

The Potential Benefits of Multi-modal Social Interaction on the Web for Senior Users

by

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Abstract

As the population of senior adults is growing rapidly, there is a high demand for social resources to support them. The Internet has become a key factor in today's society for improving lifestyle, from entertainment to obtaining necessities. Despite this, most seniors hesitate to use the Internet, and as a result there is a lower rate of growth in Internet usage among seniors compared to the younger population.

In this research, we propose a web interface using an avatar to address the problems of existing interfaces. We did a comparative study between an avatar design and a traditional design for a web-based retail store. For the most part, the results support the avatar design over a traditional web design.

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To my teachers, family and friends

1. INTRODUCTION

In today's society more people are living longer and healthier lives, which is an accomplishment for the society as a result of the advancement in technology and science [1].

Since the beginning of recorded human history, young children have outnumbered senior people, very soon this will change. For the first time in history, people age 65 and over will outnumber children under age 5 (Figure 1). This trend is emerging around the globe. Today almost 500 million people are age 65 and over, accounting for 8 percent of the world's population [1].

This growth indicates a rising need for planning to handle the increasing demands for senior adults. These upcoming demands give us an opportunity to use technology for the empowerment of senior adults and prepare us to face new challenges in the economy, healthcare and safety. Through technology, society has improved higher living standards and people live more secure and independent lives. With these changes, the Internet is one of the turning points in our lives which revolutionized the way people handle things from shopping to reading news.

The Internet has grown from a tool of the academy and Federal government to an integral part of day to day life. People are dependent on the Internet from keeping in touch with family and friends through emails to checking weather and news. While the young adults have embraced the Internet, senior adults resisted. The portion of adults over 65 who use the World Wide Web increased from 2% in 1995 to 33% in 2006. However, for this growth to reach the

point where all capable senior adults can access the web, researchers must solve more of the difficulties they experience when using it [2].

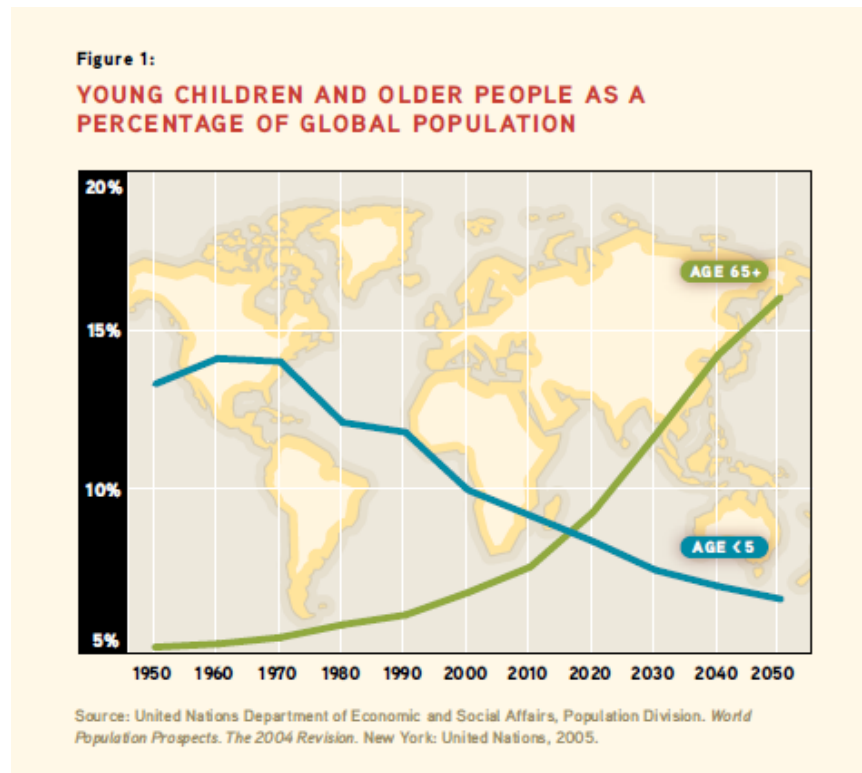


Figure 1: Global Population of senior and younger children

Most explanations of the difficulties senior adults experience with the web are based on age-related changes to their sensorimotor and cognitive capacities. Specific causes for cognitive decline have been associated with deficient attention, working memory, information processing speed, reaction time, response inhibition strength, encoding rates, or quality and rate of inference formation [2].

Unfortunately most of the current interfaces on the web are not designed to accommodate senior users need. This observation of high demand and low unavailability has motivated us to research in this area and gain more understanding about senior users need.

The main questions that are investigated in this research are:-

- Are there any discomforts among senior users in Internet usage?
- Will an avatar be helpful to bridge the gap of learning and enjoying the Internet?
- How does an avatar interface differ from traditional web interfaces?

2. LITERATURE REVIEW

The literature review begins with an overview of the general effects of aging on the Internet, to highlight the reasons for age-related problems in the usage of the Internet. Secondly, the research investigating the avatar's implications on different applications is studied.

2.1 Effects of Aging on Web

Aging has an effect on our cognitive as well as physical health. These effects result in our behavior, the way we perform our tasks and learn new things.

Some of the age related issues which are hindrance in the use of Internet are as listed below:

- *Response Time:* Research in adult learning theory and practice indicates that reaction time slows as people age, and more time is needed to learn by rote and to process information. [7].
- *Learnability:* Learning is a very crucial aspect of Internet adoption. Age brings some barriers to learning, such as -memory loss and emotional barriers [7].
- *Visibility:* With age, vision changes, both in focusing power and sharpness. Sometimes it can extend to limit the ability to see different colors [8].
- *Keyboard and mouse:* One of the biggest hurdles in learning computers is to use a keyboard and mouse. The mouse is not a very intuitive device and requires good vision and control over user's hand to point out an object on screen.

- *Mobility*: With age sitting in one position and concentrating on a screen could become difficult. Unlike television where a remote control is easy to operate and the viewer can sit on a couch, the Internet user should be close enough to read and hold a mouse for interaction

2.2 Agent based Learning

Many researchers have investigated that people display a natural propensity for interacting with machines as if they were interacting with people [11]. In studies, people have shown social rules for human computer interaction ranging from frustration, politeness to treating computers as personalities. [12]. In the HCI realm, work has been done by Reeves and Nass as “Computers as a social agent (CASA) paradigm to study the rules between human-human interaction and human-computer interaction”. In one of their studies, computers were demonstrated as a social actor [13].

People build relationships based on face to face communication, as a result of that; most of the relationship building strategies are focused on “verbal or non verbal conversational behavior”[14]. To achieve the verbal and non verbal communication on the web, a natural conversational interface will be required, which can be obtained by the use of Embodied conversational agents (ECA). ECAs are computational artifacts designed for verbal and non verbal communication with users to build long-term, social-emotional relationships. ECAs can take various embodiments including non-humanoid physical or nonphysical forms. [14].

The user experience for human computer interaction can be improved with the help of ECA. As studies have shown positive feedback is a key component in the success of learning [13]. And an ECA can provide instructions with positive feedback to user’s responses.

In addition, an increased emerging research has found an increased cognitive and emotional trust, and sense of control over the computer interaction in websites [15]

3. PROBLEM STATEMENT

In studies, user experience for learning has been improved by involving social aspects in design as discussed in an earlier section. Based on these theories, use of an ECA or avatar in a website can improve the user experience by providing help in navigation to complete a given task. An avatar can be present all the time on the website so that users can approach the avatar for any assistance in navigation or searching for a desired item. For example, an avatar welcomes the user as soon as the user enters the website and informs its presence as an assistant by saying, “Welcome to Sophisticated Casuals I am Gina, your customer service representative. What can I find for you today?” This example is from an apparel website, called *Sophisticated Casuals* and the ECA’s name is *Gina*. The user can ask for a specific item and the avatar will return the results as well as provide instructions for completing the shopping task. Instructions will include step-by-step information to complete the task that can help the user in navigating the site.

A prototype interface to study senior users’ hesitations with existing web interfaces was developed. The design was developed based on senior adults’ challenges in adopting the web as described in a previous section.

Emotions are also another important factor in Internet adoption. For example, frustration is a key emotion in using the Internet. One method for diffusing frustration involves offering an *apology*, especially if the one apologizing is taking responsibility for the obstacle causing the frustration, thus admitting blameworthiness and regret for an undesirable event [3].

This research was focused on the above parameters of providing navigational help in order to complete a desired task. Along with minimizing frustration, which can be achieved by a timely apology when the system was not able to understand the user's query. For example, if the system could not find a requested search item, the avatar responded "I am sorry, I could not find the requested item". The result made the user believe it was the avatar's mistake; as such the avatar was apologetic towards its limitations to find the requested item. In addition to the apology, the avatar assisted the user by saying "Would you please describe your search in another way". This action will make the user build trust in the avatar as the avatar is trying to solve the problem despite its limitations. Figure 3.2 and 3.3 show the avatar, or experiment, interfaces, and Figure 3.1 shows the control interface.

Furthermore, unlike the control design, the avatar welcomed the user upon opening the site and thanked them upon completing the task, which could make the user feel good.

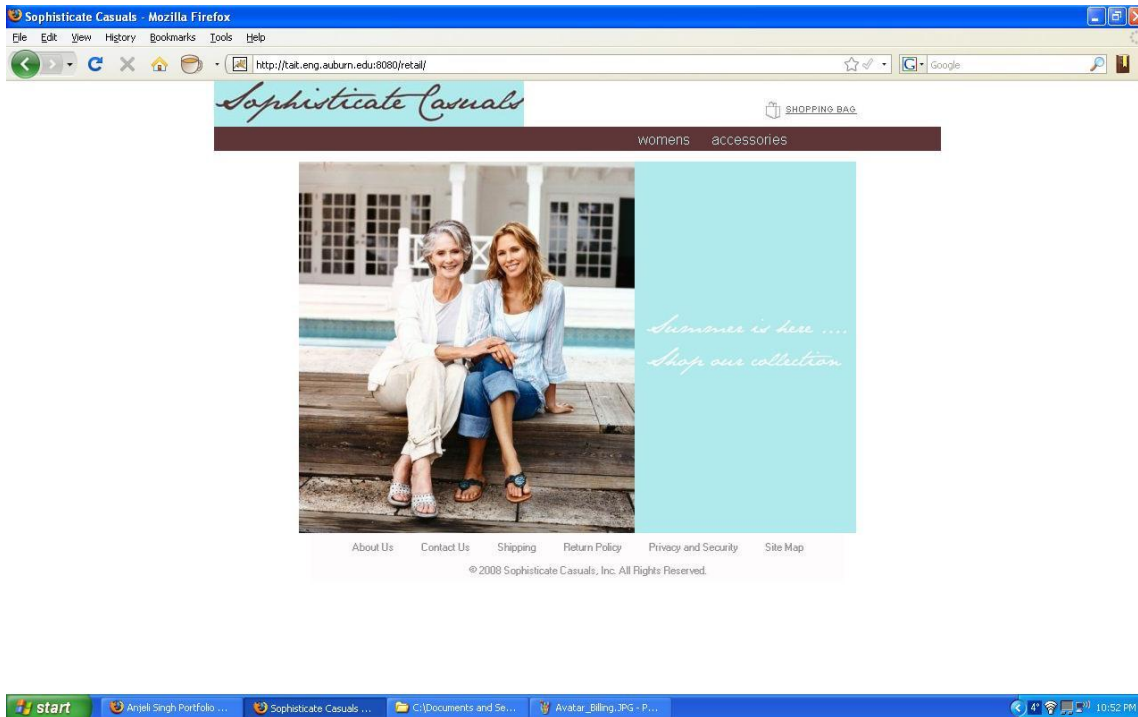


Figure.3.1: Control Interface

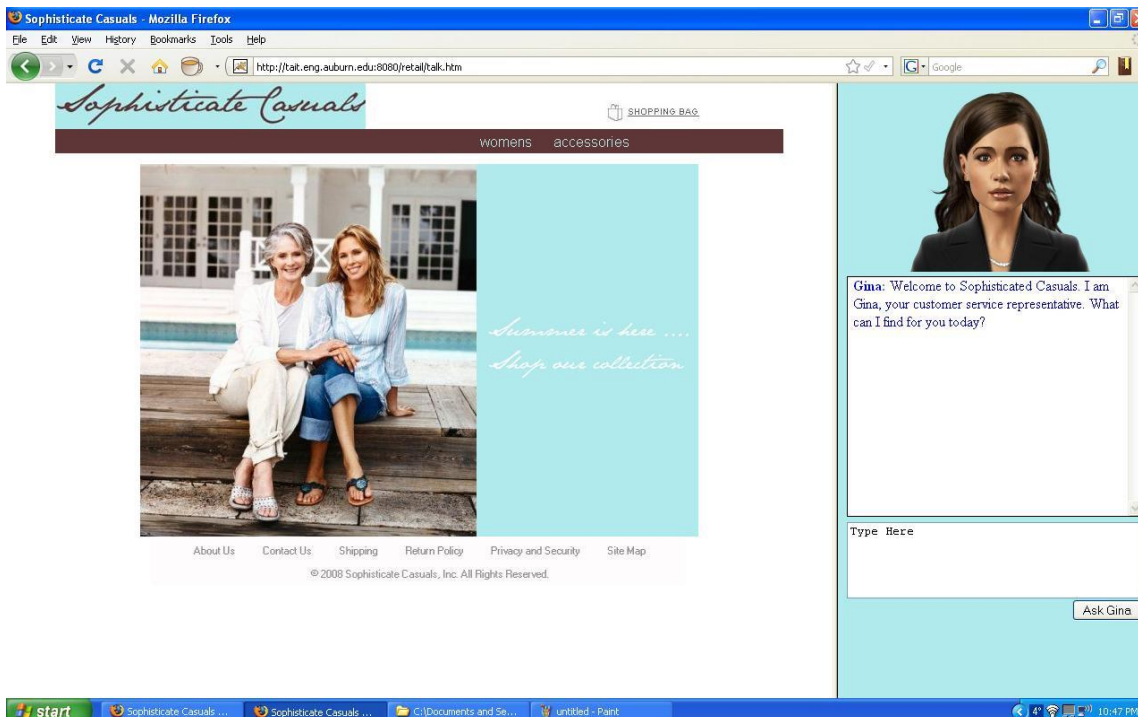


Figure 3.2: Avatar Interface

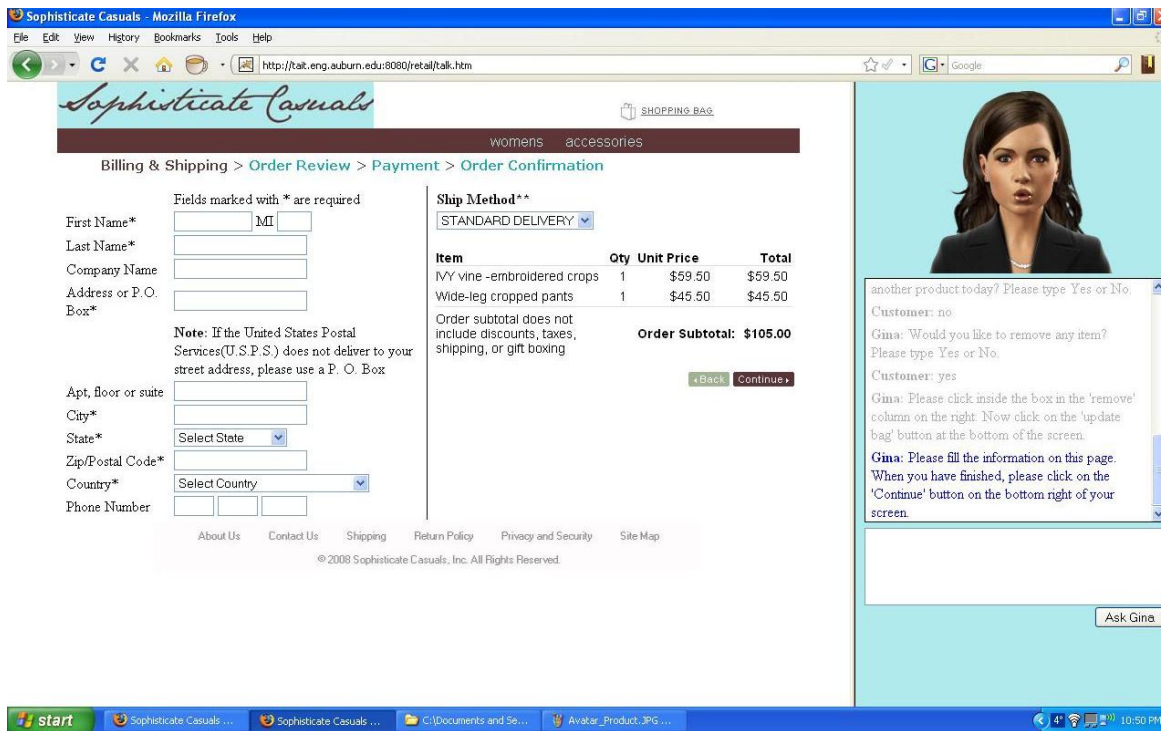


Figure 3.3: Avatar Interface helping in navigation

The avatar used in this research is animated, not a still picture. It has some emotions like nodding, blinking eyes and moving lips to speak. A young female avatar resembling a sales person found in a retail store was used in this research.

4. EXPERIMENT

A laboratory controlled experiment to study the comparison between the avatar and control interface was conducted.

4.1 Participants

The main focus of the study was to test the comparative impact of the avatar and control interface on senior users. By keeping this objective in mind, 61 participants were recruited.

An effort was made to take a random population to cover a larger part of senior adults in terms of age, gender, education, computer literacy, internet literacy, ethnicity, profession, and income.

- Age: Ranged from 50 to 89 (Min=50, Max=89, Mean = 68.34, Std Dev =8.78).
- Gender: Female and male (M=34, F=25, 2 participant did not specify).
- Education: 8th grade or less to graduate degree.
- Computer Literacy: (Min = more than 1 year but less than 2 years, Max = more than 10 years).
- Internet Literacy: Some participants started using the Internet within the last 6 months; some have been using it from 10 or more year (Time Min= 6 months, Max= 10 or more years).
- Ethnicity: Non Hispanic White and Non Hispanic Black.

- Occupation: Most of the participants were retired, while a few of them were working as part time, technical professionals, service workers, homemakers or administrative jobs.
- Income: (Min=\$20,000, Max= \$250,000 OR OVER)

Participants were recruited through postings in the community and word-of-mouth advertisements. Most of the participants were Osher Lifelong Learning Institute (OLLI) members, which is a membership program for learning in retirement. OLLI was founded in the Spring of 1990 as AUall, it has grown to over 400 members [5]. Most members are fully retired and of age 65 or older.

4.2 Design

A between-group design with two treatments, control and avatar interfaces was used. The choice of between-group design was made due to the robustness to more easily avoid confounds introduced when a single person uses both designs [6].

Furthermore, there were enough participants to conduct a between-subject design without compromising the number of subjects in each group. Due to the large number of participants, the study was conducted over an extended period of time. Thus, the experiments were in small groups and the environment remained consistent by means of interface and surroundings.

In short, the experiment had two designs, control and avatar. Each participant was randomly assigned to one of the two designs to perform the task.

4.3 Procedure

The study was conducted in a quiet, enclosed room, free from interruption by getting users away from phone calls and other distractions. First, the users were put at ease by emphasizing that the researchers are testing the product, not the users. The researchers gave a debriefing of the consent form and instructions to all the participants.

The study began with distributing a questionnaire and instructions. Beyond the instructions given in the task description and debriefing, no further assistance was provided. The user had the choice to leave the study at anytime without any explanation.

Finally, at the end of the study, participants were asked to complete the post experiment questionnaire. There were two versions of the questionnaire, one for each design as some additional questions were included in the avatar design. The questionnaires contained both demographic and interface related questions.

4.4 Task

Each participant was asked to purchase a given pair of pants and a blouse using the assigned website (e.g., avatar or control). Specifically, the task was divided into two parts, searching for the given product and completing the task by making the purchase. All the additional information for purchase such as credit card number, address and other related information were provided to the user. Furthermore, to eliminate any kind of assistance in describing the product, participants were given graphical pictures of the items to be purchased as shown in Fig 4.4. As researchers explicitly wanted to observe how participants would naturally

approach the task without any textual description. For example, Black Jacket or White Pants could be a helpful hint to search for these items if stated on the task description page therefore, this description was omitted.



Figure 4.4: Task description products.

To perform the given task each participant needed to access the assigned website therefore the researchers open the appropriate website at the start of the study to save time. The study took approximately 20 minutes.

4.5 Measures

The main goal of the study was to examine the effectiveness of an avatar in a website for control and navigation. This was obtained by measuring a number of usability attributes as listed below.

Two designs were independent variables; control and avatar. Dependant variables were difficulty in getting started, learnability, discovering new features, feedback, successful task completion, recoverability, satisfying experience and flexibility.

Participants were asked to rank each dependant variable on a Likert scale (1 Strongly disagree to 5 Strongly agree).

4.6 Apparatus

To access the website, a desktop computer with windows XP was used. As Internet Explorer is most commonly used browser, therefore it was used to provide a familiar experience to users [19]. Headphones were provided for avatar group to hear the avatar's voice.

4.7 Data Collection Method

The questionnaire, gathered information about the participant's demographics and user's experience with the interface. Five point Likert scale (1 Strongly disagree to 5 Strongly agree) was used. Details of the questionnaire can be found in APPENDIX A and APPENDIX B.

4.8 Design Hypothesis

The following hypotheses were established:

H1: Task Completion: There should be a difference in successfully completing of the task between the control and avatar interface.

H2: Satisfying Experience: The level of satisfaction in completing both tasks should not be the same.

H3: Learnability: The measure of the degree to which the user interface can be learned quickly and effectively should not be the same in both designs.

H4: Feedback: Both interfaces should not provide the same level of feedback in terms of information and comprehension.

H5: Recoverability: Error recovery should not be the same in both interfaces.

H6: Improve with practice: Improvement with time should not be identical in both designs.

H7: Getting Started: The level of difficulty in getting started should not be identical.

H8: Discovering new features: Discovering new features should not be identical in both designs.

H9: Flexibility: There should not be the same level of flexibility in both designs.

H10: Dull to Stimulating: There should be same level of Dull to Stimulating experiences in both designs.

4.9 RESULTS

The data was collected from the Likert scale of range 1 to 5 where 1-strongly disagree 2-disagree 3-neutral 4-agree 5-strongly agree. The data was treated as ordinal, therefore the researchers performed a non parametric test, Mann-Whitney U also known as Mann-Whitney-Wilcoxon for each measure [17, 18, and 20]. Furthermore, there is a graphical detailed description of means and standard deviation for each measure in Table 5.3.

There were 61 participants of 68.34 years of average age. 57.6% and 42.4% of the participants were female and male, respectively. For most of the measures a statistical significant difference was not found, but means for the avatar design were higher than the control as shown in APPENDEX C. The details of the entire study are described in the next section.

Statistical significance was seen in Recoverability (i.e., If I made a mistake, it was easy to correct) as ($Z = -2.1826$, $p = 0.0291$). The value of mean for Recovery in avatar is higher than in control. Mean (avatar) $4.40 >$ Mean (control) 3.96 .

User Experience of the site in terms of Dull to stimulating (i.e., Dull (1-5) Stimulating) has also shown statistical significance as ($Z = -2.0467$, $p = 0.0407$). The value of mean for Recovery in avatar is higher than control. Mean (avatar) $3.76 >$ Mean (control) 3.26 .

For all other measures mean values for avatar design is more than control as shown in Appendix C, although statistical significance was not found.

4.10 DISCUSSION

In this section, we discuss our findings, focusing on their implications for design.

4.10.1 Merits of Avatar Interface

This study found more seniors (Mean (control) = 4.31 , Mean (avatar) = 4.61) were able to successfully complete their task with the avatar treatment. In addition, seniors had satisfying experiences (Mean (control) = 4.14 , Mean (avatar) = 4.24) and felt the avatar website was more learnable (Mean (control) = 4.13 , Mean (avatar) = 4.32). Also seniors believed their understanding for online shopping improved (Mean (control) = 3.40 , Mean (avatar) = 3.46) after using the avatar website, which is a major accomplishment.

Seniors found they could easily recover from errors (Mean (control) = 3.90 , Mean (avatar) = 4.40) and feedback provided by avatar was understandable (Mean (control) = 4.03 , Mean (avatar) = 4.38). For example, when a user was looking for a 'white shirt' and searched for 'a

top', in such similar cases avatar apologized and asked the user to describe their request in another way. As a result of that, user was helped and trained by the avatar to refine his/her search and ask intelligent questions (i.e., questions which system can understand). Avatar assisted users not only performed better with searching for the desired item but also with site navigation.

Secondly, seniors found getting started was easier in avatar design rather than in control (it was a negative question, therefore lower the mean easier was getting started (Mean (control) = 1.97, Mean (avatar) = 1.77)). We are assuming this is due to the welcome message that the user gets at the opening of the website. Though the difference in mean values is relatively low for getting started, the standard deviation in control group is higher than that of avatar group (Std Dev (control) = 1.24, Std Dev (avatar) = 1.09). This signifies seniors had different opinions about getting started.

This raises questions about the welcome message. Before the pilot study we had highlighted the text box with a cursor blinking and the avatar prompted the user to write in the text box. During the pilot study we found that the user was searching for the area to type. We modified the design by filling the text box with a message '*Type here*', which worked well in the pilot study. During the experiment some seniors had trouble with first clicking in the text box to select it and then start typing, as some started typing directly. This resulted in higher standard deviation as some users found it helpful to start while others had tough time figuring it out.

There is a significant difference in the user experience in terms of Dullness to Simulating, as the mean value for avatar is higher. Users found the avatar site more simulating than the control site.' Discovering new features' was not very difficult on avatar site, (it was a negatively framed question, lower the mean easier to discover the new features, Mean (control) = 2.03,

Mean (Avatar) = 1.83). One possible interpretation is that, the avatar narrated the entire navigation to the user as per the user's needs. This may have resulted in helping the user to look and discover new features as directed out by avatar.

Finally, users found the avatar design was flexible (Mean (control) = 3.88, Mean (Avatar) = 4.14) and they had a satisfying experience.

4.10.2 Limitation of the Design

The limitation in the design was avatar's dialogue repetition. It was observed during the study by user's reaction; after using the system for a while users learned to navigate, therefore the avatar's navigational messages were repetitive. As the design of the experiment involved using the avatar until the user completes the task, it was difficult to conclude the point at which the user felt the information was repetitive. Further research can evaluate this limitation as how much navigational information should be provided to the users.

Finally, we focused on users with slower learning and limited exposure to the Internet. Although there are a large number of seniors who had been exposed to the Internet for a long time and they learned fast. We learned all seniors are not novice users and the avatar's repetitive navigation information was annoying to some users after going through one cycle of navigating the site.

5. CONCLUSION AND FUTURE WORK

5.1 Conclusion

This research presents the finding of an experiment to study in the effectiveness of avatar in a website as a social agent. The avatar interface, which had a social agent to help senior users to navigate and search for a desired product in a website, did show some benefits over the control site.

Furthermore, presence of an emphatic social avatar was better than just displaying the results and leaving novice users to complete the task by navigating the complex sites.

In conclusion, the avatar design has a better interface in terms of addressing web interface related issues among seniors. However, it has limitations in discovering new features; therefore, there is a need to improve the existing design.

5.2 FUTURE WORK

The future plans of this project are to continue this project by expanding the functionality of the application and working on the limitations of the design. Functionality will be expanded by adding a voice user interface. As currently only agent speaks while the user can only type his queries therefore in future both agent and user will be able to speak.

We have seen in earlier section, agent script has repetition of navigation dialogues. With further research we would like to improvise the agent conversational script, to provide a better user

experience. Finally we would like to test three designs voice user interface design, true text based chatting without voice and a control design to get a deeper understanding of the problem.

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APPENDIX A

Structured Questionnaire

PART I: WEB SITE EVALUATION

Now, we would like to learn about your **evaluation of the browsing experience with the web site assigned to you**. Please answer each question below to your best knowledge.

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	It was difficult to find information on this web site.	1	2	3	4	5
2	It was easy to locate tabs and links on this web site.	1	2	3	4	5
3	It was difficult to navigate around this website.	1	2	3	4	5

4	It was easy to find what I was looking for on this web site.	1	2	3	4	5
5	This web site was well-organized.	1	2	3	4	5
6	I feel I am able to competently use the Internet.	1	2	3	4	5
7	I am worried about making mistakes on this web site if I have to use it again.	1	2	3	4	5
8	I find the Internet easier to use after using this web site.	1	2	3	4	5
9	I have the required skills to accomplish shopping tasks on this web site.	1	2	3	4	5
10	I am satisfied with my current Internet skill level to use this web site.	1	2	3	4	5
11	I was comfortable using this web site.	1	2	3	4	5
12	I feel comfortable using the Internet.	1	2	3	4	5
13	I felt like a passive observer when viewing this web site.	1	2	3	4	5
14	This web site made me feel invited to participate in determining what I saw and experienced.	1	2	3	4	5
15	This web site was interactive.	1	2	3	4	5
16	This web site is easy to use.	1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
17	It is easy to become skillful at using this web site.	1	2	3	4	5

18	Learning to use this web site is easy.	1	2	3	4	5
19	This web site is flexible to interact.	1	2	3	4	5
20	My interactions with this web site are clear and understandable.	1	2	3	4	5
21	It is easy to interact with this web site.	1	2	3	4	5
22	This web site was somewhat intimidating to me.	1	2	3	4	5
23	It scared me to think that I could lose a lot of information using this web site by hitting the wrong key.	1	2	3	4	5
24	Using this web site would be a bad idea.	1	2	3	4	5
25	This web site is useful for shopping.	1	2	3	4	5
26	This web site improves my shopping.	1	2	3	4	5
27	This web site enables me to shop faster.	1	2	3	4	5
28	This web site enhances effectiveness in shopping.	1	2	3	4	5
29	This web site makes it easier to shop.	1	2	3	4	5
30	This web site enables me to accomplish my shopping more quickly.	1	2	3	4	5

DIRECTION: Here below, an incomplete sentence is given along with 6 pairs of contrasting words. **For each pair of words**, please **circle** the number (on a scale of 1 to 5) that best represents your response to complete the sentence.

INFORMATION ON THIS WEB SITE IS _____.

31	simple	1	2	3	4	5	complex
32	small-scale	1	2	3	4	5	large-scale
33	uncrowded	1	2	3	4	5	crowded
34	similar	1	2	3	4	5	contrasting
35	usual	1	2	3	4	5	surprising
36	common	1	2	3	4	5	rare

DIRECTION: The following list of statements address **concerns some people may feel about using this web site**. Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

THINKING ABOUT SHOPPING ON THIS WEB SITE IN THE FUTURE, I WOULD BE WORRIED BECAUSE _____.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
37	I can't trust the company.	1	2	3	4	5
38	I may not get the product.	1	2	3	4	5
39	I may purchase something by accident.	1	2	3	4	5

40	My personal information may not be kept.	1	2	3	4	5
41	I may not get what I want.	1	2	3	4	5
42	My credit card number may not be secure.	1	2	3	4	5
43	I might be overcharged.	1	2	3	4	5
44	I can't examine the actual product.	1	2	3	4	5
45	I am not able to touch and feel the item.	1	2	3	4	5
46	I must pay for shipping and handling.	1	2	3	4	5
47	I must wait for merchandise to be	1	2	3	4	5
48	Size may be a problem with buying	1	2	3	4	5
49	I can't try on clothing online.	1	2	3	4	5
50	It's too complicated to place an order on	1	2	3	4	5
51	It is difficult to find appropriate web pages.	1	2	3	4	5
52	Pictures take too long to come up.	1	2	3	4	5

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
53	I can count on this web site when things go	1	2	3	4	5
54	This web site really tries to help me.	1	2	3	4	5
55	This web site gives the help and support	1	2	3	4	5
56	This web site is like a friend who is around	1	2	3	4	5
57	This web site is comforting to me.	1	2	3	4	5
58	This web site cares about my problems.	1	2	3	4	5
59	This web site is willing to help me make	1	2	3	4	5
60	This web site is competent and effective in	1	2	3	4	5
61	This web site performs all of its roles very	1	2	3	4	5
62	Overall, this web site is capable and	1	2	3	4	5
63	In general, this website is informative.	1	2	3	4	5
64	I believe that this web site would act in my	1	2	3	4	5
65	If I required help, this web site would do its	1	2	3	4	5
66	This web site is interested in my well being	1	2	3	4	5
67	This web site is truthful in its dealing with	1	2	3	4	5
68	I would characterize this web site as being	1	2	3	4	5
69	This web site keeps its commitments	1	2	3	4	5
70	This web site is sincere and genuine.	1	2	3	4	5

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
71	This web site is entertaining.	1	2	3	4	5
72	This web site is enjoyable.	1	2	3	4	5
73	This web site is interesting.	1	2	3	4	5
74	This web site is fun.	1	2	3	4	5
75	This web site is exciting.	1	2	3	4	5
76	This web site is appealing.	1	2	3	4	5

DIRECTION: Here below, an incomplete sentence is given along with 6 pairs of contrasting words. **For each pair of words**, please **circle** the number (on a scale of 1 to 5) that best represents your response to complete the sentence.

THIS WEB SITE IS _____.

77	Bad	1	2	3	4	5	Good
78	Unpleasant	1	2	3	4	5	Pleasant
79	Unfavorable	1	2	3	4	5	Favorable

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
80	I would like to stay on this web site as long as possible.	1	2	3	4	5
81	I would enjoy spending time on this web site.	1	2	3	4	5
82	I would probably spend more time shopping on this web site than I planned.	1	2	3	4	5
83	I would visit this web site again.	1	2	3	4	5
84	I would probably shop on this web site in the future.	1	2	3	4	5
85	I would patronize this web site.	1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

		Disagree				Agree
86	I will use the Internet more for shopping in the future than I have done before.	1	2	3	4	5
87	I will use the Internet more in general than I have done before.	1	2	3	4	5

ALL the data for GINA

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PART II: DEMOGRAPHIC AND OTHER INFORMATION

Now, we would like to learn about you and your thoughts a little bit. Please answer the following questions by filling the blanks or checking the appropriate selection.

1. What is your **age**? _____ YEARS OLD

2. What is your **gender**?

_____ MALE

_____ FEMALE

3. Which of the following best describes your **current occupation**?

_____ **RETIRED AND NO PART-TIME JOB**

_____ **RETIRED BUT WORKING PART-TIME**

_____ PROFESSIONAL OR TECHNICAL (for example, accountant, artist, computer specialist, engineer, nurse, doctor, teacher)

_____ MANAGER OR ADMINISTRATOR (NON-FARM)

_____ SALES WORKER (for example, insurance salesperson, real estate salesperson, sales clerk, stockbroker)

_____ CLERICAL WORKER (for example, bank teller, bookkeeping, office clerk, postal worker, secretary, teacher's aide)

_____ CRAFTSWORKER (for example, baker, carpenter, electrician,
foreman, jeweler, mechanic, plumber, tailor)

_____ MACHINE OPERATOR OR LABORER (for example, bus driver,
conductor, factory worker, truck driver)

_____ FARMER, FARM MANAGER, OR FARM LABORER

_____ SERVICE WORKER OR PRIVATE HOUSEHOLD WORKER
(for example, barber, bartender, cook, firefighter, police officer,
waiter)

_____ MILITARY

_____ HOMEMAKER

_____ UNABLE TO WORK

_____ OTHER (Please specify: _____)

4. If you are retired, which of the following best describes **your occupation BEFORE retirement?** (If you are not retired, please skip to *question 5*.)

_____ PROFESSIONAL OR TECHNICAL (for example, accountant, artist,
computer specialist, engineer, nurse, doctor, teacher)

_____ MANAGER OR ADMINISTRATOR (NON-FARM)

_____ SALES WORKER (for example, insurance salesperson, real estate
salesperson, sales clerk, stockbroker)

- _____ CLERICAL WORKER (for example, bank teller, bookkeeping, office clerk,
postal worker, secretary, teacher's aide)
- _____ CRAFTSWORKER (for example, baker, carpenter, electrician, foreman,
jeweler, mechanic, plumber, tailor)
- _____ MACHINE OPERATOR OR LABORER (for example, bus driver,
conductor, factory worker, truck driver)
- _____ FARMER, FARM MANAGER, OR FARM LABORER
- _____ SERVICE WORKER OR PRIVATE HOUSEHOLD WORKER (for
example, barber, bartender, cook, firefighter, police officer, waiter)
- _____ MILITARY
- _____ HOMEMAKER
- _____ OTHER (Please specify: _____)

5. How long have you used COMPUTERS?

- _____ NEVER USED COMPUTERS UNTIL TODAY
- _____ LESS THAN 6 MONTHS
- _____ 6 MONTHS TO 1 YEAR
- _____ MORE THAN 1 YEAR BUT LESS THAN 2 YEARS
- _____ 2 TO 4 YEARS
- _____ MORE THAN 4 YEARS BUT LESS THAN 10 YEARS
- _____ 10 YEARS OR MORE

6. **How long have you used the INTERNET?**

_____ NEVER USED COMPUTERS UNTIL TODAY

_____ LESS THAN 6 MONTHS

_____ 6 MONTHS TO 1 YEAR

_____ MORE THAN 1 YEAR BUT LESS THAN 2 YEARS

_____ 2 TO 4 YEARS

_____ MORE THAN 4 YEARS BUT LESS THAN 10 YEARS

_____ 10 YEARS OR MORE

7. On average, how many **hours** do you spend **per week using the Internet?**

_____ HOURS

8. What is **the highest level of education** you have completed?

_____ 8TH GRADE OR LESS

_____ SOME HIGH SCHOOL

_____ HIGH SCHOOL DEGREE

_____ SOME COLLEGE OR TECHNICAL SCHOOL

_____ COLLEGE DEGREE (4 YEARS)

_____ SOME GRADUATE SCHOOL

_____ GRADUATE DEGREE (MASTER'S, DOCTORATE, ETC.)

9. Which of the following **ethnic groups** do you consider yourself to be a member of?

_____NON-HISPANIC WHITE

_____NON-HISPANIC BLACK

_____HISPANIC

_____ASIAN/PACIFIC ISLANDER

_____AMERICAN INDIAN/ALASKAN NATIVE

_____OTHER (Please specify: _____)

10. Which of the following described your current **marital status**?

_____SINGLE AND NEVER MARRIED

_____MARRIED

_____SEPARATED

_____DIVORCED

_____WIDOWED

11. Which of the following ranges includes your **total annual household income** from all

_____ UNDER \$5,000

_____ \$10,000 TO \$14,999

_____ \$20,000 TO \$24,999

_____ \$30,000 TO \$39,999

_____ \$50,000 TO \$59,999

_____ \$70,000 TO \$79,999

_____ \$90,000 TO \$99,999

_____ \$125,000 TO \$149,999

_____ \$200,000 TO \$249,999

_____ \$5,000 TO \$9,999

_____ \$15,000 TO \$19,999

_____ \$25,000 TO \$29,999

_____ \$40,000 TO \$49,999

_____ \$60,000 TO \$69,999

_____ \$80,000 TO \$89,999

_____ \$100,000 TO \$124,999

³⁷_____ \$150,000 TO \$199,999

_____ \$250,000 OR OVER

sources before taxes in 2007?

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
12	I am generally open to accepting new ideas.	1	2	3	4	5
13	I am willing to try new things.	1	2	3	4	5
14	I tend to feel new ways of living and doing things are improvements over the past.	1	2	3	4	5
15	I feel that I am an innovative person.	1	2	3	4	5
16	I would rather be safe than sorry.	1	2	3	4	5
17	I want to be sure before I purchase anything.	1	2	3	4	5
18	I avoid risky things.	1	2	3	4	5
22	In general, I am among the last in my circle of friends to buy a new computer or Internet related product/service when it appears.	1	2	3	4	5
23	If I heard that a new computer or Internet	1	2	3	4	5

	related product was available in the store, I would be interested enough to buy it.					
24	Compared to my friends, I own few computer or Internet related products.	1	2	3	4	5
25	In general, I am the first in my circle of friends to know the latest computer or Internet technologies.	1	2	3	4	5
26	I will buy a computer or Internet related product even if I haven't heard it yet.	1	2	3	4	5
27	I do not know the names of new computer or Internet technologies before other people do.	1	2	3	4	5
28	I tend to feel apprehensive about using a computer.	1	2	3	4	5
29	It scares me to think that I could cause a computer to destroy a large amount of information by hitting the wrong key.	1	2	3	4	5
30	I tend to hesitate to use a computer for fear of making mistakes that I cannot correct.	1	2	3	4	5
31	Technological change will insure a brighter future.	1	2	3	4	5
32	We are experiencing a decline in the quality	1	2	3	4	5

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
33	of life. Modern business constantly builds a better tomorrow.	1	2	3	4	5
34	Things used to be better in the good old days.	1	2	3	4	5
35	History involves a steady improvement in human welfare.	1	2	3	4	5
36	Products are getting shoddier and shoddier.	1	2	3	4	5
37	They don't make them like they used to.	1	2	3	4	5
38	Steady growth in GNP has brought increased human happiness.	1	2	3	4	5

Thank you very much for your participation in this study!

APPENDIX B

Condition #: 3 Participant #: _____

PART I: WEB SITE EVALUATION

Now, we would like to learn about your **evaluation of the browsing experience with the web site assigned to you**. Please answer each question below to your best knowledge.

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Getting started with this web site was difficult.	1	2	3	4	5
2	I was able to learn fast to use this web site.	1	2	3	4	5
3	Discovering new features on this web site was difficult.	1	2	3	4	5

4	On this web site, task can be performed in a straight-forward manner.	1	2	3	4	5
5	There were too many steps to complete the task.	1	2	3	4	5
6	Steps to complete the task followed a logical sequence.	1	2	3	4	5
7	Feedback on the completion of the steps was clear.	1	2	3	4	5
8	I was able to successfully complete the task.	1	2	3	4	5
9	It was easy to locate tabs and links on this web site.	1	2	3	4	5
10	It was difficult to navigate around this website.	1	2	3	4	5
11	It was easy to find what I was looking for on this web site.	1	2	3	4	5
12	This web site was well-organized.	1	2	3	4	5
13	I feel I am able to competently use the Internet.	1	2	3	4	5
14	I am worried about making mistakes on this web site if I have to use it again.	1	2	3	4	5
15	I find the Internet easier to use after using this web site.	1	2	3	4	5
16	I have the required skills to accomplish shopping tasks on this web site.	1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

17	I am satisfied with my current Internet skill level to use this web site.	1	2	3	4	5
18	I was comfortable using this web site.	1	2	3	4	5
19	I feel comfortable using the Internet.	1	2	3	4	5
20	I felt like a passive observer when viewing this web site.	1	2	3	4	5
21	This web site made me feel invited to participate in determining what I saw and experienced.	1	2	3	4	5
22	This web site was interactive.	1	2	3	4	5
23	This web site is easy to use.	1	2	3	4	5
24	It is easy to become skillful at using this web site.	1	2	3	4	5
25	Learning to use this web site is easy.	1	2	3	4	5
26	This web site is flexible to interact.	1	2	3	4	5
27	My interactions with this web site are clear and understandable.	1	2	3	4	5
28	It is easy to interact with this web site.	1	2	3	4	5
29	This web site was somewhat intimidating to me.	1	2	3	4	5
30	It scared me to think that I could lose a lot of information using this web site by hitting the wrong key.	1	2	3	4	5
31	Using this web site would be a bad idea.	1	2	3	4	5
32	This web site is useful for shopping.	1	2	3	4	5
33	This web site improves my shopping.	1	2	3	4	5

34	This web site enables me to shop faster.	1	2	3	4	5
35	This web site enhances effectiveness in shopping.	1	2	3	4	5
36	This web site makes it easier to shop.	1	2	3	4	5
37	This web site enables me to accomplish my shopping more quickly.	1	2	3	4	5
38	If I made a mistake, it was easy to correct.	1	2	3	4	5
39	After using this web site, my understanding of online shopping improved.	1	2	3	4	5

DIRECTION: Here below, an incomplete sentence is given along with 6 pairs of contrasting words. **For each pair of words**, please **circle** the number (on a scale of 1 to 5) that best represents your response to complete the sentence.

INFORMATION ON THIS WEB SITE IS _____.

40	simple	1	2	3	4	5	complex
41	small-scale	1	2	3	4	5	large-scale
42	uncrowded	1	2	3	4	5	crowded
43	similar	1	2	3	4	5	contrasting
44	usual	1	2	3	4	5	surprising

45	common	1	2	3	4	5	rare
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DIRECTION: The following list of statements address **concerns some people may feel about using this web site**. Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

IF I HAD TO SHOP ON THIS WEB SITE IN REALITY, I WOULD BE WORRIED
BECAUSE _____.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
46	I can't trust the company.	1	2	3	4	5
47	I may not get the product.	1	2	3	4	5
48	I may purchase something by accident.	1	2	3	4	5
49	My personal information may not be kept.	1	2	3	4	5
50	I may not get what I want.	1	2	3	4	5
51	My credit card number may not be secure.	1	2	3	4	5
52	I might be overcharged.	1	2	3	4	5
53	I can't examine the actual product.	1	2	3	4	5
54	I am not able to touch and feel the item.	1	2	3	4	5
55	I must pay for shopping and handling.	1	2	3	4	5
56	I must wait for merchandise to be	1	2	3	4	5

IF I HAD TO SHOP ON THIS WEB SITE IN REALITY, I WOULD BE WORRIED

BECAUSE _____.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
57	Size may be a problem with buying	1	2	3	4	5
58	I can't try on clothing online.	1	2	3	4	5
59	It's too complicated to place an order on	1	2	3	4	5
60	It is difficult to find appropriate web pages.	1	2	3	4	5
61	Pictures take too long to come up.	1	2	3	4	5

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
62	I can count on this web site when things go	1	2	3	4	5
63	This web site really tries to help me.	1	2	3	4	5
64	This web site gives the help and support	1	2	3	4	5
65	This web site is like a friend who is around	1	2	3	4	5

66	This web site is comforting to me.	1	2	3	4	5
67	This web site cares about my problems.	1	2	3	4	5
68	This web site is willing to help me make	1	2	3	4	5
69	This web site is competent and effective in	1	2	3	4	5
70	This web site performs all of its roles very	1	2	3	4	5
71	Overall, this web site is capable and	1	2	3	4	5
72	In general, this website is informative.	1	2	3	4	5
73	I believe that this web site would act in my	1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
74	If I required help, this web site would do its	1	2	3	4	5
75	This web site is interested in my well being	1	2	3	4	5
76	This web site is truthful in its dealing with	1	2	3	4	5
77	I would characterize this web site as being	1	2	3	4	5
78	This web site keeps its commitments	1	2	3	4	5
79	This web site is sincere and genuine.	1	2	3	4	5

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly	Disagree	Neutral	Agree	Strongly
--	--	----------	----------	---------	-------	----------

		Disagree				Agree
80	This web site is entertaining.	1	2	3	4	5
81	This web site is enjoyable.	1	2	3	4	5
82	This web site is interesting.	1	2	3	4	5
83	This web site is fun.	1	2	3	4	5
84	This web site is exciting.	1	2	3	4	5
85	This web site is appealing.	1	2	3	4	5

DIRECTION: Here below, an incomplete sentence is given along with 6 pairs of contrasting words. **For each pair of words**, please **circle** the number (on a scale of 1 to 5) that best represents your response to complete the sentence.

OVERALL, USING THIS WEB SITE IS _____.

86	Unpleasant	1	2	3	4	5	Pleasant
87	Unfavorable	1	2	3	4	5	Favorable
88	Bad	1	2	3	4	5	Good
89	Frustrating	1	2	3	4	5	Satisfying
90	Dull	1	2	3	4	5	Stimulating
91	Rigid	1	2	3	4	5	Flexible

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

IF THIS WEB SITE WAS PUBLICLY AVAILABLE, _____.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
92	I would like to stay on this web site as long as possible.	1	2	3	4	5
93	I would enjoy spending time on this web site.	1	2	3	4	5
94	I would probably spend more time shopping on this web site than I planned.	1	2	3	4	5
95	I would visit this web site again.	1	2	3	4	5
96	I would shop on this web site again.	1	2	3	4	5
97	I would patronize this web site.	1	2	3	4	5

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

AFTER TODAY’S PARTICIPATION IN THE INTERNET ACTIVITY,

I THINK THAT _____.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
98	I will use the Internet more for shopping in the future than I have done before.	1	2	3	4	5
99	I will use the Internet more in general than I have done before.	1	2	3	4	5

DIRECTION: We are interested in how helpful **Gina** (the online customer service representative) was during your shopping on this web site. Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
100	Gina provided helpful suggestions.	1	2	3	4	5
101	Gina understood well what I typed.	1	2	3	4	5
102	Gina’s conversation was difficult to understand.	1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
103	I knew what to say in response to Gina	1	2	3	4	5

	during my interaction with her.					
104	Gina behaved the way I expected.	1	2	3	4	5
105	I was able to pay attention to Gina throughout the shopping.	1	2	3	4	5
106	Gina did not appear to be a real person.	1	2	3	4	5

Here below, please provide any additional comments that you have to improve this web site.

PART II: DEMOGRAPHIC AND OTHER INFORMATION

Now, we would like to learn about you and your thoughts a little bit. Please answer the following questions by filling the blanks or checking the appropriate selection.

12. What is your **gender**?

_____MALE

_____FEMALE

13. What is your **age**? _____ YEARS OLD

|

14. What is **the highest level of education** you have completed?

_____ 8TH GRADE OR LESS

_____ SOME HIGH SCHOOL

_____ HIGH SCHOOL DEGREE

_____ SOME COLLEGE OR TECHNICAL SCHOOL

_____ COLLEGE DEGREE (4 YEARS)

_____ SOME GRADUATE SCHOOL

_____ GRADUATE DEGREE (MASTER'S, DOCTORATE, ETC.)

15. Which of the following **ethnic groups** do you consider yourself to be a member of?

_____ NON-HISPANIC WHITE

_____ NON-HISPANIC BLACK

_____ HISPANIC

_____ ASIAN/PACIFIC ISLANDER

_____ AMERICAN INDIAN/ALASKAN NATIVE

_____ OTHER (Please specify: _____)

16. Which of the following ranges includes your **total annual household income** from all

_____ UNDER \$5,000

_____ \$10,000 TO \$14,999

_____ \$20,000 TO \$24,999

_____ \$30,000 TO \$39,999

_____ \$50,000 TO \$59,999

_____ \$70,000 TO \$79,999

_____ \$90,000 TO \$99,999

_____ \$125,000 TO \$149,999

_____ \$200,000 TO \$249,999

_____ \$5,000 TO \$9,999

_____ \$15,000 TO \$19,999

_____ \$25,000 TO \$29,999

_____ \$40,000 TO \$49,999

_____ \$60,000 TO \$69,999

_____ \$80,000 TO \$89,999

_____ \$100,000 TO \$124,999

_____ \$150,000 TO \$199,999

_____ \$250,000 OR OVER

sources before taxes in 2007?

17. Which of the following best describes your **current occupation**?

- _____ **RETIRED AND NO PART-TIME JOB**
- _____ **RETIRED BUT WORKING PART-TIME**
- _____ PROFESSIONAL OR TECHNICAL (for example, accountant, artist, computer specialist, engineer, nurse, doctor, teacher)
- _____ MANAGER OR ADMINISTRATOR (NON-FARM)
- _____ SALES WORKER (for example, insurance salesperson, real estate salesperson, sales clerk, stockbroker)
- _____ CLERICAL WORKER (for example, bank teller, bookkeeping, office clerk, postal worker, secretary, teacher's aide)
- _____ CRAFTSWORKER (for example, baker, carpenter, electrician, foreman, jeweler, mechanic, plumber, tailor)
- _____ MACHINE OPERATOR OR LABORER (for example, bus driver, conductor, factory worker, truck driver)
- _____ FARMER, FARM MANAGER, OR FARM LABORER
- _____ SERVICE WORKER OR PRIVATE HOUSEHOLD WORKER (for example, barber, bartender, cook, firefighter, police officer, waiter)
- _____ MILITARY
- _____ HOMEMAKER

_____ UNABLE TO WORK

_____ OTHER (Please specify: _____)

18. If you are retired, which of the following best describes **your occupation BEFORE retirement?** (If you are not retired, please skip to *question 8.*)

_____ PROFESSIONAL OR TECHNICAL (for example, accountant, artist, computer specialist, engineer, nurse, doctor, teacher)

_____ MANAGER OR ADMINISTRATOR (NON-FARM)

_____ SALES WORKER (for example, insurance salesperson, real estate salesperson, sales clerk, stockbroker)

_____ CLERICAL WORKER (for example, bank teller, bookkeeping, office clerk, postal worker, secretary, teacher's aide)

_____ CRAFTSWORKER (for example, baker, carpenter, electrician, foreman, jeweler, mechanic, plumber, tailor)

_____ MACHINE OPERATOR OR LABORER (for example, bus driver, conductor, factory worker, truck driver)

_____ FARMER, FARM MANAGER, OR FARM LABORER

_____ SERVICE WORKER OR PRIVATE HOUSEHOLD WORKER (for example, barber, bartender, cook, firefighter, police officer, waiter)

_____ MILITARY

_____ HOMEMAKER

_____ OTHER (Please specify: _____)

19. Which of the following described your current **marital status**?

_____ SINGLE AND NEVER MARRIED

_____ MARRIED

_____ SEPARATED

_____ DIVORCED

_____ WIDOWED

20. **How long have you used COMPUTERS?**

_____ NEVER USED COMPUTERS UNTIL TODAY

_____ LESS THAN 6 MONTHS

_____ 6 MONTHS TO 1 YEAR

_____ MORE THAN 1 YEAR BUT LESS THAN 2 YEARS

_____ 2 TO 4 YEARS

_____ MORE THAN 4 YEARS BUT LESS THAN 10 YEARS

_____ 10 YEARS OR MORE

21. On average, how many **times** do you use **a computer** during the course of **a week**?

_____ 0-1

_____ 2-3

_____ 4-5

_____ 6 or more

22. How long have you used the INTERNET?

- _____ NEVER USED COMPUTERS UNTIL TODAY
- _____ LESS THAN 6 MONTHS
- _____ 6 MONTHS TO 1 YEAR
- _____ MORE THAN 1 YEAR BUT LESS THAN 2 YEARS
- _____ 2 TO 4 YEARS
- _____ MORE THAN 4 YEARS BUT LESS THAN 10 YEARS
- _____ 10 YEARS OR MORE

23. On average, how many hours do you spend per week using the Internet?

_____ HOURS

DIRECTION: Please circle the number that best matches **your level of agreement with each of the following statements** using a 5-point scale with 1 for “strongly disagree” and 5 for “strongly agree”.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
--	--	----------------------	----------	---------	-------	-------------------

13	I would rather be safe than sorry.	1	2	3	4	5
14	I want to be sure before I purchase anything.	1	2	3	4	5
15	I avoid risky things.	1	2	3	4	5
16	In general, I am among the last in my circle of friends to buy a new computer or Internet related product/service when it appears.	1	2	3	4	5
17	If I heard that a new computer or Internet related product was available in the store, I would be interested enough to buy it.	1	2	3	4	5
18	Compared to my friends, I own few computer or Internet related products.	1	2	3	4	5
19	In general, I am the first in my circle of friends to know the latest computer or Internet technologies.	1	2	3	4	5
20	I will buy a computer or Internet related product even if I haven't heard it yet.	1	2	3	4	5
21	I do not know the names of new computer or Internet technologies before other people do.	1	2	3	4	5
22	I am computer literate.	1	2	3	4	5

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
23	I am good with computers.	1	2	3	4	5
24	I trust computers to do online shopping.	1	2	3	4	5
25	I am comfortable using computers to pay household bills.	1	2	3	4	5
26	I trust computers to securely send my personal information over the Internet.	1	2	3	4	5
27	I tend to feel apprehensive about using a computer.	1	2	3	4	5
28	It tends to scare me to think that I could cause a computer to destroy a large amount of information by hitting the wrong key.	1	2	3	4	5
29	I tend to hesitate to use a computer for fear of making mistakes that I cannot correct.	1	2	3	4	5

Thank you very much for your participation in this study!

APPENDIX C

Item Number	Mapping
Item1	Getting started with this web site was difficult.
Item2	I was able to learn fast to use this web site.
Item3	Discovering new features on this web site was difficult.
Item4	On this web site, task can be performed in a straight-forward manner.
Item5	There were too many steps to complete the task.
Item6	Steps to complete the task followed a logical sequence.
Item7	Feedback on the completion of the steps was clear.
Item8	I was able to successfully complete the task.
Item38	If I made a mistake, it was easy to correct.
Item39	After using this web site, my understanding of online shopping improved.
Item89	Frustrating(1-5) Satisfying

Item90	Dull(1-5)Stimulating
Item91	Rigid(1-5)Flexible

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Proc Logistic Analysis

Obs Condition Item1 Item2 Item3 Item4 Item5 Item6 Item7 Item8 Item38 Item39 Item89
Item90 Item91

1	1	1	5	1	5	1	5	3	5	3	3	5	3	1
2	1	1	5	1	5	1	4	4	5	4	5	4	3	5
3	1	1	5	1	5	1	5	5	5	5	5	.	.	.
4	1	1	4	1	5	2	4	4	4	4	2	5	4	4
5	1	1	4	2	4	2	4	4	5	4	3	4	3	3
6	1	1	5	1	5	1	5	5	5	5	2	4	3	4
7	1	1	5	1	4	2	4	3	4	5	5	3	3	4
8	1	1	5	2	4	2	4	4	4	4	4	4	4	4
9	1	1	5	1	5	1	5	5	5	4	3	5	4	5
10	1	1	5	1	5	1	5	.	5	5	2	5	3	5
11	1	1	5	3	4	2	4	4	5	4	2	3	3	2

12	1	1	5	3	5	2	4	4	4	4	3	4	3	3
13	1	1	5	1	5	1	5	4	5	4	5	5	1	4
14	1	1	5	1	5	1	5	5	5	5	3	5	4	5
15	1	2	.	1	4	1	4	5	5	4	4	5	4	4
16	1	2	1	1	1	2	1	1	1	5	3	5	3	4
17	1	2	5	2	5	2	4	4	5	4	3	4	4	5
18	1	2	4	2	5	1	4	4	5	3	3	4	3	4
19	1	2	4	1	5	2	4	5	.	5	3	3	3	3
20	1	2	1	2	1	2	4	4	1	2	3	5	4	5
21	1	2	4	3	5	1	5	4	4	4	3	4	3	4
22	1	2	4	3	4	2	4	4	4	3	2	3	3	3
23	1	2	4	1	5	1	5	5	5	5	5	.	.	.
24	1	2	4	1	4	1	5	5	5	4	3	4	3	4
25	1	3	4	3	5	1	4	2	5	3	4	4	3	4
26	1	4	2	4	2	5	2	2	1	4	4	4	3	3
27	1	4	5	5	4	2	4	.	4	1	5	1	.	.
28	1	4	4	2	4	3	4	4	4	4	4	5	5	5
29	1	5	1	5	1	5	4	5	5	3	3	4	3	3
30	1	5	5	5	5	1	5	5	5	3	3	5	3	5
31	3	1	5	1	5	1	5	5	5	5	5	5	3	4
32	3	1	5	1	5	1	5	5	5	5	3	1	1	2
33	3	1	4	1	4	4	4	4	5	5	3	4	4	3

34 3 1 5 2 5 2 5 5 5 5 3 5 5 5
35 3 1 5 1 5 1 5 4 5 5 5 5 5 5
36 3 1 5 5 5 1 5 5 5 5 1 4 3 3
37 3 1 5 1 5 1 5 5 5 3 5 5 5 5
38 3 1 1 3 5 . 4 5 5 3 4 4 3 4
39 3 1 5 1 5 1 5 5 5 5 4 5 5 5
40 3 1 5 1 3 2 4 4 5 5 1 4 3 4
41 3 1 5 1 5 1 5 5 5 5 4 4 4 5
42 3 1 5 1 5 2 5 5 5 4 5 5 5 5
43 3 1 4 . 4 . 4 4 4 5 5 5 4 5
44 3 1 5 1 5 1 5 5 5 5 3 5 5 5
45 3 1 5 2 5 1 4 4 5 5 3 5 5 5
46 3 1 1 1 1 1 1 1 1 5 1 5 3 4
47 3 1 5 1 5 1 5 5 5 3 2 5 3 3
48 3 2 5 2 5 5 5 5 2 5 5 4 3 4
49 3 2 4 2 4 2 4 4 4 4 3 5 4 4
50 3 2 4 2 5 1 5 5 5 5 5 5 5 5

Proc Logistic Analysis

Obs Condition Item1 Item2 Item3 Item4 Item5 Item6 Item7 Item8 Item38 Item39 Item89
 Item90 Item91

51	3	2	4	2	.	2	5	5	5	5	5	5	5	5
52	3	2	5	1	4	1	5	5	5	3	2	.	.	.
53	3	2	3	2	4	2	4	4	4	3	3	3	3	3
54	3	2	4	2	4	2	4	4	4	3	3	4	3	4
55	3	2	5	1	5	1	5	2	5
56	3	3	5	1	5	1	4	5	5	4	5	1	3	4
57	3	3	4	2	5	2	4	4	5	4	4	3	3	4
58	3	3	3	4	4	2	4	4	4	4	4	4	3	4
59	3	4	4	2	4	2	4	5	5	5	4	4	4	4
60	3	4	4	3	5	2	4	5	5	4	3	5	4	4
61	3	5	5	5	3	4	4	3	5	5	1	4	3	3

Proc Logistic Analysis

----- Condition=1 -----

The MEANS Procedure

Variable	N	Mean	Std Dev	Minimum	Maximum
<i>ff</i>					
Item1	30	1.9666667	1.2452207	1.0000000	5.0000000
Item2	29	4.1379310	1.2740301	1.0000000	5.0000000
Item3	30	2.0333333	1.3256965	1.0000000	5.0000000
Item4	30	4.2000000	1.2703516	1.0000000	5.0000000
Item5	30	1.7333333	1.0482607	1.0000000	5.0000000
Item6	30	4.2000000	0.8866831	1.0000000	5.0000000
Item7	28	4.0357143	1.0357371	1.0000000	5.0000000
Item8	29	4.3103448	1.2277578	1.0000000	5.0000000
Item38	30	3.9000000	0.9595257	1.0000000	5.0000000
Item39	30	3.4000000	1.0034424	2.0000000	5.0000000
Item89	28	4.1428571	0.9315175	1.0000000	5.0000000

Item90	27	3.2592593	0.7121253	1.0000000	5.0000000
Item91	27	3.8888889	1.0127394	1.0000000	5.0000000

ff

----- Condition=3 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
----------	---	------	---------	---------	---------

ff

Item1	31	1.7741935	1.0865750	1.0000000	5.0000000
Item2	31	4.3225806	1.0766335	1.0000000	5.0000000
Item3	30	1.8333333	1.1472105	1.0000000	5.0000000
Item4	30	4.4666667	0.8995529	1.0000000	5.0000000
Item5	29	1.7241379	1.0315229	1.0000000	5.0000000
Item6	31	4.4193548	0.8072254	1.0000000	5.0000000
Item7	31	4.3870968	0.9548968	1.0000000	5.0000000
Item8	31	4.6129032	0.9193265	1.0000000	5.0000000
Item38	30	4.4000000	0.8136762	3.0000000	5.0000000
Item39	30	3.4666667	1.3578211	1.0000000	5.0000000
Item89	29	4.2413793	1.0907131	1.0000000	5.0000000

Item90	29	3.7586207	1.0231315	1.0000000	5.0000000
Item91	29	4.1379310	0.8334154	2.0000000	5.0000000

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Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item1

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
-----------	---	---------------	-------------------	------------------	------------

////////////////////////////////////

1	30	968.50	930.0	63.619225	32.283333
3	31	922.50	961.0	63.619225	29.758065

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 968.5000

Normal Approximation

Z 0.6052

One-Sided Pr > Z 0.2725

Two-Sided Pr > |Z| 0.5451

t Approximation

One-Sided Pr > Z 0.2737

Two-Sided Pr > |Z| 0.5474

Exact Test

One-Sided Pr >= S 0.2780

Two-Sided Pr >= |S - Mean| 0.5573

Kruskal-Wallis Test

Chi-Square 0.3662

DF 1

Pr > Chi-Square 0.5451

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item2

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1	29	855.0	884.50	60.519940	29.482759
3	31	975.0	945.50	60.519940	31.451613

////////////////////////////////////

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 855.0000

Normal Approximation

Z -0.4874
One-Sided Pr < Z 0.3130
Two-Sided Pr > |Z| 0.6259

t Approximation

One-Sided Pr < Z 0.3139
Two-Sided Pr > |Z| 0.6278

Exact Test

One-Sided Pr <= S 0.3061
Two-Sided Pr >= |S - Mean| 0.6099

Kruskal-Wallis Test

Chi-Square 0.2376
DF 1
Pr > Chi-Square 0.6259

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item3

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
-----------	---	---------------	-------------------	------------------	------------

ff

1	30	942.0	915.0	62.508982	31.40
3	30	888.0	915.0	62.508982	29.60

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 942.0000

Normal Approximation

Z	0.4319
One-Sided Pr > Z	0.3329
Two-Sided Pr > Z	0.6658

t Approximation

One-Sided Pr > Z	0.3337
Two-Sided Pr > Z	0.6674

Exact Test

One-Sided Pr \geq S	0.3425
Two-Sided Pr \geq S - Mean	0.6849

Kruskal-Wallis Test

Chi-Square	0.1866
DF	1
Pr > Chi-Square	0.6658

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item4

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1	30	879.0	915.0	59.009838	29.30
3	30	951.0	915.0	59.009838	31.70

ff

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 879.0000

Normal Approximation

Z -0.6101
One-Sided Pr < Z 0.2709
Two-Sided Pr > |Z| 0.5418

t Approximation

One-Sided Pr < Z 0.2721
Two-Sided Pr > |Z| 0.5442

Exact Test

One-Sided Pr <= S 0.2652
Two-Sided Pr >= |S - Mean| 0.5304

Kruskal-Wallis Test

Chi-Square 0.3722
DF 1
Pr > Chi-Square 0.5418

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item5

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
-----------	---	---------------	-------------------	------------------	------------

ff

1	30	906.50	900.0	59.335301	30.216667
3	29	863.50	870.0	59.335301	29.775862

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 863.5000

Normal Approximation

Z	-0.1095
One-Sided Pr < Z	0.4564
Two-Sided Pr > Z	0.9128

t Approximation

One-Sided Pr < Z	0.4566
Two-Sided Pr > Z	0.9131

Exact Test

One-Sided Pr <= S	0.4617
Two-Sided Pr >= S - Mean	0.9309

Kruskal-Wallis Test

Chi-Square	0.0120
DF	1
Pr > Chi-Square	0.9128

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item6

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1	30	855.50	930.0	61.306573	28.516667
3	31	1035.50	961.0	61.306573	33.403226

ff

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 855.5000

Normal Approximation

Z -1.2152
One-Sided Pr < Z 0.1121
Two-Sided Pr > |Z| 0.2243

t Approximation

One-Sided Pr < Z 0.1145
Two-Sided Pr > |Z| 0.2290

Exact Test

One-Sided Pr <= S 0.1340
Two-Sided Pr >= |S - Mean| 0.2540

Kruskal-Wallis Test

Chi-Square 1.4767
DF 1
Pr > Chi-Square 0.2243

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item7

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
-----------	---	---------------	-------------------	------------------	------------

ff

1	28	738.50	840.0	60.155949	26.375000
3	31	1031.50	930.0	60.155949	33.274194

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 738.5000

Normal Approximation

Z -1.6873
One-Sided Pr < Z 0.0458
Two-Sided Pr > |Z| 0.0915

t Approximation

One-Sided Pr < Z 0.0485
Two-Sided Pr > |Z| 0.0969

Exact Test

One-Sided Pr <= S 0.0488
Two-Sided Pr >= |S - Mean| 0.0945

Kruskal-Wallis Test

Chi-Square 2.8469
DF 1
Pr > Chi-Square 0.0915

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item8

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1	29	814.50	884.50	54.363582	28.086207
3	31	1015.50	945.50	54.363582	32.758065

////////////////////////////////////

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 814.5000

Normal Approximation

Z	-1.2876
One-Sided Pr < Z	0.0989
Two-Sided Pr > Z	0.1979

t Approximation

One-Sided Pr < Z	0.1015
Two-Sided Pr > Z	0.2029

Exact Test

One-Sided Pr <= S	0.1045
Two-Sided Pr >= S - Mean	0.2056

Kruskal-Wallis Test

Chi-Square	1.6580
DF	1
Pr > Chi-Square	0.1979

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item38

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1	30	777.0	915.0	63.227796	25.90
3	30	1053.0	915.0	63.227796	35.10

ff

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 777.0000

Normal Approximation

Z -2.1826
One-Sided Pr < Z 0.0145
Two-Sided Pr > |Z| 0.0291

t Approximation

One-Sided Pr < Z 0.0165
Two-Sided Pr > |Z| 0.0331

Exact Test

One-Sided Pr <= S 0.0157
Two-Sided Pr >= |S - Mean| 0.0314

Kruskal-Wallis Test

Chi-Square 4.7637
DF 1
Pr > Chi-Square 0.0291

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item39

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
-----------	---	---------------	-------------------	------------------	------------

////////////////////////////////////

1	30	880.0	915.0	64.885819	29.333333
3	30	950.0	915.0	64.885819	31.666667

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 880.0000

Normal Approximation

Z -0.5394
One-Sided Pr < Z 0.2948
Two-Sided Pr > |Z| 0.5896

t Approximation

One-Sided Pr < Z 0.2958
Two-Sided Pr > |Z| 0.5916

Exact Test

One-Sided Pr <= S 0.2951
Two-Sided Pr >= |S - Mean| 0.5902

Kruskal-Wallis Test

Chi-Square 0.2910
DF 1
Pr > Chi-Square 0.5896

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item89

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
-----------	---	---------------	-------------------	------------------	------------

ff

1	28	763.50	812.0	57.640332	27.267857
3	29	889.50	841.0	57.640332	30.672414

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 763.5000

Normal Approximation

Z	-0.8414
One-Sided Pr < Z	0.2001
Two-Sided Pr > Z	0.4001

t Approximation

One-Sided Pr < Z	0.2018
Two-Sided Pr > Z	0.4037

Exact Test

One-Sided Pr <= S	0.2073
Two-Sided Pr >= S - Mean	0.4071

Kruskal-Wallis Test

Chi-Square	0.7080
DF	1
Pr > Chi-Square	0.4001

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item90

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
-----------	---	---------------	-------------------	------------------	------------

////////////////////////////////////

1	27	657.0	769.50	54.967390	24.333333
3	29	939.0	826.50	54.967390	32.379310

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 657.0000

Normal Approximation

Z -2.0467
One-Sided Pr < Z 0.0203
Two-Sided Pr > |Z| 0.0407

t Approximation

One-Sided Pr < Z 0.0227
Two-Sided Pr > |Z| 0.0455

Exact Test

One-Sided Pr <= S 0.0195
Two-Sided Pr >= |S - Mean| 0.0394

Kruskal-Wallis Test

Chi-Square 4.1889
DF 1
Pr > Chi-Square 0.0407

Proc Logistic Analysis

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Item91

Classified by Variable Condition

Condition	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
<i>ff</i>					
1	27	719.50	769.50	57.349641	26.648148
3	29	876.50	826.50	57.349641	30.224138

Average scores were used for ties.

Wilcoxon Two-Sample Test

Statistic (S) 719.5000

Normal Approximation

Z -0.8718
One-Sided Pr < Z 0.1916
Two-Sided Pr > |Z| 0.3833

t Approximation

One-Sided Pr < Z 0.1935
Two-Sided Pr > |Z| 0.3871

Exact Test

One-Sided Pr <= S 0.1979
Two-Sided Pr >= |S - Mean| 0.3947

Kruskal-Wallis Test

Chi-Square 0.7601
DF 1
Pr > Chi-Square 0.3833