Qualitative Research Approaches

Interviewing as Qualitative Research
A Guide for Researchers in Education and the Social Sciences
IRVING SEIDMAN

Narrative Methods for the Human Sciences
Catherine Kohler Riessman
Quantitative Methods

• Sharpening tools
  – Stronger validity and reliability in instruments with a stronger link to theory
  – Considered designs
  – Effect size not significance testing

• New modes of quantitative manipulation
  – Multiple regression
  – Hierarchical modeling
  – Structural equation modeling
  – Cluster procedures
Methods

• Physiology
  – fMRI
  – Eye-tracking
  – Biometrics: EEG, heat flow, heart rate
Attitude

Chemistry is:

Unpleasant/Pleasant
Frustrating/Satisfying
Uncomfortable/Comfortable
Chaotic/Organized

Challenging/Not Challenging
Complicated/Simple
Confusing/Clear
Hard/Easy

Emotional Satisfaction

Intellectual Accessibility
<table>
<thead>
<tr>
<th>Number</th>
<th>Adjective</th>
<th>Scale</th>
<th>Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>easy</td>
<td>1-7</td>
<td>hard</td>
</tr>
<tr>
<td>2.</td>
<td>worthless</td>
<td>1-7</td>
<td>beneficial</td>
</tr>
<tr>
<td>3.</td>
<td>exciting</td>
<td>1-7</td>
<td>boring</td>
</tr>
<tr>
<td>4.</td>
<td>complicated</td>
<td>1-7</td>
<td>simple</td>
</tr>
<tr>
<td>5.</td>
<td>confusing</td>
<td>1-7</td>
<td>clear</td>
</tr>
<tr>
<td>6.</td>
<td>good</td>
<td>1-7</td>
<td>bad</td>
</tr>
<tr>
<td>7.</td>
<td>satisfying</td>
<td>1-7</td>
<td>frustrating</td>
</tr>
<tr>
<td>8.</td>
<td>scary</td>
<td>1-7</td>
<td>fun</td>
</tr>
<tr>
<td>9.</td>
<td>comprehensible</td>
<td>1-7</td>
<td>incomprehensible</td>
</tr>
<tr>
<td>10.</td>
<td>challenging</td>
<td>1-7</td>
<td>not challenging</td>
</tr>
<tr>
<td>11.</td>
<td>pleasant</td>
<td>1-7</td>
<td>unpleasant</td>
</tr>
<tr>
<td>12.</td>
<td>interesting</td>
<td>1-7</td>
<td>dull</td>
</tr>
<tr>
<td>13.</td>
<td>disgusting</td>
<td>1-7</td>
<td>attractive</td>
</tr>
<tr>
<td>14.</td>
<td>comfortable</td>
<td>1-7</td>
<td>uncomfortable</td>
</tr>
<tr>
<td>15.</td>
<td>worthwhile</td>
<td>1-7</td>
<td>useless</td>
</tr>
<tr>
<td>16.</td>
<td>work</td>
<td>1-7</td>
<td>play</td>
</tr>
<tr>
<td>17.</td>
<td>chaotic</td>
<td>1-7</td>
<td>organized</td>
</tr>
<tr>
<td>18.</td>
<td>safe</td>
<td>1-7</td>
<td>dangerous</td>
</tr>
<tr>
<td>19.</td>
<td>tense</td>
<td>1-7</td>
<td>relaxed</td>
</tr>
<tr>
<td>20.</td>
<td>insecure</td>
<td>1-7</td>
<td>secure</td>
</tr>
</tbody>
</table>
Clustered variables most strongly related to performance

**Attitude [ASCI v2]** (Bauer, JCE 2008; Xu&Lewis, JCE 2011)
- Emotional satisfaction
- Intellectual accessibility

**Self-Concept [CSCI]** (Bauer, JCE 2005)
- As learner of chemistry
- As learner of mathematics

**Efficacy [MSLQ]** (Pintrich & DeGroot, J Ed Psych, 1990)
- Self-efficacy
- Test anxiety
Cluster Analysis
Organize students into coherent groups

Find students close to each other in six-dimensional space and “join them” into a cluster.

Cluster differentiation based on large change (“jump”) in distance measure during agglomeration
Relationship with Performance

A: PUI       B: RU

Low affective group  Medium affective group  High affective group

Mean exam scores (z-scores)
RU: Affective Profile relationship with Motivation and Metacognitive Strategies

Mean scores (z-score)

- Low affective group
- Medium affective group
- High affective group

Task Value

Intrinsic Goal Orientation

Self Regulation
Illusions of Competence: Dunning-Kruger Effect

*S.Pazicni and C.Bauer, Chemistry Education Research and Practice, 2014, 15, 24-34.*
What do these students say?

To what do students attribute their perception of ability?
## Screening on MCI over three exams

<table>
<thead>
<tr>
<th>Student Profile</th>
<th>MCI</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistently overestimate</td>
<td>&gt; 30 units always</td>
<td>46</td>
</tr>
<tr>
<td>Consistently underestimate</td>
<td>&lt; -20 units always</td>
<td>34</td>
</tr>
<tr>
<td>Consistently well calibrated</td>
<td>± 10 units always</td>
<td>85</td>
</tr>
<tr>
<td>Over-estimates then adjusts</td>
<td>&gt; 30 on Exam One</td>
<td>Then &lt;</td>
</tr>
<tr>
<td>Under-estimates then adjusts</td>
<td>&lt; -20 on Exam One</td>
<td>Then &lt;</td>
</tr>
</tbody>
</table>
Students as a whole may be described in terms of an affective profile that has some consistency across related measures.

There is a relationship between level of affect and metacognitive behaviors. [chicken/egg?]

There is a relationship between level of affect and exam performance.
Laudan (‘84), via Duschl (‘90), via Abrams & Wandersee (‘95)

Triadic model for the growth of scientific knowledge
Have you watched this video?

Hold up
Blue 7-8
Yellow 5-6
Green 3-4
Red 0-2
Start with o—O in liquid
What look like in gas phase?