Can Playing Massive Multiplayer Online Role Playing Games (MMORPGs) Help Older Adults?

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Abstract: Gerontology researchers have demonstrated that social interaction has profound impacts on the psychological wellbeing of older adults. This paper addresses the question of whether and how playing Massive Multiplayer Online Role-Playing Games (MMORPGs) help older adults. We analyzed the relationships of older adults' social interactions in Massive Multiplayer Online Role-Playing Games (MMORPGs) to three social-psychological factors (i.e., loneliness, depression and social support). A total of 176 web surveys were usable from the 222 respondents aged 55 years or more who played World of Warcraft and were recruited online to complete the survey. It was found that enjoyment of relationships and quality of guild play had strong impacts on older adults' social and emotional wellbeing. Specifically, higher enjoyment of relationships was related to higher social support as well as lower levels of loneliness. Higher quality of guild play was related to higher levels of social support and lower levels of loneliness and depression.

1 INTRODUCTION

1.1 Social Interaction and Successful Aging

The move away from the extended family toward a more nuclear family (as children have left home), the loss of a partner, decline of health status, difficulties with mild cognitive impairment, retirement from workforce are implicated in the loss of social contacts, which in turn are expected to increase the risk of loneliness and depression (Heylen, 2010; Mirowsky and Ross, 1992). Loneliness, a lack of social support, and having a deficit of reliable or frequent contacts with friends or relatives are closely inter-related (Grey, 2009). Research has shown many negative health effects of loneliness and social-isolation, including poor mental and physical health, memory deficits, sleeps disturbances and so on (Masi et al., 2011).

Gerontology researchers have demonstrated that cognitive and social factors are key elements to enhance older adults' quality of life. Social interaction has profound impacts on physical health and psychological well-being. People who have close friends and confidants, friendly neighbours, and supportive co-workers are less likely to experience sadness, loneliness, low self-esteem, and problems with eating and sleeping, whereas people who are socially disconnected are between two and five times more likely to die from all causes (Putnam, 2000). As one gets older, people who maintain close friendship and find other ways to interact socially have reduced risk of mental health issues and live longer than those who become isolated (Singh and Misra, 2009). Eisenberger, Taylor, Gable, Hilmert and Lieberman's (2007) study yielded supportive evidence that individuals with regular social interaction during 10 days showed diminished neuroendocrine stress responses and distress of social separation. Therefore, some of the social and psychological problems faced by older adults could be improved by increasing their social interactions.

1.2 Social Interactions in MMORPGs

Massive Multiplayer Online Role-Playing Games (MMORPGs) have become a leisure activity of older adults. Yee's (2006b) study found that the mean age of the respondents was 26 years, with a range from 11 to 68. Williams, Yee and Caplan (2008) reported that 12.4% of EverQuest II (a MMORPG) players

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were in their forties, and 4.8% were fifty and older. Yee (2008) found that MMORPG players, on average, spent 22 hours each week in an MMORPG; players over the age of forty played just as much as players under the age of twenty.

MMORPGs allow a group of players to play together no matter where they are physically located. To enter a game world, players first create a character from a set of classes and races as digital representations of themselves. When creating their character, users play the role of a character living in the game's fantasy world. Each character has a specific set of skills and abilities that define that character's role. Nearly all MMORPGs featured a character progression system in which players earn "experience points" for their actions and use those points to reach progressively higher "levels".

Social interaction is a primary driving force for players to continue to play MMORPGs, and contributes a considerable part to the enjoyment of playing (Yee, 2006a). One difference between MMORPG and other social networking sites (such as Facebook, Twitter and YouTube) is that MMORPGs have functional constructs (e.g., unique attributes of each character and challenging quests that can't be addressed by a single player) that encourage players to group with others and complete a same quest for mutual benefits. These functional constructs facilitate some social groups, known as guilds. A guild is an organized group of players that regularly play together, and formed to make collective actions easier and more rewarding, as well as to form a social atmosphere.

Players join or create guilds for their pragmatic or social needs. The most common reason to join a particular guild is to use their membership as a resource to meet their game goals, such as having access to the game's most challenging content and most rewarding "loot", high-end content (e.g., equipment, weapons, and exciting monsters). Some players want to play with others who share similar personality, real-life demographics, or even sense of humor. Some players see their guildmates as nice, friendly and useful. In some cases, game friends are seen as important as real-life friends.

Players form contacts and develop relationships of trust and accountability based on their characters' attributions, actions, and the network of affiliations (Dickey, 2007).When a new group is formed, a chat channel is automatically created that only group members can use. This allows players to request help, strategize on group quests and socialize. Additionally, they can also interact with other through person-to-person instant messaging, Voice over IP (an Internet-based auditory chatting system) and site forums.

Schiano, Nardi, Debeauvais, Ducheneaut and Yee (2011) found that the majority of World of Warcraft (WoW, a popular MMORPG) players play the game with someone. Cole and Griffiths (2007) reported that 26.3% of participants played MMORPGs with family and real-life friends. Whippey (2011) reported that 82% of participants who were involved in guild life often had conversations with their guild mates; 66% often spend time playing with their guild. It was found in Williams et al.'s (2006) study that 60% of guild members used Voice IP systems, and roughly 60% of interviewees belonged to a social guild in which the primary goal is social interaction. Yee (2006c) reported that 39.4% of male players and 53.3% of female players felt that their MMORPG friends were comparable or better than their real-life friends. In Whippey's (2011) study, 54% of participants felt that their game friends were comparable to their real-life friends. Therefore, playing MMORPGs provides many opportunities to sustain off-line relationships and develop meaningful and supportive new relationships.

1.3 Previous Studies Testing the Social-Psychological Effects of MMORPGs

Many studies have focused on testing the social-psychological impacts of playing MMORPGs. Visser, Antheunis and Schouten (2013) examined the effects of playing WoW on adolescents' loneliness. It was found that there was no difference in the level of loneliness between WoW players and non-WoW players, and there was also no significant effect on loneliness of time spent playing WoW. Kirby, Jones and Copello (2014) explored the association between average hours playing WoW per week and psychological wellbeing through a cross sectional online questionnaire. A negative correlation between playing time and psychological wellbeing was revealed. These two studies correlated self-reported measures of playing time with measures of psychological wellbeing, but found conflicting results.

Dupuis and Ramsey (2011) tested a mediated model in which they examined whether higher social involvement in MMOPRGs would be associated with lower levels of depression via engendering a perception of social support. Game involvement was measured by a 13-item scale developed by the researchers. Sample items are "If I had a personal

problem that was really bothering me, I would rather tell my online friends than friends I have in real life", and "I have more good friends online than I do in real life." It was found that involvement in MMORPGs was not related to perceived social support, but a lack of perceived social support is associated with higher levels of depression. Trepte, Reinecke and Juechems's (2012) study found that online game players' physical and social proximity as well as their mutual familiarity influenced bridging and bonding social capital, and the two types of social capital were positively associated with offline social support. Domahidi, Festl and Quandt's (2014) study found that there was a significant impact of social online gaming frequency (measured by general gaming frequency and the average duration of a typical social online gaming session) on the probability of meeting exclusively online friends, and players with a pronounced motive to gain social capital and to play in a team had the highest probability to transform their social relations from online to offline context. These studies went beyond the simple measure of playing time, but social interactions in MMORPGs were conceptualized differently.

2 RESEARCH QUESTION

It is well established that social interaction is seen as an important component of successful aging (Ristau, 2011). MMORPGs are a wholly new form of community, social interaction and social phenomenon. Playing MMORPGs links people from all over the world as they engaged in a shared virtual world and collective play experience. It can maintain real-life relationships and facilitate new relationships, and therefore provides more opportunities to obtain social resources.

Then, the research question is: *Are there relationships between the social interactions in MMORPGs and various social-emotional benefits for older adults (i.e., loneliness, depression and social support)?*

3 DEFINITION OF VARIABLES

Before drawing any conclusions about the impacts of MMORPGs, the underlying variables involved in older adults' social interactions in MMORPGs should be determined (Williams et al., 2006). As discussed above, previous studies used amount of game play as the gross measure. Frequent participation in game play increases the chance of social interactions but this doesn't depict the whole picture of social interactions in MMORPGs. Shen and Williams (2011) indicated that whether MMO use were associated with negative or positive outcomes was very much dependent on the purposes, contexts, and individual characteristics of users.

Thus, this study conceptualizes social interactions in MMORPGs as follows:

(1) **Communication Methods.** Communication is the most important aspect of players' interactions in MMORPGs (Shen and Williams, 2011). Nardi and Harris's (2006) study found that chatting is a key aspect of socializing in WoW, which takes place not only when grouping and fighting, but also when players are soloing or traveling in WoW.

(2) **Network Level.** This refers to the position of players in their social network. It is another key variable when understanding the outcomes of MMORPG playing (Williams, 2010). Shen, Monge and Williams (2012) indicated that the measure of network level is essentially the same as centrality. Individuals who are in central position within a network are usually more accessible than others (Freeman, 1978/79).

(3) **Enjoyment of Relationships.** It affects how much social support players can exchange by playing together. Game play is constituted not only by joint in-game activities but also overwhelmingly by constant conversation about the game and topics well beyond it, ranging from debates about the mechanics of the game and intimate personal problems. Some players trust their game friends and see them as important as real-life friends, while others see their game friends as not particularly important to them (Williams, et al., 2006).

(4) **Quality of Guild Play.** In MMORPGs, guild is a place where deep relationship occurs (Steinkuehler and Williams, 2006). Players in formally structured guilds tend to have more social experiences than others (Williams et al., 2006). This positively affects the quality of their time in the game. So, quality of guild play determines whether its impact on social interactions is positive or negative.

4 METHODS

4.1 Participants

Participants were older adults who were aged 55 and

over, English speakers and WoW players. A total of 222 people submitted their surveys, of which 176 provided their demographic information as well as fully completing the survey. These were the responses used in the analysis.

Table 1: Participant demographics.

Variable	Frequency (%)
Gender	
Female	58(32.8%)
Male	119(67.2%)
Age	
55-59	111(62.7%)
60-64	37(20.7%)
65+	29(16.4%)
Relationship	
Married	109(61.2%)
Separate/Divorced	37(20.8)
Widowed	9(5.1%)
Never married	23(12.5%)
Living situation	
Spouse/Common law	53(42.1%)
Family	33(26.2%)
Others	8(6.3%)
Alone	32(25.4%)
Work situation	
Full-time employed	95(53.1%)
Part-time employed	17(9.5%)
Retired	61(34.1%)
Never employed	6(3.4%)
Educational level	
Less than high school	9(5.0%)
High school (or equiv.)	33(18.4%)
Four-year degree	70(39.1%)
Master's degree	36(20.1%)
Doctoral degree	14(7.8%)
Other	17(9.5%)

The background information about respondents is as follows. Approximately 33% were female, and 67% were male. Yee's (2006b) study found that MMORPG players are roughly 85% male. Thus, compared with young adults, there were more female older MMORPG players.

A significant majority of older gamers (62.7%) were aged between 55 and 59, while only 20.9% were between 60 and 64, and 1.2% fall into the 70-79 age group. The big proportion of older gamers who were in the age group of 55-59 justifies the use of "55" as the lower age cut point. More notably, 6.2% of participants are among the oldest players (those 80 years of age or older).

In terms of relationship status, 61% of participants were married and 20.8% were separated or divorced. One fourth of participants (25.4%) lived alone, while others lived with spouse or common law partner (42.1%), family (26.2%), or someone else (6.3%).

More than half of the participants (53.1%) were full-time employed and 9.5% were part-time employed.

For the highest level of education, 39.1% of participants had completed a four-year degree, 20.1% completed a master's degree and 7.8% had a doctoral degree.

Regarding gameplay patters, 40% of participants play WoW seven days per week on average, 12.2% play 6 days per week and an identical 12.2% play 5 days per week. Fully 41% of participants spend 2 or 3 hours per day on average playing WoW, and 28.4% play 4 to 5 hours per day, while some 22% play more than 6 hours per day. Taken together, 65% of participants play WoW at least 5 days per week, and on average 92% spend 3 or 4 hours per day playing WoW, which equals the working hours of a part-time job.

Surprisingly, a substantial majority of participants already were at the high end of the game. The highest level of approximate 84.2% of participants' main character (a main character is the one participants play most often if they play several characters.) is 80 and higher. (In 2014, the maximum level was 90).

4.2 Description of the Game

WoW was selected as the intervention tool in this study. On the one hand, with different types of games, it is unrealistic to assume that all games have uniform effects (Shen and Williams, 2011; Williams, 2010). Therefore, examining all MMORPGs rather than just one game will hinder the generalizability of the results. On the other hand, WoW is the most popular MMORPGs (the current North American MMORPG leader), currently having more than 10 million subscribers.

One genre of game that provides many opportunities for social interactions is the Massive Multiplayer Online Role-Playing Game (MMORPG). Massive refers to the fact that millions of players play these online games; multiplayer

identifies the fact that a very large number of players play simultaneously in the same online world, interacting with each other; Online indicates that the players need to be connected to the Internet while they play; Role-Playing, in general, refers to player who play the role of a unique character and interact with other players by using an "avatar", which is a humanoid graphical representation of the player in the game world.

To enter a game world, players first create a character from a set of classes and races as digital representations of themselves. When creating their character, users play the role of a character living in the game's fantasy world. Each character has a specific set of skills and abilities that define that character's role. For example, in World of Warcraft mages are powerful spell casters who use magic to inflict damage on their enemies from afar but are very vulnerable to attacks. These traits define the role of the mage: hang back, do a ton of damage, and hope to kill the monsters before they reach the player. Players also have the option of choosing their sex and adding various adornments to enhance their characters appearance as they progress in the game, such as hair color, clothing, armor, etc. Due to these characteristics, MMORPGs are anonymous environments in which players have many opportunities to experiment with different online identities. In contrast to other genres of games, MMORPGs do not have storylines. A MMORPG community is as dynamic and complex as the real world. A typical group requires players to fulfil a number of roles, which are summarized as kill, irritate, and preserve (Barnett and Coulson, 2010). A good group needs an appropriate balance of all three roles and successful team cooperation and coordination in order to stand a realistic chance of success. Players may invest hundreds of hours advancing their character and interacting in the virtual environment, and thus players often feel an emotional proximity to their character. In MMORPGs, players begin the game as low-level member. During gameplay, the development of the player's character is the primary goal. Nearly all MMORPGs feature a character progression system in which players earn "experience points" for their actions and use those points to reach progressively higher "levels". Over the course of a character's life, the character will brave thousands of quests while exploring the game environment, learn new and powerful abilities, and find hundreds of powerful weapons and more. In other words, the character progresses and gets stronger as the player gain experience, new skills, and more powerful items and equipment. MMORPGs do not have an ending or finishing time. Even after achieving the highest level, players may still remain in the game world to complete more challenges or participate in the social communities of which they have been part.

4.3 Survey Design

The final survey consisted of three sections. The first section focussed on playing patterns (i.e., amount of game play and level of main character) and social motivation for playing MMORPGs. Social motivation was measured using the Online Gaming Motivations Scale (Yee, Ducheneaut, and Nelson, 2012). Its reliability is .77. The second section asked questions about older adults' social interactions within WoW. It included four measurements:

(1) Communication methods was measured by asking how frequently older adults communicate with others via public chat, group chat, private chat, in game voice chat, social media and face-to-face meeting. Participants were asked to indicate on a 5-point scale (1=Never, 5=All the time) the frequency of using these communication tools.

(2) Network level was measured by asking how frequently older adults play with family, real-life friends, game friends and other players. Respondents were asked to indicate on a 5-point scale (1=Never, 5=All the time) the frequency of playing with these persons.

(3) Enjoyment of relationships was measured by the strength of relationship with family, real-life friends and game friends. Respondents were asked to indicate on a 5-point scale (1=Strongly disagree, 5=Strongly agree) to what extent they agree with these statements: (a) Playing with family members makes me feel closer to them; (b) Playing with real-life friends makes me feel closer to them; (c) I trust my game friends; (d) My game friends are as important to me as my real-life friends. They were also asked to indicate on a 5-point scale (1=Never, 5=All the time) how often they engage in these actions: (a) Talk about WoW with my family;(b) Talk about WoW with my real-life friends; (c) Share my personal problems with game friends. These statements were identified as deep relationships by Steinkuehler and Williams (2006) and Williams et al.'s (2006) study.

(4) Quality of guild play was measured by time of guild play and satisfaction with guild play. Satisfaction with guild play was measured by asking respondents to indicate how satisfied they are with the organization of the guild, guild leadership and guild members with "1" referring to "Very

dissatisfied" and "5" referring to "Very satisfied".

The third section consists of the three socio-psychological measures:

(1) Loneliness. This was assessed with the short-form of the UCLA Loneliness scale (ULS-8; Hays and DiMatteo, 1987). UCLA Loneliness scale is an instrument indexing the frequency of an individual's feelings of loneliness and lack of companionship. Participants rated each item on a scale from 1 (Strongly disagree) to 5 (Strongly agree) with higher scores indicating lower levels of loneliness. The reliability is .88.

(2) Depression. This was measured by the 10-item Center for Epidemiological Studies Depression scale (CES-D; Mirowsky and Ross, 1992). CES-D is designed to assess the current level of depression, and is one the most commonly used in a normal, as opposed to a pathological, population. It is rated on a 5-point scale ranging from 1 (Strongly disagree) to 5 (Strongly agree) with higher scores indicating lower levels of depression. Its reliability is .86.

(3) Social support. This was measured by the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, and Farley, 1988). The MSPSS measures how one perceives their social support system, including an individual's sources of social support (e.g., family, friends and significant other). Items are rated on a 5-point Likert-scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Higher scores indicate higher levels of perceived social support. Its reliability is .93.

Invitation messages including the URL to the Web survey were posted on eight WoW player forums.

4.4 Data Analysis

The purpose of this research was to examine the associations of some social-psychological benefits with older adults' social interactions in MMORPGs. As discussed above, amount of game play is an important factor (but not the only one) that affects the level of psychological wellbeing. Also, game play will likely be more social for some than for others (Bartle, 2004). So, controlling for amount of game play and social motivation, a series of two-stage hierarchical regression analyses were performed, using each of the social-psychological measures as outcome variable, and the factors in each component of social interactions in MMORPGs as independent variables. Then, to compare the effect size of each component of social interactions on each outcome measure (e.g., which one of the four components of social interactions in MMORPGs generated the biggest effect size on loneliness?), Cohen's f^2 of each individual hierarchical regression analyses was computed. By convention, effect sizes of .02, .15 and .35 are termed small, medium, and large, respectively (Cohen, 1988). Data analysis was carried out using IBM Statistics SPSS 22.0. In terms of the many multiple regression used, all regression analyses were carried out with an alpha level of .01.

5 RESULTS

5.1 Playing Time

No significant differences in playing time were found in terms of relationship status (F (3, 174) = .723, p =.539), living situation (F (3, 122) = 1.014, p = .389) and work situation (F (3, 175) = 1.138, p = .335).

5.2 Associations among Variables

Because of the small percentage of participants in age groups 65-69, 70-74, 75-79 and 80+, these were combined as 65+. A one-way analysis of variance (ANOVA) revealed that the three age groups (i.e., 55-59, 59-64, and 65+) differed significantly from each other in the time they spent playing WoW (F (2, 174) = 5.600, p = .004). A Bonferroni post hoc test indicated that the age group 65+ (M = 3.31, SD = 1.198) played significantly more than the age group 55-59 (M = 2.59, SD = 1.030, p = .004) and the age group 59-64(M = 2.62, SD = .953, p = .026).

In view of the participants` education, the ANOVA analysis indicated that playing time also differed significantly (F (5, 173) = 2.583, p = .028). A Bonferroni post hoc test revealed that the less than high school group (M =3.78, SD = 1.563) spent significantly more time playing games than did the high school group (M = 2.61, SD = .933, p = .050), 4-year degree group (M = 2.60, SD = .954, p = .026), and master`s degree group (M = 2.61, SD = 1.050, p = .048).

5.3 Predictors of Outcome Variables

For depression and social support, the amount of game-play and social motivation were significant predictors. The amount of game-play was negatively associated with depression (p = .005), i.e., more play was associated with lower depression.

Reduction in loneliness was mostly predicted by playing with family. Regarding the results of

enjoyment of relationships, this was mostly predicted by playing with real-life friends.

When the four variables for quality of guild play were entered to the model, all of these variables were statistically significant predictors of loneliness, depression and social support. Loneliness was mostly predicted by satisfaction with guild mates. Depression was predicted from quality of guild play. Similar to loneliness, it was mostly predicted by satisfaction with guild mates.. For social support, this was mostly due to satisfaction with guild leadership.

Table 1 presents Cohen's effect size (f^2) for all outcome measures. The biggest effect sizes for loneliness, depression, and social support were all associated with quality of guild play. The biggest effect sizes for loneliness (f^2 = .156) and depression (f^2 = .156) were identical, and their magnitude is medium. The magnitude of the biggest effect size for social support (f^2 = .202) is medium to large. What's more, communication methods and network level generated smaller effects sizes for loneliness, depression and social support compared with the effects sizes generated by enjoyment of relationships and quality of guild play. The magnitudes of the effect sizes generated by communication methods and network level were small.

Table 2: Cohen's effect size for outcome measures.

Mea-sure*	Communi-cation Methods	Net-work Level	Guild Leader-ship	Quality of Guild Play
L	.015	.067	.114	.156
D	.049	.037	.060	.156
Ss	.004	.057	.191	.202

*L: Loneliness; D: Depression; Ss: Social support

6 DISCUSSION

Instead of using the gross measure of playing time as to quantify MMORPG use, this study categorized social interactions into four components: communication methods, network level, enjoyment of relationships and quality of guild play, and analyzed how these were associated with loneliness, depression and social support. It is found that network level was negatively associated with loneliness; higher levels of enjoyment of relationships were related to higher levels of social support and lower levels of loneliness; higher levels of quality of guild play were related to higher levels of social support and lower levels of loneliness and depression.

In addition, the biggest effect sizes for loneliness, depression and social support were all generated by quality of guild play. Loneliness and depression were mostly predicted by satisfaction with guild mates and social support was predicted by satisfaction with leadership. This phenomenon could be the result of the membership of guilds. Due to the in-game mechanism (for example, guild members need to coordinate with each other in order to achieve the task), guild members tend to have similar values and play styles. As a result of this collective identity, trust and friendship is more likely to be developed among guild members through repeated collaboration in groups and raids (Shen, 2014). Shen's (2014) study found that guild membership is positively related to players' level of sociability. Guild players were more likely than non-guild players to participate in social activities such as chat, trade and collective quests. Loneliness, depression and social support are related to the benefits/support/resources existing in interpersonal contact of social networks. Participation in guild activities provides older adults many opportunities for informal sociability, and thus could be an important source of interpersonal relationships and social support.

Communication methods and network level generated smaller effects sizes for loneliness, depression and social support compared with the effects sizes generated by enjoyment of relationships and quality of guild play. This finding is predictable and reasonable. Communication methods and network level provides older adults many opportunities to interact with other players and exposes them to different viewpoints, but they don't indicate the intention or content of these activities. Communicating and collaborating with other players (no matter which tool is used or with whom) does not automatically create a deep social bond among them.

It was also found that amount of time of game play was not associated with older adults' feelings of loneliness, depression and social support when other variables related to the social interactions in MMORPGs were taken into account. This is compatible with the finding of Shen's (2014) study that time spent had a very small overall impact on players' psychosocial well-being. Instead, the social and psychological impacts of playing MMORPGs on older adults are very much dependent on the

contexts of game play, enjoyment of the relationships and the quality of guild play.

7 LIMITATIONS OF THE STUDY

The first limitation of this study is associated with survey research. All the data collected for this study were self-reports. As such, issues of social desirability and accuracy of responses need to be taken into account. The second limitation is related to the web survey. As discussed above, the majority of participants are heavy gamers, and most of them have reached high levels of the game. This might result in our sample being biased towards expert players. Finally, the sample comprised volunteers who were willing to complete the survey.

8 CONCLUSIONS

This study explored the social and psychological impacts of playing MMORPGs (i.e., WoW) on older adults aged 55 and over, primarily analyzing the relationships between older adults' social interactions in MMORPGs and three social and psychological factors. The regression analyses revealed that enjoyment of relationships and quality of guild play has deep impacts on older adults' social and psychological wellbeing. This study contributes to the knowledge of older adults' social experiences in MMORPGs and how it influences their social and emotional lives. The findings can form a solid foundation for conducting future randomized controlled trials to measure and evaluate the impacts of MMORPG playing on older adults.

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