

Reasons for Playing Casual Video Games and Perceived Benefits Among Adults 18 to 80 Years Old

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Abstract

Casual video games (CVGs) are becoming increasingly popular among middle-aged and older adults, yet there are few studies documenting why adults of different ages play these games, what benefits they perceive, and how regularly they play. The present study compared the online survey responses of 10,308 adults ranging from 18 to 80 years of age to questions regarding PopCap's popular free online game, Bejeweled Blitz (BJB). All respondents cited playing against friends as their main reason for playing. However, there were differences by age in the second most frequently cited reason. Middle-aged adults cited stress relief, and older adults reported that they seek the game's challenges. As a result of playing CVGs, younger adults noted that they felt sharper and experienced improved memory; older adults were more likely to feel that their visuospatial skills and response time benefited. Adults aged 60 and older had heavier patterns of game play than did adults under the age of 60 years. A significant number of respondents (14.7%) spontaneously noted that they felt that BJB had addictive qualities. CVG players seem to be drawn into this activity by its social nature and to a certain extent by its reinforcing properties. Once involved, however, they believe that they derive a number of benefits that, for older adults, appear to offset declines in age-sensitive cognitive functions.

Introduction

AS CASUAL VIDEO GAMES (CVGs) become integrated into social networking sites (SNSs), their popularity among the adult population has increased greatly, especially among adults 50 years and older.¹ Surveys of social gamers show that they report feeling more "connected," and 52% report that they have formed new friendships as a result of their involvement in CVGs.²

In addition to seeking the social benefits attached to CVGs, it is also possible that adults in their 50s and beyond are attracted by the possible impact of these games on their cognitive functioning. Over the past several years, research on the possible benefits of CVGs to counteract the aging process has received considerable media attention, which may be leading older adults to view them as a way to improve their cognitive skills. According to McLaughlin,³ older adults are willing to invest in technology if they perceive the benefits to outweigh the costs. Since many CVGs are available for free, or at very low cost, they should therefore be a very attractive form of intervention to older adults.

Researchers in the field of video games and aging base their work on a plasticity model of the nervous system, the proposal that the normal age-related losses of neurons in the central nervous system can be compensated by increased

activity of the remaining neurons. According to scaffolding theory, older adults are able to recruit alternate neural circuits as needed by task demands to make up for losses they suffer elsewhere in the brain.⁴ There may also be plasticity within the brain in that regions of the brain showing stronger function make up for activities carried out in brain regions that experience deleterious changes.⁵

Video games were first conceived of as possible intervention studies in the early 1990s,⁶ but researchers have only recently begun to explore their potential to promote brain plasticity. Studies using video game interventions have demonstrated benefits in various higher-level functions including executive functioning,⁷ reasoning,⁸ and trailmaking.⁹ There is evidence that video game training affects executive functioning by increasing the brain volume of areas involved in video game play.¹⁰ Using action-based video games, prior researchers have also reported significant improvements for older adults in attention, memory, and speeded performance.¹¹ In a college student population, Tetris, another popular tile-matching game, was shown to improve scores on tests of mental rotation that persisted for at least several months after training.¹² Although not used in a training context, smartphone applications of puzzle games were found in one study to correlate with several cognitive measures, including nonverbal working memory.¹³

Through these intervention studies, researchers hope to promote successful cognitive aging, which can be defined as cognitive performance that is above the average for an individual's age group as objectively measured.¹⁴ Questions remain about whether video game training can transfer to real world tasks, however,^{15,16} prompting researchers to continue to evaluate alternative game formats.¹⁷

One issue that has emerged in video game training studies is that of finding the best format that will both promote plasticity and motivate the older adult player. Many of the video games used in existing studies employ the first-person shooter format, and although these may be the best approach from a cognitive perspective,¹⁸ they are not games that older adults enjoy playing.¹⁹

With this background, the present study investigated adult age differences in casual game play to compare the reasons for playing and perceived cognitive benefits of CVGs. The sample consisted of adults who play PopCap's popular *Jeweled Blitz* (BJB), a colorful three-match game that is offered free on Facebook and is now in use by more than five million players.²⁰ BJB requires that players use a mouse or fingertip to align at least three gemstones of the same shape and color in rows or columns within an 8×8 matrix, making as many matches as they can within one minute of play per game. Players can gain extra points by matching larger patterns, and the faster they make their matches, the more opportunities they have to increase their score by matching more gemstones. When they finish the game, they receive a complete analysis of their pattern of scoring, which includes bonuses received from patterns of tiles remaining on the board. With the sound effects turned on, players also experience reinforcement for making matches (such as hearing a deep voice proclaim "Awesome"), as well as cues that the time limit is approaching. Music is paired with matches, getting louder and faster as the player's performance improves.

BJB players are able to compete with Facebook friends to achieve a higher ranking on weekly leader boards. They receive a point bonus when the sum of their friends and their own playing scores reach a certain threshold each week. Players are also encouraged to invite other Facebook friends to use the BJB application and can send them beneficial game gifts as incentives. Therefore, BJB may have cognitive benefits by promoting visual search and reaction time, but it is marketed primarily as a social networking game that promotes competition, advancement, and fun.

Through an online survey, respondents in the present study provided their reasons for playing BJB, its perceived benefits, and their frequency of gameplay. Older adults were expected to seek the cognitive stimulation of the games compared to younger adults, who were expected to be more likely to play for social reasons. Exploratory analyses also examined demographic factors, age differences in patterns of game play, and qualitative responses to an open-ended question regarding CVGs in general.

Method

Respondents

An online sample of 10,308 respondents (83% female) provided data on their patterns of CVG play. Based on the age distribution of the sample, five age groups were formed: 18–29 (11.0%), 30–39 (21.2%), 40–49 (27.0%), 50–60 (36.2%),

and 60 and over (13.4%). The majority had less than a bachelor's degree (68.2%), the next largest group had a college degree (19.4%), and the remainder had a graduate degree (12.4%). Of those who provided occupational information, the largest groups were retired (13.4%), office workers (12.3%), homemakers (11.0%), healthcare workers (11.0%), and those involved in service occupations (9.5%).

Measures

A self-report questionnaire assessed the demographic variables of age, gender, education, and occupation. The reason for playing BJB was measured by asking, "What is your main reason for playing the game?" with choices including (a) challenge, (b) stress relief, (c) enjoy graphics and effects, (d) try to beat my friends and teammates, and (e) other. Perceived cognitive benefits of playing BJB were assessed with the question "What is the main effect you think the game has had on your mental abilities?" Responses to this question were (a) I feel sharper in performing other mental tasks, (b) my memory has improved, (c) my ability to see patterns has improved; (d) I can perform other timed tasks more quickly, (e) I feel more confident about my mental abilities, (f) my verbal skills have improved, and (g) other.

Frequency of video game play was assessed by asking "How often do you play BJB?" with the following choices: (a) once a week or less, (b) two or three times a week, (d) once a day, and (e) several times a day. Length of play was asked with the question "How long is your typical gaming session?" with the seven choices ranging from "less than 5 minutes" to "more than 2 hours." One open-ended question asked respondents to provide comments about video games or the survey ("Is there anything else you'd like to mention about playing online games that will help us in future research?").

Procedure

Respondents were recruited via a Psychology Today blog, "Fulfillment at Any Age," written by the first author. A post by PopCap Games on Facebook also advertised the survey by directing readers to the Psychology Today Web site. The survey was preceded by an online consent form approved by the University of Massachusetts Amherst Institutional Review Board.

Results

Across all age groups, respondents indicated that their reasons for playing BJB were to seek challenge (25.9%), to find stress relief (29.9%), to enjoy graphics and effects (3.6%), to beat friends and teammates (36.8%), and "other" (5.0%). Overall, respondents stated that BJB's main cognitive effect was to help them feel sharper (42.2%), have better memory (10.6%), be better able to see patterns (10.0%), perform timed tasks more quickly (19.2%), feel more confident about their mental abilities (3.7%), and improve their verbal skills (0.4%). The remainder cited "other" (10.8%), which included reporting no effect at all (5.1%).

There were age differences in the reasons for playing BJB, $\chi^2(8)=137.72, p<0.001$. As shown in Table 1, although most respondents sought CVGs for social benefits (i.e., to play against friends and teammates), this was particularly true for those in the youngest age group (18–29 years old). Relatively

TABLE 1. MAIN REASON FOR PLAYING BJB BY AGE GROUP

Age	Challenge	Stress relief	Try to beat my friend and teammates	Enjoy graphics and effects	Total
18–29	286 (26.1%)	256 (23.4%)	522 (47.7%)	31 (2.8%)	1,095
30–39	519 (24.2%)	636 (29.7%)	943 (44.0%)	44 (2.1%)	2,142
40–49	665 (24.7%)	919 (34.1%)	1,033 (38.3%)	78 (2.9%)	2,695
50–59	714 (26.2%)	945 (34.6%)	948 (34.7%)	122 (4.5%)	2,729
60+	401 (30.5%)	287 (21.9%)	531 (40.4%)	94 (7.2%)	1,313
Total	2,585 (25.9%)	3,043 (30.5%)	3,977 (39.9%)	369 (3.7%)	9,974

larger percentages of adults in the 30–59 year old age groups, inclusively, cited stress relief than did the respondents in the 18–29 or 60 and over age groups. For the adults in the 60 and older group, wanting a challenge was more frequently cited as a reason for playing than was the case for respondents in the other age groups.

There was a significant relationship between age group and responses to the most frequently cited of BJB's perceived cognitive benefits, as shown in Table 2, $\chi^2(16)=167.94$, $p<0.001$. The percentages of respondents indicating that they were better able to see patterns and perform timed tasks more quickly was higher in each successively older age group. By contrast, feeling sharper and having improved memory were less frequently cited benefits for the older adults in the sample.

Based on the distribution of responses to the questions assessing frequency and length of play, a "heavy" player was defined as one who plays several times a day for 31 to 60 minutes at a time. Using these joint criteria, one-third of respondents qualified for this characterization (33.3%). The percentage of adults falling into the heavy player category increased with each successive age group, and was highest for adults 60 and older (40.5%), $\chi^2(4)=108.89$, $p<0.001$.

Among the total sample of adults reporting their age as 60 and older, nearly two-thirds (66.1%) were aged 60–64. A relatively larger proportion of the 60–64 year old respondents reported that they seek stress relief (25.0% vs. 15.6%), and more of the 65 and older respondents stated that they played to beat their friends and teammates (43.1% vs. 39.1%) and because they enjoy the graphics and effects (10.4% vs. 5.5%), $\chi^2(3)=22.82$, $p<0.001$. There were no differences between the two oldest groups of respondents in perceived benefits of playing BJB or patterns of game play.

Analysis of the open-ended question and "other" responses regarding BJB play identified themes not included in the structured questions through content analysis guided by word searches in the data file (e.g., all instances of "social"). However, some of the responses had not been anticipated, and therefore

their content was sorted on the basis of word frequency (e.g., use of the term "addicted" or "addictive"). Table 3 includes several responses from each age group, selected because they were prototypical of those reported within their age group. Among the 2,518 respondents who included specific comments, the most consistent themes referred to the game as addictive (14.7%), fun (34.5%), and as a way to kill time (9.6%).

Discussion

CVGs are highly popular features of SNSs, but there have been few studies on who plays them and what features they find particularly appealing. The game Bejeweled Blitz (BJB) is one of the most popular CVGs due to its ready availability through Facebook. The present study provided data on the factors that appeal to adults of different ages in BJB, as well as the game's perceived effects on cognitive functioning.

Regardless of age, the majority of respondents in the present study cited the social networking features of BJB as the game's primary attraction. These findings parallel those of previous research on the role-playing game Everquest,²¹ and reinforce the view that CVGs provide important social connections for adults. However, middle-aged adults also value the stress relief potential of the game, a finding that is consistent with experimental research investigating BJB's potential to improve mood and induce physical relaxation and even experience improvements in autonomic nervous system functioning.^{22,23}

In terms of perceived benefits, young adults reported that they experience the cognitive benefits of feeling "sharper" and having better memory. With each progressively older age group, the benefits of improved visuo-spatial abilities and reaction time became more prominent. Thus, respondents of all ages are drawn to CVGs because these games provide a chance to connect with other people in their social network. Once they start to play these games on a regular basis, however, they report improved cognitive functioning.

TABLE 2. MAIN EFFECT OF PLAYING BJB BY AGE GROUP

Age	Feel sharper	Memory has improved	Ability to see patterns has improved	Can perform other timed tasks more quickly	Feel more confident	Total
18–29	598 (57.2%)	158 (15.1%)	74 (7.1%)	173 (16.6%)	42 (4.0%)	1,045
30–39	1,064 (56.4%)	224 (11.9%)	167 (8.8%)	383 (20.3%)	50 (2.6%)	1,888
40–49	1,202 (50.6%)	287 (12.1%)	247 (10.4%)	537 (22.6%)	104 (4.4%)	2,377
50–59	1,176 (48.6%)	272 (11.2%)	295 (12.2%)	556 (23.0%)	119 (4.9%)	2,418
60+	517 (43.0%)	126 (10.5%)	223 (18.6%)	281 (23.4%)	55 (4.6%)	1,202
Total	4,557 (51.0%)	1,067 (11.9%)	1,006 (11.3%)	1,930 (21.6%)	370 (4.1%)	8,930

TABLE 3. OPEN-ENDED RESPONSES BY AGE REGARDING BJB GAMEPLAY

65 and older:

At the age of 72, it is a very entertaining way to take a rest from daily chores and also a good way to stimulate the brain cells.

I very much enjoy trying to beat my daughter-in-law; she is a very good player.

It gives me a feeling of confidence and accomplishment.

Nothing I can think of. I play because I live alone. It gives me something to do. I lost my husband after 51 years of marriage.

There is [sic] a lot of things you don't enjoy alone.

60–64:

As a person who is reaching, or some may tell me has reached, the age when the mental faculties are reducing, I like to play games that make you think and keep the mind active.

I like the game telling me what a great job I did.

Online games provide a social network that many people, especially retired seniors, need. I have met many people who

I now count among my friends and have even traveled across the United States to see some of these people, and they have come to see me.

55–59:

It's my go-to way to relax after working 8 hours (on a computer all day, I might add). I used to read a lot, but now the computer is my way to escape.

My job is complicated, distressing, and all day I have to listen hard and help to problem solve. This game is a little time out and has a beginning, an end, all achieved in 1 minute. I never get that in the day.

Hmmm...hope this study results in finding that contrary to my son's opinion, these games are not turning my brain into mush. I tell him I just need to relax when I get home, and I like the mindlessness of it all. He says that is precisely the problem! Oh well.

50–54:

The game appeals to my need for order, structured rewards for doing it right, and making sense out of chaos.

Something to do when I have nothing else to do at work.

Most people my age, in my experience, play because it is a connection to others. A way of not feeling alone. Better than watching TV.

40–49:

Games that involve a bit of strategy help with problem solving skills. Games that you can drop in and out of while doing other things help with multitasking and organization skills.

I am a middle-aged single female, and it is something that I do for me. I only compete against myself for the most part.

I play more with time off; like television, it is a relaxer.

I enjoy playing online games to help de-stress myself after a day at work. I find that by playing for about 30–60 minutes when I come helps me to unwind and relax.

30–39:

Mostly I just play a few minutes to escape from the world of my children.

I admit that playing Bejeweled Blitz is the one game I play to specifically help me concentrate. I was pretty sick when I first started playing and had a lot of trouble with "brain fog," and it has helped me so much in regaining my focus and clarity.

It's also exciting and fun!

I feel that playing these games stimulates my brain, while at the same time allowing part of it to rest. These games can be "mindless," yet improve my overall focus at the same time.

25–29:

Brain games are ALOT of fun...I FEEL the effects very quickly and feel that my mental capacities have increased.

I finished school, but I would always make a point to relax and play Bejeweled for about 10 minutes before taking an exam.

I felt it really woke me up and made me focused.

I think Bejeweled helps clear my mind after a long day at work, relieves some stress, and sharpens my mental awareness.

18–24:

It's all for fun and to stay as a kid in our hearts no matter what age u are.

I find that I like games that require very little commitment. For example, I've never been able to get into RPGs that have long stories and missions because they just seem like way too much effort for a game...I always stuck to racing, fighting, and puzzle games because you or someone that's never even played the game can easily pick it up have a few fun rounds, laps, etc. and be done with it.

Where my partner and others can just sit and watch TV, I cannot, so I play Bejewelled Blitz/other Facebook games while "watching" TV with my partner.

In addition to highlighting age differences in reasons for and perceived benefits, the findings from the present study are the first to show that heavy game play is associated with older age in adulthood, as the oldest respondents (68% of whom were retired) were also the most likely to be heavy game players. In

contrast to the image of the "typical" CVG players as a young adult, these findings on a large online sample show that it is the older adults who report the heaviest game play patterns.

Responses to the open-ended question regarding CVG play provided a rich portrait of the factors that motivate

individuals to become involved in online games. These comments expand on the perceived cognitive and stress-reducing benefits of the game. In addition, respondents mentioned that they enjoyed the reinforcing features of the game such as the voice providing praise or the sense of accomplishment.

A relatively large number of respondents voluntarily cited the addictive qualities of the game, consistent with reports that prolonged play of CVG can lead to negative outcomes such as Internet addiction, particularly for certain vulnerable individuals.²⁴

Some respondents mentioned that they continued to see the patterns even after they had stopped playing, such as while trying to fall asleep, an experience reported typically by younger players and known as game transfer phenomena.²⁵ One respondent noted that: "I had a friend (who also plays Bejeweled Blitz) once tell me that she was so addicted to it, she saw two red cars when she was out once and was looking for the third red car to complete the match." Others attributed BJB's addictive qualities to the fact that it is over in one minute: "[it] entices you to play just one more game...just one more game..." There was no significant pattern of age differences in the percentages of those who mentioned the game's addictive quality, but there was a trend for the 40–49 year olds to have the highest percentages of those spontaneously mentioning their addiction to the game (17.2%).

Limitations in the present study included the fact that the sample was primarily female, and only limited demographic information was collected, which unfortunately did not include nationality. Like other online surveys, this was a convenience sample. Nevertheless, literature on demographic variables for CVG players is sparse and the results suggest that adults of various ages obtain differing cognitive and social benefits from CVG.

If BJB indeed can be shown to induce favorable cognitive changes in older adults, there could be widespread applicability to this growing population as a way to maintain optimal cognitive aging. Moreover, to the extent that a game such as BJB can enhance feelings of self-efficacy,²⁶ video game training may also promote a sense of cognitive control, shown in memory training studies to be beneficial to the performance of older adults.²⁷ Not only would such findings provide encouragement to older adults, but they would also support theoretical models emphasizing the potential for successful cognitive aging and plasticity throughout the life span.

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