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**Evaluating Discrepancies
in Print Reading Disability Statistics
through Cognitive Interviews**

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MEMORANDUM FOR Distribution List

From: Elizabeth Martin
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Subject: Cognitive Investigation of Print Reading Disability

According to the 1991-92 Survey of Income and Program Participation (SIPP), 9.7 million people 15 years old and older have difficulty reading newspaper print, and 1.6 million of those cannot read newspaper print at all. According to combined 1977 and 1984 National Health Interview Survey (NHIS) data, 4.2 million people 15 years old and older cannot read newspaper print. The attached report, Evaluating Discrepancies in Print Reading Disability Statistics through Cognitive Interviews, (prepared by Paul Beatty, National Center for Health Statistics, and Wendy Davis, Bureau of the Census) investigates reporting and questionnaire differences as possible reasons for the different estimates produced by the two surveys.

Cognitive interviews were conducted with 30 respondents, selected to represent persons who were borderline in how difficult it was for them to see newspaper print sufficiently to read it. The results of this small study cannot support general conclusions, but the interviews do suggest that differences in question wordings and context contribute to the discrepant estimates. (There are other contributing factors as well.) The authors conclude that:

- ▶ the NHIS and SIPP questions do appear to tap the intended construct of “being able to see to read ordinary newspaper print.”
- ▶ cognitive interviews confirm that the three questions differ in the severity of the disability required to give a “disabled” response. From the least severe (“difficulty seeing words and letters”) in SIPP, we infer 9.7 million disabled; from the intermediate question (can’t “see well enough to read”) in NHIS, we infer 4.2 million; and from the most severe (“cannot see words and letters at all”) in SIPP, we infer 1.6 million. NHIS and SIPP obtain different estimates because the questions are different.
- ▶ the NHIS question, but not the SIPP questions, is preceded by other questions on vision which, the evidence suggests, may influence respondents to give more sanguine reports about their ability to see newspaper print.
- ▶ the NHIS question does not as clearly establish as the SIPP question does that the question asks about respondents’ ability to see with glasses (if they ordinarily wear them).

It would be desirable to replicate this study in a larger scale field experiment, and to compare and evaluate the quality of the data produced by the different questions. If compatible with NHIS and

SIPP objectives, it would be desirable to use more comparable measures in both surveys in order to produce more consistent estimates. The current use of noncomparable measures appears to be a source of some confusion about the prevalence of print reading disability.

Reports using these measures should note that different prevalence estimates are obtained in the different surveys, due to different questions being asked in different contexts.

In any further research on print reading disability measures, it would be desirable to address an additional issue which this study could not consider. The adequacy of these measures for adults who are not literate should be assessed. In addition, their applicability for children who are too young to read should be evaluated; currently the NHIS measure is asked for persons of all ages.

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Evaluating Discrepancies in Print Reading Disability Statistics through Cognitive Interviews

Paul Beatty, National Center for Health Statistics
Wendy Davis, U.S. Census Bureau

Background

In recent years, data from two national surveys have been used to generate estimates of the prevalence of visual impairment from a print reading disability measure: the National Health Interview Survey (NHIS) of the National Center for Health Statistics, and the Survey of Income and Program Participation (SIPP) of the Census Bureau. These estimates differ substantially. According to the 1991-92 SIPP, 9.7 million people 15 years old and older have difficulty reading newspaper print, and 1.6 million of those cannot read newspaper print at all (McNeil, 1993). According to an adjusted estimate based on a combination of the 1977 NHIS and 1984 NHIS-Supplement on Aging, 4.3 million people (approximately 4.2 million people 15 years old and older) cannot read newspaper print¹. Concerns about this apparent discrepancy led the National Library Service for the Blind and Physically Handicapped, along with a consortium of private agencies and consumer groups of blind people, to support research to investigate the discrepancy and improve prevalence statistics more generally. As a part of this effort, researchers from the U.S. Census Bureau and the National Center for Health Statistics, with the assistance of the American Foundation for the Blind, developed a research plan using cognitive interviewing methods to explore why responses to the two print disability measures differ so widely.

The first step in the study was to conduct an expert review of the two versions of the print reading disability measure as they were within the 1984 NHIS and 1992 SIPP survey instruments. This review led to the design and implementation of a follow-up cognitive interviewing study. Both of these phases are described below.

¹ See Nelson and Dimitrova (1993) for further explanation of the NHIS estimates, which were created by combining data from different years and different target populations, and adjusted to match population parameters from the 1990 Census. One may question whether such complex estimation procedures may be largely responsible for the statistical discrepancy. While a confidence interval for the NHIS is unavailable, the SIPP estimate has a 90% confidence interval of (9.3 million, 10.0 million). Although the NHIS confidence interval may be considerably wider, it seems virtually certain that the difference between these statistics cannot be accounted for solely by estimation procedures. Hence, our investigation focuses on conceptual differences between the two survey measures.

Expert review and generation of hypotheses

Before examining the specific wordings of questions, we considered features of the overall designs of the NHIS and SIPP that could be potential causes for the observed disparity.

Differences in overall design of the surveys

First, there was an 8-year spread between the NHIS and SIPP data collection. With the U.S. population getting older, it is likely that the number of people who had difficulty reading newspaper print did increase over time. However, the NHIS estimates were already weighted to 1990 population parameters, which should have accounted for these changes.

Second, the respondent rules for the two surveys are somewhat different. The 1984 NHIS Supplement on Aging was written specifically for self-report. However, SIPP respondents and 1977 NHIS respondents sometimes answered print disability questions by proxy for other members of the household². People may draw on different cognitive processes to respond for themselves as opposed to others (c.f. Schwarz and Wellens, 1997). When looking at 1992 SIPP data, about 5.8% of self-respondents reported difficulty reading newspaper print; whereas only 3.8% of people responding for some other member of their household reported difficulty reading newspaper print. Thus, self-proxy rules could have an impact on the estimates.

Last, the overall content of the two surveys is quite different. The SIPP largely consists of questions on income and participation in government funded financial assistance programs. Additional questions appear on periodic modules (such as the health and disability topical module), but the core of the interview deals with income and related issues. In contrast, the NHIS focuses on health and health related behavior. Furthermore, the NHIS print disability question follows a series of vision-related questions about glaucoma, cataracts, use of magnification devices to do close work, and so on. It is therefore important to consider the possible influence of the previous questions on responses to print disability questions.

Differences between SIPP and NHIS questions

There are four obvious ways in which the NHIS and SIPP question wordings themselves differ. The first and most obvious is that there are a different number of print disability questions used on the SIPP and NHIS. The NHIS asks only one question in which respondents indicate that either they can see well enough to read newspaper print, or they cannot (see Appendix A). The SIPP, on the other hand, asks two questions: whether respondents have difficulty seeing print and, if yes, whether they are able to see print at all (see Appendix A). The SIPP therefore has a total of three response outcomes: respondents can indicate that they do not have any difficulty

² The prevalence of proxy responses in the 1977 NHIS are unknown. The general procedure at that time was most likely to ask one “household respondent” to provide print disability responses for other family members.

seeing the words and letters in ordinary newspaper print, that they have some difficulty, or that they cannot see the print at all.

From a cognitive viewpoint, the NHIS requires respondents to make one judgment, which places them in one of two outcomes; the SIPP requires respondents to make two judgments, placing them in one of three outcomes. In other words, the two surveys ask respondents to make different response decisions. Obviously the SIPP allows greater specificity in answering. Respondents may be reluctant to say that they are incapable of reading print (given the NHIS alternatives), whereas they might agree with the softer SIPP language that they “had difficulty” doing so.

A second difference in the wording of the two measures was in the placement of the instruction informing respondents to answer in reference to wearing glasses or contact lenses, if that is how they see best. In SIPP, this instruction is explicit and contained within the first print disability question. The NHIS, in contrast, includes this instruction only as part of a lead-in to a series of questions. The print disability question is the third in this series; therefore the lead-in could be forgotten and the frame of reference not included when respondents form their responses.

A third difference between the two measures involves specificity of the print type. The SIPP asks respondents to think of “ordinary newspaper print” whereas the NHIS simply says newspaper print. Respondents sometimes indicated that their answers depended on whether they were talking about the headlines, the articles or sections like the classifieds or obituaries.

The last difference between the two measures involves the direction in which the question is asked. A “yes” response to the NHIS means that the respondent is able to read newspaper print. In contrast, a “yes” response to the first SIPP item indicates that the respondent has difficulty reading newspaper print. A bias toward “yes” responses in general could partially explain the discrepancy in statistics from the two surveys: this bias would decrease estimates of print disability from the NHIS, and increase estimates of print disability from the SIPP, which is consistent with our discrepancy.

There is some evidence of yea-saying or “acquiescence” in survey response— i.e., respondents may lean toward “yes” responses out of a general tendency to agree with the central premise of a question. However, most research on acquiescence has focused on attitudinal “agree/disagree” questions. To our knowledge, no one has explored the possible role of acquiescence on health-related judgments such as print disability questions. Due to the small number of respondents included in this study, we were not able to address this in our design. Further research could be conducted by using split-ballots in which the meanings of “yes” for each question would be reversed and the resulting distributions across each condition would be compared. (See Schuman and Presser (1981, pp. 203-217) for a discussion of experiments on acquiescence.)

The cognitive interview study

A full investigation of these issues would require large national samples and experimental controls. The study presented here is more exploratory, focusing on the meanings and interpretations of the questions, using cognitive laboratory techniques. We did make an effort to incorporate some features into our design that would allow investigation into the role of context on question interpretation.

Given each of these points, the main objective of the research was to evaluate whether the two versions of the print reading disability measure are tapping meaningful conceptual differences in how questions are understood. The results of these interviews will be used as a basis for making recommendations to improve and coordinate the collection of visual disability data.

Methodology

Design

We developed three different interview conditions to explore what factors respondents considered when answering the print disability questions. In each condition, respondents answered sections of the NHIS and the SIPP, including the print disability measures. The forms differed in terms of which section was administered first (and subsequently probed), and also in terms of the context provided by preceding questions. We were particularly interested in possible context effects created by vision-related questions in the NHIS. Table 1 outlines the basic content of the three interviewing conditions.

This design allowed us to make several comparisons. First, we made between-form comparisons by examining differences in responses to the first items administered on each form. For example, comparing responses to Form 1 and Form 2 allowed us to evaluate whether the visual ability questions directly preceding the NHIS print disability measure might have influenced responses to the NHIS measure. (Forms 1 and 2 were identical, except that Form 2 omitted the questions that directly preceding the print disability measure). Similarly, a comparison of responses to Form 2 and Form 3 allows us to examine the interpretations of the NHIS and SIPP questions without the potential influence of the preceding visual ability questions.

Also, responses to Form 1 and Form 3 allowed us to compare interpretations of the NHIS and SIPP print disability measures in their usual context-- in both cases, we administered the questions that precede the print disability measures in the actual SIPP and NHIS questionnaires.

We also made within-form comparisons. Near the conclusion of each interviews, respondents answered the print disability question from the survey that had not been the primary focus of the interview. After having answered both the NHIS and the SIPP print disability questions, respondents were explicitly asked if they thought there were any differences or similarities between the two measures.

Table 1: Three interview conditions

Form 1	Form 2	Form 3
<ul style="list-style-type: none"> • abbreviated version of NHIS core interview • visual ability questions • NHIS print reading disability measure • cognitive probing • <i>abbreviated version of core SIPP interview</i> • <i>SIPP print reading disability measure</i> • cognitive probing 	<ul style="list-style-type: none"> • abbreviated version of NHIS core interview • NHIS print reading disability measure • cognitive probing • <i>abbreviated version of core SIPP interview</i> • <i>SIPP print reading disability measure</i> • cognitive probing 	<ul style="list-style-type: none"> • <i>abbreviated version of core SIPP interview</i> • <i>SIPP print reading disability measure</i> • cognitive probing • abbreviated version of core NHIS interview • visual ability questions • NHIS print reading disability measure • cognitive probing

Eleven respondents were interviewed with Form 1 (NHIS with context questions first, and the SIPP questions asked later), nine were interviewed with Form 2 (NHIS without context questions first, and the SIPP questions asked later) and ten were interviewed with Form 3 (the SIPP questions first, and the NHIS with context questions asked later).

Each interview was transcribed, and responses to cognitive probes were coded independently by the two interviewers.³ The purpose of the coding was to determine, as much as possible, the frame of reference respondents used while answering— for example, whether respondents included glasses or other aids while answering the question; whether respondents were thinking of headlines, regular print text, or some other size of print; and so on. We also coded more objective information— for example, whether or not respondents wore glasses or used

³ Tape recorder malfunctions made it impossible to transcribe four interviews. Although we obtained completed questionnaires for all 30 respondents, we coded the content of only 26 (ten respondents on Form 1, eight respondents on Form 2, and eight respondents on Form 3).

magnification devices on a regular basis. (Percent agreement between coders was 90%; all differences were reconciled prior to analysis.)

Respondents

With the assistance of staff from the American Foundation for the Blind, respondents were recruited from two clinical settings at Johns Hopkins University, as well as the Virginia Department for the Visually Handicapped and a Washington, DC- based ophthalmology practice of retina specialists. Respondents were recruited from these clinical settings because we were interested in interviewing people within a specific range of impaired visual acuity, and within a limited geographical area. To protect clinical confidentiality, staff at these organizations contacted potential respondents to request permission to give their names, addresses and phone numbers to Census Bureau staff for the purpose of participating in our research. If and when permission was granted, the respondents were contacted to schedule an interview. Participants in our research were informed that their response was voluntary, that the information they provide is confidential, can only be seen by employees involved in the research project, and will be reported in such a way that no individuals can be identified. Because of the special transportation needs of this population, all respondents were interviewed in their homes and were paid \$25 as a token of appreciation for their participation in a 30 minute interview.

All respondents had been previously diagnosed as having a visual acuity between 20/60 and 20/100 in the better eye, with best correction. Some respondents had been diagnosed as long as several years before this study; none of the respondents had their vision retested as part of this study. These respondents were selected with the expectation that none would say they were clearly unable to read newspaper print, nor that they could quite easily read newspaper print. We were looking for those people whom we were sure would be asked these questions in the survey and would not skip out due to blindness.⁴

We interviewed a total of 30 respondents, selected by certain age, race and education criteria. Age was an important criterion because most visual impairment is among older people. Almost all respondents were above the age of 55. However, six respondents between 18 and 35 years of age were included to see if they offered a different pattern of response to these questions. Race was another selection criterion since blacks and whites have different rates of clinically measured visual impairment. Approximately 2/3 were white and 1/3 were non-white. The last selection criterion was education level. Since NHIS specifically says “read” in the question wording we thought that literacy might explain some differences in the estimates. Exactly half of the respondents had at least some college education, and the other half had a high school diploma or lower. However, given the limited number of respondents who fit our visual criteria, we were unable to recruit individuals for whom literacy was an issue. All respondents, including those in the less educated group, were literate. (Gender was not included as a selection criteria because

⁴ However, James Tielsch and James Deremiek, who advised on clinical requirements for this project, specified that no one acuity range would effectively predict reading disability.

print disability rates for men and women are not different.) As much as possible, we included a mix of age, race, and education levels across each interviewing condition.

Interviewing— Techniques and Limitations

In each of the interviewing conditions, the interviewer administered the questionnaire without interruption until the respondent answered the first print disability questions. Cognitive probing began at that point in the interview, using a semi-scripted interviewing protocol. Some of the suggested probes included:

What does this question sound like it is asking to you?

How did you decide that your answer was _____?

How easy was it for you to decide that?

When answering, were you thinking about being able to “see” newspaper print, or were you thinking about being able to “read” newspaper print? Is there a difference?

In your own words, can you tell me how well you can see newspaper print?

Using this sample of newspaper, describe what you are seeing by choosing a number between 1 and 10, with 1 being “can’t see at all” and 10 being “can read the paragraph without any difficulty.”

Following these probes, interviewers asked the print disability question from the opposite survey, and asked additional probes about whether the questions addressed different concepts. Finally, respondents were asked whether their vision prevented them from doing any activities that were important to them.

This general outline was followed in all interviews. However, interviewers were also free to pursue discussions that seemed pertinent to the goals of the study. This overall interviewing strategy is fairly typical for cognitive interviewing projects at the U.S. Bureau of the Census and the National Center for Health Statistics (see Willis, 1993; DeMaio and Rothgeb, 1996).

Still, some respondents had difficulty understanding the probes that we administered. In the example below, the respondent understood the idea of answering survey questions, but not the concept of answering a question about a question:

Interviewer: So in your own words, can you tell me what that question was asking you?

Respondent: Excuse me?

Interviewer: In your own words, can you tell me what I was asking when I asked that question: If you had to ask me that question, how would you say it? What were the important parts of that question?

Respondent: It would be— it would be— I would say it depends entirely on the size of the print that you are asking me about... I can read the big headlines, but I can't read the fine print of the columns.

Rather than providing a paraphrase, the respondent provided a more in-depth response to the question. This sort of problem occurred intermittently throughout the project, and is a problem reported often in cognitive interviewing studies. Some respondents— particularly those with less education— are simply not skilled at explaining what they think when forming a response, such as their interpretation of terms. As a result, we obtained an inconsistent amount of data for each subject, which posed some constraints in our coding and subsequent analysis of the interviews.

Some other probes did not yield as much information as we had hoped. One such probe asked respondents to evaluate on a scale from 1 to 10 how well they could read a sample newspaper article. Most respondents provided an answer, but we did not initially realize that some respondents answered regarding their abilities with the high powered magnification devices, while others thought of their ability with only glasses. Often, we were unable to tell which frame of reference they used, and consequently could make little use of this data in our analysis.

On the whole, however, the interviews yielded very useful information about respondents' frames of reference, general visual abilities, and sources of ambiguity in the questions. Our analysis of the interview data is largely based on impressions and anecdotal evidence, as is typical in qualitative research, but where possible we include some quantitative reports based on coding of interview content.

Results

Interpretation of central concepts in print disability questions

For virtually all respondents, the central concept of “being able to read print” was equivalent across SIPP and NHIS questions. When asked to compare the meanings of questions, no subjects reported that questions from different surveys addressed different conceptual domains— that is, the ability to “see words and letters” is functionally the same as being able to “see well enough to read.”

Respondents were generally consistent in answering the question based on a “functional ability” to read. The ability to make out some letters, or the ability to slowly piece through the headline of a story, was usually insufficient for them to indicate ability to read print, for both NHIS and SIPP questions. For example, a respondent who said “no” to the NHIS question (he could not see well enough to read newspaper print) explained that “I can read headlines, but... [reading]

headlines is not reading the newspaper.” Although the NHIS question does not specify “ordinary” print, respondents tended to interpret the question as referring to an inability to read something substantial. As one respondent said, the NHIS question asked if he “can pick up the paper and read it.”

Another respondent pointed out that the SIPP questions contained a literal (but not substantial) difference: “the [initial SIPP] question asks me, do you have difficulty seeing the words and letters. I don’t have difficulty seeing that there are words and letters there... actually, I can see the letters, I just can’t read them.” Nevertheless, this respondent, like most others, interpreted the question as referring to a pragmatic ability to read: individual words “don’t do you any good if you can’t read [the content of articles].” Consistent with that interpretation, his actual response was that he did have difficulty.

However, the questions do address different severity levels of print disability. The second SIPP question (SIPP 2) addresses the most severe visual impairment: ability to see the words and letters at all. The NHIS question about the ability to see well enough to read addresses a less severe impairment. The initial SIPP question (SIPP 1), about having difficulty seeing words and letters, addresses the least severe impairment among these questions. We would expect SIPP 1 to generate the most reports of print disability, SIPP 2 to generate the least, with the NHIS question somewhere in between. Respondents’ answers in our study confirm this hierarchy:

Table 2: Responses to print disability questions in the cognitive interviewing study

Question	Number of Respondents with specified disability (n=30)
SIPP 1 -- Difficulty seeing words and letters	23
NHIS -- (Can’t) see well enough to read	18
SIPP 2 -- Cannot see words and letters at all	13

Thus, it seems likely that the implied severity in the question is a very important influence on response, even though the questions otherwise address similar concepts.

Operational Definition of Print Disability and the Implied Frame of Reference

Another difference is that the SIPP questions ask explicitly about ability to see while wearing glasses. No respondents asked interviewers for clarification about whether they should include glasses while answering this question— it was clear to them that they should. But the NHIS question does not specify that glasses should be included (although such guidance is given at the beginning of the section, several questions earlier). Consequently, four respondents expressed uncertainty about whether their NHIS response should include the use of glasses or other aids. Interviewers asked respondents to interpret the question as they thought most appropriate, and virtually all respondents who wore glasses assumed that the NHIS question should be answered based on their reading ability with glasses. What should be noted is that the format of the NHIS permits uncertainty in the response process. This increases the chance that there will be differences in how the question is interpreted across respondents.

Respondents were less likely to answer the question based on their abilities to read with magnification devices. Sixteen respondents reported that they used high-powered magnifiers to assist with reading, and eight of those specified that they did not answer in reference to using magnifiers. For example, one respondent said that he could not read newspaper print at all (SIPP 2) but later mentioned “Oh, I can [read regular newsprint] with a magnifier, that is, some of it.” In any case, answering with respect to magnification devices is much less common than answering with respect to glasses, regardless of the questionnaire form that was administered. As one typical respondent put it, “You are just talking about with the glasses on, I presume— weren’t you?” Only three respondents who used magnifiers answered questions while considering those devices. (We did not ascertain a clear frame of reference from the remaining five respondents).

Altogether, it seems that respondents generally answer the print disability question based on their “everyday abilities.” Respondents who wear glasses all of the time seem to include them when evaluating their ability to see. Because they use glasses constantly, it almost goes without saying that asking about their ability to see implies “with glasses.” Though a few did include magnifiers in their answer, more sophisticated magnifiers are apparently less likely to be considered in this light, since using a magnifier entails particular effort that would not be taken as easily for granted. For example, one of our respondents who could only see print with special magnifiers responded to both the NHIS and SIPP questions that he could not read print.

In general, though we found that the specificity of the question has potential to influence the frame of reference in answering, there seemed to be a consensus on the implied frame of reference. In the next section we consider another factor that could influence the frame of reference in answering: preceding survey questions.

Context effects from preceding questions

The most notable difference between the two questionnaires are the contexts in which the print disability questions appear. While the SIPP print questions do not appear with any other vision-related questions, the NHIS question follows a lengthy series of vision-related questions. We believe that these vision questions may influence the frame of reference of the NHIS print question— in fact, print disability estimates from the NHIS should probably be viewed as a product of that series of questions, not just the print disability question alone. Such an effect of preceding context on the interpretation of subsequent questions has been well documented in the literature (Schuman and Presser, 1981; Schuman and Kalton, 1985; Schuman, 1992)

One possible effect of the preceding questions would be to “prime” respondents to consider additional factors in their answers. For example, the preceding questions mention using a “magnifying glass to read or do other close work.” Perhaps this question influences some respondents to include magnification devices while answering about print disability. For example, during context questions, one respondent confirmed that he used a magnifying glass to read. Subsequently, when asked the NHIS print disability question, he said “well... not without magnification.”

Ultimately, this respondent decided that the answer to the question was legitimately “no,” he could not read print (“to read the newspaper, I need something extra.”) This is consistent with our hypothesis that respondents tend to answer based on their everyday abilities, not including magnifiers. Still, it is possible that the context questions make respondents more likely to consider the use of magnification devices in their answers than they would otherwise.

We cannot adequately determine whether the preceding context questions systematically make respondents more likely to report that they can read print, due to small sample sizes and other limitations of our data discussed previously. However, we have some preliminary evidence that print disability responses may be influenced by the presence of the context questions.

We first checked to see if respondents’ answers to the SIPP and NHIS questions were consistent. Keep in mind that the two SIPP questions create three possible outcomes: 1) able to read print without difficulty; 2) able to read print, but with difficulty; 3) not able to read print at all. As we had hoped, everyone able to read print on the NHIS fell into the first two SIPP categories; and everyone not able to read print on the NHIS fell into the last two SIPP categories. However, the SIPP responses differed depending on whether context questions had preceded them. Table 3, below, considers only those respondents who said they were able to read print on the NHIS:

Table 3: Response to SIPP print disability question by presence or absence of context for those respondents *able to read print* according to NHIS

	Form 1 <i>SIPP preceded by NHIS context Q's</i>	Form 2 & 3 <i>SIPP <u>not</u> preceded by NHIS context Q's</i>
SIPP response:		
<i>Can read print</i>	5	2
<i>Read with difficulty</i>	1	4

Table 3 shows that respondents who answered the NHIS context questions before the SIPP question, Form 1, rated their ability to read print higher than those who did not, Forms 2 and 3 (Fisher's exact test, $p > .11$). A similar effect appears among respondents who reported that they were not able to read print on the NHIS (Table 4, below). Here also, respondents rated their ability to read print higher when they had previously answered the NHIS context questions. That is, SIPP ratings were higher for Form 1 than for Forms 2 and 3 (Fisher's exact test, $p > .09$).

Table 4: Response to SIPP print disability question by presence or absence of context for those respondents *not able to read print* according to NHIS

	Form 1 <i>SIPP preceded by NHIS context Q's</i>	Form 2 & 3 <i>SIPP <u>not</u> preceded by NHIS context Q's</i>
SIPP response:		
<i>Read with difficulty</i>	3	2
<i>Cannot read print</i>	2	11

We considered the possibility that these differences are explained by actual differences in visual abilities—that is, that those who received Form 1 happened to have better vision than those who received Forms 2 and 3. However, a simple measure of actual visual abilities did not vary across these forms.⁵

⁵ Respondents' visual abilities were originally rated on a 5-point scale. On one end of the scale, respondents were able to read easily with no aids other than ordinary glasses; on the other end, respondents could not make out individual letters even with magnification equipment. Later, to

In a comparison of Form 1 and Form 2 responses, we failed to find an interaction between NHIS responses and presence of the context questions. We believe this is because of the small sample size and the lack of variability possible in a binomial response. The NHIS only has two response outcomes (either the respondent can read print or she cannot). Context effects would be more noticeable on the SIPP questions, which have three possible outcomes, permitting more variety of responses.

Overall, this analysis suggests that the NHIS context questions may somehow influence respondents to rate their ability to read print more highly. Although the sample sizes are very small, the differences in Tables 3 and 4 approach statistical significance. An important next step would be to interview an expanded sample of respondents, covering various permutations of visual difficulties and assistive devices, with and without preceding context questions. Only then could this problem be evaluated with the attention it needs.

Summary

The NHIS and SIPP print disability questions appear to have very similar subject matter. Virtually all respondents felt the concept of “being able to read print” was equivalent across SIPP and NHIS questions.

However, there are still important differences in how print disability is operationalized across the two questionnaires. The SIPP measure differentiates between levels of impairment: one question asks whether the respondent has difficulty seeing words and letters; another assesses whether he is able to see words and letters at all. These appear to be categorically different levels of severity. In contrast, the NHIS only asks whether the respondent can or cannot read newspaper print.

The SIPP question explicitly mentions that respondents should answer in reference to wearing glasses, if they usually wear them. The NHIS question does not specifically mention this, although interestingly, it seems that most respondents answer in reference to wearing glasses, if they typically wear glasses to read or do other close work. It is possible that respondents do this because wearing glasses seems to be a logical interpretation even without being stated. Nevertheless, it seems preferable to specify on future surveys that we are interested in vision with glasses (if respondents wear them), rather than leaving this to chance interpretation.

Despite these seeming discrepancies, respondent interpretations seemed quite consistent. Typically, respondents answered in terms of regular-sized newspaper print, while wearing glasses but not with additional magnification devices. This appears to constitute their functional ability to read, under everyday circumstances.

resolve ambiguous cases, it was necessary to categorize respondents as either able or unable to read entire words in fast enough succession to comprehend a complete sentences—a basic threshold of functional ability to read. Within each of the three questionnaire groups, six respondents were unable to do this, while two or three were able.

This analysis also suggested that the battery of questions preceding the NHIS measure creates a context effect influencing respondents' assessment of their ability to read print. When asked a series of visual-oriented questions before the print disability measure, respondents seemed to rate their ability to read print more favorably than without the preceding questions. This may at least partially account for the differences between estimates from the two surveys.

Still, this potential context effect should be investigated in a more sophisticated experiment. Survey data should be collected through traditional interviewing techniques and larger samples, in order to isolate the unique effect of the context questions. Procedural factors that could have contributed to differences between NHIS and SIPP responses should be eliminated—specifically, proxy rules, and the age of the target population, should be fixed. The fact that data would be collected during the same time frame would make the complex adjustments previously performed on NHIS and SIPP data unnecessary. This could result in a more focused evaluation of conceptual issues.

Isolating the impact of context is an important step toward identifying the optimal measure of print disability. In any case, it is important to note that importing the NHIS or SIPP questions alone into other surveys would probably not yield the same results. Any attempt to develop a standard measure of print disability should also include standardization of the preceding context questions.

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Appendix A

Print Reading Disability Measures

SIPP

1) (Do you/Does Name) have difficulty seeing the words and letters in ordinary newspaper print even when wearing glasses or contact lenses if (you/Name) usually wears them?

- Yes, has difficulty
- No difficulty -- skip to 3

2) (Are you/Is he/she) able to see the words and letters in ordinary newspaper print at all?

- Yes
- No

NHIS

The next few questions are about how well you can see (wearing your (glasses/contact lenses) if that is how you see best.)

1) Can you see well enough to recognize the features of people if they are within 2 or 3 feet?

2) Can you see well enough to watch t.v. 8 to 12 feet away?

3) Can you see well enough to read newspaper print?

- Yes
- No