

# What is Development?

## Axiomatic bases for a Developmental Science<sup>1</sup>

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**ABSTRACT.** Developmental theorizing in psychology has emerged slowly in the past 300 years, and has been inconsistent. The main obstacle for developmental science is the misfit between axioms needed for looking at developmental phenomena, and psychology's habits of using standardized and consensually—rather than theoretically—validated methods. For reconstructing developmental science in new ways, it needs to build on lessons from its own history, rather than follow external fashions of sciences that are not aimed at the study of development. History of psychology is a central resource for the development of the science of psychology. Developmental science in the future is oriented to (a) preservation of time within its analytic units, (b) gives up the notion of “variables” and moves to study dynamically transforming structures, and (c) treats the systemic analysis of single cases as definitive of basic data derivation (with the notion of “sample” retained as the background “location map” of where the selected individual cases are located. This new developmental science shares its general idea complex with developmental biology, where the centrality of flexible pre-adaptation of organisms becomes central for science.

Developmental science is in a turmoil—there exists a basic mismatch between its theoretical premises and methodology (Valsiner, 1998, 2001). It has been slow in its historical advances—making few and very tentative steps ahead, then retreating to the safe heavens of non-developmental psychology—only to

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continue the search for new developmental ideas (Cairns, 1998). In this paper I analyze the general reasons for such slow growth in ideas, and outline some of the ways for overcoming it.

I will not discuss children's (or adults') "age-related changes" in different kinds of "measures" of psychological "variables." I will not speak about growth curves, or age-related stage accounts of either cognitive or moral states of persons. These are all particular issues that emerge from researchers – implicit or explicit—initial standpoint of what they consider development to be. Instead the **developmental complex of ideas** will be analyzed here. That complex-- in whichever science it may be situated-- **entails efforts to reveal general laws of emergence of novelty** in irreversible time. Developmental time is necessarily irreversible. Henri Bergson emphasized this around hundred years ago (Bergson, 1907) , and Ilya Prigogine put his ideas into practice in the second half of our Century (in physical chemistry-- which is a rather unexpected candidate for a developmental science—Prigogine, 1973).

Novelty is detectable in comparison of the new with the previous new. In other terms, I talk about the focus on STRUCTURAL TRANSFORMATION of psychological systems in the course of human life. This is in parallel to focus in developmental biology-- at least its interest in the growth of multicellular organisms. The authors known inside usual accounts of psychology who have taken interest in this issue are (among many) James Mark Baldwin, George Herbert Mead, Jean Piaget, Lev Vygotsky, Kurt Goldstein, Friedrich Sander, Felix Krueger, Heinz Werner.

Secondly, science is aimed at arriving at general knowledge, rather than remaining content with the post-modernist invention that only local knowledge is in principle available to us. Fruitful application of psychology is possible only on the basis of general theoretical knowledge-- or in Kurt Lewin's terms-- there is nothing more practical than a good theory.

However, few theories in psychology can live up to Lewin's standard for "goodness." A "good theory" would be a theory that is consistent with its axioms, sensitive to the phenomena under study, and which is the basis for construction of theory-adequate methods for empirical work. In much of developmental psychology of the second half of the 20th Century, such criteria for consistency have become loose. Theories that are claimed to be "developmental" are often a mixture of non-developmental claims, dressed in paraphernalia that depend upon actual developmental processes (such as "age-related changes" or "age-groups comparisons"), but which are merely outcomes of such development. It is not possible to re-construct the general principles of underlying processes from the static outcomes of such processes—the study of the processes themselves is needed (Valsiner, 1997).

### **Axiomatic differences of developmental and non-developmental world views**

In most general terms, non-developmental and developmental perspectives are opposites that deal with the same phenomena. They can be contrasted, but not eclectically mixed. The study of transformation addresses issues that the study of "things-as-they are" finds superfluous, unnecessary, or even "error." The non-developmental perspective is based on the **axiom of identity**:

$$X = [\text{is}] = X$$

Based on this axiom, it makes good sense to ask questions about "what IS personality?" "what IS intelligence?" "what IS memory?" Questions of development are ruled out from that axiomatic basis-- why

ask a question of **HOW X BECAME TO BE X**, if we already know that X is X.

The developmental perspective is based on the **axiom of becoming**. It takes two forms:

**X ---[becomes]---> Y**

**X --[remains]--> X**

Both becoming and remaining are processes which guarantee both relative stability and change in the case of development. In the case of remaining, the particular system that is maintained in its general form, depends upon constant innovation of the form by new parts. Biological organisms maintain themselves by the processes of new cell production and old cell death, while the form (the structure of the organism) in general remains the same.

Thus, the axiom **X--[remains]-->X** is not the same as the identity axiom of non-developmental perspectives -- **X =[is]= X**. In the case of remaining, **process of maintaining an emerged state of a system** is implied. Thus, our living is dependent on the regular flow of blood through our circulation system—its dynamics maintains our relatively constant being. In contrast, in the case of the identity axiom, no process (that makes the identity) is implied. The fact of our biological existence is simply acknowledged by a simple causal statement, like “we live because of our blood circulation”. That statement is undoubtedly true—yet inconsequential for our understanding of how is our living made possible by the blood circulation system. In general-- **the identity axiom is conceptually blind to the processes that make that identity possible**. In a

similar vein, non-developmental psychology is blind when questions of development are asked.

### **Where does developmental psychology belong?**

It is quite surprising that developmental psychology is classified to belong to psychology at all, given the difference of axioms. Historically, developmental science emerged on the basis of embryology (starting from Karl Ernst von Baer) and evolutionary thought of Herbert Spencer, Alfred Wallace, and Charles Darwin. It was a natural science within biology-- quite different from the laboratory-based distancing of early psychology from philosophy (a la Wilhelm Wundt).

The axiomatic developmental perspective has been used to create various theoretical stances over the 20<sup>th</sup> Century. Thus, James Mark Baldwin's (1906) theory of "**genetic logic**" constituted an attempt to turn the non-developmental ("classical", Boolean logic) into a developmental theory. It remained incomplete, and fell into historical obscurity-- the latter as part of the ruthless forgetting of ideas that social sciences practice. Lev Vygotsky's (1925/1971) focus on **affective synthesis** entailed efforts to see how new personal sense system can emerge via a qualitative leap in the intra-psychological processes. Similar issues were the focus for the "Second Leipzig School" of psychology where Wundt's notion of synthesis was given elaboration first by Felix Krueger, and then by Friedrich Sander (Valsiner & van der Veer, 2000, chapter 7). Heinz Werner's general principle of development-- the **orthogenetic principle**-- was likewise an attempt to explain the emergence of novel form in complex structures (through differentiation, articulation, and hierarchical integration). Last (but not last), Jean Piaget's system of **genetic epistemology** (and particularly his notion of "progressing equilibration")

was a product of the 20th Century that is oriented towards making sense of transformation of form. These developments culminate in the emergence of developmental science (Cairns, Elder & Costello, 1996)—which attempts to re-integrate these different historical traditions.

### **Psychology's limitation—avoiding its own history**

Interestingly, however, all these ideas share the fate of falling into historical obscurity as ever-new generations of researchers rush to do their research in the fashionable ways of their time. Not that these ideas are not valued-- one can find that some of these are revered by large fan clubs (of Vygotsky, or Piaget, for instance), or put on a pedestal by historians of psychology to give him (or her) a specific exposure (e.g., Wundt has been presented as an experimentalist, rather than folk psychologist). The value of the work of past theorists has been fragmented-- they are shown to belong to the history as a narrative "as they were", rather than to analytic efforts of what they did, or did not, achieve. Their ideas are not integrated into the current research practices, especially in the empirical side of those practices. In other terms—in psychology's regular practices, history is not viewed as constitutive part of the science in the present.

This segregation of history of the given science is usual in many sciences, including psychology. Scientists try to overlook the myriad of unproductive ideas and failed efforts to solve their problems-- which make up the bulk of the story about any science's past. Unfortunately such forgetting could work well only if the progress in science were that of monotonic increase of knowledge, where every new decade (or year) would bring with it scientific breakthroughs that "wipe out" the knowledge of the previous time. Even if that may be true at short time periods, to assume

such a picture for a longer time (and for science like psychology) could be risky. From time to time, different contemporary researchers "discover" a forgotten genius, who may be then claimed to be fifty years ahead of his time (e.g., some claims about Lev Vygotsky). However, with the passing of a fashion for the discovered past genius, the texture of ideas that characterize the heritage of such genius can easily again be forgotten.

Here is the trick of the role of history of ideas in psychology of the 20th Century-- different theoretical efforts have been kept as "hostages" in the movement of the discipline. These "hostages" are well hidden in the archives of psychology's history, brought out at times to demonstrate that they still exist (and to demand "ransom" for them in the form of new symbolic capital of the time-- research grants, commemorative volumes, special issues of journals, etc.), and then sent back to the archives until the next time to appear on the stage. The intellectual interdependency of the ideas the "hostages" bring with them, and current research practices, seems to remain carefully modulated by the current contemporary trends for methods. Many of the implications of the theories of Baldwin, Vygotsky, Piaget, Werner, etc. for the methodological practices in psychology are carefully NOT taken over by researchers in our time, exactly as these researchers actively claim the value of their theoretical ideas for contemporary psychology.

There is a discrepancy in the borrowings from the past which is almost the reverse compared to the end of the 19th Century. Then, most North-American psychologists got their education in Germany, and carried back from Leipzig the floor plans of Wundt's laboratories, and ideas for building experimental gadgets. Not many of them emphasized (then) the theoretical ideas for which these gadgets were built. A century later, the story seems different. Now it involves bringing out from the history of psychology some complex theoretical ideas-- such as "zone of

proximal development", "equilibration", "multivoicedness of the mind", using those as "theoretical umbrellas" for discourse about one's research topic-- yet continuing to use the "accepted methods" in empirical data generation and analysis processes. Laboratory floor plans and equipment blueprints are no longer necessary, but theoretical "umbrellas" seem to be.

Of course, there is a big difference between psychology of the end of the 19th Century, and that of our time: then, psychology was yet to create its social-institutional role, whereas at our present time it is under various pressures to maintain its established role, defending it against various challenges. When hundred years ago the set of METHODS was still flexible, and coordinated with the nature of the phenomena under study (e.g., nobody expected from William James to use ANOVA in any study of emotional contexts, such as running-away-from bears in the forest), then a century later the set of METHODS becomes standardized socio-institutionally, with value-added talk about them in terms of "right", "wrong", "objective", "standardized" etc.-- all of which orients the empirical work.

### **Directions in developmental science**

How, then, can the strictly developmental perspective innovate the empirical research practices of developmental psychology? Three directions can be outlined.

**FIRST DIRECTION. Preservation of time in the construction of units of analysis.**

If the notion of irreversible transformation of structures is assumed, then naturally the temporal frame that would allow to represent

this emergence process needs to be present in the empirical data. This may entail the use of mutually overlapping temporal units for detection of emergence processes e.g., Unit 1 entailing A-B-C, and Unit 2 C-D-E ,-- where part C is overlapping. The overlapping part may be either clearly structured, or "fuzzy" (semi-formed). Parts of semi-formed (therefore difficult to classify) phenomena may be natural parts of the time-preserving units. Development (remembering Werner) takes place through de-differentiation and differentiation. The units of analysis in the empirical work need to preserve that quality.

**SECOND DIRECTION: Psychological science studies dynamically transforming structures-- and not "variables".**

The talk about "variables" is a relatively recent invention in psychology, as Kurt Danziger (1990) has well demonstrated. In the case of a developmental focus on transformation of structures, psychological experiments cannot be viewed to entail simple changing -- by experimenter-- of "independent" variables to check their "effect" upon the "dependent" ones. In line with the strict developmental stance, the distinction between "independent" and "dependent" variables becomes impossible, as the relations between experimental setting and the research participant entail dynamic feedback loops.

In fact, there cannot exist "variables" in the strict sense of this term (i.e., quantitative entities that can be varied at researcher's will, independently from one another, and of the interpretations that research participants attribute to these). Instead, the experimental situation is constructed (and re-constructed) by the experimenter in its total structure, which is expected to elicit in the subject a process of co-acting and co-thinking. The latter processes would be the targets of analysis--equivalents of the traditional talk of "dependent variables." This is in line

with Vygotsky's "method of double stimulation", which is a socio-cultural version of the strictly experimental tradition of *Aktualgenese* of Friedrich Sander and *microgenesis* of Heinz Werner (Valsiner & van der Veer, 2000, chapter 7).

**THIRD DIRECTION: The definitive empirical source for data derivation is the single case: a particular person studied in his or her negotiation process with the particular here-and-now setting.**

Generalizations in this perspective are made from single cases to the generic functioning of the personality system (Lamiell, 2003). The empirical task of the researcher is first to analyze-- the systemic functioning of single systemic case-- and once the single case is explained-- then to aggregate knowledge of the ways in which the system works, across persons into a generic model (Molenaar et al, 2002).

The process of such post-analysis aggregation is that of re-application of the generic model (created on the basis of a single case) as a hypothetical pattern, to new selected single cases. The latter may be selected on the basis of information about the standing of the case within a sample (thus leading to a combination of case-based and sample-based information-- still with the primacy of the former). In fact, selection of cases from different ranges of the sample (i.e., using information about inter-individual differences)-- from extreme ends and from the middle of the distribution-- may help the inductive side of the generalization process. If the hypothesized generic model of the single case (and based on one single case, say, drawn from the middle range of the sample distribution) is demonstrated to function in cases who are "outlayers" in the distribution, the researcher is on her (or his) way towards basic knowledge. This strategy is well-known in linguistics, where adequacy of a theoretical proposition is tested on singular examples from language, testing for

extreme cases that may refute the proposition. Finding of such single counter-cases forces the theoretical system to reconstruct, or at times may lead to the abandonment of the system.

The goal of this paper is not to introduce a new orthodoxy to our discourse. All of the main strictly developmental thinkers of the 20th Century would have agreed that orthodoxies undermine science, and that following of the "great psychologists" is more dangerous than being critical of them. Following is unlikely to produce novel perspectives, criticism might. Instead of deconstruction of developmental psychology that our critiques are so eloquent about, we may be better set ourselves the goal of **reconstructing** the discipline.

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