Vision and image processing are robust and informative tools humans use to understand their environment. Additionally, the ability to displace our minds to different times and spaces is a defining advantage of Human cognition. Mental Imagery, or “the quasi-perceptual experience that occurs in the absence of appropriate external stimuli”, blends these aspects together by enabling visualization of situations, environments, and events outside immediate perception. This process is meaningfully similar to vision and valuable for its ability to enable prospective and retrospective thinking.

Despite the inherent differences between imagined and perceived images, research shows that human brains process them similarly. A study in 2013 reported that the same multivariate pattern classifiers used to analyze and decode fMRI scans of the Primary Visual Cortex during perception of visual stimuli can be applied to accurately discriminate the same stimuli during mental imagery (Pearson et al. 2015). This means that the process of visualization is enough like actual perception that an algorithm taught to decode brain activity for visual stimulus cannot differentiate between a real and imagined image.

Because the mental imagery can be employed along with working memory to recreate environments from the past, it is a useful tool for learning from one’s history without the necessity of returning to the place of historic events. This backwards displacement would not be possible without the ability to visualize the past, and the concept of mentally “re-viewing” a scenario would be less effective without the ability to actually picture it in the mind’s eye.

Perhaps the most useful application of mental imagery is as a tool to prepare for future scenarios through simulation. Children employ self-directed simulation often, but the process of “making believe” can extend into adulthood as a way to manage mental disorders. Mental disorders marked by intrusive mental imagery such as PTSD, Depression, and many phobias have been the subject of imagery-focused therapeutic techniques in the last decade. Such approaches attempt to disrupt the negative mental imagery that feeds the disorder, and imagery-focused Cognitive Behavioral Therapy “has the strongest documented impact on treating PTSD and social phobia, with some trials showing success rates of up to 75%” (Pearson et al. 2015)

Mental imagery is a useful feature of Human cognition, allowing for a source of novel visual stimuli that, although simpler than perception, provide useful information to the subject. Mental imagery provides education and treatment that is both as poignant as real visual perception and as robust as Human capacity for imagination.

References