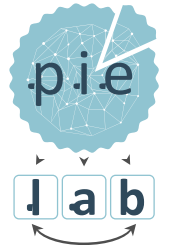
Item-level comparison of the International Personality Item Pool (IPIP) items across nations

Kendall Mather, University of Oregon





Most research comparing personality across nations focuses on scale-level

- Past studies address important questions about how personality structure varies across contexts
- However, they also suggest that broad-level constructs from proposed Etic models (e.g., big five, six) often don't generalize to some contexts
  - particularly, openness to experience (the "WEIRDest" trait in the world; Schwaba & Thalmayer, 2024)

Etic models

Proposed "Universal", culturally agnostic models

Examples:

Big five

- Extraversion
- Agreeableness
- Conscientiousness
- Neuroticism
- Openness to Experience

Big six

- Honesty/humility
- Emotional Stability
- Extraversion
- Agreeableness
- Conscientiousness
- Openness to Experience

Emic models

Culture-specific, prioritize accuracy in one context

Example:

ǂŪsigu: A mixed-method lexical study of character description in Khoekhoegowab



-Examined personality structure in a region of Namibia

-Found 26 unique dimensions

Thalmayer, A. G., Job, S., Shino, E. N., Robinson, S. L., & Saucier, G. (2021). ǂŪsigu: A mixed-method lexical study of character description in Khoekhoegowab. *Journal of Personality and Social Psychology*, *121*(6), 1258.

The value of item-level assessment

Personality items have many trait-like properties…

- Stability over time (Mõttus et al., 2017)
- Cross-rater agreement (Mõttus et al., 2014, 2019)
- Heritability (Mõttus et al., 2017)
- Unique developmental trajectories and associations with outcomes (Mõttus et al., 2019)

However, It remains somewhat uncommon to focus on the item-level…

- Items are viewed mostly in terms of their relationship to broader constructs
- Most popular statistical techniques focus on the scale-level (e.g., factor analysis, measurement invariance)

There aren’t as many statistical methods suitable for item-level assessment

- Mostly limited to descriptive statistics

Identifying a strategy for item-level comparisons

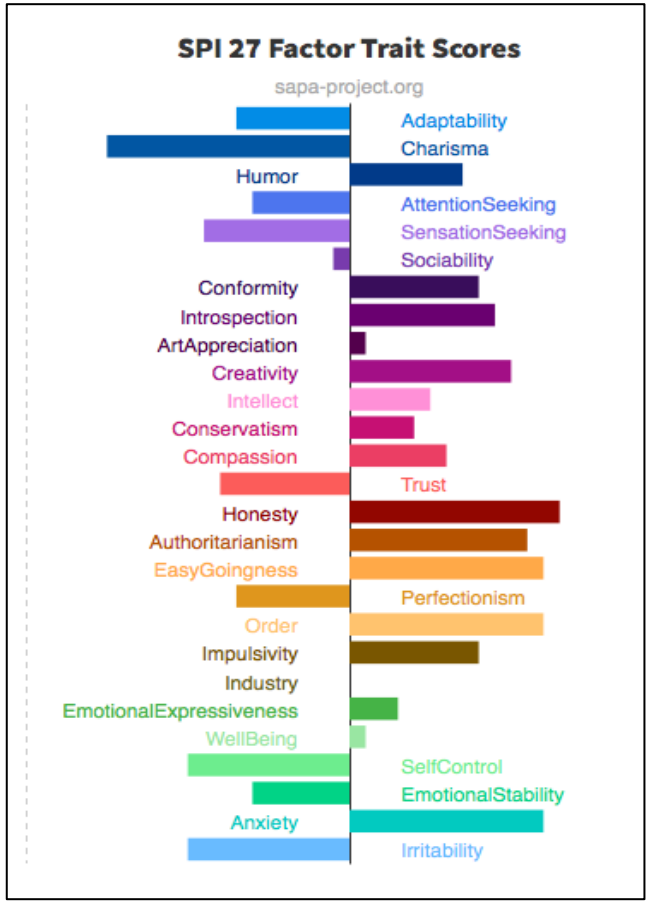
Objective: Compare responding across pairs of 13 diverse nations on the 2,623 IPIP* items

Dataset: The SAPA Project

- Online data collection platform that uses a planned missingness design (about 90% missingness)
  - Participants are administered a random subset of items
- Total sample = 1,025,954
  - Participants (indicated speaking English "Well" or "Very well/Fluent"

Nations: India, Pakistan, United States, Nigeria, the Philippines, South Africa, Bangladesh, Brazil, United Kingdom, Zimbabwe, Argentina, Mexico, and Egypt.

78 total pairs across these 13 nations



Participants receive information about their personalities in exchange for participation

* *IPIP = International Personality Item Pool*

Identifying a strategy for item-level comparisons

Tests comparing nation pairs on IPIP items:

78 Nation pairs **x** 2,623 IPIP items **=** 204,594 Total tests

Across 13 nations…

Argentina
Bangladesh
Brazil
Egypt
United Kingdom
India
Mexico
Nigeria
Pakistan
Philippines
United States
South Africa
Zimbabwe

Identifying a strategy for item-level comparisons

Tests comparing nation pairs on IPIP items:

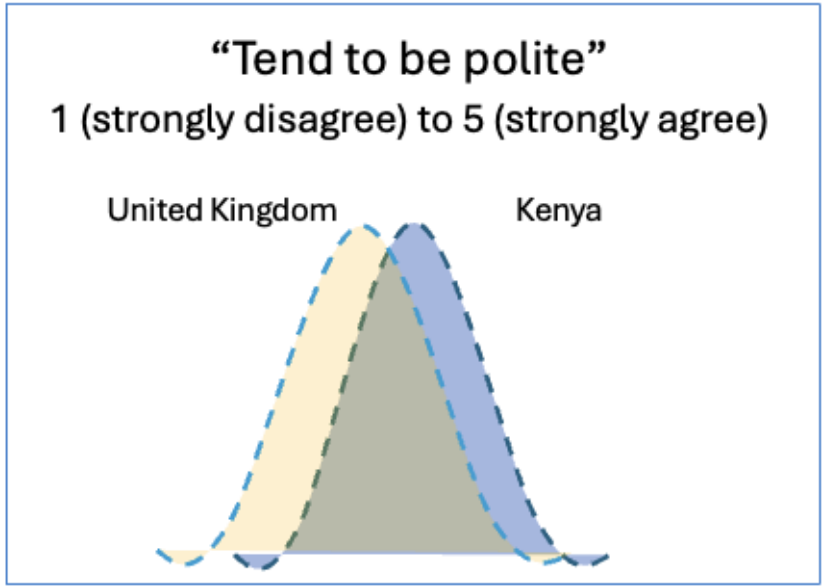
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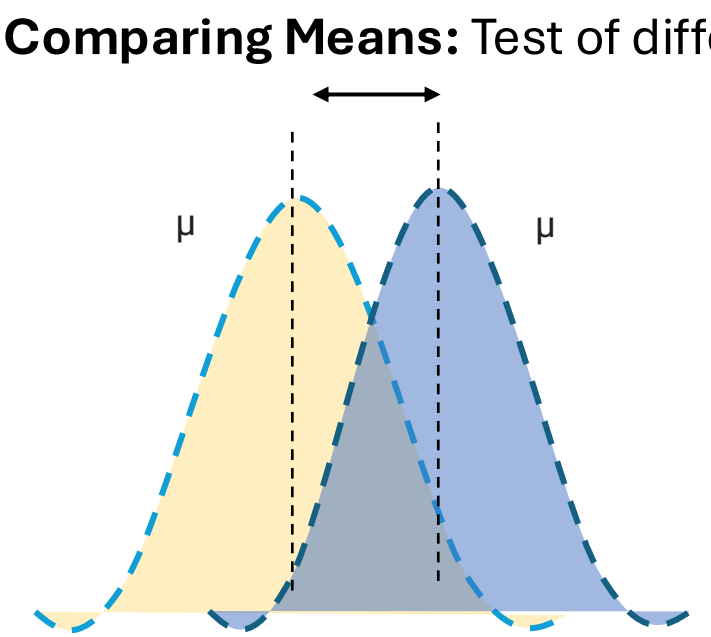
Options for examining differences between nation pairs:

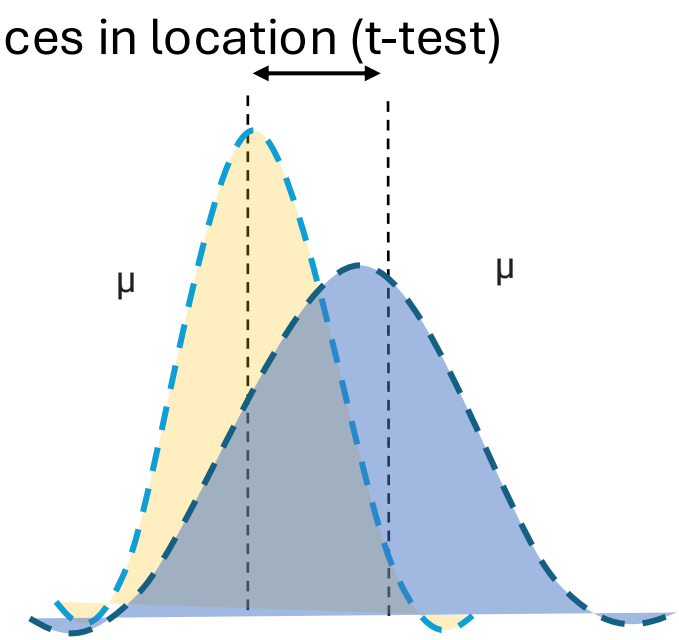
- T-tests (compare means)?
- F-tests (compare variances)?

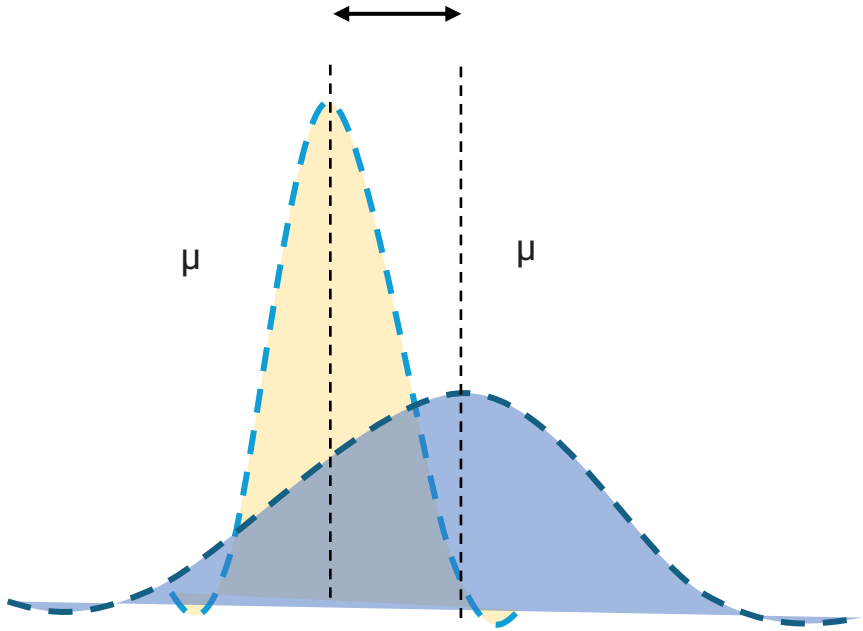


Identifying a strategy for item-level comparisons

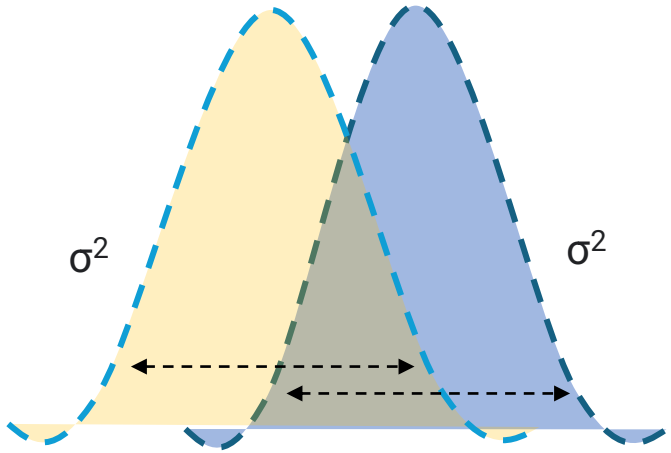
Comparing Means: Test of differences in location (t-test)

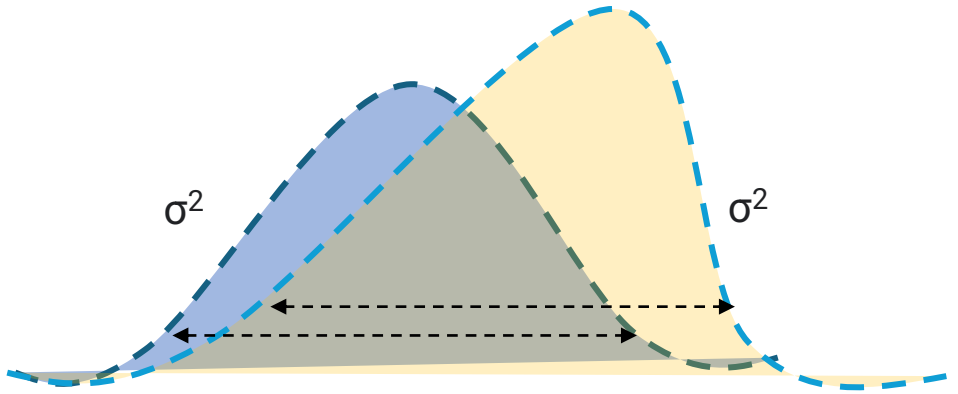


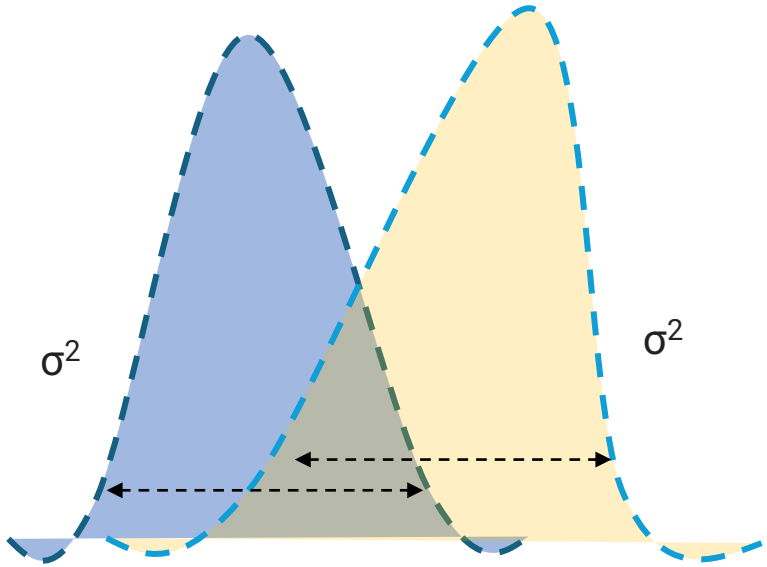


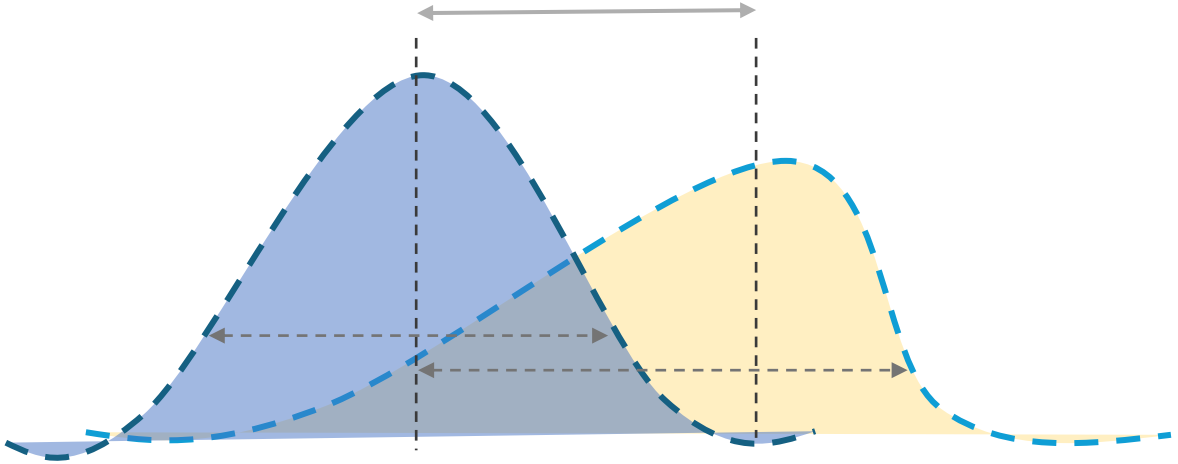


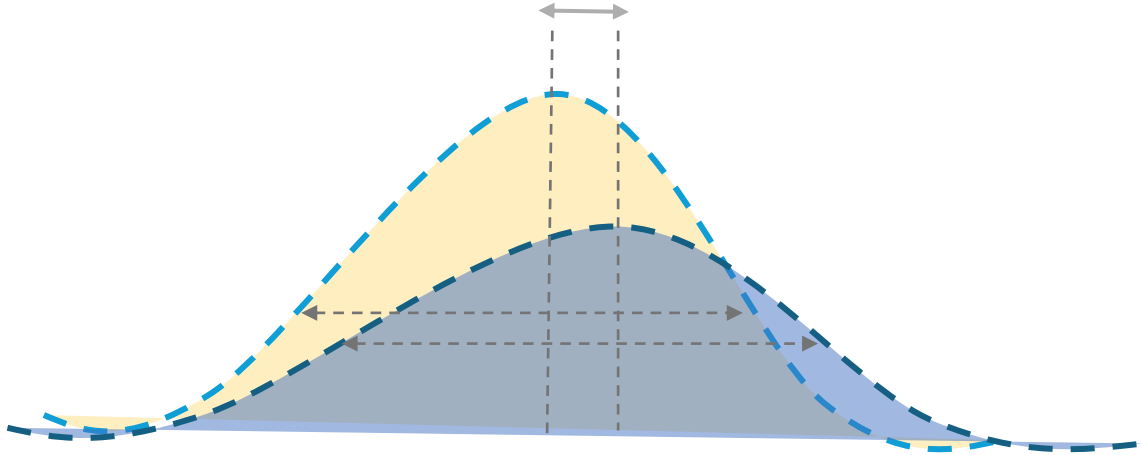
Comparing Variances: Test of differences in spread (F-test)





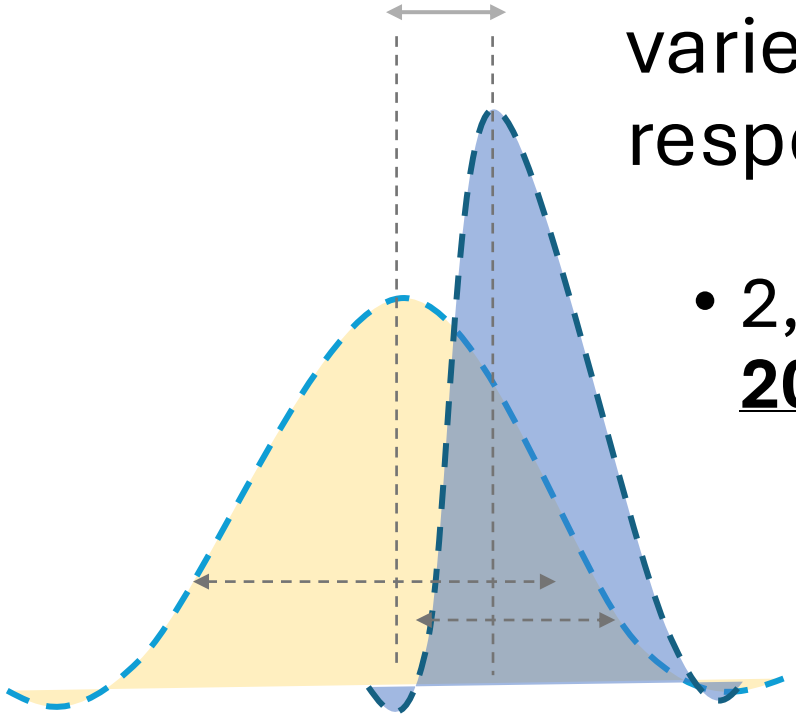


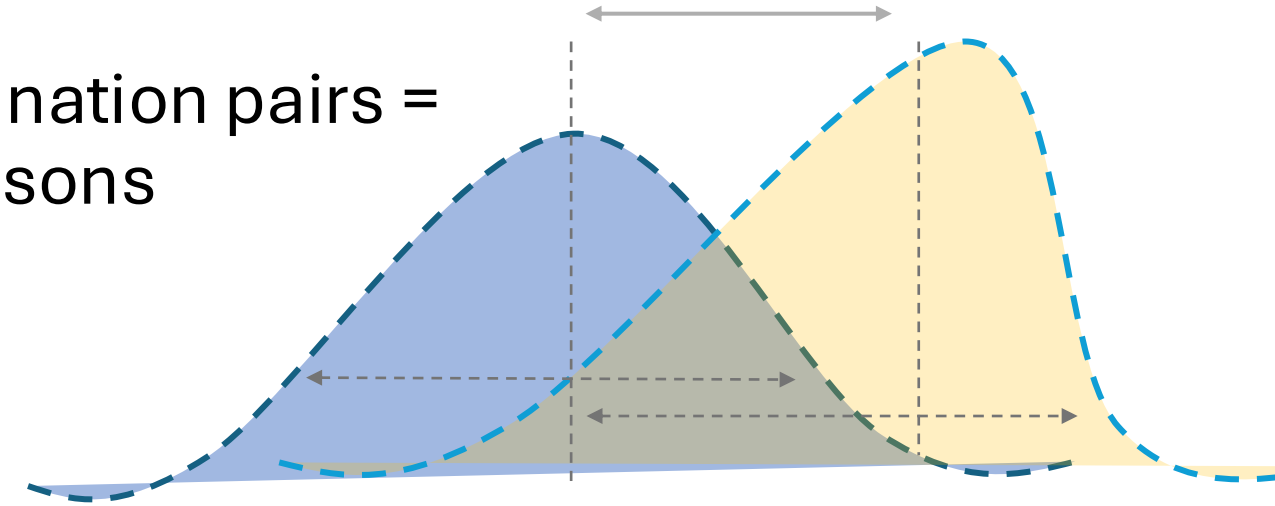




Any one test might fail to detect a variety of important differences in responding patterns across groups.

- 2,623 items x 78 nation pairs = **<u>204,594</u>** comparisons

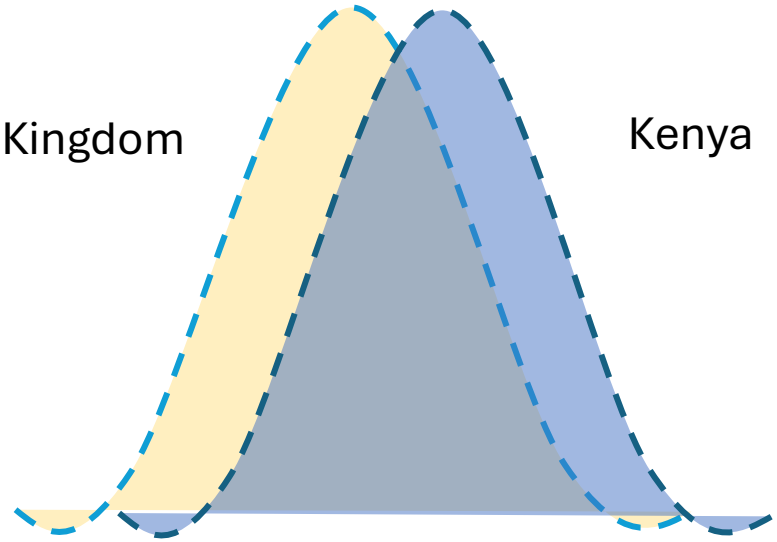


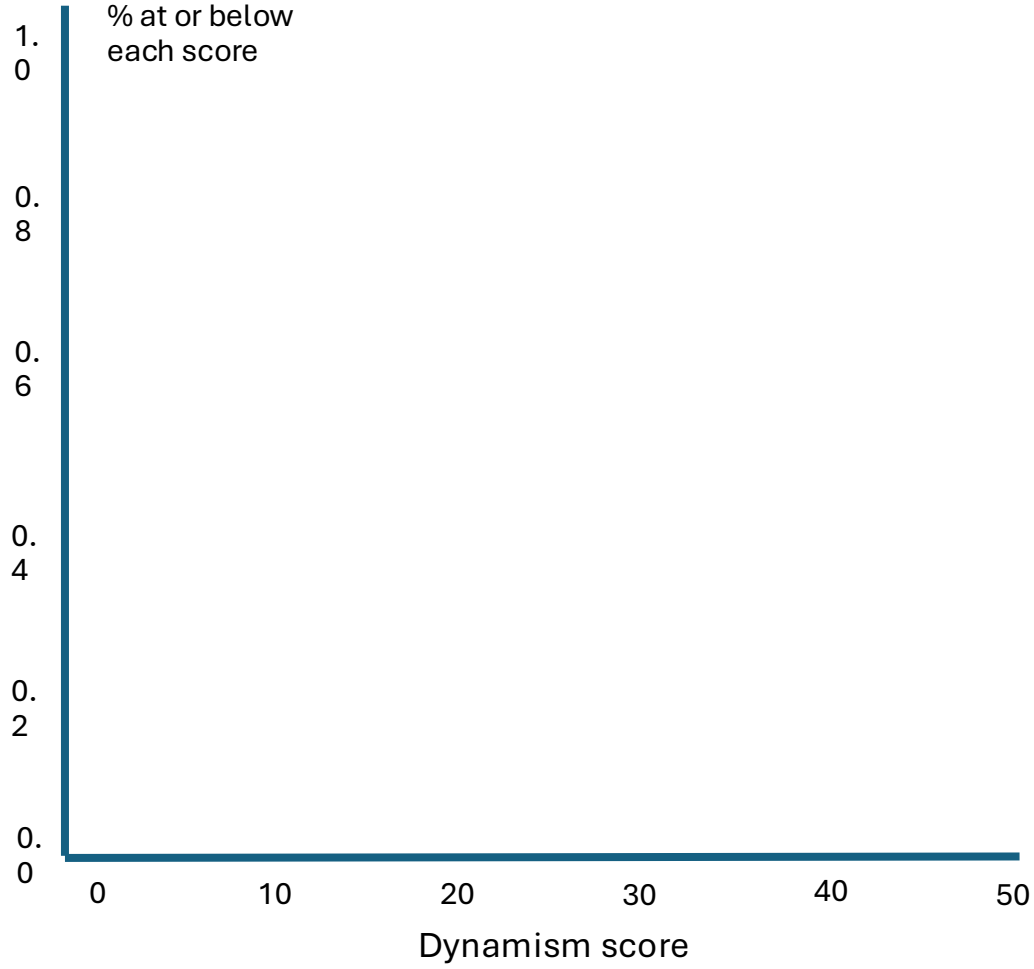


Another option: Compare entire distributions using a single test

- Alternative tests can compare the **empirical cumulative distribution functions (ECDFs)** for two groups

Distribution of Big Two Dynamism scores for two samples (hypothetical)

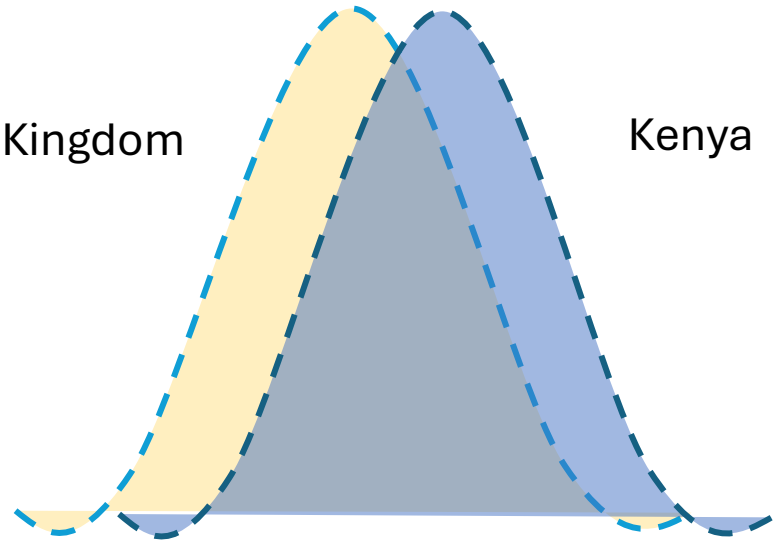




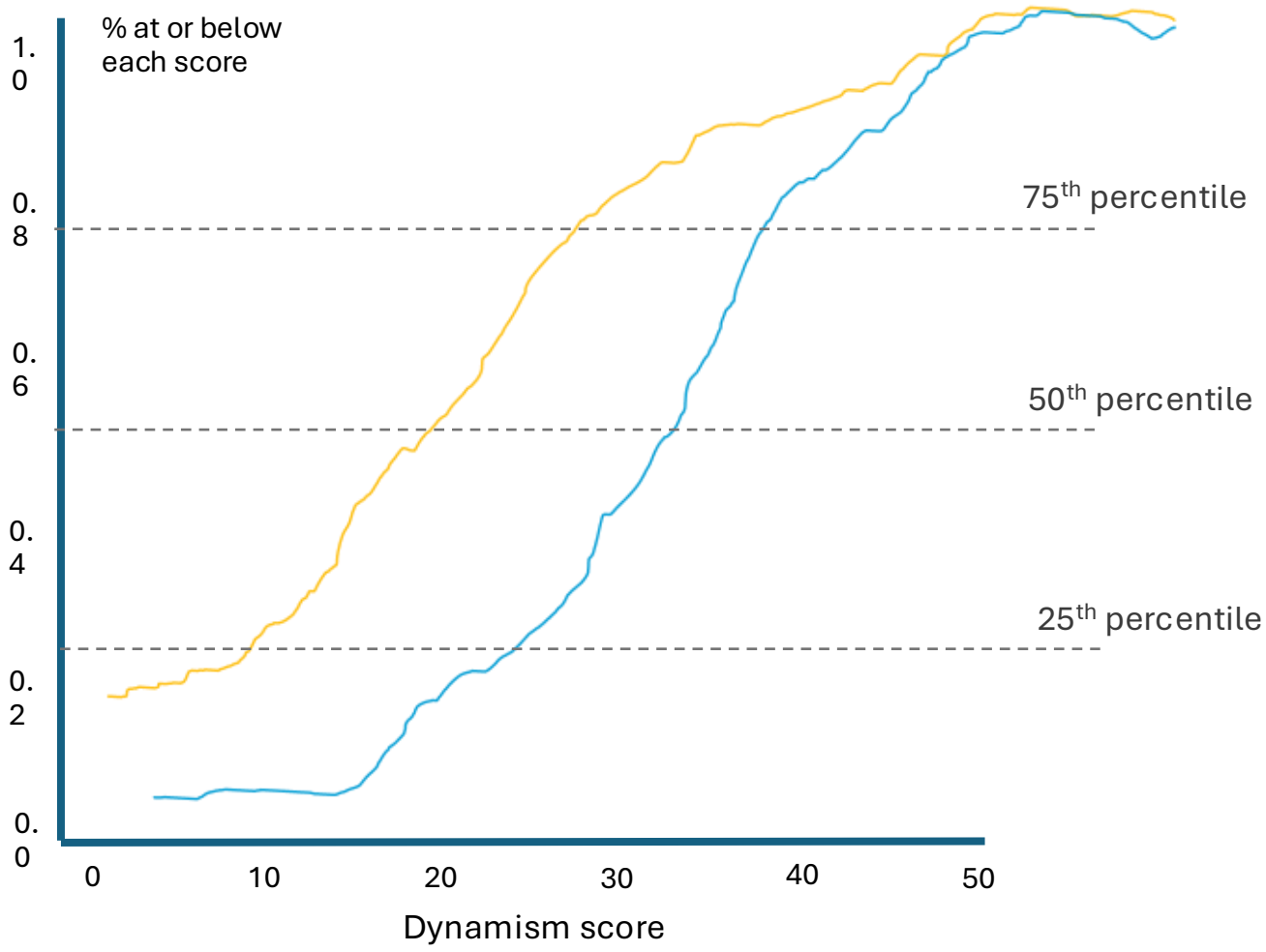
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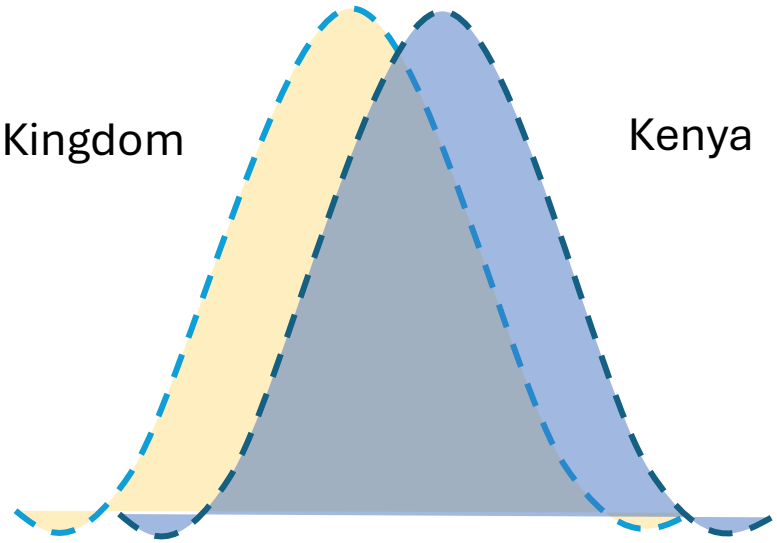
Example: ECDFs for Big Two Dynamism scores



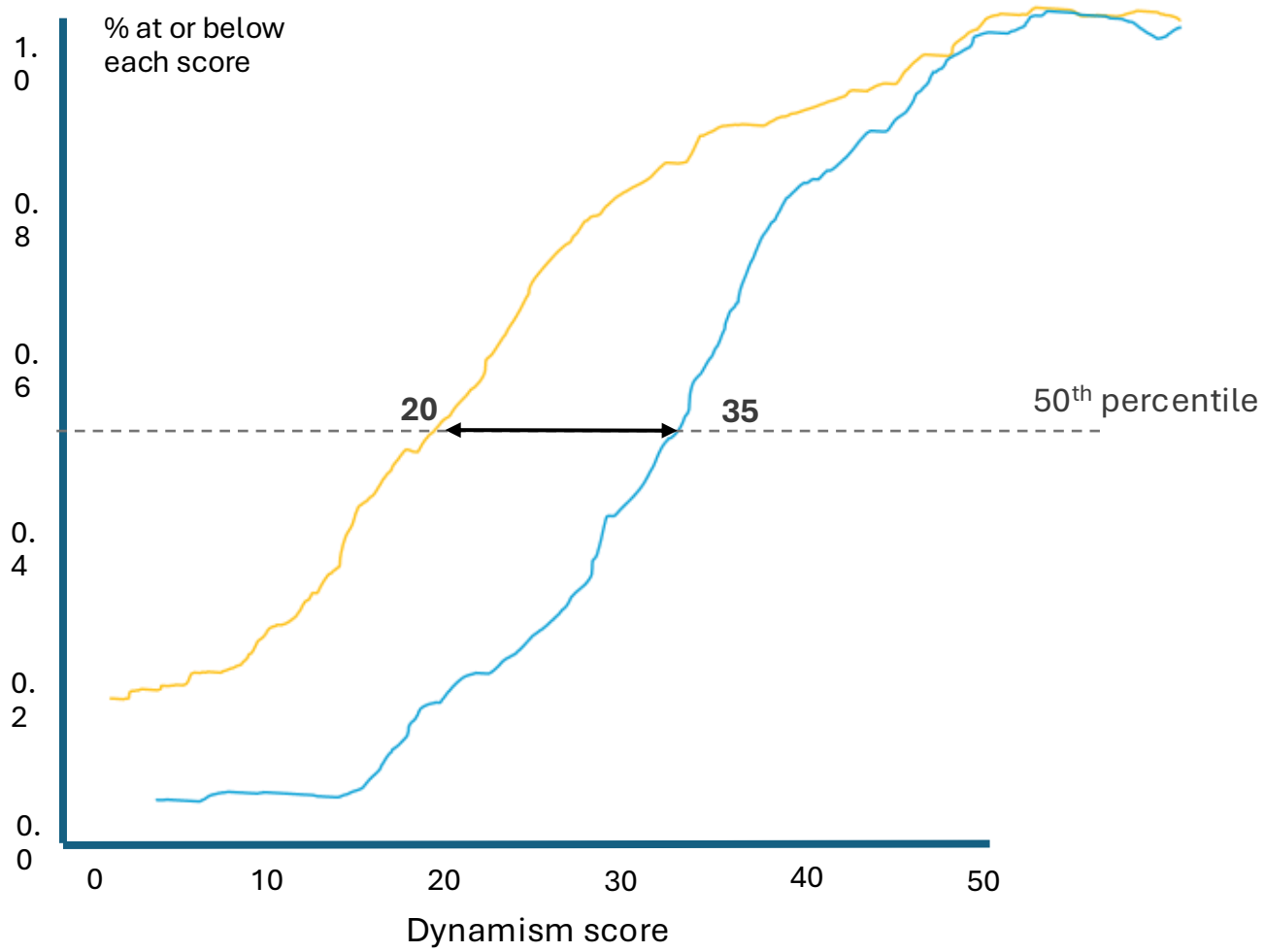
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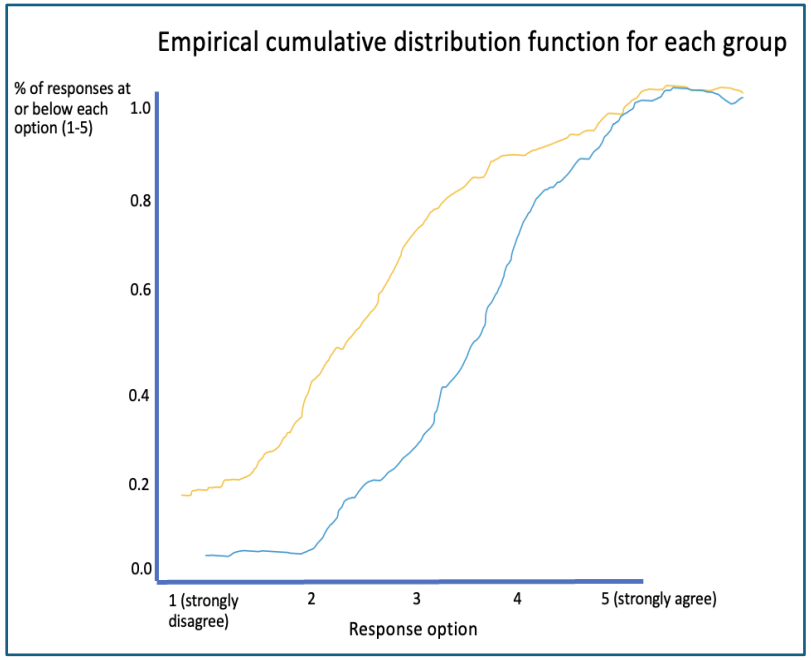
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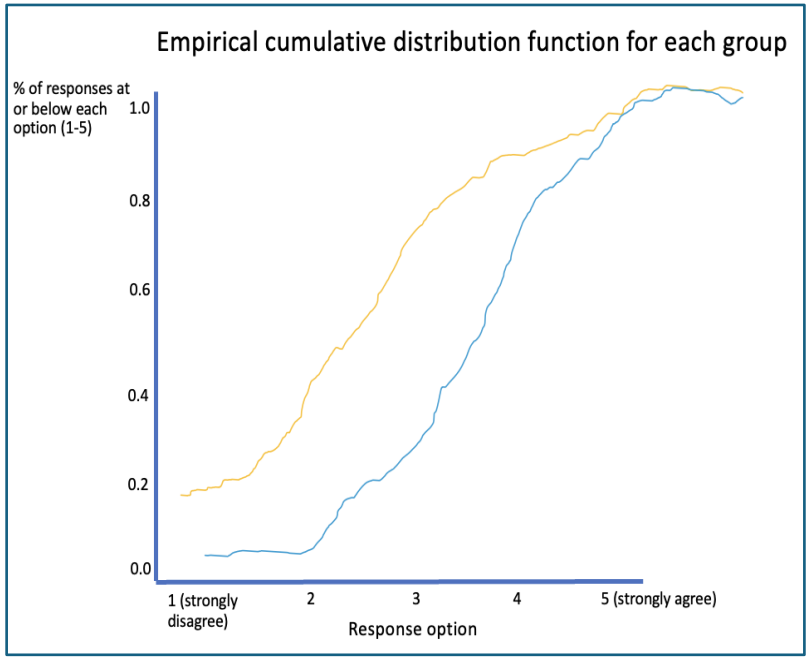
Comparing entire distributions using a single test

- Several statistical options for comparing ECDFs….

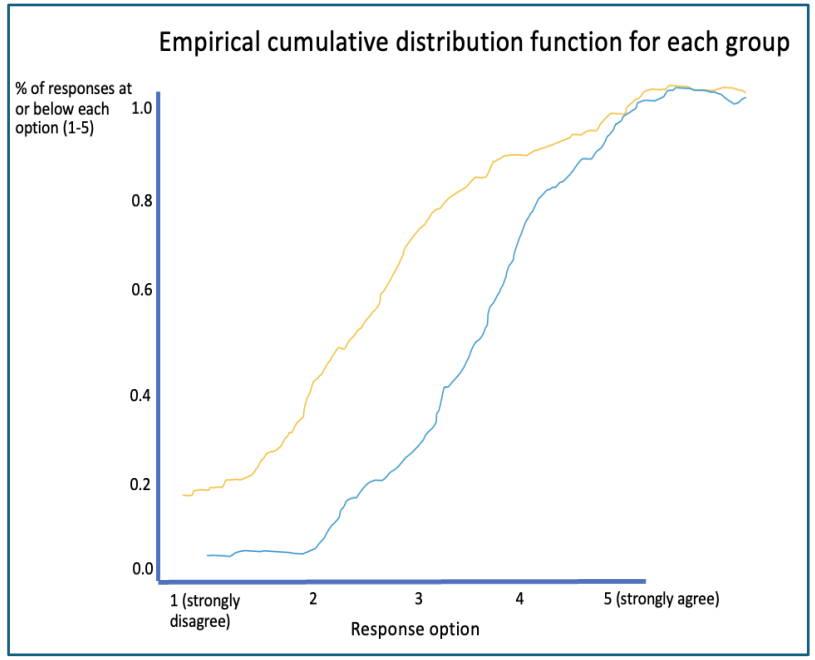
Anderson-Darling statistic



Wasserstein statistic



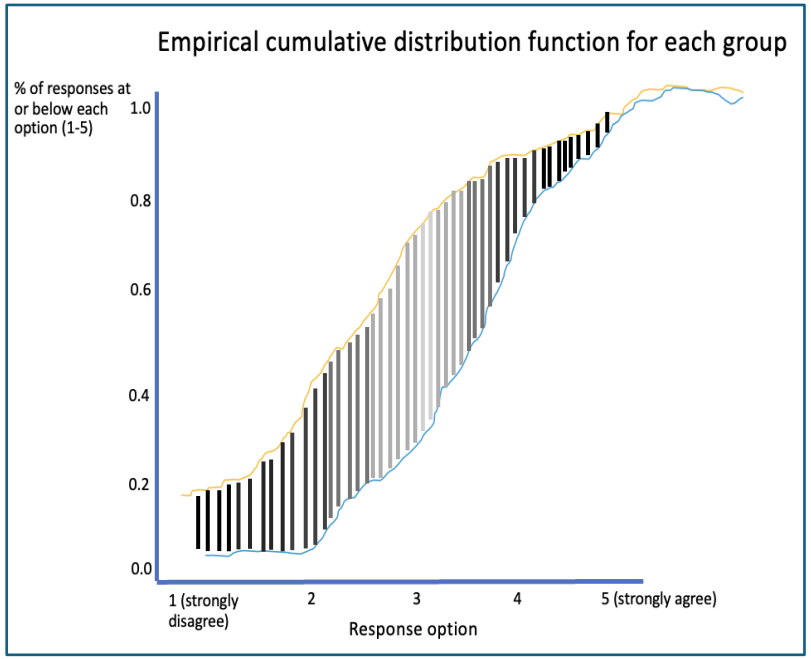
DTS statistic



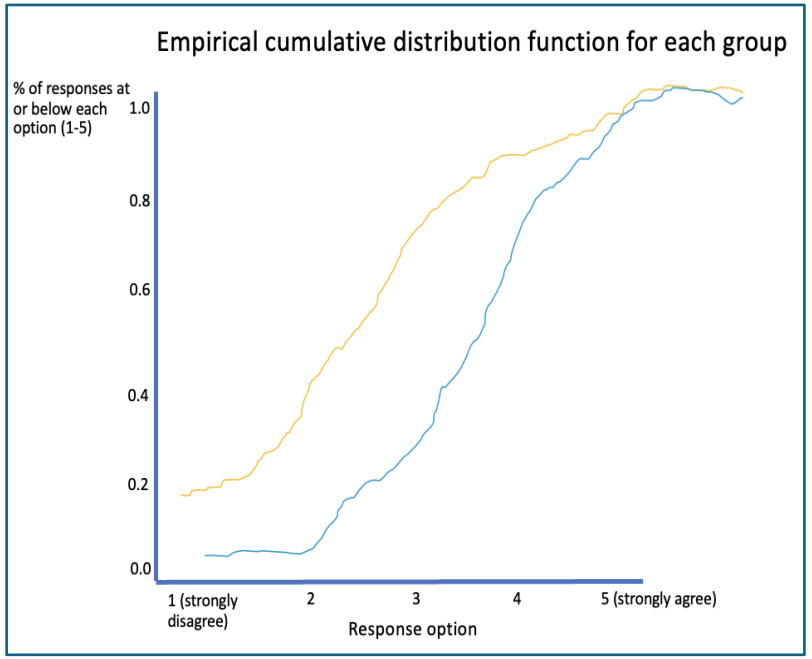
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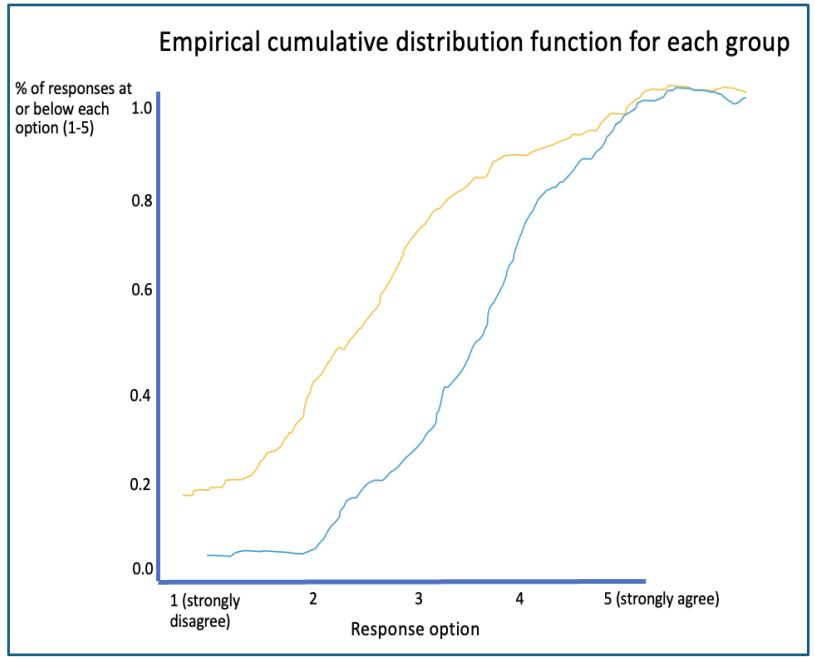
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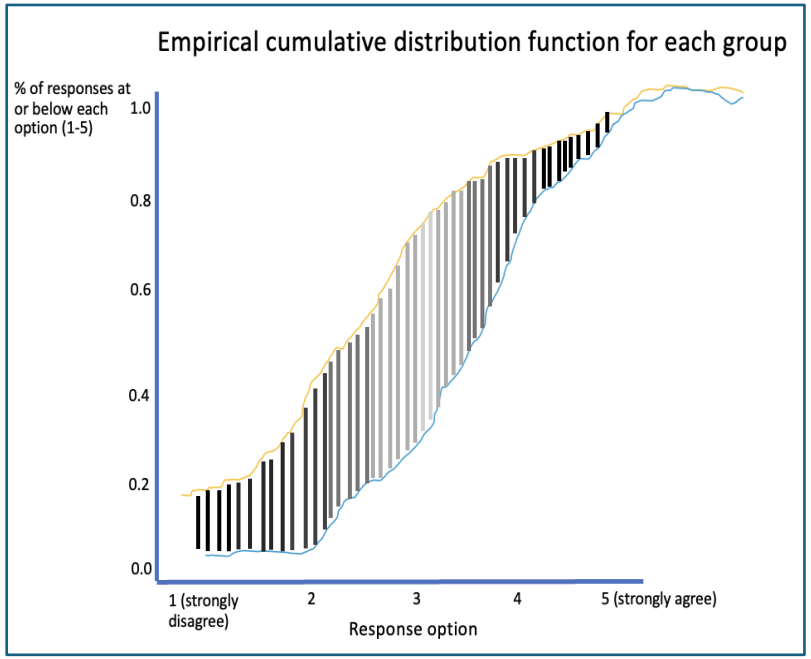
The weighted sum of all observed differences (Anderson & Darling, 1952)

Putting less weight on observations in the middle of the distribution is done to improve the power of the test.

Comparing entire distributions using a single test

- Several statistical options for comparing ECDFs….

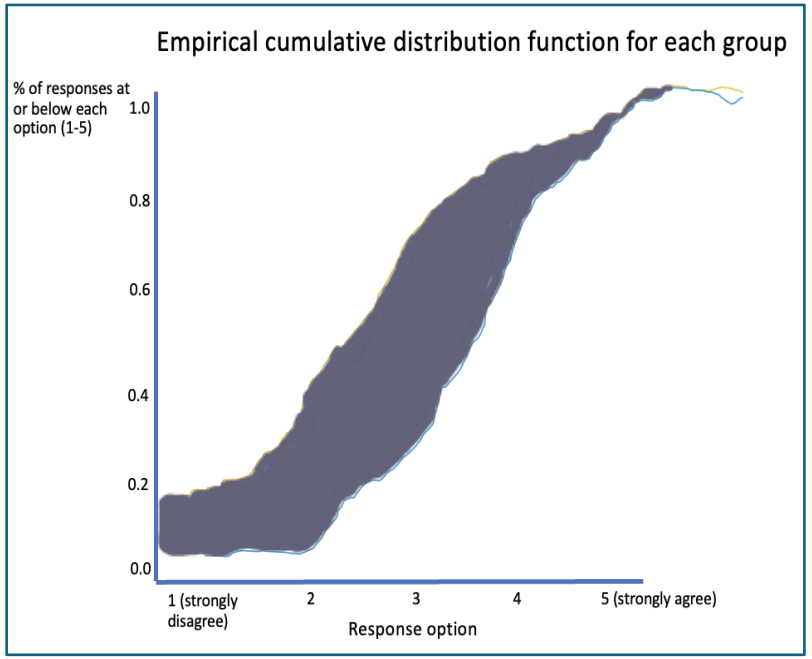
Anderson-Darling statistic



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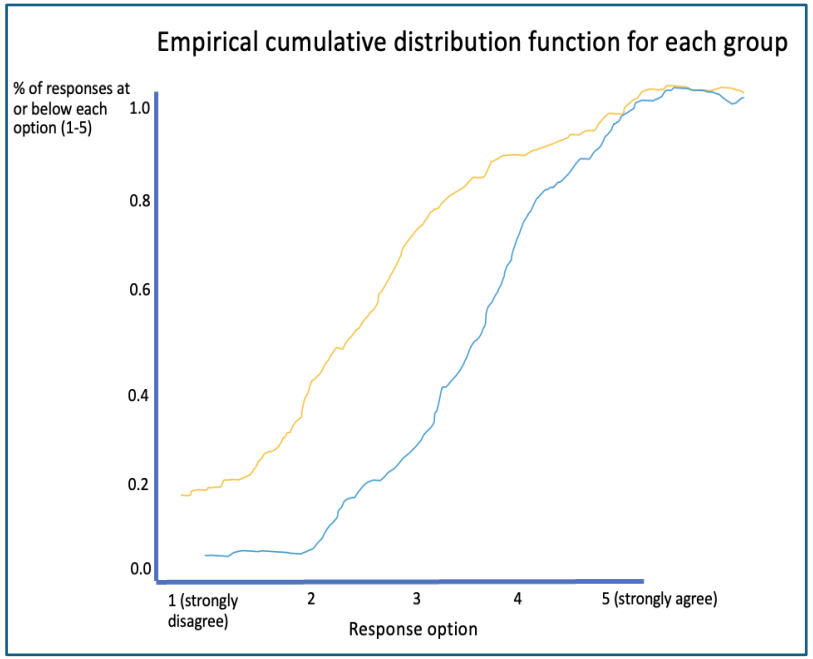
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Wasserstein statistic



The area between the ECDFs (Wasserstein, 1969)

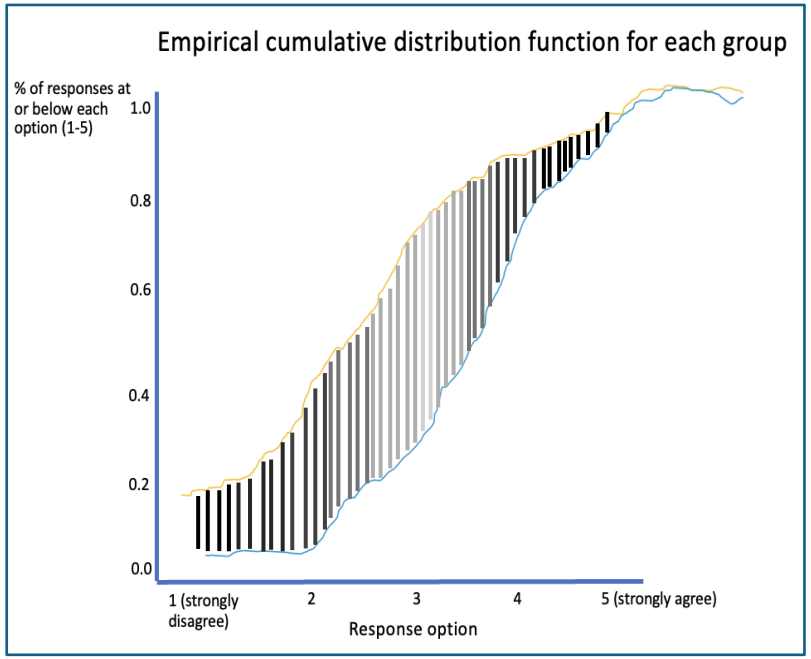
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Comparing entire distributions using a single test

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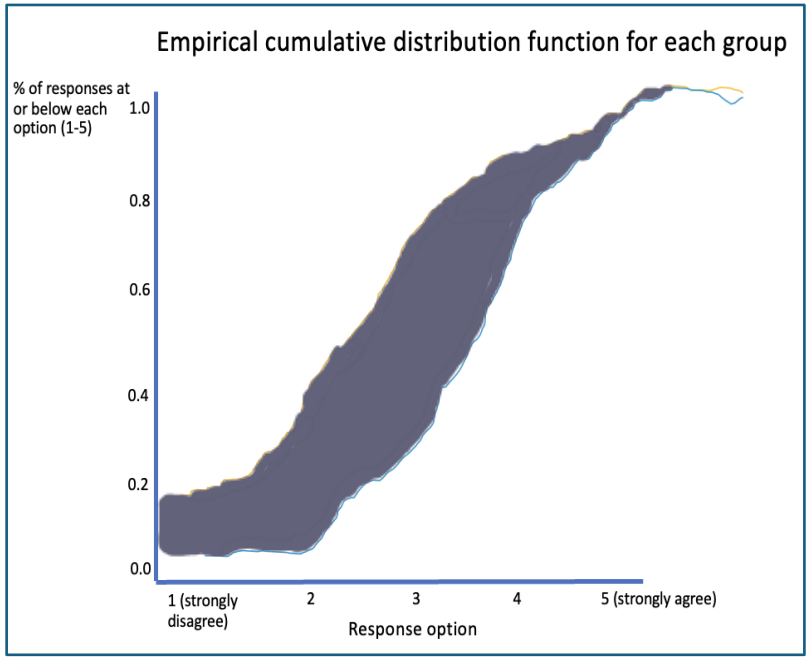
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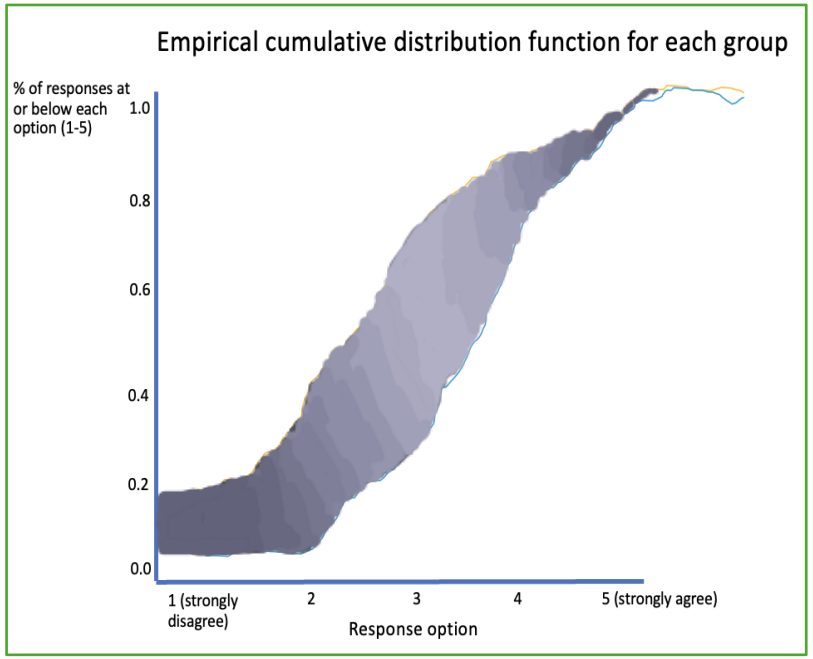
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The area between the ECDFs (Wasserstein, 1969)

DTS statistic ☑



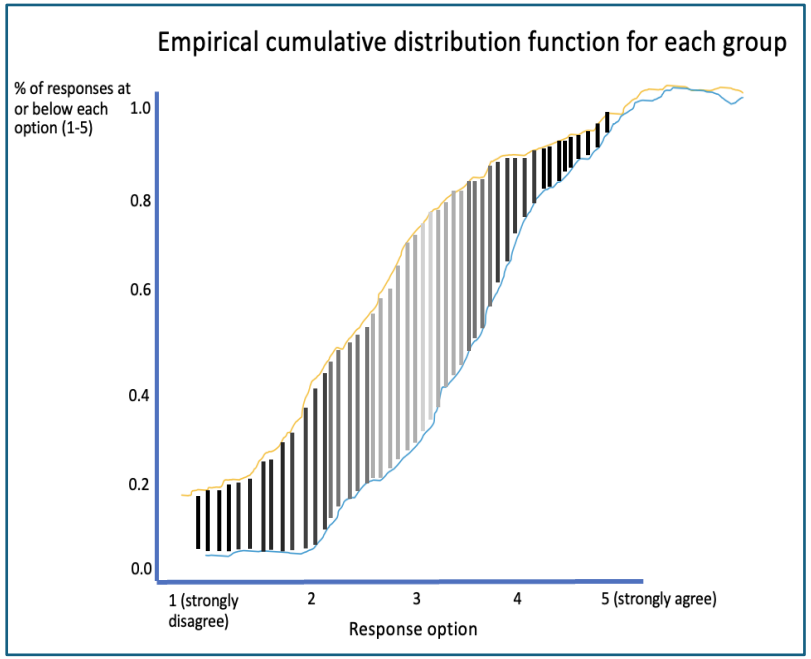
Synthesis of AD and Wasserstein: The weighted integral of the difference between the ECDFs (Dowd, 2020)

Comparing entire distributions using a single test

- Several statistical options for comparing ECDFs….

Significant *p*-val (*p*<.05) indicates that the difference between the ECDFs is fairly extreme if we assume that that samples are drawn from the same population

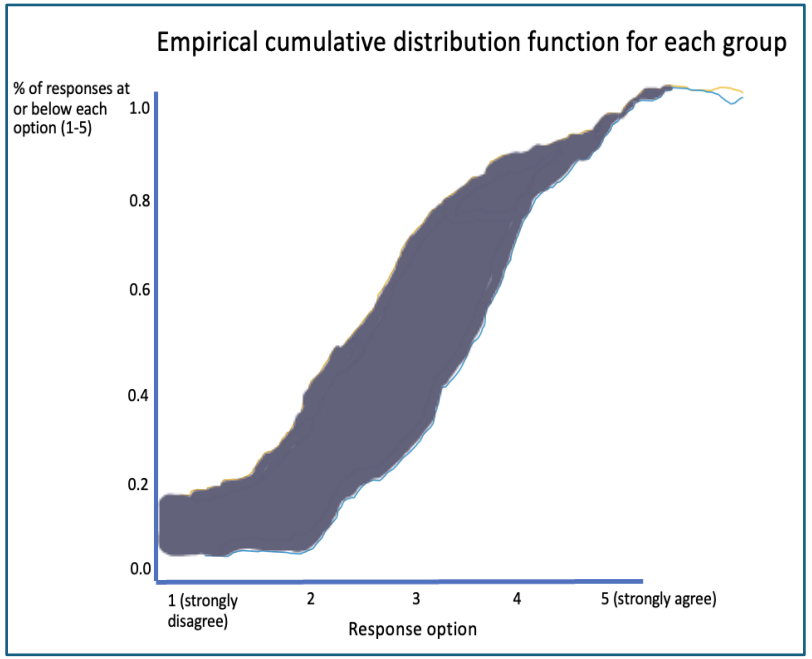
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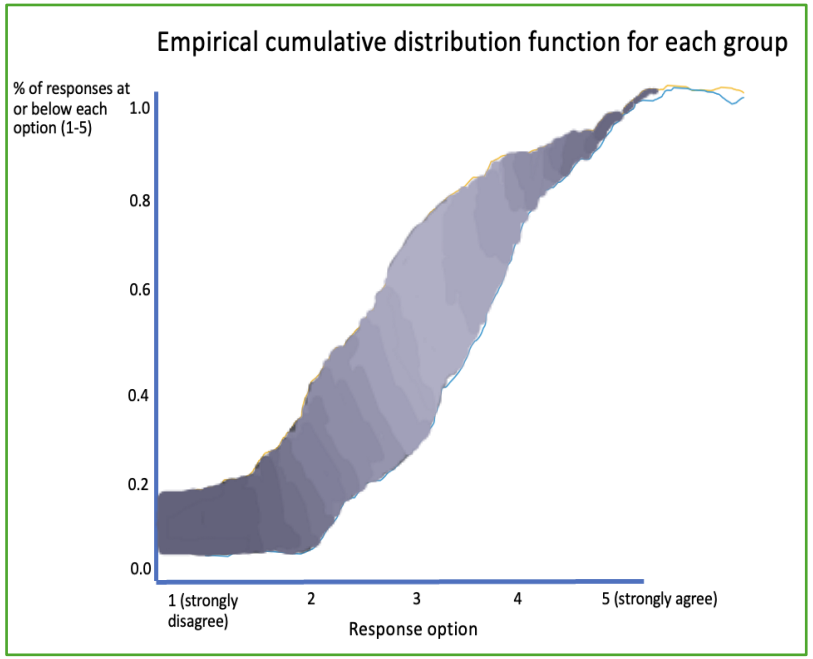
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DTS statistic ☑

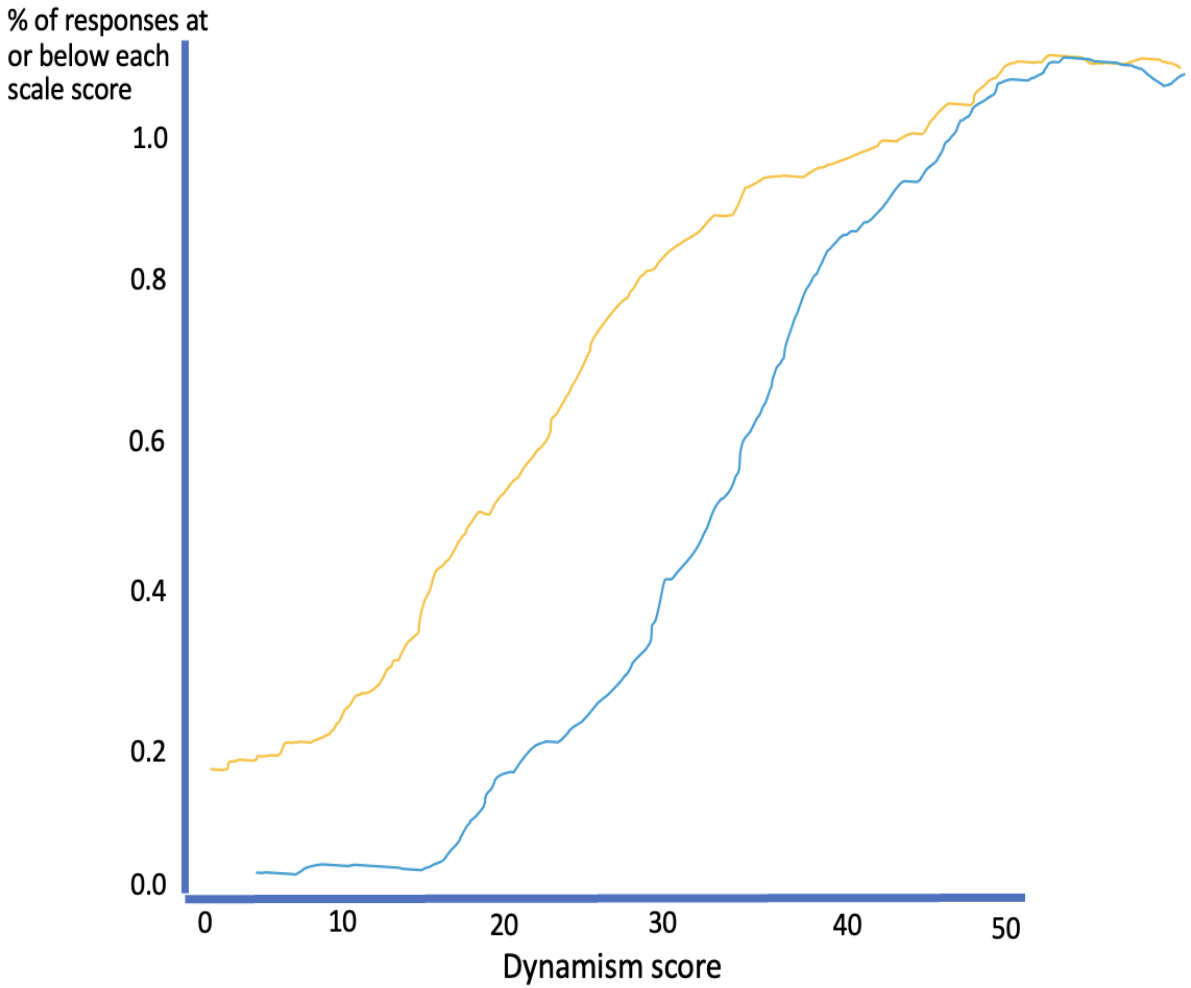


Synthesis of AD and Wasserstein: The weighted integral of the difference between the ECDFs (Dowd, 2020)

ECDFs for scale scores vs. item responses

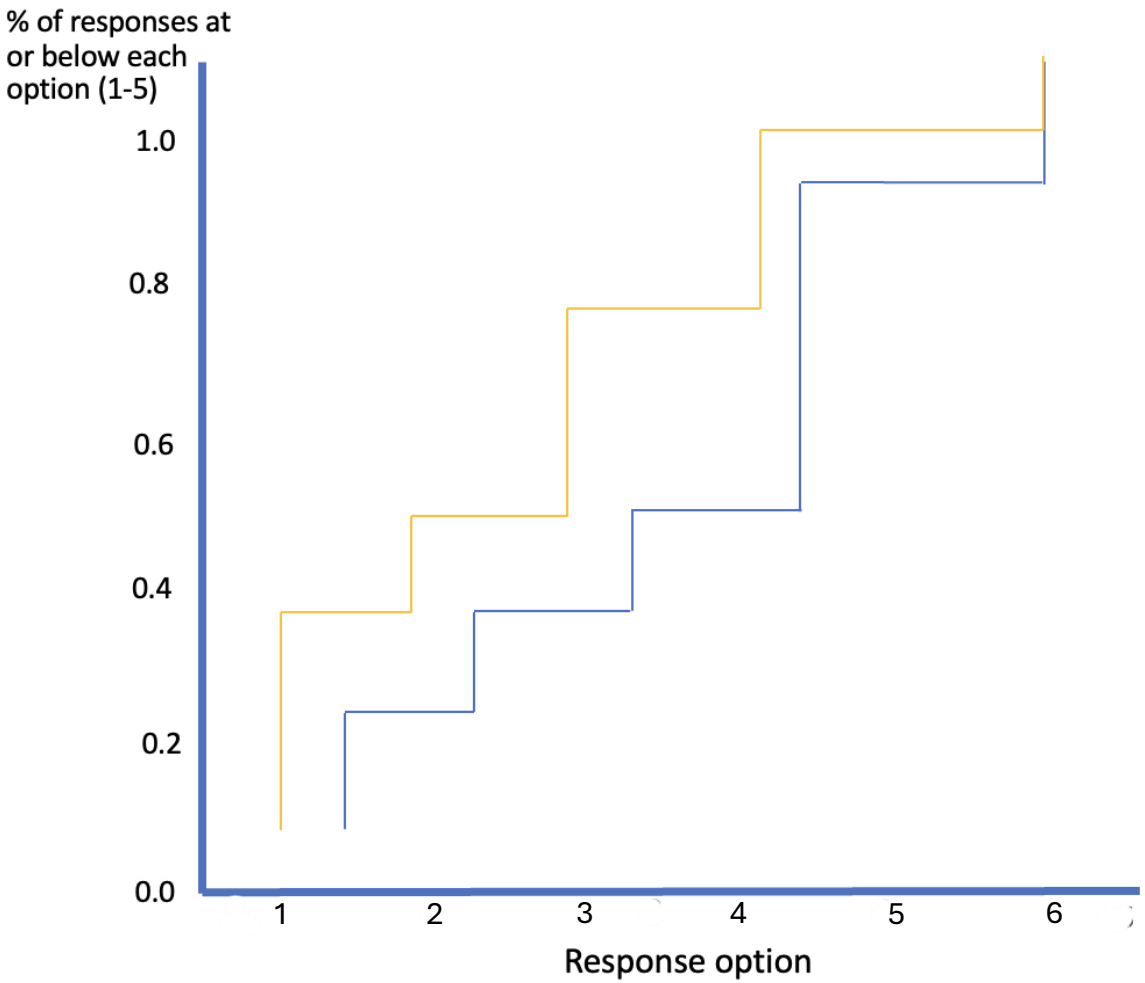
Empirical cumulative distribution function for each group

Dynamism scale score



Empirical cumulative distribution function for each group

Dynamism item: "Tend to be confident"

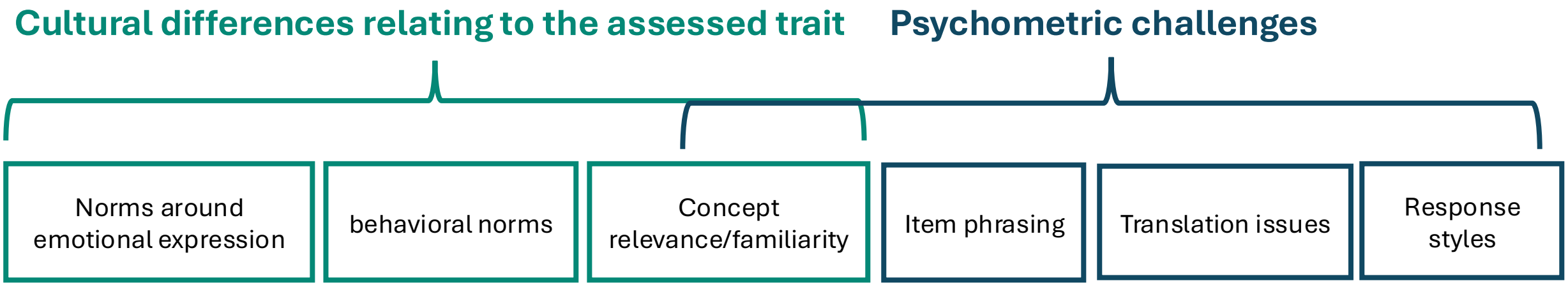


Purpose of these analyses

This work is descriptive and exploratory, with goals of identifying items…

- That show evidence for generalizability
- That highlight interesting similarities and differences in personality across nations
- That might have issues when administered to diverse samples

Differences might arise for many reasons that the present work cannot determine…..



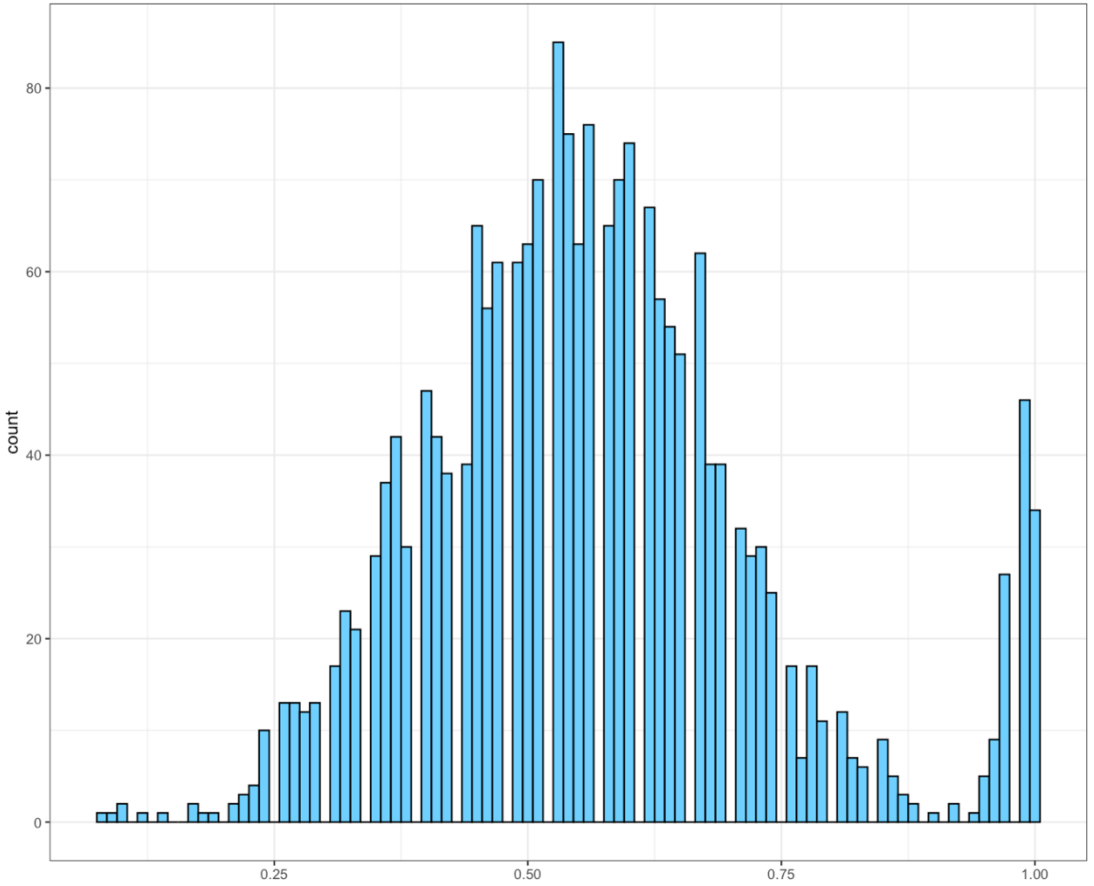
Findings across….

Items	Nation pairs	Individual nations

Findings across….

Items	Nation pairs	Individual nations

Histogram of proportion of tests significant per item



56% of DTS tests were significant overall*

2,623 (# items) x 78 (nation pairs) = **204,594 total tests**

*Note: these findings have **not** been corrected for multiple comparisons

Findings across....

Items	Nation pairs	Individual nations

Items with the <u>most</u> significant tests: 30 items with 100% significant tests

Am able to come up with new and different ideas
Am full of ideas.
Am not bothered by disorder.
Am skilled in handling social situations.
Believe in one true religion.
Believe that people are basically moral.
Dislike myself.
Don't consider myself religious.
Feel comfortable with myself.
Get angry easily.
Have a natural talent for influencing people.
Have a slow pace to my life.
Jump into things without thinking.
Let things proceed at their own pace.
Like order.
Like to be thought of as a normal kind of person.
Like to stand during the national anthem.
Like to take it easy.
Love dangerous situations.
Never spend more than I can afford.
Never splurge.
Often forget to put things back in their proper place.
Often make decisions on the spur of the moment.
Panic easily.
Prefer variety to routine.
Put on a show to impress people.
Rarely get irritated.
Rarely overindulge.
Seek danger.
Start tasks right away.
Take risks.
Tend to vote for conservative political candidates.
Think quickly.
Think that my moods don't change more than most people's do.
Trust people to mainly tell the truth.
Trust what people say.
Use others for my own ends.

Findings across....

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Impulsivity or sensation-seeking related items

Findings across....

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Use others for my own ends.

openness-related items

Findings across….

Items	Nation pairs	Individual nations

Items with the most significant tests: more openness items with >90% significant tests

More openness-related items

Spend time reflecting on things
Love to reflect on things
Tend to vote for liberal political candidates
Seek adventure
Learn things slowly
Enjoy examining myself and my life
Don't like the idea of change
Do not like poetry
Believe in the importance of art

Am quick to understand things
Can handle a lot of information
Try to understand myself
Love to think up new ways of doing things
Have read the great literary classics
Have a vivid imagination
Catch on to things quickly
Am an original thinker
Do not enjoy going to art museums
Would hate to be considered odd or strange

Findings across….

Items	Nation pairs	Individual nations

Items with the <u>fewest</u> significant tests: 13 items with <20% significant tests

Believe that there are many sides to most issues	7.7%
Want to understand things	9.0%
Enjoy the beauty of nature	10.3%
Know how to fly a helicopter	10.3%
Have little patience for slackers	11.5%
Am committed to principles of justice and equality	12.8%
Am able to see how other peoples' emotions can affect their behaviors	14.1%
Don't have a soft side	14.1%
Have lived in all 50 states in the U.S.A.	16.7%
Love to chat	16.7%
Look at the facts	17.9%
Think a lot before complaining in a restaurant if my meal is not well-prepared	19.2%
Want to know the reasons why	19.2%

Findings across….

Items	Nation pairs	Individual nations

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Want to know the reasons why	19.2%

Some ask about more specific behaviors or life experiences

(the population might not vary much between and/or within cultures on these items)

Findings across….

Items	Nation pairs	Individual nations

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Want to know the reasons why	19.2%

Others were openness-related

Findings across….

Items	Nation pairs	Individual nations

Items with the <u>fewest</u> significant tests: More openness-related items with < 30% significant tests

More openness-related items with fewer significant tests

Enjoy games of strategy
Try to identify the reasons for my actions
Go my own way
Love to learn new things
Don't like to travel
Get excited when I learn new things
Like to visit new places
Love to read challenging material
Love to travel to places that I have never been before
Understand things quickly
Want to increase my knowledge
Come up with alternatives
Am good at thinking of solutions that no one else thinks of
Prefer to analyze problems rather than just describe them
See beauty in things others might not notice
Have new ideas for improving things
Look at myself through others' eyes
Love to hear about other countries and cultures
Tend to think about something for hours
Am a true life-long learner
Can see different points of view
Can sense how things will turn out
Care about justice
Notice contradictions
Try to do difficult things

Findings across….

Items	Nation pairs	Individual nations

Themes among openness items…

With the most significant tests:

With the fewest significant tests:

Findings across….

Items	Nation pairs	Individual nations

Themes among openness items…

With the most significant tests:

- **Coming up with ideas/imagination**

Am able to come up with new and different ideas
Have a vivid imagination
Am full of ideas
Love to think up new ways of doing things

With the fewest significant tests:

- **Coming up with solutions, strategies**

Have new ideas for improving things
Come up with alternatives
Am good at thinking of solutions that no one else thinks of
Enjoy games of strategy

Findings across….

Items	Nation pairs	Individual nations

Themes among openness items…

With the most significant tests:

- Coming up with ideas/imagination
- **"Quickness" of understanding**

Think quickly
Learn things slowly
Am quick to understand things
Catch on to things quickly

With the fewest significant tests:

- Coming up with solutions, strategies
- **Enjoyment of learning, challenges**

Am a true life-long learner
Love to learn new things
Love to read challenging material
Try to do difficult things
Want to increase my knowledge
Want to understand things

Findings across….

Items	Nation pairs	Individual nations

Themes among openness items…

With the most significant tests:

- Coming up with ideas/imagination
- "Quickness" of understanding
- **Being different from others**

Like to be thought of as a normal kind of person
Would hate to be considered odd or strange
Am an original thinker

With the fewest significant tests:

- Coming up with solutions, strategies
- Enjoyment of learning, challenges
- **Perspective-taking**

Can see different points of view
Look at myself through others' eyes
Believe there are many sides to most issues

Findings across….

Items	Nation pairs	Individual nations

Themes among openness items…

With the most significant tests:

- Coming up with ideas/imagination
- "Quickness" of understanding
- Being different from others
- **Art, politics, or religion**

Believe in the importance of art
Do not enjoy going to art museums
Believe in one true religion
Tend to vote for liberal (conservative) political candidates

With the fewest significant tests:

- Coming up with solutions, strategies
- Enjoyment of learning, challenges
- Perspective-taking
- **Cultural exploration**

Love to hear about other countries and cultures
Like to visit new places
Don't like to travel

Findings across….

Items	Nation pairs	Individual nations

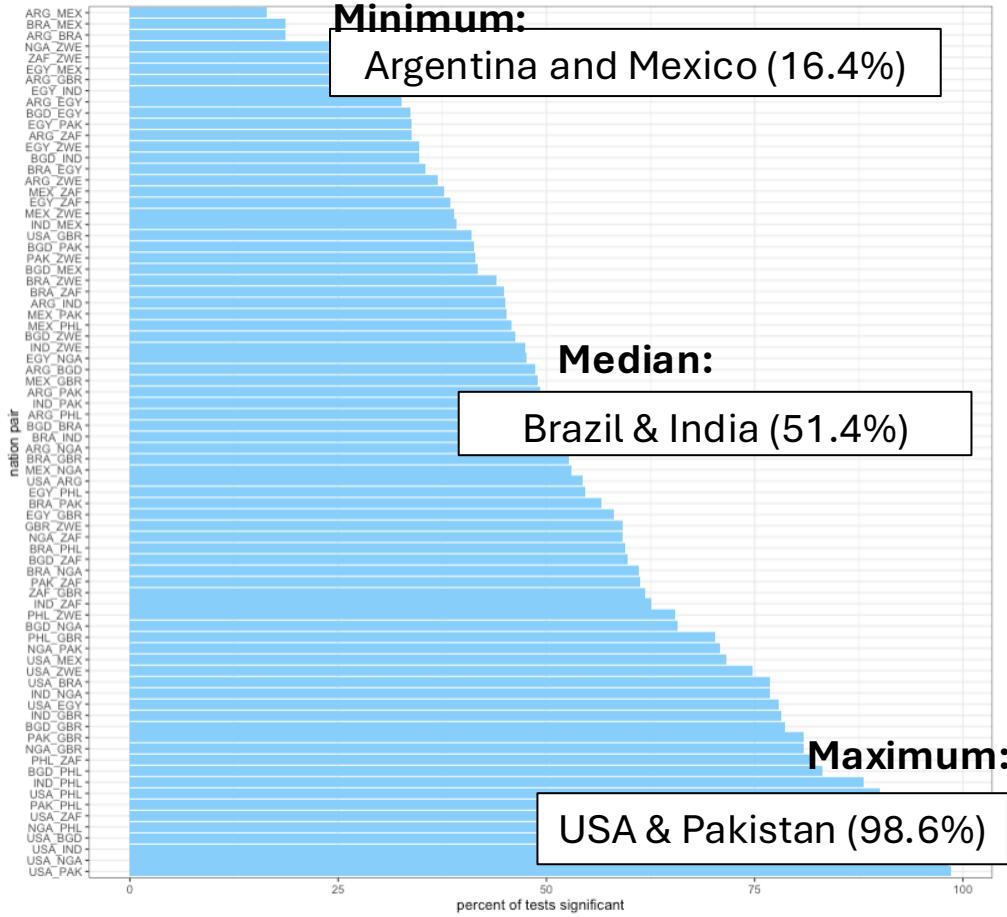
Findings across....

Items	Nation pairs	Individual nations

The proportion of significant tests per nation pair ranged from **16.4%** to **98.6%**

- Mean = 55.8 %
- Median = 51.4 %
- SD = 21.2%

% of significant tests across nation pairs

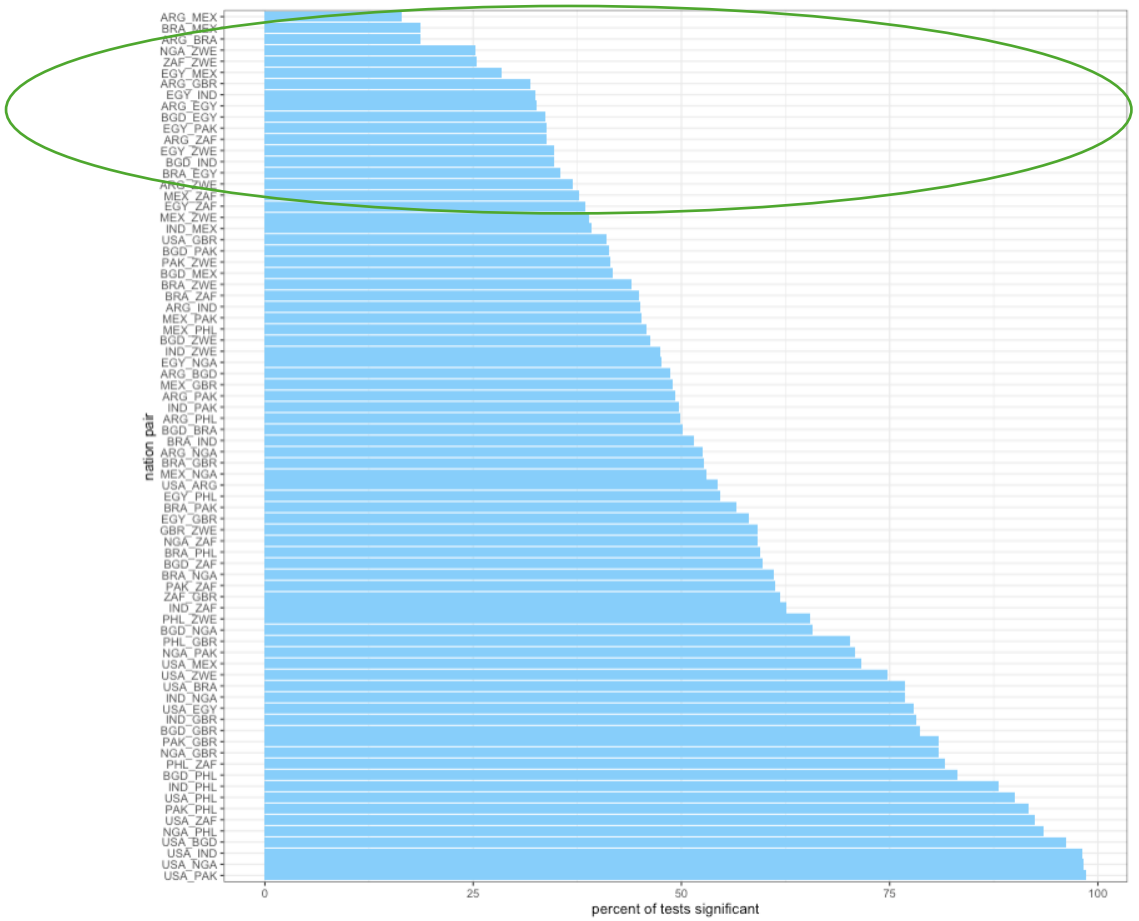


Findings across....

Items	Nation pairs	Individual nations

Nation pairs with the <u>fewest</u> significant tests

<u>% of significant tests across nation pairs</u>



Findings across….

Items	Nation pairs	Individual nations

Nation pairs with the <u>fewest</u> significant tests

- Nations in close geographical proximity



<u>South/Central American nations</u>
Argentina and Mexico (16.4%), Brazil and Mexico (18.6%)
Argentina and Brazil (18.7%)



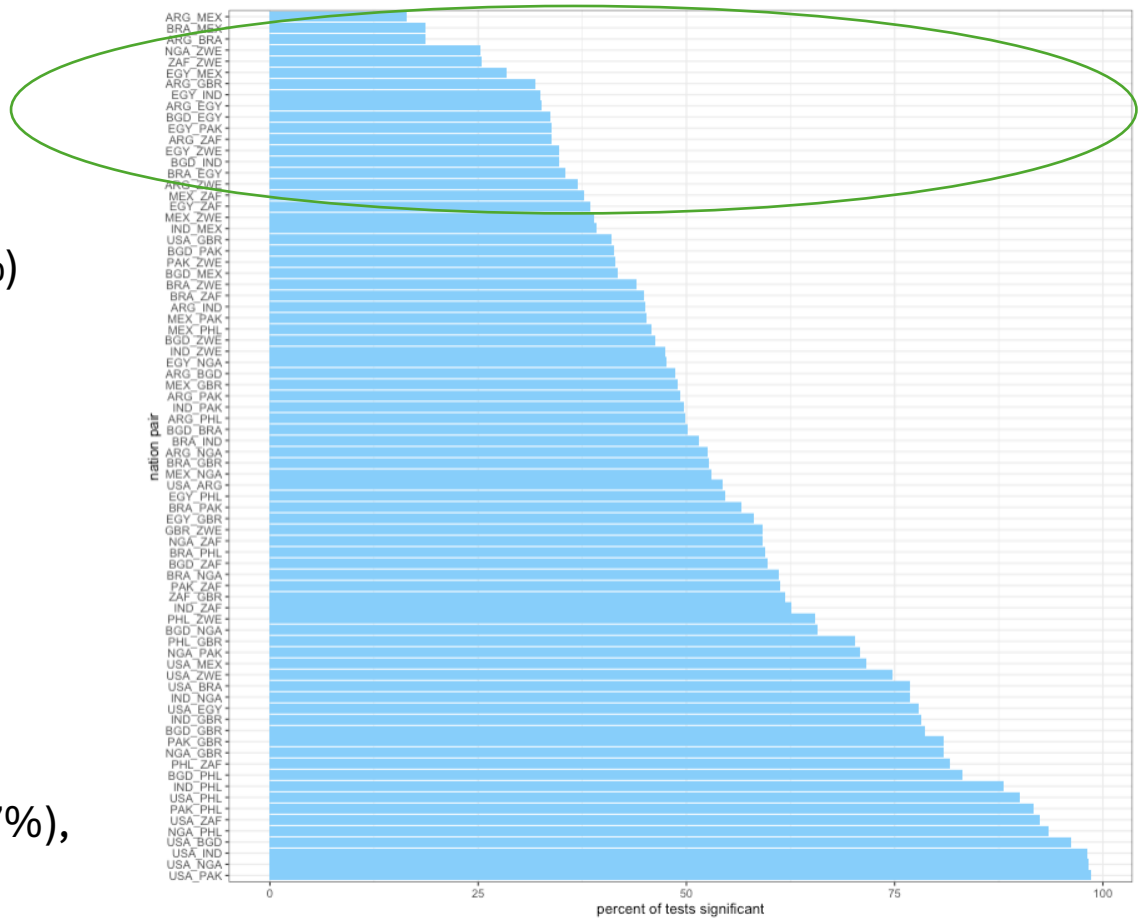
<u>African nations</u>
Nigeria and Zimbabwe (25.2%),
South Africa and Zimbabwe (25.4%)

- Tests between Egypt and other nations



Mexico (28.4%), India (32.5%), Argentina (32.6%), Bangladesh (33.7%), Pakistan (33.8%), Zimbabwe (34.7%), Brazil (35.5%)

<u>% of significant tests across nation pairs</u>

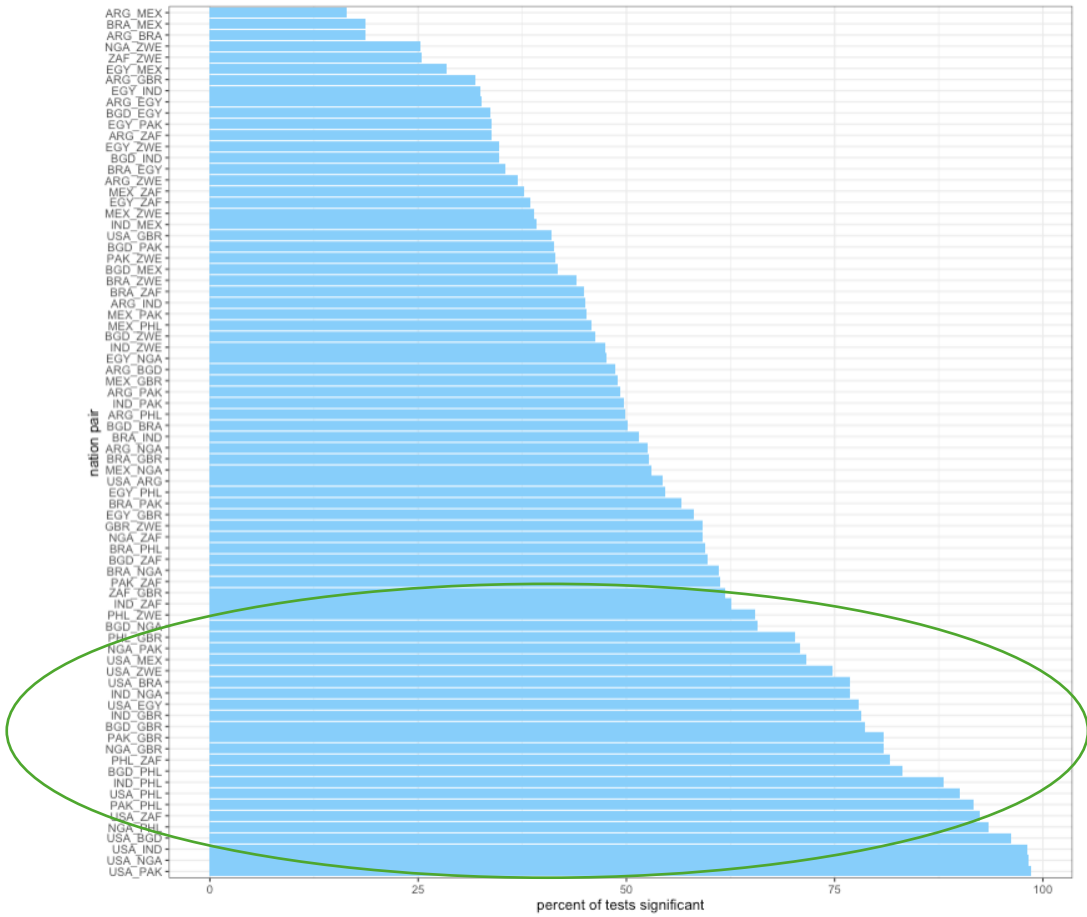


Findings across....

Items	Nation pairs	Individual nations

Nation pairs with the <u>most</u> significant tests

<u>% of significant tests across nation pairs</u>



Findings across….

Items	Nation pairs	Individual nations

Nation pairs with the most significant tests

- Tests between United States and other nations



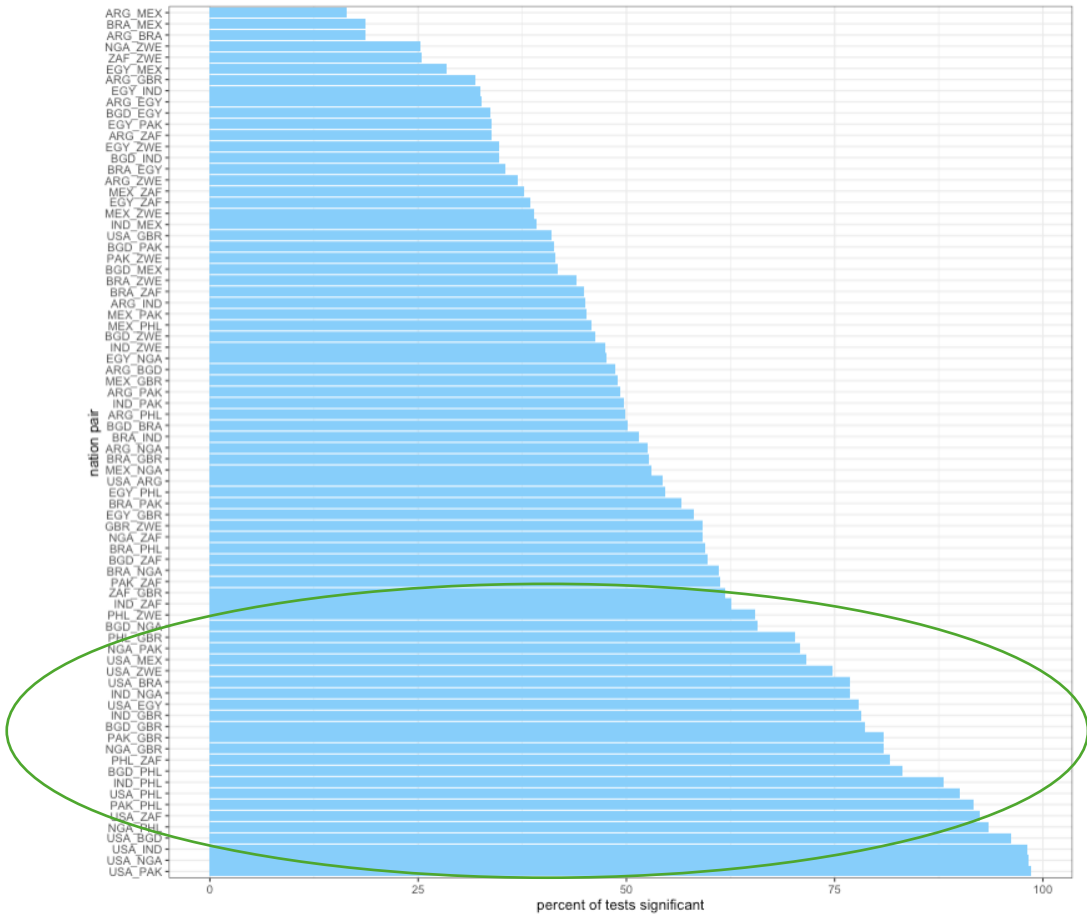
Pakistan (98.6%), Nigeria (98.2%), India (98.1%), Bangladesh (96.1%), South Africa (92.5%), Philippines (90.1%), Egypt (77.9%), Brazil (76.8%), Zimbabwe (74.8%), Mexico (71.6%)

- Tests between the Philippines and other nations



Nigeria (93.5%), Pakistan (91.7%), United States (90.1%), India (88.1%), Bangladesh (83.1%), South Africa (81.6%)

% of significant tests across nation pairs



Findings across….

Items	Nation pairs	Individual nations

Findings across....

Items	Nation pairs	Individual nations

Nations differed on the proportion of significant DTS tests and in the distributions of DTS effect sizes

- Nations generally had between 40% and 65% significant tests
- **Argentina** had the fewest significant tests (39.2%)
- **The United States** had the most (80.8%)

Nation	% significant
Argentina	39.2%
Mexico	40.5%
Egypt	42.3%
Zimbabwe	45.0%
Brazil	47.5%
South Africa	54.9%
Bangladesh	56.7%
India	58.6%
Pakistan	60.1%
United Kingdom	61.9%
Nigeria	65.4%
Philippines	72.8%
United States	80.8%

Findings across….

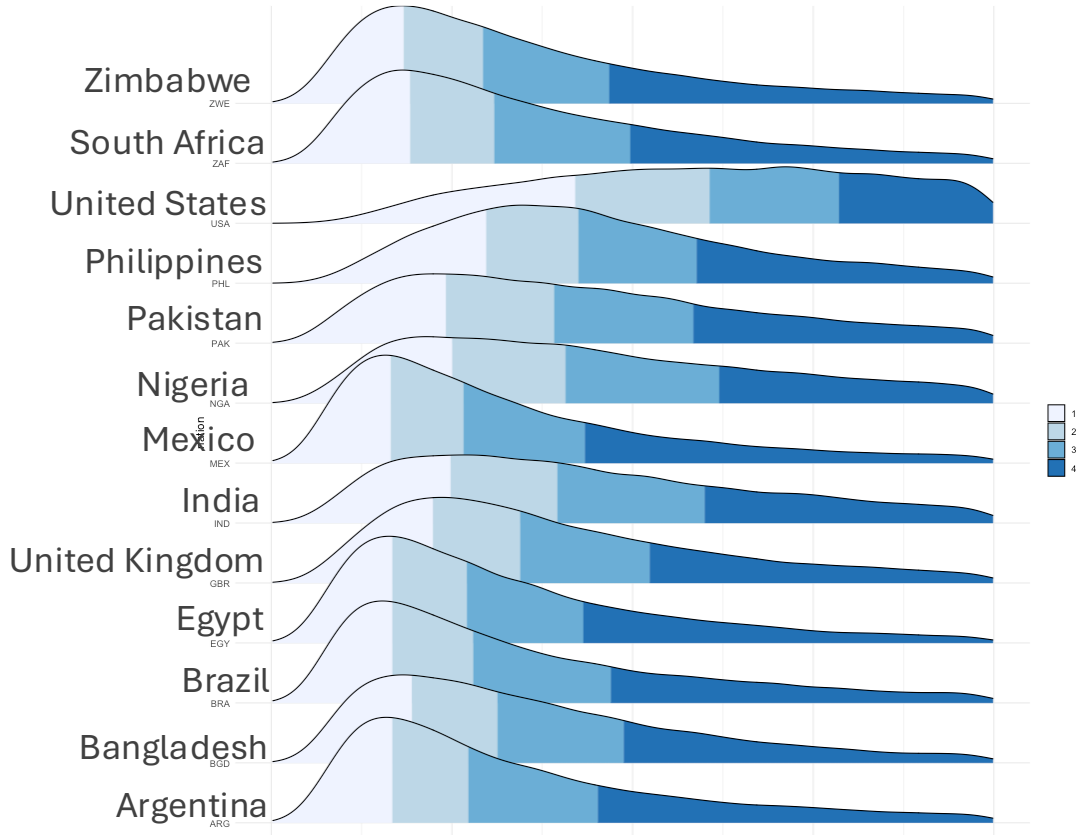
Items	Nation pairs	Individual nations

Nations differed on the proportion of significant DTS tests and in the distributions of DTS effect sizes

- Many nations showed similar distributions of effect sizes.
- The U.S. appears to differ markedly from the others.

Distribution of DTS effect sizes across nations

Color = quartile



Note: Figure based on significant (p<.05) tests only

Limitations and future directions

Findings are descriptive, can't yet explain these differences in responding

- True cultural differences, response styles, interpretation issues and other barriers?
- Cross-national differences do not necessarily reflect cross-cultural differences
- Need qualitative work to evaluate the items further

Need to adjust for multiple comparisons

- Over 200,000 tests were run, many of which will no longer be significant after applying the necessary correction.

Set of items was developed in Western context

- Future work should include items developed in non-western contexts

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Questions?