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Table 42 Needs Ranch: Working Memory and Waiters

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Abstract

Past literature on waiters as specialists in memory ability focus mainly on short term memory. The encoding and retrieval are vital parts of the process of serving, but the way these studies have operationalized this task have taken the task of waiting tables removed extraneous material present in the daily tasks of a waiter for the purposes of laboratory measurement. During a shift, a server maintains several tasks in their mind and executes them in a very fast pace, sensory stimulating, distracting, environment. Working memory is the ability to maintain accurate information in the face of distraction. This type of mental ability seems to be a more accurate operationalization of the skill it takes to be an efficient server. This study assessed working memory capacity in servers.

Keywords: working memory capacity, waiters.

Table 42 Needs Ranch: Working Memory Capacity as a Predictor of Performance on an Ecological Serving Task

There are 2.25 million people working as a waiter in the united states (Data USA, 2016). The average salary of servers is $16,678, which is $33,535 less than the average national salary of $50,213. It widely believed within the restaurant industry that if a server is able to remember the variety of tasks they are assigned by the customers and execute them in a timely manner without forgetting one, they will increase customer satisfaction which will lead to a bigger tip. An executive function that predicts multitasking ability is working memory (WM) (Redick, et al., 2016). This is the ability for an individual to maintain information in the face of distraction, one of the central aspects of a waiter's job. If working memory is a primary correlate of performance at serving, then training WM could help waiters make more money, and assist in raising some of these individuals above the poverty line (U.S. Department of Health and Human Services, 2019). The purpose of this study is to establish a correlation between WM and performance on an ecological serving task.

WM is an executive process that is distinct from short term memory or long-term memory. WM includes the process of executive attention which enables individuals to maintain information that needs to be remember in the face of distractions (Engle, 2002). This executive process is central to what waiters do. Imagine you are a server. You walk up to a table and greet them and take their order. The man on the left wants a Coke and lasagna, the woman next to him wants a Sprite and spaghetti and meatballs, the child across from them wants a kid's chicken fingers with a side of grapes with an apple juice. Now you walk away from the table, through the full dining room. There is a baby at table 342 crying, a man just spilled his drink at table 224, a coworker asks if you have a second to help them run food. After all these stimuli, you make it to the computer to ring in your table's food. Without looking at the text above, what did they order? This is how working memory capacity relates to the job of a waiter. Now, take this situation and multiply the difficulty by however many tables a waiter is serving at one time. The number of things customers need increases significantly. For a waiter, multitasking and the corresponding executive function of WM is of central importance.

If WM is correlated with serving performance, then increasing working memory capacity (WMC) through mental training could increase waiter job performance. According to Foster et al. (2017), individuals with both high and low baseline WMC were able to improve their performance on a WM assessment over the course of the training sessions. Participants engaged in 20 training sessions with assessments at the beginning, middle, and end of the experiment. All participants showed improvement in the task given, but individuals who had high WMC improved more than individuals who had lower WMC. No participants showed improvement in the control task, a visual search task, that does not engage WM.

This evidence that WMC can be improved does not, however, mean that all trainings yield equal performance. One industry that many people have bought into is "brain games" such as Lumosity (Lumosity, n.d.). This industry is based on the principle of far transfer, that training a task related to a specific cognitive function will generalize to improvements in other forms of cognitive functioning. A meta-analysis testing far transfer effects looked at study that sampled children who were being trained in chess and music and the relationship between those skills and academic performance in reading and mathematics. This meta-analysis found that the reported far transfer effects were related to confounds in the experimental design, not to the training itself (Sala & Gobet, 2017a); however, the researchers did find substantial effects of near transfer in their analysis.

Near transfer effects can be imagined as common practice effects. A simple example is experience driving a car is related to ability in driving other types of cars. Near transfer effects are related to training in domain specific tasks, or tasks related to a specific discipline. This is the effect found by Engle (2002) in his WM training experiment on executive attention. Sala and Gobet (2017b) found that memory expertise gained in domain specific task lead to performance in other activities compared to a sample of novices. This effect was theorized to be due to the flexible memory structures built during domain specific training. Training executive functions that are specific to a task can lead to increased performance in said task, but not all domain specific training yields equal results. In a study of 40 waiters, knowledge of memorization strategies was not associated with increased performance on a serving task (Huet & Marine, 1997). This result was explained by the inappropriate application of memory strategies to situations where the strategy was inefficient to encode and retrieve the information.

Waiters inappropriately applying domain specific training can have no effect, or be a hindrance to performance at serving, but as an individual spends more time at serving, performance at the task ought to improve. In a study of the memory abilities of long-term waiters (10 years or more of experience), Bekinschtein, Cardozo, & Manes (2009) found that the waiters dramatically out performed a sample of non-waiter participants at a memory task. Along with this, Huet & Marine (2009) found that long term servers out performed beginning servers at a memory task. The long-term waiters were better able to self-regulate their memory abilities under increased cognitive load and interruptions in encoding which are realistic representations of what waiters encounter in daily working conditions. The results of this study suggest that long-term waiters are better able to implement skills and strategies that they have acquired through their time as a waiter. Familiarity with a task increases performance (Kole, Snyder, Brojde, & Friend, 2015).

Working memory is a flexible executive function that can be improved through domain specific training. If there exists a correlation between WMC and performance on an ecological serving task, then WM training could be used to increase the abilities of waiters and improve their financial health.

It is hypothesized that performance on the WM assessment will be positively correlated with performance on the ecological serving task because of the conceptual connection between WM and the daily tasks of waiters. It is also expected that WM will be positively correlated with GPA, the section size of the waiter participants, and the amount of time an individual has been a server.

Method

Procedure

Participants, upon entering the research room, sat down, looked over the informed consent sheet, and asked any potential questions. They then completed a symmetry span working memory capacity assessment on a laptop through a Java based psychometric assessment tool delivered through Tatool software designed by Stone (2018). Online WM assessments have been shown to be valid measurement tools compare to in-person assessments (Hicks, Foster, & Engle, 2016). Symmetry span was chosen as the WM assessment because it has been observed to be a significant predictor of multitasking ability (Redick et al., 2016). Participants completed 19 trials. In the first step of a trial, the participant saw a 4x4 grid with one square filled in. They then had 2 seconds to memorize the placement of colored square (See Appendix A). After the

4x4 grid disappeared, a series of 10x10 grids appeared, and the participant made symmetry judgements for each grid in the series (See Appendix B). Some of the 10x10 grids were symmetrical around the vertical midline, others were asymmetrical. Participants performed 5 symmetry judgements for each trial and had 1.5 seconds to make each judgement. At the end of each trial, the participant recalled the placement of the colored square on the 4x4 grid (See Appendix C). Each trial had this same basic format. As the trials progressed, the number of colored blocks the participant was required to memorize and recall steadily increased. The participant recalled the location of 2 blocks in trial 1-2, 3 blocks in trials 3-6, 4 blocks in trials 7-10, 5 blocks in trials 11-13, 6 blocks in trials 14-16, and 7 blocks in trials 17-19.

Ecological Serving Task

After completing the WM assessment, participants were transitioned to the serving task. Participants were verbally given a simulated restaurant order of items to be retrieved from a table at the end of the hallway outside the research room. The categories from which the order was created were: cans of soda (12oz): Coke, Sprite, Mountain Dew, root beer. Snack cakes: Twinkie, Nutty Bar, Ding Dong, oatmeal cream pie. Nuts: Almonds, cashews, mixed, pistachios. Box of pasta: spaghetti, elbow, fettuccini, corkscrew, fruit: apple, orange, banana, pear, kiwi. The order consisted of one item from each category**.** The participant memorized the order to the best of their ability and retrieve the items from the table. The participant put the requested items in a plastic bag that was provided by the researcher and brought them back down to the research room. The participant then filled out a paper and pencil survey that asked age, gender, GPA, past serving experience; if the participant answered yes to past serving experience, they were asked how long they served for, and how many tables they served on an average shift. After completing of the survey, the participant was given a debriefing form and allowed to leave.

Results

The descriptive statistics and correlation matrix was run on all the variables in Excel and SPSS (See Table 1, 2). Several non-significant correlations were of note. The hypothesis that WM would be positively correlated with performance on the serving task was not supported. Performance on the ecological serving task was not significantly correlated with any of the WM performance measures or survey questions about a participant's experience as a waiter. Another interesting lack of significance was between WMC and GPA. WMC is a significant predictor of reading and math ability, so this lack of correlation is of note.

Of the findings that did reach significance, *MaxSpan* and *PropOverall* (For description see Table 1 notes) were strongly correlated (r = .797, p = .032). This means that the WM assessment was working correctly, because those two variables are measuring very similar constructs (See Table 1 notes). Although the sample size was small (n = 10), there was a strong correlation between how long a participant had been a waiter and performance on *MaxSpan* (r = .657, p = .039).

Discussion

The null results from the analysis on the WM assessment and ecological serving task can be explained by several factors. When looking at the raw data of the serving task, there was almost no variability (M = 4.73, SD = .12). Almost every participant correctly retrieved 5 out of 5 items. This lack of variability suggests that the task was too easy. To increase the variability in the results, future studies should design a more difficult serving task. Participants would have to keep the information in their minds for a longer period of time and have more potential for distraction that would more accurately represent what a waiter does on an average shift. In order to accomplish this, the distance participants walk from the research room to the place the item is located should be increased. The route could also be directed through a busier section of campus to increase distractions, and the number of categories of items to be retrieved would be increased as well.

The lack of correlation between WMC and GPA is of note. WMC is a predictor of reading and math skill (Engle, 2002). Within this sample of EKU students, there was not a significant relationship between these variables. This suggests the way EKU has operationalized GPA does not have to do with reading and math skill. In a sense, this finding is good because it means that regardless of biological gifts or highly trained neurological skills, students are still able to be competitive in grades. This also raises the question, however, what does GPA at EKU actually measure?

The finding that the longer someone was a server, the better their *MaxSpan* score replicates a finding from Huet & Marine (2009) that long term servers out performed short term servers on a memory task (See Figure 1). The way the data points were spread, I expect that with a bigger sample the same result would be found, but with less strength.

Conclusion

This was an explorative study into the possible relationship between WMC and performance on an ecological serving task. The lack of correlation between WMC and the task can be attributed to methodological limitations that could be addressed in future studies. The minimal findings suggest the possibility of the hypothesized relationships that would be detected under more strict experimental design.

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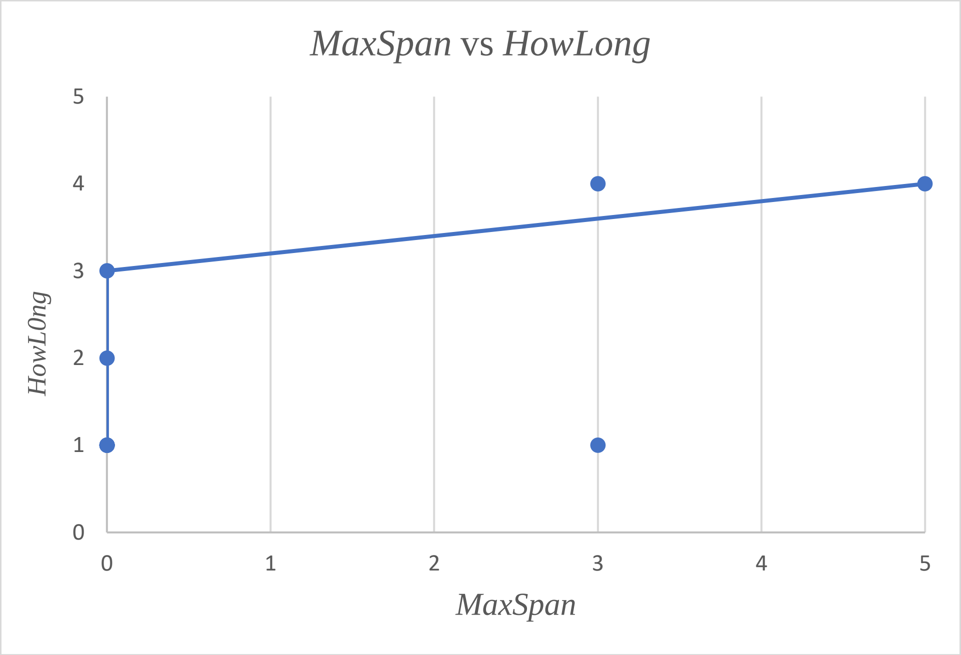


Figure 1. Correlation between *MaxSpan* and how long a participant was a waiter.

Table 1

Summary of intercorrelations mentioned in method.

	MaxSpan	*PropOverall*	*Time*	*Gender*	*Age*	*GPA*	*HaveWaited*	*HowLong*	*HowTables*	*CompScore*
MaxSpan	1									
PropOverall	0.7968*	1								
Time	-0.0342	-0.004761	1							
Gender	-0.1774	-0.248962	-0.3229	1						
Age	-0.056	-0.08308	0.0033	0.037	1					
GPA	0.1696	0.1286141	-0.1995	0.028	-0.1473	1				
HaveWaited	-0.1265	-0.023333	-0.0351	-0.16	-0.0007	0.1507	1			
HowLong	0.6571*	0.6724471*	0.43482	######	-0.0194	-0.091	#DIV/0!	1		
HowTables	0.1501	-0.028973	-0.0289	######	-0.3506	0.1924	#DIV/0!	-0.3443	1	
CompScore	0.0705	0.1512894	-0.1877	0.11	-0.0431	-0.025	0.0912164	-0.02731	0.238454311	1

Note. The labels for this table: *MaxSpan* – the largest number of trails a participant was able to complete, *PropOverall* – the overall number of conditions a participant correctly recalled, *HaveWaited* – has the participant worked as a waiter, *HowLong* – how many years the server participants had served, *HowTables* – if a participant has been a server, how many table were they responsible for at a given time, *CompScore* – the number of items correctly recalled on the serving task.

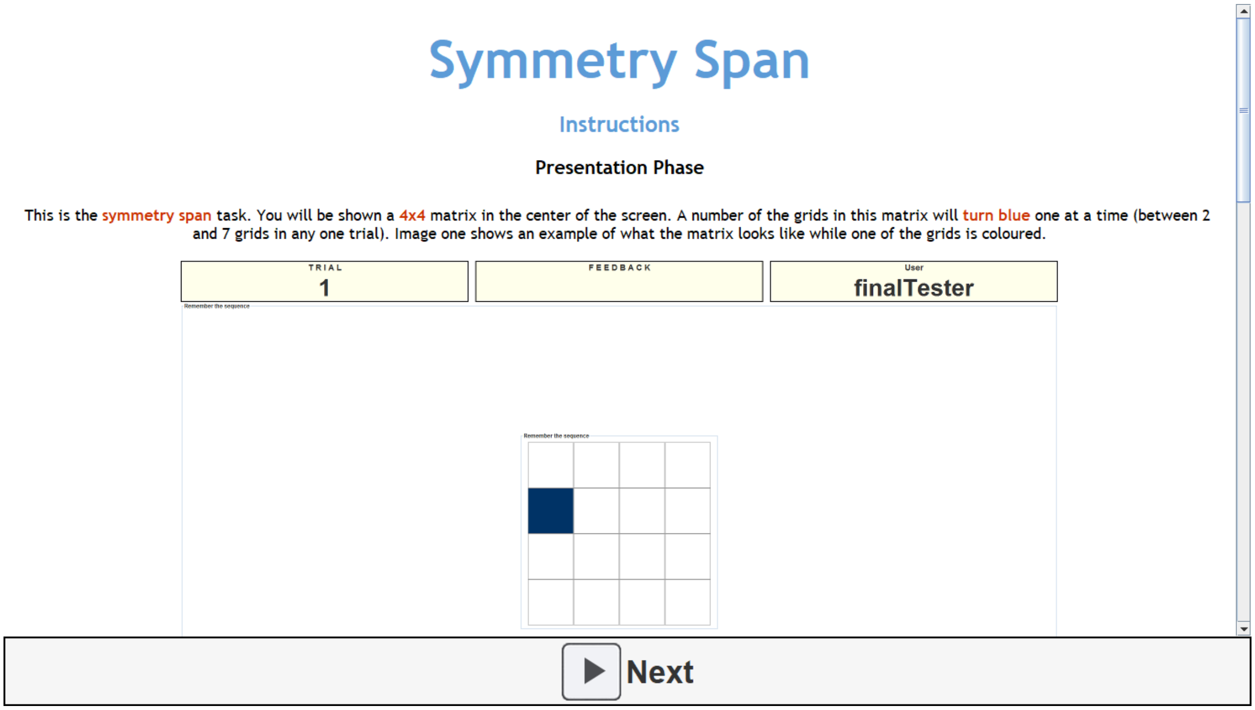
Table 2

Descriptive statistics for all variables

	MaxSpan	*PropOverall*	*Time*	*Gender*	*Age*	*GPA*	*HaveWaited*	*HowLong*	*HowTables*	*CompScore*
Mean	0.864407	0.228813559	0.000833	0.779661	20.0678	3.384259	0.807017544	1.9	1.762711864	4.728814
Standard Error	0.23496	0.029305196	2.25E-05	0.054423	0.276558	0.064722	0.052735903	0.406885	0.70455601	0.120467

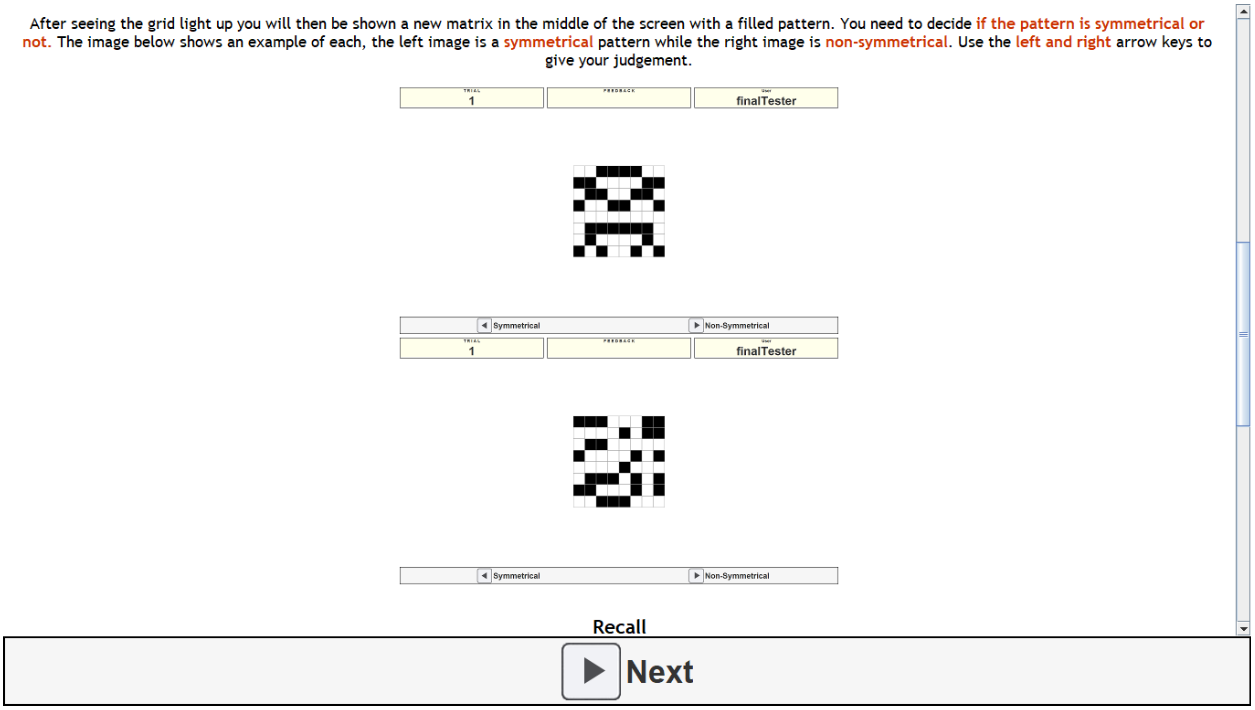
Appendix A

Working Memory Assessment Directions



Appendix B

WM Assessment Directions 2



Appendix C

WM Assessment Directions 3

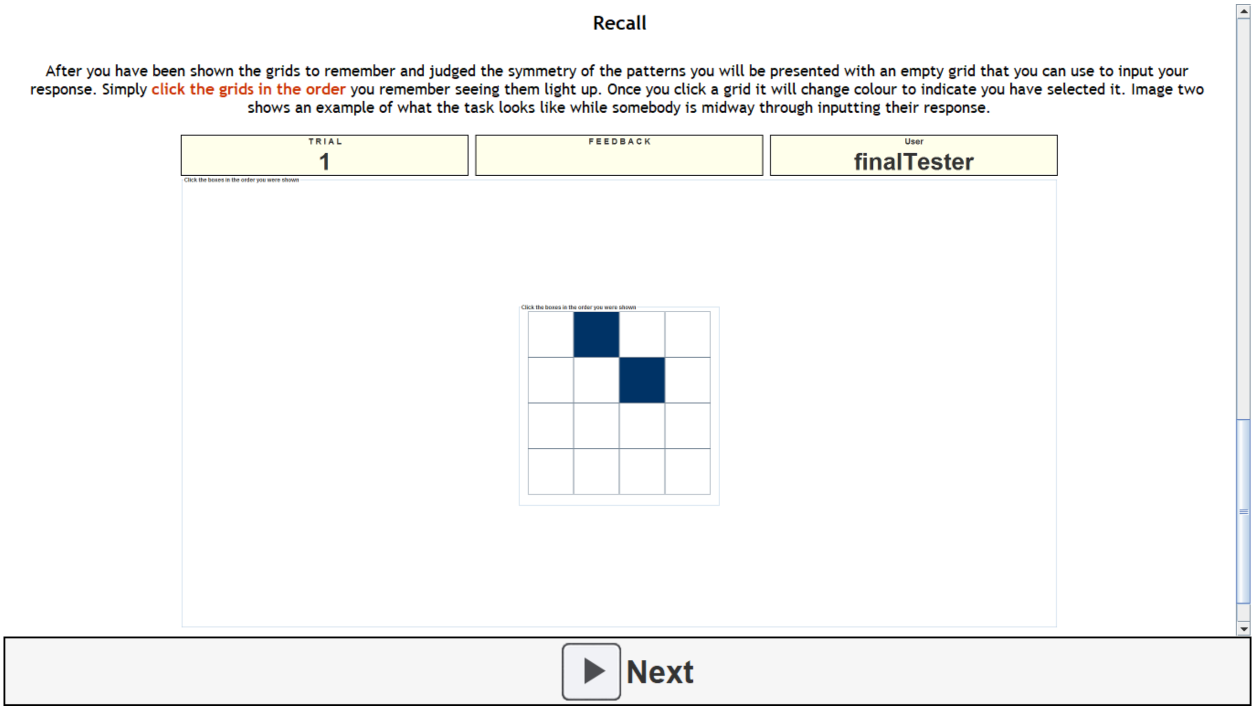


Figure 3.