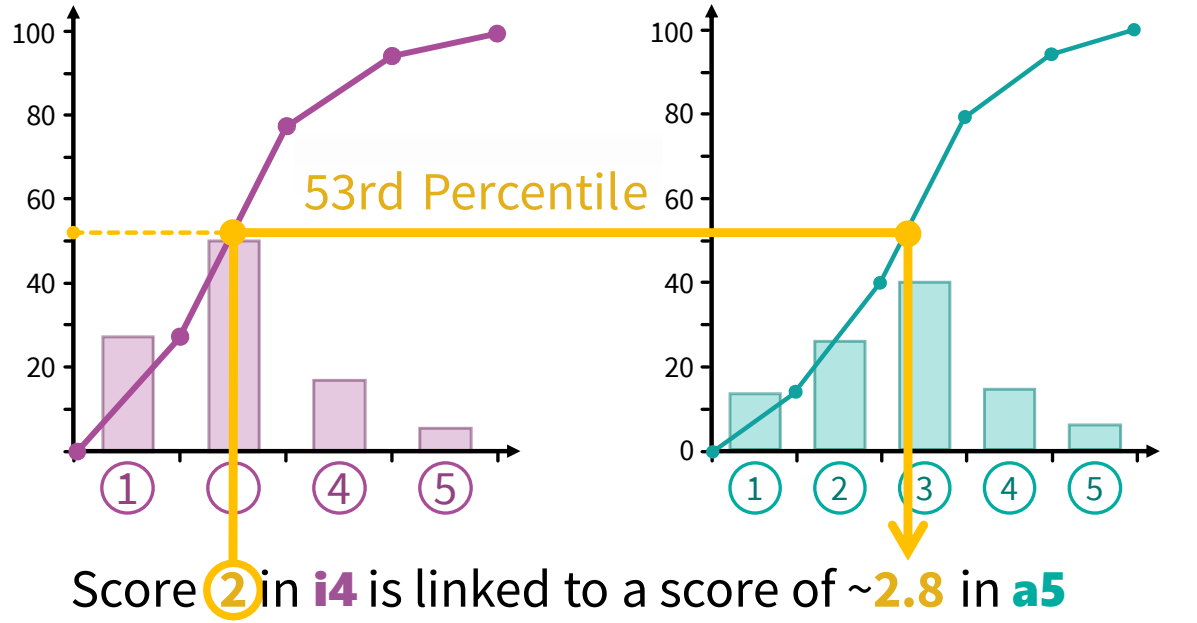


Equipercentile Equating 1:
Interpolating Percentile Ranks (e.g., for **a5**)



Equipercentile Equating 2:

i4 score → Percentile Rank → a5 equivalent



Political interest in German prob. samples

(In six surveys GESIS is involved in.)