

Revamping London Heathrow Airport

With the use of neuroscience knowledge and research tools to better understand consumer responses to their experience and relief identified pain points

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2019-06-13

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Abstract

Taking into account how the brain works, processes and retains information is the difference between traditional marketing and neuromarketing. Today, The focus is on emotional information, experiences that induce more positive emotions and reinforcement of associations made and tied to the brand. Neuromarketing enables the creation of a better customer experience, as it delivers usable and measurable responses to circumstances that are wished to be maximised. Identifying pain points, that cause negative emotional, associative and physiological responses can then be adequately treated and measured for successive implementation of change. To have the greatest impact upon maximising the positive association of stay, problems of highest mutuality among travelers are under observation.

The consumer brain is often very irrational and the underlying processes often unconscious and outside of our control. Thus, Neuromarketing tools can be utilised to improve experiences by exploiting those irrational and unconscious processes. That is why these tools can be very powerful, henceforth require ethical considerations regarding intention.

A typical scenario

Imaginary, follow a common person's journey through the airport to understand why change is needed. Imagining the average traveller is done to maximise the number of people affected by the changes.

The average user is a for leisure travelling individual, middle aged. (Facts and figures | Heathrow . (2019)) It is Friday afternoon and he will be taking the *Piccadilly* tube line to reach the airport like most. This makes his arrival quite easy and predictable. He added a thirty minute buffer to his travel time within the airport as always and bag drop went over quickly as he flies can do that on his own at one of the numerous automated terminals. The stress only really starts at the airport where security check commences. As he flew many times, this may be less stressful for him and he is adequately prepared by having pre-sealed all his liquids. The queue though is much longer than he anticipated, which made sense as he realises that the next Monday is a bank holiday, which is why there are much more travelers. As he gets out the other side, rather late for his flight, not being able anymore to get a quick snack as planned, he realises that he didn't put in his contacts this morning and left his backup glasses in his luggage. Not being able to identify where he needs to go without coming really close to the info panels or signs illustrating the directions, he loses a lot of time, which induces quite a bit of stress. He never flies Heathrow, always Gatwick, which is why he doesn't know the layout. For five minutes he walks into the wrong direction because he read the wrong gate number as a result of slipping the line, which now makes him anxious as soon as he realises, because now the time it takes to get to his gate is unclear. He begins to steadily increase his pace just to make it half wet of sweat to the gate, which hasn't even opened for boarding, because it is delayed, which he didn't realise in all his efforts.

Pain Points & Problems

Improving the customers journey going through Heathrow airport can be done by minimising factors that induce pain during the stay. These problems can be identified with and treated utilising neuromarketing tools to create intangible but measurable value. Another good way of identifying problems, is to consider negative associations of past experiences. To make decisions about how to treat the pain the root cause needs to be identified, which caused the experience to be associated negatively.

Measuring these pain points and the effectiveness of the proposed solutions should be done using neuromarketing tools instead of traditional tools due to inference, biases and other attributed problems such as “*strategic answering*” or *faulty introspection*”. Verification of results should be done using combinations of implicit measurements of neuromarketing tools to strengthen a thesis about the cause of a physiological response. The physiological response(s) such as facial coding, wording or galvanic skin response can have multiple sources of origin, thus it is desired to proof that every other theory of source of origin seems so unreasonable to as the thesis is only sensible to accept.

Stress

Given that Heathrow is the UK’s busiest airport by passenger traffic, one of the most relevant pains during the stay is stress. Stress is an emotion. It is stimulus related and triggers bodily/physiological responses. Thus, it has measurable values that can be observed for severity. Stress itself though, is not a root-cause that can be treated by itself, it is a symptom, merely a cause of a perceived stimuli.

Time pressure Time pressure is probably the most dominant stressor for travellers. Beginning at the trip planning process, increasing as the journey to the airplane progresses and declining as soon as in the seat, if not anxious of flying. This stressor is only relevant to Heathrow airport, if it can effectively contribute to reducing the stress and/or identify circumstances in which the airport design may be a contributing factors towards stress. Adrenaline is the neurotransmitter contributed to stress regulation, thus its presence should be minimised during the travel through or stay at the airport. The major contribution towards time pressure originating from airports come from *travel time* and *ease of navigation*. Travel time in itself can mostly be predicted given that transport is achieved via train, but also includes situations where the variable traveller count at the airport could significantly increase time taken at security control or passport inspection (e.g. Christmas).

Travel Time’s catalysing effect on time-pressure and consequently stress can be reduced by reducing its variability, meaning steadier progression throughout the airport. This also includes queueing and its significant stress effects due to its unpredictability. The unpredictability seems to be the root-cause for time-pressure based travel time stress. The perception of why stress increases so much, is because we see many people in a queue, don’t know how long it will exactly take and whether the unpredictable hold up causes us to miss the flight. The reason of why on the other hand, is that we have no control over the situation and are thus subject to other people’s capabilities, who we not trust due to not knowing them.

Ease of navigation on the other hand is much more variable and includes how

easy it is for travellers to navigate the airport, not regarding finding information on where to go, but optimising the physical design to ease navigation, the layout. The *parietal lobe* is relevant for the ease of navigation due to it being responsible for spatial processing and navigation based on input from the occipital lobe, which processes visual stimuli. The temporal lobe adds visual recognition via memory access ability to the capabilities. These three brain regions in conjunction allow the recognition of spatial patterns and use system one's speed of pattern recognition and *environment scanning*. Bringing the process of recognising pathways and destinations closer to an easier, more automatic and system 1 heavy type, greatly increases ease of navigation and consequently reduces stress.

Top-down attention success Top-down attention success describes the rate of success of finding information that is being looked for within a given stimuli. Compared to bottom-up attention, which aims at analysing what draws attention within a stimuli, it is essential to know whether information important to the traveller is easy to be found. It happens much too often that stimuli that strongly draw attention avert the collection of relevant information. With advertising and information having to share the same physical space, it is as well too often seen that what is relevant is lost in *a sea of information*. Have a look at the following pictures, depicting two designs for the winner card, of the 2017 *Oscar's*.



(a) The old and terribly bad Oscars winner card design
(b) The revamped Oscars winner card design

Figure 1: A comparison between the visual presentation on a Oscars winner card

As easily to identify, the revamped design only changes that there is a greater emphasis on the essential information, the category of the Oscar to be received. This subtle change could now be given value after having measured the implicit factors with the new version and compared it to the old design. The *pain* is

measurable and thus the relief of it thanks to a less negative experience is the change's intrinsic value. Above example is often seen in real life, where advertising and commercial information display like merchandising is more dominant and intentionally so than to the traveller relevant. Often this can be seen by relevant and commercial information sharing the same *space*, such as a wall or being in close proximity to each other. Such placement/positioning confuses and creates importance for unimportant stimuli, simply because they're positioned close to relevant information.

Information, panels & signs In contrast to the above mentioned top-down attention success, this is different in the sense of how the actual information is presented, in isolation of sorts. The problem with those signs is that they are super hard to read and cram too much information onto small space, so that utilisation of white-space, size and form become useless. For Heathrow, a typical *departures* info panel would look like this:



Figure 2: London Heathrow info panel

Tiny typography, repetitive patterns and little use of iconography do not ease the absorption of relevant information. The Dorsal stream is, utilising the occipital lobe, responsible for visual processing cannot grasp visual stimulation as easy as it could be. Making the absorption of important information a less system two intensive process reduces stress immensely. Important information such as warnings or urgent announcements are normally only distributed via

spoken announcements, those impaired or unaware may miss very much relevant information.

Proposed Solutions

Stress

Traditional methods would likely to be surveying past travellers about their experience and associated stress, which is not a good measure, given that we know about inference, socially desirable and strategic answering. The proper way to conduct research about actual stress levels rising during the progression through the airport are *hypothalamus*' activated physiological body responses, such as galvanic skin response, heart-rate changes, pupil dilation or similar. These reactions are triggered unconsciously and cannot easily be controlled consciously and are thus the best option for measuring stress values.

There are many ways to reduce stress and the main focus is on by the airport created and at the airport experienced stress, but general stress reduction methods can support such undertaking. *GABA* neurotransmitter release induces calmness, counteracting stress's *adrenaline* effects. Many unrelated measures such as reducing sound or increase natural presence (plants, greenery) to reduce stimulation and thus stimuli to interpret for the brain, will increase the positive emotional association with the airport.

Travel Time As most arrival originates from public transport and is thus quite predictable, the focus is on reducing the travel time and stress induced during it for a better experience.

If we again consider above mentioned *typical scenario*, improving these symptoms can either be done by taking away the *ambiguity* of duration, automation (electronic passport control is a great start) and/or giving the traveller the feeling of maintaining control. Having **more frequent, but less dense** security checks, allow the traveller to choose more freely based on self-perceived/predicted time of duration at each point of entry. Ambiguity of duration can be reduced by implementing AI to predict duration and digital technology to **distribute duration estimates**. In a concrete sense, this could be implemented by having a webpage or app section in which the estimated time for each queuing point is visible before arrival at the airport, so that the feeling of choice is induced. This doesn't actually improve security checks, but minimises the stress experienced during these elements of the airport.

Ease of navigation The spatial layout and design of the airport is incredibly important for the factors stress and positive experience. Optimising the layout should go in hand with a redesign of information visualisation and commercial

space utilisation, not only reducing stress in navigating, but also increasing recognisability and distinct separation of relevant information, design and marketing. Concretely, this idea is to be realised by integrating more open design, so that pathways seem less hidden or adapting angles of corners so that they are easily to gaze through to find a destination/path in question easier. Personally, I guess a recurring radial-centric design would result in a much better layout for the airport than a procedural addition of rectangles forming a structure.

Top-down attention success Giving travellers the information they need when, they need it is probably one of the most important jobs of the airport. The premise is distinct separation of relevant and irrelevant information, where relevant information is following constant design rules to be easily recognised and held apart from marketing content. The job is to improve the experience of the overall stay at the airport, not the optimisation of sales of within positioned commercial facilities.

Eye tracking can be used to validate effectiveness of improvements made to the design of the space and whether the traveller can find what he wants. Time to first fixation, and gaze can be used for knowing how long and at what a traveller looks at and whether the distinction between relevant and irrelevant information is close to instantaneous.

Information, panels & signs Above mentioned information distribution at airports is generally very poor and channels need to be increased to effectively create a better experience, by taking away the stress of the traveller, that he might miss an announcement, may not be up-to-date with his flight information or ambiguity of travel time.

The below shows the proposed alterations to existing information panels throughout the airport by improving upon ease of recognition of relevant information.

As also shown in the illustration itself, several aspects have been changed to ease the recognition of relevant information. Knowledge from what draws attention, acquired from bottom-down attention eye tracking on airport grounds and information panels, has been used to optimise placement and presentation of relevant information as there were disparities between what draws attention and what is relevant.

Again, Eye tracking software can be used to measure the differences in gaze, time to fixations and recurring fixations to evaluate the changes' effectiveness. Galvanic skin response can also be used this time, as the changes experienced can be easily tracked to the changes made and ambiguity about causality of the changes in bodily responses can be minimised.

The changes could start at delivering informative announcements directly to traveller's phones instead of only announcing them auditive. Predictions made

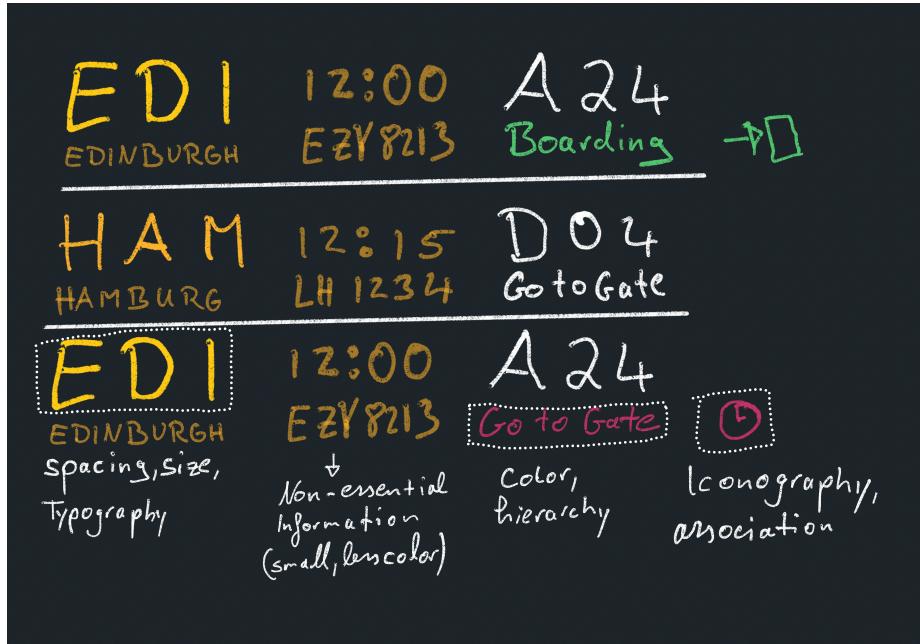


Figure 3: Proposed info panel design changes

by AI can be used to estimate time estimates for queues and other travel aspects, such as people at a given machine or checkpoint.

The airport could use **augmented reality** to better view the information above mentioned, extremely increasing the amount of relevant content for the user, if so programmed to. This could concretely be implemented by a companion app that overlays the path to the gate over the camera view of the smartphone. To better envision what is meant, below placed is a view of Google Maps Augmented Reality Mode, that does just the above described.

Exact tracking of travellers can be done using Bluetooth beacons and improved *pathfinding* and *around-me* recommendations can be made. A lot of stress is induced by the traveller not knowing whether the plane is still ready for boarding or if the doors already closed. Live and real time communication between the travellers and airport systems could provide a much better experience for the traveller, while simultaneously increasing insight about what is going on within the airport, as security issues are a prominent stressor for some airports, especially in this time of age. The traveller could receive real time updates about his flight, when it landed, when boarding opens, where the gate is, how long until boarding opens, how long until takeoff or even if there are many people already at the gate waiting to enter the plane. The private information of the user doesn't need to be known, which is important, but all mentioned features are available without it, the proximity to the beacon doesn't reveal any information

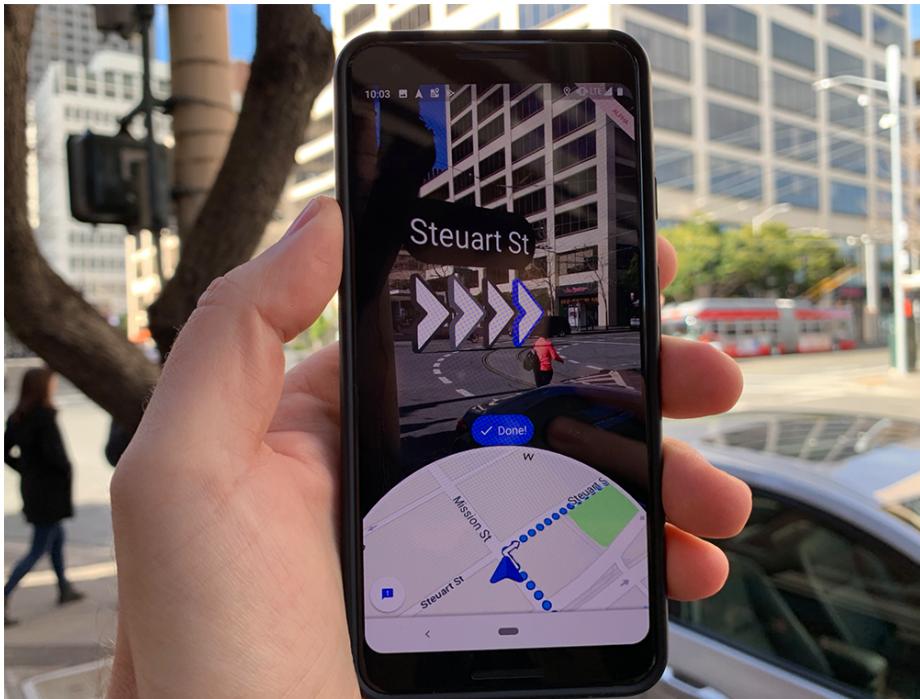


Figure 4: Google Maps AR Mode

other than device details.

Conclusion

There are many ways to improve the stay at an airport. The proposed solutions made are based upon the fact of having minimal interference with ongoing business, offering *neuromarketing* measurable and impactful changes, while improving on shortcomings of the existing airport rather than coming up with a completely new structure.

Traditional tools cannot be used for effective and knowingly unbiased emotional analysis regarding associations to London Heathrow Airport, thus *neuromarketing* tools are used on identified *pain points*, problem situations that have similar root-causes, that can be measured in response via mentioned tools.

The common pain for many travellers is *stress* and has thus become subject of major focus. *Neuromarketing* tools can measure changes in stress responses via physiological responses such as heart-rate, pupil dilation or galvanic skin response. These unconsciously occurring bodily reactions are the reason why the experience of the stay at Heathrow airport can be optimised by changing small aspects instead of the whole thing.

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