**Molyneux’s question and interpersonal variations in multimodal mental imagery among blind subjects**

If the sight of cortically blind people were restored, could they visually recognize a cube or a sphere? This is Molyneux’s question. I argue that the answer to this question depends on the specificities of the mental setup of these cortically blind people. Some cortically blind people have (sometimes quite vivid) visual imagery. Others don’t. The answer to Molyneux’s question depends on whether the blind subjects have had visual imagery before their sight was restored. If they did, the answer to Molyneux’s question is yes, if they didn’t, the answer is no. There is no generic answer to Molyneux’s question.

**Introduction**

Molyneux’s question is the following: If the sight of cortically blind people were restored, could they visually recognize a cube or a sphere? Historically, this has been taken to be a yes or no question (with the negative answer dominating the discussions), but more recently it has been argued that there are in fact not one but many Molyneux’s questions (Glenney 2013, Ferretti 2017, Matthen and Cohen 2019).

 My aim is to examine a thus far neglected aspect of Molyneux’s question, namely, the interpersonal variations among blind subjects. I will argue that some of these interpersonal variations cannot and should not be ignored when answering Molyneux’s question because depending on these interpersonal variations, in the case of some blind subjects the answer to Molyneux’s question will be yes and in the case of some others, it will be no.

 The most important interpersonal variation from this point of view concerns the differences in visual imagery among blind subjects (see Villey 1930 for an early account of this). Some blind subjects have (often remarkably vivid) visual imagery. Such visual imagery can be triggered not just voluntarily by visualizing, say, a triangle, but also crossmodally, by stimulating a different sense modality. Other blind subjects have no visual imagery. I will argue that we get different answers to Molyneux’s question depending on whether we apply it to the first or the second group of blind subjects. In the case of blind subjects with visual imagery, the answer is yes, in the case of blind subjects without visual imagery, the answer is no.

**Molyneux’s question**

One of the most drawn out debates in philosophy of perception is called Molyneux’s question. Molyneux’s question may have originated from the 12th century Islamic philosopher, Ibn Tufail, who was the author of the very first widely read philosophical novel, *Hayy Ibn Yaqzan*. Centuries later, *Hayy Ibn Yaqzan* was translated to English and published in 1671 and was very widely read afterwards in England (Russell 1994). The widespread label of this question is ‘Molyneux’s question’, because of a question the 17th century Irish philosopher William Molyneux posed in a letter addressed to John Locke in 1688. The question is simple: suppose that a blind subject is familiar with two very differently shaped objects by tactile perception. If her vision were restored would she be able to tell them apart and identify them visually? So our blind subject handles a cube and a sphere and then when her sight is restored, she looks at a cube and a sphere, can she identify one as a sphere and the other one as a cube? And in the centuries that followed, answering Molyneux’s question (and, preferably, giving an original answer) was a must for any aspiring philosopher of perception.

 Locke himself answered no (Locke 1690, II, ix, see also Bruno and Mandelbaum 2000, Schumacher 2003), as did George Berkeley (Berkeley 1709, p. 41, p. 110, Berkeley 1710, p. 43). Gottfried Leibniz, directly contradicting Locke, said yes (Leibniz 1704, II, ix). Thomas Reid thought the question was ambiguous (depending on whether it is about two-dimensional or three-dimensional shapes, and also depending on the subject’s expertise,[[1]](#footnote-1) we get different answers, see Reid 1764, VI, 3, 7, 11). But the discussion of Molyneux’s question did not stop in the 18th century (see Degenaar 1996). Gareth Evans gave a very original answer defending the Leibnizian positive answer, kicking off a new wave of debates (Evans 1985, see also Prinz 2002, Noë 2004, Campbell 2005, Levin 2008). As Matthen and Cohen 2019 point out, there are by now many somewhat different versions of Molyneux’s questions and not all of these accounts are answering the same question (see also Glenney 2013, Ferretti 2017).

 This was a theoretical question in the 17th century and it still was at the turn of the century (in spite of some earlier attempts to test Molyneux’s questions empirically, see, for example, Cheselden 1728, Abbott 1904). But it has been suggested that the question can be answered, given today’s medical technology, in an empirical manner. And this is exactly what was done a decade ago with congenitally blind people after their sight was restored (Held et al. 2011). What these findings show is that after having their sight restored, these subjects could immediately match one visual shape with another one (just as they could match one haptic shape with another one), but they could not match the shapes across sense modalities: so they could not match a visual shape and a haptic shape – which would have been the task at stake in the Molyneux debate. They did manage to acquire this ability in a couple of days, but not immediately after having their sight restored (but see Connolly 2013, Schwenkler 2013, Cheng 2015, Clarke 2016 for some worries about the experimental design). So a tempting resolution of Molyneux’s question would be that the data is in and it supports the Locke/Berkeley line of thought. Leibniz and Evans lost.

 I want to question this conclusion and tackle Molyneux’s question on the basis of what we know about individual differences between blind subjects. While it may be a somewhat disappointing answer to the Molyneux’s question that it doesn’t have a generic answer, the reasons for this, concerning individual differences between blind subjects, are hopefully less disappointing.

**Multimodal mental imagery**

Mental imagery, as psychologists and neuroscientists understand the concept, is early perceptual processing not triggered by corresponding sensory stimulation in the relevant sense modality (Kosslyn et al. 2006, Pearson et al. 2015, Nanay 2015, 2018). So visual imagery is early visual processing (say, in the primary visual cortex) not triggered by corresponding sensory stimulation in the visual sense modality (that is, not triggered by corresponding retinal input).

 Mental imagery is defined negatively: it is early perceptual processing *not* triggered by corresponding sensory stimulation in the relevant sense modality. But then what is it triggered by? It can be triggered, in a purely top-down manner, say, when you close your eyes and visualize an apple. But it can also be triggered laterally by other sense modalities. This is multimodal mental imagery. Multimodal mental imagery is early perceptual processing in one sense modality triggered by sensory stimulation in a different sense modality.

 So if you have early auditory processing that is triggered by sensory stimulation in the visual sense modality, this counts as multimodal mental imagery. This is what happens, when, for example, you watch the tv muted (e.g., Calvert et al., 1997; Hertrich, Dietrich, & Ackermann, 2011; Pekkola et al., 2005). But for this paper, the converse phenomenon is what is especially relevant. If you have early visual processing that is triggered by sensory stimulation in another sense modality, this also counts as multimodal mental imagery. Crucially, early visual processing that is triggered by sensory stimulation in the tactile sense modality is also a form of multimodal mental imagery.

As we shall see, some congenitally blind people do have visual mental imagery (which is clearly not triggered by corresponding retinal input). And such mental imagery may be triggered laterally, by sensory stimulation in a different sense modality – for example, the tactile one. When these subjects touch a cube before their sight is restored, they form visual mental imagery. This will be of great importance when we return to Molyneux’s question in the next section.

But before I do so, I need to make some clarificatory remarks about the concept of multimodal mental imagery. First, not everybody will agree with my use of the term ‘mental imagery’ (which I borrow from the standard usage in psychology and neuroscience, see Pearson et al. 2015, for example). Nothing depends on the label ‘mental imagery’ in the argument that follows. Those who have very strong views about how this concept should or should not be used should read the rest of the argument to be about mental imagery\* (which is defined as early perceptual processing not triggered by corresponding sensory stimulation in the relevant sense modality).

Second, mental imagery may or may not be voluntary. When you close your eyes and visualize an apple, this is an instance of voluntary mental imagery. But not all mental imagery is voluntary. Unwanted flashbacks to an unpleasant scene or earworms in the auditory sense modality would be examples for involuntary mental imagery.

Third, mental imagery may or may not localize its object in one’s egocentric space. When we visualize an apple, we often do so in such a way that the apple is represented in some kind of abstract visualized space, so that it would make little sense to ask whether you could reach the apple or how far the apple is from the tip of your nose. But this is, again, not a necessary feature of mental imagery. We can also visualize an apple on the pages of this book you are reading.

Finally, and most controversially, perceptual processing may be conscious or unconscious. We know from numerous experimental studies that perception, that is, sensory stimulation-driven perceptual processing, can be unconscious (Weiskrantz 1997, 2009, Kentridge et al. 1999, Kouider & Dehaene 2007, Goodale & Milner 2004). So there is no prima facie reason why mental imagery, that is, non-sensory stimulation-driven perceptual processing, would have to be conscious. Just as perceptual processing in general, perceptual processing that is not triggered by corresponding sensory stimulation in the relevant sense modality may also be conscious or unconscious. Note that nothing I say in this paper presupposes the existence of unconscious mental imagery as the kind of multimodal mental imagery that will play a crucial role in the Molyneux question is a conscious one.

**Mental imagery in blind people**

Some blind people’s visual cortices are intact. They can visualize, often as vividly as sighted people and they even dream. This is also true of some congenitally blind people (Arditi et al. 1988). Cortically blind people have damaged visual cortices, so this is not true of them. But even if a blind person’s (especially a congenitally blind person’s) visual cortex is intact, given that it is not used a lot for visual tasks, it gets reallocated to other brain processes, which can, in the long run, lead to less and less visual mental imagery.

Given the well-demonstrated plasticity of the brain, if a brain region is not used regularly, it is reallocated to do something else. More specifically, if blind subjects whose visual cortices are intact do not use these visual cortices, they get reallocated (to, for example auditory or olfactory processing, see Amedi et al. 2007, Fine et al. 2014). If they use their visual cortex, it works well, if they don’t, it will eventually stop processing visual information, thereby making it impossible for the subject to have mental imagery.

So some blind people (including congenitally blind people) have visual mental imagery, some others don’t. Those who do can conjure up visual images in their mind’s eye voluntarily. But their visual imagery can also be triggered by sensory stimulation in a different sense modality, for example, audition or touch. And congenitally blind subjects also perform many behavioral tasks that require the manipulation of visual (as opposed to, say, tactile) mental imagery in a way that is comparable to the performance of sighted subjects (Aleman et al. 2001).

Hence, those congenitally blind subjects who are capable of exercising their visual mental imagery would have visual mental imagery of the sphere when they handle the sphere. This would be an instance of visual mental imagery triggered by tactile sensory stimulation. And they would have visual mental imagery of the cube when they handle the cube. Blind people who lack visual mental imagery would not have any of this.

**Back to Molyneux’s question**

The question is which category of blind subjects Molyneux’s question is asked about. The cortically blind subjects would have very little chance to identify the cube and the sphere, but those blind subjects who have visual (and multimodal) mental imagery can use their visual mental imagery to identify the cube which they now see by means of sensory stimulation-driven perception. So depending on the state and use of the visual cortices of the Molyneux subjects, we get very different answers.

The Held et al. 2011 experiments therefore should be considered to be a partial answer to Molyneux’s question: for some blind subjects, the answer to Molyneux’s question might indeed be no.[[2]](#footnote-2) But this is not the final answer. While the original Held et al. 2011 study is not very specific about whether the subjects whose sight was restored in this experiment had the ability to have visual imagery before the operation, it is clear from a follow-up study (which studied the visual imagery of these subjects post-operation), that it is unlikely that they had any form of visual imagery before the operation (Gandhi et al. 2014).[[3]](#footnote-3)

In other words, the Held et al. 2011 experiments (and its follow-up experiments) only gave a partial answer to Molyneux’s question inasmuch as they are silent about what the answer to Molyneux’s question should be in the case of those blind subjects who have the ability to have visual mental imagery. And, as we have seen, we have good reasons to suppose that as the visual mental imagery of these subjects can be triggered by sensory stimulation in another sense modality (crucially for our purposes, in the tactile sense modality), these subjects would have visual mental imagery of spheres and cubes long before their sight was restored. And then after the operation, they can and would utilize their visual mental imagery of cubes and spheres in visually recognizing cubes and spheres.

It needs to be emphasized that this is an empirical hypothesis that has not been tested. The empirical hypothesis is that if the sight of those congenitally blind people who have visual mental imagery were restored, they would be able to match seen and felt objects. This empirical hypothesis has not been confirmed or disconfirmed and the aim of this paper was to give theoretical reasons for why we should expect this empirical hypothesis to be true. But we will only know for sure if we find congenitally blind people with vivid visual mental imagery and restore their sight. In other words, we would need to conduct a Held et al. 2011 style experiment but with close attention to the visual imagery abilities of the experimental subjects.

**Tolstoian conclusions**

The conclusion is that Molyneux’s question gets very different answers depending on the visual imagery abilities of the blind people in question. ‘Blind people’ is not a monolithic category. To abuse Tolstoy’s famous first line of the novel *Anna Karenina*: all vision is alike, but all blind people are blind in their own way (see also Block 2016 for reusing this line for other purposes in philosophy of perception). Lots of things need to come together for someone to perceive visually. Consequently, lots of things can go wrong. There could be problems with the retina, with the main visual pathway, with the lateral geniculate nucleus, with the early cortices, and so on. Any one of these problems would result in blindness, but very different kinds of blindness (Cattenao and Vecchi 2011).

Treating blindness as a monolithic phenomenon would paper over these crucial differences. And the Molyneux question does just this: paper over the crucial differences between very different kinds of blindness. When Molyneux’s question was originally posed, this might not have been as obvious as it is now (although Diderot’s *Letter to the Blind* paints another story). But now we do know this, so there is no reason why we would want to know the answer to a question about ‘the blind’ as there is no such thing as ‘the blind’. The historical misadventures of trying to answer Molyneux’s question is a beautiful demonstration of this.

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1. In fact, there might be a way of interpreting Reid in a way that the dependence on expertise itself correlates with the vividness of the subject’s mental imagery (see 1764/1997, esp pp. 117-118 (6.11)), which would make Reid’s view consistent with mine. But I will not attempt to argue for this historical claim here (or anywhere else). [↑](#footnote-ref-1)
2. This does not mean that there is a monolithic explanation for why the answer is no in the case of all these subjects. There might be individual variations among the ‘no’ subjects as well, so they all fail to identify the cube visually but do so for very different reasons. See Glenney 2013. [↑](#footnote-ref-2)
3. The same is true of the eye restoration experiment reported in Chen et al. 2016 see Ferretti 2017 (with the extra complication that the subject was 44 month old). [↑](#footnote-ref-3)