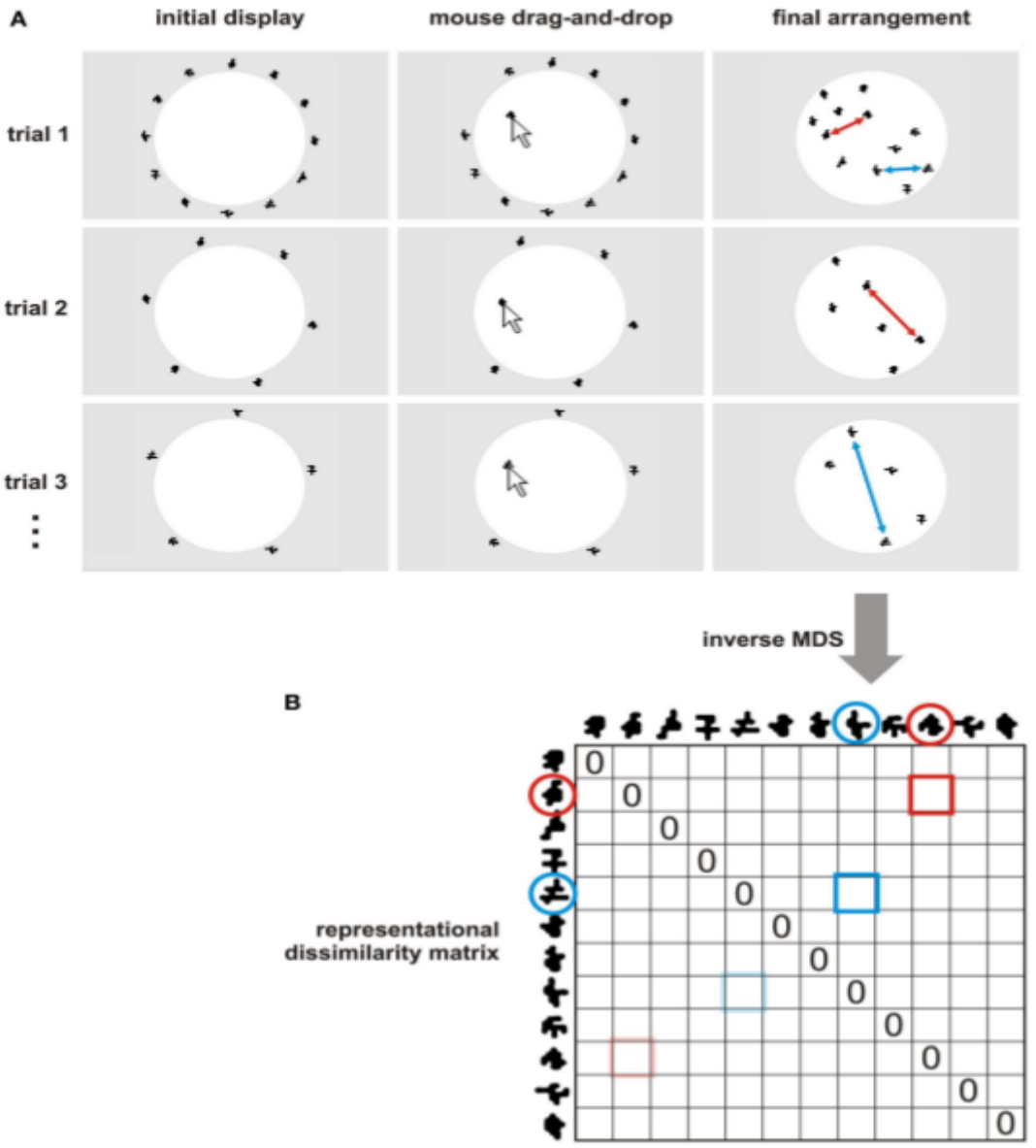
Inverse multidimensional scaling



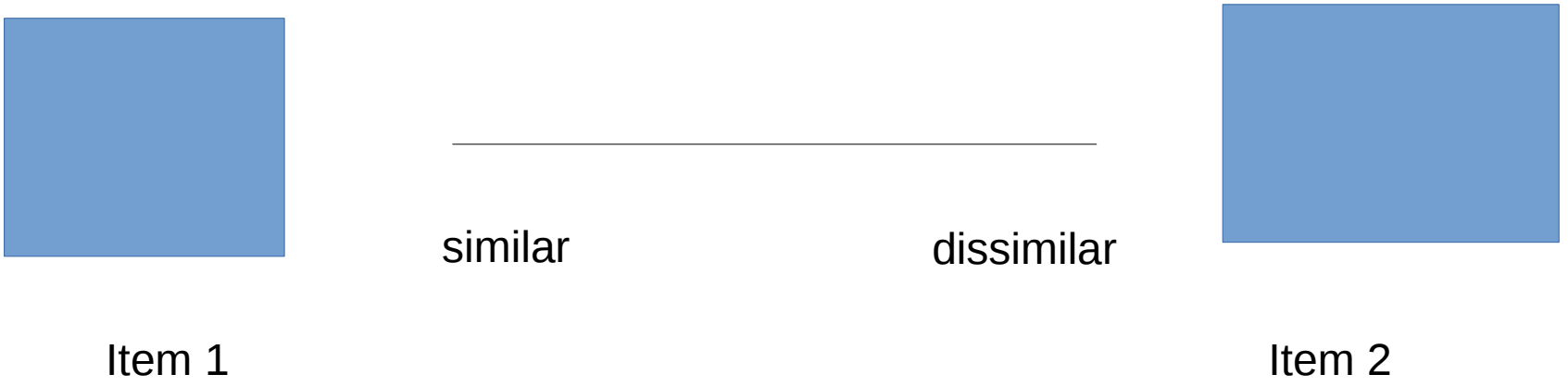
Which method should be used to measure the subjective perception dissimilarities?

We have a set of 20 items

- Should we...
  - Compare 20 items at the same time? (Single Arrangement)
  - Compare 2 items at the same time? (Pairwise)
  - Put all the items into different categories which we will define? (free sorting)
  - Compare 5 items in different subsets? (Multi Arrangement)

Pairwise Similarity Judgments

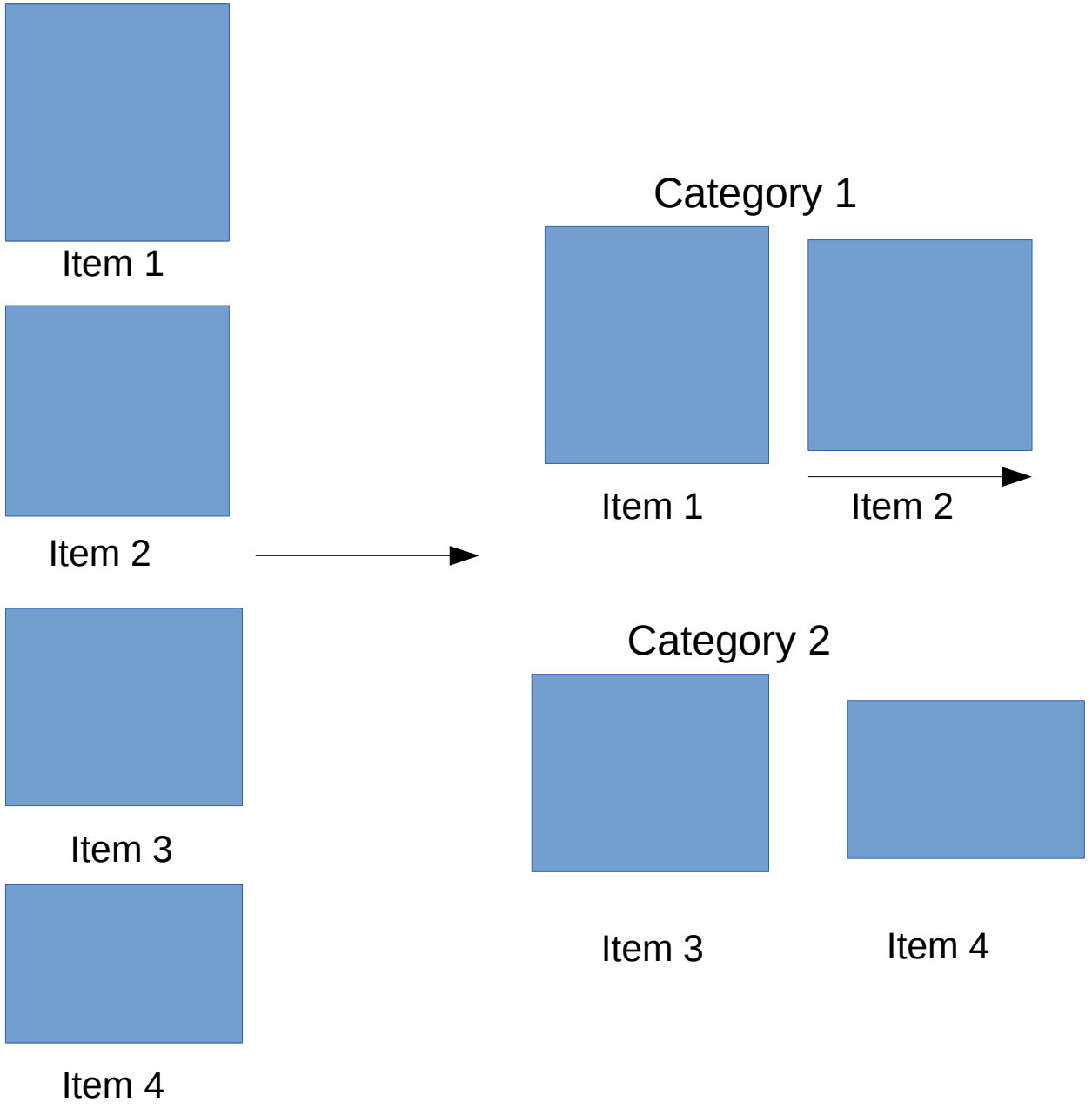
- Each item pair is presented in isolation and the subject rates the dissimilarity on a scale



- Each pair is independently rated (context is thought to distort Judgments)

- Each pair is independently rated (context is thought to inform)
- Slow: $(n^2-n)/2$
- Interpretation of the dissimilarity scale may drift

Free sorting

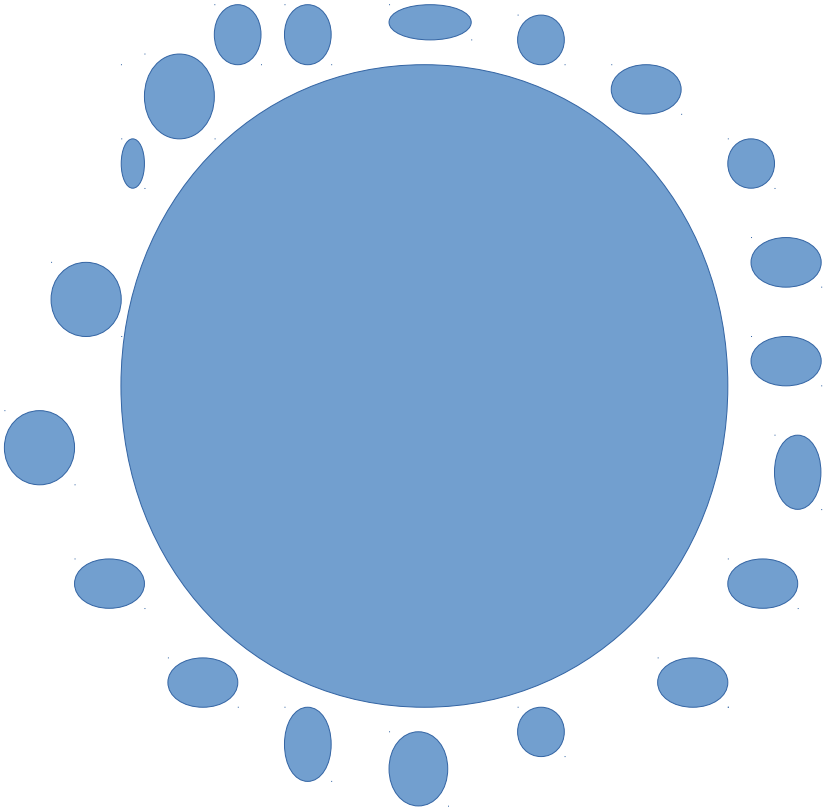


- The subject sorts the items into a freely chosen number of piles (i.e. categories)

Quick: requires n placements

Gives only binary dissimilarities
Categorization might be dominated by first item

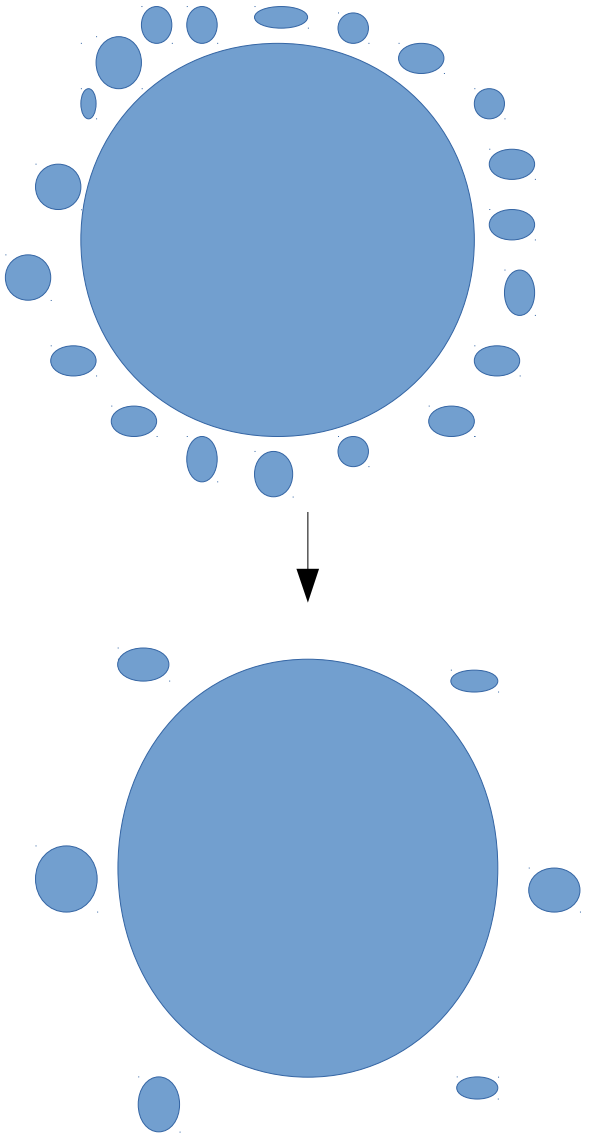
Single arrangement



- Subjects have to place items in a 2D space
  - Similar items: close together
  - Dissimilar items: far apart
- All items are always in view
- Quicker than Pairwise Similarity Judgments because all items are always in view

Multi arrangement

- Small circles: Items
- Big circle: „arena“
- 1) Arrange all 20 items
- 2) Arrange up to 5 items in one subset



- Items are judged in context

- quick: subject estimates several dissimilarities in one subset

- continously varying dissimilarities

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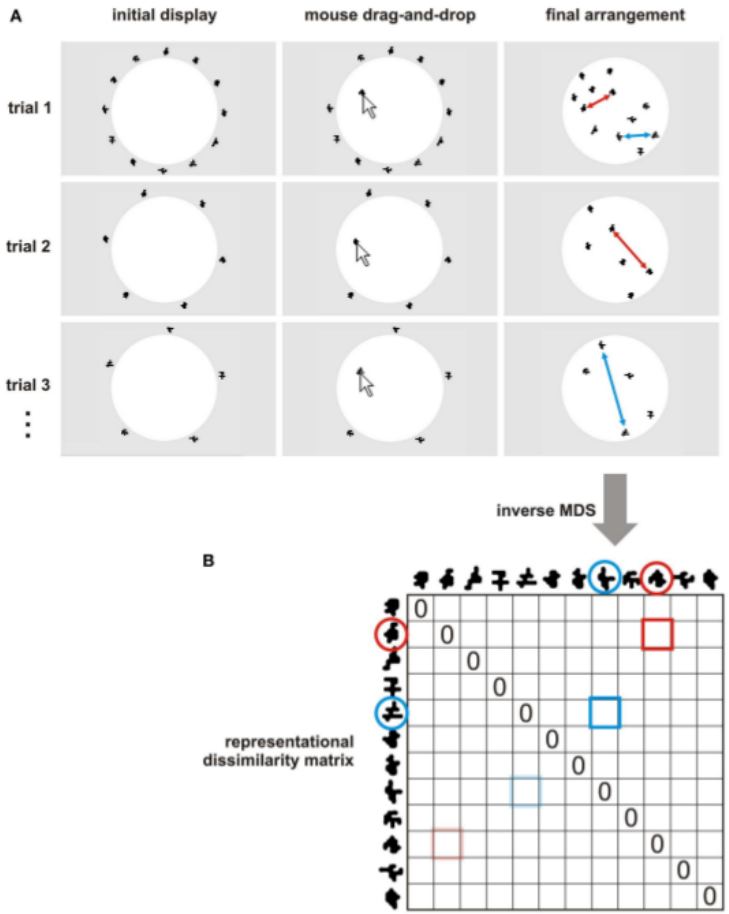
What is the fastest method?

- Free Sorting
- Single Arrangement
- Pairwise Similarity Judgments

- Multi arrangements (depends on the „lift the weakest-algorithm“)

Why is it called **inverse** Multidimensional Scaling?



- First: Multidimensional Scaling
- Second: representational dissimilarity matrix

Why do we have the algorithm of „lifting the weakest“?

- Lifting the weakest: weakest pairwise dissimilarity will be asked again
  - Weakest means that this pair is rated the less and the less inconsistent across trials
- In a random subset it could happen that…
  - Some items are not in the sample
  - Some item pairs are not together in one subset