Respondent use of straight-lining as a response strategy in education survey research:
Prevalence and implications

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Paper presented at the annual meeting of the American Educational Research Association
April 17, 2012
Vancouver, British Columbia, Canada
Introduction

Student surveys are a widespread tool in the assessment of educational quality. However, the quality and usefulness of the survey data depends on the accuracy of the responses students give on each survey question. Thus, one concern of educational survey researchers is the extent to which students complete each survey item with sincerity and thoughtfulness, as opposed to satisficing, the process of “conserving time and energy and yet producing an answer that seems good enough for the purposes at hand” (Schaeffer and Presser, 2003, p. 68). One indicator of satisficing may be the frequency of straight-lining, of which little is known in educational research. Straight-lining occurs when the respondent selects the same response option for a set of items, visually indicated by the appearance of a “straight-line” of responses as the viewer reads down a set of items.

This study investigates the frequency of straight-lining in a higher education survey, and is based on prior research on satisficing behaviors in survey research (e.g., Kaminska, McCutcheon, & Billiet, 2010) and the prior research on estimation of behavior frequency (e.g., Schaeffer & Presser, 2003).

Survey Data Quality

While collecting survey data regarding estimates of behavior is common practice, it is not without controversy (e.g., Porter, Rumann, & Pontius, 2011). Surveys of student behavior commonly collect data regarding estimations of behavior frequency in two ways, to ask the respondent to estimate behavior using vague quantifiers such as “sometimes” or “often,” or enumerated quantifiers where the respondent enters a numeric value that estimates the frequency of the target behavior. Researchers note serious limitations when interpreting survey data using both types of response sets (Schaeffer & Presser, 2003; Wanke, 2002). For instance, interpreting
each vague response category can be difficult (e.g., What does “often” mean for this question?) and enumerated responses are prone to many sources of error in the process of recall (Bradburn & Miles, 1979; Brown, 1995).

**Satisficing**

One of these concerns is satisficing. Krosnick, Narayan, and Smith (1996) identify three regulators of satisficing: task difficulty, performance ability, and motivation. *Task difficulty* has to do with how familiar the language is to the respondent. *Performance ability* generally refers to the cognitive task required to recall the information needed to provide an accurate or best-estimate answer. *Motivation* is how willing the respondent is to provide an accurate or best-estimate answer. Given the cognitively taxing nature of providing an enumerated response (e.g., “How many times did you meet with your academic advisor this past year?”), some individuals use satisficing as a response strategy (Blair & Burton, 1987). One result of satisficing for these types of questions is the clumping of numerical estimates around common multiples such as 5 or 10 (Krosnick, Narayan, & Smith, 1996; Huttenlocher, Hedges, & Bradburn, 1990). One manifestation of satisficing on surveys is a phenomenon known as straight-lining (SL), or selecting the same response option for a set of items using the same scale. SL typically involves the selection of all middle or extreme response options (Kaminska, Goeminne, & Swyngedouw, 2006).

**Satisficing and Reluctance**

It is important to note that the mere fact of straight-lining on a given set of survey items does not in itself signify either a data quality problem or an instance of satisficing. That is, a respondent may have thoughtfully considered and responded to each item, but the end result is a set of identical responses. Behaviorally, we cannot distinguish this case from that of a satisficing
respondent who strategically elects identical answers so as to complete the survey more quickly. One approach to this difficulty is to examined straight-lining among those identified through other measures as reluctant respondents. Given the potential for error in survey data as a result of satisficing and the connection of satisficing and motivation, it is interesting to note that there has been little research investigating the connection between respondent reluctance and satisficing in survey response (Groves, 1989). One of the few studies on this topic did find a significant association between reluctance to respond and satisficing. Specifically, Kaminska, McCutcheon, and Billiet (2010) reported survey reluctance, as indicated by the number of contact attempts it took before the survey recipient responded, was significantly associated with straight-lining. However, these researchers also reported an interaction with cognitive ability indicating that reluctance to respond may indicate both low motivation and lower cognitive ability, each of which increased the chance of satisficing.

As prior research has shown, both behaviors (straight-lining and survey reluctance) undermine data quality. This study will expand on this line of research by investigating the occurrence of straight-lining in higher education surveys and the association of this behavior with survey reluctance. Specifically, the research questions include:

1. How frequently were sets of items straight-lined in a survey of educational engagement behaviors?
2. What were the characteristics of those who straight-lined and those who did not by each contact wave of the survey?
3. Was straight-lining associated with contact (wave) order?
Method

Data for this study come from the 2010 web administration of the National Survey of Student Engagement (NSSE). A total of 371,616 NSSE respondents enrolled at 573 colleges and universities across the United States are included in the study. Many of the items in NSSE use vague quantifiers. To investigate the prevalence of straight-lining on web surveys, items that appear on the same survey screen and also have the same response categories were included (see Figure 1). Straight-lining was indicated by the respondent checking the same response for the entire set of items on that screen. In total, 11 sets were included in the study, numbered 1 through 11, corresponding with the order of their appearance on the survey (Table 1).

Figure 1. Example of a survey screen analyzed for straight-lining (set 3)
Table 1. Description of NSSE web survey item sets

<table>
<thead>
<tr>
<th>Set No.</th>
<th>No. items</th>
<th>Description of question</th>
<th>Response options</th>
<th>Nature of response options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>Engagement frequency</td>
<td>“Very often” to “Never”</td>
<td>Vague</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>Engagement frequency</td>
<td>“Very often” to “Never”</td>
<td>Vague</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>Engagement frequency</td>
<td>“Very often” to “Never”</td>
<td>Vague</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Perception of coursework emphasis</td>
<td>“Very much” to “Very little”</td>
<td>Vague</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Amount of writing and reading</td>
<td>“None” to “More than 20” in categories</td>
<td>Enumerated</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Engagement frequency</td>
<td>“Very often” to “Never”</td>
<td>Vague</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>Time spent on various activities</td>
<td>Hours per week in ordinal ranges from “0” to “More than 30”</td>
<td>Enumerated</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>Time spent on various activities</td>
<td>Hours per week in ordinal ranges from “0” to “More than 30”</td>
<td>Enumerated</td>
</tr>
<tr>
<td>9</td>
<td>7</td>
<td>Perceptions of campus environment</td>
<td>“Very much” to “Very little”</td>
<td>Vague</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>Self-reported gains</td>
<td>“Very much” to “Very little”</td>
<td>Vague</td>
</tr>
<tr>
<td>11</td>
<td>8</td>
<td>Self-reported gains</td>
<td>“Very much” to “Very little”</td>
<td>Vague</td>
</tr>
</tbody>
</table>

Students were invited to complete the NSSE survey by customized email message. The first contact was an invitation to complete the survey, which was followed by up to four reminders to nonrespondents to maximize response rate. No more than five contacts were permitted by the approved institutional review board protocol. Thus, students received between one and five email invitations to complete the survey, and respondents were identified by which
These students are coded with 1, 2, 3, 4, or 5 indicating the contact (wave) order in which they submitted their surveys.\footnote{Students who began the survey after one wave but did not complete until after a subsequent reminder are counted in the latter wave.}

Student ability was measured by their SAT (and ACT-equivalent) scores which were provided by the participating colleges and universities in the population files used by NSSE for sampling. ACT scores were converted to the SAT scale using an equivalency table. Respondent ability was categorized into four categories as follows: low ability = 1000 and lower, low-medium ability = 1001 to 1100, medium-high ability = 1101 to 1200, and high ability = 1201 and higher (summed verbal and quantitative scores on the older SAT scale, in which the summed scores range from 400-1600).

MANOVA was used to investigate group differences in straight-lining and wave (contact) order.

**Results**

1. How frequently were sets of items straight-lined in a survey of educational engagement behaviors?

Results indicate that, some sets of items displayed very low rates of straight-lining (under 2% of respondents) while as many as one in five respondents straight-lined other sets (Figure 2). The lowest SL rates were on sets 1, 2, 5, and 7, while sets 3, 6, and 8 showed slightly higher levels of SL. The greatest amounts of SL occurred on sets 4 and 10 with nearly 20% of all respondents choosing the same response option for all items. In addition, for those that did SL, the vast majority chose positive response options (e.g. “very often” or “often”), which were presented first, rather than the more negative options (“sometimes” or “never”). Sets with lower
rates of straight-lining (6, 7, & 8) were different from the other sets in some notable ways. Set 6 was a set of items requiring the respondent to enumerate (count) frequency of behavior, whereas sets 7 and 8 were items regarding respondent attitudes. As indicated in Figure 3, more than half of the students straight-lined no item sets.

Figure 2. Frequency of straight-lining by item set
2. What were the characteristics of those who straight-lined and those who did not by each contact wave of the survey?

Overall, there were significant gender and academic ability differences regarding straight-lining (F=101.54, p<.001; F=175.79, p<.001, respectively). For nine of the eleven item sets, males straight-lined significantly more than females. However, for item sets 4 and 10, females had a significantly higher occurrence of straight-lining. Regarding academic ability (as measured by SAT and ACT scores), there was a consistent significant difference between low, low-medium, medium-high, and high test scores. Overall, the higher the test score, the lower the occurrence of straight-lining. There was also a significant interaction between gender and academic ability regarding straight-lining (F=3.904, p<.001). In general, the significant
interaction indicates that the gap between males and females was higher for the lower ability levels than for the higher ability levels. This appears to be the case regardless of whether men or women were more prone to SL on a given set (see Figure 5).

Figure 4. Straight-lining on Item Sets 1, 2, and 3
Figure 5. Straight-lining on Item Sets 4 and 10

Figure 6. Straight-lining on Item Sets 5, 6, and 7
The characteristics of respondents also differed by survey wave (Figures 8 and 9). Females were slightly more likely to respond to earlier waves, consistent with the fact that females are more likely to respond to surveys in general. About 53% of female respondents responded to waves 1 or 2, whereas about 49% of male respondents did so. Higher ability students also were more likely to respond to earlier waves. For example, while only about a quarter (25.6%) of low-ability students responded to the first email invitation to complete the survey, more than a third (34.2%) of high-ability students did so. On the other hand, more than a third of low-ability respondents waited until the fourth or fifth wave to complete, while only a quarter of high-ability students did so.
3. Is straight-lining associated with contact (wave) order?
We also consider contact wave of survey submission as a proxy for reluctance to respond, where later respondents are seen as more reluctant. We found significant differences between the wave 1 responders and wave 5 responders. For early item sets, the differences were significant but small. For instance, .8% of wave 1 respondents straight-lined item set 1 compared to 2.4% of wave 5 respondents. Though this is an increase of 200%, it is hardly worth much attention given the low frequency. However, block 4 items were straight-lined 15.2% of the time by wave 1 respondents and 22.1% by wave 5 respondents. This 45% increase in straight-lining is of more concern given the raw frequency of the occurrence.

To the extent that later responders are indeed reluctant completers, then, these results suggest that straight-lining behavior is more common among reluctant respondents.

Figure 10. Straight-lining on item sets 1, 2, and 3 by wave
Figure 11. Straight-lining on item sets 4 and 10 by wave

- Wave 1: 15.2%, 17.9%
- Wave 2: 17.9%, 19.5%
- Wave 3: 21.8%, 22.1%

Figure 12. Straight-lining on item sets 5–7 by wave

- Wave 1: 1.1%, 1.4%, 1.5%
- Wave 2: 2.0%, 2.2%
- Wave 3: 2.8%
- Wave 4: 3.4%
- Wave 5: 5.2%, 5.6%
Conclusions

In all, the results indicate that straight-lining is rarely employed as a response strategy by respondents for early items sets, though the prevalence of straight-lining does increase over the length of the survey, and that this increase in straight-lining is more likely to be used by males with lower academic preparation. In addition, the prevalence of SL increases with each invitation wave that is sent to would-be respondents. Though the use of straight-lining is not necessarily problematic (i.e., it is likely that straight-lined answers are valid responses for some students), these results indicate that SL behavior may cause concern regarding data quality. That increased SL behavior is associated with wave (contact) order, lower academic ability, and males, leads one to wonder if aggressive campaigns and completion incentives targeted at increasing response rate may actually reduce data quality due to increased SL. These findings are consistent with the results of Kaminska et al (2010), who found that academic ability is associated with higher reluctance to complete and lower-ability respondents are more likely to straight-line. Given these
results and as discussed by Kaminska et al, one approach for improving data quality is by “simplifying the respondent’s task . . . to improve both reluctance and response quality” (p. 975).

These results suggest many opportunities for further research. Suggestions for future research include:

- Are some item sets more prone to straight-lining due to comprehensibility, respondent interest, or perceived cognitive burden of response (e.g., screen complexity)?
- Are there differences in anchoring by gender or ability?
- Are some respondents more likely to SL compared to other students?
- Is straight-lining associated with decreased survey duration time?
- Multivariate analyses?

References


