

GEORGIA INSTITUTE OF TECHNOLOGY

The Effects of Experience with a Technology on Privacy Concerns and
Disclosure of Health Information

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Abstract

Although the ubiquity of technology can make many aspects of life more convenient, it may simultaneously raise concerns about the privacy of personal information. While the link between privacy, self-disclosure, and new technology has been suggested, a clear understanding of these variables remains lacking. Explanation for the need for information has been suggested to increase one's comfort level and in turn lead to increased disclosure. The goal of the present study was to assess how experience with a technology affects attitudes toward levels of disclosure of personal information. Older adult (ages 65-74) and younger adult (ages 18-22) participants were exposed to one of two systems, either providing feedback or no feedback relating to the purpose of the question, designed to gather personal health information. Participants provided a rating about how much information they believed they would disclose to the system. Results indicate that younger adults alter their self-disclosure attitudes based on the sensitivity of the question asked, but older adults do not. Neither age group was affected by feedback related to the purpose of the question.

The Effects of Experience with a Technology on Privacy Concerns and Disclosure of Health Information

As the use of technology expands into many different areas of life, the need to protect users' privacy and to understand privacy concerns associated with technology use grows in importance. The ubiquity of technology does make many aspects of life more convenient, but often at the cost of making masses of information more easily accessible. However, technologies such as computers and the Internet pose major threats to privacy due to their capability to store and transfer large amounts of information (Sims Bainbridge, 2003). According to one study, concern for privacy is cited most frequently as the reason for not engaging in computer interactions such as e-commerce (Jupiter Research, 2002).

Multiple attempts to define privacy have been made, but it is a difficult and complex problem. Currently a unified and simple definition of privacy does not exist. Some researchers have described privacy as the right to prevent disclosure of personal information (Joinson & Paine, 2006; Westin, 1967). More specifically, Westin (1967) defined privacy as the claim of individuals, groups, or institutions to decide for themselves when, how, and to what extent information about them is communicated to others. The measurement of privacy concerns tends to be subjective because it varies based on individual perceptions and values (Buchanan, Paine, Joinson, & Reips, 2007).

Essential to privacy is the concept of self-disclosure; the two concepts are significantly related. Privacy concerns are typically assessed by measuring people's willingness to disclose personal information (Olson, Grudin, & Horvitz, 2005) because privacy is thought to be a

prerequisite for disclosure of privileged material. Simultaneously, the act of self-disclosure may reduce privacy (Joinson & Paine, 2007).

Self-disclosure is defined as the telling of previously unknown information so that it becomes shared knowledge (Joinson & Paine, 2007). Self-disclosure is a behavior that has been experimentally measured in a number of ways, such as self-report and content analysis.

Willingness to share privileged information varies based on the type of information being elicited (Olson et al., 2005). The person or organization to which the information is disclosed as well as the reason the information is asked also affects willingness to share personal information (Olson, Grudin, & Horvitz, 2004).

Joinson and Paine (2007) suggest three issues that link privacy, self-disclosure, and new technology: trust and vulnerability, costs and benefits, and control over personal information. The direction of the relationship between privacy and technology remains unclear because the only data that have been collected on the topic of privacy associated with technology use primarily involve survey methodologies and take place in the online retail context (Olson et al., 2005). Hence, there is a need for data collection related to privacy concerns in different situations and in more practical settings, such as disclosure to a technology in a healthcare setting.

Health information has been cited as the most privacy protected category of information (Metzger, 2004). As information technology diffuses into the health field, protective measures must be taken to protect private health information. In particular, the adoption of electronic medical records (EMR) poses major implications for stringent privacy policies and regulations. Widespread adoption of EMR would allow for improved patient care and convenience for patients, physicians, and other associated healthcare professionals. Some benefits include 1) easy

accessibility of health histories in the case of emergency, 2) improved surveillance over the use of prescription drugs, and 3) overall reduction of medical costs by limiting the amount of paperwork and number of unnecessary tests performed on a single patient by multiple physicians. But efforts to install these systems have been hindered due to concerns with privacy and fear that personal health information will be misused (Miller & Tucker, 2007). In one survey, the largest concern about having EMR, cited by 68% of adults, is privacy (Harris Interactive, 2004). Moreover, people are beginning to use online health information sites and online health questionnaires to assess their health. Sillence, Briggs, Fishwick and Harris (2004) suggested a two-stage model of trust in online health sites. In the first stage, appealing visual appearance, such as a professional interface design, influences early decisions to trust a site. Personalization of content influences later decisions to revisit and use a site in the second stage.

The people who stand to benefit the most from health information technologies are those having chronic medical conditions or a wide range of health concerns. This group of people includes older adults who tend to have experienced more health problems over the course of their lives and may be taking multiple medications. Lawton and Bader (1970) asserted that the desire for privacy increases with age. Likewise, older adults may have more concerns with their privacy since they may have to give up privacy to accommodate health conditions (Petrino & Kovach, 1997).

The goal of the present study was to investigate how participants' experience with a computer data collection system affects their attitudes about their personal level of self-disclosure. Participants were asked a series of health questions requiring different levels of self-disclosure. The computer system was manipulated to provide feedback about the purpose of each question asked, or to provide no additional information pertaining to the purpose of each

question. It was expected that participants in the feedback condition would provide higher overall ratings of self-disclosure compared to those in the no-feedback condition. It was further expected that older adults would provide lower overall levels of self-disclosure compared with younger adults. Older adults tend to have less overall technology experience compared with younger adults, and they tend to have a more complex health history compared to younger adults whose histories are constrained by age; for these reasons, older adults may have more concerns with inputting personal information into a computer.

Method

Participants

Participants included 12 younger adults (8 males and 4 females) ranging in age from 18 to 22 years ($M = 19.67$, $SD = 1.435$), and 12 older adults (7 males and 5 females) ranging in age from 65 to 74 years ($M = 70.00$, $SD = 3.104$). Younger adult participants were recruited from the psychology student participant pool at the Georgia Institute of Technology. Older adults were recruited from a pre-existing database of adults living in the Atlanta area. As shown in Table 1, all participants had completed at minimum, a high school education, and all were in fair or better general health condition.

Table 1
Sample Description

	Younger adults	Older adults
Number	12	12
Age (<i>M, SD</i>)	19.67 (1.435)	70.00 (3.104)
Gender		
Male	8	7
Female	4	5
Education		
≤ High school	17%	8%
Vocational training	0%	8%
Some college/Associate's degree	75%	33%
Bachelor's degree	8%	25%
Master's degree	0%	17%
Doctoral degree	0%	8%
Ethnicity		
White/Caucasian	75%	67%
Black/African American	17%	25%
Asian	8%	0%
No primary group	0%	8%
Other	6%	0%
English primary language		
Yes	92%	100%
No	8%	0%
Occupational Status		
Student	100%	8%
Work part-time	0%	25%
Retired	0%	67%
General health		
Excellent	33%	17%
Very good	50%	33%
Good	17%	25%
Fair	0%	25%
Health compared with other people of same age		
Excellent	42%	17%
Very good	17%	33%
Good	42%	33%
Fair	0%	17%
Satisfaction with present health		
Extremely satisfied	25%	33%
Somewhat satisfied	67%	42%
Not very satisfied	8%	17%
Not at all satisfied	0%	8%
Health problem limited activities		
Never	42%	25%
Seldom	58%	50%
Sometimes	0%	17%
Often	0%	8%

Note: Self-report.

Design

The experiment was a 2 (age) \times 2 (condition) \times 2 (sensitivity) mixed design. The independent age factor included the two levels: older adults and younger adults. The independent condition of distribution of feedback (*Figure 1*) or no feedback (*Figure 2*) was manipulated between subjects: half of the participants in each age group were randomly assigned to the feedback condition, and the others were assigned to the no-feedback condition. The level of self-disclosure, 'less sensitive' or 'more sensitive,' was assessed within participants *post-hoc*. That is, the mean level of sensitivity for each question was assessed by the health item sensitivity questionnaire (Appendix B) developed for this study. The items were divided into the top 10 'more sensitive' items and the top 10 'less sensitive' items among the younger adults and older adults.

Do you take any medications (prescription or non-prescription) on a regular basis (at least once a week)?

Knowing the medications you are taking will allow your doctor to properly assess the symptoms you have and choose appropriate treatments.

With the answer to the question you were just asked in mind, please rate the completeness of information you would provide.

1 <input type="radio"/>	2 <input type="radio"/>	3 <input checked="" type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	<input type="button" value="ok"/>
I would skip this question (not enter any information)	I would provide an answer, but I would only provide minimal information	I would provide an answer, but I would only provide some information	I would provide an answer, but I would only provide most information	I would answer this question to the fullest extent possible	

With the answer to the question you were just asked in mind, please rate the accuracy of the information you would provide.

1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	<input type="button" value="ok"/>
I would enter information that was totally inaccurate	I would provide information that was somewhat inaccurate	I would provide some information that was accurate, and some that was inaccurate	I would provide information that was mostly accurate	I would provide information that was completely accurate	

Figure 1. Feedback condition.

Do you take any medications (prescription or non-prescription) on a regular basis (at least once a week)?

With the answer to the question you were just asked in mind, please rate the completeness of information you would provide.

1 <input type="radio"/>	2 <input type="radio"/>	3 <input checked="" type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	<input type="button" value="ok"/>
I would skip this question (not enter any information)	I would provide an answer, but I would only provide minimal information	I would provide an answer, but I would only provide some information	I would provide an answer, but I would only provide most information	I would answer this question to the fullest extent possible	

With the answer to the question you were just asked in mind, please rate the accuracy of the information you would provide.

1 <input type="radio"/>	2 <input type="radio"/>	3 <input checked="" type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	<input type="button" value="ok"/>
I would enter information that was totally inaccurate	I would provide information that was somewhat inaccurate	I would provide some information that was accurate, and some that was inaccurate	I would provide information that was mostly accurate	I would provide information that was completely accurate	

Figure 2. No feedback condition.

Measures

Demographics, health, technology experience, and privacy attitudes. Demographics, health, technology experience, and privacy attitudes were assessed using standard questionnaires. Demographics, health, and broad technology experience were all assessed using tests designed for the Human Factors and Aging Laboratory. Privacy attitudes were assessed using a questionnaire (Appendix A) that was adapted from Jensen, Potts, and Jensen (2005) and Harris and Associates Incorporated and Westin (1998). These data will be used for future comparative studies.

Completeness. Participants rated the completeness of the answers they would provide to the computer system to each health-related question on a scale from 1: “I would skip this question (not enter any information),” to 5: “I would answer this question to the fullest extent possible.” This scale was given within the computer program participants used.

Accuracy. Participants rated the accuracy of the answers they would provide to the computer system for each health-related question on a scale from 1: “I would provide information that was completely inaccurate,” to 5: “I would provide information that was completely accurate.” This scale was given within the computer program participants used. Participants were not given a question relating to accuracy if they responded 1: “I would skip this question, not enter any information” on the completeness scale. A response of zero (not applicable) for accuracy was reported in this case. These zero responses were removed prior to analysis of accuracy data.

Question Sensitivity. Participants rated the sensitivity of each health-related question on a scale from 1: “Least sensitive,” to 5: “Most sensitive.” This questionnaire was developed for this

study (Appendix B) and was administered on paper. The purpose of this questionnaire was to assess attitudes about question item sensitivity because these attitudes vary between individuals.

Procedure

The study was conducted in the Human Factors and Aging Laboratory at the Georgia Institute of Technology. The experiment was an individual testing session lasting approximately one hour. Participants first completed demographics and broad technology experience questions, and then completed a privacy attitudes questionnaire.

Participants were then seated at a desktop computer running Windows operating system and instructed about the nature of the task for the study. Participants were told they would complete a questionnaire about their health using a data entry system (*Figure 1*). They were told to imagine being at a physician's office responding to these questions using a computer system, for the physician to access their responses at a later time. The items in the questionnaire were adapted from a health questionnaire commonly used in experiments in the Human Factors and Aging Laboratory and the Patient Health Questionnaire (PHQ™; Spitzer, Williams, & Kroenke, 1999) to provide a range of sensitivity of questions. Participants were told to consider each question and any other relevant information on the computer screen to formulate an answer they would provide in the given situation. The participants did not actually enter any personal information into the system. Instead, after they read each question and considered their answer, they were presented with two different Likert-type scales assessing the completeness and accuracy of their responses.

Following the participants' interaction with the data entry system, they were given a health item sensitivity questionnaire that presented all of the health question items again. This time, participants answered on a Likert-type scale for question sensitivity.

Finally, participants took part in a short exit interview. They were asked questions about the process they used to formulate their answers and the nature of their interaction with the system. In addition, they were asked if they had ever used any type of computer or online system to input personal health information.

Results

Ratings of item sensitivity for each health question were averaged across participants, and the top 10 'less sensitive' and the top 10 'more sensitive' items were identified as shown in Table C2 for younger adults, and Table C3 for older adults. To test the hypothesis that responses of completeness and accuracy would vary based on age and experimental condition of feedback or no feedback across varying levels of question sensitivity, a mixed design ANOVA was conducted for the independent between subjects factors of age and condition, and the within subjects factor of question sensitivity. The two dependent variables of interest were participants' responses of completeness and accuracy.

Completeness

Overall, there was no interaction of age \times condition \times question sensitivity on completeness ($p = 1.00$). Further analysis yielded no interactions for condition \times question sensitivity on completeness ($p = .31$), or for age \times question sensitivity on completeness ($p = .06$). A significant main effect of question sensitivity was found $F(1, 22) = 10.427, p < 0.05$, such that participants reported that they were more willing to answer more completely on questions of lower sensitivity compared to questions of higher sensitivity.

Based on our *a priori* hypothesis, we did expect to find an interaction between experimental condition and question sensitivity, so further analyses were done for the individual age groups. Overall ratings of completeness of self-disclosure for the younger adults and for the

older adults, shown in *Figure 2*, were obtained by measuring the means of each participant's ratings of completeness of disclosure within the data entry system between the less sensitive and the more sensitive items.

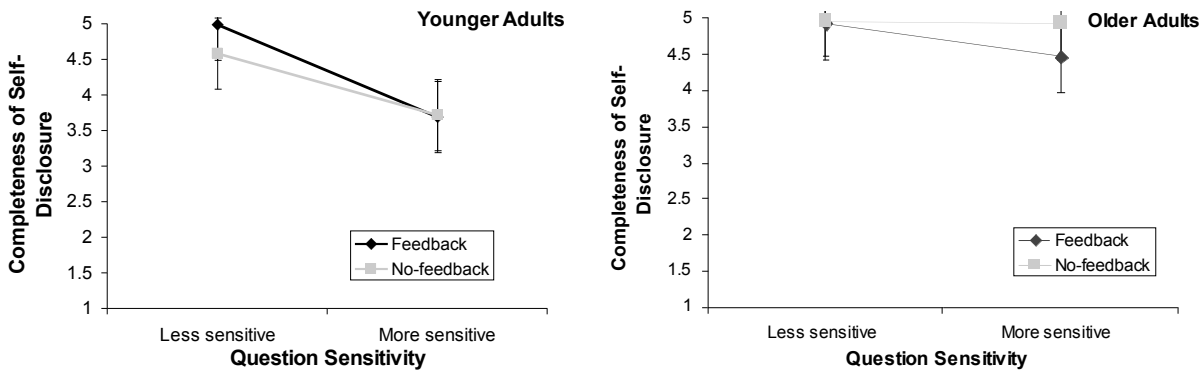


Figure 2. Self-reported level of completeness of self-disclosure among the top 10 less sensitive question items and the top 10 more sensitive question items by younger adults and older adults.

There is a clear difference in the responses of completeness between the less sensitive items, which received higher overall responses compared to the more sensitive items. A main effect of question sensitivity on completeness of responses was found for younger adults $F(1, 10) = 8.13$, $p < 0.05$, but not for older adults ($p = .15$). However, there was not a significant interaction between system feedback or no-feedback and sensitivity of questions for either younger adults ($p = .58$) or older adults ($p = .21$).

Accuracy

Like completeness, there was no interaction of age \times condition \times question sensitivity on accuracy ratings ($p = .83$). There was no interaction between condition \times question sensitivity on accuracy ($p = .83$). There was a significant interaction between age \times question sensitivity on accuracy responses $F(1, 22) = 5.81$, $p < 0.05$, such that younger adults stated they would respond more accurately to less sensitive questions than more sensitive questions, and older adults reported that they would not alter the accuracy of their responses between less and more

sensitive items. A significant main effect of question sensitivity was found $F(1, 22) = 10.06, p < 0.05$, such that participants also reported that they were more willing to answer more accurately on questions of lower sensitivity compared to questions of higher sensitivity.

Overall ratings of accuracy of disclosure, shown in *Figure 3*, were found by the same method as for completeness.

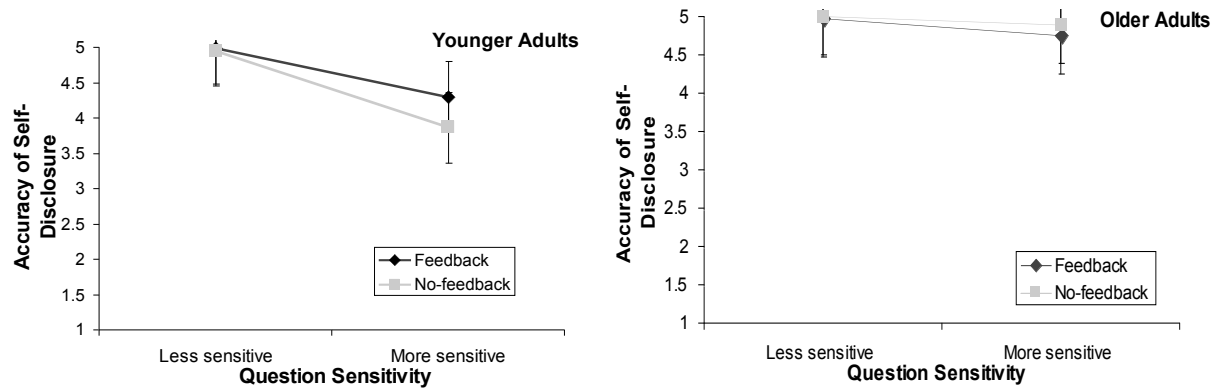


Figure 3. Self-reported level of accuracy of self-disclosure among the top 10 less sensitive question items and the top 10 more sensitive question items by younger adults and older adults.

There was a main effect of question sensitivity was found for ratings of accuracy of self-disclosure for younger adults $F(1, 10) = 8.24, p < 0.05$, but not for older adults ($p = .13$). There was no significant interaction between the experimental condition and level of question sensitivity on accuracy ratings of younger adults ($p = .72$) or older adults ($p = .62$).

Discussion

Summary

Younger adults reported that they would give more complete and accurate answers to less sensitive questions, and tend to hold back on more sensitive questions. Older adults, on the other hand, did not report that they would significantly alter their responses based on question sensitivity. Neither younger nor older adults significantly alter reports about level of self-

disclosure in reaction to the distribution of feedback about the purpose of each item asked. That is, this specific characteristic of the computer system did not influence ratings of disclosure.

A number of different variables could account for these results. First, there may be a large effect of context. All participants were told to imagine they were in a physician's office and that this information would primarily be for their physician's use. In the exit interview for the experiment, all participants cited that they would not want to withhold any information from their doctor or lie to their doctor. Two participants explicitly cited trust for a physician as a reason for entering all relevant information that was asked. These statements affirm the claim made by Wheelless and Grotz (1977) that trust can overcome concerns for privacy. Five younger adults responded that they would always answer the questions that related to tangible health problems such as, "Have you ever had heart disease, now or in your lifetime?" but that they would prefer to skip more abstract questions such as, "Over the last 2 weeks, how often have you been bothered by feeling depressed, down or hopeless?" Other younger adults agreed that there was nothing they would not want their physician to know about them because "doctors are there to help." All older adults tended to agree that if health is involved, then they would want to provide all information possible even if it had to be through a computer to prevent misdiagnosis or any other problems. Two participants even referenced their personal health, saying that they had many health problems and had seen many doctors and therefore would not want to hide anything.

All but one of the participants in this study had at least some experience with computers and other technology. Participants were asked in the exit interview if they had ever used any type of computer system or online questionnaire to enter personal health information. Interestingly, no younger adults could recall such an experience, and three older adults had prior experience with

using online or computer systems to enter personal health information. One older adult even stated that he was actively trying to get his medical records online.

Finally, it was assumed the younger adults who participated in this study were in relatively good health and had a limited amount of health problems over their lives, because of their age. General health status was assessed by the health section of the demographics questionnaire that was completed by each participant. People with fewer health issues may be less apt to withhold any information since many of the items do not necessarily pertain to them. For instance, participants reported in the exit interview that they would not have a problem answering questions such as, “Have you ever had a stroke in your lifetime?” simply because it does not apply to them.

Future Directions

Future research should include behavioral measures to support previous attitudinal measures of self-disclosure in a given context. Previous research has indicated that most people show discrepancies in judgment between attitudes and how one would actually behave in a described situation (Antaki, Barnes, & Leudar, 2005; Jensen et al., 2005). In the present study, it appears that younger and older adults may over-report their disclosure of health-related information while using a technology, as indicated by the high ratings of complete and accurate self-disclosure across conditions. However, this claim would need further exploration by measuring disclosure behavior to compare to these attitudes. If confirmed, this finding would directly oppose evidence found by Jensen et al. that people tend to under-report their level of self-disclosure in response to survey items compared with actual disclosure behavior. Further, the behavior to be measured should take place in the context it is assessing. For example, an extension of the present study could include conditions where participants report to a new

physician's office to try a new computer data entry system and input their answers in the system, to later be measured by content-analysis.

The present research assessed a very narrow part of an experience with a technology. A number of other manipulations to an experience with a technology, such as interface design variations and presence or absence of a privacy policy, could be made to assess effects on privacy concerns.

Privacy concerns associated with technology could be further observed among different groups of people. Age effects are generally difficult to assess experimentally due to confounding variables such as cohort effects, cultural differences, and other factors within people's lives. A middle-age adult group could be added in addition to the younger and older adult groups to assess cohort effects. Alternatively, people classified as unhealthy or having many chronic health problems over their lives, could be compared to those who are healthy with few chronic health issues.

Also, people with strong preexisting attitudes about privacy could be compared. The Westin segmentation is widely used to group individuals based on their concern for privacy: (1) "privacy fundamentalists," who attach a very high value to privacy (2) "privacy pragmatists," who weigh the value of providing personal information, and (3) "privacy unconcerned," who have no real concerns about privacy (Harris and Associates Inc. & Westin, 1998). Classifying participants *a priori* according to Westin's segmentation could provide a link between preexisting attitudes about privacy and actual behavior.

Evidence of this relationship between privacy concerns and technology experience will have implications upon the design and use of new information technologies as they continuously diffuse into nearly every part of life. Health-related information is regarded as the most sensitive

category of personal information. An increase in information technology by physicians can make many improvements in the field of health. Thus, this research can lead to important knowledge about components of experience with a technology, such as providing feedback with each piece of information requested that can affect users' trust in the system, and thus alter disclosure. This information will be pertinent to designers of health-related information technology to appeal to users as well as physicians as they experience integration of a growing number of technologies into their practices.

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Appendix A

1. Consumers have lost all control over how personal information is collected and used by companies.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

2. Most businesses handle the personal information they collect about consumers in a proper and confidential way.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

3. Existing laws and organizational practices provide a reasonable level of protection for consumer privacy today.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

4. I am concerned about online identity theft.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

5. I am concerned about my privacy online.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

6. I am concerned about my privacy in everyday life.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

7. I am likely to read the privacy policy of an ecommerce site before buying anything.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

8. Privacy policies accurately reflect what companies do.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

Appendix B

HEALTH ITEM SENSITIVITY QUESTIONNAIRE

GENDER (Circle one): **MALE** **FEMALE** **AGE:** _____

Please take a moment to consider the following questions regarding your health. The purpose of this questionnaire is to understand your attitudes about the sensitivity of health questions. You do not actually need to provide a written answer to any of the questions. Please rate on the scale how sensitive you think each question is, by placing an 'X' at the chosen response.

1. During the last 4 weeks, how much have you been bothered by stomach pain?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

2. During a typical day, does your health limit you in bending, kneeling, or stooping?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

3. Have you ever had a stroke in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

4. Over the last 2 weeks, how often have you been bothered by having little interest or pleasure in doing things?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

5. Do you often feel that you can't control what or how much you eat?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

6. Have you ever had arthritis, now or in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

7. During the last 4 weeks, how much have you been bothered by constipation, loose bowels, or diarrhea?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

8. During a typical day, does your health limit you in moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

9. Have you ever had asthma or bronchitis, now or in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

10. Over the last 2 weeks, how often have you been bothered by trouble falling asleep, staying asleep or sleeping too much?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

11. Do you ever drink alcohol (including beer or wine)?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

12. In the last 3 months, how often have you made yourself vomit in order to avoid gaining weight?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

13. How satisfied are you with your present health?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

14. Over the last 2 weeks, how often have you been bothered by feeling tired or having little energy?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

15. In the last 4 weeks, have you had an anxiety attack – suddenly feeling fear or panic?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

16. Have you drunk alcohol, even though a doctor suggested that you stop drinking because of a problem with your health, more than once in the last 6 months?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

17. Have you ever had epilepsy, now or in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

18. Over the last 2 weeks, how often have you been bothered by poor appetite or overeating?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

19. In the last 3 months, how often have you taken more than twice the recommended dose of laxatives in order to avoid gaining weight?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

20. How often do health problems stand in the way of your doing the things you want to do?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

21. During the last 4 weeks, how much have you been bothered by headaches?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

22. Do you often eat within any 2-hour period, what most people would regard as an unusually large amount of food?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

23. Have you drank alcohol, been high from alcohol, or been hung over while you were working, going to school, or taking care of children or other responsibilities more than once in the last 6 months?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

24. Have you ever had a hearing impairment, now or in your lifetime?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

25. During the last 4 weeks, how much have you been bothered by back pain?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

26. During a typical day, does your health limit you in bathing or dressing yourself?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

27. Over the last 2 weeks, how often have you been bothered by feeling depressed, down or hopeless?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

28. In the last 3 months, how often have you fasted – not eaten anything at all for at least 24 hours – in order to avoid gaining weight?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

29. Have you ever had diabetes, now or in your lifetime?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

30. During a typical day, does your health limit you in walking more than a mile?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

31. During the last 4 weeks, how much have you been bothered by feeling restless so that it is hard to sit still?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

32. Over the last 2 weeks, how often have you been bothered by having trouble concentrating on things such as reading the newspaper or watching television?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

33. During the last 4 weeks, how much have you been bothered by muscle tension, aches or soreness?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

34. During the last 4 weeks, how much have you been bothered by nausea, gas, or indigestion?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

35. During the last 4 weeks, how much have you been bothered by pain in your arms, legs or joints (knees, hips, etc.)?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

36. Have you ever had hypertension, now or in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

37. During the last 4 weeks, how much have you been bothered by dizziness?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

38. Have you ever had cancer (other than skin cancer), now or in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

39. Do you take any medications (prescription or non-prescription) on a regular basis (at least once a week)?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

40. Have you ever had a vision impairment, now or in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

41. Over the last 2 weeks, how often have you been bothered by moving or speaking slowly that other people could have noticed? – Or the opposite – being so fidgety that you have been moving around a lot more than usual?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

42. In the last 3 months, how often have you exercised more than an hour specifically to avoid gaining weight after binge eating?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

43. Over the last 2 weeks, how often have you been bothered by feeling bad about yourself – or that you are a failure or have let yourself or your family down?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

44. During the last 4 weeks, how much have you been bothered by chest pain?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

45. Have you ever had heart disease, now or in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

46. During a typical day, does your health limit you in walking several blocks?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

47. Please list any significant illnesses you have had, now or in your lifetime?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Least Sensitive	Less Sensitive	Neutral	More Sensitive	Most Sensitive

48. During a typical day, does your health limit you in vigorous activities, such as running, lifting heavy objects, or participating in strenuous sports (e.g. swimming laps)?

 Least Less Neutral More Most
 Sensitive Sensitive Sensitive Sensitive

49. Have you missed or been late to work, school or other activities because you were drinking or hung over more than once in the last 6 months?

 Least Less Neutral More Most
 Sensitive Sensitive Sensitive Sensitive

50. During the last 4 weeks, how much have you been bothered by fainting spells?

 Least Less Neutral More Most
 Sensitive Sensitive Sensitive Sensitive

51. During the last 4 weeks, how much have you been bothered by feeling your heart pound or race?

 Least Less Neutral More Most
 Sensitive Sensitive Sensitive Sensitive

52. During a typical day, does your health limit you in lifting or carrying groceries?

 Least Less Neutral More Most
 Sensitive Sensitive Sensitive Sensitive

53. Over the last 2 weeks, how often have you been bothered by thoughts that you would be better off dead or hurting yourself in some way?

 Least Less Neutral More Most
 Sensitive Sensitive Sensitive Sensitive

54. During the last 4 weeks, how much have you been bothered by shortness of breath?

 Least Less Neutral More Most
 Sensitive Sensitive Sensitive Sensitive

55. During the last 4 weeks, how much have you been bothered by pain or problems during sexual intercourse?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

56. During a typical day, does your health limit you in climbing several flights of stairs?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

57. Have you had a problem getting along with other people while you were drinking more than once in the last 6 months?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

58. During the last 4 weeks, how much have you been bothered by becoming easily annoyed or irritable?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

59. During the last 4 weeks, how much have you been bothered by feeling nervous, anxious, or worrying about a lot of different things?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

60. Have you driven a car after having several drinks or after drinking too much more than once in the last 6 months?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Least Sensitive | Less Sensitive | Neutral | More Sensitive | Most Sensitive |

Appendix C

Table 2

Top 10 less sensitive question items and top 10 more sensitive question items according to younger adults (ages 18-22), rated on a scale from 1: 'Least sensitive' to 5: 'Most sensitive'.

Less Sensitive	Mean rating of Sensitivity
- During a typical day, does your health limit you in bending, kneeling, or stooping?	1.42
- During the last 4 weeks, how much have you been bothered by stomach pain?	1.50
- Have you ever had a stroke in your lifetime?	1.50
- Have you ever had arthritis, now or in your lifetime?	1.58
- Have you ever had asthma or bronchitis, now or in your lifetime?	1.58
- Have you ever had diabetes, now or in your lifetime?	1.58
- Have you ever had heart disease, now or in your lifetime?	1.58
- During a typical day, does your health limit you in walking several blocks?	1.58
- Have you ever had a hearing impairment, now or in your lifetime?	1.67
- During a typical day, does your health limit you in walking more than a mile?	1.67
More Sensitive	
- Over the last 2 weeks, how often have you been bothered by feeling bad about yourself – or that you are a failure or have let yourself or your family down?	4.17
- During the last 4 weeks, how much have you been bothered by pain or problems during sexual intercourse?	3.83
- Over the last 2 weeks, how often have you been bothered by thoughts that you would be better off dead or hurting yourself in some way?	3.83
- Over the last 2 weeks, how often have you been bothered by feeling depressed, down or hopeless?	3.75
- During the last 4 weeks, how much have you been bothered by feeling nervous, anxious, or worrying about a lot of different things?	3.67
- Have you driven a car after having several drinks or after drinking too much more than once in the last 6 months?	3.58
- During the last 4 weeks, how much have you been bothered by becoming easily annoyed or irritable?	3.58
- Have you missed or been late to work, school or other activities because you were drinking or hung over more than once in the last 6 months?	3.58
- Have you drank alcohol, been high from alcohol, or been hung over while you were working, going to school, or taking care of children or other responsibilities more than once in the last 6 months?	3.50
- Over the last 2 weeks, how often have you been bothered by having little interest or pleasure in doing things?	3.17

Table 3

Top 10 less sensitive question items and top 10 more sensitive question items according to older adults (ages 65-74), rated on a scale from 1: 'Least sensitive' to 5: 'Most sensitive'.

Less Sensitive	Mean rating of Sensitivity
- Have you ever had a vision impairment, now or in your lifetime?	1.91
- During a typical day, does your health limit you in moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf?	2.00
- During a typical day, does your health limit you in walking more than a mile?	2.00
- Have you ever had a hearing impairment now or in your lifetime?	2.08
- In the last 3 months, how often have you fasted – not eaten anything at all for at least 24 hours – in order to avoid gaining weight?	2.08
- During a typical day, does your health limit you in lifting or carrying groceries?	2.08
- Have you ever had hypertension, now or in your lifetime?	2.09
- Have you ever had arthritis, now or in your lifetime?	2.17
- Have you ever had asthma or bronchitis, now or in your lifetime?	2.17
- During the last 4 weeks, how often have you been bothered by back pain?	2.17
More Sensitive	
- During the last 4 weeks, how much have you been bothered by pain or problems during sexual intercourse?	4.00
- During the last 4 weeks, how much have you been bothered by constipation, loose bowels, or diarrhea?	3.83
- Have you drunk alcohol, even though a doctor suggested that you stop drinking because of a problem with your health, more than once in the last 6 months?	3.56
- During the last 4 weeks, how much have you been bothered by nausea, gas, or indigestion?	3.46
- During the last 4 weeks, how much have you been bothered by feeling nervous, anxious, or worrying about a lot of different things?	3.08
- Over the last 2 weeks, how often have you been bothered by moving or speaking slowly that other people could have noticed – Or the opposite – being so fidgety that you have been moving around a lot more than usual?	3.08
- Have you had a problem getting along with other people while you were drinking more than once in the last 6 months?	3.00
- Over the last 2 weeks, how often have you been bothered by thoughts that you would be better off dead or hurting yourself in some way?	3.00
- Over the last 2 weeks, how often have you been bothered by feeling depressed, down or hopeless?	3.00
- In the last 3 months, how often have you taken more than twice the recommended dose of laxative in order to avoid gaining weight?	3.00