First Person vs. Third Person perspective in a digital Memory Palace

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Abstract

The ancient method of loci is a mnemonic device which allows users to remember items by mentally placing them along a route in a familiar environment. While originally purely real life environments were used, improvements in digital environments in video games prompt the question if the option of viewing an environment from a third person perspective might improve the user's ability to memorise characters in a digital environment, as opposed to the first person perspective. This research tested two groups. Both groups were presented with a video of a walk-through of a video game environment. Along the route through the environment, they saw 3D models of fictional characters at several locations. The first group saw the walk-through in the first person perspective, while the second group saw it in the third person perspective. Participants were then asked to recall which characters they saw where, first on a schematic map of the environment, and then based on images of each location. While there was no statistical difference between the scores of the first person and third person groups, there is a significant statistical difference between the schematic map test and the location image test. Participants performed significantly better locating the characters on the schematic map. This could suggest that the Method of Loci works so well based not on the anchoring of memories to other information (such as the item of furniture that the character stands next to) but rather, the actual location in space.

1 Introduction

1.1 Method of Loci

The Method of Loci (MoL, also called the Memory Palace Method) is an ancient mnemonic device that is founded on the idea that we remember environments very well. It originates from the story of poet Simonides of Ceos, who had been invited to perform at a Banquet. When he stepped outside, the building collapsed, leaving the bodies of the guests crushed beyond recognition. When they later attempted to identify the bodies, Simonides realised he could remember the guests by their place around the banquet hall, leading him to invent one of the most effective mnemonic devices that is still used to this day. (Cicero, 2011) The concept is simple: you pick an environment you are familiar with, and place things you want to remember at specific locations along a route though the environment you have chosen. Later, by mentally walking through your chosen "memory palace" you can recall what you wished to remember. The MoL is difficult to study, as it is mostly a very personal process. You choose a location that is familiar to you, and then convert things you want to remember by the use of associations that make sense to you, into something visual that you can anchor at a specific place in your personal "Memory Palace". As such, to make a good study design around the MoL is rather tricky. Still, some research has been done. One such

study concluded that—from a group of students who were asked to recall a 12-item shopping list—the amount of people who recalled it (near) perfectly almost doubled after they learned how to use the MoL. (Mccabe, 2015)

1.1.1 Example of the Method of Loci at work

To give the uninitiated a better idea of how the method works, I'll present an example of how certain information could be remembered using this system. An often used example is trying to remember a grocery list by placing the items on the list in a room in your house. The first thing you would do is mentally walk through that space (a living room, for instance) and decide the locations (loci (plural), singular: locus) that you will use to remember the items on the list. In an average living room, this could be the TV, the couch, the coffee table, a chest of drawers, and a birdcage. Now say you need to buy bread, cheese, peanut butter, coffee and tea. If you were to simply place a mental image of the things you need to buy on each locus, you might remember them, but likely not for very long. In order to remember them better, it is often advised to make your imagery bizarre, and thus more memorable.

Say you want to place the item "bread" on the locus "couch". You could just imagine a loaf of bread displayed on top of the couch, but it's more effective to make your mental image stand out. If bizarre imagery is used in a commonplace context, it is easier to remember. (McDaniel and Einstein, 1986) So, it is good practice to make the mental image unusual. A more suitable image might be the couch made out of bread. The weirder the image, the better you will remember it. You would repeat this process for the rest of your list, then do a mental walk-through of you living room when you are at the grocery store, and recall each item you need to buy.

1.1.2 Video Games as a Digital Palace

With the increase in beautiful digital environments in video games, it becomes more appealing for users of the MoL to want to use some of those environments as their Memory Palaces. If one is an avid user of the Method, it is easy to run out of real-life places to store information. So, what better virtual location to use for a digital palace than your favourite video game? This raises interesting questions about what about the way we observe the real world makes it so easy for us to revisit it in our minds, and what aspects thereof translate to our experience of digital environments. One such thing is the fact the perspective we see the world in. While in real life we can only experience things from a first person perspective, we can often experience video game environments in a third person perspective as well.

1.3 Objective of the study

In this study, I aim to investigate the influence of the viewing perspective when remembering digital environments. While we can only use first person perspective when remembering environments from our "real life" experience, video games offer us the choice to explore an environment with much more of a "bird's eye view". If we compare the two, we might be able to find out whether the first person perspective that we necessarily use in real life is one of the factors that makes the MoL so useful, or rather that it is holding us back. Does the first person perspective lead to better recall of individuals in a digital environment than the third person perspective?

. 2 Related Work

2.1 A Digital Method of Loci?

We live in a world where the digital has become ubiquitous. We are able to outsource virtually everything to our devices. Not only do we use them to keep track of things we might otherwise have to keep track of in an analogue way (such as keeping shopping lists in a smartphone app as opposed to a paper list) but we also use devices to learn and educate others. While this perhaps raises the question of why anyone would even still use such archaic mnemonic devices – except in situations where a device is not allowed to be used, such as exams – there are still many people who actively use the MoL. And as the digital becomes increasingly important, people find themselves questioning whether a digital environment could be used just as well for the Method of Loci.

Research has been done into this question, and a study by Legge et al. found that when comparing a group who used a "traditional" MoL environment, a group that used a digital MoL environment, and a control group that used no mnemonic devices at all, both MoL groups showed an equal improvement of recall as compared to the control group. They argue that this means that high levels of detail in the environment are likely not what is essential for the MoL to function well. (Legge et al., 2012)

Rosello et al. propose an Augmented Reality (AR) System named "NeverMind", that helps the user to place augmented reality images over environments they are familiar with, so as to take the mental aspect out of the creation of a memory palace. They claim that visualising a space is difficult for novice users of the MoL, and that it is easier for new MoL users to use an environment they are familiar with. They conclude that compared to users who remembered items using a paper list, there were no immediate memory benefits visible from using the NeverMind system. However, after a week, those who had used the system recalled the ten items near perfectly (with an average of 96%), whereas the paper group remembered only 35% on average. (Rosello et al, 2016) Personally, I fundamentally disagree with the idea that visualising a space is difficult for novices; after all, the very reason why the MoL works so well is that we are naturally very good at this. Many years after having last visited a location, we are often still able to visualise it, even if we haven't been there a lot. Furthermore, while Augmented Reality may be a fun and concrete way to be introduced to the MoL, I doubt it would be able to add anything to the MoL, especially since with AR one can only use existing images on top of reality, whereas using the original MoL one can imagine anything. They claim that their interface makes the MoL accessible to "the general user", but I would argue that it was more accessible without the use of a system, as the original MoL does not require an external system/wifi/pre-existing images/an AR-headset.

Much of the literature on digital memory palaces concerns the use of Head Mounted Displays (HMD). Virtual reality (VR) allows one to truly be submerged in a memory palace, which could mean that a virtual reality memory palace might be more effective than a simply digital one. One study that uses HMD's to allow users to explore a virtual memory palace is a study by Vindenes et al. They compare three groups, one using a HMD VR (called Mnemosyne), one using a desktop VR, and a control group using the original MoL. They find that the higher a person's spatial ability, the better the MoL seems to work for them, regardless of which group they belonged to. Because of the division of spatial ability across their three groups, however, they are unable to draw any conclusions about which method works best. The best results were found in the traditional MoL group, but this group was also the one with the highest spatial ability. (Vindenes et al, 2018)

Krokos et al. examined the use of a HMD to see if using a virtual reality memory palace would improve recall, compared to a mouse-controlled desktop-base virtual environment. They found that using the HMD, the participants indeed performed better on a recall test than after viewing the desktop based digital environment, with a statistically significant improvement of 8.8%. (Krokos et al., 2018) This suggests that the more we feel we are present in a digital environment, the more we seem to recall from our surroundings.

2.2 Perspectives and Immersion

As mentioned, one of the interesting features offered by video games is the fact that, depending on the game, they allow the player to experience their world in first person perspective (1PP) or third person perspective (3PP). The literature on perspectives in video games often focusses on immersion. One of the factors that cause one to be immersed in a game is presence. There is quite a bit of confusion over the meaning of these terms. (Calleja, 2011) Lombard and Ditton define presence as "the perceptual illusion of nonmediation" (Lombard and Ditton, 2006), which is how we shall also define it in this research. Thus, when we feel like we are not playing through the medium of a console or a PC or other device, we feel like we are truly present in the game. If presence is what truly creates immersion, then it would seem clear that 1PP games are more immersive, after all: they take away the idea that you are controlling a character, rather you are controlling yourself in a virtual world.

When looking at how gamers themselves experience immersion in games, it seems that many feel first person is more immersive. The fact that in third person you are controlling an avatar seems to cause enough separation between these players and their characters to make them feel less like it is them playing it. However, it also seems that many people feel that third person is more immersive, as the presence of an avatar takes away any confusion that stems from seeing things in first person. You do not have to imagine your body being there, as an avatar has been provided for you. Video games have limited options for how your character can respond to situations, and so having an avatar can mean you get to role-play and will not "lose immersion" because you cannot respond in the way that you personally would. The most important thing we can learn from hearing gamers talk about immersion in different perspectives is that it varies per person. Each of us values different things in video games, and different modes supply us with these different things.

Christou examines the relationship between immersion and appeal in video games. He finds that the two are intimately related, in that appeal increases immersion, and immersion increases appeal. (Christou, 2014) Thus, if a third person game is more appealing to a gamer, this gamer will likely feel more immersed in a third person game, and the gamer who prefers first person will feel more immersed there.

In a 2015 essay, Black seeks to answer the question of why third person games are so popular, when logic would suggest that they are much less immersive than first person games. He concludes that it is not the visual perspective of the game that makes the player believe she is her avatar, it is the fact that her physical actions and intentions are simultaneous with the actions of her character. In a similar way, first person perspective in film feels odd to the viewer precisely because of the lack of control one has over what the character whose viewpoint we embody does. (Black, 2015) Few studies have been done that compare the two modes. Choi and Lane (2013) study the effects of video games, both first and third person (as well as a puzzle game as control) on several cognitive abilities, such as navigation, spatial insight and speed of processing. Their findings show that while none of the modes help improve navigational abilities, the First person

shooter group had better visual attention ability during testing, which suggests that video game perspective does in fact make a difference in something other than just immersion.

2.4 Memory

Perspective is also something that plays a role in our memories. Rice and Rubin examined from what perspective people recall memories. While memories are usually encoded in the first person perspective, we are capable of recalling them from third person (that is, as if we are looking at ourselves, rather than looking through our own eyes) as well. Rice and Rubin note that recall perspective often says something about the memory, such as the level of emotion involved or how connected we feel to ourselves at the time of encoding. According to their research, third person recall is more often used for distant memories, and that first person recall correlated with vividness of the memory, which they suggest may mean that more visual vividness is necessary for first person recall to later occur. (Rice & Rubin, 2012) Wells et al. find that those who suffer from social anxiety are more likely to see their memories of social situations from a third person perspective. (Wells et al., 1998) This would suggest that visual perspective has something to do with how connected we feel to our past selves. So logically, third person video games could only be less immersive than first person games. However, with video games, we do not always play as "ourselves". It could be easier for us to play as a different character, if we are not forced into his skin, but are allowed to take somewhat of an outsider's perspective

How well we remember something depends on many factors. McDaniel and Einstein explored the role of bizarre imagery as a memory aid. They find that the effectiveness of bizarre imagery depends on if the bizarre is contrasted by the mundane. If you are presented with only bizarre things to remember, this bizarre imagery will not help you remember. However, when the bizarre images stands out among more common images, you do recall it better. (McDaniel and Einstein, 1986) In a similar vein, Summerfelt et al. ran several experiments to investigate the effect of humour on memory. They find that this incongruity also plays a role in humour – that the occasional funny item amongst a group of non-funny ones was remembered better than when a group of funny items was presented together. (Summerfelt et al., 2010) The Method of Loci is an excellent example of this phenomenon at work. You insert unusual elements into an ordinary environment, thus creating this contrast between the mundane and the bizarre that triggers improved recall.

. 3 Method

3.1 Defining the Method of Loci

The trouble with doing research into the Method of Loci is that it is very difficult to define. As explained before, while the core idea of the MoL is that you encode items on a list onto positions in an environment, it works better when you use very vibrant, unusual imagery in your palace. The way I see it, the MoL is the framework that allows you to remember other mnemonics. We have probably all at some point experienced needing to remember something – *knowing that we have the information somewhere in our head* – but not being able to "locate" the information in our brain. The Method of Loci solves this problem by giving information a specific location that you can

navigate to. However, if you have the information stored in a way that is not in itself visually memorable, the palace will be limited in its effectiveness.

The curse of scientific research will always be that in order to eliminate outside factors to be able to see if the variables we change actually make a difference, we have to make an experiment as controllable as possible. With the MoL this becomes especially apparent. First of all, if you test amateurs, you will not be able to see the true power of the method, but if you test experts, you will get a distorted image as well. Experts may use many techniques combined to make their palace as powerful as possible. Additionally, the MoL is a learned skill. An expert makes associations quicker, and thus can populate a palace with images that he or she already knows will be memorable.

When doing research, then, the choice is often made to eliminate mnemonics that are used in conjunction with the MoL, as those are not what we want to test. Images of people are used, or people are asked to imagine items on a list in the palace. I won't say that I do not understand why this approach is often taken, as it allows for easy testing. However, for many, the way information is encoded in the palace is as important as the palace itself.

3.2 Study Set up

3.2.1 Set up

To test the difference between the first and third person on how we remember in a Method of Loci style environment, I created a digital environment in the Hammer editor, which allows one to create playable levels for games created by the Valve corporation. This then allowed me to make a walk-through of this environment apartment in the Sandbox game Garry's Mod (Facepunch Studios, 2004)

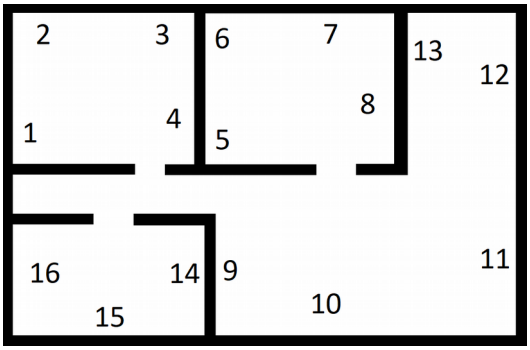

Fig 1. (left) a schematic overview of the digital apartment the test subjects had to navigate. At each number, they found a character that they had to remember.
Fig 2. (right) One of the locations (nr. 3) where the test subjects found a character.

I created an apartment with four rooms, as shown above. At each number, there was a piece of furniture, as well as a 3D model of a character from the Star Wars movies (Lucas, 1997), or the video game Half Life (The Valve Corporation, 1998). While most of these are not themselves bizarre, and thus memorable, they are strange and unexpected in the environment the participant sees them in. As such, this allows us to test the MoL used in combination with the "bizarre imagery" mnemonic without losing experimental control by allowing participants to come up with their own images.

48 participants were recruited to partake in the experiment. The experiment was done twice. Both sessions were done in a classroom setting, the room was divided in two, and one half of the group left the room while the other half did the 1PP experiment. Then, the group that had taken the break did the 3PP experiment while the other group left. During the first session of the experiment,

the videos were projected on a screen in the middle of the room. Each group sat on their own side of the room while watching the video. For the second session, the screen was situated on the right side of the room, so both groups were seated in the right side of the classroom while watching the videos, to ensure that the group on the left side was not disadvantaged. In two groups, the participants watched a video of a walk-through of this digital space. One group saw a walk-through in the first person perspective, the other in the third person perspective, where the avatar they were following was the character Chell, from the Portal games (The Valve Corporation, 2007). At each number, the player stops for four seconds to observe the Star Wars/Half Life character in its location.

After watching this video, both groups were subjected to a questionnaire in which they were first asked to match the characters they have seen with the numbers on the schematic map (as shown in figure 1, referred to as the "map matching task"). Then, they were asked to match the characters they had seen to the locations they had seen them (as shown in figure 2, referred to as the "location matching task").

To control for knowledge of the Star Wars/Half Life characters, questions are included to check the familiarity of the test subject to these two universes. Furthermore, I included a question asking how often the subjects play video games in which they control a character (be it in first or third person) and whether they themselves have a strong preferences for either mode.

3.2.2 Reflection on Study Design

This is, of course, not a perfect setup. In a perfect world, I would have tested each person individually, letting them control their own journey through the environment. This is not to say this would not create its own problems. You would have to control for how long they spend looking at each character, or perhaps – with a large enough sample size – one could simply give the subjects a time limit and let them divide their time exploring as they see fit.

Furthermore, there is the question whether it is a good idea to inform participants of the fact that they are supposed to memorise the characters they see. On the one hand, if participants are informed, this might mean that they try to use other mnemonic devices to remember the character, thus leading to unreliable results. I have informed the participants of my study that this is not the intent, but it is not unrealistic to think that people get competitive if they know that their memory is being tested. However, the very goal of the method of loci is that you use it to remember. It would be interesting to see how much people remember when they are uninformed of the intent of the study (though previous pilots have shown that the result of that is likely "barely anything"), but this would not be testing the MoL. When using the Method of Loci, you are actively attempting to remember what you see, so I do believe that should be part of the experiment as well.

The order of the questionnaire was also an active choice. The questionnaire consisted of three sections (Map matching, Location matching, and control questions). In each section, the questions were shuffled. The map matching task was placed first to make the location matching task easier for the participants, and to encourage them to use the Method of Loci during the second task. By giving the participants the layout of the environment during the first task, it is easier for them to do the mental walk through that the method of Loci requires. Repetition of the to-be-remembered material makes it easier to recall this information later. One of the tasks was always going to be easier because it is done first, when what is seen is still fresh in the mind, while during the second task the participants benefit from a training effect, as they have had the opportunity to mentally walk through the palace in the first task. As the map matching task encourages the participants to visualise the layout of the space they have seen (as well as allowing them to recall the exact route

that was taken in the video), it is more likely to facilitate the learning effect than the location matching task, and was thus placed first.

. 4 Results

The results for my study were calculated in R. Unless stated otherwise, data is normally distributed and variance between groups is equal. For each test, a significance level of 0.05 is used. For some tests the Number Score was used, which refers to the total number of questions answered correctly (a number out of 32 for the total questionnaire, and a number out of 16 when only the map matching or location matching sections are looked at seperately). The Percentage score refers to this same score, but as a percentage of the total number of questions.

4.1 First Person vs Third Person

My hypothesis is that the first person perspective (1PP) group performs better than the third person perspective (3PP) group. The null hypothesis is that there is no statistical difference between the performance of the two groups.

Using a two sample t-test, I found that there is no statistical difference between the 1PP and 3PP group means (42.250 and 40.217, respectively), with a p-value of 0.7737. As such, the null hypothesis is confirmed.

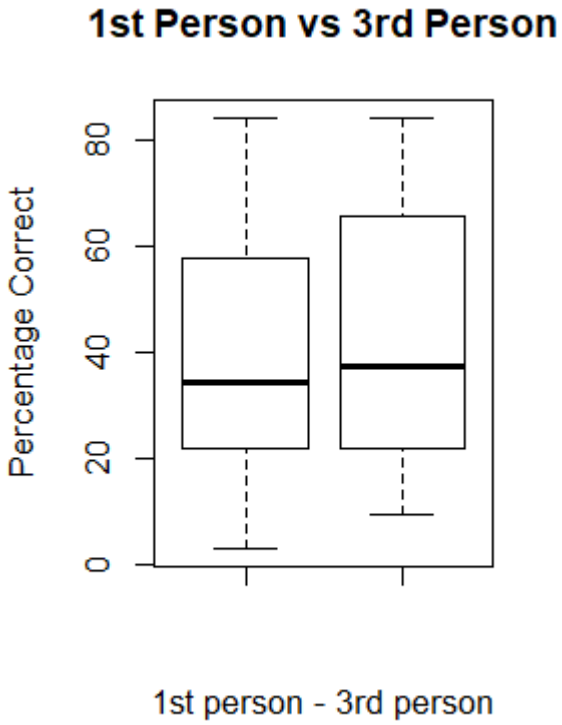

Fig 3. Boxplots showing the mean of the two groups (the thick black line), with the Standard deviations shown by the boxes. The dashed lines represent the min and max of each group.

4.1.1 First Person Map matching vs Third Person Map Matching

For the map matching task, we cannot assume normality for the 1PP group, but we can for the 3PP group. The means for the map matching task are slightly higher than the means for the complete test results (with the 1PP mean at 52.500 and the 3PP mean at 50.270). A Mann Whitney U test was used to compare the two datasets, which with a p-value of 0.7799 also did not lead to a significant result.

4.1.2 First Person Location matching vs Third Person Location Matching

The location matching task had lower mean results (1PP mean = 31.250, 3PP mean = 30.160), and once again did not show statistically significant results, with a p-value of 0.8605.

4.2 All Participants

4.2.1 Map Matching vs Location Matching

The mean Percentage Score for the map matching task was 51.430 (with a median of 46.880) and the mean for the location matching task 30.730 (with a median of 31.250). Because the variance between the two groups was unequal (with an F-test result of p=0.004) a Welch two sample t-test was used to compare the mean scores from the two tasks. This resulted in a p-value of $p < 0.001$, which means that it is statistically significant.

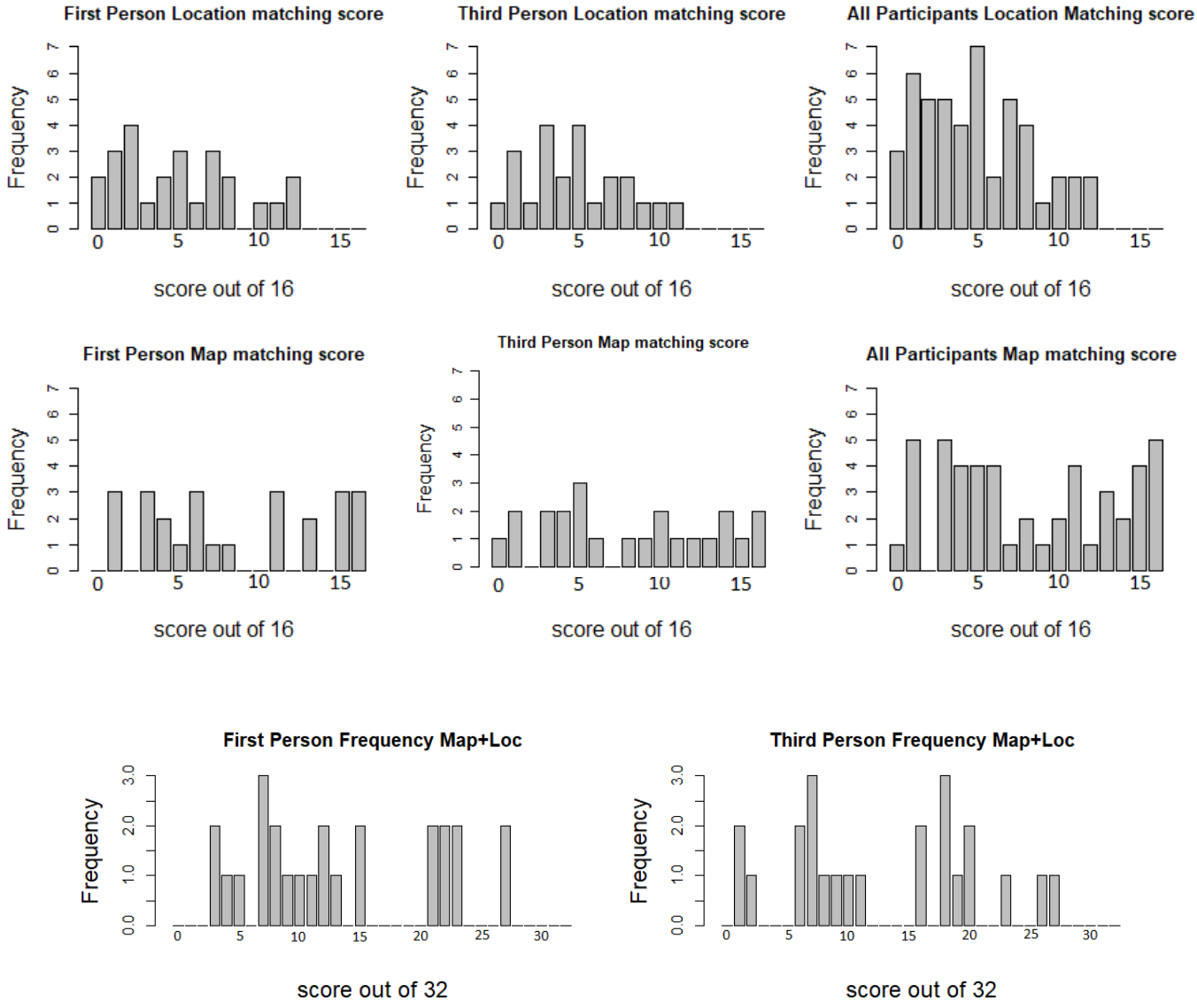

Fig 4. Histograms showing the frequency of total correct answers for each group.

4.3 First Person

4.3.1 Map Matching vs Location Matching

The results from all of the participants are reflected in the first person only group. For the map matching results we cannot assume normal distribution, so a Mann Whitney U test was used to analyse the difference between the two groups. With a resulting p-value of $p < 0.001$, we can once again assume statistical significance.

4.4 Third Person

4.4.1 Map Matching vs Location Matching

The same hold true for the third person group, which, while normally distributed, does not have equal variance (with an F-test results of p=0.1685). With a Welch two sample t-test result of p=0.01411, we can thus once again conclude that the result is statistically significant.

4.5 Scores vs auxiliary variables

4.5.1 Character Knowledge

In the questionnaire, participants were asked to rank their knowledge of Star Wars and Half Life characters with a score of 1 to 5. To test for correlation between test results and pre-existing character knowledge, a weighted average character knowledge score was calculated for each participant. Out of the 16 characters that they encountered, 11 (roughly 69%) were from the Star Wars franchise, while 5 (roughly 31%) were from the Half Life franchise. Thus, a weighted average of each participants character knowledge was calculated by taking their knowledge of characters from each franchise and calculating an average while taking into account the relative weight of each franchise.

To ensure that there was not an unequal distribution of character knowledge scores between the two groups, a two-sample t-test was done, which showed that there is no statistically significant sifference between the character knowledge scores of two 1PP and 3PP groups (with a p-value of 0.1892). Thus, character knowledge scores of the participants did likely not throw off the results.

The resulting character knowledge score between 1 and 5 was then juxtaposed with the total Percentage Score for each participant. From a Pearson correlation test we get a correlation coefficient of r=0.5737, with a p-value of $p < 0.001$, meaning that there does indeed seem to be some correlation between a participant's previous knowledge of the characters that were encountered, and his/her final score.

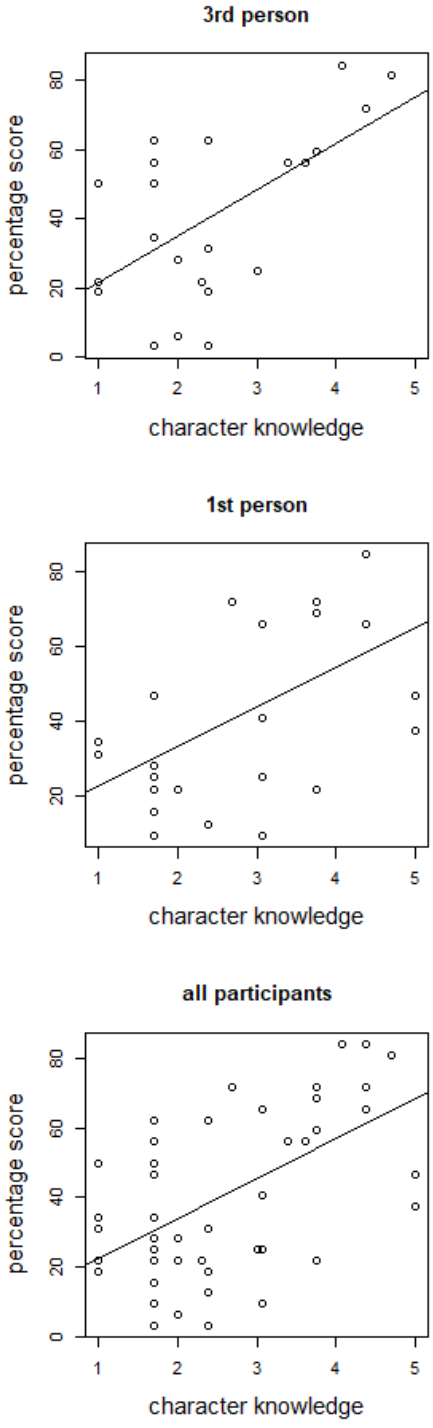

Fig 5. Scatter plots showing correlations between total score in percentages , and character knowledge scores.

4.5.2 Game Play Frequency

For the game play frequency, a scale of 0 (never plays video games) to 5 (plays video games every day) was created. To the question of how often the participant plays video games where

he/she, the questionnaire included, amongst the more usual answers such as “daily” or “rarely”, also the option “I sometimes play video games, but not with any regularity (for instance: 100 hours of a new game when it comes out, then nothing for half a year)”. For the evaluation of the data, this option was given the same number as the once a week variable. This question served as a way of testing the participants’ level of comfort playing video games, and viewing a digital world from the same type of way as they see it in the video they had to watch for the experiment. Gamers who play rarely, but play a lot whenever they do game, can be assumed to be rather comfortable with digital environments.

From a Pearson’s correlation test comparing the game play frequency and Percentage Score, a correlation coefficient of r=0.5726 was found, with a p-value of $p < 0.001$. As such, we can say there is a significant correlation between how often the participants play video games, and how well they did in the experiment.

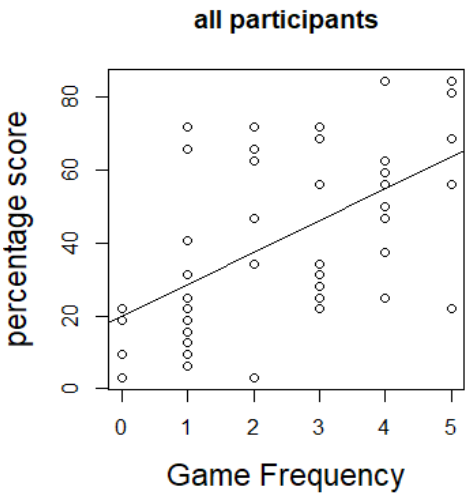

Fig 6. Scatter plot showing correlation between participants’ total score in percentages, and how often they indicated they played video games displayed on a range of 0 (never) to 5 (daily).

4.5.3 Game Perspective Preference

To check if people who prefer playing 1PP games in the 1PP test condition performed better, a Pearson’s correlation test was performed. This resulted in a correlation coefficient of r=-0.04735, with a p-value of p=0.8222, which is not statistically significant.

The same was done to test the performance of those who saw the 3PP video. Here, the Pearson’s test resulted in a correlation coefficient of r=0.25288, with a p-value of p=0.2444. Once again, the result is not statistically significant.

4.5.4 Questionnaire Device

I also tested for correlation between total Percentage Score and the device used for the questionnaire, to rule out the chance that people who used a smartphone to fill out the questionnaire performed worse because they were less able to distinguish the characters they saw in the pictures in the questionnaire. For this purpose, the device used was labelled “0” in the case of a smartphone, “1” in the case of a laptop, and “2” in the case of a tablet. A Pearson correlation test led to a result of r=0.0029, which would mean that there is no correlation between the device used and the score. However, the p-value for this test was p=0.9846, which means that this result is not significant.

. 5 Discussion

5.1 Reflection on Results

The hypothesis with regards to the differences between the first person and third person group cannot be confirmed. However, participants clearly did better in the map matching task than they did in the location matching task. This is interesting for our understanding of the Method of Loci, and what aspects of the method make it work so well. It would seem that this is not the appearance of the locations that we can visualise the people in when we try to recall who we saw where. Rather,

it is the spatial location in the apartment that we tie each character to. This could have been influenced by the order of the tasks in the questionnaire. It is possible that participants performed better at the map matching because the characters they had seen were still fresh in their minds. Still, it is also possible that the participants would have performed even worse on the location matching task if they had not had the opportunity to train their memory of the environment with the map matching task, and were asked immediately to remember who they had seen in each location based on the pictures in the location matching task.

There is correlation between the participants' total scores and their character knowledge, as well as between the total score and the play frequency. It must be noted that if a participant is familiar with the Half Life series, it is not unlikely that this person also plays many video games. This same thing cannot be said quite so confidently about Star Wars, as it is first and foremost a series of films, but it is not impossible to imagine that people who like Star Wars a lot, play more video games as well. Perhaps different results would be achieved if other characters were used.

I also did not test for spatial ability during this research. While Vindenes et al. found that this impacted their results, it would have cost as much time to test for spatial ability as the rest of my research together. As such, it was unfortunately not possible to incorporate this into my research.

Furthermore, the video's of the walk-throughs were almost exactly the same length, but there might have been small differences between the two. For a start, the 3PP video has the occasional overlap between two different 3D character models, whereas the 1PP version allows for the focus on only one character at a time. This is a logical result of the 3PP mode allowing for a larger field of view.

In addition, different results might have been achieved if participants had been allowed to do their own walk-through of the digital apartment, instead of watching a pre-recorded walk-through. It is possible that we look at things differently in the 1PP versus the 3PP, and this study only tests for the differences between how whoever records the video looks around. It is possible that interaction plays a part in why the MoL works so well. When we choose to walk around an environment and observe it, we have a different experience than when we are shown a video of an environment. As Black (2015) stated, movies in first person feel strange because we are used to being in control when we have a first person perspective. So perhaps not only presence, but also control of where you look might influence how you recall. In this research, the participants had no choice in where to look, which might make it a fundamentally different experience than it might have been had the subjects been allowed to control their own character.

It is also possible that different viewing perspectives may be helpful in different situations. For instance, it might be so that we are better able to recall things from a "real life" memory palace we know well when using first person, the perspective we have always seen this space from in real life. However, when we are confronted with a new environment, the third person perspective may make it easier for us to quickly get a feel for the layout of a room.

5.2 Relevance for Video Games

So what does this mean for video games? In effect, nothing can be said definitively about how these results would translate to an experiment that is actually interactive.

It seems that the perspective you view an environment in does not affect how well you remember the things you see in that environment, at least if you have no way to control what you look at yourself. However, as mentioned, it would be interesting to see if the angle changes what you look at, and how you look at things. After all, it is entirely possible that that is what changes when you switch modes. Still, that is something we can draw no conclusions about from this study.

So, if we assume for the moment that the results of such an interactive experiment were the same as the results of my experiment? It seems we remember the general layout of a digital

environment better than we remember the pieces of furniture in the space. My digital apartment did not include a lot of overlapping items of furniture, and yet the connection between a piece of furniture and the character who was standing in front of it was apparently much smaller than the connection between the spatial location and the character.

This is good news for video games, as it means that infinite numbers of different models are not what is necessary to create distinct and memorable video game environments. there are often a limited number of models that can be created for a game, whereas there tend to be many more options for the layout of levels.

5.3 Reflection on Digital MoL

A question that often occurs to me is what the point of using a digital environment for a memory palace even is. For the casual user of the method, it seems there is little advantage to using a digital method of loci. If you do not intend to memorise enormous amounts of information, you will have sufficient storage space using just the environments you are familiar with from your personal life. However, if it becomes a hobby to memorise things, you might run out of storage space. In that case, it may well be tempting to use a digital environment.

Still, it could just be a case of personal enjoyment. I personally dislike calling the MoL the “Memory Palace Method” because none of the places I know well enough to use for the MoL really resemble a palace. This can be fixed, however, if you use a fantastical palace from a video game. It certainly does the word “palace” a little more justice.

Where it concerns systems that aim to make the Method of Loci more accessible to the casual user, I truly doubt if the learning curve for such a system can ever be made less steep than the learning curve for the traditional MoL. At least for now, digital systems in no way measure up to the images we can create mentally, and we can use those wherever and whenever we want.

. 6 Conclusion

This study found that, of people remembering 3D character models encountered in a digital environment, there is no statistical difference between those who saw a walk-through of this environment in the first person perspective as opposed to those who saw it in the third person perspective. This either suggests that there is no real difference between the immersiveness of 1PP games versus 3PP games, or that immersion does not play a large role in memory.

However, there is a statistically significant difference between the ability of all participants to recall the characters they saw based on a picture of the location they saw them in, as opposed to their ability to recall where they saw them on a schematic map of the environment they saw. This supports the idea that what truly makes the MoL work so well is the way we are able to remember things spatially.

Based on this, it might be interesting to see what results are found in a study repeating this experiment, except have one group see a furnished apartment, and the other group an unfurnished apartment. This might help to explore the role of the items that populate a memory palace. To test if the same results can be found in an actual video game, it would be interesting to see if the results of this study hold true for a similar study where each individual participant gets to do her own walk-through of the environment, getting to control where she looks, rather than just seeing a video of a walk-through.

In general, there are a couple of things that could be improved in future Method of Loci research. The use of 3D models instead of images is something that is easy to do these days, and more accurately represents how one might visualise things in a mental palace, than using 2D pictures. It would be useful to do a survey of people who actually use the method of loci, and find out what parts of the method are deemed "essential" by them, so as to test a version of the method that best reflects how it is used in real life.

Alternatively, once could test the MoL using characters from a specific franchise, and then run the experiment exclusively on test participants who are fans of this franchise. This way, they are all familiar with the context, and it is easier to test for the influence of bizarre imagery in the Memory Palace because you have a context that is understood by all subjects.

While there is some research comparing digital or even virtual memory palaces to "traditional" ones, I would argue that the use of digital memory palaces allows us to test for more interesting things. Digital memory palaces allow us to manipulate factors of the environment and our perception thereof (such as viewing perspective) that allow us to examine which elements of the MoL are essential for its functioning, and which ones are not. Virtual reality in particular is a very popular new medium for MoL research. However, virtual reality concerns itself with trying to create experiences that feel like real life to us. Rather, I would find it interesting to see how we could use virtual reality to create experiences that are very different from real life, and testing how those influence how we remember things.

Digital spaces are only going to play a bigger role in our lives, as virtual reality technology becomes cheaper and more accessible, and they give us the opportunity to interact with them in a way that is at times similar, but often vastly different from the way we interact with real-life spaces. It will be interesting to see not just in what different ways we can observe the world around us (and worlds that are created exclusively in digital form, although it would not surprise me if the boundaries of these two will begin to blur as even more of our lives takes place in digital worlds), but also how these different ways shape our the experiences we have.

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