

Bohm's Quantum Mind and the Spatial Acquisition Device

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This research abstract will build upon David Bohm's quantum mind and implicate order concepts at the intersection of developmental psychology and consciousness. David Bohm viewed quantum theory and relativity as contradictory, which implied a more fundamental level in the universe. He claimed that both quantum theory and relativity pointed to this deeper theory, which he formulated as a quantum field theory. This more fundamental level was proposed to represent an undivided wholeness and an implicate order, from which arises the explicate order of the universe as we experience it. Bohm's proposed order applies both to matter and consciousness. He suggested that it could explain the relationship between them. He saw mind and matter as projections into our explicate order from the underlying implicate order. Bohm claimed that when we look at matter, we see nothing that helps us to understand consciousness.

Bohm discussed the experience of listening to music. He believed that the feeling of movement and change that make up our experience of music derive from holding the immediate past and the present in the brain together. The musical notes from the past are transformations rather than memories. The notes that were implicated in the immediate past become explicate in the present. Bohm viewed this as consciousness emerging from the implicate order. Bohm saw the movement, change or flow, and the coherence of experiences, such as listening to music, as a manifestation of the implicate order. He claimed to derive evidence for this from Jean Piaget's work on infants. He held these studies to show that young children learn about time and space because they have a "hard-wired" understanding of movement as part of the implicate order. He compared this hard wiring to Chomsky's theory that grammar is hard-wired into human brains.

Bohm's notion of this "hard-wired" understanding of movement I am proposing is a Spatial Acquisition Device which is similar to Chomsky's Language Acquisition Device (LAD). Let me develop the Spatial Acquisition Device more fully borrowing from Piaget's theory of cognitive development as David Bohm suggested.

Jean Piaget has influenced cognitive theory with how children develop their concepts of space and time. The theory delineates a four-stage process of moving from sensori-motor to pre-operations to concrete operations and finally to formal operational thought. The developmental process is one of increasing complexity as the child internalizes and builds upon their concepts of

space and time. It is almost as if they have a Spatial Acquisition Device, similar to Noam Chomsky's Language Acquisition Device.

One of Piaget's most important discoveries is the concept of object permanence in which the child begins to understand that an object exists even when it cannot be viewed. Prior to object permanence when an object is removed from a child's sight, it no longer exists. This acquisition of object permanence occurs in the first year of life during a child's sensori-motor stage of cognitive development. The child develops the sense of being as having a permanent existence physically. So just as the child has learned about three dimensions physically through movement in the first two-years of life, the child begins a journey of internalizing how they learn about dimensionality over the next three stages of Piaget's theory in moving from one dimension to two dimensions and finally to three-dimensional space.

Piaget invented a very unique experiment to test for this acquisition called "conservation experiments" in which he devised experiments for one-dimension (number), two-dimensions (area), and three-dimensions (volume) (see the following chart):

Developmental Sequence to the Spatial Acquisition Device

<i>Dimensionality</i>	<i>Conservation Experiment</i>	<i>Stage of Piaget's Theory</i>
0 Dimension	Object Permanence	Sensori-Motor
1 Dimension	Number	Late Pre-Operational
2 Dimensions	Area	Concrete Operational
3 Dimensions	Volume	Late Concrete Operational

To further explain the above chart: the first stage focuses on sensori-motor (Birth-2yrs) learning in which the child learns via movement through space by raising their head, sitting up, rolling over, crawling and then by walking. The child experiences all the various dimensions of space from one dimensional space to three-dimensional space. A key component during this stage is the development of the concept of object permanence where an object continues to exist even if it can no longer be seen. Prior to the development of object permanence, out of sight is out of mind, non-existent.

During the pre-operational stage (2-7yrs), the child begins the initial tasks of conservation and begins to internalize the concept and not being influenced by perception and how things change. Conservation of number occurs during this stage. In the concrete operations stage (7-11yrs), the child moves on their conservation journey by acquiring conservation of area, length, weight, and volume completing their walk through the dimensions. Once the child has completed this dimension journey by internalizing these various levels of conservation when it comes to number, area, length, weight, and volume the Spatial Acquisition Device now governs how s/he will interact with the world on a spatial plane.

Let's return to the importance of object permanence, Piaget's most important discovery. As far as the child is concerned prior to object permanence everything is a wave function and perceptual, not internally represented. Once object permanence takes hold it provides the basis of internalization and representation of external reality within the Spatial Acquisition Device. It is the beginning of the child's life arrow establishing the concept of linearity. Up to that point it is a non-linear relationship as far as the child is concerned.

This acquisition is invariant, it may occur at different ages for children, but they are not going to go from object permanence to area before going to number, for example. Recent research has demonstrated that Piaget's stages may occur a bit earlier than suggested by the theory, but the invariance of spatial dimensionality has not been challenged. This is an important discovery since it could lead us to a Spatial Acquisition Device, which has implications in how we interpret the world. Are our brains prewired to interpret the world within three dimensions and if so, what could be the next logical step in understanding the relationship between space and time. For example, is object permanence the switch in moving from a non-deterministic (quantum) world to one that is deterministic (relativistic).

It is possible that object permanence could be a solution to quantum physics and psychology related to consciousness, but there is no scientific consensus on this yet. Some physicists believe that the concept of object permanence could help to explain the phenomenon of wave function collapse, which is a key concept in quantum mechanics. Wave function collapse is the process by which a quantum particle's wave function, which represents all possible states of the particle, collapses into a single state when it is observed. Some physicists believe that this collapse is caused by the conscious observer, and that the concept of object permanence could help to explain how this happens.

In psychology, object permanence is the ability to know that objects continue to exist even when they are not visible. This ability develops in children around the age of 7 months, and it is thought to be a key milestone in cognitive development. Some psychologists believe that object permanence could be related to consciousness, and that the ability to understand that objects exist even when they are not visible is a fundamental aspect of consciousness.