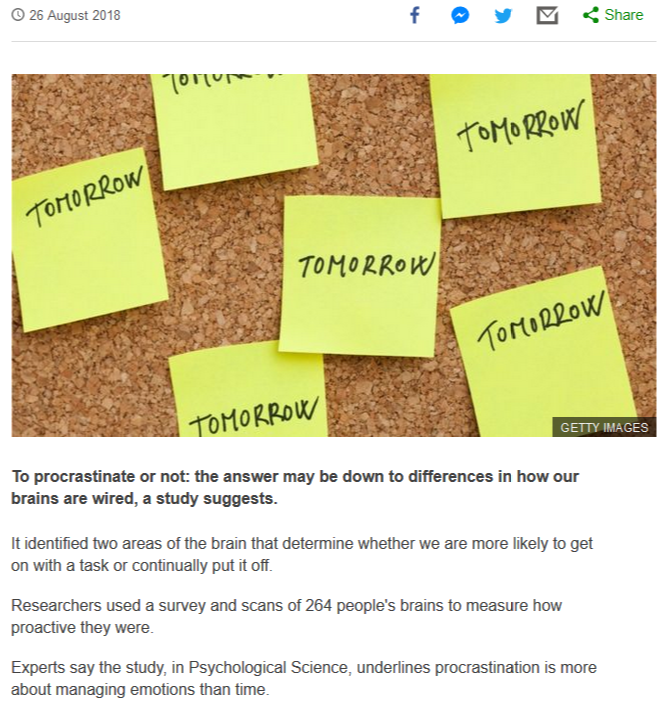
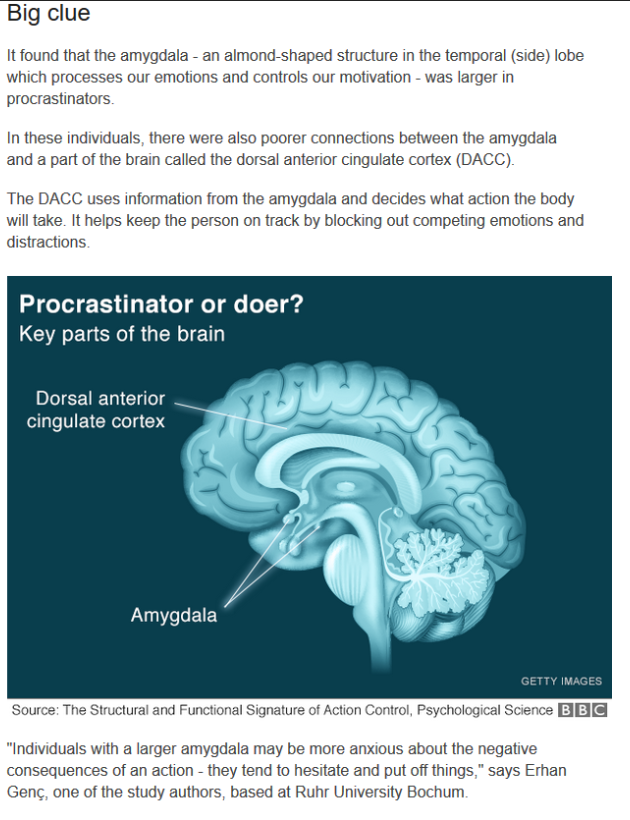
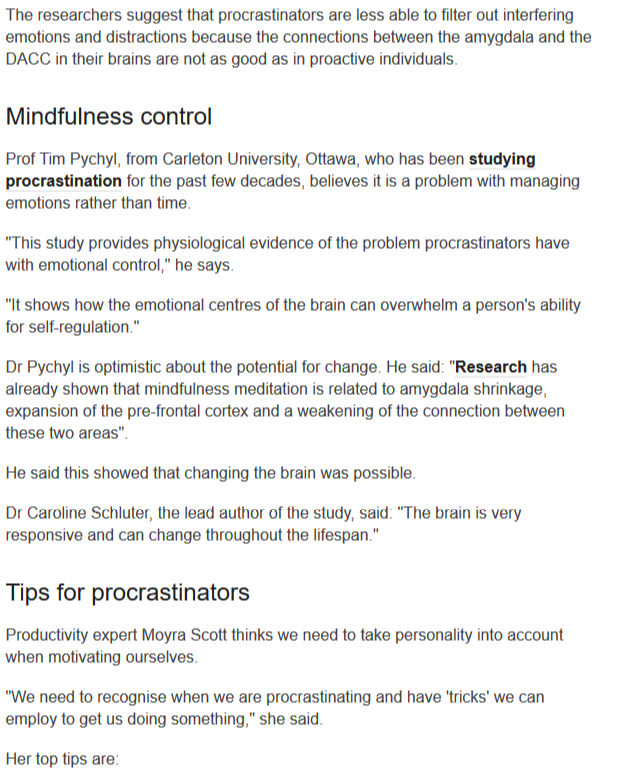
This news article is about procrastination, so without further ado; let’s take a look at it:

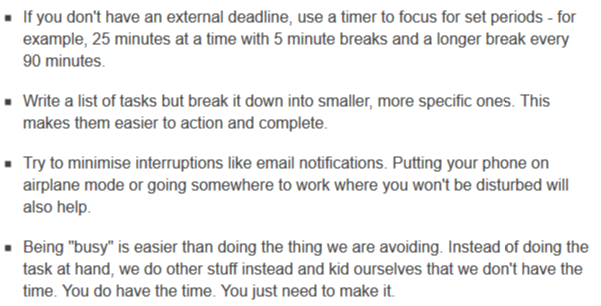
<https://www.bbc.co.uk/news/health-45295392>

I’ll post the entire website here, as I’ll be looking at a few areas in it, so once we can see the full page, we can start on each part.









So, I have a few things that I want to look at. Firstly, the survey said that 264 brain scans were performed. Is that value correct?

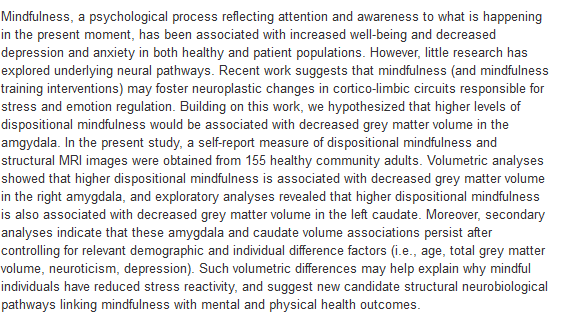
Well, and this is the misleading thing with this article, they link to one piece of research:

“Dr Pychyl is optimistic about the potential for change. He said: "Research has already shown that mindfulness meditation is related to amygdala shrinkage, expansion of the pre-frontal cortex and a weakening of the connection between these two areas".”

This is this paper:

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0064574>

Now, although that is a full research paper, it was published in 2013. Plus, it says that they only looked at 155 adults:



I have also quoted it as well:

“Building on this work, we hypothesized that higher levels of dispositional mindfulness would be associated with decreased grey matter volume in the amgydala. In the present study, a self-report measure of dispositional mindfulness and structural MRI images were obtained from 155 healthy community adults”

So, this clearly isn’t the study the article is talking about, but I will come back to this paper later.

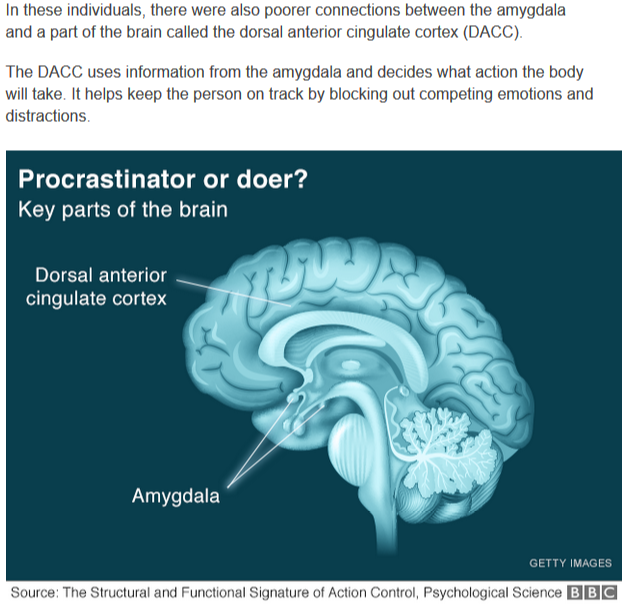
Now, the paper that it is based on was written by the lead author, Dr Caroline Schluter, and here it is:

<http://journals.sagepub.com/doi/10.1177/0956797618779380>

And it states:

“Here, we measured action control in a sample of 264 healthy adults and related interindividual differences in action control to variations in brain structure and resting-state connectivity.”

So, yes, the article is correct, it was 264 brain scans. Now, onto the next question.



So, in the above, I’m looking at a few things. Firstly, does the dorsal anterior cingulate cortex (DACC) use information from the amygdala and decides what action the body will take. And does it help keep the person on track by blocking out competing emotions and distractions.

Also, in the picture, are those the exact location as shown?

Well, according to research papers, and even Wikipedia (which I use as you know, as a broad reference), states that it’s actually the dACC. It’s a little d, as the ACC is the main part, and the d just stands for a part of it, the dorsal. So, it’s partially correct, with the meaning, just not with the abbreviation. But that’s pretty tiny thing to be at fault with, so it’s more or less correct.

Now, does it use information from the amygdala as stated?

Naturally, for this I need to have a look at some research papers, to see if it does or not.

But first, Wikipedia, as I found it stated this:

<https://en.wikipedia.org/wiki/Anterior_cingulate_cortex>

“The dorsal part of the ACC is connected with the prefrontal cortex and parietal cortex, as well as the motor system and the frontal eye fields,[8] making it a central station for processing top-down and bottom-up stimuli and assigning appropriate control to other areas in the brain. By contrast, the ventral part of the ACC is connected with the amygdala, nucleus accumbens, hypothalamus, hippocampus, and anterior insula, and is involved in assessing the salience of emotion and motivational information.”

The main parts of that quote are that the dorsal (dACC) is connected to the cortex, motor system and frontal eye lids. But the ventral (assuming vACC) is connected to the amygdala, nucleus accumbens, hypothalamus, hippocampus, and anterior insula.

So, that states that it’s not the dACC but the vACC (I’m calling it vACC as its still part of the main ACC). I found this in one science website and I’ve bolded the main parts

<https://www.sciencedirect.com/topics/neuroscience/anterior-cingulate-cortex>

“The ventral anterior cingulate is part of the brain “default mode network” whereas the dorsal anterior cingulate is a component of the frontoparietal attention networks. The **ventral anterior cingulate cortex** includes subcallosal and precallosal portions that have extensive connections with the insula, prefrontal cortex, **amygdala**, hypothalamus, and brain stem.”

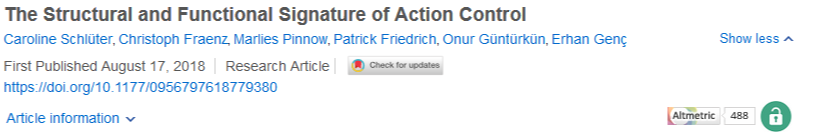
So, again it looks like it’s not the dACC as the article suggests. So that part is incorrect.

And as for the part in the article that states ‘It helps keep the person on track by blocking out competing emotions and distractions’: well, that part is correct for the amygdala.

Next part to look at. In this quote:

“"Individuals with a larger amygdala may be more anxious about the negative consequences of an action - they tend to hesitate and put off things," says Erhan Genç, one of the study authors, based at Ruhr University Bochum.”

Was he actually one of the authors of the main research this article is reporting on? Well, although Dr Pychyl is mentioned in the article, discussing the research he’s done over the years, he wasn’t one of the authors of this main study. Erhan Genç on the other hand, was:



So that part is correct. Now, the next part is actually the main subject of the article:

“Dr Pychyl is optimistic about the potential for change. He said: "Research has already shown that mindfulness meditation is related to amygdala shrinkage, expansion of the pre-frontal cortex and a weakening of the connection between these two areas".”

Now, this is for the original research paper, as stated above, and not the one that is for this article of 264 brain scans. But, let’s see if we can check it out, and see if there is shrinkage of amygdala, and expansion of the pre-frontal cortex.

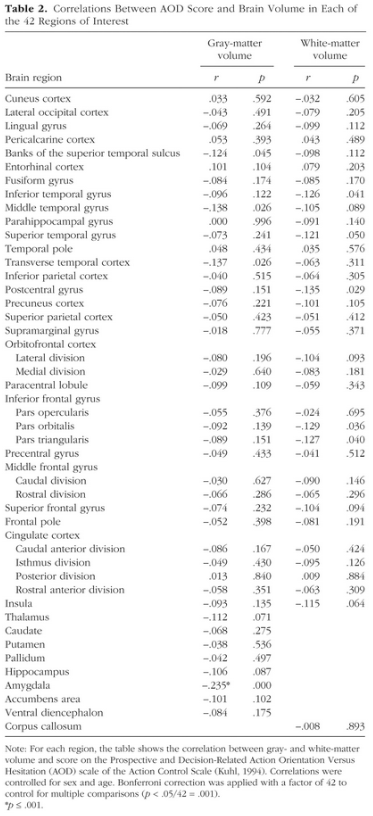
Back to the website:

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0064574>

Yep, a lot of information but I’m only really concerned with numbers. However, I can’t see any there. Sure, there are a few tables, but nothing tangible. So, the second paper:

<http://journals.sagepub.com/doi/10.1177/0956797618779380>

So, if you look at the figures on the left, you can see this one (originally you could see this, but now it’s hidden unless you pay for it, so this is a snapshot of what it was when I looked earlier):



Looks daunting, but if you look at the equation at the very bottom, there was 42 regions of interest. Looks like the 0.05 (or .05) is the alpha level.

“For each region, the table shows the correlation between grey- and white-matter volume and score on the Action Orientation During (Successful) Performance of Activities Versus Volatility (AOP) scale of the Action Control Scale (Kuhl, 1994). Correlations were controlled for sex and age. **Bonferroni correction was applied with a factor of 42 to control for multiple comparisons (p < .05/42 = .001). \*p ≤ .001.”**

The Bonferroni correction is mentioned here:

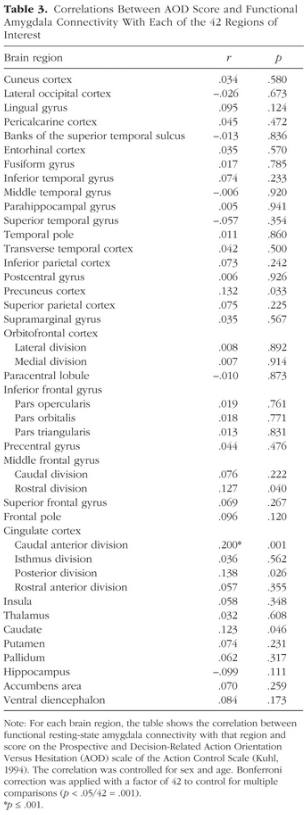
<https://www.aaos.org/AAOSNow/2012/Apr/research/research7/?ssopc=1>

“The Bonferroni correction is an adjustment made to P values when several dependent or independent statistical tests are being performed simultaneously on a single data set. To perform a Bonferroni correction, divide the critical P value (α) by the number of comparisons being made. For example, if 10 hypotheses are being tested, the new critical P value would be α/10. The statistical power of the study is then calculated based on this modified P value.

The Bonferroni correction is used to reduce the chances of obtaining false-positive results (type I errors) when multiple pair wise tests are performed on a single set of data. Put simply, the probability of identifying at least one significant result due to chance increases as more hypotheses are tested.”

So, the p value needs to be less than or equal to 0.001 for it to be of interest. And looking at the table above, it’s the only one, being 0.000.

For the pre-frontal cortex, we need to look at the next table (again, snapshot only as site updated):



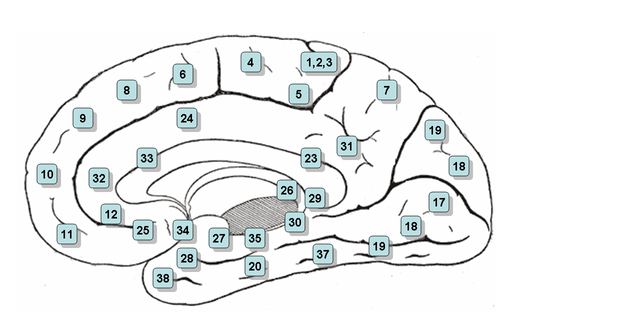
Again, same equation is used, and the only one that is of interest is at 0.001 (or .001). That is the Cingulate Cortex – Caudal Anterior Division

So, is this the pre-frontal cortex? Well, it certainly lies in the middle of the pre-frontal cortex, caudal in medical terms means the tail or hind part. That’s not to say that this is an area located at the bottom part of the brain, but it can mean the bottom area of the pre-frontal cortex. Anterior is used to describe parts of the human body with regards to anatomy.

Now, without delving too deep and losing you completely, in (I know) Wikipedia, we can look at the Brodmann area. This is all the sections of the brain, in numbers. We’re interested in 24:

<https://en.wikipedia.org/wiki/Brodmann_area>

This is the Ventral anterior cingulate cortex. And as you can see in the picture, it’s located in the pre-frontal cortex:



--

So, my findings from this article. It’s an interesting one that I’ve looked at, learnt quite a bit about the human brain I never really new about. I would say it’s 50/50. Sure, they got an abbreviation wrong, partially. But they got a few other things correct. However, in the article it said that dACC that was the main area in question, but it’s actually the vACC. Again, I named it that to keep with the naming convention. It may not be actually that, it’s the ventral ACC.

It also mentions that it’s the shrinking of the amygdala and expansion of the pre-frontal cortex. Well, from the numbers in the actual research paper, and by delving into some of the naming, yes it’s correct.

So, like I say, it’s 50/50, which is a shame as I would have liked them to get certain parts of it correct. Add to the fact that the only research paper they included as a direct link was not even for this article, but for a previous study. That’s not good in my opinion.

Anyway, please leave any feedback on this article, and as always, it’s been a pleasure to research this one ☺