
Insights from Eye-Tracking and Pupillometry in Design Education Research



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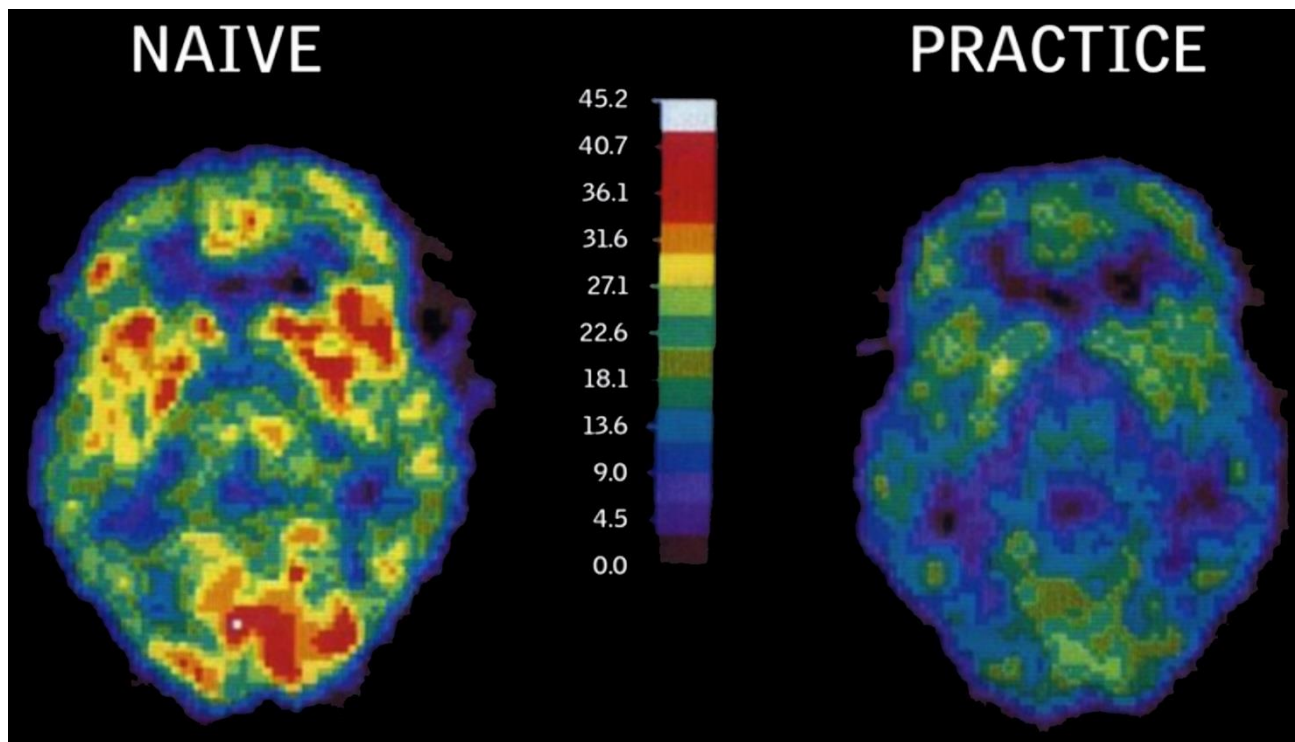
Dr Donal Canty

University of Limerick

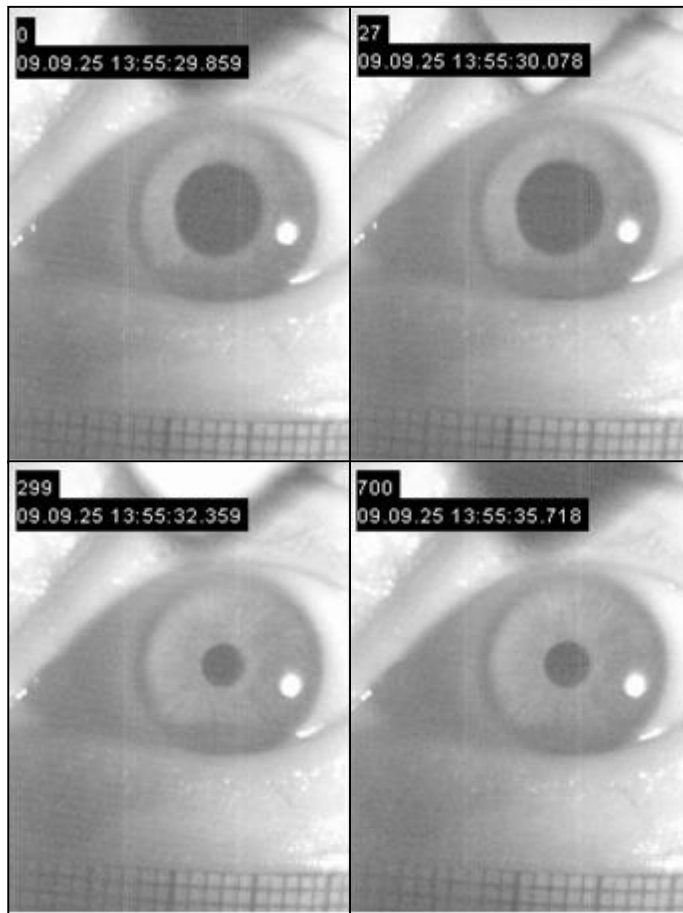
The Neural Efficiency Hypothesis

The original hypothesis:

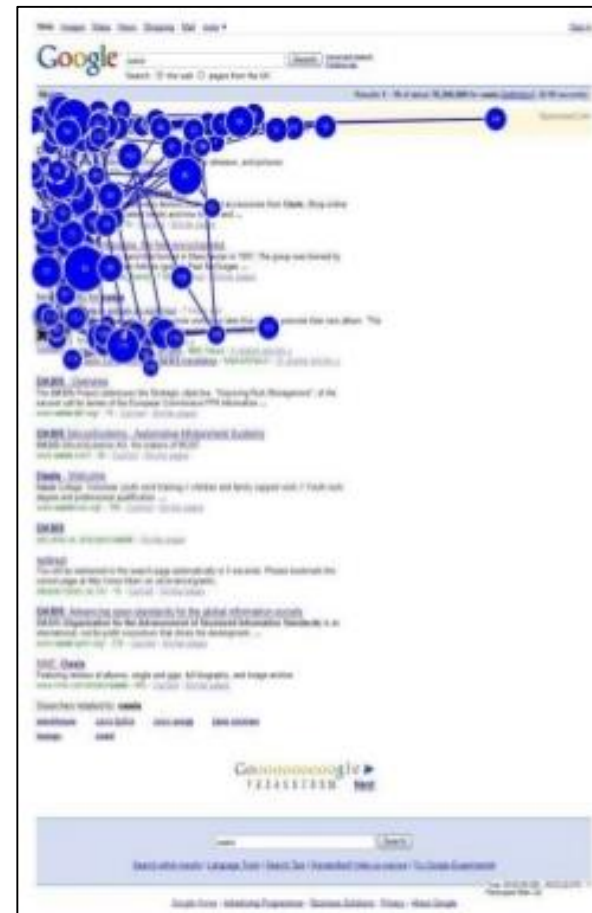
Low ability students would demonstrate lower neuronal activity than high ability students (as high ability students would be engaging in more difficult tasks due to experience)



Pupillometry and Eye-Tracking



Pupillometry



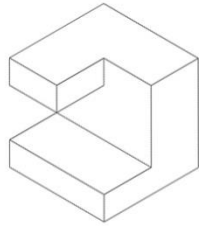
Eye-Tracking

Pupillometry Setup

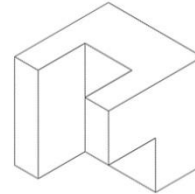


Study Design

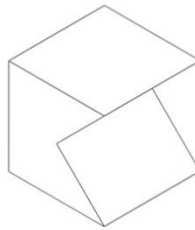
1



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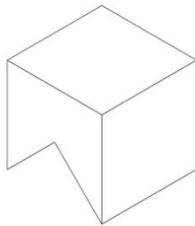


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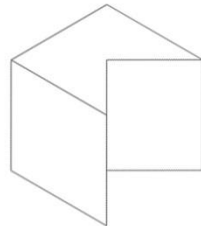


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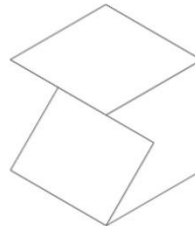
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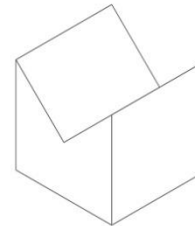
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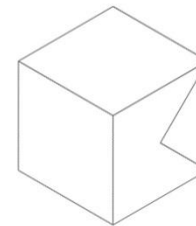
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Study Design

1



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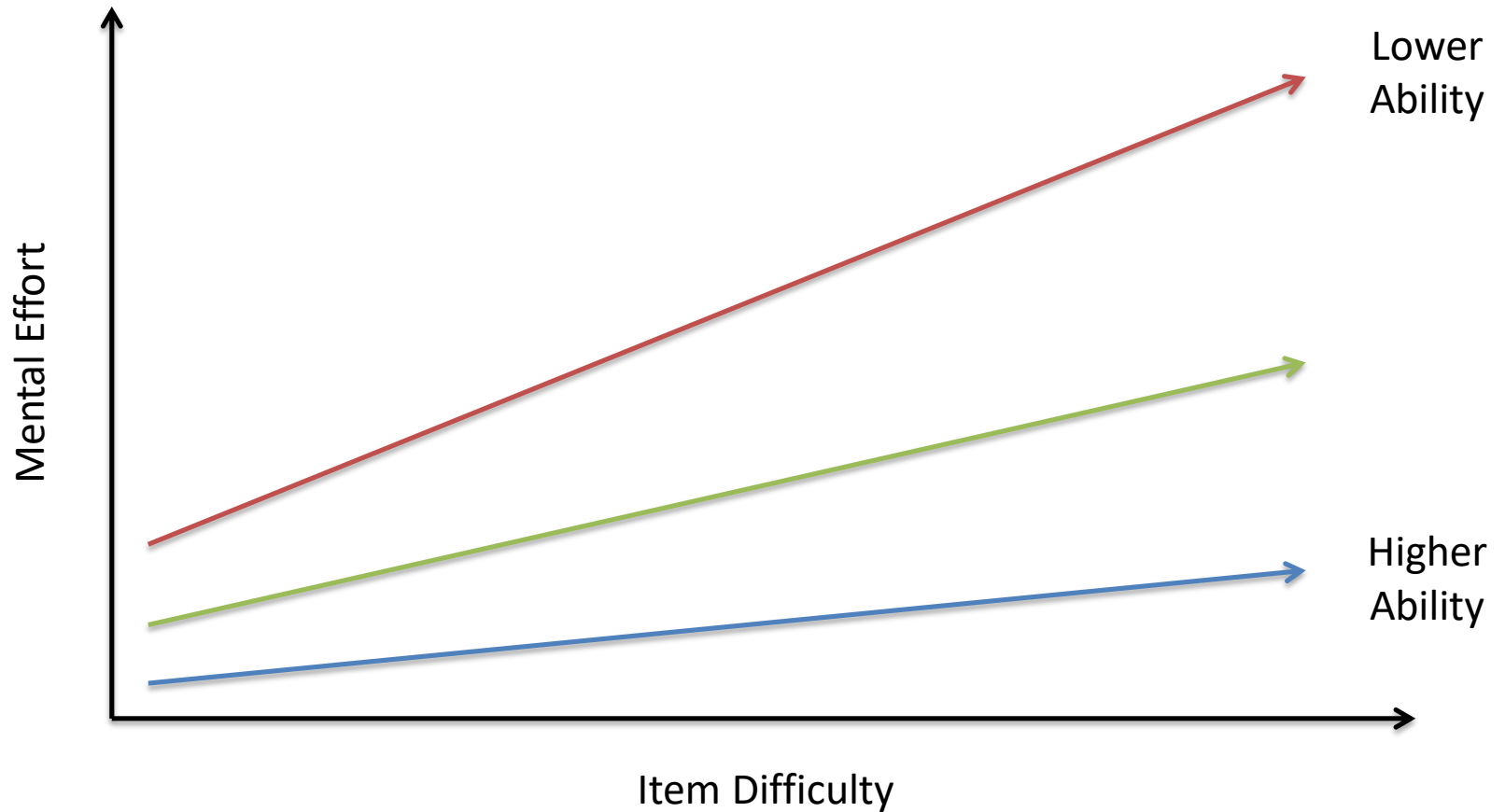
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E

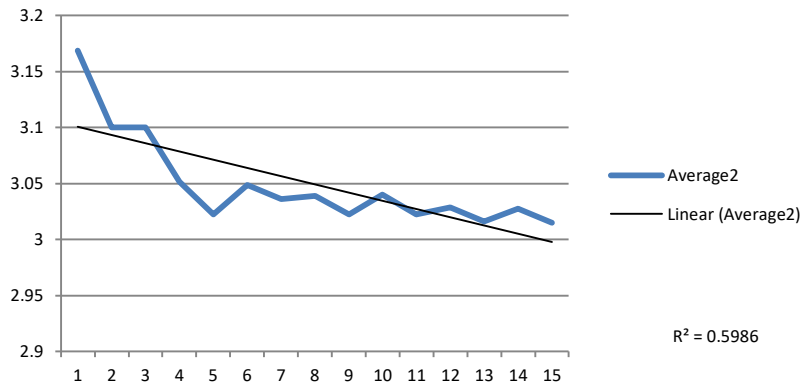


Hypothesis

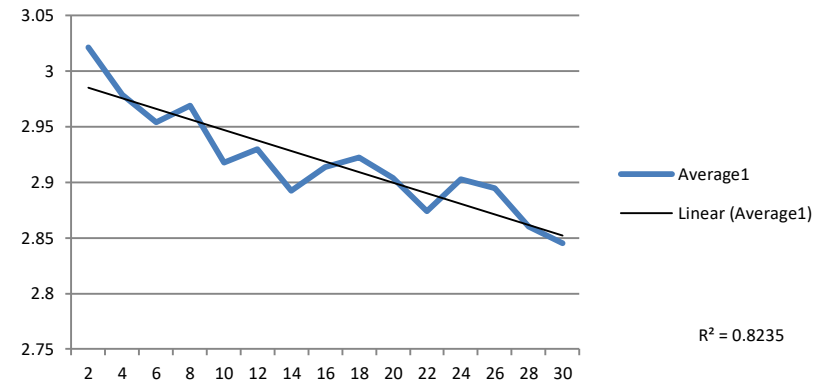


Results

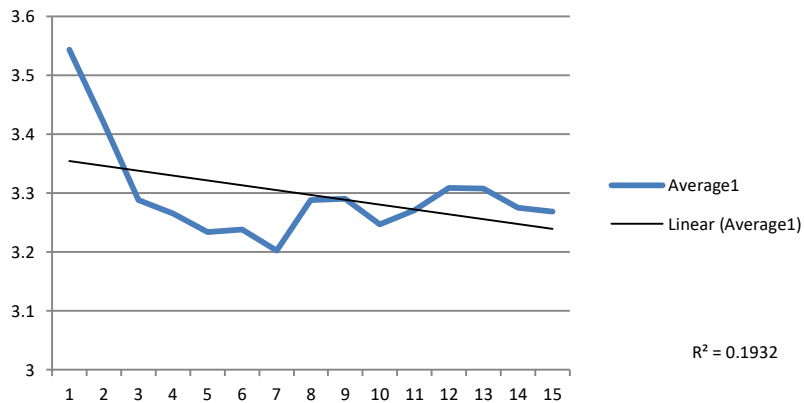
Odd Items - Abstract



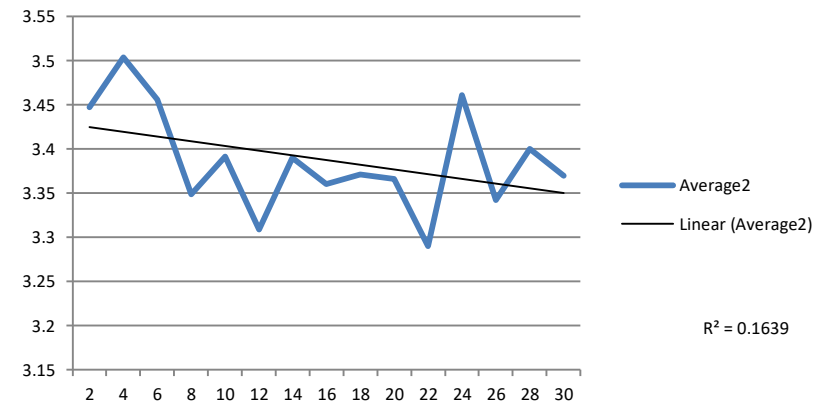
Even Items - Abstract



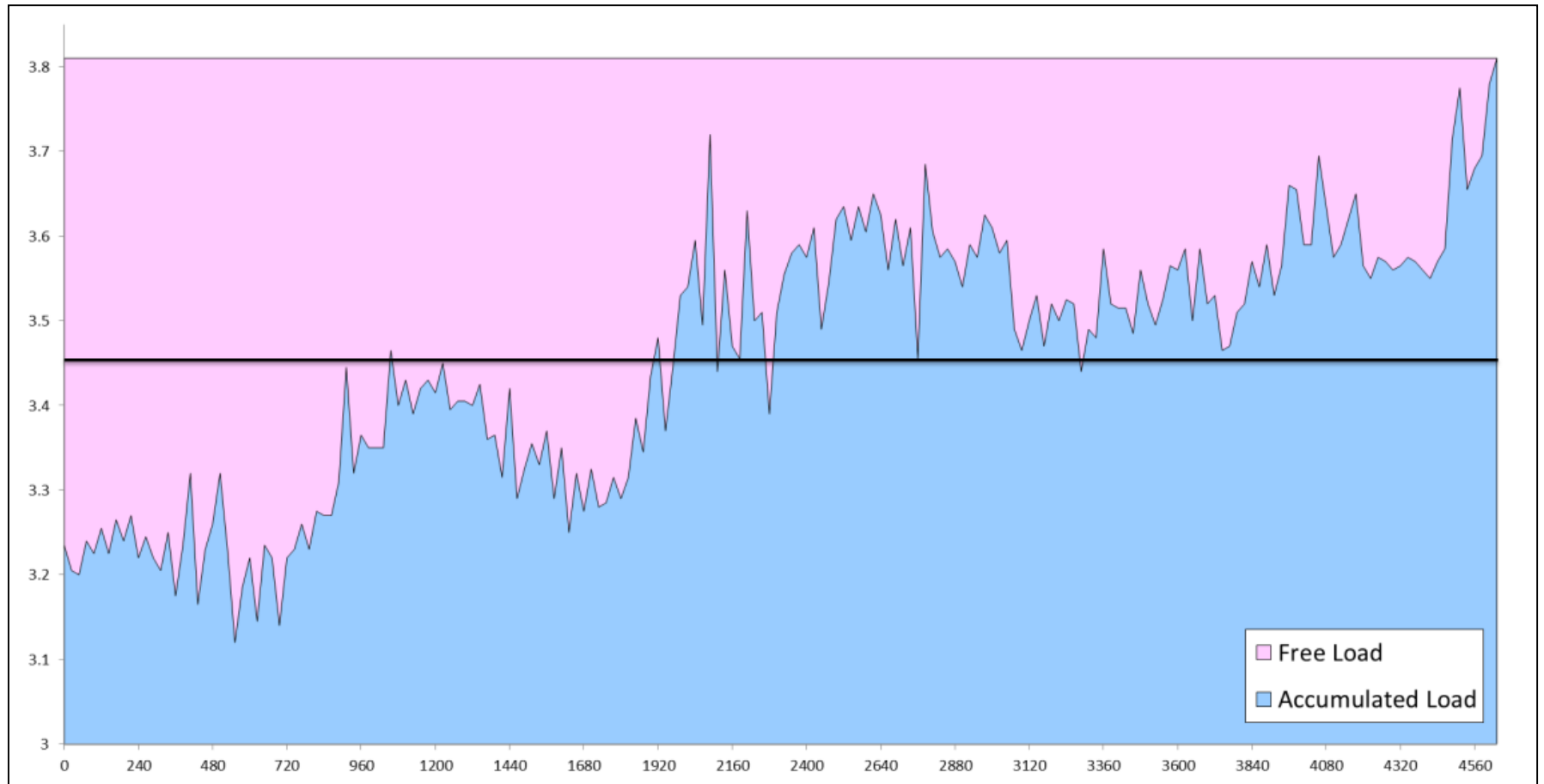
Odd Items - Apparent



Even Items - Apparent



Results

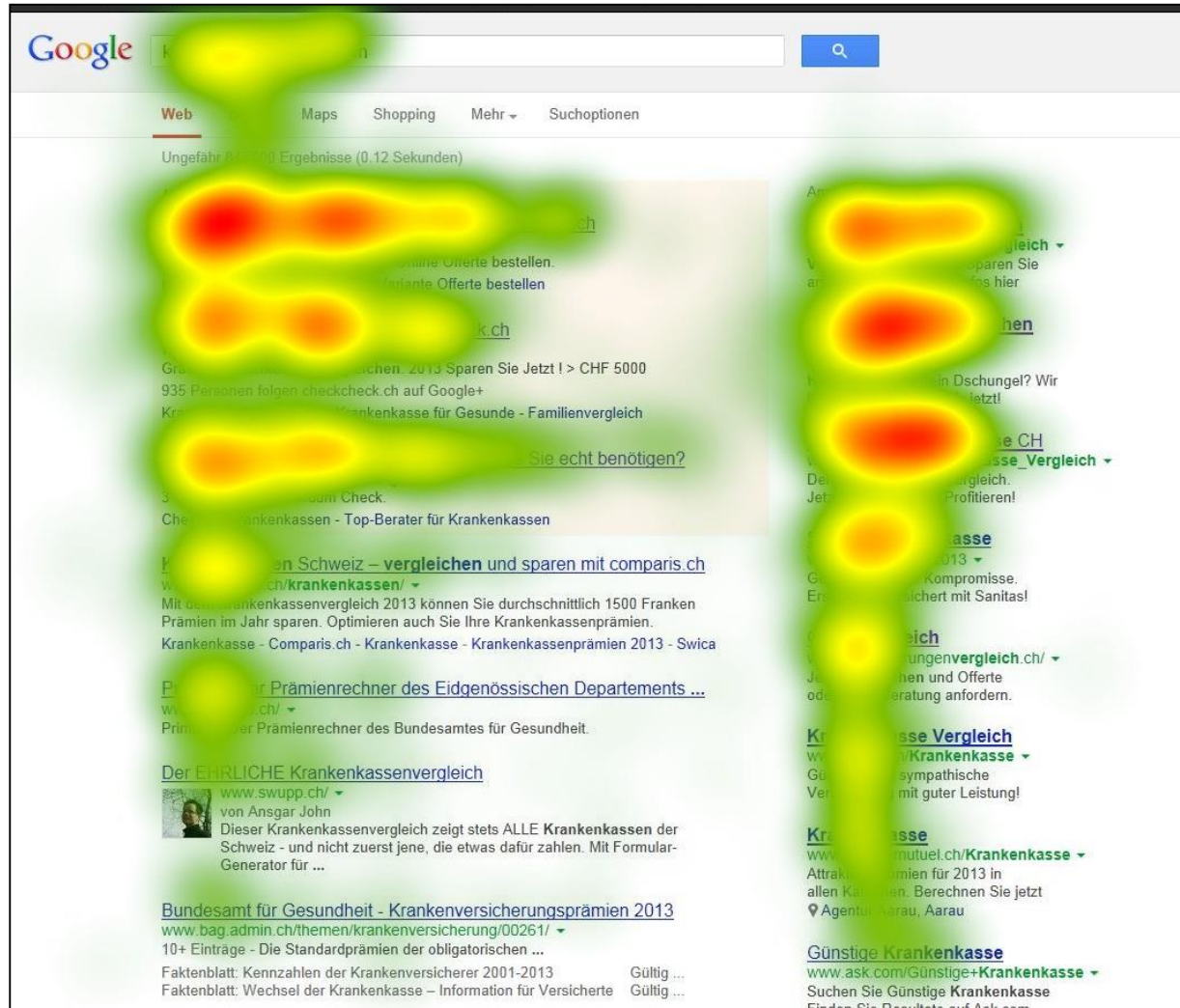


Eye-Trackers

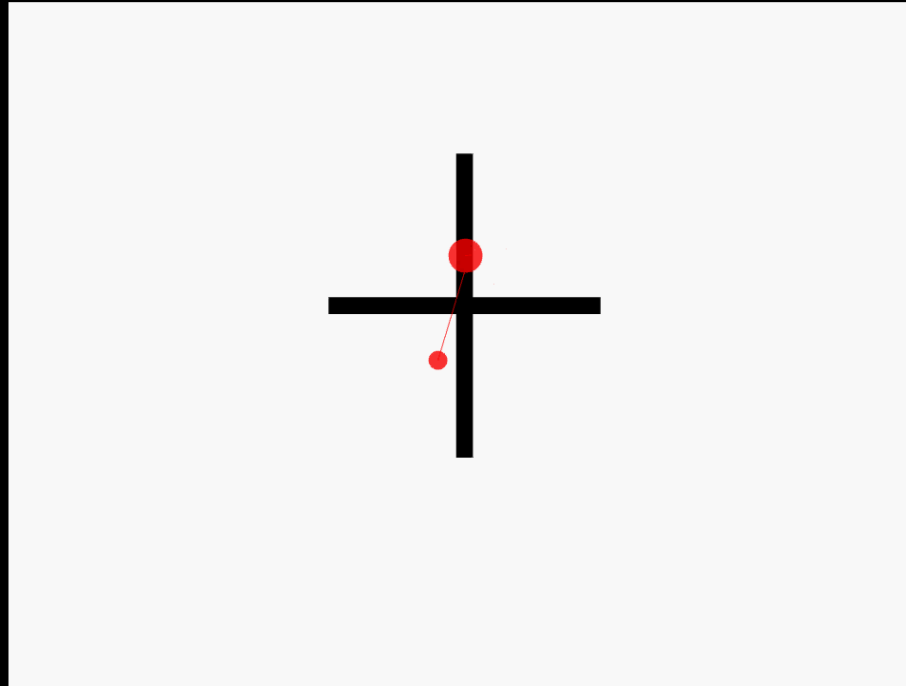


The Eiffel Tower is an iron tower built in 1889 in Paris, France. It was named after its designer, Gustave Eiffel, and is the tallest building in Paris. It was originally supposed to be built in Barcelona, Spain. The entire building weighs about 10,000 tons.

Data Types – Heat Maps



Data Types – Gaze Plots



Data Types – Gaze Plots

1



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GazePlot
Media: Q1.jpg
Time: 00:00:00.000 - 00:00:16.503
Participant filter: p41
Number of participants included: 1/11 (9%)

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Potential Applications in Design Education Research



Representation of 'The Oregon Experiment'

Potential Applications in Design Education Research

Examining Mental Effort

- *Does modelling reduce subsequent effort in design activities?*
- *What is the variance between novices and experts when judging creative work?*
- *Determining the degree of effort students need to exert when engaging with specific tasks or activities*
- *Examining mental effort in creating/organising/assessing a design portfolio*

Eye-Tracking

- *Examining eye movement for user experience design*
- *Examining critical (intriguing, high quality, poor quality etc.) parts of a creative artefact*
- *Investigating assessment behaviour – what do assessors actually examine*
- *Studies of attention – where are students looking during certain activities*
- *Is there a split attention effect in educational tasks*

Emotional Response

- *Pupils also dilate in response to a heightened emotional state and therefore stimulus design and selection is critical*
- *Pupilometry could be used to examine responses to designerly artefact based on an emotional reaction*