

Chapter 10

Exploring Perception, Cognition, and Neural Pathways of Stereo Vision and the Split-Brain Human Computer Interface

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ABSTRACT

This chapter examines research from psychology of perception and cognition as well as select developments in the visual arts that inspired the design of the split-brain user interface developed for the interactive documentary Anita und Clarence in der Hölle: An Opera for Split-Brains in Modular Parts (Garvey, 2002). This experimental interface aims at ‘enhanced’ interaction while creating a new aesthetic experience. This emergent aesthetic might also be described as induced artificial cognitive dissonance and recalls select innovations in the rise of modernism notably the experiments of the Surrealists. The split-brain interface project offers a model for further investigations of human perception, neural processing and cognition through experimentation with the basic principles of stereo and binocular vision. It is conceivable that such an interface could be a design strategy for augmented or virtual reality or even wearable computing. The chapter concludes with a short discussion of potential avenues for further experimentation and development.

INTRODUCTION

Form is henceforth divorced from matter. In fact, matter as a visible object is of no great use any longer, except as the mould on which form is shaped. Give us a few negatives of a thing worth seeing, taken from different points of view, and that is all we want of it. (Oliver Wendell Holmes, 1859)

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The split-brain user interface was first developed for the interactive installation *Anita und Clarence in der Hölle* (trans. “Anita and Clarence in Hell”): *An Opera for Split-Brains in Modular Parts*. This project used documentary video (C-SPAN 1991) from the 1991 Senate Judiciary Committee hearings on the nomination of Judge Clarence Thomas to be Associate Justice of the United States Supreme Court (United States Congress Senate Committee on the Judiciary 1993). During these televised hearings lawyer Anita Hill came forward to testify under oath and accused nominee Clarence Thomas of sexual harassment when she worked under him at the United States Equal Opportunity Employment Commission in Washington, D.C. Thomas vehemently denied these charges as “a high tech lynching.” On October 15, 1991 the full Senate voted 52 to 48 to confirm Thomas as a Justice on the United States Supreme Court.

The split-brain interface presents the testimony of Anita Hill simultaneously with that of Clarence Thomas before the Senate Judiciary Committee. The principle behind a split-brain interface is to deliver two independent video and audio streams separately to each eye and ear so that the content of those streams is experienced or perceived independently and simultaneously by each hemisphere of the brain.

These two diametrically opposed versions of the same events delivered in parallel to each hemisphere of the brain induce a kind of artificial cognitive dissonance. The right and left hemisphere of the viewer hears a different version of the events. The ‘whole’ brain is left to sort out the truth.

The title of the original installation (Garvey 2002), “refers literally to the ordeal of the two main participants. It is a story with tragic characters, a clear conflict and a well-defined beginning, middle and end. In the tradition of grand opera, it is an epic narrative that emerged from the realm of the personal and private to play out on the national televised stage. Against a backdrop of gender, race and class, this drama pits the political forces of the right and left, and a man and a woman, against one another in a lurid spectacle of ‘she said, he said.’” This work was originally developed as a co-production at the Banff New Media Institute in Alberta, Canada (Banff Centre 1999) during a residency and was later part of the exhibition *Sleuthing the Mind* in the fall of 2014 at Pratt Manhattan Gallery in New York City curated by Ellen K. Levy (2014).

The original prototype developed at the Banff Centre required the viewer to wear the Virtual Research Systems Head Mounted Display (1998–2000) to view the digital video. The 2014 installation at the Pratt Manhattan Gallery used the ScreenScope (Stereo Aids, n.d.) handheld mirror stereoscope for viewing the digital video displayed side-by-side on a large flat screen display (Figure 1 shows the ScreenScope and monitor at the Pratt Manhattan Gallery). Normally a stereoscope creates the perception of depth by projecting two slightly different images to each eye. The brain fuses these two images into a single coherent percept (perception) of three dimensions.

When the two eyes receive independent images this is technically known “dichoptic” stimulation (Blake 2005). The split-brain or dichoptic interface uses the ScreenScope viewer so the left eye sees only video of Anita Hill and simultaneously the right eye only sees the video of Clarence. Therefore this video installation included in the *Sleuthing the Mind* exhibit was titled *The Split-Brain (Dichoptic) Interface: Thomas v. Hill* (1999/2014). Through headphones the left ear hears only the testimony of Anita Hill while the right ear hears that of Clarence Thomas (Figures 2 and 3 show a user viewing the installation).

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