Using verbal and paralinguistic behaviors to identify mapping difficulties in responses to self-reported health questions

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Introduction

• Self-reported health (SRH) question
  • “How would you rate your health: excellent, very good, good, fair, or poor?”

• Independent predictor of mortality
  • (Idler and Benyamini, 1997)

• Research focuses on
  • Factors that explain variation in responses to SRH
  • Variation in health status among those with same answer to SRH
What influences self-reported health

• Investigate which of the covariates are more strongly associated with the respondent’s answer to SRH
  • (Benyamini, Leventhal, Leventhal 1999, 2000, 2003)
• Followup with open or closed probes to examine how respondents arrive at their answers to the SRH item
  • (Groves, Fultz, and Martin 1992; Krause and Jay 1994)
• Are features of the interaction that takes place between the interviewer and respondent during administration and answering of SRH associated with dimensions of health?
Examples of features of the interaction

- Response time
- Number of exchanges
- Interruption by R
- R requesting clarification
- Followup by the interviewer
- Number of words R uses
- Mitigators – qualify, express uncertainty or doubt

(Bassili & Scott 1996; Draisma & Dijkstra 2004; Dykema, Lepkowski, & Blixt 1997; Ehlen, Schober, and Conrad 2005; Mathiowetz 1998, 1999; Schaeffer & Dykema 2004; Schaeffer, Dykema, Garbarski 2008)
Features of the interaction

• Past research has found that paralinguistic behaviors are sometimes correlated with:
  • Response errors: inaccuracy, unreliability
  • Task difficulty
  • Cognitive ability
  • (Draisma and Dijkstra 2004; Dykema, Lepkowski and Blixt 1997; Holbrook, Cho, and Johnson 2006; Knauper, Belli, Hill, and Herzog 1997; Schaeffer and Dykema 2004; Schaeffer, Dykema, Garbarski 2008)
Conceptual model

- Actual health
- Response process: Comprehension, Retrieval, Judgment, Response
- Cognitive ability
- SRH answer
- Features of interaction
Aims of current research project

• Aim 1: Are features of the interaction during administration of SRH associated with SRH answers?
• Aim 2: Does a health inconsistency index predict certain features of the interaction?
• Aim 3: Are features of the interaction associated with a health inconsistency index among respondents with the same SRH answer?
Data: The Wisconsin Longitudinal Study

- 1/3 random sample of WI high school class of 1957
- Telephone interviews digitally recorded in 2004 and 2005
  - Full sample includes 100 interviewers and 5 respondents from each interviewer stratified by high school IQ (N=355)
- Coding system used to obtain measures uses structure of Sequence Viewer (Dijkstra)
  - “Event” is the unit of interaction that is coded
  - Up to nine Code Variables are coded for each event
Features of interaction during SRH

• Any R tokens [vs. none]
  • “uh”, “well”
  • Term or phrase with a neutral connotation that appears to respond to a prior utterance
• Any R uncertainty indicators [vs. none]
  • Reports/considerations: “my mental health is ok, my physical health is not”
  • Inadequate answers:
    • Range: “good to very good”
    • Hypothetical response options: “pretty good”
  • Mitigators: “I think,,” “I guess,” “just,” “maybe,” “about,” “put,” “I’d say”
Features of interaction during SRH

- Response time (natural log, tenths of seconds)
  - Time from end of INT’s reading of the item until the first complete codable answer from R
- Any pre-emptive INT behaviors [vs. none]
  - Indicate problems R has in answering item
Features of interaction during SRH

- Non-paradigmatic sequence [vs. paradigmatic]
  - Paradigmatic sequence (Schaeffer & Maynard 1996)
  - INT asks question, R picks response category (with or without a preceding pause), sequence ends
- More than one exchange [vs. one exchange]
  - An exchange level is one interviewer-respondent sequence of talk.
  - 2 exchanges:
    - INT Question
    - R Answer
    - INT Followup
    - R Answer
Health inconsistency index

- Dichotomized
  - HUI-functioning: mean or less, greater than mean
  - Reported health conditions: 0 or 1, 2 or more
- Health consistency (=0):
  - High functioning/low # conditions
- Health inconsistency (=1):
  - High functioning/high # health conditions
  - Low functioning/low # health conditions
  - Low functioning/high # health conditions
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### Aim 1: Features of the interaction and SRH answers

<table>
<thead>
<tr>
<th>Feature</th>
<th>Proportion</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>R token</td>
<td>0.32</td>
<td>0.71**</td>
<td>0.56 - 0.90</td>
</tr>
<tr>
<td>R uncertainty indicator</td>
<td>0.33</td>
<td>0.76*</td>
<td>0.60 - 0.96</td>
</tr>
<tr>
<td>Pre-emptive INT behavior</td>
<td>0.07</td>
<td>0.77</td>
<td>0.50 - 1.19</td>
</tr>
<tr>
<td>Non-paradigmatic</td>
<td>0.52</td>
<td>0.72**</td>
<td>0.57 - 0.90</td>
</tr>
<tr>
<td>More than one exchange</td>
<td>0.32</td>
<td>0.82</td>
<td>0.65 - 1.04</td>
</tr>
</tbody>
</table>

| Mean Coefficient                     | 1.73       | -0.34***   | -0.47 - -0.22|
| (2.42)                               |            |            |             |
Aims of current research project

• Aim 1: Are features of the interaction during administration of SRH associated with SRH answers?

• Aim 2: Does a health inconsistency index predict certain features of the interaction?

• Aim 3: Are features of the interaction associated with a health inconsistency index among respondents with the same SRH answer?
## Aim 2: Features of the interaction and health inconsistencies

<table>
<thead>
<tr>
<th>Feature</th>
<th>Bivariate</th>
<th>Controlling for SRH, IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>R token</td>
<td>1.94**</td>
<td>1.23 - 3.07</td>
</tr>
<tr>
<td>R uncertainty indicator</td>
<td>1.86**</td>
<td>1.19 - 2.93</td>
</tr>
<tr>
<td>Pre-emptive INT behavior</td>
<td>3.89**</td>
<td>1.41 - 10.74</td>
</tr>
<tr>
<td>Non-paradigmatic</td>
<td>2.34***</td>
<td>1.53 - 3.59</td>
</tr>
<tr>
<td>More than one exchange</td>
<td>1.99**</td>
<td>0.65 - 1.04</td>
</tr>
<tr>
<td>Response time</td>
<td>0.47***</td>
<td>0.23 - 0.72</td>
</tr>
</tbody>
</table>
Aims of current research project

• Aim 1: Are features of the interaction during administration of SRH associated with SRH answers?
• Aim 2: Does a health inconsistency index predict certain features of the interaction?
• Aim 3: Are features of the interaction associated with a health inconsistency index among respondents with the same SRH answer?
### Aim 3: Features of the interaction and health inconsistencies within SRH answers

<table>
<thead>
<tr>
<th>Feature</th>
<th>Excellent (N=102)</th>
<th>Very Good (N=125)</th>
<th>Good (N=95)</th>
<th>Fair/Poor (N=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R token</td>
<td>0.20*</td>
<td>0.20*</td>
<td>0.01</td>
<td>-0.27</td>
</tr>
<tr>
<td>R uncertainty indicator</td>
<td>0.23*</td>
<td>0.06</td>
<td>0.08</td>
<td>-0.06</td>
</tr>
<tr>
<td>Pre-emptive INT behavior</td>
<td>0.25*</td>
<td>0.10</td>
<td>0.08</td>
<td>0.16</td>
</tr>
<tr>
<td>Non-paradigmatic</td>
<td>0.26**</td>
<td>0.25**</td>
<td>0.02</td>
<td>-0.17</td>
</tr>
<tr>
<td>More than one exchange</td>
<td>0.20*</td>
<td>0.21*</td>
<td>-0.04</td>
<td>-0.17</td>
</tr>
<tr>
<td>Response time</td>
<td>0.25*</td>
<td>0.11</td>
<td>-0.01</td>
<td>-0.09</td>
</tr>
</tbody>
</table>
Summary

- Features of the interaction are associated with SRH
- Features of the interaction are associated with health inconsistency index, controlling for SRH answer and cognitive ability
- Among Rs with “excellent” or “very good” SRH, some of the features of the interaction are associated with health inconsistency index
Conclusion

• Inconsistent health information reflected in features of the interaction

• Features of the interaction may be useful indicators of health status when limited data on health are collected
Thank you!
Code Variables (9): (Brief) Description

- Actor: who is speaking
  - e.g. R or INT
- Location: where in the instrument is the interaction occurring
  - e.g. in the instructions or during the task
- Event Type: what is general nature or kind of talk
  - e.g. is actor asking a question or requesting information
- Specification: for some event types; includes more detailed information about the nature or kind of talk
  - e.g. what kind of question is the actor asking
- Adequacy: how adequately does INT read/R answer item
- Laugh Tokens: does the coding event contain a laugh token
- Continuation: is utterance continued across multiple coding events
- Overlap: does the coding event contain overlapping speech
- Repair: does the coding event contains a repair
## Code Variable: Repair

- **Examples--Specific**

<table>
<thead>
<tr>
<th>H</th>
<th>01</th>
<th>28</th>
<th>rtsdu-f-</th>
<th>rtku-----</th>
<th>pt------</th>
<th>rtsdu-l-r</th>
<th>rtsc----</th>
<th>R: I would have to say</th>
<th>R: ah</th>
<th>()</th>
<th>R: I would say</th>
<th>R: very good</th>
</tr>
</thead>
</table>


Aim 3: Mean (SD) number of conditions by SRH answer
Features of the interaction and SRH answers

- Any token
- Any uncertainty indicators
- Any pre-emptive INT behaviors
- Non-paradigmatic sequence
- More than one exchange
Mean (SD) of response time by SRH answer
What information does interaction add?

- Does knowing about features of the interaction during administration of SRH add information beyond that provided by the answer to SRH?
- Example:
  - In general, would you say that your health is excellent, very good, good, fair or poor?
  - Respondent 1
    “excellent”
  - Respondent 2
    “I guess I’d say excellent”