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A view from the kaleidoscopic:
How behavioral scientists deal with explanatory complexity

Much Studying human behavior is difficult. This is so not just because we cannot do experiments with humans and not just because it is *behavior*, which (in contrast to many physiological traits such as body height) brings in *semantic* problems of how to understand (describe, categorize, operationalize, and measure) the respective phenomenon properly. It is also because it is the behavior of *complex entities*, namely organisms (be they human or not), which *develop* (in contrast to things such as stones). Development is a complex causal process, consisting of many mechanisms and pathways at many levels of analysis. The explanation of every product of this complex process (the physiological as well as the behavioral traits of organisms) will be complex too, albeit in an *explanatory* and therefore epistemic sense, a sense of complexity that is related but not necessarily dependent on the other two (*semantic complexity* and *developmental complexity*).

To analyze the relations between these three kinds of complexities will thus be the task of the first part of the talk. The focus in the second part will be on two issues related to the third kind of complexity, which I will call (for lack of a better name) *explanatory complexity*, a kind of complexity that frequently shows up in behavioral scientist's language when they talk about this or that *trait being complex* (meaning not that the trait is literally complex but that it has a complex explanation).

Part 1: Actual scientific practice is full of cases where (implicitly if not explicitly):

(a) semantic complexity is pragmatically solved by fixing the description, categorization, as well as operationalization and measurement of a human trait (e.g. by treating aggression to be a phenomenon of non-state inflicted violence), where

(b) the scope of a study is equally decided by focusing on differences between individuals in a specific population (e.g. the US), where

(c) the level of analysis is limited (e.g. if the study black-boxes endophenotypes, the intermediate stages that constitute (or at least contribute) to the phenomenon without being compositional parts of the phenomenon).

Despite all these simplifications, there is explanatory complexity: each result of development is *multifactorial* (to use contemporary language in the behavioral sciences), caused my a multitude of causes. On the one hand, this multiplicity is not specific for developmental processes, since it is the trivial multiplicity that all phenomena have more than one cause, each cause being contributing only, i.e., partial rather than total (to use contemporary philosophical language). On the other hand, there might be a specific kind of explanatory complexity that derives from developmental complexity, a specific multiplicity or multiplicities even. Robustness and redundancies are, for instance, concepts that will be discussed to clarify what is specific about the explanatory complexities involved in developmental processes.

Part 2: After this first part, the partiality of any explanation in reach for contemporary behavioral studies will be analyzed. All studies select among the multiple factors that could be studied. Philosophers have addressed this issue under the heading of 'causal selection' since J. St. Mill first pointed at it. I shall focus on two issues:

(a) How does that selection work for causal factors that are ontologically on a par, not just in being causes but in being *similar kinds of causes* (similar in terms of the level of analysis). This is the case, for instance, when scientists give priority to genetic factors in the explanation of diseases and ignore environmental factors, a bias in causal explanation that stands beyond all the futile nature-nurture wars of the last roughly 100 years.

(b) Are the resulting partial explanations (resulting from different selections of different perspectives, methods and causes of interest regarding a phenomenon) reconcilable? Helen Longino (2013), for instance, has stressed the incommensurability of the different 'causal spaces' that are utilized by different approaches to the explanation of human behavior.

In terms of the claims to be defended, the talk aims at three things:

- Illustrating that there is no specific explanatory complexity for developmental processes by analyzing the relations between three kinds of complexity: semantic, developmental, and explanatory.

- Making sense of causal selection (for cases where the causes are on the same level of analysis) as a heuristic reaction to explanatory complexity by pointing to a revised version of Collingwood's (1938) pragmatic-pluralist 'control principle' of causal selection.

- Defend that the involved pluralism of causal spaces should not depict behavioral sciences as tower of babel but as exhibiting a kaleidoscopic unity between the partial perspectives, with lots of knowledge integrated for specific problems.

Behavioral scientists manage behavioral complexity with a view from the kaleidoscope.