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Expansion and Organizational Applications of Zigzag Theory

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In this paper we (1) review the basic distinction between linear and zigzag developmental social science theory, (2) examine one particular nonlinear zigzag pattern ("zigzag learning theory" Andersson, 2004) in detail (3) demonstrate that important and significant elements of the social context, such as suggested by Mead (1934), are missing from the zigzag formulation and (4) conclude that when such elements are added, the theory is far more robust allowing for a wider range of applications to issues in organizational behavior and organizational theory research.

Field of Research: Organizational Behavior

JEL Codes: L20, M10 and Z13

1. Introduction

The purpose of this paper is to distinguish linear from zig zag developmental learning theory as suggested by Andersson (2004) and to show that a major element is missing from the theory. The missing element is the social context which is eloquently discussed by Mead (1934). We propose that a more useful theoretical formulation for organizations is to incorporate the social context as discussed by Mead (1934) into Andersson's Zigzag learning theory thereby increasing the power of the theory. In this paper we show how the social context can be incorporated and then we discuss several practical applications of the theory for subsequent research aimed at understanding the process of learning in organizations.

This paper takes Andersson's zigzag framework (2004) as a point of departure – he ties learning to interaction between mind and body and then ties it to practical behaviors such as learning how to operate a computer. In our view, however, he has neglected one major element which is the social context, an element which has not been identified in previous studies, thus forming the major differentiating finding of the study. Based upon the work of George Herbert Mead (1934), we expand Andersson's focus on mind, body and inorganic elements to include social elements which are seen as moderating effects on the entire set of theoretical connections which are posited by Andersson (2004) and apply it to the phenomena of learning in the organizational context. The organizational context of focus is general and includes issues common to research in organizational behavior and organizational theory in business, nonprofit and governmental settings.

The remainder of the paper is organized into five sections. The first section (Literature Review) is a summarization of the literature pertaining to the origins and applications of zig zag theory and to the zig zag theoretical work of Andersson (2004) which is the major

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focus of the paper. The next section (Methodology) discusses the procedure which is used to present the development of the theory through four increasingly complex cumulative models. The Analysis section focuses on a key element of the formulation which is missing, namely the social concepts developed by Mead (1934). The completed zig zag model is elaborated in the Applications and Conclusions section though the use of illustrations. A reference list and an appendix complete the paper.

2. Literature Review

A popular approach to describing changes in phenomena through time is to identify major distinguishing events and then to organize these events as a series of relatively Identifiable linear stages (levels, phases, cycles, moments, points, etc.) connected by transition activities. Usually the phenomenon is described by several variable characteristics ("trends") which change from stage to stage following either a linear pattern or a very gradual nonlinear pattern. Also, these sets typically begin with underdeveloped stages and proceed to more developed stages. The distinction between "under" and "more" development is usually driven by one or more covarying criteria representing subjective values.

Such patterns are typically referred to as "Developmental Stage" patterns; Appendix One presents several examples of developmental sequences drawn from the social sciences, most of which are of the type described here; familiar examples from organizational behavior and organizational theory are Maslow's (1943) hierarchy of needs and Quinn and Cameron's (1983) organizational life cycles. The focus in this paper is on learning theory within the organizational context. For purposes of the applications in this paper we do not distinguish between business, nonprofit or governmental organizations.

An alternative approach to describing developmental changes in phenomena from stage to stage as linear, or gradual nonlinear, is to suggest they follow a "zig zag" pattern – nonlinear with sudden, nongradual, often severe reverses in some but not all of the underlying values (i.e. not completely co-varying). An example from Appendix One is Marx and Engels (1969) stages of societal history – they posit a pattern of societal development through application of the dialectic method which at times involves violent reversals of some of the underlying trends – a zig zag pattern. A quick internet search will reveal that the zigzag pattern has been used to describe phenomena as diverse as:

- Sports Betting (http://sportsgambling.about.com/od/basketball/a/zigzag.htm),
- Automobile Braking Systems (http://community.cartalk.com/discussion/2281940/the-zig-zag-theory-of-braking)
- Aeronautical Engineering (http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20100013955_2010013894.pdf)
- Philosophy (http://people.umass.edu/klement/RussellsParadoxes-part2.pdf),

- Physical Fitness (http://www.fitsite.com/members/nutrition/zigzag.html)

Andersson (2004) bases his ideas about zigzag theory on Bateson (1979) who, he indicates (Andersson (2004:4158), writes:

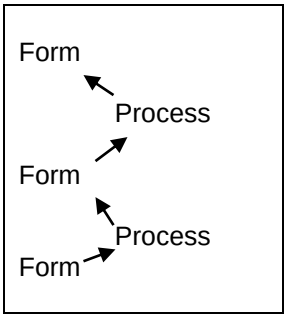
> …when we take the notion of logical typing out of the field of abstract logic and start to map real biological events onto the hierarchies of this paradigm, we shall immediately encounter the fact that in the world of mental and biological systems, the hierarchy is not only a list of classes, classes of classes and classes of classes of classes but has also become a *zigzag ladder of dialectic between form and process*.

Thus, while elements of this analysis have been discussed in previous works, they have not been brought together in one model which thus puts a major constraint on the ability of social scientists to understand human behavior. In our study, however, such an integration of elements is presented which enables movement significantly closer to a truly comprehensive understanding of human behavior.

3. Methodology

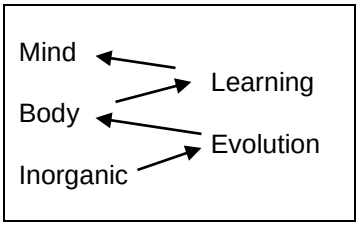
Andersson's (2004) ideas of a zigzag theory may, for our purposes here, be divided into four parts (Figures 1 to 4). An important note is that Andersson uses the terms "organic nature" and "body" interchangeably. The essential distinction in Andersson's (2004) formulation is between forms and processes – the zig zag pattern results from the movement between them which approximates the dialectic. Processes incorporate a time element and forms do not. Andersson (2004) portrays this dialectic movement metaphorically as a ladder as shown in Figure 1

Figure 1: Andersson's (2004) Zig Zag Theory Structure



When Andersson (2004) attempts to cast the forms-processes model in reality terms he develops the zig zag pattern shown in figure 2. The distinction between the learning and evolution processes is that learning relates to one person whereas evolution refers to two or more generations of individuals.

Figure 2: Forms and Processes of Reality Superimposed on Zig Zag Theory Structure (Andersson, 2004)



Continuing, Andersson (2004) introduces a subordinate zigzag ladder sequence which relates to the Learning Process; these forms and processes of learning are shown in Figure 3. and are combined with the reality forms and processes for one person in Figure 4. Because of the one-person focus in this paper, intergenerational and inorganic elements are not of interest and are not shown in Figure 4.

Figure 3: Zig Zag Forms and Processes of Learning (Andersson, 2004)

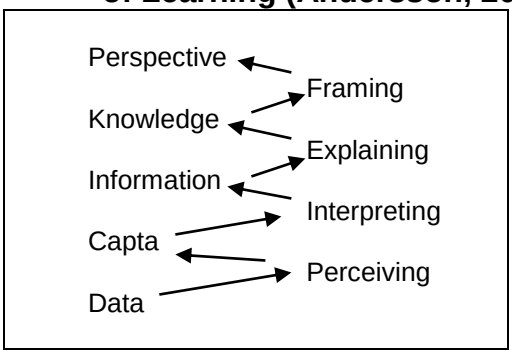
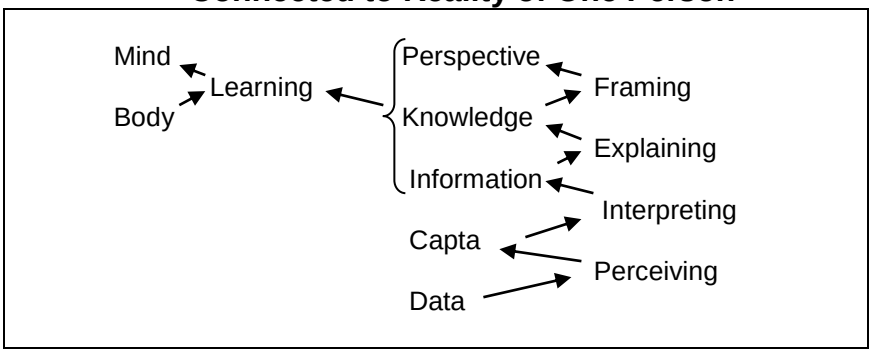


Figure 4: Learning Forms and Processes Connected to Reality of One Person



Thus, to summarize, at the one-person individual level, learning can be described for a particular individual as the process which connects mind to body and learning, in turn, results from the zig zag interplay among various forms (perspective, knowledge, etc.) and processes (framing, explaining, etc.) From here, Andersson goes on to apply this general model to learning and acting in task processes. It is at this point, however, where a crucial element, in our view, is missing and that is the social element – not intergenerational but temporal. The basic methodology of this study is not empirically focused, thus traditional empirical technical considerations of sample design and the collection of quantitative or qualitative data are not discussed. The method of selection of theoretical concepts was based on the relative persistence through time such as with Mead's (1934) formulation and the intentional comprehensive focus on zig zag conceptualization.

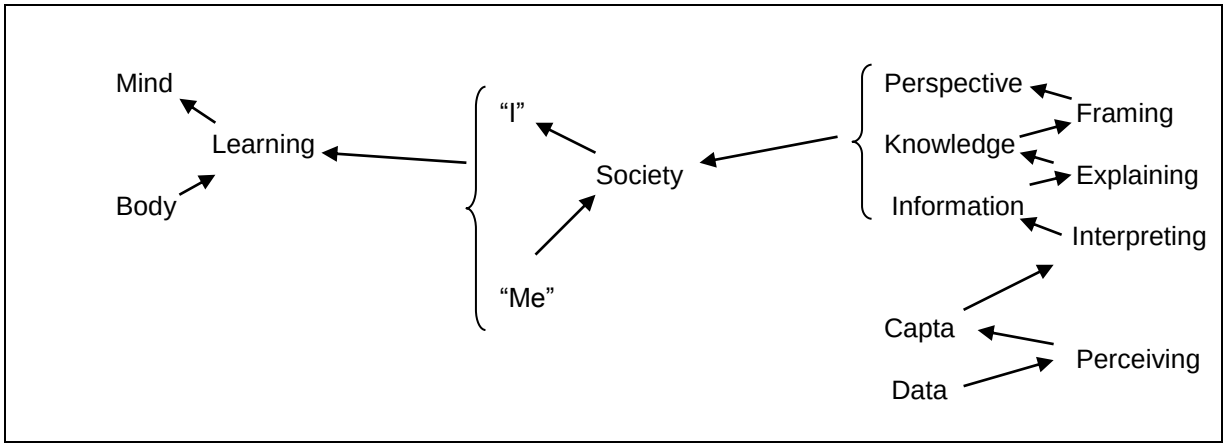
4. Analysis

In this section we present a zigzag theory which is composed of elements from the theories of Andersson (2004) and Mead (1934) and then, finally, in the next section we summarize this theoretical formulation in a set of applications which we believe will offer the researcher greater explanatory power in understanding the acquisition and use of information.

George Herbert Mead (1934) visualized society as the interplay between mind, self and society. The self, or "self-concept", was understood to be the interplay between the "I" or self-identify and the "me" or perceived expectations (rules, norms, values) of society. The mind essentially represents the incorporation of the self as a reflection of society and is constantly being reformulated according to the changing perceptions of society; these changing perceptions arise out of the symbolic interaction of the individual with other human beings.

Figure five presents the social concepts of Mead (1934) as a crucial subordinate zig zag ladder as a mediator between learning and learning forms and processes. In dialectical terms, "learning" as a step between mind and body is a process but when considered in the larger framework, learning is also a form which results from the mediation of the learning forms and processes by social factors. In Mead's (1934) terms these crucial factors are the self (I and me) and society. By adding self and society to the model, Mead's complete theory (Mind, Self and Society, 1934) is included in our expanded version of Andersson's (2004) zig zag theory which, as a result, is proposed as a more complete formulation. This formulation represents a major development and expansion of symbolic interactionism, in itself one of three dominant explanatory models of the discipline of sociology and related social sciences. In this way, then, the formulation discussed here is quite unique and adds significantly to the accumulated body of knowledge of social theory as it relates to the understanding of human behavior.

Figure 5: Self (I, Me) and Society as the Connection between Learning Forms and Processes and the Reality (Mind, Body, Learning) of One Person



5. Applications and Conclusions

The zig zag model as developed in this article, then, provides partial support for relevance of the literature beginning in the 1950s with Erikson (1950) and Bloom et al. (1956), continuing through the end of the twentieth century in the work of Bandura (1977) and Bateson (1979) and beyond (Klement, 2010). Likewise it accounts for works as diverse as Piaget (1954) and Marx and Engels (1969).

In this section we develop a series of possible applications of the expanded zig zag theory which we believe will offer substantial promise to researchers in business and related social science fields. The concepts have special relevance to a number of organizational behavior and organizational theory issues. As indicated above, familiar examples are Quinn and Cameron's (1983) organizational life cycles and Maslow's (1943) hierarchy of needs. In addition, the topics of organizational ethics, organizational

structure, interorganizational relations and decision-making are fruitful areas for application of the expanded zigzag theory. In terms of organizational ethics, one of the more frequently cited taxonomies is that introduced by Lawrence Kohlberg (1981) in which he introduces six sequential categories of business ethics development which are classified by pairs as preconventional, conventional and postconventional. Referring to figure one above, these three categories could be substituted for the three levels of forms shown; Kohlberg's discussion of the transition from one form level to the next would provide details of the intervening learning processes; referring to figure five the antecedents of these forms and learning processes are "facts" (perspective, knowledge and information) as filtered through and facilitated by society. The point here is that ethical development of and within organizations does not occur simply as a result of "facts" but also as a result of social motivations via the interaction, within each participant, between the instinctive "I" and the socially reflective "me".

The literature is replete with developmental theories concerning the growth of organizational structure; perhaps one of the most enduring is that introduced by Pugh et al. (1969) in which seven stages in the development of organizational structure were proposed, indicated here by brief titles: implicit, personnel, preworkflow, nascent workflow, workflow, nascent full and full. Once again, these seven stages constitute the "forms" in figure one above while the detailed discussion by Pugh and his colleagues (1969) provides the backdrop of the intervening learning processes which enable movement from one stage to the next; moving to the full set of concepts shown in figure five we see that these organizations move to these levels as a result of facts (perspective, knowledge, information) and the intervening social motivation which results from the interactions, within the individuals involved, between their intuitive "I" and their socially reflective "me".

In both of these example applications, organizational ethics development and organizational structure development, the forms and processes may be shown to follow the generic content labels shown in figure two above. That is, the lower levels of ethical development are "body" (i.e. basic nonreflective) in nature while the higher levels of ethical development are "mind" (i.e. advanced, reflective); throughout, the processes are at the level of "learning". And, similarly, the lower levels of organizational structure constitute the "body" (implicit, personnel) in nature while higher levels are bureaucratic (workflow, full) in nature.

The development of interorganizational relations likewise follows this pattern. Thompson's (1967) three categories of "contract", "cooptation" and "coalition" interorganizational relationships are "forms" which at the beginning of the formation of an interorganizational relationship (contracting, for example) are driven by implicit needs (i.e. "body") and later (cooptation and coalition) by reflection (i.e. "mind") and the facilitating mechanisms are learning processes based on facts (perspective, knowledge, information) as filtered and interpreted by society via the interactions between the "I" and "me" in individual participants. Similarly, the classic decision making stages as described by Simon (1947) of intelligence, design and choice, would seem to follow the expanded zigzag pattern. In terms of organizational fields which might benefit the most from applications of the expanded zigzag theory, however, we would point to information technology within the organizational context in as much as this was the ultimate context of application for Andersson's (2004) work.

In a highly theoretical article, such as this, a major limitation is the untested character of the assertions and propositional statements. It is our belief that, while this most certainly is a limit, that the article, nevertheless, serves the purpose of providing the background necessary for future work on the model as discussed in the paragraph above. A second limitation of this article is the primary focus on the zig zag theory developed by Andersson (2004) and, although we regard this work as a major milestone in the development of the field, it does remain an important limitation to be noted by the reader.

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Appendix

Selected Social Science Developmental Sequence Hierarchies

Developmental Focus	Developmental Stages	Major Reference
Human Needs	1. Physiological 2. Safety 3. Love 4. Esteem 5. Self-Actualization	Maslow, A. (1943) A Theory of Human Motivation. Psychological Review, 50, 370-396.
Business Ethics (Moral Development)	1. Preconventional 2. Conventional 3. Postconventional	Kohlberg, L. (1981). The philosophy of moral development: moral stages and the idea of justice. San Francisco: Harper & Row.
Educational Objectives	1. Knowledge 2. Comprehension 3. Application 4. Analysis 5. Synthesis 6. Evaluation	Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). Taxonomy of educational objectives: the classification of educational goals; Handbook I: Cognitive Domain. New York: Longmans, Green.
Organization Structure	1. Implicit 2. Personnel 3. Preworkflow 4. Nascent Workflow 5. Workflow 6. Nascent Full 7. Full	Pugh, D.S., Hickson, D.J. & Hinings, C.R. (1969) An Empirical Taxonomy of Structures of Work Organizations. Administrative Science Quarterly, 14,115-126.
History of Society	1. Primitive Communism 2. Slave Society 3. Feudalism 4. Capitalism 5. Socialism 6. Communism	Marx, K. & Engels, F. (1969) Manifesto of the Communist Party in Marx/Engels Selected Works, Volume One, Progress Publishers, Moscow, 98-137.
Organization Life Cycles	1. Entrepreneurial 2. Collectivity 3. Formalization 4. Elaboration	Quinn, R. & Cameron, K. (1983) Organizational Life Cycles and Shifting Criteria of Effectiveness: Some Preliminary Evidence. Management Science,29, 33-51.
Economic Growth of Society	1. Traditional Society 2. Take-Off Preconditions 3. Take-off 4. Drive to Maturity 5. High Mass Consumption	Rostow, W.W. (1959) The Stages of Economic Growth. The Economic History Review,12,1-16.

Innovation Adoption	1. Knowledge 2. Persuasion 3. Decision 4. Implementation 5. Confirmation	Rogers, E.M. (1962) Diffusion of Innovations. New York: Free Press.
Interorganizational Relations	1. Contract 2. Cooptation 3. Coalition	Thompson, J.D. (1967) Organizations in Action. New York: McGraw-Hill.
Childhood Socialization	1. Preparatory- Imitation 2. Play 3. Game	Mead, G.H. (1934) Mind, Self and Society. Chicago: University of Chicago Press
Observational Learning	1. Attention 2. Retention 3. Reproduction 4. Motivation	Bandura, A. (1977) Social Learning Theory. Engle Wood Cliffs, NJ: Prentice-Hall.
Psychosocial Development	1. Hope 2. Will 3. Purpose 4. Competence 5. Fidelity 6. Love 7. Care 8. Wisdom	Erikson, E.H. (1950) Childhood and Society. New York: W.W. Norton.
Cognitive Development	1. Sensorimotor 2. Preoperational 3. Concrete Operational 4. Formal Operational	Piaget, J. (1954) The Construction of Reality in the Child. London: Routledge and Kegan Paul.
Decision Making	1. Intelligence 2. Design 3. Choice	Simon, H. (1947) Administrative Behavior. New York: Macmillan.