

# Paradoxes of Measurement of Stage Development Within Educated Societies

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# Paradoxes of Measurement of Stage Development Within Educated Societies

- There are at least four sets of problems even with problems constructed using the Model of Hierarchical Complexity
  - All of the below matter
- Domain
  - With performances on problems in the social domain, however, the results were different
- What instructions one gives
- What questions one asks
- What the economic, social and political environment is

# Synchrony of Development Is Found Within The Mathematics/Logic/Physics/Chemistry Domain

- In educated populations, synchrony of development is found
  - The form of the problems did not matter
- We found that mathematics, logic, and physical sciences form a single domain.
- We used
  - Rasch Analysis, a statistical scaling procedure to determine the relative difficulty of items
  - Factor analysis, to make sure there was only one factor
  - Multivariate linear regression model to see how well *The Order of Hierarchical Complexity* predicted the Rasch scores performance difficulty
- The model was effective, the hierarchical complexity of the items predicted the difficulty of the items (Rasch Performance score):
  - $r = .980$ , factor loading = .987 (Balance Beam);
  - $r = .912$ , factor loading = .969 (Infinity);
  - $r = .966$ , factor loading = .934 (Distributivity in algebra);
  - $r = .964$ , factor loading = .913 (Causality/laundry).

# The Results Were Different In The Social Domain

- With performances on problems, however, the results were different.
  - Participants were given the Counselor-patient (informed consent), Anti-Death Penalty, Incest - No Report and Incest-Report.
  - Each presented five or six vignettes of arguments constructed to have different *Orders of Hierarchical Complexity*.
  - Participants rated the quality of arguments on a 1 to 6 scale.
- The Order of Hierarchical Complexity of each vignette predicted Rasch scores of how difficult the vignettes were
  - But somewhat variably depending upon the problem

# The instructions really matter

- In situations where the participants are familiar with the content it is important for the instructions to be very clear
- Participants must know that some answers will go against their personal experience and/or bias
- An example of this can be seen in a study done by Ravnican, S.
  - done in Slovenian manufacturing plant
  - Presented employees and managers with management scenario
  - Participants were unable to answer certain extremely simple problems that went against their personal beliefs
- An example of a problem that seven participants answered incorrectly will be shown on the next slide

# The instructions really matter

- These participants were able to answer more difficult questions correctly
- The issue with these questions was that the answer went against what they felt should have been true
- The instructions were not clear enough in explaining to participants that they had to only focus on the information in the problem
  - Rather than their personal belief

2. The business project called Beta was chosen. Here are two ways the manager can lead the project and how it will turn out. Sometimes the project will have value added and sometimes it will have no value added.

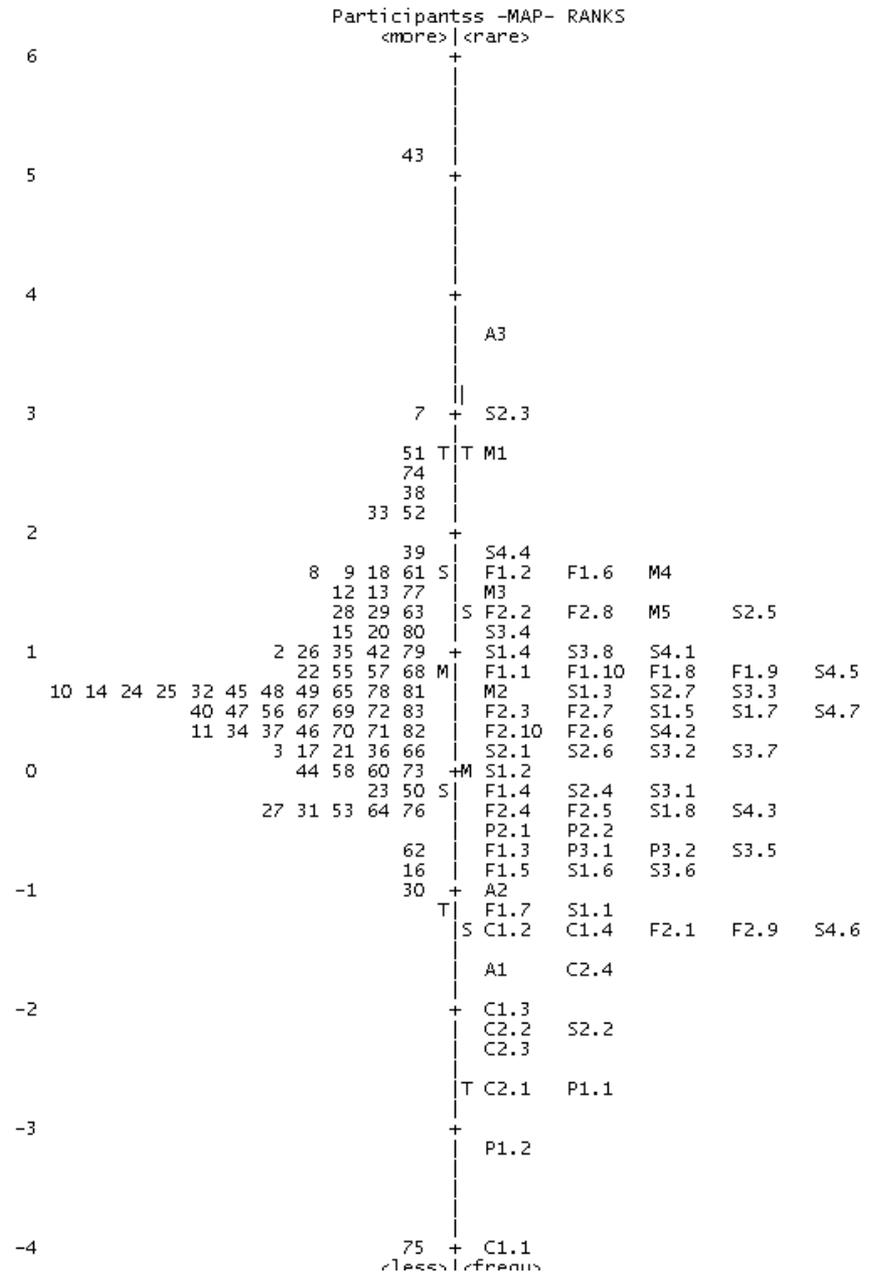
Employee engagement	-->	No value added
Employee disengagement	-->	Value added

2. Look back at the examples in the table. Will the way the manager leads the business project add value or not?

	Value added	No value added
Employee disengagement	<input type="radio"/>	<input type="radio"/>
Employee engagement	<input type="radio"/>	<input type="radio"/>

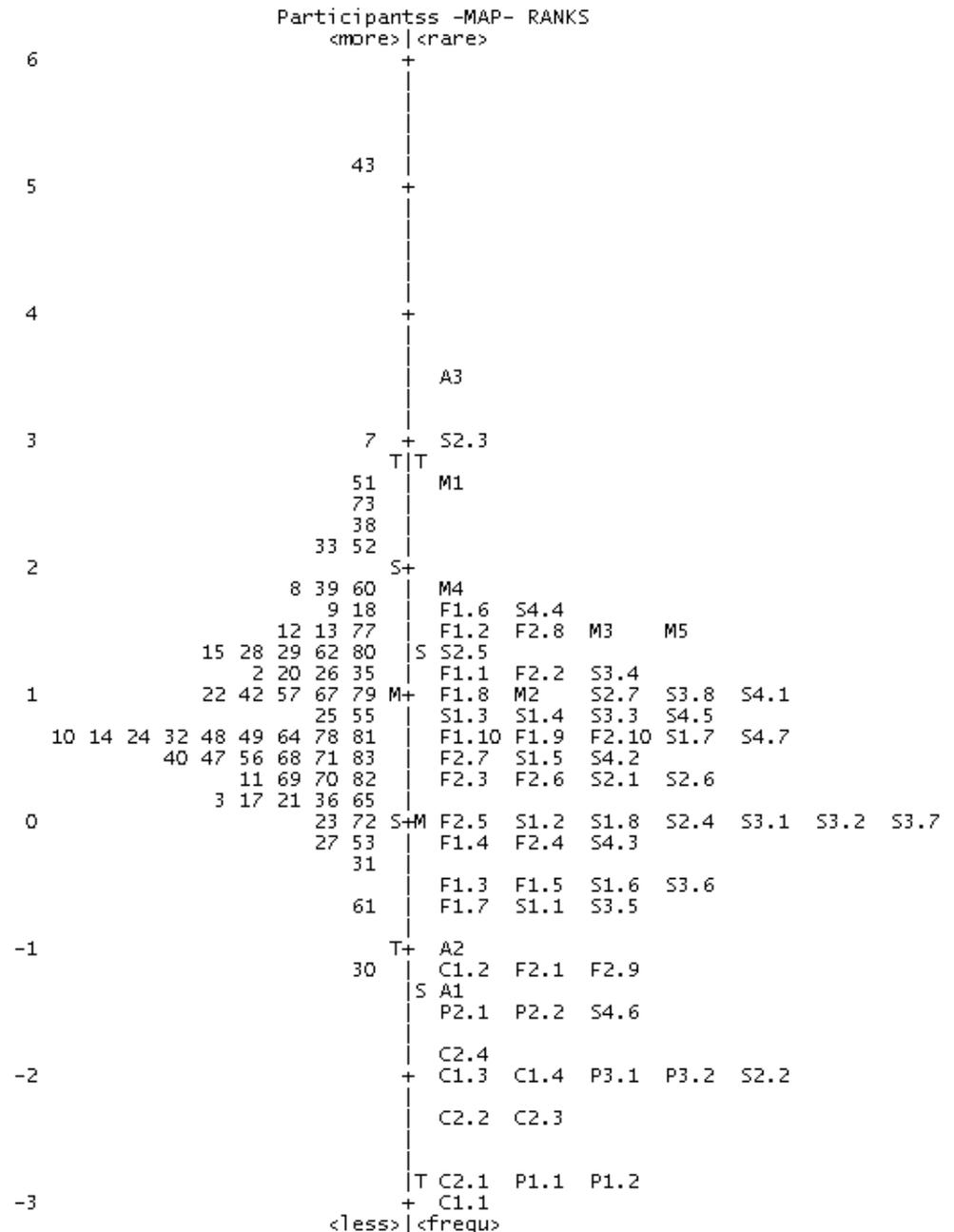
# Rasch Variable Map of DMI Item Performance

- Unaltered Data
- 75 Participants
- 15 (20%) Executive Managers
- 16(21.3%) Middle managers
- 44 (58.7%) Employees
- Regression Results
- $r = .587$
- $r^2 = .344$



# Rasch Variable Map of DMI Item Performance

- Participants Removed
- 62 Participants
- 13 (21%) Executive Managers
- 10(16.1%) Middle managers
- 39 (62.9%) Employees
- Regression Results
- $r = .690$
- $r^2 = .476$



# Social Domain Results

- $r(3) = .992$  Counselor-Patient
- $r(3) = .919$  Anti-Death-Penalty, Incest
- $r(3) = .916$  No Report, Incest
- $r(3) = .624$  Report, Incest
- In most cases the hierarchical complexity of the items predicted of performance similarly to that seen in the physical sciences
  - But in the last case it was much lower
- The correlation between tasks in the two domains was very low.
  - The correlation between Person Rasch scores for Counselor Patient (Informed Consent) and Treatment Decision (Laundry),  $r(25) = .20$ .

- These low correlation between performance in the different domains may be partially due to how much “coding” a participant must do when working on a problem.
- In the science and math problems, the aspects of the problems that need to be considered are much clearer to the participants,
- In the social problems, the participants are not accustomed to “coding” everyday social issues into “variables”
  - They may often respond at a lower stage.
- The “mathematics” is there, embedded in the social language.

# Stage Change In Adults May Be An Illusion

- A stage model that is informed by evolution, asserts that almost all humans acquire at least abstract stage behavior in at least some tasks within some domains
  - Recognizing what groups one is affiliated with (Abstract stage)
  - Experimentally devising tools for specific purposes by trying them out (Formal stage).
- Stage change in adults may be an illusion
- What the low correlation between performance in the mathematics/science/logic domain and social domain shows
  - Performance is domain specific
  - **What happens that appears to be stage change is actually the transfer of training of stage of performance from an old task and domain**
    - Into a new task and domain
    - There is now real stage change
    - Just transfer of training or assimilation in Inhelder and Piaget's terminology