



PORSCHE



Porsche's uncommon effect on the brain

A neuro scientific research on the addicting aspects of driving a
Porsche

1.0 The motive

Porsche claims to produce special cars for extraordinary people. This approach is successful because Porsche drivers turn out to be extremely faithful to 'their' brand. This brand loyalty raises a question: Is driving a Porsche addictive? In order to answer this question, Porsche asked neuromarketing research agency Neurensics to investigate whether seeing yourself driving a Porsche raises the same brain activity as seeing other – better known- addictive products.

2.0 Research summary

Is driving a Porsche addictive? No, that is not a conclusion we can make. Like so many things in science, the truth is a bit more complicated. The brain activity generated by Porsche does not look like the brain activity of addictive stimuli. However, Porsche does look more like addiction than the average car on one important dimension. Porsche is more similar to addiction than the average car when it comes to the anticipated reward of addiction (the Neurensics 'Expectation' mapper). Previous research has shown that stimuli that arouse this signal are potentially addictive. However, our research also shows that potentially addictive stimuli raise negative emotions (the 'Danger' mapper). The results show that Porsche looks less like the danger associated with addiction. It seems like a Porsche is assessed more positively than an addiction. All in all, we can conclude that Porsche has an unique effect on our brain compared to other car brands.

3.0 The Research

In this neuro scientific research Neurensics used the functional MRI scanner, which is situated in the Spinoza Center of the University of Amsterdam. Professor in Cognitive Neuroscience Prof. Dr. Victor Lamme supervised the research that focused on the impact of a Porsche on the brain of a Porsche driver. The brain activity of 21 participants was measured while they looked at short video clips of a Porsche and 3 cars of other brands. This activity was compared to the brain activity that is measured when looking at addictive stimuli, chocolate, speed and neutral stimuli.

Only 5% of all our thoughts are conscious. This means that the majority of our thoughts are subconscious. And it turns out that those subconscious thoughts, associations and emotions determine our behaviour. Traditional ways of research, where the consumer is asked questions, are in this case insufficient. Brain scanning techniques offer the solution: We are able to look directly into the consumers brain and measure their conscious and subconscious thoughts.

The big advantage that measuring brain activity brings us, is that it lets us predict behaviour more accurately. Studies are known that predict whether people will gain or lose weight (Demos, Heatherton, & Kelley, 2012) or whether people will persevere to quite smoking (Falk, Berkman, & Lieberman, 2012). But it can also be used to predict consumer behaviour. With a MRI scanner we can predict whether a song will become a hit (Berns, & Moore, 2012), and whether people will buy a product (Knutson, Rick, Wirmmer, Prelec, & Loewenstein, 2007).

With functional Magnetic Resonance Imaging (fMRI) it becomes possible to visualize brain activity in a three-dimensional image. Increased activity in an area in the brain causes a stronger blood flow in this particular area. A fMRI detector detects the difference between blood that is rich in oxygen and blood

that is low in oxygen. This enables us to create an image of an active brain. So, the fMRI method allows us to see which areas of the brain are activated while watching or listening to a stimulus.

Research agency Neurensics uses a MRI scanner to analyse the brain activity in 13 specific neural patterns (see Fig. 1). This is conducted along Neurensics' 3D Brain Rating, a method that measures four different dimensions: positive and negative emotions, engagement and impact dimensions. These 13 emotions and conscious and subconscious thoughts are measured along a pattern of activity throughout the whole brain. The dimensions are calibrated in previous studies, by showing stimuli that are known to generate certain emotions or thoughts and measuring the subsequent brain activity. These patterns of brain activity are used in this study in order to investigate whether the clips that are shown (Porsche, average car, addictive stimuli, chocolate, speed and neutral stimuli) generate the same patterns of activity in the brain.



Fig. 1: The 13 dimensions of Neurensics' 3D Brain Rating.

3.1 The main questions

Porsche knows that their drivers are extraordinary people who choose their car for different reasons than the average car buyer. Porsche drivers are often loyal to their brand. This raises the question: Is driving a Porsche addictive? In order to answer this question a fMRI research is conducted, where the brain activity of 21 Porsche drivers is analysed.

The following questions will be answered using the brain activity of the participants:

- 1) Does a Porsche generate feelings of addiction?
- 2) Is a Porsche similar to the feeling chocolate generates?
- 3) Is a Porsche similar to the feeling speed generates?

3.2 Method

The research takes place in the fMRI scanner of the Spinoza Center of the University of Amsterdam. The participants in the research are 21 Porsche drivers. The decision to solely use Porsche drivers has been made because this target group has experience in driving a Porsche and therefore is more likely to show a measurable effect of addiction. People who never have driven in a Porsche are not familiar with the feeling and therefore probably will not show feelings of addiction. This can be compared to watching video clips of people smoking cigarettes. These clips will arouse feelings of addiction with smokers, but a feeling of addiction will not be present for someone who has never smoked a cigarette (McBride, Barrett, Kelly, Aw & Dagher (2006).

In this research, the Porsche drivers are put in the MRI scanner for half an hour. They get to see a total of 20 short 10-second video clips showing a Porsche, a Volkswagen, a Volvo and a Skoda. Footage of the Porsche shot from the outside and from the inside of the car is combined. A man gets into the Porsche, starts the car, accelerates, drives over a road and takes a turn. The same events are used in the footage of the 3 other car brands (Volkswagen, Volvo and Skoda) so that the type of car is the only difference in the clips. The footage is shot in a first person view in order to optimally imitate the experience of driving a car. The 3 other car brands are combined in the analysis as 1 group: The average car.

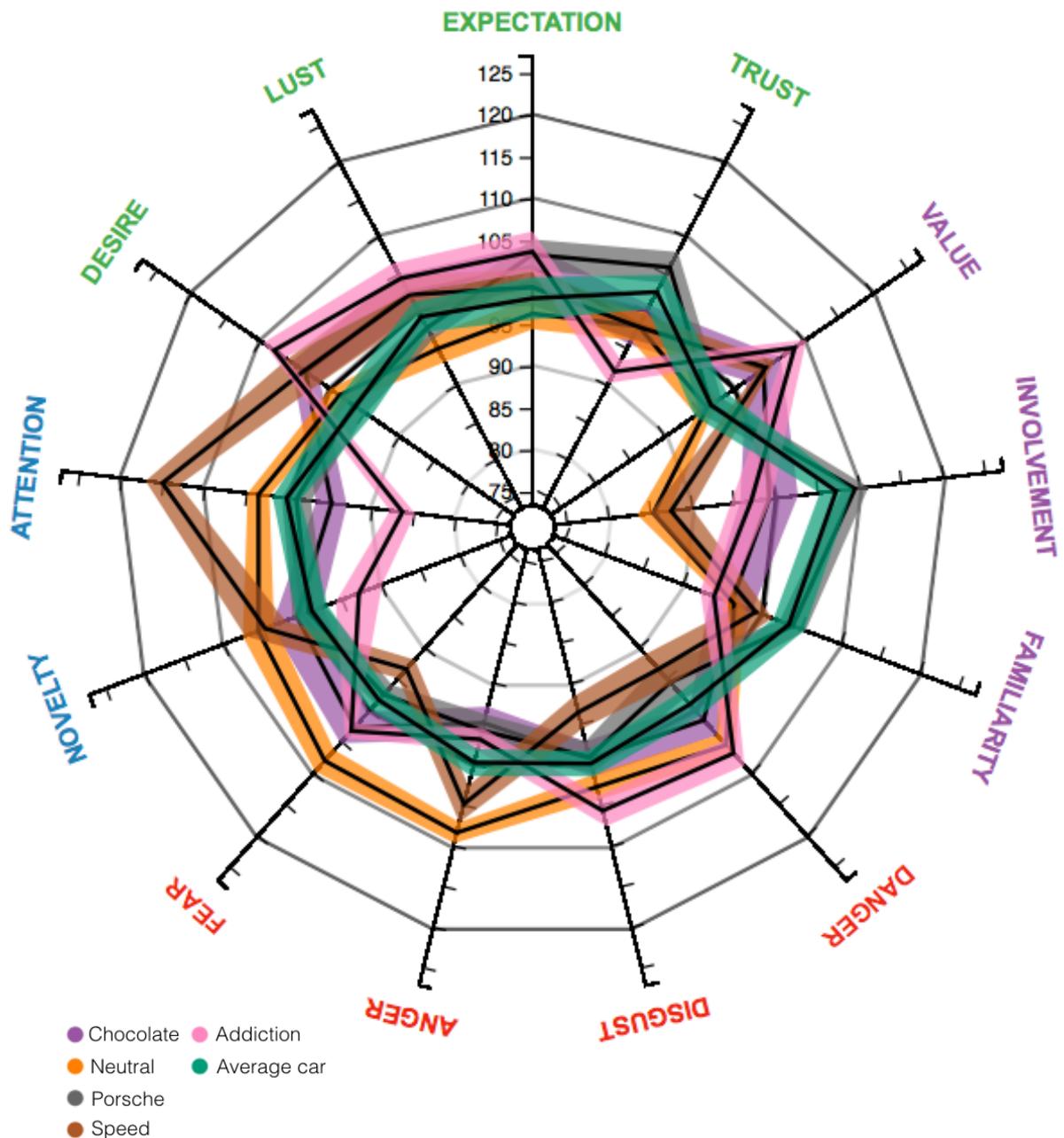
In order to research whether and to what degree Porsche and the average car are addictive, the clips of the cars are compared to 5 short 10-second clips of addictive stimuli: coffee, beer/wine, flirting, erotic images and smartphone usage. These 3 categories (Porsche, the average car and addictive stimuli) will be compared to each other on the 13 dimensions of the 3D Brain Rating method.

In addition to the comparison of Porsche and the average car with addiction, we will also compare the cars to 2 other categories: Chocolate and speed. Once again, we will use 5 10-second clips for both categories. Chocolate is shown in different clips with close ups of melted chocolate and pieces of chocolate. In the category speed we show clips of: a rollercoaster, motor cross, skiing, snowboarding and a wing suit.

In order to define the 3 categories addiction, chocolate and speed, we use a contrast category. This category contains 10 second clips of boring events: doing the dishes, grocery shopping, vacuuming, putting on glasses, reading, using a pen, standing on an escalator and writing on a piece of paper.

4.0 Results

4.1 the effect of Porsche on 13 brain dimensions



Graph 1: reactions to the different categories of clips.

Graph 1 shows that the different categories of clips arouse different patterns of brain activity. Each point in in each line represents a response in a specific network in the brain (a mapper, like 'Trust' or 'Disgust'). The activity in this network is established by a complex entirety of processes, which are strongly related to for example the emotional appreciation that the brain attaches to the stimuli. In the case of the 'Expectation' mapper, our own research combined with other research shows that this activity strongly correlates with the expectation of a reward.

Every stimulus category arouses different patterns of activity. In some cases, these patterns look very alike, in other cases they are quite different from each other. In order to quantify this similarity we performed a correlation analysis (see Table 1.) An analysis with a number of $r = 1$ means that two categories are exactly similar to each other. A number of $r = -1$ means that two categories are exactly 'reversed'. Table 1 shows a strong correlation for two categories: Seeing potentially addictive stimuli (coffee, alcohol, erotica or the smartphone) arouses more or less the same activity as seeing images of another often addictive product: chocolate ($r=0.80$). The table also shows that seeing a Porsche is comparable to seeing another car ($r = 0.83$), which is not surprising because of the strong similarity in the stimuli in the overall experience. However, there are some important differences that we will discuss next.

The most important correlation for our main question is the similarity between seeing addictive stimuli and seeing a Porsche and compare this to seeing an average car. This correlation is negative ($r = -0.45$), which means that the brain activity of seeing a Porsche does not look like seeing addictive products. However, we can also see that this correlation is less negative than the correlation between driving an average car and seeing addictive products ($r = -0.55$). These results could implicate that driving a Porsche does have more potentially addictive components than driving a regular car. We will elaborate on this in the next paragraph.

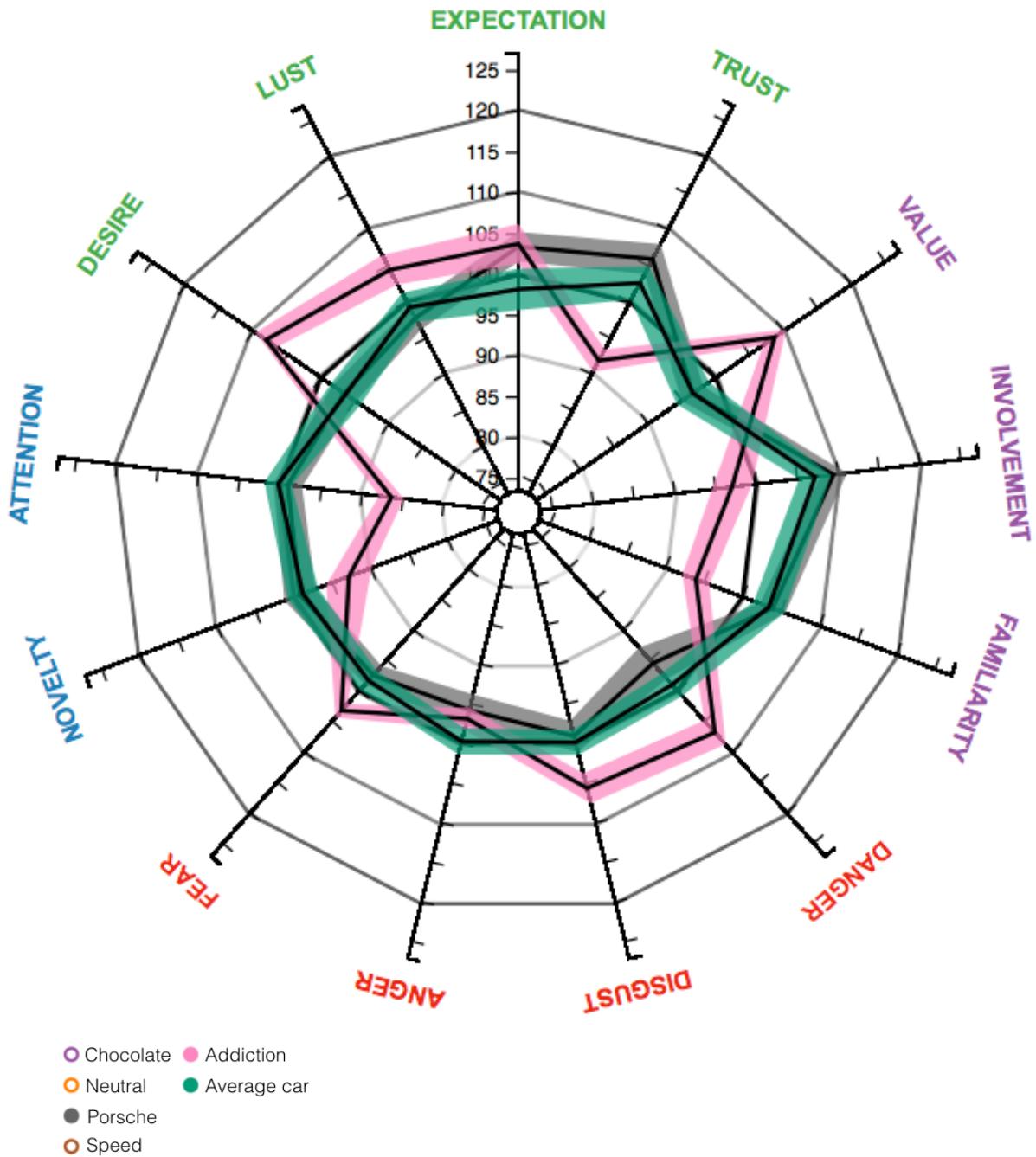
	Neutral	Average car	Porsche	Speed	Chocolate	Addiction
Neutral	---	-.53	-.70	.31	-.16	-.06
Average car	-.53	---	.83	-.45	-.56	-.55
Porsche	-.70	.83	---	-.42	-.28	-.45
Speed	.31	-.45	-.42	---	-.24	-.36
Chocolate	-.16	-.56	-.28	-.24	---	.80
Addiction	-.06	-.55	-.45	-.36	.80	---

Table 1: Correlations between the cars, speed, chocolate, neutral and addictive stimuli.

4.2 The difference between Porsche and another car

Out of all the 13 dimensions there are 2 that show a significant difference between Porsche and an average car: Expectation (anticipated reward) and Danger (hazard of threat) (see Graph 2.). The results on the mapper 'Expectation' is especially important because this mapper combines (among other things) the activity of the areas like the Anterior Cingulate Cortex and the Nucleus Accumbens (see Fig. 2). Previous research has shown that activity in these areas of the brain is strongly related to seeing addictive stimuli or even with having an addiction (McBride, Barrett, Kelly, Aw & Dagher, 2006; Pontieri, Tanda, Orzi & Chiara, 1996).

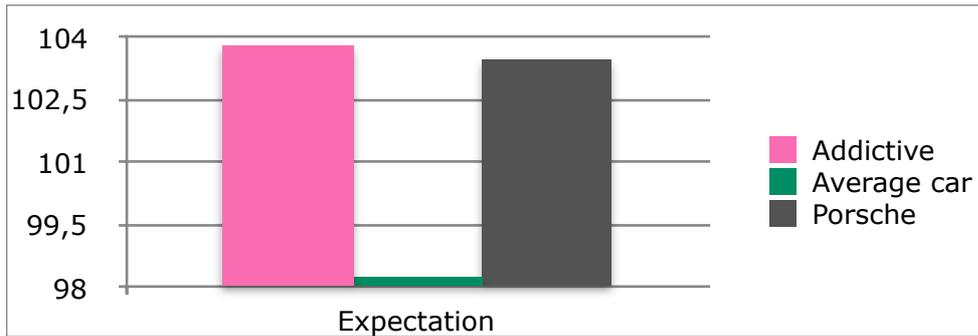
Further explanation on these results can be found in the bar chart of Graph 3. This chart shows the scores of the categories addiction, average car and Porsche on the mapper 'Expectation'. There is a clear significant difference ($p < 0.05$) between the average car and a Porsche. On the mapper 'Expectation' we can see that Porsche is more similar to the addictive stimuli than the average car is to the addictive stimuli.



Graph 2: Porsche, Average car and Addiction on the 13 dimensions.

4.3 Expectation

The results of the scores of addiction, an average car and Porsche on Expectation are shown in Graph 3. There is a significant difference ($p < 0.05$) between the average car and Porsche. Porsche looks more like addictive stimuli than the average car when it comes to Expectation.



Graph 3: Scores of Porsche, addiction and average car on Expectation.

These results imply that a Porsche looks more like an addiction than an average car for Expectation or the anticipated reward. As said before, every dimension is a pattern of activity throughout the whole brain. However, expectation is mainly visible in the Nuclues Accumbens, an important pleasure centre. Figure 2 shows this pattern of activity of the dimension Expectation. The yellow circle marks the Nucleus Accumbens.

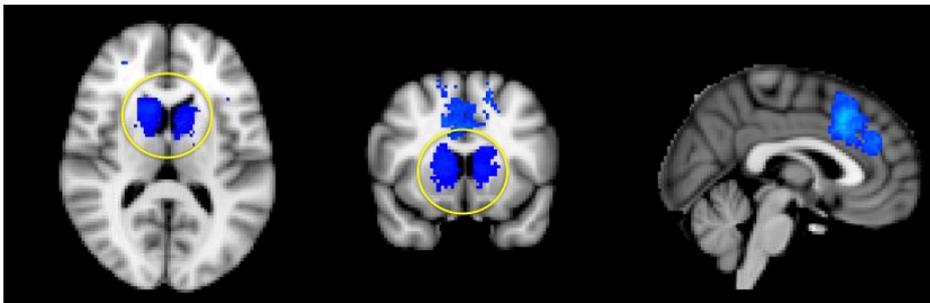


Fig. 2: The brain pattern of expectation. The yellow circle marks the Nucleus Accumbens.

4.4 Danger

The other dimension that showed a significant difference is 'Danger', or hazard, threat. Graph 4 shows that an average car is significantly ($p < 0.05$) more similar to the Danger associated to addiction than Porsche. In other words: Porsche has less features of the negative associations of an addiction than the average car.



Graph 4: Scores of Porsche, addiction and the average car on Danger.

Figure 3 depicts the brain pattern of Danger. This feeling is mostly visible in the Amygdala, marked by the yellow circle.

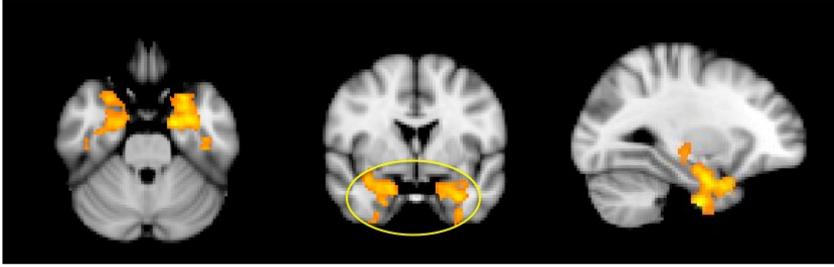


Fig. 3: The brain pattern of Danger. The yellow circle marks the Amygdala.

4.5 Similarity to chocolate

Apart from addiction, the cars were also compared to 2 other categories: chocolate and speed. Chocolate is a stimulus that generates feelings of addiction for most people. The results back this up with the strong positive correlation that we found between addictive stimuli and chocolate. Table 1 shows that there is no positive correlation between chocolate and Porsche and chocolate and the average car. When we looked at the 13 independent dimensions we did not see any significant differences between a Porsche and an average car on the category chocolate.

4.6 Similarity to speed

Lastly, Porsche was compared to the average car on the category of speed. Once again, Table 1 shows that Porsche and the average car have no positive correlation with speed. We also found no significant differences between Porsche and an average car on their similarity to speed on the 13 different dimensions.

5.0 Conclusion

In this research we investigated whether the feelings that are aroused by a Porsche can be compared to the feeling that are aroused by addiction. For this purpose we looked for the answers on 3 research questions: 'Does a Porsche generate feelings of addiction?', 'Is a Porsche similar to the feeling chocolate generates?' and 'Is a Porsche similar to the feeling speed generates?'

The results show that the brain activity generated by Porsche does not look like the brain activity generated by the addictive stimuli. But, Porsche does look more like addiction than the average car on one important feature: Porsche is more similar to addiction than the average car when it comes to the anticipated reward (Expectation) of addiction. Despite this similarity Porsche is not quite the same as addiction. This becomes more clear when you look at the results on the dimension of Danger. These results show that Porsche looks less like the danger associated with addiction than the average car. The other two research questions are to be answered negatively. The feelings that are generated by watching a Porsche are not similar to the feelings chocolate generates. Furthermore, the feelings that are generated by speed stimuli do not look like the feelings of driving a Porsche.

When we compare driving a Porsche to driving other cars, it has become clear that the anticipation of driving a Porsche generates a positive feeling in the brain. The positive feeling that is generated by the footage of the Porsche is mainly visible in the area of the brain called the Nucleus Accumbens. This

area is an important pleasure centre of the brain. Good music, tasty food, sex (Holmes & Fam, 2013) and apparently also images of a Porsche trigger and activate these brain structures. At the same time, Porsche causes less activation of negative associations of addiction than the average car. This can be seen in the Amygdala. In conclusion, it is safe to say that a Porsche has a unique effect on our brain.

6.0 References

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