# Social Benefits of Playing Wii Bowling for Older Adults

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## Abstract

This research study investigated whether playing a digital game, Wii Bowling, with others can enhance the social life of older adults. Our research used a mixed-methods approach. Results showed that players' levels of social connectedness increased and loneliness declined over an 8-week period. Qualitative results described participants' perceptions of their interactions with others, conversations with family and friends, social connections, and the team experience relating to playing in the multiweek, multilocation Wii Bowling tournament.

As people live longer and the number of older people increases in our society (World Health Organization [WHO], 2002), concerns about future health care and social costs have prompted an interest in enhancing healthy living and quality of life. Quality of life is associated with an independent, positive, healthy, and meaningful life and, if encouraged and supported, could yield significant benefits for older adults and society at large (Kaufman, 2013).

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Historically, medical and biological perspectives have dominated the study of aging, but recent theories take a more holistic view (Bowling & Dieppe, 2005). Being active is now thought of as more than the ability to be physically active or to remain in the workforce, involving participation in social, economic, cultural, spiritual, and civic affairs (WHO, 2002). Within this framework, policies and programs that promote and sustain social connections are as important as those that improve physical health.

Studies have shown that digital games have the potential to enhance the social life of older adults (IJsselsteijn, Nap, de Kort, & Poels, 2007) and to positively affect an individual's sense of well-being (Kahlbaugh, Sperandio, Carslon, & Hauselt, 2011). Mature gamers are a growing segment of the gaming population, and the Entertainment Software Association (ESA) reported that the number of gamers in the United States aged 50 years and over grew from 9% in 2005 to 29% in 2011 (ESA, 2005, 2011).

Playing games provides opportunities to master game skills, experience feelings of satisfaction, and develop a sense of achievement (Astell, 2013). Games are also associated with a feeling of immersion, creating a sense of satisfaction that players find enjoyable (Csikszentmihalyi, 1997). When played with others, games can offer a venue for meeting other people, creating personal connections, and alleviating loneliness (De Schutter & Abeele, 2010). To further investigate whether digital gameplay can have positive social benefits for older adults, this study explored in detail the quantitative impact and participants' reported experiences of playing in an organized, multiweek, multilocation digital game (Wii Bowling) tournament.

## Literature Review

### Digital Games and Older Adults

Participation in casual leisure activities has been shown to promote the development and maintenance of relationships, enhance well-being, and reduce feelings of depression (Allaire et al., 2013; Stebbins, 2007). Technology offers new opportunities for casual leisure that can benefit the social life of older adults as they age (IJsselsteijn et al., 2007), particularly when these technologies focus on addressing more complex, higher level social needs (Astell, 2013).

As the numbers of older adults increase, they are becoming significant consumers of technologies including digital games (ESA, 2011). Developing skills and mastering a game can create a sense of accomplishment (IJsselsteijn et al., 2007), and the flow effect of digital games has the potential to create positive experiences for older adults. The feeling of flow occurs when one is immersed in an activity for its own sake, loses the track of time, and experiences a sense of satisfaction (Csikszentmihalyi, 1997). One study of 68 older adults found that when playing the Nintendo Wii Sports games, players experienced levels of flow and were observed exhibiting signs of enjoyment and feelings of control and skill (Marston, 2013). When games include

social interaction, they may offer a venue for enhancing the social life of older adults. Furthermore, Voida and Greenberg (2009) found that console games could be used as a meeting place for diverse groups, including older adults.

Nimrod (2009) found that online games offered mature gamers meaningful play, an opportunity to demonstrate their abilities, and a means for coping with aging. Those who played digital social games in Nimrod's study frequently became involved in sociable conversations online that fostered a sense of social connectedness among players. A study comparing the impact on 35 individuals with an average age of 82 of playing Wii and watching television concluded that playing Wii games benefited older people in terms of well-being, social connection, and enjoyment (Kahlbaugh et al., 2011). Social interaction that emerges when playing digital games has been shown to be important to older players (De Schutter & Abeele, 2010; Wollersheim et al., 2010). Playing digital video games can also help to alleviate depression and reduce feelings of loneliness and isolation (Wollersheim et al., 2010).

## Social Connectedness

Social connections can enhance our lives and affect us throughout our life span (Elder, 1994). Interactions, social connections, and support are major contributors to quality of life and aging successfully (Bowling & Dieppe, 2005; Reichstadt, Sengupta, Depp, Palinka, & Jeste, 2010), and a lack of social relationships can adversely affect the lives of older adults (House, Landis, & Umberson, 1988). There are two aspects of social connectedness, companionship and providing social support, that may occur separately or together (Ashida & Heaney, 2008). Our social connections with family members, neighbors, friends, acquaintances, health care professionals, and other contacts reflect our level of social connectedness (Ashida & Heaney, 2008). In general, the more social ties a person has, the more socially connected they feel (Buckley & McCarthy, 2009).

Social connectedness has been linked to improved health outcomes (Ashida & Heaney, 2008; Glei et al., 2005). For example, Glei et al. (2005) found that those who were more socially active performed better on cognitive tests than those who were less socially active, and this effect was particularly pronounced when participants were interacting with people not related to them. Diversity of social connections may provide increased benefits (Litwin & Shiovitz-Ezra, 2011).

Social relationships give meaning to later life and provide a foundation for giving and receiving support that helps one to cope with life's setbacks and difficulties (Connidis, 2006). In a focus group study, Reichstadt, Depp, Palinkas, and Jeste (2007) found that participants placed a much greater emphasis on psychosocial factors for successful aging than on longevity, genetics, and an absence of disease/disability. In another study of 22 community-living adults with a mean age of 80, Reichstadt, et.al. (2010) found that an active engagement with life that included social engagement exerted a positive influence on how people experienced old age. Victor, Scambler, Bowling, and Bond (2005) also identified a strong relationship

between social engagement, social participation, and quality of life in old age. These results show that interventions that promote social engagement and reduce loneliness and isolation may offer opportunities to maintain and enhance the quality of life as people age.

## Loneliness

A lack of social connectedness in a person's life may lead to feelings of loneliness (Rook, 1990). This may, in turn, lead to social isolation (Cacioppo & Patrick, 2008). Some studies have found that feelings of loneliness increase with age, with those over 80 being more likely to report loneliness (Cattan, White, Bond, & Learmouth, 2005; Dykstra, van Tilburg, & de Jong Gierveld, 2005; Pinquart & Sorensen, 2001). In a longitudinal study of 2,925 older adults, Dykstra, et.al. (2005) found that as people aged, they became lonelier. The study also found that expanding their social networks and/or functional capacities led to reduced feelings of loneliness.

Feelings of loneliness are contingent upon an individual's perception of a difference between the actual and the desired quality and quantity of social engagement (Hawkley & Cacioppo, 2010). These authors suggest that living alone and time spent alone do not by themselves contribute to the experience of loneliness and social isolation. In a recent study on age-related loneliness based on quantitative measures of 1,598 respondents aged 65 or more, 61% self-identified as never lonely, about 1/3 as sometimes lonely, and 5% as always lonely. The study found that of the 26 variables identified, the oldest, the widowed, and those living alone had the most significant levels of loneliness (Victor, et.al., 2005). Chronic health problems, disability, sight or hearing problems, reported depression, lack of material resources, and low levels of education also showed significant correlations with loneliness. Regarding age-related loneliness over time, two thirds of respondents reported the same level of loneliness as 10 years before, while 23% reported that they were lonelier and 10% reported that they were less lonely (Victor et al., 2005). In Victor et al.'s study, almost one third of the participants reported that they were sometimes lonely, which is a much higher level than in earlier British studies.

Social activity can be effective in reducing loneliness and social isolation (Cattan et al., 2005). Although social participation has been traditionally thought of in terms of face-to-face activities such as attending church, going to the movies, or physical activities, such as taking a walk or swimming at a community center, technology may be useful in developing social connections (Baecker, Moffatt, & Massimi, 2012). Some digital games are built on social networks and are social activities. Since loneliness is believed to be a deficit in the broader range of social contact (Heylen, 2010), expanding the social network through digital games may provide benefits that bridge this gap, resulting in decreased feelings of loneliness.

## Research Questions

The study was guided by the following questions:

**Research Question 1:** Does playing a digital game, Wii Bowling, with others over an 8-week period increase the level of older adults' social connectedness?

**Research Question 2:** Does playing a digital game, Wii Bowling, with others over an 8-week period decrease the level of older adults' loneliness?

**Research Question 3:** How do older adults perceive the social experience of playing Wii Bowling?

Participants played Wii Bowling face to face over an extended period of time with members of their own team in the location where they lived. The study hypothesized that being involved in playing Wii Bowling within this context could be a way of getting people together to play and have fun, creating a social situation that would not otherwise exist.

## Method

The study used a mixed-methods research approach (Creswell, 2011). For the experimental intervention, older adults played the digital game Wii Bowling in teams during an 8-week tournament. Data were gathered using pre- and postquestionnaires with a sample of 73 participants. Seventeen participants from this larger group volunteered to take part in the qualitative study, consisting of a posttournament interview.

### Ethics Approval and Consent

Prior to starting the study, ethics approval was obtained from the Department of Research Ethics at Simon Fraser University, where the study was conducted (file no. 2014s0042). The participants' consent form included full disclosure that the study was undertaken to investigate the possibility that playing Wii Bowling with others may enhance the socioemotional life of older adults.

### Settings and Participant Recruitment

Participants were recruited from 14 independent living centers, assisted living centers, and senior recreation centers in greater Vancouver, Canada. Independent living centers offer apartment living for those over 55 years of age, while assisted living centers offer additional services to residents such as meals, housekeeping, laundry, recreational opportunities, 24-hour response lines, and personal care services. Recreation centers are community facilities that offer opportunities to join leisure activities.

The volunteers for the qualitative study interviews came from three adjoining municipalities. Twelve participants were recruited from independent living centers and five others from assisted living centers.

Participation was limited to those who were 60 years of age or older. Since dementia could be a confounding factor in the results, none of those recruited had been diagnosed with this illness, to the knowledge of the researchers. Participants were screened by staff at the centers. As well, at least two research assistants (RAs) attended each week and observed participants carefully to assure themselves that their cognitive function was in the normal range.

## Research Design

The research used a concurrent/triangulation design in which data collection was carried out within the same time frame and the results reported, then merged into a larger understanding in the final analysis (Creswell & Plano Clark, 2011). In the quantitative study, questionnaires were distributed to players before they began to play Wii Bowling and after they had completed playing in the tournament 8 weeks later. Players were asked to rate their agreement on Likert-type scales with statements relating to social connectedness and loneliness.

For the qualitative study, 17 participants were interviewed at the start of the study and after the tournament concluded. The first interview asked about participants' game playing experience and expectations for the tournament. The second interview collected data on players' perceptions of friendships and social contacts made during the tournament, conversations with friends and family about their involvement in the tournament, and the team experience.

## The Wii Bowling Tournament

Wii Bowling was chosen as the digital game in this study for several reasons. First, it is a very popular digital game played by many older people (Jung, Li, Janissa, Gladys, & Lee, 2007). Second, previous research has found that playing with the Wii Console can increase the flow experience for older adults (Marston, 2013). Finally, bowling is a game with which many older adults are familiar. Often the initial introduction of digital games to this demographic is easier when they are familiar with the content, since they can use their prior knowledge in learning the system (Aison, Davis, Milner, & Targum, 2002).

Those recruited to play in the tournament were organized into teams of four players (and a few teams of three players) within each participating site. Most research sites provided one team, although some provided two teams. The scores from the two games played by each team were posted weekly on a website, and the paper copies of scores were provided at each site for players who did not use, or had no access to, the Internet. Winning teams received prizes of CAN$500 for the first prize, CAN$250 for the second prize, and CAN$100 for the third prize, divided among the four players on each team. Wii equipment and a monitor were provided for the research sites if required.

In the first session for each team, a RA trained participants to set up the equipment and play Wii Bowling and also helped them to create their own avatars. Weekly

practice was strongly encouraged. Since appointments, commitments, or illnesses could prevent participants from attending sessions, only teams' top three scores were posted each week, even if all four team players attended that session. This approach allowed some flexibility when one team member was absent. In one case, team members dropped out from two teams at one center, so the remaining team members were combined into one team that continued playing to the end of the tournament.

## Data Collection

As noted above, data were collected through pre- and postquestionnaires and in-person interviews. The aim of the pre- and postquestionnaires was to measure levels of study participants' social connectedness and loneliness before and after the Wii Bowling tournament. The pretests were administered by RAs after participants had completed their consent forms and before their training session on the Wii game.

The pretest questionnaire collected demographic data such as age, gender, residence, city, and living arrangements and data about participants' social networks, feelings of social isolation, and loneliness. The posttest instrument was the same except that it did not include the section on demographics. Questions relating to social connectedness and loneliness were based on two existing social scales: the Overall Social Connectedness subscale and the University of California, Los Angeles (UCLA) Loneliness Scale.

The Overall Social Connectedness subscale (Van Bel, Smolders, IJsselsteijn, & de Kort, 2009), adapted from the Specific Connectedness Dimensions Scale developed by IJesselstijn and de Kort, was designed to measure the subjective experience of belonging and relatedness in relation to computer-mediated communication like e-mail, social media, and texting. This scale captures two types of social connectedness: (1) an individual's social network and (2) social connectedness at the individual level (Van Bel et al., 2009). Twenty-two items are included in six categories, that is, (1) knowing other's experiences, (2) dissatisfaction with contact quantity, (3) satisfaction with contact quality, (4) dissatisfaction with contact quality, (5) relationship salience, and (6) shared understanding. In the adaptation of this scale, 12 items were used, with 2 items in the category of ''shared understanding'' changed from positive statements to negative statements to achieve a balance of positive and negative statements. Participants selected their responses from a 5-point Likert-type scale that ranged from *strongly disagree* to *strongly agree*.

The UCLA Loneliness Scale (V3) measures social and personal levels of relationships and is considered to be highly reliable in terms of internal consistency and test–retest reliability, convergent and divergent validity, and construct validity (Penning, Liu, & Chou, 2014). Although originally used with younger adult samples (Russell, 1996), it has also been used with older people. The scale includes 20 items for which participants can choose among *never*, *rarely*, *sometimes*, and *always*, with scores ranging from 1 to 4, respectively. Ten of the items are worded positively and 10 negatively. Scoring is reversed for the positive items, so that higher scores indicate greater degrees of loneliness.

The structure of the original scale was changed from a question to a statement with a Likert-type response scale to provide consistency and ease of responding for this audience among the instruments included in the questionnaire. For example, the question, "How often do you feel that you are 'in tune' with the people around you?" in the UCLA Loneliness Scale was adapted to "I feel that I am 'in tune' with the people around me." Rather than asking the participant to choose "how often" on a scale of 1 (*never*) to 4 (*always*) as in the original scale, the respondent indicated their agreement with the statement on a 5-point Likert-type scale from *strongly disagree* to *strongly agree*.

## Qualitative Interviews

In-person interviews were conducted after the tournament with a sample of 17 players located across all centers, who volunteered to take part in the qualitative study. Each interview was about 30 minutes long and asked about their perceptions relating to the formation of friendships or social connections with their team members, their family, and friends in the context of the Wii Bowling tournament. The interview protocol is shown in Table 1.

## Data Analysis

Quantitative data analysis was carried out using SPSS, version 22.0. Demographics were examined using frequencies. Paired sample *t*-tests were conducted comparing pretest and posttest scores for social connectedness and loneliness.

For the qualitative analysis, the 17 interview transcripts were imported for coding into qualitative analysis software MAXQDA version 11 (VERBI GmbH, 2015). The coding process consisted of three steps: familiarization with the content of the transcripts, applying codes to the interviewees' responses to each question, and grouping codes into emergent categories. Preliminary coding was applied to three transcripts using pencil and paper to elicit a first set of codes. Once the transcripts were imported into MAXQDA, codes were applied to each statement using a word or phrase to summarize the basic meaning of each comment (Saldana, 2009). If two or more completely different ideas were included in a statement, each idea was coded separately, although this occurred rarely in the analysis. Words that were simple affirmatives like "Yeah," or part of introductions or other topics not related to the study, were coded as "*irrelevant*." After codes were collected into categories, codes that applied to comments by more than 50% of the participants were collected in a table in the order of most to least applied. This table also showed the number of times each code was applied.

## Results

### Demographic Characteristics

Table 2 summarizes participants' demographic characteristics. Of the 73 participants in the study, 52 were female and 21 male, 55 were widowed or single, and

**Table 1.** Post Wii Bowling Tournament Interview Protocol.

- Why did you decide to be part of the study?
- Did you find playing Wii Bowling a positive experience? If so, how?
- Now that you have played Wii Bowling, do you think others would find playing Wii Bowling a positive experience? Why or why not?
- Do you think there might be some drawbacks for others playing Wii Bowling?
- Did playing Wii Bowling have any effect on your social life? What kind of effect?
- Did you find the social aspect of playing Wii Bowling enjoyable? How?
- Did you make new friends or become better friends with your team members?
- Did you do some things with team members you got to know through Wii Bowling? What kind of things did you do?
- What was the reaction of your friends and relatives when they told them you were playing Wii Bowling?
- Did playing Wii Bowling help overcome or relieve some of your real-life problems, either by distraction, or having fun, or anything else?
- What did you think of the tournament? (Was the competition fun? Was it stressful for you?)
- Were you upset when you didn't do well at Wii Bowling and why?
- What made you feel good about playing Wii Bowling and why?
- What made you feel bad when you were playing Wii Bowling?
- Were there things you found difficult to do when playing Wii Bowling?
- Tell me what it was like playing Wii Bowling with your team (fun, enjoyable, stressful, and irritating).
- What do you think of playing Wii Bowling overall?
- How have you felt socially and emotionally in the last month? (probe about personal feelings of loneliness or social isolation)
- Do you think that playing Wii Bowling can have a positive effect on your social life? How or why do you think so?
- Is there anything else you'd like to share with me?

18 lived in common law or married relationships. The majority ($n = 51$) lived alone, and 22 had other living arrangements. It is notable that 80% of the group were 70 years of age or older and with half of all participants were 80 years old or older. Seven participants lived in houses, 29 in apartments, and 37 in independent/assisted living accommodations. Thirty-six had graduated from high school or had less than a high school education; 33 had some university education, a 2- or 4-year degree, junior college (CEGEP in Quebec); and 3 had master's degrees.

## Quantitative Findings: Loneliness and Social Connectedness

Table 3 provides the results of paired-sample *t*-tests of pretest and posttest scores on social connectedness and loneliness. A paired-samples *t*-test compared social connectedness before and after gameplay. There was a significant difference in social connectedness scores before ($M = 3.41$, $SD = 0.53$) and after gameplay ($M = 3.53$, $SD = 0.49$), $t(72) = 2.18$, $p = .033$. The result suggests that the social connectedness scores of older adults increased significantly after 8 weeks of game playing.

**Table 2.** Participants' Demographic Characteristics.

| Variable | n | Percentage |
|---|---|---|
| Gender | | |
|     Male | 21 | 28.8 |
|     Female | 52 | 71.2 |
| Age | | |
|     65–74 years | 21 | 28.8 |
|     75–84 years | 27 | 37.0 |
|     85+ years | 25 | 34.2 |
| Current relationship status | | |
|     Married/common law | 18 | 24.7 |
|     Single/widowed | 55 | 75.3 |
| Living arrangement | | |
|     Alone | 51 | 69.9 |
|     Other | 22 | 30.1 |
| Living place | | |
|     House | 7 | 9.6 |
|     Apartment/condo | 29 | 39.7 |
|     Independent/assisted living home | 37 | 50.7 |
| Education | | |
|     High school/less than high school or equivalent | 36 | 50.0 |
|     Some college/2- or 4-year degree/junior college/CEGEP | 33 | 45.8 |
|     Master's degree | 3 | 4.2 |

**Table 3.** Paired Sample *t*-Tests on Social Connectedness and Loneliness Scores for Participants Before and After Playing Wii Bowling.

| Variable | n | Pretest M (SD) | Posttest M (SD) | t | p | Effect Size |
|---|---|---|---|---|---|---|
| Social connectedness | 73 | 3.41 (.53) | 3.53 (.49) | 2.18 | .033 | .25 |
| Loneliness | 71 | 2.21 (.53) | 2.05 (.54) | 3.52 | .001 | .42 |

A second paired-samples *t*-test compared loneliness before and after game playing. There was a significant difference in the score of loneliness before ($M = 2.21$, $SD = 0.53$) and after gameplay ($M = 2.05$, $SD = 0.54$), $t(70) = 3.52$, $p = .001$. This result indicates that loneliness scores of older adults decreased significantly after 8 weeks of game playing.

## Qualitative Findings: Social Connectedness

Social connectedness was one of five categories that emerged from the qualitative comments, along with Wii Bowling as a pastime, game issues (such as usability), the

design and logistics of the tournament, and participant backgrounds and other activities (Table 4). The category of social connectedness consisted of codes that were mentioned more times (240) than those in any other category, and the next most frequently mentioned category was game issues, mentioned 198 times. This was followed by Wii Bowling as a pastime, mentioned 150 times; participant background information, mentioned 63 times, and tournament design and logistics, mentioned 46 times.

Codes related to the category of social connectedness were (1) the team experience, (2) interaction with others because of playing Wii Bowling, (3) better social connections, and (4) conversations with family and friends about playing Wii Bowling. All 17 participants mentioned statements coded as "Team experience," while 16 participants mentioned statements coded as "Interaction with others because of Wii Bowling." Furthermore, this code was applied 84 times, more than any other single code.

The code Team experience was applied to statements where participants referred to their team, for example, "It was a good team thing" or "We tried to do the best that we could individually but we were still a team, you know." The code "Interaction with others" was applied to statements where participants referred to others who were not on their team or did not play in the tournament but were involved in conversations or activities with them that focused on Wii Bowling. Generally, these conversations were with those who lived in their building. The code "Better social connections" was applied to statements where participants described their perception that their social connections with those on their team had deepened in some way. For example, "We got to know our team members well and had a good time." and "I could walk up to them and give them a hug if you want to." The code "Conversations about Wii Bowling with family and friends" was applied to statements when participants specifically mentioned conversations with family members or friends. For example, "They (grandkids) thought grandma had flipped out but that's OK. I had tried it (Wii) one Christmas on one of their machines." Codes in the social connectedness category are shown first in Table 4 and are discussed, with comment examples, below.

*The team experience.* Participants found playing with their Wii Bowling teams a casual and enjoyable activity. Although relationships that grew out of the Wii Bowling tournament were not profound, many commented on how nice they found the other players and how they welcomed each other's company. In contrast, two players who joined a second team after their original team disbanded expressed disappointment that their former team had broken up, especially since they had the highest score of any team in the first week of the tournament. One said the experience was unsettling, while the other found that the reconfigured team was not as cohesive as her former team. Still, she commented that her new team members supported one another, and "that was good."

A few of the oldest players downplayed the competitive aspect of the tournament, and they simply liked to play Wii Bowling with their teams. A 90+ player's opinion of what she liked about her team and the tournament was " . . . just being there. And the same girls, and we all knew one another, and all said "hi" as we came in. We were all set for the game."

**Table 4.** Categories, Codes, Number of People With Code, and Number of Times Applied[a] (*n* = 17) for Interviews With Older Wii Bowling Players.

| Category | Code | No. of People Making Comments With Code | No. of Times Code Applied |
|---|---|---|---|
| Social connectedness | Team experience | 17 | 37 |
| | Interaction with others because of playing Wii Bowling | 16 | 84 |
| | Better social connections | 13 | 70 |
| | Conversations with family and friends about playing Wii Bowling | 13 | 49 |
| | Total times mentioned | | 240 |
| Game issues | Scores and competition | 15 | 61 |
| | No disadvantages to playing Wii Bowling | 14 | 32 |
| | Wii equipment (mentioned) | 11 | 29 |
| | No problem with equipment | 10 | 18 |
| | Help with set up | 10 | 23 |
| | Playing with disabilities | 9 | 35 |
| | Total times mentioned | | 198 |
| Wii as a pastime | Playing Wii Bowling was a positive experience | 16 | 38 |
| | Interest in playing in the future | 12 | 61 |
| | Wii Bowling was fun and enjoyable | 12 | 29 |
| | Something to do, something different to do, and pass the time | 10 | 22 |
| | Total times mentioned | | 150 |
| Background information | Participant background information | 10 | 45 |
| | Other activities | 9 | 18 |
| | Total times mentioned | | 63 |
| Tournament design and logistics | (Various comments) | 12 | 46 |

[a]Codes that emerged in comments by more than 50% of participants.

The four women on the winning team developed a stronger connection than most teams, and they often practiced together outside their official weekly sessions. One described this connection as "getting to know your teammates: Right. Then, you know, when you see them, you sort of—well, you feel part of them. Right? So it brings the camaraderie between you, you know."

Her teammate said that she believed that they had become closer, and she called the Wii Bowling sessions a "happy event." Another team member agreed that they had become quite close.

One team established their "team identity" by sporting hot pink T-shirts they had purchased for the four of them, including the two men on their team. A staff member laughingly called their style "very distinctive."

The following comment describes how team members demonstrated their mutual supportiveness, especially for a player who was new to Wii Bowling and also a relatively new Canadian:

> He was new, a bit insecure. He got help and support. It's hard coming from another country. Both he and his wife feel much more in place. I noticed that we all go out to make them feel at home. I liked that part of Wii Bowling.

In summary, a number of those interviewed enjoyed their team experience and developed stronger bonds with their teammates, but the extent of these relationships varied from center to center and person to person. In particular, the winning team of four women appeared to be quite close, while those whose team had disbanded and regrouped might not have had the same opportunity to deepen their relationships with their new team members.

*Interaction with others because of playing Wii Bowling.* Participants often commented about the social opportunities presented through playing Wii Bowling. They noted that the bowling tournament became a topic of conversation and expanded their interaction with nonplayers where they lived. One player gave an example of this scenario as follows:

> At the end of … the last couple of sessions, a couple of other people came in …. I guess they had seen the volunteer thing, but they hadn't got around to doing it. They were kicking themselves literally, because they hadn't got around to doing it, and they were keen. I think some of them had some free throws ….

On occasion, other residents showed an interest in game playing sessions, becoming audience members and a kind of cheering section for the team representing their center. When asked about how Wii Bowling raised their profile in their center, a player explained, "because we had people come to watch. Because they showed interest. They thought 'what are they up to now?'"

However, even when invited, older adults could find using the Wii equipment intimidating. When asked if she believed other older adults might enjoy playing Wii Bowling, one resident recounted:

> I think they would. I think they just have to make the effort to come and have a look. And a lot of older people don't really … they're not interested. You know what I mean? So, I've—sort of like my next-door neighbor: she was up here doing her laundry, and I said, 'Come and try it.' And she couldn't get the ball going. I mean, the other

day I said to her, 'Come up on the 12<sup>th</sup> ... and let's try it again.' So, um, I think you've got to—you've just got to—market it.

At times, knowing how to play Wii Bowling led to games or conversations with participants' family members (also discussed further below). In one case, a player with serious mobility issues described getting a high score when he played with his adult son and his wife while supporting himself with a walker:

> Oh, it's kind of fun because my—I took my son down and his wife down bowling there. And he used to be pretty good and so, you know, I'd just lean on here and pssshhht. Boom. Boom. Getting 200 plus. So he was curving all around the place and there. So, anyhow, he got a little bit frustrated.

Some participants developed new friendships or became involved in new activities with other players. A 78-year-old living at an independent living center described getting to know her neighbor better:

> Well, I got to know the lady next door. And, um, because she was on my team we found out that we lived next door to each other. So we are going to share a garden spot together, and now that I look at the size of the spot, we probably both needed one. But anyway, we will garden together. We're going to buy the plants together. So, yes, I met my neighbor ... and I might not have spent the time with her otherwise.

Some found that Wii Bowling opened up opportunities to get involved in the center, where they lived and expanded their repertoire of social events to engage people who might be feeling isolated.

> Well, more people get out and do things. I won't call it exercise because it's ever so little (laughs). But, get out and become involved in more social activities. It makes for a better complex. As I said, people could sit at home, here, and do nothing. And that's not a good idea. So, if we can get them out and get them involved and, uh, arrange for people to possibly help a neighbor or somebody they know who kind of sits inside; sorta "Hey, Helen; Bob; whatever, come and—come and join this. It's really fun! And it's not hard—it's not physically hard on you. It's not like you have to run around the block three times."

At a similar independent living center, some Wii bowlers went out for dinner with team members:

> which is something we might not have done ... and we brought another member who doesn't bowl, but belongs in our little group, we went out together and had a meal together. So in that respect it was fun.

In the same center, another commented that she had had coffee with someone she met bowling, while others started to go to church with team members: "Our team

all goes to church together. Well, two members have come along since we started to bowl."

One Wii Bowling team started playing darts together. A player believed that darts would be a good activity to improve her Wii Bowling game skills and decided to join a darts group organized by her team member:

> She had quite a group going and then they just faded away. So, she used to go on her own. And when I started the Wii, I said to her, 'You know, I would like to come down and join up with you with the-the darts' cuz it's-it's a coordination and the concentration, which I felt would help me with the Wii.

The oldest interviewee at 90+, playing despite impaired vision, noted that by playing Wii Bowling, she now knew her team members better and had expanded her social circle:

> We all have lunch in the lunchroom together anyways, but . . . when we go on our bus trips together, we kind of sit together now and mix. Where we just used to sit with the same couple. Now we just sit with whoever we see because we have been with them in bowling. I often go sit with J. now or P. or whoever is there. We could chat away . . . I think it is added that we . . . mix in.

These stories show that participants found that they had become better acquainted with team members whom they may have encountered in their building but did not know well. In some cases, players joined new activities such as darts, dinner, or going to church, with people they met through Wii Bowling. Playing the game also stimulated interest among others who lived in their centers, and players enjoyed the attention they received when they were asked about playing in a video game tournament. Some participants also played Wii Bowling with their children and grandchildren, which they found an enjoyable experience.

*Better social connections.* Since the Wii Bowling tournament took place in the centers where participants lived or regularly visited, they had often known each other before the tournament. However, they found that as they became better acquainted, their friendship deepened, although it remained fairly casual. The four women on the winning team started meeting outside the game playing sessions for practice or even to play darts together. One of them explained:

> We'd meet and—first Friday, we met in the evening and came up and we had a bottle of wine, or whatever, sherry—and we would have a little bit of a glass of sherry, and that sort of thing. Yes. And it did have a positive effect on the socializing.

Those who lived in assisted living centers saw each other frequently and dined together and yet commented on the closer relationships forged through playing Wii

Bowling. The oldest player found that she became friendlier with her teammates: "When we pass each other now, we always stop and have a chat. They're different girls . . . and so it sort of added to my collection of girls" (laughing).

As mentioned earlier, in some centers, spectators joined the Wii Bowling sessions. Before the tournament started, there was an established coffee group who met in the gym at one center. An organizer of the café described how some of the regulars became interested in watching the Wii Bowling games: "I mean they come in on Tuesdays just to see, where they, you know, they used to come anyway but now they come specifically and turn the chairs around and come and watch."

Wii Bowling provided some opportunities to develop social connections. This was noticeable among the winning team as well as for those for whom Wii Bowling became associated with the morning coffee event with spectators. At another independent living center, with many players who were new to the complex, comments on social connectedness were not as frequent when compared to locations where players were long-term residents.

*Conversations with family and friends about playing Wii Bowling.* Participants provided humorous accounts of conversations when acquaintances and relatives who learned about the Wii Bowling tournament expressed surprise and responded positively. Some talked about recent exchanges with their grandchildren, while some played Wii Bowling with family during this time. The following statements describe some of these experiences:

> I-yes—when I pick up my grandson or my granddaughter, after school, they've got a Wii machine and I practice my golf—pick up my golf again. And tennis. And I said, "Now, it's grandpa's"—my grandson, Jacob: "Come here, because Grandpa's going to whip your butt." (Laughs)

> They loved it! They were so proud of me. I played with my grandsons and I always beat them. They rooted for me! They adored it. So close to my family. I was playing before I moved here. I played everything: tennis, golf . . . .

> (Laughing) My grandson's: "Oh no, Granny!" (Laughs). No, their reaction was pretty positive. You know? And all that's nice.

One player saw Wii Bowling as a venue to play with her daughter and her grandchild who had Down's syndrome:

> Well, my youngest—my daughter that's got the Wii Bowling thing, she has—my granddaughter has Down's syndrome. So—she said, "Oh, you will be able to play with H." You know. So, I said, "Yes, but I'm not just going to play with H. You're going to be involved, too." (Laughs). Because the more you have, the better it is. Right?

Others found that their friends were quite amused and supportive when they learned about their participation in a Wii Bowling tournament:

Well, a lot of my friends thought it was really funny. You know, "You're bowling?" "Yes, I am. I'm doing Wii Bowling." "Oh, wow!" Um, most of my friends are pretty active people. They swim or they go to the gym. They play golf. They play tennis, some of them. So, it was—it was interesting for them to think that I would do this.

A team member described how his son was happy to see him having fun and getting involved, especially since he had recently suffered some significant health setbacks:

They thought it was wonderful. It's good on you. Because they know—as I say, I used to play sports and when I told them that this was presented to us, they said, "Wonderful, do it, Dad, because it's good for you and it's –you know, you're getting back into the swing of things." And—you see, I've had two heart—lung surgeries because of my cancer . . . . I was told: "Walk. Be active. Do whatever you can." And it's good for my lungs, so this is just a plus. It's just a plus.

A 90-year-old player commented on her conversation with her family:

They laughed at first. I was thinking why not, but they started to get interested and wanted to know how I was doing. Did I still enjoy it and all this? I told them we did, 'cause we were having fun together. They thought that was good.

Relationships with family were clearly important to older adults in the study. Wii Bowling was a subject of conversation and initiated games with grandchildren, an interaction they particularly enjoyed.

## Discussion

The quantitative results of this study showed that over the tournament period, participants' levels of loneliness declined while their levels of social connectedness increased. The qualitative results reflected these findings and allowed for triangulation. The study found, as others have previously, that those who played Wii Bowling found it a positive experience and an opportunity for social interaction (Kahlbaugh et al., 2011; Marston, 2013; Wollersheim et al., 2010).

The design of the study created a context that might have enhanced the social experience by integrating both competition and collaboration, since members worked together in a team but competed against other teams. While the oldest players were not particularly concerned with competition in the tournament, they did enjoy playing Wii Bowling with their teams. For others, the competitive aspects were an enjoyable part of the experience.

Team dynamics might have played a role. The winning team became very close over the tournament, although it wasn't clear whether their success fostered closer relationships or vice versa. During the tournament, these four women met regularly, and they socialized with each other at other times. They seemed to form a stronger connection than most teams. While all those interviewed commented on the positive

nature of their team experiences, those whose team broke up and reformed with the remaining players found the situation disorienting and discouraging. This suggests that playing with a regular group may have certain benefits.

Audience participation was encouraged, and this brought about positive social contacts with those who joined as spectators. Some participants commented that playing Wii Bowling stimulated conversations from peers who were interested in what they were doing in the study. Playing the game provided participants and their grandchildren with topics of conversation, and in some cases, they played Wii together, supporting interactions that were very important to participants. It seems that this was an enjoyable way for older adults to interact, extend their social networks, and deepen bonds with those they already knew.

Playing Wii Bowling also led to interactions outside the game environment and expanded social connections for participants beyond the weekly sessions. These interactions included conversations with fellow players; activities such as going to dinner, going to church together, and playing other games with people they met in the tournament; and adding dynamics to family relationships.

These multiple interactions led to an increased diversity of contacts, which might have increased social benefits (Litwin & Shiovitz-Ezra, 2011). Furthermore, whereas Voida and Greenberg (2009) discuss console games as computational meeting places, these results indicate that social contact extended beyond the console. Here, the digital game acted not only as a place to gather and play but also as a topic that fostered connections beyond the game. Thus, people were brought into the Wii Bowling tournament atmosphere through conversations or being bystanders, regardless of whether they actually played or were physically present.

We are not claiming that playing Wii Bowling provides more social opportunities than other recreational activities. However, our results do suggest that playing Wii Bowling cannot only foster positive social interactions at the time and place where games occur but also extend relationships beyond the scope of the game, even in facilities where people are already acquainted with their fellow players and spectators.

To determine whether the tournament has had longer lasting impact, we conducted a qualitative follow-up study of participants 3 months after the completion of the tournament to determine whether participants were still playing Wii Bowling or other games on the Wii and whether this is happening in social settings such as clubs or organized groups. We are currently following up to determine whether the Wii equipment is being used either by participants or by others in the centers. The data from these follow-up studies are being analyzed.

## Limitations

Within social research, it is often difficult to eliminate outside factors that might influence the results. Because this study had no control group, concerns arise about whether it is the digital gameplay, the act of being together, or the increased

visibility from participating in a publicized experiment that caused the positive outcomes. Although we cannot fully answer these questions, the study attempted to address them by using triangulation through a combination of quantitative and qualitative data collection about the social milieu created by playing Wii Bowling.

Another limitation is that participation in the Wii Bowling tournament was voluntary and thus limited to those who were willing and interested in playing. The participants, although they might have been somewhat socially connected to begin with, did increase in social connectedness and decreased in loneliness and did report benefits from their involvement in the study. Possibly, those who are not as social might have benefited even more from participating, particularly if their original scores had been low. It could have given them an opportunity for new social interactions with play as the medium.

A third limitation is that participants who attended recreation centers to play Wii Bowling did not volunteer for interviews and so were not included in the qualitative study. Therefore, we do not know whether their experience was different from those who played where they lived.

## Implications and Future Research

This study adds to current research on the socioemotional benefits of digital games for older adults. A large number of participants were over 85 years of age, and this study may help to promote further research and practice on the possible benefits of digital games for this age-group. Some studies have found that loneliness increases with advancing age (Cattan et al., 2005; Dykstra et al., 2005), and digital games may serve as a way to offset this tendency. For example, seniors' centers could use digital gameplay as an enjoyable leisure activity that offers the possibility of increasing players' social contacts. Additionally, although this study did not specifically look at intergenerational interactions, some of our participants discussed how their gameplay brought about new connections with family and friends, including grandchildren. Games such as Wii Bowling could be used to help strengthen these relationships and gain the benefits of an increased diversity of social networks (Litwin & Shiovitz-Ezra, 2011).

Future studies could examine ways to help support social interaction and to make digital games as accessible as possible for those with physical and cognitive limitations. Another aspect worth examining is whether the same social benefits can be found in gameplay when interaction is completely online, particularly for those who are more isolated in their living situations. Finally, although it is suggested by this study that digital games may have social benefits, they may also serve as educational tools (Jong, Shang, Lee, & Lee, 2008). It would be worthwhile to investigate whether educational games have the same socioemotional benefits when also serving a learning purpose for older adults.

## Conclusion

In this mixed-methods study, both quantitative and qualitative analyses suggest socioemotional benefits for older adults who played Wii Bowling in an organized tournament. When measured before and after the tournament, quantitative results indicate that participants experienced a significantly increased level of social connectedness and a significantly decreased level of loneliness. Social connectedness and loneliness are strongly related, and this study seems to support this finding. The results of the qualitative analysis show that some participants made social connections that extended beyond their teammates to family and friends, in several cases creating opportunities to meet and socialize in contexts outside the tournament. Although relationships that grew out of the Wii Bowling tournament were fairly casual, many participants welcomed the time spent together.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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