Are Interactional Behaviors Exhibited During the Self-Reported Health Question-Answer Sequence Associated with Health Status?

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Abstract

The self-reported health question summarizes a wide range of information about health status across several domains of health and is widely used to measure health because it predicts mortality well. We examine whether interactional behaviors produced by respondents and interviewers during the self-reported health question-answer sequence reflect complexities in the respondent's health history. We observed more problematic interactional behaviors during the self-reported health question-answer sequence when respondents reported worse self-reported health. Furthermore, these behaviors were more likely to occur when respondents had health inconsistencies, even after controlling for the respondent's answer to the self-reported health question and cognitive ability. We also found that among respondents who reported "excellent" health and to a lesser extent those who reported their health was "very good," problematic interactional behaviors were associated with health inconsistencies. Overall, we find evidence that the interactional behaviors exhibited during the question-answer sequence are associated with respondents' health status.

Key words: self-reported health, interactional behaviors, interaction coding, interviewer-respondent interaction, cognitive ability, health, response latency, uncertainty, disfluencies of speech, paradigmatic question-answer sequence

1. Introduction

The self-reported health question – e.g., "Would you say your health in general is excellent, very good, good, fair, or poor? -- summarizes information about health across several domains, and is widely used to measure health status because of its ability to predict morbidity and mortality (Idler and Benyamini, 1997). Researchers have demonstrated that self-reported health is related to multiple domains of health including illnesses, symptoms of undiagnosed diseases, judgments about the severity of illness, family history, dynamic health trajectory, behaviors, and the presence or absence of resources for good health (Idler and Benyamini, 1997). In sum, "a very long list of variables is required to explain the effect of one brief 4- or 5-point scale item…" (Idler and Benyamini, 1997: 31). As a result, research on the predictive power of the self-reported health question has waned. We seek to demonstrate that there is additional

health information to be gleaned from the self-reported health question; in particular, that information from the interviewer-respondent interaction during the self-reported health question-answer sequence may provide an indirect way to capture information on respondents' health status beyond that provided solely by their answer to the self-reported health question.

1.1 Dimensions of Health Associated with the Self-Reported Health Question

Two broad sets of studies have investigated the dimensions of health respondents consider when they answer the self-reported health question. First are studies that investigate the associations between self-reported health and other measures of health to determine which of the measures are more strongly associated with self-reported health. An inference is then made that the measures that are more strongly associated with self-reported health were weighed more heavily by respondents when they were constructing their answer. These studies have found the following: current health experience is more strongly associated with self-reported health than prior health experience (Benyamini, Leventhal, Leventhal, 1999); indicators of positive health are as important in determining future and current self-reported health as negative indicators (Benyamini, Idler, Leventhal, Leventhal, 2000); and men's self-reported health is associated with serious, life-threatening diseases while women's self-reported health is associated with both life-threatening and non-life-threatening diseases (Benyamini, Leventhal, Leventhal, 2000). In addition, the dimensions of health that respondents rate as important for their self-reported health vary by the response option (e.g., "excellent," "very good," "good," "fair" or "poor") they select. For example, respondents who selected "poor" or "fair" rated current disease status as important while those choosing "excellent," "very good" and "good" rated risk factors and positive indicators as important; respondents in all categories rated overall functioning and vitality factors as important (Benyamini, Leventhal and Leventhal, 2003).

Other studies have used follow-up probes to ask respondents what they were thinking about when they answered the self-reported health question in order to ascertain how respondents construct their answers. For example, Groves, Fultz, and Martin (1992) found that respondents who used external cues (absence or presence of illness, health service usage, and outcome of physical exam) were slightly less likely than those who used internal cues (feelings, physical performance/ability, affect) to report "excellent," "fair," or "poor" health. Further, those who reported that they considered their health in more recent time were less likely to report "excellent" and more likely to report "good" or "fair" health. Krause and Jay (1994) reported that overall there was not a significant relationship between self-reported health and the content of respondents' reports to follow-up probes. However, interesting patterns emerged in the data: respondents who reported that they compared their health to that of others were more likely to select "excellent," while respondents whose health referents were physical functioning, health problems, or health behaviors were more likely to select "good." In cognitive testing of the self-reported health question, Canfield and colleagues (2003) reported that respondents considered a variety of situational factors in constructing an answer; these included reporting "good" health despite a long list of serious health conditions, weighing how well a condition was controlled by medication, comparing themselves with others their own age or with similar medical conditions, or considering a prior question about physical limitations.

We expect that interactional behaviors exhibited during the self-reported health question-answer sequence may provide an indirect way to capture information on respondents'

health status beyond that provided by their answer to the self-reported health question. In contrast to the approaches outlined above, coding features of the interviewer-respondent interaction does not require additional health-related questions or follow-up probes. We seek to show that behaviors exhibited during the self-reported health question-answer sequence may provide more information about the respondent's health than the answer to the question alone. This information may be useful when additional questions or follow-up probes are not available.

1.2 Model of the Response Process and Interactional Behaviors

In constructing an answer to a survey question, a respondent may progress through four stages: comprehension of the question, retrieval of relevant information from memory to answer the question, use of retrieved information to make judgments, and selection and reporting of an answer (Tourangeau, Rips, and Rasinski, 2000). The actual stages of cognitive processing of the response can vary depending on the wording of the question, how accurate the respondent wants to be, and the respondent's cognitive ability. During the response process, respondents and interviewers may exhibit behaviors that can be viewed as by-products of the information processing that occurs when a respondent answers a survey question (Fowler and Cannell, 1996; Holbrook, Cho, and Johnson, 2006). Some behaviors -- such as response latency and expressions of uncertainty by respondents, and probing of respondents by interviewers -- have been shown to be associated with inaccurate or unreliable answers, the difficulty of the task, and cognitive ability (Draisma and Dijkstra, 2004; Dykema, Lepkowski and Blixt, 1997; Fowler and Cannell, 1996; Hess, Singer, and Bushery, 1999; Knäuper et al., 1997; Mathiowetz, 1999; Schaeffer and Dykema, 2004; Schaeffer et al., 2008; van der Zouwen and Smit, 2004).

We propose that the interactional behaviors exhibited by respondents and interviewers during the self-reported health question-answer sequence may also be related to the content of what the question is asking, that is, with various dimensions of health. More specifically, we expect that when the respondent's health history is complex, inconsistencies between health conditions and functioning may be expressed through behaviors respondents and interviewers exhibit during interaction. As a result, these behaviors may provide useful proxy information about health status that may be particularly useful when limited data on health are collected.

1.3 Conceptual Model of Self-Reported Health Question-Answer Sequence

Our conceptual model is depicted in Figure 1. The diagram indicates that the response process is affected by the respondent's actual health and her cognitive ability; actual health and cognitive ability are also correlated. The respondent's actual health and her response process affect her answer to the self-reported health question, and her response process and cognitive ability determine which behaviors are exhibited during the interaction. Finally, the respondent's self-reported health answer and interactional behaviors are associated because they are co-produced by the respondent after the question is posed by the interviewer.

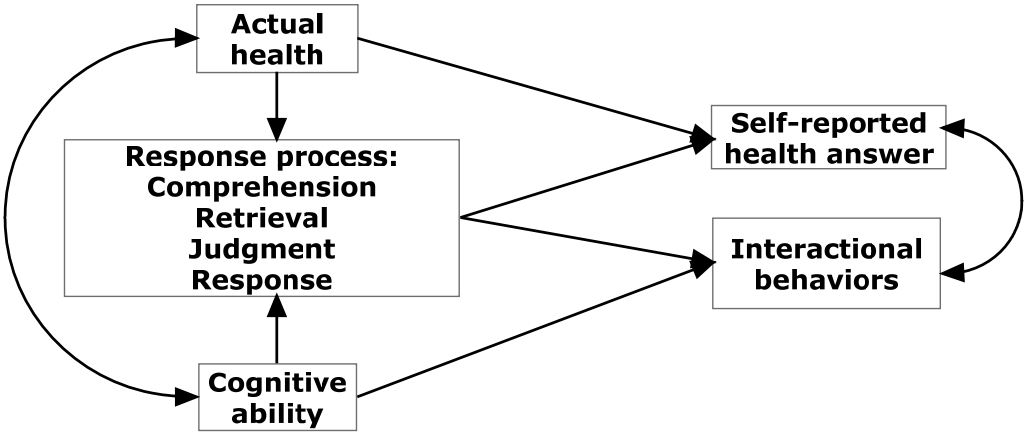

Figure 1: Conceptual model of the response process linking respondent health status to interactional behaviors during the self-reported health question-answer sequence

Prior research has shown that some interactional behaviors are associated with cognitive ability as measured by performance on cognitive assessments (e.g., Schaeffer et al. 2008). For self-reported health, our model suggests that this association could include both the general effect of cognitive ability on behaviors, as well as the effect that cognitive ability has on the cognitive processing of this particular question. We also expect that the respondent's actual health will influence behaviors during the interaction in three ways: by implicating a specific answer to the self-reported health question, through the effects of actual health on cognitive ability, and through the effect of the respondent's actual health on the processing of the question.

More specifically, in this paper we focus on how inconsistencies in respondents' reports of disease and functioning might be associated with behaviors during the self-reported health question-answer sequence. The complexity of the information respondents have about their actual health may require them to combine disparate types of information, such as disease and functioning, which may make it more difficult to retrieve relevant information, formulate judgments about health, and map an answer onto the response options. We seek to show that respondents with more complex health histories are more likely to exhibit certain interactional behaviors, providing evidence that these behaviors indicate difficulties in the response process (e.g., difficulties in combining information about disease and functioning or difficulties in mapping a resulting judgment onto one of the offered options). As a result, behaviors exhibited during the self-reported health question-answer sequence may provide additional information about health status.

1.4 Research Hypotheses

We examine a subset of interactional behaviors produced when interviewers administer and respondents answer the self-reported health question. We select behaviors previously identified as indicating potential problems in the response process, which we refer to as problematic interactional behaviors. These behaviors include: tokens, expressions of uncertainty, and long response latencies as produced by respondents; pre-emptive behaviors by interviewers; and non-paradigmatic question-answer sequences and multiple exchange levels resulting from the interviewer-respondent interaction. Because these behaviors are co-produced when respondents answer the self-report health question, they vary along with responses to the self-reported health question. We predict that:

Hypothesis 1: Problematic interactional behaviors will be more likely to occur and response latencies will be longer when respondents report worse self-reported health because less healthy respondents have a more complex response task and may be more likely to have cognitive abilities impaired by poor health.

Hypothesis 2: Problematic interactional behaviors will be more likely to occur and response latencies will be longer when respondents have inconsistent health statuses, even after controlling for the respondent's answer to the self-reported health question and a measure of cognitive ability. The presence of the predicted relationship indicates that the behaviors may provide information about the respondent's health status beyond that provided by the respondent's answer to the self-reported health question.

Hypothesis 3: There will be a positive correlation between the occurrence of problematic interactional behaviors and a measure of health inconsistency among respondents who answer the self-reported health question using the same response option (e.g., among respondents who select "excellent"). The presence of the predicted relationship suggests that the behaviors carry information about differences in health status among respondents with the same self-reported health answer.

2. Methods

2.1 Data

Data for this study are provided by the Wisconsin Longitudinal Study (WLS), a longitudinal study of 10,317 randomly selected respondents who graduated from Wisconsin high schools in 1957. The study covers a variety of topics with a focus on educational plans, occupational aspirations, social influences, and, more recently, physical and mental health status (Hauser 2009; Sewell, Hauser, Springer, and Hauser 2004).

We analyze interviewer-respondent interaction produced during the 2004 telephone administration of the self-reported health question and several other questions about physical and mental health. From a random subset of the total sample, we drew a sample of 100 interviewers and stratified respondents within interviewer according to the respondent's IQ (high, medium, and low,measured while the respondent was in high school). We then sampled up to 5 respondents for each interviewer. Our analysis includes 355 digitally recorded interviews.

We examine the interviewer-respondent interaction during the self-reported health question-answer sequence, beginning with the interviewer's administration of the question and ending with the respondent's final answer. We coded the interaction using an elaborate scheme that segmented the interaction into a series of events and assigned codes to specific behaviors, a subset of which are described below. We used Sequence Viewer (Wil Dijkstra, http://www.sequenceviewer.nl/) to code events.

2.2 Measures

We examine six problematic interactional behaviors and patterns that may indicate difficulties in the response process, due to either the complexity of the respondent's

actual health or to her cognitive ability. It should be noted that while each variable represents a distinct interactional construct of interest, there is overlap in the operationalization of these behaviors, such that more than one may occur within a given interaction.

Tokens such as "um," "uh" or "well" are sometimes labeled "disfluencies," and have been interpreted as indicating disruption in the speaker's cognitive processing (e.g., Bortfeld et al., 2001). Some tokens have also been described as "continuers," because they appear to respond to a prior utterance in a way that signals to the speaker to continue (Schegloff, 1981). We include an indicator for whether the respondent uttered any tokens (0=none, 1=1 or more).

Respondents express uncertainty in many ways. We include an indicator that is coded "1" (versus "0" otherwise) if the respondent exhibited at least one of the following behaviors: a report or consideration, where the respondent provides information that is either stated as an answer or offered as an explanation for an answer (e.g., "my mental health is ok, my physical health is not"); a hypothetical response option, where the respondent volunteers an answer that falls on the response dimension but was not offered to the respondent (e.g., "pretty good"); an answer that gives a range (e.g., "good to very good"); and mitigating phrases that reduce the exactness, precision, or certainty of an answer and are offered as answers or parts of answers (e.g., "I guess excellent" or "just," "maybe," "about," "put," or "I'd say").

Response latency, the time in seconds from the end of the interviewer's reading of the question until the respondent's first complete codable answer, has been used as an indicator of cognitive processing time, and in some cases longer times are associated with lower (or higher) data quality (Ehlen, Schober, and Conrad, 2007; Schaeffer and Dykema, 2004; Schaeffer et al. 2008; Yan and Tourangeau, 2008). In our analysis, response latency ends when the respondent provides one of the response options (excellent, very good, good, fair or poor). The mean response latency was 1.73 seconds (SD 2.42). We used the natural log of response latency in order to correct for the positive skew in the distribution of response latencies.

Interviewers often intervene in order to obtain a codable answer from a respondent before the respondent has answered, and such pre-emptive behaviors by interviewers may indicate that a respondent is having difficulty answering (see Schaeffer and Maynard, 2002). Only 7% of our cases include interviewers talking other than to administer or close the question, so we created an index of pre-emptive behaviors and then dichotomized the behaviors into a dummy variable (0=no pre-emptive behavior from the interviewer, 1=any pre-emptive behavior). These pre-emptive behaviors can be characterized in terms of the respondents' behaviors that precede them, such as a response to the respondent expressing uncertainty in one of the ways indicated above. For example, if the respondent provides a range (e.g., "good to very good") as her initial answer, the interviewer might probe with the response options in order to obtain a single answer.

Two variables in the analysis capture interactional patterns. Sequences are coded as paradigmatic when the interviewer's administration of the question is directly followed by the respondent's answer (with or without a preceding pause). The sequence may end there, or the interviewer may say "okay" or repeat the respondent's answer before the sequence ends (Schaeffer and Maynard 1996). Any sequence that does not follow this

pattern is non-paradigmatic (0=paradigmatic, 1=non-paradigmatic). The number of exchanges between the interviewer and respondent that occur in a question-answer sequence has also been found to be associated with lower data quality (Schaeffer and Dykema, 2004; see also van der Zouwen and Smit, 2004). We include a dummy variable for whether the interaction has more than one exchange or not (0=no, 1=yes).

The main independent variables are the respondent's cognitive ability, the respondent's answer to the self-reported health question, and a health inconsistency index. Cognitive ability is indicated by the respondent's IQ score (normalized) which was assessed during respondents' junior year of high school (if available; if not, during respondents' freshman year) using the Henmon-Nelson test of mental ability (mean 101.99, SD 17.94) (Retherford and Sewell 1988). Of the 355 respondents in this analysis, 102 reported "excellent" health, 125 reported "very good," 95 reported "good," 24 reported "fair," and 9 reported "poor." "Fair" and "poor" health ratings are combined into one category because of the small number of respondents in each category. Self-reported health is coded so that a higher value indicates worse health (e.g., "excellent"=1 to "fair"/"poor"=4).

Our health inconsistency index summarizes respondents' standing on indicators of functioning and presence of various health conditions. Functioning (ambulation, dexterity, and pain) is assessed from a subscale of the Health Utilities Index (HUI3; http://www.healthutilities.com). Scores are dichotomized in terms of mean functioning or less (22% of the sample) or greater than mean functioning (78% of the sample). Health conditions include arthritis, diabetes, high blood pressure, heart conditions (current or in past), cancer, stroke, and high blood sugar. Respondents reported having zero to five conditions, with a mean of 1.37 conditions (SD 1.09). Because respondents are older, approximately 67 at the time of the interview, and likely to have at least one condition, the measure of health conditions is dichotomized into zero or one condition versus two or more conditions. Using these two pieces of information, we code those with a low number of health conditions (zero or one) and high functioning (above the mean) as having consistent health information; that is, their health status is probably clear, and it is probably relatively easy for them to select one of the response options indicating positive overall health -- "good" or "excellent." All other respondents -- e.g., those with a high number of health conditions and high functioning, a low number of health conditions low functioning, and a high number of health conditions and low functioning -- have what we consider to be inconsistencies between health conditions and functioning, in that it may be less clear to them which self-reported health response option is best.[1] In our data, half of respondents have inconsistent functioning and disease information. The proportion of respondents classified as inconsistent varies as expected by answers to the self-reported health question: 29% of respondents answering "excellent," 43% of those answering

[1]It is also plausible that those with low functioning and a high number of health conditions have "consistent" health information, in that it is consistently not good. We also analyzed a trichotomous version of the health inconsistency index in the analyses reported below, with low functioning and a high number of health conditions as its own category. Results were similar for this category and the inconsistent category, and were thus combined in the analyses presented below. We think "consistently bad" combinations of functioning and conditions functions like inconsistency between functioning and conditions for a few reasons: it is easier to identify when health is good than when it is not; in addition, because "excellent" is the first response option provided, respondents anchor to that first response option and tailor their response accordingly.

"very good," 70% of those answering "good," and 85% of those answering "fair" or "poor."

2.3 Analytic Approach

In the first part of the *Results* section we regress each of the interactional behaviors on self-reported health to investigate the first hypothesis, that the behaviors vary across the self-reported health response options. Because most of the behaviors are dichotomous variables, we use logistic regression and report the odds ratios. The exception is response time, where we perform OLS regression and report the coefficient. We also use likelihood-ratio tests to determine whether self-reported health can be treated as an interval measure with evenly spaced categories or whether this leads to a loss of information about the association between the independent and dependent variables. The likelihood-ratio tests compare models where self-reported health is an ordinal variable with models where self-reported health is included as an ordinal variable as well as dummy variables for each response option (omitting two) (Long and Freese, 2001). In the second part of the *Results* section, we regress each of the behaviors on the health inconsistency index to investigate the second hypothesis, that the interactional behaviors are associated with inconsistencies between health conditions and functioning. We then perform the same regressions while controlling for the respondent's self-reported health, and again controlling for the respondent's self-reported health and cognitive ability, in order to determine whether the behaviors are associated with information about the complexity of respondent's health status beyond the respondent's self-reported health and cognitive ability. In the third part of the *Results* section, we examine the correlations between inconsistent health status and each interactional behavior to investigate the third hypothesis, that the behaviors are associated with variation in actual health status among respondents with the same self-reported health.

3. Results

3.1 Interactional Behaviors by Self-Reported Health

First we investigate whether the interactional behaviors that occur during the self-reported health question-answer sequence vary by the answer given. Because the answer to the self-reported health question and the behaviors are co-produced, we expect that the behaviors that accompany answers to the self-reported health question will vary by the answer given. Specifically, we predict that there will be more problematic interactional behaviors when respondents report worse health.

Figure 2 shows that in general, the proportion of problematic interactional behaviors occurring is higher for respondents with worse self-reported health. The exceptions are having any uncertainty indicators and a non-paradigmatic sequence, for which the proportions are lower for "fair/poor" compared to "good." Figure 3 shows that the means and standard deviations of response latencies are larger for respondents with worse self-reported health.

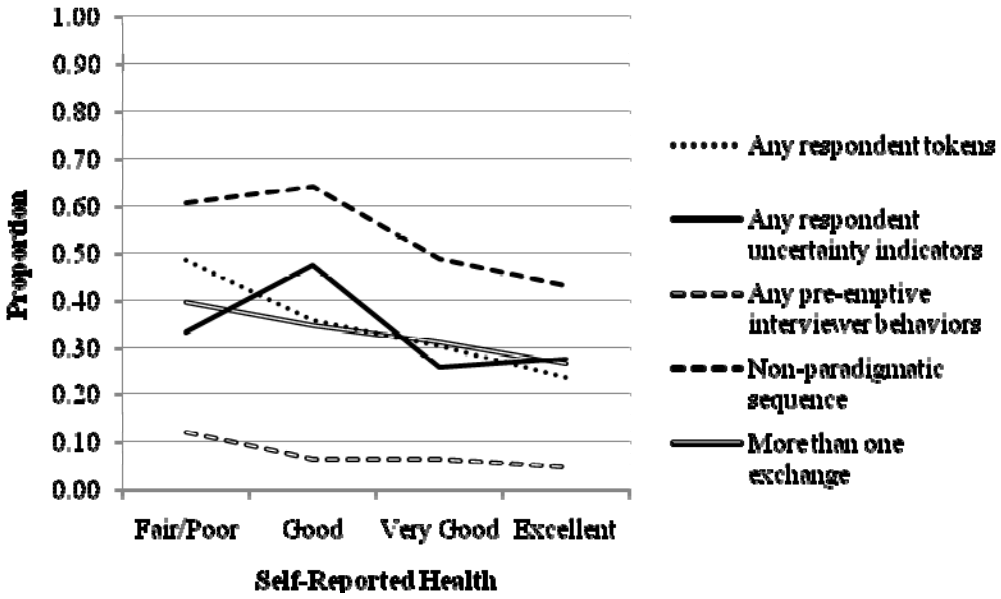

Figure 2: Proportion of question-answer sequences showing each problematic interactional behavior by answer to the self-reported health question

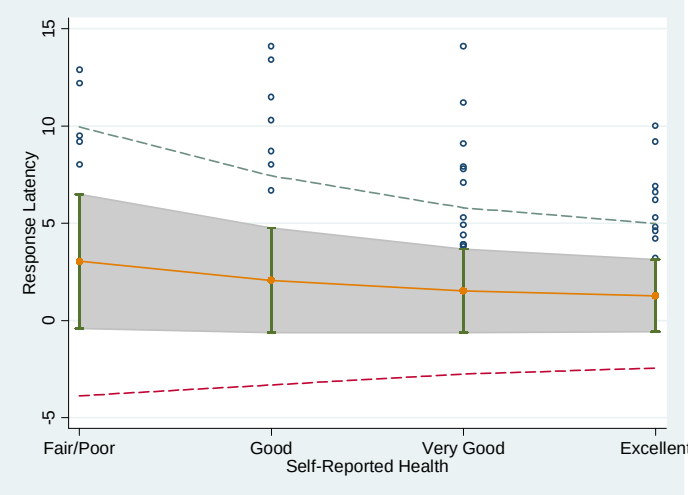

Figure 3: Mean-standard deviation plot of response time by self-reported health answer

Bivariate regression analyses demonstrate that the odds of each problematic interactional behavior significantly increase for respondents whose self-reported health is worse. The exception is any pre-emptive interviewer behaviors, which do not vary by respondents' self-reported health (see Table 1). Likelihood-ratio tests (not shown) demonstrate that the self-reported health response options can be treated as evenly spaced for all regressions except when the dependent variable is "any uncertainty indicators." Logistic regressions of any uncertainty indicators on dummy variables for the self-reported health response options show that the odds of having any uncertainty indicators are significantly lower when self-reported health is "excellent" or "very good" compared to "good," the odds of having any uncertainty indicators are lower (but not significantly so) when self-reported health is "fair" or "poor" compared to "good" (see Table 1). In other words, self-reported

health has a curvilinear relationship with any uncertainty indicators, but for all of the other behaviors the relationship is linear, such that levels of the problematic behaviors are lower when better levels of health are reported and higher when worse levels of health are reported.

Table 1: Regressions of Behaviors on Self-Reported Health[a]

	Mean or Proportion	Coefficient or Odds Ratio	95% CI
Respondent behaviors			
Response latency (natural log of tenths of seconds)	-0.13 (1.20)	0.34***	0.22-0.47
Any tokens [vs. none]	0.32	1.40**	1.11-1.78
Any uncertainty indicators [vs. none] ["good" omitted]	0.33		
"excellent"		0.42**	0.23-0.76
"very good"		0.40***	0.23-0.70
"fair/poor"		0.56	0.24-1.27
Interviewer behaviors			
Any pre-emptive behaviors [vs. none]	0.07	1.30	0.84-2.01
Interactional behaviors			
Non-paradigmatic sequence [vs. paradigmatic]	0.52	1.40**	1.11-1.75
More than one exchange [vs. one exchange]	0.32	1.34*	1.04-1.73

***p<.001, **p<.01, *p<.05

[a]Mean and coefficient reported for response latency, proportion and odds ratios reported for all other interactional behaviors.

2.2 Predicting Interactional Behaviors During the Self-Reported Health Question-Answer Sequence from Actual Health

In the previous section we showed that there are some differences in the likelihood of the problematic interactional behaviors occurring for different levels of self-reported health. Next, we examine whether inconsistencies in respondents' health information predict behaviors during the self-reported health question-answer sequence, and whether the association remains when controlling for the answer to the self-reported health ultimately produced by the respondent and the respondent's cognitive ability.

When we predict behaviors produced during self-reported health question-answer sequence from the health inconsistency index, we find that each behavior is more likely to occur when the respondent has inconsistent health, and longer response latencies are positively associated with health inconsistencies (see Table 2). These relationships are slightly attenuated, but still statistically significant, when controlling for the respondent's self-reported health answer. Controlling for cognitive ability does not lead to any changes in interpretation. Thus, interactional behaviors are associated with information about the respondent's health status -- in this case, the complexity of the respondent's health status

as indicated by inconsistencies in health conditions and functioning -- beyond the answer to the self-reported health question.

Table 2: Regression of Behaviors on Health Inconsistency Index[a]

	Bivariate		Controlling for SRH		Controlling for SRH, IQ	
	Coefficient or Odds Ratio	95% CI	Coefficient or Odds Ratio	95% CI	Coefficient or Odds Ratio	95% CI
Respondent behaviors						
Response latency (natural log of tenths of seconds)	0.47***	0.23 -0.72	0.27*	0.01 -0.53	0.27*	0.01 -0.53
Any tokens [vs. none]	1.94**	1.23 -3.07	1.65*	1.01 -2.70	1.66*	1.02 -2.73
Any uncertainty indicators [vs. none]	1.86**	1.19 -2.93	1.65*	1.02 -2.68	1.66*	1.02 -2.70
Interviewer behaviors						
Any pre-emptive behaviors [vs. none]	3.89**	1.41 -10.74	3.79*	1.31 -11.00	3.78*	1.31 -10.97
Interactional behaviors						
Non-paradigmatic sequence [vs. paradigmatic]	2.34***	1.53 -3.59	2.05**	1.30 -3.24	2.09**	1.32 -3.31
More than one exchange [vs. one exchange]	2.01**	1.22 -3.33	1.77*	1.03 -3.24	1.77*	1.03 -3.04

***p<.001, **p<.01, *p<.05

[a]Coefficient reported for response latency, odds ratios reported for all other interactional behaviors.

3.3 Association between Interactional Behaviors and Inconsistent Health Status within Self-Reported Health Answer

Another way to determine whether interactional behaviors have predictive power beyond that of self-reported health is to determine whether these behaviors are associated with variation in actual health, as indicated by the health inconsistency index, among respondents who have the same answer to the self-reported health question. Table 3 shows that among respondents who reported “excellent” health, the behaviors were associated with health inconsistencies in the expected direction. For respondents who reported “very good” health, this was also the case with tokens, nonparadigmatic sequences, and exchanges. The significant correlations are evidence that even though all of these respondents answered “excellent,” for example, the interactional behaviors may provide additional information about the respondent’s health status (in this case the complexity or inconsistency of health status) among these respondents. It is potentially

important that these relationships appear most consistently in the "excellent" category. There is some limited experimental evidence that when "excellent" is the first response option offered, answers may be biased toward the positive end of the scale, and the relationship between self-reported health and number of health visits reduced (Means, Nigam, Zarrow, Loftus, and Donaldson 1989, pp. 18-19). If that were the case, information about the interaction could be important in correcting for this bias and improving construct validity.

Table 3: Correlations of Behaviors with Health Inconsistencies Index by Self-Reported Health

	Excellent (N=102)	Very Good (N=125)	Good (N=95)	Fair/Poor (N=33)
Respondent behaviors				
Response latency (natural log of tenths of seconds)	0.25*	0.11	-0.01	-0.09
Any tokens [vs. none]	0.20*	0.20*	0.01	-0.27
Any uncertainty indicators [vs. none]	0.23*	0.06	0.08	-0.06
Interviewer behaviors				
Any pre-emptive behaviors [vs. none]	0.25*	0.10	0.08	0.16
Interactional behaviors				
Non-paradigmatic sequence [vs. paradigmatic]	0.26**	0.25**	0.02	-0.17
More than one exchange [vs. one exchange]	0.21*	0.17†	-0.05	0.09

***p<.001, **p<.01, *p<.05, †p<.1

4. Discussion

Answers to the self-reported health question and the interactional behaviors we examined are co-produced. We expected and found more problematic interactional behaviors when respondents reported worse self-reported health. Furthermore, these behaviors appear to be related to a measure of health inconsistency, in that the interactional behaviors were more likely to occur when respondents had health inconsistencies, even after controlling for the respondent's answer to the self-reported health question and cognitive ability. This finding indicates that the behaviors are associated with information about the respondent's health status -- in this case, the complexity of respondents' health status as indicated by inconsistencies between health conditions and functioning -- beyond the respondent's answer to the self-reported health question. We also found that among respondents who reported "excellent" health, and to a lesser extent those who reported their health was "very good," the behaviors were associated with inconsistencies between

health conditions and functioning, indicating that interactional behaviors may be able to provide additional information about respondents' health status among those with the same self-reported health.

Overall, we found that respondents whose health conditions and functioning were inconsistent were more likely to exhibit certain problematic interactional behaviors, providing evidence that these behaviors indicate difficulties in the response process (e.g., difficulties in combining information about disease and functioning or difficulties in mapping a resulting judgment onto one of the offered response options). It is plausible that the results of this analysis extend beyond the domain of health, giving us some idea of the behaviors that respondents exhibit when grappling with complex experiences, as well as the interactional patterns that may occur thereafter, such as interviewer follow-ups and nonparadigmatic sequences.

Furthermore, we find promising evidence that interactional behaviors might reveal important information about the respondent's health status. When limited information about health is collected in a survey, survey researchers using self-reported health as a measure of health might benefit from coding certain behaviors in the interaction as an indirect measure of health status or measurement error. Researchers might improve the predictive power of self-reported health by augmenting the answer to that question with measures of the interactional behaviors exhibited during the question-answer sequence. Future analyses should explore whether using these behaviors as additional control variables leads to improvements in models that use self-reported health as an independent or dependent variable.

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