Crash Blindness in an Inveterate Apple User: A Case Study

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Abstract

We report a brief case study of Crash Blindness in a long-term user of the Macintosh computers. The patient (LB), an otherwise normal, healthy adult, shows an almost complete blindness to software crashes on Macintosh computers. The degree of the pathology appears to correlate with the version of the operating system. An MRI shows an atypical lesion in the right frontal cortex, which is the only neurological pathology. A comparison is made with other operating systems to show the specificity to the Mac OS. The findings are discussed with respect to theories of software 'Holy Wars'.

Introduction

Ever since the advent of computers, there have arisen several pathologies specific to human-computer interactions. These have led to interesting insights into the human cognitive system. One of the pathologies is a firm attachment to software and hardware that the person himself/herself uses, and extreme criticism of every other system.

Although several recent research articles have shown that different computer hardware and software lead to different trade-offs (see Minsky & Papert, 2005, for an overview), individual users tend to assume that their solutions are the best across the board. This leads to what are popularly known as 'Holy Wars'. From their characteristics, several authors have assumed that the Holy War Phenomenon (HWP) shares underlying neural substrates with similar traits in real life, particularly religious fanatism.

In this paper, we describe a case study of an otherwise normal, healthy adult, LB, who displays a remarkable affection for the Macintosh system. So much so, that LB is

We wish to thank LB for his (sometime unwilling) co-operation in the project.

almost completely unable to detect software crashes in the latest versions of the Mac OS. We present some preliminary behavioral data, and discuss the results in light of possible brain mechanisms.

Methods

Patient

LB is a 45-year-old, right handed male. He holds a Ph.D. in Philosophy of Mind and currently he holds research position in two Universities of repute in continental Europe, and is fluent in several languages. LB's pathology went largely unnoticed, till colleagues observed repeated refusals to address software problems in his laboratory.

Anatomical MR showed an atypical pathology restricted to the right, pre-frontal cortex (Figure 1). However, there appears to be no negative effects on visuo-spatial tasks as well as motor tasks in a standard neuropsychological assessment.

Figure 1. MRI scan showing atypical lesion in right pre-frontal cortex (white arrow)

OS	LB	Control[a]
MS-Dos	98%	97.7%
Windows XP	99.3%	96.2%
Windows 2000	99.7%	98.1%
Red Hat Linux	94%	96.8%
Mac OS 9	85%*	95%
Mac OS 10.1	35%**	98.3%
Mac OS 10.2	12%**	96.7%
Mac OS 10.3	3%**	98.9%
Mac OS 10.4	0%**	97.1%

Table 1: A comparison of LB at 10 healthy adult controls in crash detection in a variety of OS environments. (a: Mean values for 10 controls; $^{*}: p < 0.01$; $^{**}: p < 0.001$)

Behavioral task

The basic behavioral task consisted of LB being subjected to random system crashes in a variety of OSs that the authors got him to work with, ostensibly with an aim to comparing certain target software with comparable versions across all the OSs.[1]

The system crashes were prepared in advance, using assembly routines adapted to the chipsets in the different computers using the previously described Function-Usurping Chip Kit system (Endress & Shukla, 2000), which provides benchmark testing of software crash through careful misprogramming. This ensures that the software crashes are balanced across OSs, and de-correlated from overall system loads, leading to better cross-platform comparisons.

The authors monitored the responses of LB through three concealed cameras. Offline, independent coding was done by the two authors separately. Only data from pre-programmed crashes was analyzed. For each crash, we scored crash detection through the following criteria: (a) overt verbalization (b) facial expressions of disgust, annoyance or anger (c) delayed pause in work mid-flow and (d) system-resetting. These four scores were highly inter-correlated, corrected multiple regression, $r^2 = 0.89, p \leq 0.0001$. Besides, the independent scores from two authors were also highly correlated , $p < 0.001$.

A group of 10 age-matched controls were also tested to provide baseline values.

Results

Table 1 shows the showing software crashes detected in a variety of operating systems.

The results clearly show a marked crash blindness in LB compared to healthy controls. We separately considered false alarm rates (detecting crashes when none were

[1] With the exception of MS-DOS, which does not support GUIs

present) for LB and controls. Based on multiple comparisons and PCA on false alarm data from LB, we were able to detect two major groups: the first consisted of MS-DOS and Windows, while all Mac OSs formed a second group. Overall, false alarm rates for controls was very low, and comparable to LB (which was zero) for the Mac group. In contrast, while the same low rate was observed in controls for the MS-DOS + Windows group, LB showed a significantly enhanced false alarm rate, $p < 0.01$.

We re-analyzed the data, separating the controls based on their own OS preference (3 DOS and Windows users, 4 Linux/Unix users, 3 Mac users), and although there was some trend for each subgroup to detect fewer crashes for their preferred OS, the differences were not significant (all $p > 0.2$). Surprisingly, Linux users showed lower crash detection for both Linux as well as the Mac OS.

Discussion

A long-standing theme in cognitive science is the relation between language and thought (Edward, Ising & Crooks, 1937). Here, we describe an individual whose condition suggest an intricate interplay between perception, thought and tool-use. LB, an inveterate Mac user, shows crash blindness for the Mac Operating system (at least for recent versions), while hallucinating crashes on other, less preferred operating systems. This suggests that LB's predominant pattern of tool use influences his perception of the external world.

Related conditions have been reported previously. For example, Andersen (1837) describes an individual who is unable to notice his nakedness, believing that he was wearing highly elegant clothes. Unfortunately, however, Anderson does not provide details on the neurological and pharmacological condition of his patient. (In fact, it is well known that the oral administration of some readily available substances reduces inhibition towards socially prohibited conditions such as nakedness (Gra, Pa & Soforth, 2005); a toxicological examination would thus have been desirable.) Nevertheless, we believe that his report constitute a case of "nakedness blindness"; just like LB cannot perceive crashes on the Mac OS, affected individual are unable to perceive a certain class of events in their environment in the absence of any other neurological or sensory problems.

The pharmacological mechanisms of nakedness blindness have been investigated by Crowley (approx. 7 dpc, see Pratchett & Gaiman, 1996, for a recent reappraisal). He reports a pair of individuals who are blind to their nakedness; upon oral administration of an apple, their condition improves. In this experimental set-up, a toxicological examination is dispensable, as psychoactive substances were unavailable in the experimental maze (see Pair & d'Ice, approx. 8 dpc, for details). Although Crowley did not examine the affected individuals himself, and other authors cast doubt on the veracity of this research (e.g.,

Nietzsche, 1882/2000), we believe that it is plausible that administration of apples may improve nakedness blindness.

Why then does oral administration of apples reduces nakedness blindness, while prolonged exposure to apple computers furthers crash blindness? One possibility is that apple intake facilitates synaptic transmission in neural populations crucial for detecting important events in the environment; prolonged exposure to apples may drive these populations to permanent saturation, possibly even resulting in the maliform lesion in Figure 1.

Right pre-frontal cortex and 'Holy Wars'? William James, in *The Varieties of Religious Experience* (1902), claimed that a juxtaposition of low level instincts and higher, more profound urges (like self-sacrifice) were the general basis of religious experience. Dramatic examples have been reported from Greece, where a group of patients instrumentalized their instinct to ingest particular liquids to sacrifice their livers as a celebration of a well-known deity. Unfortunately, however, no neurological or neuropsychological assessment is conserved. Recent neuropsychological evidence have linked such behavior to regions in the right pre-frontal cortex (Dewhurst & Beard, 1970, Joseph, 2001; Rampa, 1986; Yong, 2005). It is well known that the frontal and pre-frontal lobes for a bridge between basic instincts (Douglas & Stone, 1992) and social cognition (Gazzaniga, 2004), a link which can be variously altered, leading to a variety of symptoms (see for example, Lennon, 1980; Frutex, 2002).

Interestingly, LB shows a prominent abnormality in the right pre-frontal cortex. While this ties in with the fact that software disputes have been often characterized as 'Holy Wars', his symptoms originated in excessive use of a particular software system, a situation in which external indoctrination is rare. This suggests that LB used intrinsic, unsupervised psychological mechanisms to alter his brain function to optimally suit his preferred pattern of tool use. Indeed, the overt symptoms of fanaticism are quite similar to those developped by LB, and our data provides concrete evidence in support of the hypothesis that the neural origins of religious experience and participating in 'Holy Wars' might be one and the same. The capacity to alter brain function, and to represent the world in particular ways, may convey some ecological advantages in the context of long-lived religious systems because it facilitates believe, but it clearly impaired LBs performance in less stable domains such as software use.

Further research is needed in order to establish the time course of the pathology. Only a better understanding of what leads to a pathological human-computer interaction can help prevent countless innocents from being 'priests' in Holy Wars, or being victims.

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