The Importance of Random Assortment and Blinding in Qualitative Data Analysis
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**Qualitative Data Analysis Contains Some Degree of Error**
- Goal is to have error that is randomly/equally distributed
- Bias creates systematic error, which misrepresents the truth

**Confirmation Bias**
- Common form of bias
- Prior knowledge leading researchers to confirm what they believe they know is true

**AACR Develops Computerized Coding Models**
- What does AACR do?
  - Construct research-based Constructed Response items to evaluate students' understanding of scientific concepts
  - Use computer automated techniques for Lexical and Statistical analysis of these items

**How does AACR work?**
- Predictive Model
- Confirmation Analysis
- New Question Design
- Data Collection
- Lexical Resource Development
- Exploratory Analysis
- Categories grouping homogeneous terms/phrases
- SPSS Text Analytics for Surveys
- Terms/phrases extracted from responses
- Possible Solution: Instead of coding responses blindly, run responses through model and verify the codes produced by the model

**Four Treatments to Test Effects of Blinding and Random Assortment**

<table>
<thead>
<tr>
<th>Treatment</th>
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</thead>
<tbody>
<tr>
<td>1 (n = 500)</td>
<td>2 (n = 500)</td>
<td>3 (n = 500)</td>
<td>4 (n = 500)</td>
</tr>
</tbody>
</table>

**Coded Responses to AACR Question**

**Holistic Rubric**
- Correct
- Partially Correct/Incomplete
- Incorrect

**Statistical Data Analysis to Compare Treatments**
- Compared no blinding to blinding and random assortment to random assortment using two-proportion z-test
- α = 0.05; Bonferroni Correction; 12 tests completed for each coder; significant p-value = 0.004167

**Multiple Techniques May Reduce Bias Effects**
- Phase 1: Coder agreed with the computer scores significantly more when responses were not blinded and when responses were in a random order
- But, will having the computer codes visible (i.e., no blinding) and putting the responses in the order of the codes (i.e., no random assortment) introduce bias?

**Results**

- Responses Randomly Assigned ~2,000 Responses

- Treatment 1 (n = 500)
- Treatment 2 (n = 500)
- Treatment 3 (n = 500)
- Treatment 4 (n = 500)

- % Consistency (agreement total)

- * = statistically significant difference
- Not Random
- Random
- Not Blind
- Blind

- Phase 2: Three Coders, More Clearly Defined Rubric, and Split-Plot Design

- Responses Randomly Assigned 2,000 Responses

- Treatment 1 (n = 500)
- Treatment 2 (n = 500)
- Treatment 3 (n = 500)
- Treatment 4 (n = 500)

- % Consistency (agreement total)

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- Not Random
- Random
- Not Blind
- Blind

- Phase 3: One Coder

- % Consistency (agreement total)

- * = statistically significant difference
- Not Random
- Random
- Not Blind
- Blind

**Acknowledgements**
This material is based upon work supported by the National Science Foundation (Grants 0736932, 0909999, 1020853, 1323162, and 1347740). Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the supporting agencies.