

## An enactivist reaction to Samson & Schäfer

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In FLM 31(1) Samson and Schäfer (2011) explore how a combination of three theoretical ideas, enactivism, figural apprehension, and knowledge objectification, can shed light on figural pattern recognition. Such attempts to make connections between the disparate perspectives researchers in mathematics education bring to bear are to be valued. There are many possible approaches to combining theoretical ideas. Here I will use metaphors of salad, cake and soup to describe three.

In a salad each ingredient remains visibly itself. If you do not like cucumbers you can pick them out fairly easily. There is only a requirement that the ingredients can coexist in the same bowl. Multiple theoretical perspectives are valued for the different ways each one helps us make a different sense of data. There is no attempt to reconcile what each perspective says about the data. The perspectives can be contradictory (can say different things), as long as they are consensual (accepted as sensible stories to tell about the data). When you have a salad you have the “multiple consensual contradictory perspectives” I wrote about in Reid (1996).

In a cake each ingredient combines chemically with the others to produce a new substance, cake, in which the flour, eggs, milk, etc. are no longer visible. A new theoretical perspective is offered that is a synthesis of others. Once the synthesis is made, the qualities of the ingredients are not evident and, mostly, not relevant. While a baker might try to puzzle out the components of a cake, most consumers are content to enjoy the finished product without analysing it. Enactivism itself is an example of such a synthesis. It is interesting for some to trace its origins in cybernetics, phenomenology, neurobiology and so on, but you can understand enactivism without understanding its origins.

Samson and Schäfer made soup. Chunks of knowledge objectification and figural apprehension float in an enactivist broth. The chunky ingredients taste a bit different as a result of being cooked in the broth, but remain identifiably themselves. The broth, on the other hand, retains only the flavour of its origins. Its substance has melted or been strained away. This may have happened because of a difference in the nature of the ingredients used. Enactivism, figural apprehension, and knowledge objectification are described as three “theoretical ideas” but enactivism seems to me to be a theory, not an idea. It might be possible to focus on an idea from enactivism that relates to figural pattern generalisation in order to keep an enactivist element visible in the mix, but Samson and Schäfer let enactivism fade into the background.

I find myself dissatisfied with this approach, perhaps because the disjoint categories at the heart of knowledge objectification and figural apprehension do not taste quite right when mixed with the middle way of enactivism. These categories are based on properties “contained” in figures and it is hard for me to understand what is meant by this metaphor. From an enactivist perspective, the structures of

figures offer certain affordances, which can trigger various perceptions/actions according to the structure of the observer. The four modes of figural apprehension tell us something about Duval as an observer of figures, as well as telling us that figures afford being apprehended in these four ways by an observer sufficiently like Duval to apprehend them in these ways. Similarly the sensory/cognitive dichotomy (which seems suspiciously like a body/mind dichotomy) tells us something about those who observe this dichotomy, and a little bit about the phenomenon of visual perception – that it can be dichotomised in this way by a suitably structured observer. Simply adopting Duval’s categories and the sensory/cognitive dichotomy is not a very enactivist approach. Instead one could explore what the categories are like far from the prototypes that implicitly define them and ways to escape from the dichotomy (like the Möbius band mentioned on p. 40).

What if I wanted to make enactivism more visible by not combining with anything and simply trying to say something about the events described in the vignette? Certainly Grant’s structure is such that the figure can trigger many interpretations and, hence, the figure has affordances for those interpretations. For an educator a key question is “How did Grant’s structure come to be this way?” We do not have any data to help us speculate about this. Samson and Schäfer describe him as “high ability” which suggests that his structure possesses (perhaps from birth and, perhaps, essentially) something called “ability” that allows him to observe the figure in many different ways. Samson and Schäfer’s concluding comments on implications for teaching suggest, however, that a history of interactions with teachers who themselves recognise multiple interpretations of figures and interact with figures in multiple ways might have influenced the development of Grant’s structure. I tend to this belief myself, mostly because it gives teaching an important role. As a teacher educator, however, I am keenly aware that it puts responsibility on to me to influence the development of teachers’ structures so that they can interact with figures in multiple ways. It is sobering to remember that all my interactions with teachers change both their structures and my own in ways I cannot predict but which will ultimately influence the interactions those teachers have with their students. And perhaps that brings me to the point of presenting a complex process like figural apprehension as a relatively simple matter of combining four modes of apprehension with two modes of perception. If I want to remain connected with the teachers I hope to influence, then it is important that I present affordances to their structures. Disjoint categories and dichotomies may be a way to do that, whatever I think of them as ways for me to think about figural pattern generalisation.

### References

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