



Life online: Mouse rage!

**A supplementary study by the Social Issues Research
Centre on behalf of
Rackspace Managed Hosting**

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Introduction

The term 'rage' has become increasingly used by the popular media to describe states of frustration and anger that we experience in our everyday lives. Motorists engage in 'road rage' – characteristically gesticulating and mouthing expletives at the 'ditherers', 'tailgaters' or simply 'moronic' drivers who have committed the cardinal sin of interfering with one's progress along the highway. Airline passengers engage in 'air rage' – stressed out by their cramped seats, surly cabin crew or, perhaps more commonly, by one-too-many G&T's consumed at 39,000 feet.

'Call centre' rage has also become a common, contemporary phenomenon. Most of us have experienced the frustration generated by passionless, automated voices that drone out various options, none of which will solve our problem and invite us to press telephone keys that simply lead to more droning voices and, if you are really unlucky, back to where you started – but thirty minutes later.

In keeping with this pervasive need to define and label things that make us angry, 'web rage' emerged about four years ago following reports such as that of an IT manager who smashed his £2,500 laptop to pieces after a web page had declined to accept his personal details after six attempts.¹ More recently, a participant in an online chat room vented his anger not at his machine but at a fellow member who was thought to be spreading rumours about him. He tracked down his address, travelled 70 miles to his home with a pickaxe handle and a knife and slit his throat – and was subsequently sentenced to 2 years in prison.²

While most of us have more anger management control than was the case in these two headline grabbing examples, we have all undoubtedly been driven at one time or another to mutter insults at computer monitors when web browsers fail to do what we vainly expect them to do, or to go a little cross eyed when faced with a site full of garish animation. Increasingly, more and more people are exposed to these kinds of problem. The Office of National Statistics (ONS) reported earlier this year that 57% of households in Britain (that's 13.9 million homes) can now access the internet. The online retail economy is worth £10 billion per year. More of us are using the internet to access the web for more purposes, more often, from work and shopping, to banking, communication, leisure and learning. Websites and home pages are increasingly our first port of call for information, advice and services of all kinds.

We should remember that the technology which allows the web to function is of human design. Despite the best efforts of designers, 'techies', service providers and web hosts, it can be flawed. The majority of its applications do not live up to the standards of its best examples.

Broadband access, among other things, has made us hostages to instant gratification. Nearly 70% of British homes with internet access have broadband connections.

We want Google-style speed, function and accuracy from *all* the websites we visit, and we want it *now*.

Unfortunately, many websites and their servers cannot deliver this. The result is end-user stress manifested in different ways, resulting in what we have termed 'Mouse rage'.

¹ "Web rage hits the internet." 20th February 2002. Available at BBC news <http://news.bbc.co.uk/1/hi/sci/tech/1829944.stm>

² "Man has throat slit in 'web rage'". 18th October 2006. Available at Times online: <http://www.timesonline.co.uk/article/0,,2-2409469,00.html>

Our first report in this Rackspace Managed Hosting series focused on 'perfect' websites – those that do what they say on the tin, and do it quickly and simply. Users value substance over style. The paragons – BBC, Google, Wikipedia, Amazon, eBay, British Airways – were all seen by the participants in our study as doing this, but they set a high standard. It was when our in-house website evaluators were browsing sites which did not live up to these standards that we started to observe some interesting responses. We had identified the causes, and some of the physical responses: clicking furiously on your mouse, slamming it a few times on your mouse mat, and giving up, and participants verbal commentaries had provided us with some insight into what frustrates a user when visiting a particularly 'bad' website.

What we were interested in was whether we could physiologically measure these observed 'symptoms' of 'Mouse rage', the Information Age equivalent of kicking the cat. We wanted to identify the physiological responses, as a means of answering the question: What is Mouse rage? And in turn in order to suggest some ways to alleviate this emerging ailment of the digital age.

SIRC's approach and research methods

The online website evaluation exercise conducted as part of our research into the 'Perfect Website' provided unexpected additional insights into what frustrates people most about a website and what form their responses take. Intrigued by this, we wired-up a sub-set of 12 participants in order to examine more closely what Mouse Rage is really all about.

Measurements of skin conductivity (GSR), muscle tension (EMG), heart rate (ECG) and various brain waves (EEG) – in particular, Alpha, Beta and Theta – were recorded (see 'Physiological Measures' below). Together, these provided a direct indication of physiological and psychological arousal associated with stress and anger, as well as levels of concentration and relaxation while participants undertook the online 'virtual' website evaluation exercise.

In combination, visual observations of our participants website use, together with their own verbal commentaries and our physiological measurements formed an interesting addition to our original 'Perfect Website' research.

Physiological measures

Various physiological (or biofeedback) measures were taken when our participants were browsing the various websites that we selected for them. These were obtained using a device that receives inputs from a number of strategically placed electrodes and displays the results in real time on a computer screen. One of our researchers can be seen modelling the setup in Figure 1.

Figure 1. Arrangement of electrodes



Two electrodes are placed on the left side chest above and below the heart to provide an electrocardiogram (ECG). The two on the left arm measure muscle tension while the electrodes on the scalp measure the small amounts and frequencies of electrical energy generated by the brain (EEG). The silver ear clips act as reference points.

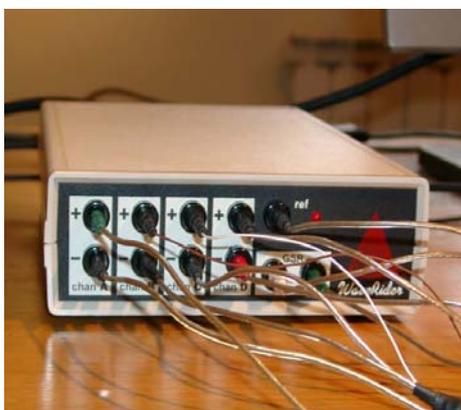
In addition, two electrodes are attached to the fingers of the left hand, as shown in Figure 2. These detect tiny changes in the conductivity of the skin – often known as the Galvanic Skin Response (GSR).

Figure 2. GSR electrodes



The box to which these wires lead is a 'MindPeak WaveRider', shown in Figure 3. The computer, to which the box in turn is connected, can be programmed to emit musical tones as the various measures of heart, muscle, brain etc. rise and fall. By using the feedback this 'music' provides, you can make yourself relax by 'thinking' your heart rate and muscle tension down.

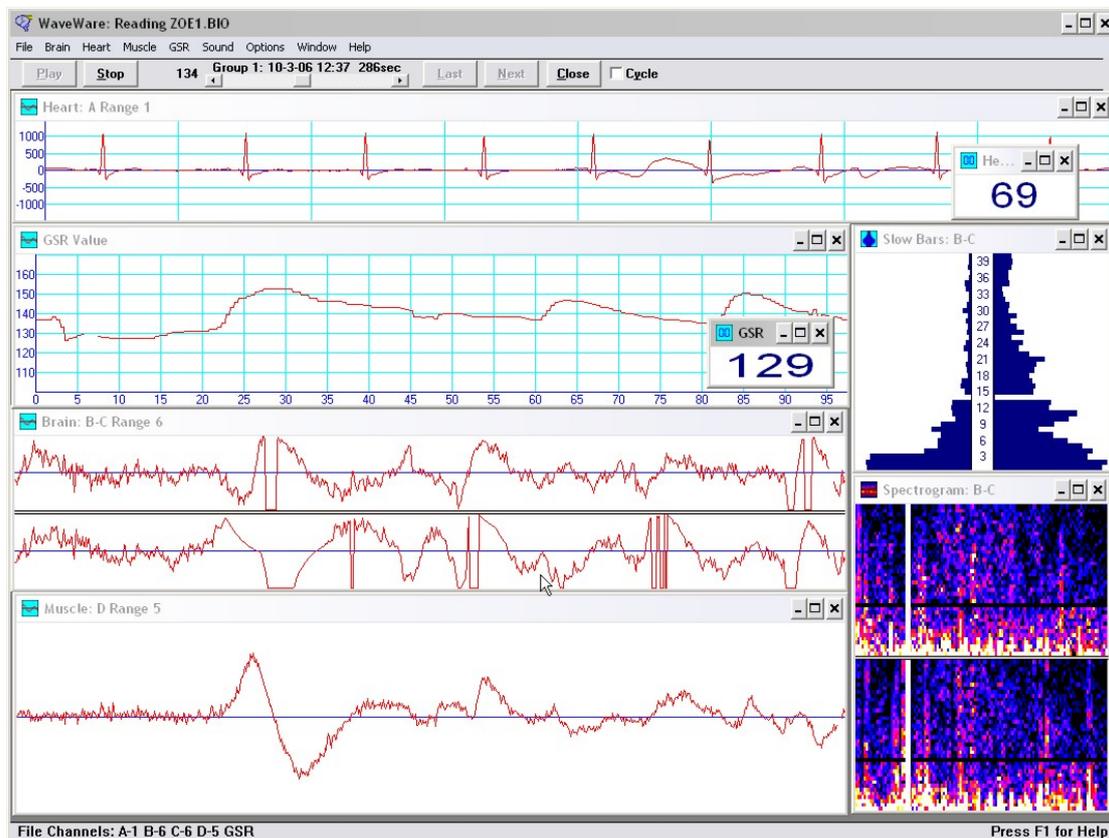
Figure 3. The biofeedback box



We used the MindPeak to establish the levels of stress. To what extent can mouse rage be measured in terms of physiological measures known to be associated with frustration, anger and tension?

Figure 4 below shows a typical configuration for the visual display of physiological measurements.

Figure 4. Visual display of physiological measures.



At the top of the screen is the measure of electrical energy generated by the heart – the ECG. Each of the peaks represents one heart beat. The box superimposed on the right-hand side of this displays the heart rate in beats per minute. In the illustration above the subject is quite relaxed with a perfectly normal heart rate of 69.

Below this are the measures of skin conductivity – GSR. The graph shows how this rises and falls over time while the box displays the current value. There is no such thing as a 'normal' GSR. Everybody varies in terms of the dampness of the skin and, therefore, how easily tiny amounts of electricity are conducted across it. The important thing here is the extent to which the conductivity rises and falls. When frustrated or under pressure the pores of our skin secrete extra amounts of moisture in the form of sweat. As we relax, the skin becomes drier and the GSR decreases.

On the third row of the screen are two measures of 'brain waves' in the form of electroencephalograms (EEG) coming from electrodes placed on the head. In most cases they were attached to the frontal cortex. To the right of these graphs are two other charts showing the distribution of the various electrical frequencies in the brain. The final row consists of a graph showing the amount of tension in the arm muscle – in the illustration above there is very little.

Physiological responses

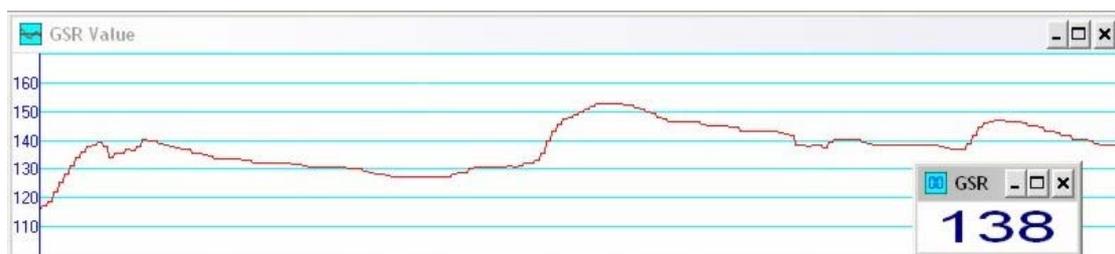
The sub-set (12) of participants wired up to the physiological feedback box, as described previously, provided some evidence of peoples different physiological responses to websites that were frustrating to use. It is well known, of course, that individuals respond differently to stressful situations. Some become very agitated while others retain a more calm and logical approach to dealing with the source of their frustration. This is exactly what we observed from the physiological measures. There were, however, some common themes. When surfing easy-to-navigate sites the indicators of both physiological and psychological stress were relatively low. Galvanic Skin Response (GSR) for example, tended to be at the same rate as before the testing, when participants were encouraged to relax to let the charts on the screen 'settle down'. Heart rates were similarly steady and at the normal 'resting' rate.

The particular brain waves in which we were interested are know as Alpha waves and occur in the brain at a frequency of around 9 to 14 cycles per second (Hz). The waves at the high end of this spectrum (Hi-Alpha) are particularly associated with relaxed attentiveness – just what you need for surfing the web. These too were at reasonably high levels in most participants when browsing the well-designed and easy to use sites.

When the test participants came to the 'problem' sites that we had deliberately chosen as comparisons for the 'Perfect Website' evaluation exercise, things changed quite dramatically in most, but not all, cases. While a few managed to stay calm and simply 'rise above' the problems presented by crazy graphics and slow-loading pages, others showed very distinct signs of stress and anxiety.

Figure 16 shows typical skin (GSR) responses triggered by various attempts to navigate a very badly designed website.

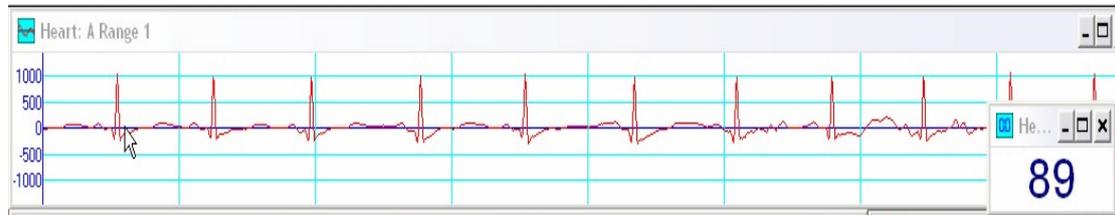
Figure 16. Typical GSR response to difficult website



Here we can see three distinct peaks in GSR – each associated with an irritating feature of a website. The first peak shows a rapid rise in GSR from a level of 118 to over 140. Having been aroused by frustration, GSR tends to take some time to return to its previous level, even though the source of the frustration has been removed. We can see from Figure 16, however, that before it has had time to do this, a new source of frustration has sent it shooting back up to a level of 154. The third peak on the plot, this time in response to a broken link on the website, again sends the GSR level up, but not by so much. Perhaps our participant was getting used to the situation.

Heart rate also increased in most participants when triggered by the same types of frustration. Figure 17 shows a heart beat that has become slightly irregular and significantly faster for a participant who started the exercise with a heart rate of 61.

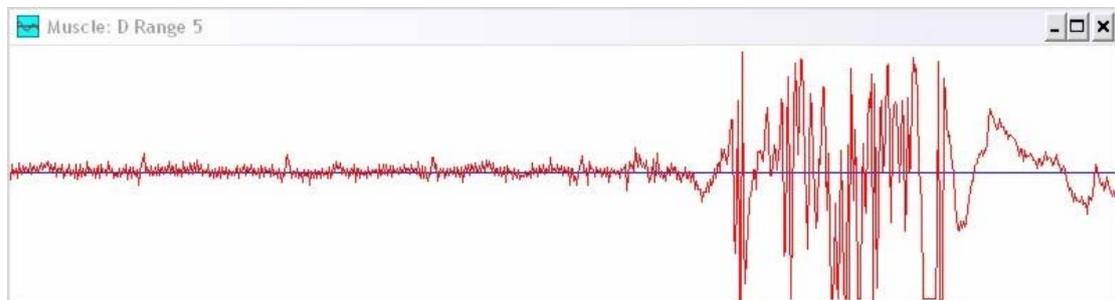
Figure 17. Changes in heart rate in response to frustration



Some changes in muscle tension were quite dramatic when participants were faced with finding specific information from a website that appeared to be designed in such a way that, while important and relevant to the visitor (such as the price of a camera) was almost impossible to find.

Figure 18 below shows a typical example of changes in electrical activity in the muscles – in this case from electrodes attached to the left-hand shoulder. Here we can see towards the right-hand side of the plot a large increase in both the amplitude and frequency of electrical activity. While this was happening the participant's face also tensed visibly, with the teeth clenched together and the muscles around the mouth becoming taught. These are physically uncomfortable situations that reduce concentration and increase feelings of anger.

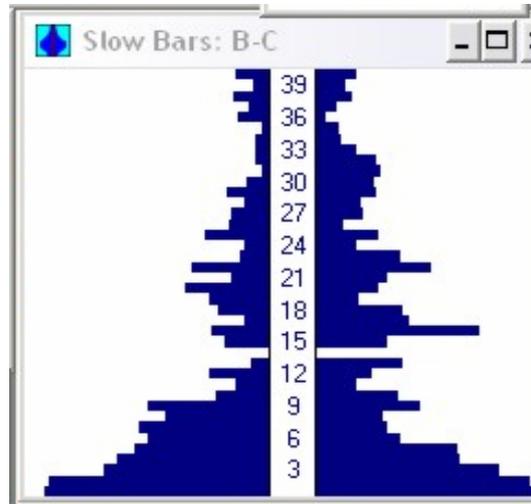
Figure 18. Changes in muscle tension in response to frustration.



This loss of concentration that occurs in frustrating situations was also evident from the signals generated by the electrodes on the scalp. We noted earlier that we were particularly interested in the levels of Alpha waves to indicate how well a participant was both relaxed and concentrating.

We see from Figure 19 that waves in the frequency band 9-14 Hz are relatively lower than other frequencies because they had dropped significantly when encountering a 'problem' website. The frequency around 13-14 Hz – the most important indicator – has disappeared altogether!

Figure 19. EEG responses to frustration.



What we see reflected in these measures is a picture very close to that emerging from both the commentaries and visual observations of participants. 'Mouse rage' is not an abstract concept – it is very real both in terms of how people report their responses to duff websites and in terms of observable changes in the body and the brain.

Summary

This additional research indicates that for the most part 'end-users' are somewhat resigned to the fact that they will encounter some 'bad' websites during the course of their online experiences, and the fact that some will not be as quick / user-friendly / reliable as others. However, as the above results show, web-users do still suffer from varying levels of 'Mouse rage'.³

This has implications for the future of website design, hosting and the necessity of ensuring that 'Mouse rage' triggers are limited as much as possible...

Most usual causes of 'Mouse rage':

- Excessive pop-ups
- Slow to load pages
- Confusing / difficult to navigate layouts
- Unnecessary advertising
- Faulty links

'Mouse rage' physiologically manifested through:⁴

- Increased GSR (sweatiness) responses
- Increased heart rate
- Increased muscle tension
- Drop in high-Alpha – relaxed attentiveness – brain wave functioning
- Tensed facial muscles

³ In our in-house tests, participants persevered with the online 'virtual' website evaluation exercise we set, but many noted that they would have been more likely to give up sooner had they been online at home or work.

⁴ It should be stressed that different people respond to stress and frustration in different ways, physiologically and behaviourally, these 'symptoms' are generalisations.

Possible implications

Websites visited for personal and leisure purposes which are frustrating to use are quite simply likely to lose business and cause some stress, depending on the urgency of the web users request among other things. When faced with a slow to load, non-existent, or difficult to navigate website users are most likely to give up and seek alternatives. High expectations for speed and functionality mean that 'leisure' users will simply chose not to expose themselves to the stress caused by a bad website.

We are told that the 'knowledge economy' is the future. This means that more of us will rely on the internet and websites for our work, exposing ourselves to the best and the worst of the Web during the course of our jobs. While repetitive strain injury (RSI) caused by long hours spent at the computer is one medically proven negative physical side effect of our IT based work lives, what might the future 'health' implications be from 'Mouse rage'?

If we were to apply the results of our sub set of participants physiologically monitored for 'Mouse rage' symptoms, to the hypothetical situation of a worker being exposed to many frustrating websites over an extended period of time, while under the added stress of a pressurised work environment, then the implications for long term physical and mental health could be negative.

Sustained exposure to the kind of heightened stress levels caused by 'Mouse rage' could have negative effects on the immune system, cardio functioning and the nervous system, in the same ways that stress caused by other trigger factors is proven to.

The implications of this picture for employers, web designers and ISPs is to ensure that they take seriously the potential future side effects of 'Mouse rage', both for an individuals physiology and a business's reputation. 'Mouse rage' is a relatively new affliction, and hopefully one that might be nipped in the bud through good design and adherence to 'Perfect website' usability principles which demand sites which are fast, easy, simple and reliable.