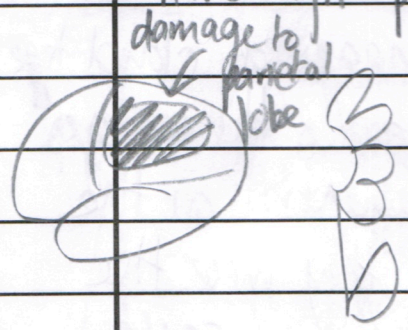
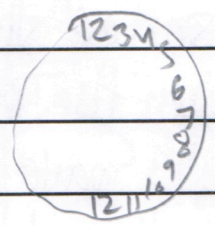
Attention is the process by which you filter out the incoming sensory information. It is an active process that is difficult to study. However, some patients with lesions to their parietal lobes will experience a condition called hemi-neglect, where they are unable to pay attention to the side of their world contralateral to the damaged lobe. Hemi-neglect patients, for example, would only eat the food off of one side of their plate, or would draw the following images when asked to draw a flower and a clock (if they have right parietal lobe damage):



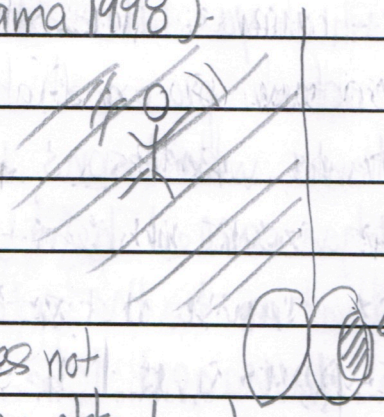


} they ignore half of their world.

It is because these patients have their attention compromised that we are able to learn more about the nature of attention from case-studies.

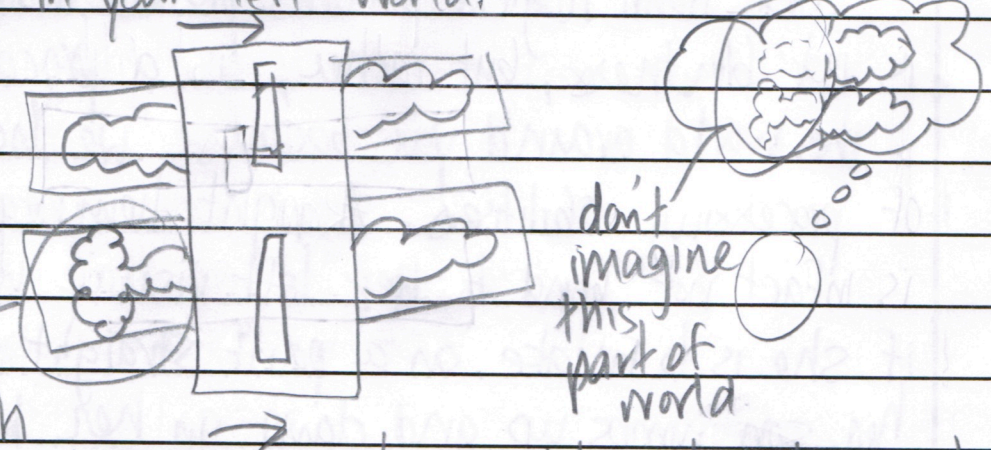
First, hemi-neglect patients provide insight that attention is not blindness, but rather, is a process of filtering the world around you because we have a finite amount of processing abilities. A right hemineglect patient, Ellen, is infact not blind to her left visual world, because if she is to fixate on a point straight ahead and her son jumps up and down in her left visual field, then sometimes she will see it and turn her head toward

her son (Rama 1998).



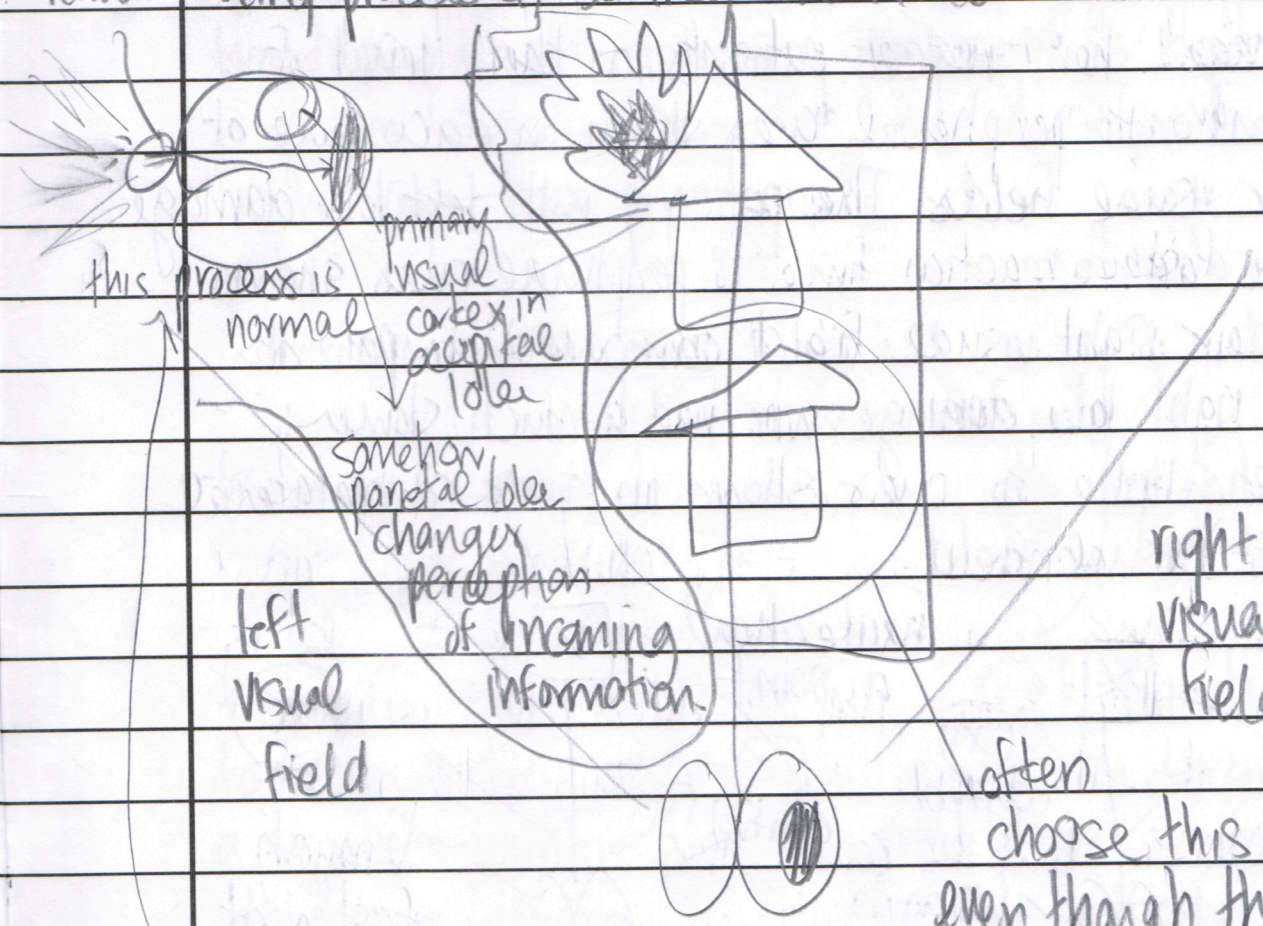
because she can sometimes see her son, she is not blind, just doesn't pay attention.

Another experiment done by Bisiach et al (1979) supported that hemi-neglect patients are not blind, because their imagination also ignores the left side of their world. Left unineglect patients were shown 2 images of cloud-type figures through a small slit, but sometimes the images were different. When the image was different on the left side, the patients would indicate that they were the same, but when different on the right, they could notice the difference. This proves that the patients were unable to imagine the left side of their world, showing that they have an attentional deficit, because if they were blind, you could still imagine something in your left world.



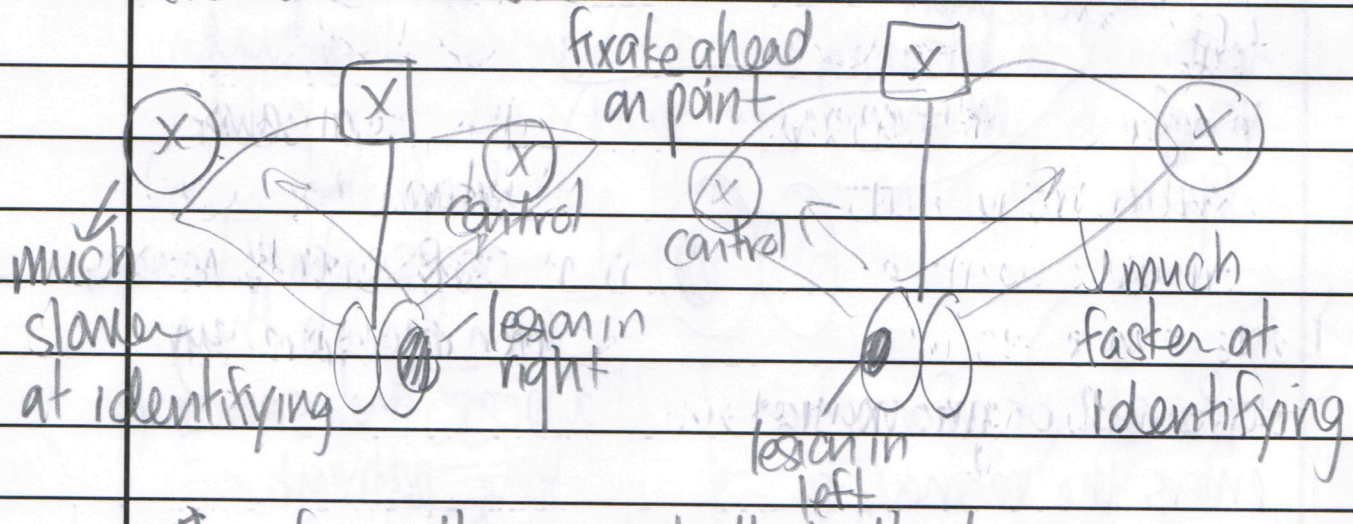
on the left would be ignored by a right parietal damaged

One last experiment also supports that hemi-neglect is not blindness (Halligan, 1988). Patients were shown pictures of 2 houses, one of which had fire coming off the left side, to right parietal lobe damage patients with left unilateral neglect. Patients were asked what house they would rather live in, and most chose the house not on fire, but yet, couldn't explain why. This supports that the visual information has entered the person and is unconsciously being processed, so they are in fact not blind.



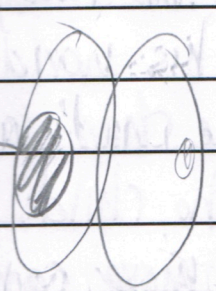
∴ all of information enters the retina, to primary visual cortex, but is not consciously accepted (filtered out by their attention). Therefore, hemi-neglect patients are not blind to contralateral side of lesion but rather, have an attentional deficit so they filter out the contralateral visual field.

Hemi-neglect patients show that attention is localized primarily through one hemisphere, because the disorder manifests itself asymmetrically. So, attention is thought to be housed in the right parietal lobe rather than the left, because left parietal lobe damaged patients seem to recover faster and better than right parietal lobe damaged patients. Loshier et al (2001) conducted an experiment that supports this theory. He tested both left and right parietal lobe damaged hemi-neglect patients on their level of attention to peripheral cues shown on each side of their visual fields. The patients with left lobe damage had a faster reaction time to peripheral cues shown in their right visual field compared to patients with right lobe damage who had a much slower reaction time to cues shown in their contralateral (left) visual field.



Therefore, this supports that attention is more commonly stored in the right parietal lobe because the left parietal lobe damaged patients had less attentional deficits as measured from reaction times in contralateral

Because attention seems to be dominated by one hemisphere, is it housed always in the right parietal lobe, or, is it dependent on one's dominant hemisphere? Maeoshima et al (1991) set out to answer this question by analyzing left-handed and right-handed left parietal damaged patients and their recovery from their right unilateral neglect symptoms. All of the right-handed patients recovered fully; however, the majority of the left-handed patients did not. This supports that attention is housed in one's non dominant hemisphere, not always in the right hemisphere.

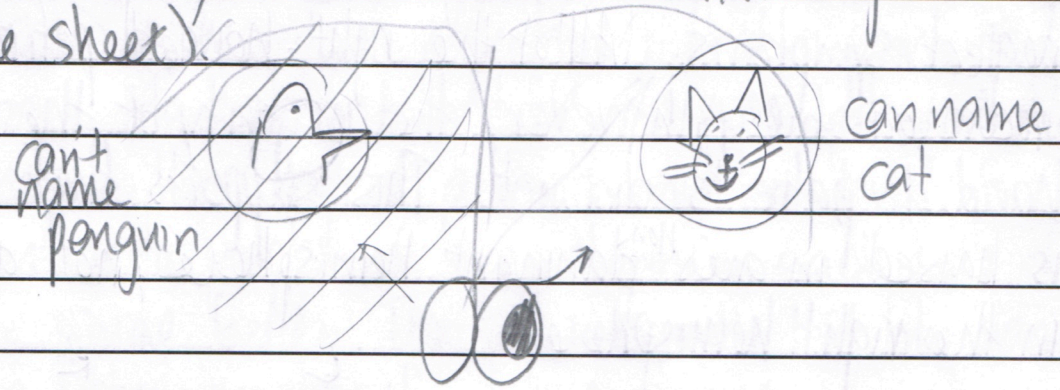


left-handers harder to recover because only a small amount of attention roles are done in the right hemisphere.

right-handers recover because the right-side can take over for the left side damage.

Therefore, because I am left-handed, if I have damage to my right parietal cortex, I should be able to recover from neglect compared to the majority of people.

One case-study of hemi-neglect also shows attention related to development. Thompson et al (1991) studied hemi-neglect in a 3 year old with right parietal lobe damage from a traumatic brain injury. Left unilateral neglect was diagnosed using a sheet of animals for the child to name, since he was illiterate (and he could only name the animals on the right side of the sheet).



Within 6 months, the child had fully regained his ability to pay attention to his world on the left side. Note: because of the child's age, we do not know the handedness of the child, but because right handed-ness is more common, he is more likely to be right handed. If this is the case, it would mean that the child's brain was so plastic that he could find another area in his brain to house attention which right-handed adults with right parietal damage cannot do. This would support 2 theories (if he is right handed): ① attention is stored in the same place since infancy - in his case, the right parietal lobe, and ② attention can be

rewired in brain during development during a critical period.

In conclusion, studying hemi-neglect patients have given tremendous insight into our understanding of the nature of attention, in that, (1) just because you don't paying attention to something doesn't mean you are blind to it (example: even if you are daydreaming in lecture, the sensory visual information is still going into your brain to your occipital lobe, but your attention filters it out from conscious perception), (2) there is support that it is housed in your non-dominant hemisphere, (3) if damaged, it may be able to fully recover if done during a critical period and (4) attention seems to be housed in the same place since birth.