The Ability Hypothesis: An Empirically Based Defense

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Abstract

We defend Laurence Nemirow's and David Lewis's Ability Hypothesis against Paul Raymont's criticisms in defense of Jackson's Knowledge Argument. According to the Ability Hypothesis, what Mary lacked when she was in her black-and-white room was a set of abilities; she did not know how to recognize or imagine certain types of experience. Her subsequent discovery of what it is like to experience color amounts to no more than her acquiring these abilities. Appealing to the Molyneux test, Raymont has argued that knowledge of what an experience is like cannot be equated with the possession of any set of abilities, since one can be in possession of a recognitional ability concerning a certain type of experience without knowing what that experience is like. We argue that the intermodal recognitional ability in the Molyneux test and similar ones depends on previous experience and thus makes an implicit appeal to knowledge of what it is like.

Keywords: *the knowledge argument, the Ability Hypothesis, Molyneux test, intermodal matching*

1 Introduction

Physicalism has long been hampered by difficulties of the sort that Frank Jackson ([8] and [9]) illustrated in his knowledge Argument. A range of replies have been given to his argument in defense of physicalism, one of which is the Ability Hypothesis. Counterattacking, Raymont has tried to show that the Ability Hypothesis is not effective against the Knowledge Argument, by appealing to the Molyneux test, and that therefore the Knowledge Argument still stands as an argument against physicalism. The present paper begins by formulating the Knowledge Argument, the

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Ability Hypothesis, and the Molyneux test. Then the validity of this test as against the Ability Hypothesis is assessed, as is the possibility of mounting a defense.

2 The Knowledge Argument and the Ability Hypothesis

Frank Jackson introduced the Knowledge Argument in two celebrated papers, "Epiphenomenal Qualia" ([8]) and "What Mary Didn't Know" ([9]). In his thought experiment, Mary is confined to a black-and-white room from birth. Via a black-and-white television, she is educated by the best neurophysiologists and is taught the most recent achievements in neurophysiology. All the books provided to Mary are black and white and, in her black-and-white world, she becomes one of the most distinguished neurophysiologists. Jackson makes an assumption here which is crucial for his argument: neurophysiology is completed in Mary's time, and every aspect of the human body and of the nervous system has been explored. Hence, Mary's knowledge of neurology is complete, and it includes every truth about the function of the human nervous system.

After learning everything about human neurology and physiology, Mary is suddenly permitted to leave her room. Mary enters a corridor that leads her to a garden containing colorful flowers. For the first time, the neurologist Mary is directly confronted with colors and experiences them. Since she is a perfect neurologist, she already knows everything about colors as well as the way they are processed in the human brain. However, it seems that she now has a new experience, and acquires new knowledge, when she sees the color green for the first time. Now she knows what it is like to have an experience of green things. Thus, this thought experiment seems to show that no amount of physical knowledge can lead to knowledge of the quality of conscious experience. In other words, the knowledge she now acquires is not simply physical knowledge, since her physical knowledge was already complete.

The Knowledge Argument has been subject to a great deal of discussion, and many objections and replies with different approaches have been proposed. One of the criticisms thus developed in response to the Knowledge Argument is what is known as the Ability Hypothesis. The Ability Hypothesis, developed by Nemirow ([22]) and Lewis ([12], [13]), is that what Mary gains after her release is a set of abilities, not propositional knowledge, knowledge of a new truth, or information on a certain fact.

According to Lewis, the Knowledge Argument and the hypothesis of

phenomenal information (that knowing 'what it is like' is propositional) are based on a confusion of two meanings of "knowledge": 'we confuse ability with information because we confuse knowledge in the sense of knowing-how with knowledge in the sense of knowing-that' ([13], p. 488).

The Knowledge Argument claims that Mary's knowledge after release is propositional knowledge about a phenomenal quality. To the contrary, the Ability Hypothesis regards this knowledge as knowledge-how. 'The Ability Hypothesis says that knowing what an experience is like just is the possession of these abilities to remember, imagine, and recognize. It isn't the possession of any kind of information, ordinary or peculiar. It isn't knowing that' ([13], p. 487).

Jackson regards Mary's knowledge as knowledge of a phenomenal quality, while Lewis argues that it is knowledge-how and reduces it to ability. According to Lewis, Mary gains three abilities after being released from her black-and-white room and seeing the colors directly. These triple abilities include imagining, recognizing, and remembering ([13], p. 487). When Mary experiences seeing the color of the red flower, she does not acquire knowledge of a phenomenal property in the world; rather, by such an experience, she comes to have a triple ability by which she can imagine and remember the color red whenever she likes, and can recognize it if she sees that color again. According to Lewis, acquiring these triple abilities is only possible through direct experience and it cannot be built up through "knowing-that."

Coleman ([5]) has argued that reducing Mary's new knowledge to abilities does not affect the issue of whether she also learns new truths. He claims that gaining specific new phenomenal knowledge is required for acquiring abilities of the relevant kind. Phenomenal knowledge being basic to abilities, it is left an open question whether someone who acquires such abilities also learns new truths. The answer depends on whether the new phenomenal knowledge involved is factual. But this is the same question the knowledge argument wanted to settle. The Ability Hypothesis, he concludes, has offered us no progress with the knowledge argument, and is best forgotten.

But, as we will see in the Molyneux test, one may have relevant abilities without gaining phenomenal knowledge. That is why the Ability Hypothesis has not been forgotten and there have been continuous discussions about it. Laurence Nemirow ([23]) defends the Ability Hypothesis and its effectiveness in undermining the knowledge argument. He considers a variety of objections, including objections advanced by Conee ([6]), Tye ([31]), Levin ([11]), Loar ([15]), Nida-Rümelin ([24]),

Lycan ([17]), Alter ([1]), and Perry ([25]). As he mentions, many philosophers find the Ability Hypothesis counterintuitive. But in his view, it should be judged by 'the strength of the available rejoinders,' and on that score, he argues, it 'proves to be reasonably resilient to assault.' ([23], p. 43)

3 The Molyneux Test

One of the criticisms that have been developed against the Ability Hypothesis is the criticism developed by Paul Raymont ([26]). Raymont argues that mnemic, recognitional, and imaginative abilities neither separately nor conjointly amount to knowing what it is like to have an experience. He first argues that none of these abilities is necessary and sufficient for knowing what it is like. (a) Mnemic abilities are not necessary, since someone can learn what an experience is like when first having it without already remembering an experience of the same kind. (b) Imaginative abilities are not sufficient, since one can have the ability to imagine an experience without exercising it. (c) To show that recognitional abilities are not sufficient, Raymont appeals to empirical data that support 'the view that one can have the ability to noninferentially recognize a certain type of visual experience without ever having had it, and thus without knowing what it is like to have it' ([26], p. 117). These three kinds of abilities cannot conjointly amount to knowing what it is like. If they did, then each of them would have to be a necessary condition for knowing what it is like, whereas (a) has shown the contrary.[1]

In what follows, we discuss Raymont's argument in order to show that the recognitional ability is not sufficient to know what it is like. Based on the recognitional ability, one can recognize a previous experience amid other experiences when one is faced with them.

By means of a test, Raymont has attempted to show that recognitional ability is possible without experience, and thus without knowing what it is like to have an experience. The *Molyneux test*,[2] to which he appeals, is as follows: a person, AI, is a congenitally blind man who, due to his deficiency, has learned to use his other senses in order to do his daily tasks, so that he can now do some of the activities that would be usually done by sight. For instance, he develops his power of listening and gets informed about his surroundings by means of the sounds he hears, something which is usually done by seeing. Another sense that AI develops to replace his sight is touch: AI has learnt to distinguish between what we call cubes and spheres by touch alone. To this end,

he touches their surface with his hands, such that he can distinguish spheres from cubes.

Now, imagine that after several decades in this state, scientific progress enables doctors to treat the causes of his blindness, and through a successful operation AI gains his sight. Now he enjoys sight like all of us; however, he is not yet allowed to open his eyes. When physicians decide to allow him to open his eyes, they place before him a sphere and a cube and ask him to tell us which of the two objects is a cube without touching them. Can AI recognize them only by using his sight, without touching them? Have we any reason to believe that AI could pass the test? Based on actual conducted tests, Raymont believes that AI would be successful: 'It seems that we do [have this reason], given the evidence that has been gathered from studies of adults who had been blind from an early age and who gained their sight as a result of surgery' ([26], p. 117).

Through AI's success in the Molyneux test, Raymont concludes that AI has a recognitional ability and that he had acquired this ability *before* gaining his sight or drawing upon a visual experience of cube and sphere in his mind. Raymont believes that such recognitional ability is the result of the period when AI was not able to see the objects. 'He possessed this recognitional ability even though he did not (when he was blind) know what it is like to see cubes or to see anything at all' ([26], p. 117).

In view of the Molyneux test, it seems that Lewis's plan to reduce what Jackson calls the phenomenal aspect of experience to a recognitional ability fails, since we here confront a test which enables Raymont to claim that someone without an experience of seeing an object has the recognitional ability. This test 'undermines any account of knowing what it is like (to have a given sort of experience) in terms of having certain recognitional capacities' ([26], p. 117).

It is clear that Raymont's argument does not answer the question of whether Mary's knowledge of what it is like to see red is simply her acquisition of a recognitional ability, since it has been framed in terms of shapes rather than colours. Shapes can be perceived by means of both visual and tactile experiences. For this reason, he has used cases involving shapes and exploited our ability to recognize new visual experiences of shapes as a result of previous tactile experiences of them. But colours are only perceivable by means of sight, therefore there can be no previous tactile experience of red that enables one to recognize one's first visual experience of it. Hence, Raymont's argument does not aim to show that one could possess the ability to recognize experiences of

redness without knowing what it is like to have such an experience. His point is that there are experiences (of shapes) that one can possess the ability to recognize them without knowing what they are like. Therefore, the knowledge argument can be presented in terms of shapes instead of colours. Such a knowledge argument will be immune from the Ability Hypothesis.

On the contrary, Levin acknowledges that AI is able to recognize visual experiences of shapes, but denies that his recognition in his first experience is direct. He has had, presumably, extensive tactile experience of cubes and spheres and other objects while bind, and has a good memory of how things feel. Thus even if he were merely shown a cube and a sphere and were not allowed to touch them, he could recognize the cube and sphere. Levin claims that he acquires the recognitional ability indirectly by an inference that involves comparing his visual experience of the shapes and his previous tactile experience. By comparing these shapes with his memory of touching them, he can recognize them by means of his knowledge of the similarities and differences between tactile and visual experiences. In the case that his recognitional ability is due to an inference, the Molyneux test cannot refute the claim that the recognitional ability depends on a type of previous experience ([11], p. 483).

To answer this objection, Raymont appeals to experimental work by psychologists Meltzoff and Borton ([20]) on infants. In order to show that the detection of shape invariants across different sense modalities is a fundamental characteristic of man's perceptual cognitive system, available without the need for learned correlations, they have run tests on infants. They have shown that infants tend visually to fixate on an object of which they have had previous tactile experience for a longer time than on objects with which they have not already been tactually acquainted. They interpret this longer visual fixation as evidence of the infants' recognition of the object's shape as a consequence of their previous tactile experience of it.

Critics may question the relevance of such experiments on the grounds that the infants had at least some opportunity beforehand to explore their surroundings both tactually and visually and to correlate the deliverances of these two sense modalities. However, to ensure that their experiments would not be vulnerable to this sort of criticism, Meltzoff and Borton ran their tests on infants who were only twenty-nine-days old. Infants of this age 'will not explore objects manually' ([20], p. 403) and thus have not already explored their surroundings both visually and

tactually and correlated the resulting sense impressions. (These infants were tactually familiarized with the shapes used in the experiment by being given one of two differently shaped pacifiers which they sampled orally and which they were prevented from seeing; visual fixation time was subsequently measured while showing them both pacifiers.) So, we here have experimental data in favor of the view that there can be direct recognition of a certain kind of visual experience without having had this experience beforehand and thus without knowing what it is like to have it ([26], p. 118).

4 Answer to Raymont

In this section we examine the Molyneux test and argue that the recognitional ability which Raymont claimed is acquired prior to knowing what it is like to have the experience by AI and infants is in fact due to previous tactile experience. We conclude, therefore, that we are not able to acquire direct recognitional ability with respect to a visual experience without already knowing what it is like to have it.

First, we return to Mary's experiment. Mary is confronted with a kind of experience in which her recognitional ability is isolated from her other senses, while in the Molyneux test we are talking about a kind of experience in which the recognitional ability is accessible through multiple senses. In other words, if Mary loses her sight, she is no longer able to acquire the ability to recognize colors and she has no alternative power to rely on. To the contrary, AI can use his tactile sense to distinguish the cube from the sphere even if he loses his sight. Recognitional abilities that are possible for an ordinary human, as Raymont ([26], p. 118) notes, are therefore to be divided into two kinds: (1) uni-modal recognitional abilities which include recognitional abilities acquired by a special sense which cannot be replaced by any other sense, such as the ability to recognize colors which can be acquired only through sight, or the ability to recognize sounds, which is possible only through hearing. (2) Multi-modal recognitional abilities which can be acquired by more than one sense, such as the ability to recognize shapes by both visual and tactile senses. The existence of multi-modal recognitional abilities is an important factor which makes it possible for disabled people to compensate for the lack of one sense through boosting another.

The importance of this division is underscored when we note that in the multi-modal recognitional ability we are faced with a kind of matching which is not found in uni-modal recognitional abilities, and it

is the same type of matching which motivates Raymont to deploy the Molyneux test against the Ability Hypothesis.

Before acquiring his sight, AI was able to distinguish cubes from spheres. How did he acquire this ability? As observed above, AI acquired this ability through his sense of touch. In other words, to compensate for his inability AI resorted to another sense, and, as mentioned before, succeeded in recognizing cases in which various senses are effective. It can be said that before retrieving his sight, AI acquired the ability to recognize the cube and the sphere through experiences of touching cubic and spherical objects.

The problem arises when AI opens his eyes and looks at the cube and the sphere. Although it is his first visual experience and the cube and sphere are not properly introduced to him – he is not told which object in front of his eyes is the cube or sphere – this does not mean that AI did not previously know what it is like to see these two objects regardless of their names. If we allow AI to call one object α and another one β, based on such naming he would have the ability to distinguish object α from object β from the first moment when his eyes receive light from these objects. This ability is acquired through an experience, and it happens after seeing α and β.

So far, nothing in the Molyneux test has created any problem for the Ability Hypothesis. We proceed, like Raymont, by assuming that AI can recognize the cube and the sphere in his first visual experience. On this basis, Raymont concludes that AI was able to achieve the recognitional ability for cubes and spheres without knowing what it is like to see these objects. The important point here is the role of matching in the multi-modal recognitional ability. AI is faced with an experience which, due to its multi-modal nature, opens up more than one way of achieving the recognitional ability. For the same reason, if AI passes the test as Raymont claims, this means that he has been able to determine that α is the cube and β the sphere.

In other words, AI's success is the result of exploring this matching. Is this matching to be considered a threat to the Ability Hypothesis? To answer this, let us explore more closely what this matching means. By using touch, AI has acquired mental images of the cube and the sphere. By seeing α and β for the first time, AI has achieved images from visual experience via sight. What AI's mind does during this matching process is to find that α and the cube, which are the results of two different perspectives and, consequently, have two different qualities, belong to one and the same object. The same is true for β and the sphere. AI

rightly identifies two images from two different perspectives as belonging to a single object. In fact, AI finds that four images in his mind (α, β, sphere, and cube) belong to two and not four objects.

By this test, Raymont can only show that our mind is sometimes able to find the (external) unity of objects of two experiences when confronted with different qualities of experiencing one object. A cube (a six-sided object whose sides are set at right angles) is one object that AI experiences with a certain quality when he touches it. On the other hand, when AI perceives the quality of the cube through visual experience, he rightly (according to Raymont) finds that the objects of these two experiences with different qualities are one and the same.

We believe that this matching ability poses no threat to the Ability Hypothesis, since qualities of experiences exhibit no difference in respect of intermodal recognition. On this basis, our response to Raymont would be that the qualities of tactile and visual experiences of shapes exhibit no difference. Therefore, the recognitional ability by both AI and infants in their first visual experience is due to previous tactile experience. This hypothesis is supported by experimental data.

Locke and Berkeley believed that the human starts life with independent senses and that simultaneous exploration of objects through sight and touch requires learning to match tactile and visual impressions ([16]; [2]). However, one can maintain that recognizing shapes through different senses is an original property of the human perceptual-cognitive system and this recognition exists without the need to learn how to match. Meltzoff and Borton ([20], p. 403) believed that the abovementioned experiment on 29-day-old infants supported the second hypothesis.

Furthermore, Meltzoff asserts, as a result of the experiment, that these infants register the same information when they pick up the shape of an object through two different modalities, namely touch and vision. Having perceived the form through one perceptual mode, they are familiar with it when it is presented to them in the new mode ([19], p. 224). Meltzoff believes that infants are not limited to registering isolated bits of sense data such as tactile impressions. There is no time in development in which infants are restricted to modality-specific fragments, sense scraps that are connected through empirical correlations. Instead, infants represent the world more abstractly, in terms of objects and events that transcend a single sensory modality ([19], p. 228).

In this experiment, neonates may have been particularly interested in the visual instantiation of the form because it provided modality-specific information, such as color, that was not available through touch. Hence,

they looked significantly longer at the matched than the mismatched shape ([19], p. 224). When an infant brings a round rattle before his eyes, he is probably not engaged in discovering what visual sensation is associated with this particular tactile impression; he already knows that. Instead, he is fascinated by the additional modality-specific features (the rich color) of the abstract form that he already apprehended through touch ([19], p. 228).

Kay and Bauer ([10]) conducted a similar experiment on 12-hour-old neonates, showing that 12-hour-old infants have the same ability to match the looked-at object and the object touched via the mouth as indicated in Meltzoff's report. In this experiment, infants seem to be able to recognize the visually presented shape of an orally explored object on the first look. According to Kay and Bauer, the speed of acquiring this ability supports a nativist hypothesis that this is a natural ability, not one learned through experience. In the meantime, they suggest that infants do not register sensory impressions as such, but rather register abstract amodal features of such impressions ([10], p. 286). They conclude that it does not seem likely that infants initially elaborate a tactile image of a pacifier and then compare it with the two visual images in order to prefer one over the other. The speed with which the preference emerged makes it more likely that the initial inputs were described and represented in amodal terms ([10], p. 288).

In addition, the claim that sense data are registered in amodal terms is supported by a variety of findings. In several experiments, young infants have been reported to register amodal information for a variety of object properties, including shape, size, and texture across sight and touch ([3]; [28]; [27]; [29]; [32]; [30]; [7]). We want, for the first time, apply this result to the Ability Hypothesis.

Through AI's success in the Molyneux test, Raymont concludes that AI has a recognitional ability (concerning the cube and the sphere) without knowing what it is like to have an experience (of cube and sphere).

Appealing to the empirical results of psychologists' works, our response to Raymont is that, the fact that AI can recognize the cube and the sphere after retrieving his sight before touching cubic and spherical objects is due to his previous tactile acquisition with the qualities of experiencing the cube and the sphere when he was blind. Now, he uses this acquisition in recognizing cube and sphere through his sight. Since in his visual experience of α, AI experiences the same quality he had experienced in his tactile experience of cube, now he finds that α and the cube are one and the same thing. The same is true for β and

the sphere. So, it is not true that AI has a recognitional ability without knowing what it is like to have an experience, since in his tactile experience, he has already acquainted with the qualities of experiencing cube and sphere.

Levin's response to Raymont was that AI acquires the recognitional ability indirectly by an inference. By comparing his visual experiences with his memory of touching, and acquiring the similarities and differences between tactile and visual experiences, he can recognize cube and sphere. Hence, the Molyneux test cannot refute the claim that the recognitional ability depends on a type of previous experience ([11], p. 483). Raymont, however, answered through an experiment on 29-day-old infants. Infants of this age will not explore objects manually and thus have not already explored their surroundings both visually and tactually and correlated the resulting sense impressions.

The difference between our response and that of Levin is that according to Levin, AI's recognitional ability is due to an inference, and this paves the ground for Raymont's objection. But our response, appealing to the empirical results of psychologists' works, is that, in his visual experience, AI experiences the same quality he had experienced in his tactile experience. So, his recognitional ability is due to a previous experience and there is no need for inference.

We saw earlier that the Molyneux test does not answer the question of Mary's thought experiment, since it has been framed in terms of shapes rather than colours. Shapes can be detected by means of both visual and tactile experiences. But colours are only detectable by means of sight. To make the Molyneux test relevant to the Mary's question, let us imagine that AI is a man born blind with the omniscience attributed to Mary. Suppose that he had mastered all the facts about 3-dimensional figures and visual and tactile experiences that could be stated in the physical knowledge of geometry and psychology, including the judgments made by ordinary people about the similarities and differences among their visual experiences. Furthermore, suppose that he is not permitted to touch 3-dimensional figures and doesn't have any experience of them.

After learning everything in geometry and psychology, AI is permitted to touch 3-dimensional figures and be acquainted with the 3-dimensional world. For the first time, AI is directly confronted with a cube and a sphere and experiences them. Now can he recognize them only by touching them upon his physical knowledge, before being told which experience is the experience of an angle and which is cube and which is sphere? The answer is that he never has this recognitional

ability. Only after being acquainted with the experience of the angle and other geometrical features of 3-dimensional figures, he can recognize them upon touching. In other words, there is no recognitional ability without knowing what it is like to have an experience.

Now, suppose that for the first time, before being permitted to touch anything, he gains his sight and is directly confronted with a cube and a sphere and sees them. Again, in his first visual experience, before being acquainted with the angle and other geometrical features of 3-dimensional figures via reference, ha cannot recognize the cube and the sphere merely upon his physical knowledge. Again, there is no recognitional ability without knowing what it is like to have an experience.

5 Conclusion

Appealing to the Molyneux test, Raymont has argued that someone without the experience of seeing an object has the recognitional ability. So, the phenomenal aspect of experience cannot be reduced to a recognitional ability. Furthermore, he has argued that experiments on infants show that this recognitional ability is direct and does not depend on previous tactile experience.

Defending the Ability Hypothesis, we argued that some experiments in psychology show that infants register sense data in amodal terms in multi-modal perceptions. Hence, in intermodal recognition, there is no difference between qualities of the new (visual) experience and the previous (tactile) experience. Therefore, the recognitional ability in the Molyneux test and the experiments on infants in the first visual experience is due to the previous tactile experience. So, there is no recognitional ability without knowing what it is like to have an experience.

Notes

1 Raymont's criticism that mnemic abilities are not necessary to phenomenal consciousness seems obviously correct and a number of proponents of the Ability Hypothesis don't mention or emphasize on mnemic abilities. In his earliest version ([12], p. 131), Lewis doesn't mention the ability to recall and in his latest discussion ([14], p.141), only refers to the ability to recognize and imagine and he omits mnemic abilities without qualification. Mellor ([18], pp. 5-6) argues that mnemic abilities are not necessary, and Carruthers ([4], p. 144-5) focuses on the ability to recognize and imagine. However, this does not affect whole of Raymont's argument. It can be raised a criticism concerning the necessity of recognitional abilities similar to Raymont's criticism to the necessity of mnemic abilities. Some people who became blind late in their lives still do know what it

is like to experience red. They are capable of visualizing red, but incapable of recognizing red, given that they are blind (see [21], p. 704). Thus, recognitional abilities are not necessary for knowing what it is like.

2 William Molyneux (1656–1698) was an Irish scientist and politician who sent a letter on 7 July 1688 to John Locke and asked him a question. The question Molyneux asked was whether a man who has been born blind and who has learnt to distinguish and name a sphere and a cube by touch, would be able to distinguish and name these objects simply by sight, once he had been enabled to see.

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References

[1] Alter, T. (2001). Know-How, Ability, and the Ability Hypothesis, *Theoria* 67, pp. 229–39.

[2] Berkeley, G. (1709). *An Essay towards a New Theory of Vision.*

[3] Bryant, P. E., P. Jones, V. Claxton, and G. M. Perkins. (1972). Recognition of Shapes across Modalities by Infants. *Nature* 240 (5379): 303–4.

[4] Carruthers, P. (1986). *Introducing Persons*: *Theories and Arguments in the Philosophy of Mind.* Albany, N.Y: State University of New York Press.

[5] Coleman, S. (2009). Why the Ability Hypothesis is best forgotten, *Journal of Consciousness Studies* 16 (2-3): 74–97.

[6] Conee, E. (1994). Phenomenal Knowledge, *Australasian Journal of Philosophy* 72, pp. 136–50.

[7] Hernandez-Reif, Maria, and Lorraine E. Bahrick. (2001). The Development of Visual-Tactual Perception of Objects: Amodal Relations Provide the Basis for Learning Arbitrary Relations. *Infancy* 2 (1): 51–72.

[8] Jackson, F. (1982). Epiphenomenal Qualia, *Philosophical Quarterly* 32: pp. 127–136.

[9] Jackson, F. (1986). What Mary Didn't Know, *Journal of Philosophy* 83: pp. 291–295

[10] Kaye, Kelley L., & Bower, T. G. R. (1994). Learning and Intermodal Transfer of Information in Newborns, *Psychological Science*, Vol. 5, No. 5 (Sep., 1994), pp. 286–288.

[11] Levin, Janet (1990). Could Love Be Like a Heatwave? Physicalism and the Subjective Character of Experience" in William G. Lycan (ed.), *Mind and Cognition*: *a Reader* (pp. 478–490). Oxford: Basil Blackwell.

[12] Lewis, D. (1983). Postscript to Mad Pain and Martian Pain, in D. Lewis, *Philosophical Papers*. Vol. 1 (pp. 130–132). Oxford: Oxford University Press.

[13] Lewis, D. (1988). What Experience Teaches, *Proceedings of the Russellian Society*, 13: pp. 29–57. Reprinted in Timothy O'Connor, & David Robb (eds.), *Philosophy of Mind*: *Contemporary Readings* (pp. 467–490). London: Routledge, 2003.

[14] Lewis, D. (1995). Should a Materialist Believe in Qualia? *Australasian Journal of Philosophy* 73 (1): 140–44.

[15] Loar, B. (1997). Phenomenal States, in N. Block, O. Flanagan, and G. Güzeldere (eds.), *The Nature of Consciousness* (pp. 597–616). Cambridge: MIT Press.

[16] Locke, J. (1690). *An Essay Concerning Human Understanding*. Scolar Press.

[17] Lycan, W. (1996). *Consciousness and Experience*. Cambridge: MIT Press.

[18] Mellor , D. H. (1993). Nothing Like Experience. *Proceedings of the Aristotelian Society* 63:1-16.

[19] Meltzoff, A. N. (1993). Molyneux's babies: Cross-modal Perception, Imitation, and the Mind of the Preverbal Infant, in N. Eilan, R. McCarthy, & B. Brewer (Eds.), *Spatial Representation*: *Problems in Philosophy and Psychology* (pp. 219–235). Cambridge, MA: Blackwell.

[20] Meltzoff, A. N., & Borton, R. (1979). Intermodal Matching by Human Neonates, *Nature* 282: pp. 403–404.

[21] Nanay, B. (2009). Imagining, recognizing and discriminating: Reconsidering the ability hypothesis, *Philosophy and Phenomenological Research* 79 (3): pp. 699–717.

[22] Nemirow, L. (1980). Review of Thomas Nagel, Mortal Questions, *Philosophical Review* 89: pp. 473–477.

[23] Nemirow, L. (2006). So this is what it's like: A defense of the ability hypothesis, In Torin Alter & Sven Walter (eds.), *Phenomenal Concepts and Phenomenal Knowledge*: *New Essays on Consciousness and Physicalism* (pp. 32–51). Oxford University Press.

[24] Nida-Rümelin, M. (1995). What Mary Couldn't Know: Belief about Phenomenal States, in T. Metzinger (ed.) *Conscious Experience* (pp. 219–41). Ferdinand Schoningh Verlag GmbH.

[25] Perry, J. (2001). *Knowledge*, *Possibility*, *and Consciousness*. Cambridge: MIT Press.

[26] Raymont, P. (1999). The Know-How Response to Jackson's Knowledge Argument, *Journal of Philosophical Research* 24: pp. 113–126.

[27] Rose, Susan A., Allen W. Gottfried, and Wagner H. Bridger. (1981). Cross-Modal Transfer in 6-Month-Old Infants. *Developmental Psychology* 17 (5): 661–69.

[28] Steele, Donna, and David R. Pederson. (1977). Stimulus Variables Which Affect the Concordance of Visual and Manipulative Exploration in Six-Month-Old Infants. *Child Development* 48 (1): 104–11.

[29] Streri, Arlette, and Marie-Germaine Pêcheux. (1986). Vision-to-Touch and Touch-to-Vision Transfer of Form in 5-Month-Old Infants. *British Journal of Developmental Psychology* 4 (2): 161–67.

[30] Streri, Arlette. (1987). Tactile Discrimination of Shape and Intermodal Transfer in 2- to 3-Month-Old Infants. *British Journal of Developmental Psychology* 5 (3): 213–20.

[31] Tye, M. (2000). Knowing what it is like: The ability hypothesis and the knowledge argument, In *Consciousness*, *Color*, *and Content* (pp. 3-20). MIT Press.

[32] Wagner, S. H., and Sakovits, L. J. (1986). A process analysis of infant visual and cross-modal recognition memory: Implications for an amodal code. In L. P. Lipsitt and C. Rovdollier (Eds.), *Advances in infancy research* (Vol. 4, pp. 195-217). Norwood, NJ: Ablex.