

THEY FOLLOWED THE CHEESE

VISUAL WEB-BASED EXPERIMENTS SHOWCASING THE OPPORTUNITIES AVAILABLE FOR THE PRESENTATION OF INFORMATION IN AR


The desktop paradigm bridged a sizeable usability gap at a time before the term “usability” became a conscious objective goal of developers. Mapping the capabilities of the computer to how a user understands their work desk, helped users understand how to interact with a computer. The paradigm has evolved and continues to evolve and reshape itself in different platforms. However, the UIs still rely heavily on established laws and principles that suit the conditions of screens. AR has the opportunity to leverage Semiotic Extension to create context relevant UIs that rely on the focus of the real-time view to inform the user, rather than the device. This is a departure from established design patterns that may cause frustration for both the designers and the users. Nevertheless, it is an area that needs experimentation, to find levels of communication that work for AR. This poster presents the findings of a web-based visual experiment that posed the hypothesis:

Can simple visual cues change the user’s interaction behaviour with a system? If so, is there a threshold between the communication value of the cues, where no behavioural change can be identified.

A SELECTION OF THE EXPERIMENT SCREENS

Instruction: Put the ball into the box.


Score: 2/3



The main theories being implemented: Affordance

Instruction: Take the dog home.

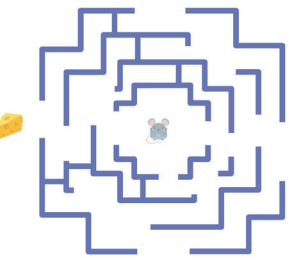
Score: 2/3



The main theories being implemented: Affordance

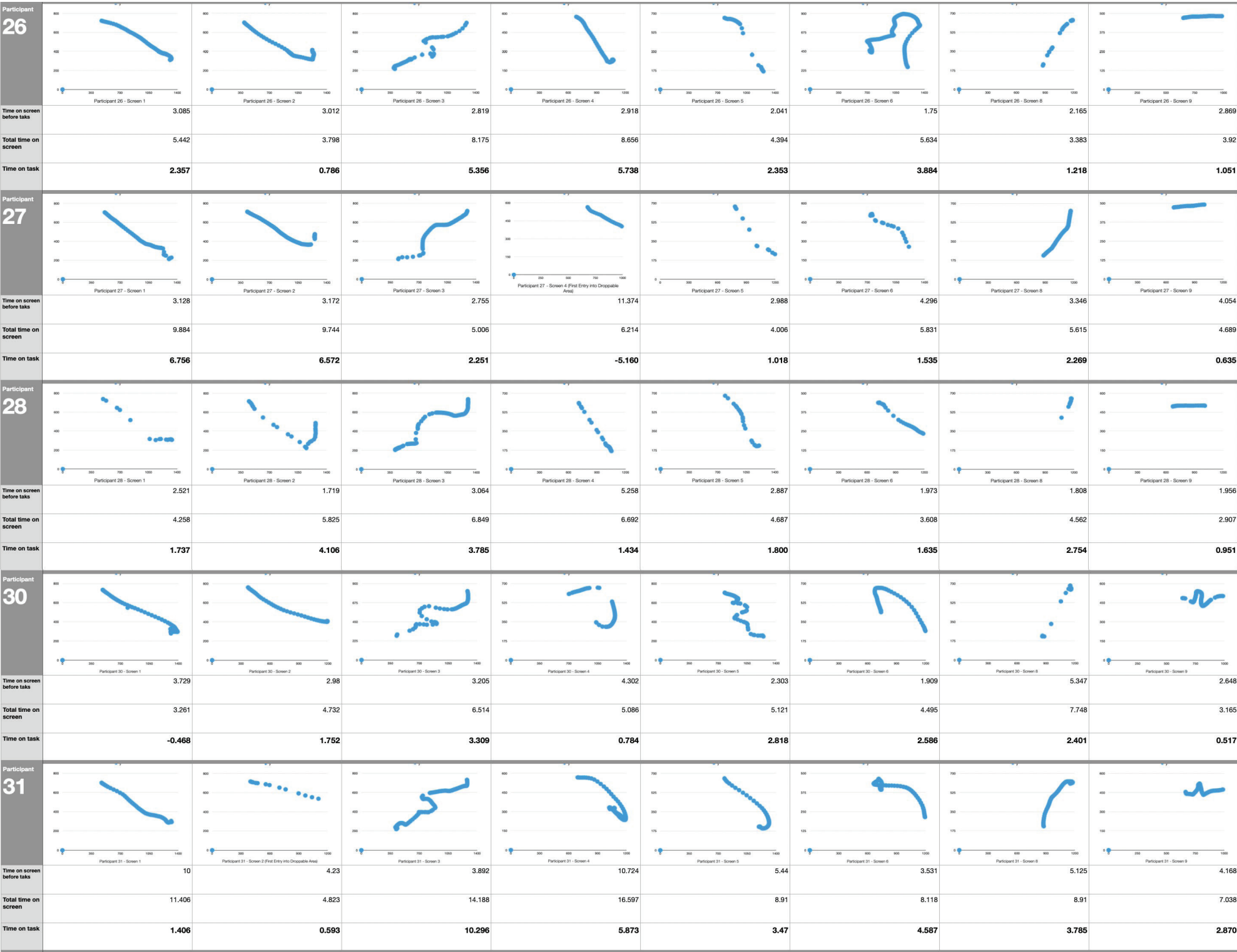
Instruction: Move the mouse out of the maze.

Score: 0/3



The main theories being implemented: Affordance & Connotation

SAMPLE OF MOUSE MOVEMENT PATHS



REFERENCES

Chandler, D., 2007. *Semiotics: the basics*. Routledge.

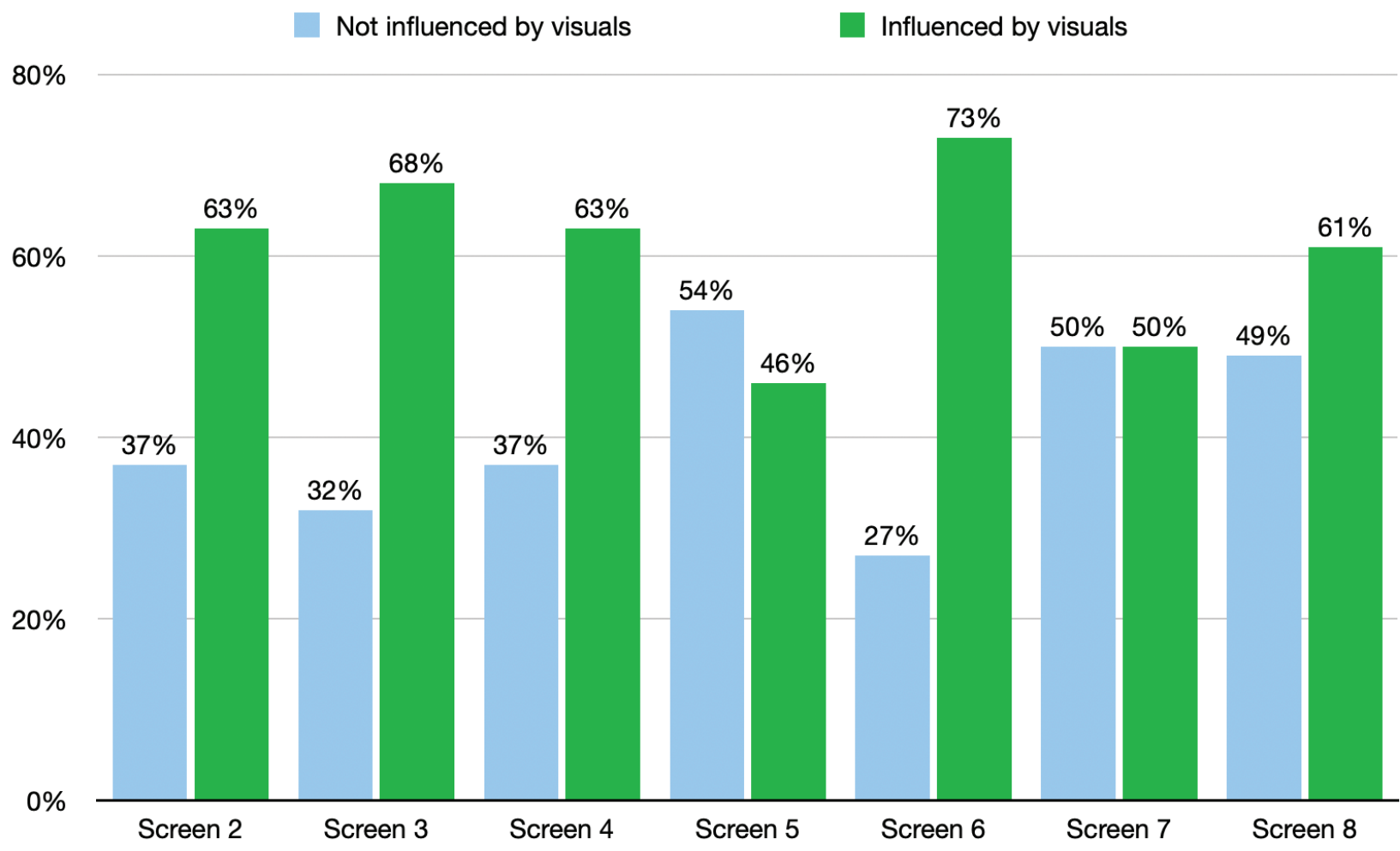
Krassanakis V, Kesidis AL. 2020. MatMouse: A Mouse Movements Tracking and Analysis Toolbox for Visual Search Experiments. *Multimodal Technologies and Interaction*. 4(4):83. <https://doi.org/10.3390/mti4040083>

METHODOLOGY

To test the hypothesis a web-based user task experiment was designed. It consisted of 8 screens, each with a visual user task; once the each task is completed the user moves on to the next screen. The visuals were designed utilising visual theories that are used in achieving Semiotic Extension. The experiment investigates whether the visual on each screen would influence the interaction behaviour of the user. Data was collected from the users’ mouse movement coordinates in response to the visual and the time spent on each page and on each interaction. Mouse movement tracking as a “methodology constitutes one of the simplest methods used towards capturing user response during the execution of typical computer tasks (i.e., a task that is performed on a graphical user interface (GUI) presented on a digital display”, (Krassanakis

& Misthos, 2023 p.128). In this benchmarking experiment, we are utilising the mouse movement to evaluate how the users perceived and interpreted the visual in response to the task. The mouse movement and time it takes to complete each task should give insight into their instinctive response to the visual to complete the task. The visuals utilised the semiotic visual theories of affordance, connotation, discourse and Gestalt. While this experiment is not testing extension itself, it does utilise the theories that achieve extension in the creation of the visuals, to evaluate their effectiveness in this context. The tasks were simple in nature and very direct. An effort was made not to include leading language. The visual compositions were simple, but included elements that when read together are easy for the user to understand and complete the task.

RESULTS



THE POWER OF CONNOTATION

The visual of the maze influenced 61% of users to move the mouse out of the maze, via the maze routes. However, Screen 8 was also utilising connotation. The maze had 4 valid exits. A visual of a piece of cheese was at the far left exit. Despite no mention of the cheese in the instruction 95% of users moved the mouse to the exit with the cheese. Thus highlighting the power of connotation.

DISCUSSION

Overall, the results are positive, with nearly all screens recording a high level of influence during the task. When reviewing these results in relation to the visual compositions of the screens & the different visuals utilised to implement the specific theories, a pattern starts to emerge of what is influencing the user — the composition itself, the context of the composition, the individual elements. All of these data points behind the percentages provide rich insights. When the time data is added to the analysis, a more detailed set of insights emerge on whether there was indecision or hesitation before moving or if it was purely instinctive. All of this data builds a portrait of the behaviour which can be mapped back to the visuals and the visual theories in their creation. In terms of extension, the results of screen 8 where 95% of users followed their instincts to take the mouse to the cheese is indicative of the power of connotation. Cheese is not mentioned in the task, yet 95% of users chose the exit with the cheese.

Each screen showed signifying levels of influence, with good results for affordance & Gestalt across all the screens. However, it was the result for connotation that stands out. While the other theories are visually based, connotation is working as a second level of signification taking the denotative sign (signifier and signified) as its signifier and attaching to it an additional signified (Chandler, 2007). Connotations may have socio-cultural and personal associations of the sign (Chandler, 2007) which generally relate to the interpretation, as connotation generally occurs in context. In terms of screen 8 there is a connotative relationship between the mouse and the cheese, mice like cheese, therefore the user believed that taking the mouse to the cheese was best choice for the mouse. The experiment highlights how these theories can influence users, which opens up the opportunity for AR to move away from the annotative design that AR UIs have become. Using these theories to achieve semiotic extension could create more engaging AR experiences.