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LEISURE TIME AND GENDER: UNDERSTANDING WHY NON-GAMERS DON'T PLAY

By

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ABSTRACT

LEISURE TIME AND GENDER:
UNDERSTANDING WHY NON-GAMERS DON'T PLAY

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The study provides the first research evidence of the relationship between gender, leisure time availability and time spent playing digital games. To better understand why people choose to spend (or not to spend) time playing digital games, 276 college undergraduates were recruited to respond to an online survey about (1) gender, (2) current and prior gaming behavior, (3) non-leisure time demands, and (4) leisure time availability. The study found that female undergraduates have less free time than men, available in shorter chunks. Between both sexes but even more so among females, more free time is strongly linked with more gameplay. Additionally, the study is a first attempt to look at gaming across the life span for college students, revealing that avid players in middle school are likely to be avid players in high school and in college. The study explains some of the reasons why non-gamers don't play. Implications for the game industry and game designers are explored.

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Carrie Heeter rocks.

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Introduction

This study looks at the impact of gender, prior gaming behavior, non-leisure time demands and leisure time availability on time spent playing digital games. On average, females spend less time than males playing digital games (ESA, 2006a; ESA, 2006b, p. 3). However, some females are avid gamers and others never play. The magnitude of the gaming gap increases as children become young adults (Roberts, Foehr, & Rideout, 2005, p. 39). Adult women have less leisure time and free time available in smaller chunks than adult males (Mattingly & Bianchi, 2003; Apt & Grieco, 1998). This disparity begins in childhood (Ritchie, Lloyd, & Grant, 2004). Amount of free time and chunk size limit the available time that can be spent playing games and, when free time occurs only in small chunks, there is an impact on what kind of games can be played. Leisure time availability and non-leisure time pressures may help to explain differences in how much time women and men spend playing games. The findings have implications for game designers, which could help them to reach a wider audience.

Games today touch all ages. According to data from the Entertainment Software Association, the average game player today is 33 years old (ESA, 2006b, p. 2). Thirty-one percent of game players are under the age of 18, 44% are 18 to 44 years old, and 25% are 50 or older. Girls and women DO play games. The pattern varies by age. At almost every age category, males spend more time

playing games than females do. Combining computer and video games, a recent Kaiser Family Foundation Report (Roberts, Foehr, & Rideout, 2005) found that a steady drop in gameplay occurs between the ages of 8 and 18. Boys play an hour and a half per day (1:34), while girls play less than half as long (40 minutes).

Something surprising happens with adult women and digital games. The trend for females to spend less and less time playing games as they grow up reverses, particularly for the category of casual online games. Casual games represented 10% of the PC game market in 2005 (IGDA, 2005). The IGDA (International Game Developer's Association) defines casual games as games which are primarily distributed online. Online play periods are often divided into numerous short game sessions. Female casual gamers pick up and drop games multiple times per day. Casual online games are playable in small chunks of time, as little as 5 to 10 minutes. According to the IGDA Casual Games White Paper, market research shows the majority of the casual online games audience today is women 30-45 years old (IGDA, 2006, p. 9). Clearly many casual gamers today did not grow up playing digital games, but have adopted them later in life. Females spend more time on average playing online casual games (9.1 hours per week) than do males (6.1 hours per week). Furthermore, casual online games represent a larger proportion of females' overall gaming time (46%

of females' 21.6 hours per week) than males' overall gaming time (26% of males' 23.2 hours per week).

Digital games today come in many genres. For example, MMOs (massively multiplayer online games) are time intensive. They require long blocks of time to complete a quest. The average MMO player spends 22 hours per week playing their favorite MMO (Yee, 2006, p. 2). Although male MMO players significantly outnumber female MMO players, female MMO players are much more likely to be older adult women, while more male MMO players are younger (Yee, 2006, p. 17). As with casual games, we see increased gameplay by older adult women. Research shows the context of MMO play tends to be different for female MMO players. Female MMO players are more likely than male MMO players to be playing with a romantic partner or a family member, typically a mother and son playing together (Yee, 2006, p. 19).

Speakers from industry and academia speculate the reason adult women are such avid casual gamers is because women have less available time to spend playing games and thus can best play in small chunks.[1] However, this common sense expectation of a relationship between available time and casual gameplay is conjecture, not confirmed by research. Women 35 and older spend more time playing casual online games than younger women and than men and boys.

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[1] For example, Beyond Barbie and Mortal Kombat: New perspectives on gender, games, and computing workshop, 2006 and Girls 'n' Games conference, 2006, both at UCLA.

What happened between the ages of 15 and 34 in the lives of today's 35 and older female casual gamers to result in this behavior? Casual online games are said to provide adult female players with a short burst of "me time" in the midst of an otherwise packed schedule of obligations for work and family.

Considering gaming across the lifespan, college comes at a point when gameplay has ebbed to its lowest point in childhood. Gender and time use has been studied extensively among adult women and to a lesser extent among children living at home. As adults, family responsibilities predictably result in time demands. As children, parents assign daughters and sons different household chores. College for the majority of undergraduates is a stage in life, typically from the age of 18 to 22, when they experience relative freedom, a time when parents no longer assign chores and before relationship and family responsibilities are omnipresent. This study will explore the relationship between free time, time pressure, and current and past gaming behavior of female and male college undergraduates.

Literature Review

Time Availability

Time perception, or one's sense of time, has a great effect on how individuals live their lives and what they choose to do with their time (Nir, 1999). People live their lives based off of their own perception of time—how much of their time is already planned for, how much available time they have left to spend, and how valuable they believe that time is. Often it is said that we "make" time for something. Unfortunately, time cannot really be made. Time is like money that can be spent in different ways. Unlike money, time is finite and runs out every day. Even the richest among us have at most 24 hours in a day.

Individuals assess the amount of available "free" time they have and then decide how to spend that time. Playing a game is an act of spending time. Some activities, such as listening to music or eating, can happen concurrently with other activities. Indeed, some games require little enough attention that they can be multitasked, played while engaging in instant messaging, emailing, and surfing the Web. But most games are intended to engage players, to "hold them on the edge of their seats for hours" (Prenksy, 2001). Playing an engaging game typically means choosing to spend time exclusively on that activity.

The number of men who choose to spend available free time on gaming is much higher than the number of women (game players are 62% men and 38% women)

(ESA, 2006a). However, male-female differences in whether they play games may be directly related to how men and women perceive and manage their time. Time management and time use studies consistently reveal gender differences. Aguiar & Hurst (2006, pp. 44) report 36 hours of leisure time per week for Americans in general; 38 hours for men and 34 hours for women. Women have less available leisure time than men (Larson & Verma, 1999; Aguiar & Hurst, 2006).

Differences in Time Availability

Ritchie, Lloyd, and Grant (2004) studied gender differences in time use among adolescents in developing countries and found girls carried a larger workload at school and home. Regardless of age, "girls tend to spend longer hours than boys on all work activities combined, leaving boys more time for leisure activities." Mattingly and Bianchi's (2003) study found women have less free time than men in regard to both quantity and quality of time. They found that on average men have nearly half an hour more free time per day than women. The availability of "disposable" or leisure time is inversely related to other obligations in life. The opportunity cost of allocating free time to playing a game is much higher for those with very little free time. Since women have less free time than men, the cost of spending that time is more expensive. Gameplay would need to be a gratifying experience for women, to be worth the allocation of free time.

Reports about "millennials" suggest that older kids today have more scheduled activities than previous generations. Responding to a survey of the high school class of 2000, students reported that kids a few years older than them had less homework and fewer scheduled activities during high school than high school students do today (Howe & Straus, 2000, p. 161). Today's high school students believe they experience more pressure than even their slightly older peers.

Both the amount and nature of responsibilities and leisure time activities differ for men and women. In general, more responsibility falls on women for taking care of the family and household duties, regardless of other work-related obligations (Apt & Grieco, 1998; Mattingly & Bianchi, 2003). Renk et al. posited that women have more responsibility for caring for the family because "fathers may experience more choice in their interactions with their children, whereas mothers may perceive the time they spend with their children as part of their expected role rather than as a leisure activity" (Renk et al., 2003).

Gender Differences in Managing Time

Not only do men and women have different roles in society, but they also manage their time differently. Women have more time constraints built into their daily routine (Apt & Grieco, 1998) and feel more time pressure (Mattingly & Bianchi, 2003). Moser (2005) asserts,

> "The major difference, however, is that men typically play their roles sequentially, focusing on a single productive role, while women

> must usually play their roles simultaneously, balancing the demands of each within their limited time constraints."

Women utilize time management and multitasking skills to cope with an overload of tasks and have fragmented amounts of available time (Apt & Grieco, 1998). Traditional video games demand undivided attention (Prensky, 2001) and therefore are not conducive to multitasking. The result is games are a less appealing and less viable option for busy women.

Games that permit multitasking and games that serve the simultaneous function of socializing with friends or family may appeal to women. Examining the results of an Australian time-use study of men and women 15 years and older, Floro found women mainly engage in leisure as an overlapping activity rather than as an exclusive activity (Floro, 1999). Women are more likely than men to multitask leisure time activities with socializing or other "good for me" activities. "One of the most important gender differences in western civilization involves the amount of emphasis placed on interpersonal relationships" (Smith, 1997). Women and girls put more emphasis on interpersonal relationships, including relationships with their significant other, but also with their children, other family members, friends, and co-workers. Because of this, they are more likely to spend time with others rather than alone and spend more time in conversation than males (Smith, 1997).

Gender Differences in Technology Usage

Games have the potential to be highly attractive for women. Genevive Bell, a cultural anthropologist at Intel, observed that women use technology as often as men, but in different ways. "Women tend to use technology in ways that make busy days more manageable, which is why cell phones, laptops and wireless Internet access are popular" (Sidener, 2005). The availability of laptops and faxes increases the ease of mixing work and leisure activities (Floro, 1999). A study by Apt and Grieco (1998) determined women benefit from distance education, which allow them to have more flexible school schedules. Distance education worked well for women in particular because lessons could be delivered in components, accessed remotely, completed incrementally, and available at anytime. These features encouraged time management, allowed tasks to be completed over multiple chunks of time, and provided an influx of flexibility. The features of distance information technologies that are attractive to women can be used to understand women players' needs in games. Women need games that are designed in component forms and can be played in an incremental manner rather than in a one-time block mode.

Conclusion

This study examines (1) gender, (2) current and prior gaming behavior, (3) non-leisure time demands, and (4) leisure time availability in order to better understand why non-gamers don't play video games. It is believed that if we find

or better understand patterns of gaming, we will be able to know more about why people play and what keeps them playing. Additionally, if we understand why non-gamers don't play, maybe we can find better ways to get them to play. The study focuses on time in relationship to video game playing. There are not past studies in this area. It is hypothesized that the less free time one has, the less time they will spend playing games. According to the literature review, women have less leisure time than men. Is this pattern true with our participants and, if so, how large is the gap of available leisure time between men and women? Is there a significant relationship between available leisure time and time spent gaming? How about between these two variables and gender? Of course an individual plays varying amounts of games throughout their life, but does game behavior follow a pattern? Do gamers play less, more, or consistently the same over time? How about in comparison to their peers? Does one's game playing evolve over time? Are those that were the avid gamers amongst their peers in middle school still avid gamers today when compared to their college classmates? There is much to learn about how time effects game play and what patterns of gaming exist over time.

Methods

Participants

A survey was conducted with 276 undergraduates between the ages of 18 and 24. The mean age of the student respondents was 20.4 and the median was 20. Slightly more than two thirds (68.8%) were female. Most were Caucasian (including Hispanic); 7.6% were African American and 5.2% were Asian. All of the participants were undergraduate students at a large Midwestern university. Thirty-six percent took the survey for extra credit in an introductory "Information Society" course and 63.8% completed the survey as an optional, for-credit assignment in a junior level "Health Psychology" course. The breakdown by year was 13.8% freshman, 15.6% sophomore, 26.5% junior, and 44% senior. About one fourth (25.6%) of students were pursuing majors in the College of Social Science (most likely Psychology majors) and another fourth (26.7%) were pursuing degrees in the College of Communication Arts and Sciences (most likely majoring in Telecommunication, Information Studies, and Media). Majors for the other students varied widely with no other college accounting for more than 13.9% of the respondents.

Data Collection and Instrument

Data was collected anonymously. Survey questions were designed with prior research in time perception and survey design methods in mind (Bendig, 1953; McClendon, 1989). For fixed choice questions, five point scales had fully labeled

rating points and extreme options were used to anchor scales. When applicable, specific options were used instead of the traditional, yet vague, "strongly agree" and "strongly disagree" response options.

The label "digital game" or "digital games" was carefully selected and used consistently throughout the instrument instead of "video game" or other similar terminology in order to encompass many types of games, such as console games, arcade games, computer games, handheld games, etc. We did not want to use a term like video games, which may be interpreted by some participants as console games only.

Respondents were asked to recall how recently they played a digital game. This measure was used to determine where they fit on a continuum from non-gamer to avid gamer. The instrument asked the participants, "When was the last time you played a digital game?" and had 8 response categories (within the hour, within the day, within the week, within the month, within 1-6 months, within 7-12 months, over a year, and never— within the hour and within the day were later combined during analysis into one category, "today").

Participants were also asked to estimate the number of hours per week on various leisure and non-leisure activities. Non-leisure activities included time spent at work and doing homework. They were asked to estimate hours spent

playing digital games per week in middle school, high school, and college (now). Middle school and high school were defined for participants as 6-8th grade and 9-12th grade, respectively. Demographic data was also assessed. Participants were asked their gender, age, relationship status (single, dating, engaged, married), year in school, and their grade point average (GPA) using a 4.0 scale.

Participants were asked about their "free" time in two ways. They were asked the number of days per week they had at least some free time and also how long their typical chunks of "free time" were. Respondents could choose 1 through 7 days per week with at least some free time or they could select "less than one day per week." Five response categories were provided for indicating how long their typical chunks of free time were (10 to 15 minutes, 30 minutes, one hour, two hours, and more than two hours). Data was also collected on whether respondents were able to find appealing games to choose from and the likelihood that they would play more if better games were available.

Data Analysis

T-tests, two-way analysis of variance and correlation analysis were conducted to explore the research questions and test the research hypotheses.

Results

Game Behavior

In order to characterize individuals with different affinities for gaming, we first defined the construct. Respondents were asked when was the last time they played a digital game with 7 response categories (today, within the week, within the month, within 1-6 months, within 7-12 months, over a year, and never). Responses on recency of game playing helped to define a construct with a spectrum of avid gamer to non-gamer. Those who responded that they played games the most recently (played "today") are avid gamers, while those who played games not so recent approach the non-gamer side of the spectrum. The recency of play variable was compared with results from estimated number of hours playing games per week to confirm the use of the measure and to characterize gameplay among those with different game orientations, or player-types.

Gender differences were extreme. Half of male undergraduates and only 7% of female undergraduates had played a game the day they completed the survey. Combining respondents who had last played today with those who had last played sometime in the last week, 70% of males in the survey had played within the last week, compared to one fourth of female respondents. Gaming was an extremely common activity for male undergraduates and much less common for female undergrads. Because of small cell sizes within male respondents, the last

three categories (6 to 12 months, more than one year ago, and never) were collapsed into a "non-gamer" category, combining all respondents who had not played a game within the last 6 months. Even after collapsing these response categories, the non-gamer category included almost no males (3.5%) but one third of female respondents (32.6%). Table 1 presents the results.

***TABLE 1:** When was the last time you played a digital game?*

		◄ *avid gamer*				*non-gamer* ►	
		today	**this week**	**this month**	**2 to 6 months ago**	**Longer than 6 months**	**Total**
Female	n	14	33	39	42	62	190
	%	7.4%	17.4%	20.5%	22.10%	32.60%	100
Male	n	35	17	18	12	3	85
	%	50.1%	20.0%	21.20%	14.10%	3.50%	100
Overall	n	41	50	57	54	65	275
	%	17.8%	18.2%	20.70%	19.60%	23.60%	100

Hypothesis 1: Females spend less time playing games than males do in middle school, high school, and college.

The Kaiser Family Foundation Report described gameplay time between different age groups, but did not break down playing time at different ages by gender (Roberts, Foehr, & Rideout, 2005). In our study, males played significantly longer than females did at all three ages. In middle school, female undergraduates recalled playing games an average of 2.85 hours per week, compared to nearly 8 hours per week for males. Female undergraduates recalled playing 1.75 hours per week in high school, compared to a little more

than 7.5 hours for males. In college females played an average of one hour per week, compared to 5.3 hours for males. Gender differences at each age are significantly different based on t-test analysis, each with a probability of $p < .001$. Extrapolating from these differences (multiplying average weekly hours by 52 weeks), males played 266 more hours per year each year of middle school, 305 more hours per year each year of high school, and 225 more hours per year each year of college than females. Hypothesis 1 is supported.

***TABLE 2:** How many hours do or did you play digital games in a typical week?*

		Middle School	**High School**	**Now (College)**	**n**
Female	weekly	2.85	1.75	0.98	189
	est. yearly	148.2	91	50.96	
Male	weekly	7.96	7.62	5.3	84
	est. yearly	413.92	396.24	275.6	
Total	weekly	4.45	3.57	2.31	273
	est. yearly	231.4	185.64	120.12	
t-test	Gender	t=10.19, p<.001, df=271	t=11.25, p<.001, df=272	t=9.27, p<.001, df=270	

(Paired t-tests comparing middle school and high school, high school and college, and college and middle school are all significantly different ($p<.001$, df range 270 to 272, t range 5.12 to 8.45)

Hypothesis 2: Time spent playing games changes from childhood through young adulthood. Gaming is highest in middle school, and declines to its lowest point in college, for both males and females.

The Kaiser Family Foundation Report showed gameplay time declines between the ages of 8 to 10, 11 to 14, and 15 to 18 (Roberts, Foehr, & Rideout, 2005). We wanted to confirm this trend, and to look at gender differences over time. Do

college students recall middle school as the time when they played the most games, and college the least? Examining trends over time (Table 2), respondents overall recalled playing an average of 4.45 hours per week in middle school, 3.57 hours in high school, and 2.31 hours in college, consistent with the pattern found in the Kaiser Family Foundation Report. Paired t-tests comparing middle school and high school, high school and college, and college and middle school are all significantly different. Females in particular follow this declining pattern of time spent gaming—their playing time drops between middle school and high school and again between middle school and college. On average females played 2.85 hours per week in middle school, 1.75 hours in high school, and one hour in college. Among males, middle school and high school playing time was not significantly different, varying between 7.5 and 8 hours per week. Between high school and college, male time spent with games dropped to 5.3 hours per week. Hypothesis 2 is partially supported.

Hypothesis 3: The choice of allocating leisure time to games is consistent over time: those who spend more time playing games in middle school will also spend more time playing in high school and college. Young gamers are more likely to grow up to be adult gamers.

Examining time spent playing games by age shows individuals play varying amounts during different parts of their lives (Hypothesis 1; Hypothesis 2; Roberts, Foehr, & Rideout, 2005). However, when investigating how much one plays in

comparison to their peers, do individual play patterns or styles immerge? For example, although the actual amount of time that one plays may fluctuate; do those who play the most games in middle school also play the most games in high school and college in comparison to their peers? Do play patterns or styles exist that explain gameplay over one's lifespan? Self-reported gameplay hours per week in middle school, high school, and college are significantly correlated (Table 3). Frequent gamers in college were also heavier gamers in high school and middle school. Infrequent game players in college also devoted less time to playing games in middle school and high school.

College and high school play have a correlation of .721; high school and middle school are correlated .814, and middle school and college have a weaker though still significant correlation, .558. All correlations are significant at $p < .001$. Time spent playing games in middle school is a good predictor of future game behavior. Time spent playing games in high school is an even better predictor of college gameplay time.

TABLE 3: *Correlations between gameplay hours per week in middle school, high school, and college*

		college	high school
high school	R	0.721	
	p	<.001	
	n	273	
middle school	R	0.558	0.814
	p	<.001	<.001
	n	271	272

Looking deeper at lifespan trends in time spent playing games, time spent with games in middle school, high school, and college were examined in relation to how recently respondents last played a game. Recency of gameplay is an approach to characterizing game orientation, or the player-type according to frequency of play. Relating recency of play with estimated hours per week serves to confirm the measure and to characterize gameplay among those with different game orientations.

Table 4 combines data from three two way ANOVA analysis, testing the significance of gameplay hours by gender and game orientation in middle school, high school, and college. The first column reports average hours per week playing games in middle school. Averages for females appear first, broken down by the five levels of game orientation (from avid gamer who most recently played today to non-gamers who have not played in the last 6 months). Averages for males are next, followed by overall averages across the game orientation categories. At the bottom of the column, statistical results (f size, significance, and degrees of freedom) are reported for the effect of gender, gaming orientation, and the interaction (if any) between gender and game orientation. Column 2 presents parallel data for high school game hours and column 3 for college game hours.

TABLE 4: *How many hours do or did you play digital games in a typical week?*

		Middle School	High School	Now (College)	N
Female	**Today**	5.23	4	3.92	12
	This week	4.13	3.11	2.03	33
	This month	3.14	2.28	1.15	29
	2-6 months	3.4	1.55	0.48	42
	> 6 months	1.16	0.37	0.05	62
	Total	2.85	1.75	0.98	189
Male	**Today**	10.51	11	8.94	34
	This week	7.35	6	4.53	17
	This month	6.17	6	2.64	18
	2-6 months	5.83	4.17	1.01	12
	> 6 months	1	1	1.67	3
	Total	7.96	7.62	5.3	84
Total	**Today**	9.08	9.1	7.55	47
	This week	5.27	4.09	2.88	50
	This month	4.1	3.46	1.62	57
	2-6 months	3.94	2.13	0.59	54
	> 6 months	1.15	0.4	0.12	65
	Total	4.45	3.57	2.31	273
ANOVA	gender	F=100.25, p<.001, df=1,262	F=160.85, p<.001, df=1,264	F=161.39, p<.001, df=1,263	
	gaming	F=11.98, p<.001, df=4,262	F=17.43, p<.001, df=4,264	F=35.47, p<.001, df=4,263	
	gender x gaming interaction	n.s. (p=.262)	F=2.95, p=.021, df=4,264	F=4.03, p=.003, df=4,263	

Two way ANOVAs reveal significant relationships and interactions between gender, game orientation, and hours spent gaming across the lifespan (Table 4). Time spent playing games in middle school is significantly different by gender and by when respondents last played a digital game. When avid gamers (those

who last played today) were in middle school they played an average of 9 hours per week. Those who had not played today but played sometime this week played less in middle school, an average of 5.3 hours per week. Non-gamers today were the least frequent gamers in middle school, they played an average of 1.15 hours per week. This same significant trend is observed for high school and college.

Gaming as a leisure time choice appears to be a consistent leisure time preference, despite developmental changes in the individual and changes in the nature and content of available games. Hypothesis 3 is supported.

Hypothesis 4: Male college students have more free time overall and their free time is available in larger chunks than female college students.

Research shows that adult women have less available free time than adult men, and that their free time is available in smaller chunks. Does this same pattern occur for female and male undergraduates, even though their lifestyles do not yet have the childcare, relationship, and household demands of typical adults? Female undergraduates reported significantly smaller available chunks of free time (Table 5), an average block size of one hour and 21 minutes, compared to male undergraduates who on average had closer to two hour blocks (1:42). Males also had more days per week with at least some free time (4.76) than females (3.27). Multiplying the block size of free time by the days per week with

any free time derives an underestimate, because individuals may experience more than one chunk of free time in a day. T-tests comparing male and female means were significantly different at $p < .001$ for all three leisure time availability measures (1. typical chunk size; 2. number of days per week with any free time; 3. chunk time number of days). The measure can be interpreted as representing the minimum average free time per week, realizing that for some individuals the actual amount of free time may be larger. Using this conservative formula, males had nearly twice as much free time per week as female college students (10 versus 5.2 hours per week). Hypothesis 4 is supported.

***TABLE 5:** Estimated free time in a typical week*

	Typical Chunk Size (hours:minutes)	**Number of Days Per Week with any free time**	**Chunk size times number of days**	**n**
Female	1:21	3.27	5.15	189
Male	1:52	4.76	10.08	84
Total	1:31	3.73	6.68	273
Gender t-test	t=4.57, p<.001, df=273	t=4.70, p<.001, df=272	t=5.64, p<.001, df=272	

Hypothesis 5: Time spent playing games is related to available free time. Male and female students with more available leisure time will spend more time playing games.

Avid gamers (college students who played a game on the day they completed the survey) had more free time than other students. This relationship was true for

both male and female students, although female gamers had less free time than male gamers (7 hours and 41 minutes per week compared to 12 hours and 18 minutes). Non-gamer females had the least free time (4 hours and 15 minutes per week) and they experienced free time in the shortest chunks (on average, 1 hour and 12 minutes). Among males, those who played a game the same day as the survey had the most free time and those who played sometime that week had the next most free time (12:18 and 9:58). The relationship between the number of days per week with some free time and game orientation was not significant (n.s., p=.590). Both gender and game orientation are significantly related to overall amount of free time and available chunk size. Hypothesis 5 is supported.

TABLE 6: *Estimated free time in a typical week by gender and game orientation*

		Typical Chunk Size (hours: minutes)	Number of Days Per Week with any free time	Chunk times number of days (hours: minutes)	n
Female	**Today**	1:41	3.5	7:41	12
	This week	1:23	3.4	5:08	33
	This month	1:21	3.6	5:05	29
	2-6 months	1:57	3.3	5:45	42
	> 6 months	1:12	3	4:15	62
	Total	1:21	3.3	5:09	189
Male	**Today**	2:11	5.1	12:18	34
	This week	1:43	4.7	9:58	17
	This month	1:33	4.5	7:22	18
	2-6 months				
	> 6 months				
	Total	1:52	4.8	10:05	84
Total	**Today**	2:02	4.6	10:59	47
	This week	1:30	3.8	6:47	50
	This month	1:25	3.9	5:48	57
	2-6 months	1:28	3.7	6:22	54
	> 6 months	1:15	3	4:25	65
	Total	1:31	3.7	6:41	273
ANOVA	gender	F=21.37, p<.001, df=1,265	F=21.77, p<.001, df=1,264	F=32.23, p<.001, df=1,264	
	gaming	F=3.04, p=.018, df=4,265	n.s. (p=.590)	F=2.57, p=.039, df=4,264	
	gender x gaming interaction	n.s. (p=.703)	n.s. (p=.939)	n.s. (p=.864)	

Hypothesis 6a, 6b, 6c: Competing demands on students' time, such as a.) homework, b.) a paying job, and c.) maintaining a good GPA will result in less time devoted to gameplay.

Time in a day is a finite resource. The number of hours spent on required activities or responsibilities reduces the number of hours available for leisure time activities. Those who have less leisure time to spend will likely spend less time playing games than their more leisure-rich peers. In order to spend the same amount of time playing games as other students, time-constrained individuals would have to value gameplay as a leisure activity of choice more highly than other leisure activities, allocating a larger proportion of their limited free time to games. Time spent on required activities such as homework and/or work is expected to reduce time spent playing games.

(a) Both male and female students who had played a game the same day they completed the survey spent the least amount of time per week doing homework (9.3 and 8 hours, respectively) (Table 7). Gender was not significantly related to time spent on homework. Game orientation was significantly related ($p=.002$), but the difference was located primarily between those who had played today versus those who had played less recently.

TABLE 7: *Estimated time spent on non-leisure activities in a typical week by gender and game orientation*

		Homework	Job	Homework + job	GPA	n
Female	**Today**	8	14	22	3.086	12
	This week	14.7	28.79	43.48	3.061	33
	This month	10.51	24.56	35.08	3.211	29
	2-6 months	14.57	19.14	33.71	3.15	42
	> 6 months	12.69	25.93	38.74	3.177	62
	Total	12.66	23.76	36.46	3.150	189
Male	**Today**	9.29	5.89	15.17	3.071	34
	This week	12.29	4.76	17.06	3.335	17
	This month	13	16.22	29.22	3.067	18
	2-6 months	15.42	8.25	23.67	3.108	15
	> 6 months	15.67	18.00	33.67	3.467	3
	Total	11.76	8.61	20.38	3.142	84
Total	**Today**	8.92	8.2	17.12	3.076	47
	This week	13.88	20.62	34.5	3.154	50
	This month	11.3	21.93	33.23	3.164	57
	2-6 months	14.76	16.72	31.48	3.141	54
	> 6 months	12.83	25.56	38.5	3.191	65
	Total	12.39(a)	19.06(a)	31.47(a)	3.148(a)	273
ANOVA	gender	n.s. (p=.378)	F=61.530, p<.001, df=1,264	F=60.394, p<.001, df=1,264	n.s. (p=.898)	
	gaming	F=4.36, p=.002, df=4,265	F=3.682, p=.006, df=4,264	F=5.207, p<.001, df=4,264	n.s. (p=.731)	
	gender x gaming interaction	n.s. (p=.606)	n.s. (p=.063)	F=3.228, p=.013, df=4,264	n.s.	

(b) Women who reported spending the least amount of time working at a paying job per week played games more often, however, the same was as consistently true for men. Female undergraduates in our study spent significantly more time per week working at a paying job ($p<.001$) than male undergraduates: 2.8 times more (23.76 hours as compared to 8.61 hours). There was also a significant relationship between the number of hours spent working and game orientation ($p=.006$). Those who most recently played "today" worked an average of 8.2 hours per week, whereas those who had not played at all within the last 6 months worked an average of 25.6 hours per week.

(a,b) Doing homework and working at a paying job can both be considered obligatory, required uses of time. These two time estimates were added together to form a measure of time spent in required activities (work plus homework hours per week). Amount of time spent in the obligatory activities of homework and work was significantly different by gender and by gaming orientation ($p<.001$). Female students experienced an average of 36.5 hours of obligatory activity compared to 20.4 hours for male undergraduates. Those who had most recently played the day of the survey had the least obligated time (17.1 hours) whereas those who had not played in the last 6 months had the most obligated time (38.5 hours per week). In this analysis the interaction between gender and game orientation was significant ($p=.013$). Looking at the pattern of gaming and obligated time within female students, those few who had most recently played

today (7% of females) reported by far the lowest obligated time (22 hours per week). However, female students who had played within the last week but not the same day as the survey reported the most obligated time (43.5 hours). The relationship between obligated time and gameplay among female students is quite variable. Looking at the pattern within male students, the relationship between game orientation and obligated time is more linear. Males who played today experienced the least obligated time (15.2 hours). Those who played sometime the week of the survey experienced the next lowest amount of obligated time (17.1 hours). Seventy percent of male students are accounted for within these two categories of gaming. Males who are less game oriented experience more obligated time.

(c) There was no relationship between gender or game orientation and GPA.

Hypothesis 6 is partially supported.

Hypothesis 7: Being involved in a romantic relationship will result in less time devoted to gameplay.

It was predicted that students would play games less often if they were in a romantic relationship because they would need to spend free time with their romantic partner, leaving less time for other leisure time activities like gaming. Female student respondents were much more likely to be in a relationship than

male student respondents (54.2%, as compared to 36.5%). However, there was not a significant association between game orientation and relationship status. The small group of avid female gamers (those who had played the day of the survey) were least likely to be in a relationship. Avid male gamers who had played the day of the survey were twice as likely to be in a relationship as male students who had played the week of the survey (42.9% and 23.5% in a relationship, respectfully). But overall relationship status is unrelated to game orientation. Hypothesis 7 is not supported.

***TABLE 8:** % in a relationship by gender and game orientation*

		% in a relationship	n
Female	**Today**	21.4%	14
	This week	57.60%	33
	This month	56.40%	39
	2-6 months	52.40%	42
	> 6 months	59.70%	62
	Total	54.2%	190
Male	**Today**	42.90%	35
	This week	23.50%	17
	This month	33.30%	18
	2-6 months	41.70%	12
	> 6 months	33.3%	3
	Total	36.5%	85
Total	**Today**	36.70%	49
	This week	46.00%	50
	This month	49.10%	57
	2-6 months	50.00%	54
	> 6 months	58.50%	65
	Total	48.7%	275
ANOVA	gender	F=7.580, p=.006, df=1,265	
	gaming	n.s. (p=.816)	
	gender x gaming interaction	n.s. (p=.109)	

Hypothesis 8 a, b: a.) Lack of interest in currently available games will be associated with less time devoted to gameplay and b.) the prospect of more interesting games would motivate non-gamers in playing more.

Here we investigate the possibility that the reason games fail to attract non-gamer students is the nature of games, not the time orientation and demographics of potential student players. Studies show that most of today's game genres and themes reflect digital games' history of targeting young male markets and thus still appeal much more to males than to females (Cassell & Jenkins, 1998). Lack of games that appeal to females is an obvious explanation for why they spend less time playing. Non-gamers are expected to report less satisfaction with existing game titles, and to say they would play more if more interesting games were available.

As predicted, gender and game orientation were significantly associated with ease of finding appealing games, both at $p < .001$. Students with an avid game orientation felt it was moderately easy to find appealing games (an average of 3 on a five point scale from able to find 1=almost no appealing games, 2=very few appealing games, 3=some appealing games, 4=many appealing games, or 5=almost all appealing games). Those who had not played in the last 6 months reported more difficulty finding an appealing game (an average of 1.7). Overall female students found games less attractive (2.3) than male students (2.9). Female and male undergraduates who had not played a game in the last six

months reported the hardest time finding interesting games (1.67 for females and 2.33 for males). The male non-gamer statistic should be interpreted with caution because the sample size for non-gamer males was extremely small. Hypothesis 8a is supported.

Contrary to our predictions, those who already play the most games were the most likely to agree that they would play more if better games were available. Both gender ($p<0.01$) and game orientation ($p<0.01$) were significantly related to an expectation that the individual would play more if better games were available. For female students, the average response was 2.41 on a scale from 1=not true at all, 2=somewhat true, 3=neutral, 4=somewhat true, and 5=extremely true, while for male students the average was 2.84. The gender difference was significant but not large. The level of enthusiasm for playing more games was lukewarm across respondents but in the opposite direction predicted.

Students with an avid game orientation were significantly more likely to say they would play more if better games were available (3), while non-gamers were less likely to anticipate an increase in their gaming if better games were available (2). College-age individuals appear to have already established a general attitude towards gaming. Those who already play and enjoy games would be interested in playing even more with the availability of more interesting titles, while those who play very little would not be persuaded to play more because they do not

consider gaming as an appealing leisure time activity in general. Hypothesis 8b is not supported.

***TABLE 9:** Ease and availability of games by gender and game orientation*

		it's easy to find appealing games	I would play more if better games were available	n
Female	**Today**	2.79	3	14
	This week	2.55	2.73	33
	This month	2.49	2.62	39
	2-6 months	2.65	2.38	40
	> 6 months	1.67	2	61
	Total	2.29	2.41	187
Male	**Today**	3.06	3.03	34
	This week	2.88	2.71	17
	This month	2.72	3	18
	2-6 months	3	2.42	12
	> 6 months	2.33	2	3
	Total	2.92	2.84	84
Total	**Today**	2.98	3.02	48/49
	This week	2.66	2.72	50
	This month	2.56	2.74	57
	2-6 months	2.73	2.39	52/54
	> 6 months	1.7	2	64
	Total	2.48(a)	2.54(a)	271
ANOVA	gender	F=36.648, p<.001, df=1,261	F=7.330, p=.007, df=1,264	
	gaming	F=15.082, p<.001, df=4,261	F=4.398, p=.002, df=4,264	
	gender x gaming interaction	n.s. (p=.947)	n.s. (p=.925)	

Hypothesis 9: Female undergraduates will spend more time playing casual games than male undergraduates.

Respondents were asked, when they did play a digital game, about how long did they spend in a typical session. Response choices were 0 (never play), 10 to 15 minutes, 30 minutes, 1 hour, 2 hours, and more than 2 hours. The "more than 2 hours" category was coded as 3 hours, which is certain to be an underestimate for extreme gamers, though it is impossible to know by how much. Gender and game orientation were significantly related to time spent in a typical digital gameplay session (both significant at $p<.001$). Avid male gamers spent at least a half-hour longer than avid female gamers when they did play (1.39 hours versus 1.02 hours). Sixty-one percent of male undergraduates played for more than one hour when they sat down to play a digital game. Among females and among all except the odd three non-gamer males the decline in session time from avid gamer to non-gamer was linear. Non-gamer females reported by far the shortest typical game session, an average of 9 minutes (.15 hours). Avid female gamers averaged about one hour per gameplay session. All other groups of females played for 33 to 38 minutes per session, with the exception of non-gamers who were already described.

***TABLE 10:** Typical amount of time spent playing a game in a single sitting*

		Hours	n
Female	**Today**	1.02	14
	This week	0.63	33
	This month	0.61	39
	2-6 months	0.55	42
	> 6 months	0.15	60
	Total	0.48	188
Male	**Today**	1.39	35
	This week	1.10	17
	This month	0.91	18
	2-6 months	0.89	12
	> 6 months	1.07	3
	Total	1.15	85
Total	**Today**	1.28	49
	This week	0.79	50
	This month	0.71	57
	2-6 months	0.63	54
	> 6 months	0.19	63
	Total	0.69	273
ANOVA	gender	F=77.54, p<.001, df=1,263	
	gaming	F=11.48, p<.001, df=4,263	
	gender x gaming interaction	n.s. (p=.561)	

TABLE 11: *Typical amount of time spent playing a game in a single sitting (in hours) by gender*

	.00	.20	.50	1.00	2.00	3.00	
Female	43	53	51	30	8	3	188
	22.9%	28.2%	27.1%	16.0%	4.3%	1.6%	100.0%
Male	2	5	13	46	13	6	85
	2.4%	5.9%	15.3%	54.1%	15.3%	7.1%	100.0%
Total	45	58	64	76	21	9	273
	16.5%	21.2%	23.4%	27.8%	7.7%	3.3%	100.0%

Looking at the six possible responses to gameplay session duration by gender, 51.2% of female undergraduates' typical gameplay session is less than half an hour. Most female undergraduates played for at most 30 minutes per session. Casual games are about the only possible type of game that can be played in their entirety within such a short period; however, a player could always choose to play a small part of any game. Conversely, only 8.3% of male undergraduates played in such short bursts of gaming. Only a handful of female gamers played for 2 or more hours per session (5.9%) compared to 22.4% of male gamers. Slightly more than three-fourths of male undergrads play for sessions of at least one hour. Gender differences were significant at $p<.001$, with a X^2 value of 77.35 with 5 degrees of freedom. The implications for game design to suit the play style of male and female undergraduates is very clear. Half hour or shorter gameplay is essential for most female players, whether due to schedule, expectations, or willingness to allocate time to gaming. Typical game session duration is strongly correlated with respondents' estimate of their weekly gameplay hours (r=.672) but only weakly associated with chunk size of available free time (r=.387) and

hours of work plus homework per week (r=-.323). All correlations are significant at $p<.001$. Hypothesis 9 is supported.

Discussion

This study provides the first research evidence of a relationship between leisure time availability and time spent playing digital games. Time allocated per session of gameplay is strikingly shorter among female than male undergraduates, with females typically devoting one half hour or less per play session and males typically devoting one hour or more. This tendency was not strongly correlated with available leisure time nor with chunk size of typical leisure time. The difference appeared to be deeper and gender-related. The need for short play cycles in games designed to appeal to nontraditional, female gamers is very clear.

This study is a first attempt to look at gaming across the life span for college students, revealing that a propensity to spend time playing games is consistent though proportionately lower over time between middle school, high school, and college. Even though college students do not have familial responsibilities or parental demands for household chores, female undergraduates have less leisure time, available in smaller chunks, than male undergraduates. Being in a relationship was unrelated to gameplay, as was GPA. Gaming was associated with less time spent doing homework, but not with lower GPA.

Weakness of the study

Self reported time use estimates are not accurate, and the accuracy gets worse when respondents are asked to describe average behavior, or worse still, to

report average behavior from many years ago. In this study participants were asked to make estimates of their time now and to reflect back in time to high school and middle school. The responses have face validity in that the magnitude and gender and age differences in the study are consistent with prior research. Internal consistency was also observed. For example, those who reported not playing a game at all within the last 6 months also had the lowest average time per week spent playing a game. The most recent gamers reported the highest average gameplay per week. Despite the face validity regarding direction and general magnitude of time estimates, it would be a mistake to place confidence in the specific hourly estimate data.

The study was a one time survey using self reported data. Other methods, each with their own drawbacks, could be used to seek more accurate data. Time use diaries could be used. Longitudinal studies could track gameplay behavior over time with much more accuracy.

Research shows that individuals perceive time in different ways and "they may construct markedly different conceptions of the world both in scale and in quality" (Nir, 1999). Additionally, it has been found that males and females perceive and estimate time differently. Men are more accurate than women in appraising time, they view the future as farther away and often have a longer perspective of the future than women (Nir, 1999; Rammsayer & Lustnauer, 1989; Gagne, 1979;

Cottle & Klinberg, 1974; Von Wright & Von Wright, 1977). Gender differences in psychological time perceptions mean comparing time data within the sexes may provide fairly reliable relationships, while comparing men and women may not be as accurate since they define time using different scales. However, this is not a problem caused from data collection and cannot be resolved by research methods, it is a psychological and perception difference between the genders.

Lack of male non-gamers in the study prevented deeper understanding of this subgroup, and even cast some doubt on the existence of male undergraduate non-gamers.

Synthesis of key findings

Our study confirmed the well-known gender gap in gaming, verifying that this overall trend also occurs among college students. Seventy percent of male undergraduates had played a digital game the week of the survey, compared to only one quarter of the females. The majority of women fell in the category of non-gamers, those who had not played a game in over six months, or never. The goal of the study was not to add evidence in support of a gender gap in gaming. We wanted to explore some of the underlying causes and predictors of differences in gamer orientation.

Female undergraduates in our study spent significantly more time per week working at a paying job then male undergraduates, 2.8 times more. Women also

reported spending more time on homework. Those who had played games "today," worked less hours a week than those who had not played at all within the last six months (8.2 hours per week, compared to 25.6 hours per week). [Hypothesis 6]

Since women reported spending 16 more hours per week on obligatory activities (work + homework) then men, it follows that women would have less available time to dedicate to leisure activities. Male participants reported having more free time than female undergraduates. Men reported larger chunks of free time and more days per week with at least some free time. Comparing what can best be considered estimates of the minimum available free time, males reported nearly twice as much free time as women did, per week (10 versus 5.2 hours per week). [Hypothesis 4]

Gender and gaming behavior were significantly related to the amount of free time one had available and the size of their blocks of time. Students with less free time were less likely to spend time playing games. [Hypothesis 5]

The findings suggest that one reason women play fewer games then men is because they are required to fulfill more obligatory activities, leaving them less available leisure time, which in turn makes them less likely to "make" time for

games. Therefore, how one's time is divided between responsibilities and "free" time is a predictor of their game behavior.

Regardless of the amount of time, or leisure time, that one might have available, if they "make" time to game at an early age, players will continue to do so. When looking at gamer orientation across time, individuals were fairly consistent in their game playing in comparison with their peers' gaming. Across as much of the lifespan as we measured, avid gamers consistently played more than their peers. Those now, in college, play the most games and were also the most frequent gamers in high school and middle school. Those classified as non-gamers in college were also likely to be non-gamers in high school and middle school. The study shows that time spent playing games at younger ages is a good predictor of future play.

Looking at gender and gameplay behavior over time, males played significantly more than females at all three stages in life. Males played 266 more hours per year each year of middle school, 305 more hours per year each year of high school, and 225 more hours per year in college. [Hypothesis 1]

Females played more games when they were younger than they do in college (yet less then their male counterparts). When comparing playing time in middle school, high school, and college, undergraduate women played more in high

school than in college and more in middle school than in high school. [Hypothesis 2]

When females did play games, they played in much smaller chunks of time than their male counterparts. Slightly more than three-fourths of male undergrads played for sessions of at least one hour, while the majority of females' (51.2%) typical gameplay session was less than half an hour. There was even a difference in gameplay time between male and female avid gamers. Avid male gamers spent at least a half-hour longer than avid female gamers when they did played (1.39 hours versus 1.02 hours). Non-gamer females reported by far the shortest typical game session, an average of 9 minutes (.15 hours). [Hypothesis 9] These results are evidence that new games are needed to attract and hold the attention of females. Games, such as casual games, may be more attractive to women because they can be played in small chunks of time. Of course, any game can be played for small intervals of time, but perhaps games that allow goals or levels to be completed in a short amount of time are more attractive to women players who apparently play for less than 30 minute periods. Games that require an extensive amount of time to learn would be less attractive to females—and an extensive amount of time would be more than 30 minutes. Women mostly likely need games that can give them a quick jolt of in-game accomplishment so they feel rewarded for their time spent and want to return when they have another short burst of leisure time available to them.

The study provides evidence that women have different amounts of leisure time than men and choose to manage that free time differently. Games need to appeal to women and how they want to spend their leisure time. The goal is to create games that will fit women's needs, not try to convince women that their needs should be different. Most games are highly engaging by encouraging immersion, but perhaps that's why games aren't as attractive to women. Games that encourage multitasking, rather than immersion, might appeal more to women. MMO's encourage socializing while gaming and could be an example of current games that encourage multitasking, but there could be more possibilities in the future. Perhaps engagement can be achieved by linking game play to the promise of a short play period, encouraging players to dive in for 15 minutes and block out all other worries.

Looking across the study results, time stress and the perception of limited leisure time is linked to gender, even during college before adult gender roles are fully enacted. Shorter chunks of leisure time, more time spent on homework, less gameplay and shorter gameplay sessions even beyond actual time limitations characterize female undergraduates. Almost all of these gender differences were highly significant and large.

Directions for future research

The study looked at (1) free time and time pressure and (2) current and past time spent playing digital games in relation to both gender and gaming orientation. We studied college students, so data was collected about the present and recent childhood which included middle school and high school. Today's female casual gamers aged 35 and older do not have a childhood history of digital gameplay. Yet casual digital games attract them to allocate precious leisure time to gaming. Research should be conducted with this player segment to understand how gaming fits into their lives and interests. Will future women over 35, those who grew up with games, spend even more time playing? Games and gaming behaviors are still rapidly changing, and need to be studied and reported with attention to when in the evolution of games and society each study is conducted.

Although 20 members of the game industry converged on a definition of the broad concept of casual games as "web and downloadable" when they co-wrote the 2005 IGDA Casual games whitepaper, this distinction based on distribution mechanism, and not the game genre or content. Players do not necessarily use or even understand the term "casual games." The biggest defining factor of a casual game is to be playable within a short time period. The current study asked about typical duration of a digital game session. Future research should attempt to further define and measure the construct of casual gaming.

Directions for future game design: Less is more

Common sense explanations of casual gameplay among women 35 and older claim women have less free time, available in smaller chunks. Therefore casual games are well suited to the leisure time constraints of older women. The current study clearly shows that it is not just older women but indeed even undergraduate college females who play in blocks of half an hour or less. Games that want to attract larger numbers of female players need to dramatically change game designer expectations of how long a player will or should spent in a typical play session. A female player who knows she can spend as little as 10, 15, 20, or 30 minutes can more easily justify spending her time with a game. Quite likely it is useful to be able to know and control exactly when the play session will end, to facilitate time management and to permit temporary concentration on the gaming experience without the worry of being sure to stop on time. More time in a play session is not better, for the typical adult female player.

APPENDIX: Survey Instrument

- When was the last time you played a digital game?
  - within the hour
  - within the day
  - within the week
  - within the month
  - within 1-6 months
  - within 7-12 months
  - over a year
  - never
- How many hours do you play in a typical week?
- When you were in high school (9th-12th grade), how many hours would you play digital games in a typical week?
- When you were in middle school (6th-8th grade), how many hours would you play digital games in a typical week?
- How long are your typical chunks of free time?
  - 10 to 15 minutes
  - 30 minutes
  - one hour
  - two hours
  - more than two hours
- How many days per week do you have at least some free time?
  - less than one day per week
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
- How many hours do you spend doing homework per week?

- How many hours do you spend working at a paying job each week?
- What is your gender?
- How old are you?
- What is your relationship status?
  - Single
  - Dating
  - Engaged
  - Married
  - Separated
  - Divorced
- What year are you in college?
  - Freshman
  - Sophomore
  - Junior
  - Senior
  - Graduate Student
  - Other
- Which college does your major belong to?
- What is your overall grade point average (GPA)? (using a 4.0 scale)
- When you look for an appealing new digital game to play, do you find:
  - Almost No Appealing Games
  - Very Few Appealing Games
  - Some Appealing Games
  - Many Appealing Games
  - Almost All Appealing Games
- I would spend more time playing games if there were more interesting games to play.
  - Not True at All
  - Somewhat Untrue
  - Neutral
  - Somewhat True

- Extremely True

- How many minutes do you usually play digital games for in one sitting?

  - Not Applicable. [I NEVER play digital games of ANY type.]
  - 10 to 15 minutes
  - 30 minutes
  - One hour
  - Two hours
  - More than two hours

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