

Movement and numbers. Husserl and Maxine Sheets-Johnstone

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- synopsis -

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The Husserlian phenomenology of arithmetic shows that symbolic numbers are founded on non-symbolic sensuous cardinals of sets of things. Experiences about using symbolic numbers are founded on experience about using sensuous numbers. Husserl's early paradigm is visual. He would exemplify that symbolic numbers originate in the transition from multiple things, like for example some persons a subject sees, to a unity of multiplicities: the crowd a subject sees. I call this unity of multiplicities a sensuous cardinal, or to be more faithful to the non-symbolic register of blunt perception, I call it sensuous generality.

Maxine Sheets-Johnstone builds up on the Husserlian phenomenology of arithmetic and digs deeper down the constitutive path. She says that a unity of multiplicities - the sensuous generality - is tactile-kinaesthetic in nature before is it visual. She argues that the continuous kinaesthetic fabric of experience gives a permanent unity of multiplicities from which I can single out some distinctive things. For instance, *pointing* at a person is a case of singling out a thing from my kinaesthetic horizon. Sheets-Johnstone discovers a phenomenological ground beneath Husserl's which is reversed in comparison to Husserl's.

To bring the picture together:

1. The sensuous cardinal, in its horizon form, as a sensuous generality, is kinaesthetic in nature and is characterized by a vaguely defined set and by vaguely defined things (e.g. a subject is aware that he moves in a space that is frequently occupied is his vicinity)
2. Particular things, which are the objects of consciousness I direct conscious movement and vision at, characterized by sets of one thing (e.g. a subject avoids bumping into this person he sees, then that person, then the other person)
3. Non-symbolic sensuous cardinal of sets of things, in its objectual form. It is the object of consciousness I direct conscious movement and vision at, characterized by sets of many things (e.g. a subject sees a crowd and is aware of the crowd even though he moves through it by avoiding to bump into people)

This is a picture about shifting the intentionality in such a way that a sensuous cardinal becomes an object of consciousness out of a horizon.

Susan Goldin Meadow's research on how children learn to do basic arithmetic shows that

movement drastically helps children learn a new way of focusing: to abstract. She shows (2014) that using gestures to display addition differentiates children how learn addition regardless of the numbers they work with from children that have problems with generalization. The current phenomenological reading acknowledges that teaching children to abstract is synonymous to the subjective and counter-constitutive process of producing a new type of horizon out of objects of consciousness.

2a) Children focus on the plastic numbers on the whiteboard and on the + and = plastic symbols; these are objects of consciousness taking the form of things

3a) Children focus on the teacher's *pointing* at the plastic numbers and create a new object of consciousness, the missing plastic number; this is the symbolic non-sensuous cardinal of those plastic numbers

4) Most children that learn from a pointing teacher are able produce this new object of consciousness, a cardinal, *regardless* of the numbers they use; it becomes a symbolic horizon for using any number in a specific manner, just like my own movement can be used in any environment in its specific manner

Children are taught to produce new numbers by being lured into producing a new symbolic horizon. They are not taught something, an object. Rather, they are taught that a limit of intuition does not apply. A barrier is lifted for them. They are taught an affordance. This is what makes this experience counter-constitutive. A new horizon is formed against a subject's usual objectuality. This affordance children are taught mirrors the movement affordances they teach themselves by moving. Just as any environment presents a subject with the rules for producing movement, the teacher that points at the plastic numbers teaches the rules for producing a new number.

To produce a number does not imply producing its thinghood. If a child adds the plastic 4 to the plastic 5 from the whiteboard, he will not produce a previously absent plastic 9. The usage of symbolic numbers, or inauthentically experienced numbers, as Husserl would say, vouches for the subject's detachment from all particularities that led to the subjective production of those numbers. Inauthenticity becomes synonymous to thinking because inauthenticity here is a shift from attending to the immediate particular to attending to an expected generality. Producing symbolic numbers pushes me back to the subjective situation where the horizon dominates all objects, where focusing on something is secondary to following the rule. The very fabric of abstraction is spelled out in the nature of its usage - the specificity is encased in the rules that power up the symbolic practice, so that any subject using those rules can maintain a pre-specific position, a generality position from which to practice. The teacher's movement is the visual correlate of those rules.