

EDUCATION AND THE EXTENDED MIND: POPPER, THE THIRD WORLD AND  
THE HUMAN COGNITIVE REVOLUTION

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Invited paper presented to the Philosophy: Aims, Problems, Responsibilities Conference,  
Warwick.

**Abstract**

Although he originally trained as a schoolteacher, and studied educational psychology, Popper's influence over educational thinking has been limited. This paper examines a relatively under-explored aspect of Popper's work – his notion of 3 worlds. The concept is critically discussed, and an attempt is made to complete Popper's picture of the interaction between objective and subjective knowledge. Drawing on recent developments in psychology and cognitive science, it is suggested that the uniquely human capacity for an intersubjective engagement with the intentional lives of others provides a way to understand the development of objective knowledge, and its contribution to the educational enterprise.

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## **Introduction: Popper and Education**

Imre Lakatos once wrote about Popper's legacy that 'the new central question':

'How do you improve your guesses? Will give enough work for philosophers for centuries; and how to live, act, fight, die, when one is left with guesses only, will give more than enough work for future political philosophers and educationalists'.

It would certainly be fair to judge that that most educational theorists and practitioners have yet to realise the full implications of Popper's programme. In any event, this disregard would be unfortunate. However, since educational research seems to have found itself the battleground between a rather crude positivism and an absurd postmodernism; and since so much educational practice continues to be based on a presumption of inductivism and the *tabula rasa*, or, in Popper's phrase, 'the Bucket Theory of Mind'; there is a genuine need to consider alternative approaches.

Of course, we should not overlook Popper, himself. It is easy to forget that a great deal of Popper's formative intellectual development took place whilst he was training to be, then practising as, a schoolteacher in worn-torn Vienna.

Popper's earliest writings, written whilst he was a student teacher, then graduate student, had explicitly educational themes, including discussions of the role of the teacher,

learning, and memory development, and, of course, there is his doctoral thesis, written whilst a student at Vienna's Institute of Education, on the methodology of the psychology of thought. Many of Popper's subsequent books – *The Open Society and its Enemies*, *Objective Knowledge*, his 'intellectual autobiography' – are littered with comments on learning and on the nature of school. And, Popper's remarkable *Logik der Forschung* was produced whilst he was a teacher.

### **Three Worlds**

The topic of this paper, the 3 Worlds hypothesis, has received very little attention from educational theorists. In fact, relative to the rest of Popper's work, it has not received much attention from anyone. Notturmo suggested that most contemporary philosophers regard Popper's engagement with this theme as an unfortunate product of his old age. I think that such disregard is a mistake. Specifically, I suggest in what follows that the 3 Worlds hypothesis suggests some fascinating lines of enquiry that cut right to the heart of educationalists' discussions of learning, teaching and the growth of knowledge.

Popper has suggested that we can distinguish at least three different worlds of our experience; three 'ontologically distinct sub-worlds'. World 1 is the world of physical objects, both organic and inorganic; it includes bodies and brains, houses and mountains, animals and plants. World 2 is the psychological world of conscious experience, such as sensory perception, feelings of pain and pleasure, of joy and anger, and of memories, thoughts and inspirations. World 3, or the *third world*, is ... Well, what exactly *is* World 3? There is a certain ambiguity in Popper's description; a brief review suggests a wide

range of inhabitants of World 3, as suggested by Popper and his collaborator, Eccles, some of which are listed in Table 1 (below).

A brief list of the inhabitants of World 3:

1. Theories, conjectures and linguistically formed hypotheses (1972, pp. 73 & 157)
2. Statements of unsolved problems and problem-situations, and arguments for and against competing theories (1972, pp. 109-110)
3. Human descriptive and argumentative language (1980, p. 159)
4. Logical relations between statements, such as contradictoriness, compatibility and deductibility (1984, p. 253)
5. Stories, myths and legends (1994, p. 82)
6. Open problems, with unexpected consequences and hidden potentialities (1972, p. 159-160)
7. Theories of space and time, and of physical bodies (1994, p. 114-115)
8. Works of art (Popper and Eccles, 1966, p. 41)
9. Standards and values, such as altruism (Eccles & Robinson, 1984, p. 74)
10. Linguistic expressions and records of human intellectual effort and achievement (Eccles, 1979, p.100)

Table 1: possible inhabitants of Popper's World 3

Popper's representation of World 3 as 'the world of objective contents of thought, especially of the scientific and poetic thoughts and works of art' (is not unproblematic, and a number of issues require clarification. For example, at one point, he states that the

most important inmates of the World 3 are critical arguments, and the state of discussion. Yet, he also identified them as ‘books or new synthetic medicines or computers or aircraft’. But, according to his own criteria, the latter group belong to World 1, the world of physical objects, not World 3. Popper adds that such items as books are ‘embodied in World 1 objects’, but that seems to confuse matters, because a book *is* a physical object; it is the ideas in it that can accurately be attributed to World 3.

So, it could be claimed that by blurring the difference between ideas and their physical embodiment, the way is open for a monist critic to dismiss World 3 on the grounds that it is an unnecessary addition to the argument.

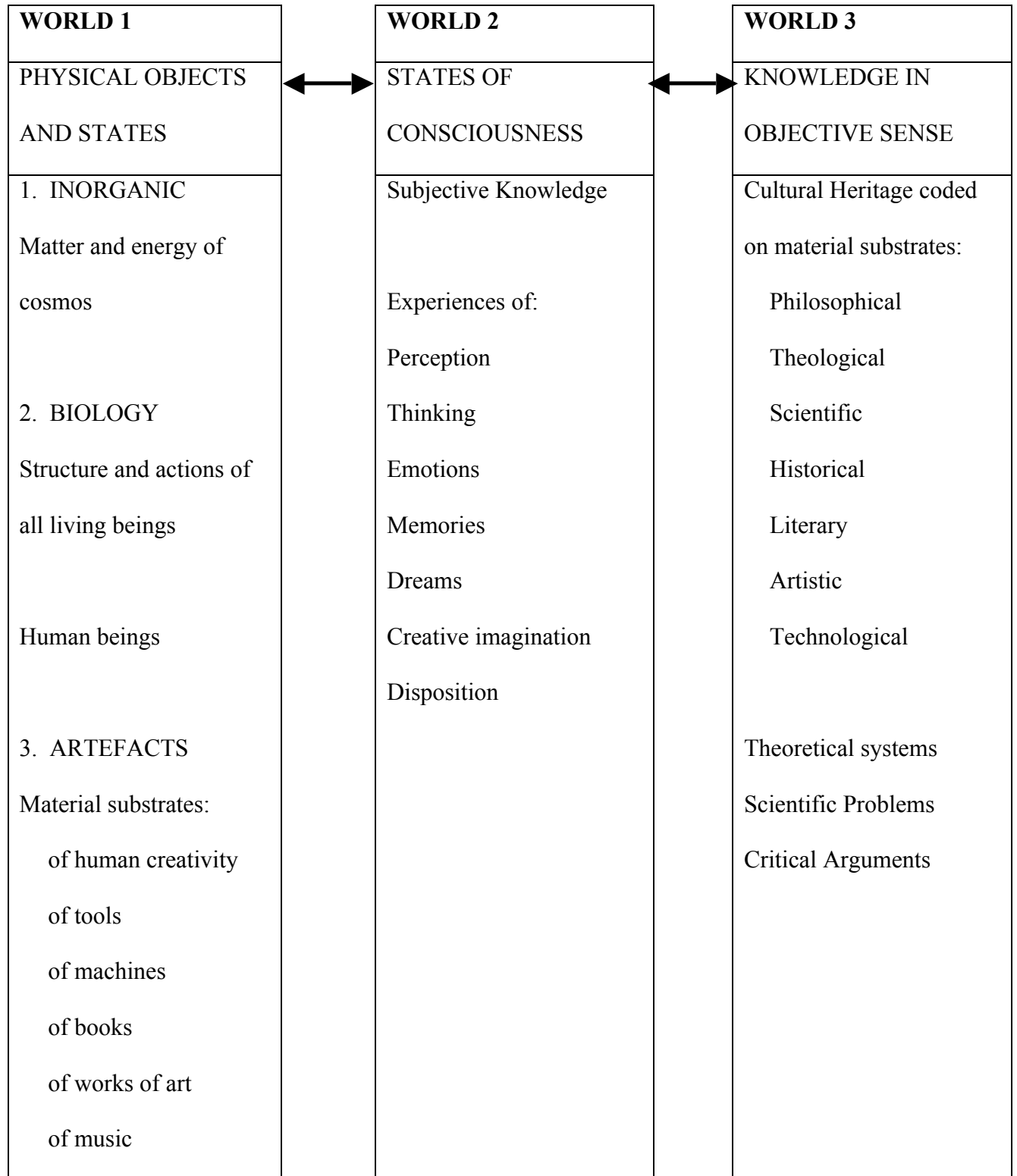
In this regard, Popper’s distinction between subjective and objective knowledge is central. Subjective knowledge consists of states of mind and consciousness (which seem fairly well ensconced in World 2). Subjective knowledge equates to the common usage, as in the phrase ‘I don’t know much about art, but I know what I like’. It is with this sense of knowledge that many philosophers have occupied themselves, but the difficulty with this is that it does not fully account for the growth of scientific knowledge, or for the other common usage of the word, as in ‘We know that water is made up of hydrogen and oxygen’, or when we talk of ‘human knowledge’. For Popper, this latter *objective* sense of knowledge is of crucial importance. Objective knowledge, he argues, exists prior to and independent of any individual’s claim to know. It is *knowledge without a knower*; it is *knowledge without a knowing subject*.

With regard to the precise relationship between World 3 and objective knowledge, Popper's phrasing is quite interesting. He says that 'objective knowledge forms *part of* the World 3 of mental products. Thus the growth of objective knowledge would be *part of* the growth of World 3'. I am not clear why he needed to insert the phrase 'part of' to both sentences. Surely, objective knowledge *constitutes* World 3, and the growth of objective knowledge *is* the growth of World 3. This certainly seems to be the position of Popper's collaborator on this topic, John Eccles.

Focusing on Popper's presentation of objective knowledge presents a more concrete outline of his World 3. Rather than talk of books or libraries, it seems far more appropriate to talk of World 3 as the word of knowledge without a knowing subject, and books, libraries, works of art and aeroplanes as merely the physical containers of that knowledge. Eccles, reasonably describes books and the like as only objective knowledge that is 'coded symbolically in the actual structures that serve as vehicles for this knowledge.

One possible way of representing the relationship between the three worlds is illustrated in the following diagram.

**Popper's Three Worlds:**



Popper uses the word *interaction* to characterise the relationship between these three worlds.

Popper's critics often claim a lack of a social and cultural dimension in his philosophy, and Popperian philosophers of education have often been criticised precisely on these grounds. But his later work, with its explicit analysis of the world of ideas, values and theories, clearly shows his recognition of the tremendous significance of the culture, tradition and society in which an individual grows.

One key feature of Popper's case is rationality, which he describes simply as a critical attitude towards problems. Rationality, he claims, is not a property living within an individual mind, but a consequence of the interaction of the World 2 and World 3.

Human beings are not born rational. On the contrary, they are often irrational, passionate and unreasonable. However, rationality is an aim towards which the human can strive; it is a standard and so inhabits World 3.

The development of such rationality locates education at the heart of the Popperian vision.

An infant left in isolation might be able to master a range of skills, but, according to Popper's description, she would not develop the foundations of rationality. Rationality is a product of social life and of an individual's interaction with theories and traditions. Similarly, fostering and educating rationality cannot be conceived of individualistically.

Rather, it must be approached within a framework that contains the traditions, culture and institutions in which an individual lives.

Popper's case for a cultural and social framework within which individuals grow and develop reaches its acme in his analysis of the human self and self-consciousness, what he described as 'that greatest of all miracles'. He asserts that it is only humans who are capable of consciousness of self. He accepts that self-consciousness is an evolutionary product of the brain, but he also argues that it transcended the brain. As the title of his major work in this area, *The Self and its Brain*, implies, the self controls the brain; it is the self that decodes the information received by the senses and based upon this information it is the self that prepares to act in the world. Popper's hypothesis of an active immaterial self interacting with the material world is the climax of his insistence against inductivism, of an active imposition of theoretical structures on sensory experience.

Rather than the intuitive idea that self-knowledge is gained through self-observation, which Ryle showed to be conceptually impossible, Popper argued that humans become selves by actively creating theories and conjectures about themselves and their relationship to the world.

At birth, babies can discriminate human faces and voices from other sights and sounds, and they seem attracted to them. Within days, they can begin to recognise familiar faces, voices and smells. Evidence of this sort seems to support Popper's suggestion that even

new born babies have an innate kind of understanding of others, and it is largely through this disposition that a consciousness of self begins to develop. In other words, the baby learns to become conscious of herself in relation to other people's consciousness of herself.

According to Popper, the self is anchored in World 3, and it cannot develop normally without contact from World 3 artefacts. Through experience, the child develops an ever-increasingly sophisticated systems of expectations. She learns a rudimentary theoretical framework, in which she places herself in time and space, including a sense of past and future, of certain regularities and of cycles, and of physical bodies. In other words, the child learns to be a self through viewing herself from the outside. These expectations are of a theoretical character, and develop alongside the parallel development of human language.

Popper labels this form of learning, learning to be a self through interaction between World 2 and World 3 '*cultural learning*'. What is the nature of this cultural learning? Popper does not give a detailed explanation or description of this process. Of course, like all features of learning in Popper's framework, it is presented as an active process. Rather than simply absorbing an object within World 3, an individual must make that object afresh, or recreate it in his or her own mind. However, this description is not comprehensive, not adequate for fully understanding the interaction between Worlds 2 and 3.

So, I would like to suggest one way of understanding this interaction, informed by recent developments in the cognitive and developmental sciences.

### **Cultural Learning**

Cultural learning, I suggest, is made possible because humans, from an early age, are able to understand others as living mental and intentional lives. This ability, usually described as ‘theory of mind’ by psychologists, as ‘adopting the intentional stance’ by the philosopher Daniel Dennett, and as ‘mind-reading’ by others, enables learners to see the world through another’s eyes, and to go beyond the immediately observed action, towards an understanding of the reasons for choosing that action rather than another. In terms of human development, this form of learning applies as much to linguistic and social abilities as to technical skills. Indeed, one of the most thoroughly explored uses of such mind-reading skills is in conversation.

Grice, for example, argued that, in mature symbolic communication, Utterer not only intends Audience to respond in a particular way, but also intends that Audience *recognises* that Utterer intends Audience to respond in that way. Likewise, to learn the conventional use of a tool or a symbol, learners must come to understand its intentional significance: What it is for? What do ‘we’ do with it? . This is a skill that comes effortlessly and quickly to most people, so it is rather difficult to appreciate fully the great advantage it offers over other species in acquiring skills and cultural practices.

In many respects, psychological research in this area parallels the philosophical '*Problem of Other Minds*' in the work of Wittgenstein, Strawson and Hamlyn. In part, these philosophers have sought to offer a response to the solipsistic challenge that 'my mental states are the only mental states'.

To convey the spirit of this line of argument, and to draw it back to the central issue of this paper, consider the situation of someone who really could not recognise mental states in others; who are unaware of others' thought, feelings and intentions. This is no mere thought experiment, as there are people with severe difficulties in this area: people with autism.

A number of theorists have suggested that it is an inability to infer the mental states in others that causes autistic people to have such great difficulty understanding social environments. One autistic man stated:

I really didn't know there were other people until I was seven years old ... I never could have a friend. I really didn't know what to do with other people, really.

And, the neurologist, Oliver Sacks, describes the difficulties facing one autistic woman whilst at school:

Something was going on between the other kids, something swift, subtle, constantly changing – an exchange of meanings, a negotiation, a swiftness of understanding so remarkable that sometimes she wondered if they were all telepathic. She is now aware of the existence of these social signals. She

can infer them, she says, but she herself cannot perceive them, cannot participate in this magical communication directly, or conceive of the many-levelled, kaleidoscopic states of mind behind it.

Autistic people are severely restricted in the extent to which they can communicate, share and connect with other people, and, thus, benefit from the process of cultural learning. They seem to stand outside of the social milieu and observe, and such non-participatory observation is inadequate to provide an understanding of other people and other minds.

According to Popper's model, children have an innate need to live and learn in culture. I suggest that their motivation to do so is one that strives to understand the world by sharing experiences and purposes with other minds. The ability to understand other minds is often called 'intersubjectivity', and 'we are the intersubjective species par excellence'. From a very early age, children are tuned to others' actions and emotions. So, from soon after birth human infants engage in 'protoconversations', or social interactions in which parent and child focus their attention on each other in ways that serve to share emotion. Also, from a few weeks old, infants mimic bodily movements of adults.

Cultural learning primarily occurs through interacting with other people. Clues from developmental and comparative psychology suggest that cultural learning can take many forms of, which, I suggest, act as media for the interaction between Worlds 2 and 3. The forms are:

- imitative learning;
- instructed learning;
- collaborative learning.

Each of these types of learning is made possible by distinctively human intersubjectivity.

There are three key features of imitation in human infants:

- infants are ‘imitative generalists’: they imitate a range of novel and arbitrary acts;
- imitation is intrinsically motivating for the young;
- imitation is often bi-directional: parent and infants frequently reciprocally match each other’s behaviours.

It is important to appreciate that human imitation is not the same as ‘mimicking’, since it involves the taking of another person’s perspective in order to reproduce both means *and* ends as one acts. It is also worth noting that imitation is not, as sometimes assumed, a passive form of learning. On the contrary, the infant is actively trying to understand an intention and match a behaviour, and their choice of models can be idiosyncratic and unpredictable.

Instructed learning involves learning about another’s understanding of a task and how that compares with our own. This intersubjective quality differentiates instructed learning from other forms of learning that sometimes go under the banner of ‘teaching’. There are many ways in which adults can support learning, such as simplifying a task or through giving clues to a problem’s solution. Such support – what is sometimes called

‘scaffolding’ - certainly has the potential to improve learning and performance.

However, these are examples of *social*, rather than genuinely *cultural* learning, since the child need not learn about the adult’s intentions or perspective. During instructed learning, the adult regulates the child’s performance, usually through talk at critical points, and the learner attempts to understand the task from the adult’s point of view.

That is to say, the learner attempts to internalise the adult’s instructions in relation to their own task understanding.

There is a range of evidence to suggest that children become capable of engaging in instructed learning from about 4 years of age. By 4 years of age, for example, most children are able to recognise others as mental agents with thoughts and beliefs that may be false or different from their own. At about the same time, infants start to use the language of mental states, use language to regulate their behaviour, and employ meta-cognitive strategies in support of their learning.

For instructed learning to take place, though, more is required than simply the learner’s ability to read the intentions of the adult. There is a logical asymmetry between the level of social cognition needed by the teacher and the learner:

- To learn by instructed learning, the learner must be able to recognise the intentions of the teacher.
- However, the teacher must operate at a significantly higher level, as the he must have some notion of the learner’s knowledge or ignorance of a specific task.

Therefore, the teacher needs to be able to recognise false beliefs in the learner,

and also have some acknowledgement of the learner's beliefs about the teacher's intentions, so that the teacher is able to spot misunderstandings on the part of the learner. So the real clincher in cultural learning of this sort is not the ability to imitate, but the ability to *teach*.

The final form of cultural learning, collaborative learning, takes place when neither participant is an authority. Typically, two learners work together on a problem and arrive together at the solution. They then individually internalise their co-constructed knowledge. Whilst there are many instances in which children work together, they are not necessarily engaged in collaboratively constructing knowledge at this stage. They are more often working - *rather like most academics* - in the same space as others, but without significant interaction. Indirect evidence suggests that the ability to problem-solve collaboratively emerges at about 6 years of age.

## **Conclusion**

Popper attributes the development of self-consciousness and cultural learning to an interaction between Worlds 2 and 3. But what is the nature of the relationship? I have suggested that the child's interaction with World 3 objects is mediated through an intersubjective engagement with other minds. Objective knowledge, as Popper argued, exists prior to and independent of any individual coming to know – *it is knowledge without a knower* – but learners come to access it through an active engagement with other people and other minds.

This is of great significance to educationalists, for whom the Bucket Theory of Mind seems to be the default. With their emphasis on the *curriculum* rather than the *learner*; on *teaching* rather than *learning*, educational systems around the world have taken it for granted that their goal must be to fill passive students' heads with knowledge, as if they were filling apples into a barrel.

The image of education presented in Popper's works is quite different. For him, the learner is not a bucket, but a searchlight, actively seeking out and constructing solutions to problems. And these problems reflect the distinctive environment in which humans grow and develop – an environment characterised by rich social and cultural relationships.

In the words of Michael Oakeshott,

‘Being human is recognising oneself to be related to others, not as parts of an organism are related, nor as members of a single, all-inclusive society, but in virtue of participation in multiple understood relationships and in the enjoyment of understood, historic languages of feelings, sentiments, imaginings, fancies, desire, recognitions, moral and religious beliefs, intellectual and practical enterprises, customs, conventions, procedures and practices... a human being is an inhabitant of a world composed, not of “things” but of meanings ... It is a world of sentiments and beliefs, and it includes also human artefacts (such as books, pictures, musical

compositions, tools and utensils) ... To be without this understanding is to be, not a human being, but a stranger to a human condition.'