Age Differences in Associations with Digital Gaming

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ABSTRACT
Seniors are an underrepresented group as digital gamers, but also as a focus of study in digital gaming research. We know relatively little about senior gamers, in particular about their needs and motivations to engage in digital gaming. The current explorative study used a free association technique to gather seniors' perceptions, experiences, and domain knowledge about digital gaming. For reasons of comparison, young adults were also included in the study to allow us to identify associations that are unique to the senior population. From the study new and interesting insights were gathered about seniors' digital gaming knowledge, which appears to be more limited and less up-to-date than the knowledge of young adults. In addition, seniors seem to hold serious concerns about the negative effects of the digital gaming activity on gamers. These factors could create a barrier for seniors to engage in digital gaming. The findings presented in this paper provide potential directions for game design and marketing to overcome seniors' obstacles to gaming.

Author Keywords
seniors, elderly, digital gaming, associations, knowledge

INTRODUCTION
In 1982, the ATARI 2600 was commercially available as a home gaming console [13]. The console was targeted mainly at young adults, people that are the seniors of today. Although there is little data available on the senior demographic, industry studies suggest that the percentage of gamers who are 50 years and older is on the rise. In the US, the percentage increased from 9% in 1999 [8], to 26% in 2008 [9]. Despite this increase, 50+ gamers are still an underrepresented group compared to the 49% of 18-49 years olds who play digital games [9]. In fact, the large majority of newly released games and consoles are targeted at kids, adolescents, and young adults. With a few exceptions (e.g., Nintendo's 'BrainTraining'), senior gamers and non-gamers, the young adults of the 1980s, seem to be a forgotten market population. This is a great loss because digital game play holds the potential to enhance seniors' leisure time, to communicate and connect with others, and to train cognitive and physical functioning (for a review, see [12]).

There appears to be an inverse relationship between age and availability of data on game use and preference. For the age group between 51 and 65 years of age, the BBC commissioned a study showing that gamers prefer to play puzzle, quiz and board games [3]. Nevertheless, it is not known what type of games people play *above* the age of 65 years. A small number of studies (e.g., [2, 7]) addressed the motivations of seniors to engage in digital game play, however, not of seniors who actually play digital games. It is still unclear what motivates senior gamers to engage in digital gaming. By gathering an in-depth understanding about senior needs and the obstacles they face, future digital games and gaming systems could be designed in such a way that they are accessible, engaging and fun to the senior population.

To gather knowledge on senior gamers' perceptions and motivations regarding digital games, a free association method could be used. Free association is a technique originated by Sigmund Freud to unravel crucial memories (mostly painful) of his patients [6]. Through the years, different free associations techniques have emerged. In the most basic technique, persons are asked to relate anything which comes to mind, while other techniques use laddering (i.e. tree diagrams), for example to elicit people's goals and values. The free association technique is still used to explore thoughts and perceptions of people within different contexts. Benthin, Slovic, Moran, Severson, Mertz, and Gerrard [4] found a word association technique to be useful to explore adolescents' cognitions and affective reactions in relation to health-related behaviors. An associative group analysis, similar to a free association technique, has also been used to gather an understanding about cultural differences in mental models of American and Japanese workforce entrants [14]. A free association technique was also used by Friedman and deWinstanley [11] to describe adults' knowledge of 200 countries in the world, and to gather an understanding about the properties of semantic

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memory. Thus, the free association technique has moved beyond its psychoanalytic roots to become a well-established qualitative research tool.

The current study uses a free association technique to gain an insight in the digital gaming knowledge and experiences of seniors. To explore if seniors' associations are unique to the senior population it is necessary to compare seniors' associations with the associations of young adults. Before the current study is described in more detail, we first explain what is meant with the digital gaming activity and how different associations can be classified. The digital gaming activity can be described by the interaction between a player or players and the tools to perform this activity (both software and hardware), within an environment and time period (see figure 1). When people associate a thought or percept with digital gaming, it will likely be related to one of these attributes or, alternatively, to the relations between them. For example, people can associate brand names of tools (e.g., Sony, Nintendo, etc.) with digital gaming or for instance relate games or game devices to positive or negative effects on players (e.g., relaxation, frustration, etc.). The main advantage of classifying the associations according to the attributes of the digital gaming activity is that the associations can be categorized and reduced to *relevant* attributes of gaming.

The goal of the current explorative study is to gather insight in free associations of seniors with digital gaming. With this knowledge, possible obstacles may come to light that obstruct seniors to engage in digital gaming. This may subsequently infom game development or marketing strategies. For example, limited knowledge about games or hardware may hinder seniors to take part in the gaming activity. Because young adults are more experienced with digital gaming, it is likely that the number of associations given by young adults will be higher than the number of associations given by seniors.

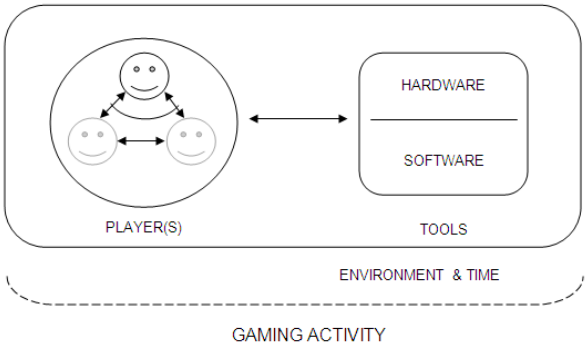

Figure 1: Schematic model of the digital gaming activity; the relation between players and tools within a certain environment and time.

FREE ASSOCIATION STUDY

Method

Participants

Sixty-four seniors (33 female, 31 male), and fifty-eight young adults (11 female, 47 male), participated in the study. The mean age of the seniors was 65.2 (*SD* = 5.4) and of the young adults 23.4 (*SD* = 5.8). The participants were recruited through an advertisement on several web portals; the senior web portals www.seniorweb.nl and www.seniorennet.be, the www.credible.nl youth forum, and the www.tweakers.net gaming forum. In addition, participants were also recruited at a senior summer course, and via friends and relatives.

Experience with digital gaming was measured by two questions. First by the question: "How often do you play computer games?" with six alternatives (never, almost never, a couple of times a year, every month, every week, daily). Second: "When you play a computer game, how much time do you spend on average?" with four alternatives (less than 30 minutes, between 30 minutes and one hour, between one and three hours, more than three hours).

Through participation, the seniors had the chance to win a Dutch dictionary of proverbs, and the young adults had the chance to win a 50 Euro coupon that could be spent at an online bookstore (www.bol.com). Both prizes were awarded at the end of the study.

Procedure

The study was conducted online and for about a third of the seniors via paper-and-pencil. First, the test was introduced with the instruction that the participants were expected to fill in or write down as many words or concepts that they associated with a certain activity. An example was given; "If I would ask you which words you associate with the activity 'fishing', you could fill in: fishing pole, fish, water, float, relaxation, boat, bait, larva, etc.". After this, the next web page was shown or the paper was turned, and the participants had three minutes to fill in as many words or concepts they associated with playing computer games. It was explicitly stated that there were no right or wrong words and that all responses were treated anonymously. After the time limit the participants were instructed to rate four of their associations by personal importance: the 2 least important and 2 most important ones. This was followed by a questionnaire that had to be filled in to collect the participants' characteristics. The participants were thanked and it was mentioned that they would be informed about the price winner.

Results

Characterization of participants' gaming behavior

Approximately 34% of the seniors never played computer games, while 3% of the young adults never played. Of the participants that played computer games, about 50% of the seniors played between 30 minutes and one hour a gaming

session, and approximately 30% played less than 30 minutes. Approximately 22% of the young adults played between 30 minutes and one hour and 54% of the young adults played between one and three hours.

Number of Responses

The participants provided a total of 1790 word associations to digital gaming. The mean number of responses of the senior participants was 10.3 (*SD* = 5.8), and of the young adults 19.4 (*SD* = 7.7). The mean number of responses of senior participants that played digital games at least a couple of times a year or more frequently (n = 31, M = 11.55, *SD* = 5.78) was only slightly higher than the mean number of responses of senior participants that played hardly ever or never (n = 33, M = 9.24, *SD* = 5.72).

Data Analysis

All the words and the frequencies of responses were listed and analyzed. Responses that indicated that the participant did not understand the task were already removed from the list, for example 'our university is better than yours'. Misspellings were corrected; plurals with similar meanings were pooled (e.g., 'games' was coded as 'game'), as well as words in a different tense. In addition, words with the same stem word and similar meanings were also pooled (e.g. 'grandson' was coded as 'grandchild'). Acronyms and their definitions were also pooled (e.g. 'first person shooter' was coded as 'FPS'). English word responses with identical meanings to Dutch word responses were put together (e.g. 'racing' was coded as 'racen'). Responses that were given by only one person were also removed from the list, and finally, non-words were also removed. The remaining list consisted of 223 unique words.

From the 223 unique words, senior participants responded with 54 unique words that were not given by the young adult participants, and young adult participants responded with 123 unique words that were not given by the seniors. Seniors and young adults shared 46 unique words; these words were given by both populations. See figure 2 for a shortened list of the percentages of responses in Dutch with the English translation between brackets, given by at least 10% of a population group.

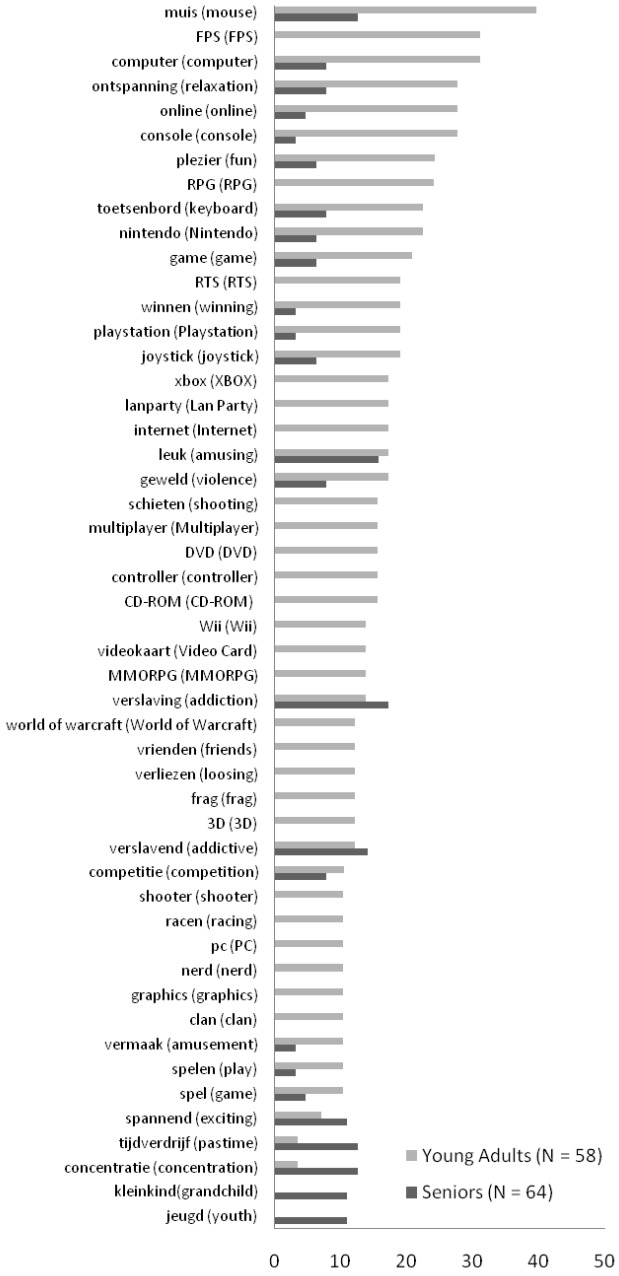

Figure 2: Percentages of word associations per population group (young adults & seniors), given by at least 10% of a population group.

Associations per attribute of the digital gaming activity

Considering the *players* of the gaming activity, seniors associated 'youth' and 'grandchild' with gaming, which were not associated with gaming by the young adult participants. Young adults associated 'clan', 'nerd', and 'friends', with gaming, these associations were not made by the senior participants.

Considering the *tools*, the senior participants associated 'computer', 'console', 'game', 'joystick', 'mouse', 'Nintendo', 'Playstation', and 'keyboard' with gaming, while the young adult participants also associated 'CD-ROM', 'controller', 'DVD', 'PC', 'Video Card', Wii, and 'XBOX' with gaming. The percentage of associations related to gaming tools, given by both groups, differed considerably. For example, only 7.8% of the senior participants associated a computer with digital gaming, compared to 31% of the young adults. None of the senior participants associated a gaming genre with gaming, while the young adult participants associated 'FPS' (First Person Shooter), 'MMORPG' (Massively Multiplayer Online Role-Playing Game), 'RPG' (Role-Playing Game), and 'RTS' (Real-Time Strategy) with gaming.

Considering the *effect of the gaming activity* on players, both senior participants and young adult participants associated 'concentration', 'amusing', 'relaxation', 'fun', 'pastime', 'amusement', 'addictive', 'addiction', and 'winning' with gaming. It is interesting to note that a higher percentage of seniors than young adult participants associated 'concentration', 'exciting', and negative outcomes 'addictive' and 'addiction' with digital gaming. This in contrast with positive outcomes of gaming like 'amusement' and 'fun', which was associated more by young adult participants. An exclusive word association with digital gaming of young adults was 'losing', which was not associated with gaming by the senior participants.

Subjectively perceived importance of the associations

The associations that were rated as most important in relation to digital gaming by young adult participants were, among others, 'relaxation', 'fun', 'winning', 'amusement', and 'challenge' (see figure 3). Some of these associations were also rated by a number of senior participants as most important, however, the percentages were considerably lower; 18.9% of young adults for 'relaxation' compared to 6.3% of seniors. Seniors' most important associations were, among others, 'addiction', 'addictive', 'speed', 'concentration' (see figure 3). It is interesting to note that 'speed' and 'concentration' were not considered to be important by the young adults.

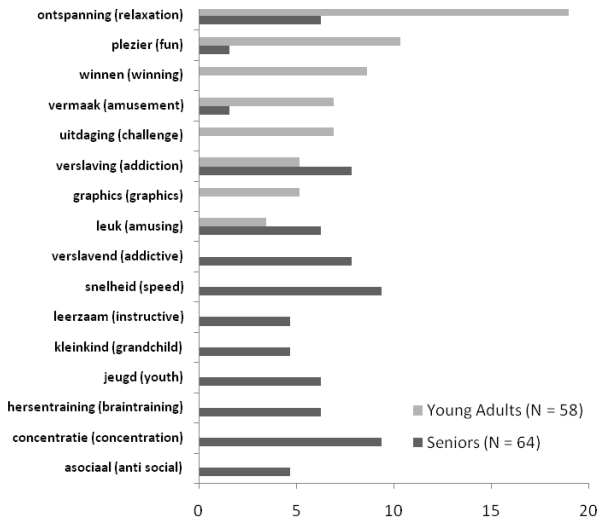

Figure 3: Percentages of most important associations with digital gaming per population group (young adults & seniors), given by more than 4.5% of a population

The associations that were rated as least important in relation to digital gaming by the young adult participants were, among others, 'violence, 'mouse', 'console', and 'computer' (see figure 4). A 'mouse' was also considered to be least important by the senior participants. Seniors rated, among others, 'pastime', 'alone', 'competition', and 'addiction' as least important. From the percentages and number of least important associations given by both population groups it becomes clear that these are much lower compared to the most important associations, i.e., within and between both population groups there was less shared agreement on what is least important than on what is most important in relation to digital gaming.

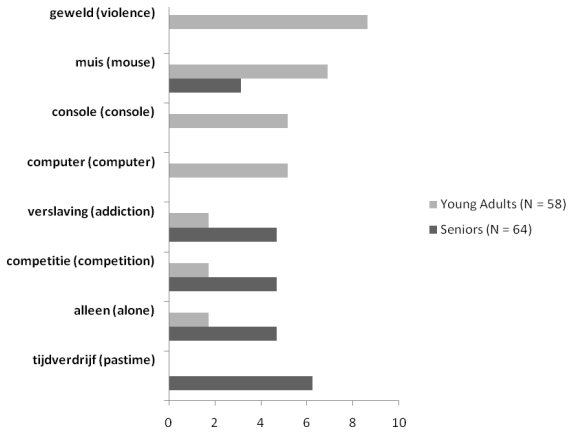

Figure 4: Percentages of least important associations with digital gaming per population group (young adults & seniors), given by more than 4.5% of a population group.

DISCUSSION

The present explorative study used a free association technique, which provides new insights about the perceptions, experiences and domain knowledge of seniors and young adults in relation to digital gaming. Young adults produced approximately twice as many associations compared to seniors. This difference could be accounted for seniors' lack of experience with digital game play, however, even seniors who played digital games on a regular basis produced almost half the amount of associations compared to young adults. A possible cause for the lower amount of asscociations could be the time limit for the task. Seniors have been found to be slower than young adults in computer-interaction tasks [15, 16], which is likely influenced by age-related declines in speed of processing, motor control, and visual perception [see, 5].

Interesting differences were found between both population groups in relation to the attributes of the digital gaming activity (player(s), tools, and the interactions between them). Seniors associated young players (e.g., youth, grandchild) with digital gaming. Digital gaming seemed to be perceived by seniors as an activity that is performed by young adults, while young adults perceived themselves as a group of players in the gaming activity (e.g., clan, friends). Seniors associations about the tools to perform digital gaming seemed less up-to-date with the latest developments and less detailed or knowledgeable in comparison to the associations of the young adults. For example, seniors did not associate an XBOX or Nintendo's latest Wii console with digital gaming, while efforts are made to market the Wii as a major accessible console for the aging population.

Seniors did not associate gaming genres with digital gaming. It is likely that seniors have little to no knowledge about gaming genres, which, for example, might make it quite difficult for them to find and decide which digital game to choose in a shop or online. Game shops could consider providing seniors with a 'games for seniors' section with easily identifiable game themes and descriptions (e.g., 'teamwork game' instead of 'coop game').

The findings showed that young adults associated more positive outcomes of the digital gaming activity on a player (e.g., relaxation, fun) than seniors did. It is worth noting that the percentage of negative outcomes (e.g., addiction, addictive) of the activity given by seniors was higher than the percentage given by the young adults. Seniors' possible concerns about the negative outcomes of the gaming activity were also reflected in the ratings about the most important associations (e.g., addiction, anti-social). Seniors seem to hold serious concerns about the possible negative effects of digital gaming on gamers.

Other important associations of seniors concerned competencies that are necessary for digital gaming (e.g., concentration, speed) or can be trained by performing the gaming activity (e.g., instructive, braintraining). Young adults' most important associations concerned mainly positive outcomes of digital gaming (e.g., relaxation, fun, amusement). Noteworthy, these positive outcomes of digital gaming are identical to the in and post-game enjoyment experiences by young adults found by means of focus groups and expert reviews in a study by Poels, de Kort, and IJsselsteijn [17]. Future research could explore to what extent a free association technique could support and enhance focus group sessions and interviews.

A number of young adults rated 'violence' as least important to digital gaming, which might reflect their opinion about the effects of violence in digital games on children, which is still an active debate in the media and in gaming research [1, 10]. The number and frequencies of shared least important associations in relation to digital gaming was considerably lower than the most important associations given by both population groups. It seems that people have a shared agreement about important word associations in relation to an activity, while they have little shared agreement in least important word associations. Associations that are least important in relation to an activity are likely to be influenced by personal preferences, indifferences, and experiences.

Seniors' perceptions and domain knowledge about digital gaming fits into the gaming media frame of the beginning of the 1980s. The seniors of today were the adults of the 1980s, and were at first accepted by the public as a user group that plays digital games [18]. In 1981 and 1982, adults suddenly began to be framed as shameful or deviant in their game use, and gaming became something for kids. After a utopian frame, a dystopian frame arose, in which

public opinion polls even showed that about a third of US citizens were in favor of a total ban on arcade games [18]. The lack of associations of seniors about today's tools to play digital games, and their associations 'youth' and 'grandchild' might suggest that the digital gaming experience and perceptions of many seniors have not changed by much since the 1980s.

In conclusion, when compared to young adults, the domain knowledge of seniors about digital gaming seems limited and out of touch with current developments. A considerable number of seniors seemed to be concerned about possible negative influences of digital gaming on gamers, and did not seem to perceive themselves as gamers. Seniors' limited and outdated domain knowledge about digital gaming could have consequences for them to engage in the activity. It will certainly hinder them from finding games and consoles that might meet their needs. For example, to effectively and efficiently search online or in a game store for a digital game that meets your preferences, you need some basic knowledge about gaming genres and the game systems that support the media. Future research could explore how to effectively reach the senior customer base and how to inform them about the games and systems that are currently on the market. In future research it would also be interesting to study age differences in associations with board gaming, and compare the results with the study presented in this paper. By means of such a study we might learn what seniors like about the games they played when they were young and use this understanding to increase seniors' enjoyment in digital game play. Overall, substantial research effort is necessary to gather an in-depth understanding of seniors' specific gaming needs, and how these might translate into game design guidelines, and potentially new game genres tailored to a senior population.

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