

## **Explaining Literacy Development from a Bioecological Systems Framework: Affordances and Challenges**

**Commentary on Jaeger**

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Elizabeth Jaeger's interesting article [this issue, pp. 163–187] takes on the rather challenging yet exciting task of extrapolating Bronfenbrenner's seminal theory of human development [Bronfenbrenner & Morris, 1998] to a new domain, not covered by the original proposal. After presenting an overview of the evolution of Bronfenbrenner's comprehensive bioecological theory, she shows with considerable skill how this framework could be used to account for the development of literacy, at both theoretical and empirical levels. The paper thus contributes significantly to this latter field by providing a useful theoretical perspective that can aid researchers to explain developmental literacy processes in a broad and systematic fashion.

In the next sections I will highlight some of Jaeger's main contributions in the context of advances in the field of human development in general and of development of literacy in particular. I will first present a brief overview of some affordances of Bronfenbrenner's theoretical paradigm to account for human development, in the light of other seminal theories in the field. In the second section I will point at some strengths of Jaeger's accounts of literacy development using a bioecological system perspective. In closing, I will explore some possible future avenues researchers might take to move the field forward, as well as some challenges that accompany this enterprise.

## Revisiting Bronfenbrenner's Bioecological Model in the Context of Some Human Developmental Theories

The first section of Jaeger's article lays out a clear and synthetic account of the evolution of Bronfenbrenner's theory, rendering it accessible to readers unfamiliar with its complexities. This synthesis will undoubtedly be useful for scholars of human development who wish to apply this encompassing theoretical framework to their own research interests.

From the inception of his theory, Bronfenbrenner placed great emphasis on the active role of the child as he/she interacts with diverse social agents and objects (parents, caregivers, peers, teachers, other members of the community, toys), an emphasis also present in other seminal theories, particularly Piaget's constructivist approach [Piaget & Inhelder, 2000].

From a western tradition, Bronfenbrenner was also among the first theoreticians to underscore the need to take into account both the complex, reciprocal and subtle interactions among each individual's biological and personal characteristics and also the significant social and ecological contexts that influence development [Rosa & Tudge, 2013]. The nuances involved in understanding these phenomena go way beyond simply acknowledging that both personal and environmental factors contribute to shaping the course of development, or that they interact.

His key concept of "proximal processes," together with his account of how "microsystems" intersect at the level of "mesosystems," provides an enlightening perspective on this core issue. Bronfenbrenner argued that "environments change people (the external is internalized and transacted)" but also that "people change environments (the internal is externalized and transacted)" [Bronfenbrenner & Ceci, 1994; Jaeger, this volume, p. 163–187]. In addition, he underscored the intricate interrelations holding among person, process, context, and time, arguing that more important than the various ecological systems per se are the transactions and synergies among them. Bronfenbrenner's ambition was to integrate the multiple factors that influence development at each systemic level into a broad and encompassing framework [Bronfenbrenner & Morris, 1998].

Some of the above bioecological concepts resemble certain constructs proposed by sociocultural theorists to explain the interrelations between person and environment, although they emanate from a different epistemological tradition. These constructs include Leontiev's "appropriation," involving transformations of external actions into internal ones through an "active agent who makes something that was not one's own into something new that belongs to the person" [Leontiev, 1981; in Valsiner, 1998, p. 106]. More recently, Rogoff [1995] has explained how the intricate interactions between the child's active "participatory appropriation" and the caregiver's "guided participation" are essential in shaping the course of development. Within these interactions, "scaffolding" takes place when such guidance falls within the "zone of proximal development" [Vygotsky, 1978; Wood, Bruner, & Ross, 1976]. These processes are in turn situated in broader sociocultural contexts, which also contribute importantly to development [Rogoff, 1990]. It is important to stress that the complex interactions between the individual's biological and personal traits and diverse environmental factors have resonance with the enduring "nature-nurture" controversy over human development to date [Sameroff, 2010].

Another of Bronfenbrenner's significant contributions relates to his account of how increasingly complex proximal and distal ecological systems, including historical time, influence and expand human development throughout the life span [Tudge, Mokrova, Hatfield, & Karnik, 2009]. This account relates to Vygotsky's [1978] proposal of four genetic domains required to explain development: ontogenesis, microgenesis, phylogenesis, and sociohistory [Wertsch, 1985]. According to Vygotsky [1978], throughout ontogeny the individual undergoes increasingly complex revolutionary changes that are qualitative in nature and influenced importantly by the socio-cultural milieu. These phenomena are also related to Bruner's account of the evolution of the main forms of representation of reality throughout development: from "enactive" (actions) to "iconic" (images) to symbolic (language and other sign systems). This evolution takes place through spiral processes that become more sophisticated and abstract while at the same time interacting with one another [Bruner, 1966].

In his work, Bronfenbrenner accurately emphasized the importance of considering the key role played by temporal variables (both in ontogenesis and throughout history) in developmental processes, highlighting the need for researchers to carry out longitudinal studies. His proposal of the influence of time throughout history bears some resemblance to the emphasis on the key influence of sociohistorical processes proposed by Vygotsky and his followers [Cole, 1996; Engeström, 2010; Wertsch, 1985]. However, although there is consensus among theoreticians over the primacy of time in human development, we still need to incorporate temporal variables more fully in developmental research. As Mercer and Littleton [2007] argue: "The *temporal dimension* of educational dialogue and interaction has not been given the attention it deserves, even by sociocultural researchers" (p. 113).

Lastly, from the beginning Bronfenbrenner was concerned that researchers need to study development not only in the laboratory, but also in natural contexts [Bronfenbrenner, 1976]. He thus anticipated the central and ongoing tension in psychological inquiry between "internal" and "external" or "ecological validity" as well as the challenges faced by contemporary researchers who strive to maintain a fine balance between them.

### **A Bioecological Perspective on Literacy Development**

I will now highlight some significant contributions of Jaeger's accounts of literacy development from a bioecological perspective, as presented in her article [this issue, pp. 163–187]. In the section entitled "Bioecological systems theory and literacy research," she provides readers with a very useful meta-analysis of studies between 2000 and 2016 that attempted to use (parts of) Bronfenbrenner's theoretical framework to account for aspects of literacy development. Her careful filtering of the studies reviewed, using rigorous criteria, reduced the sample of research reports from over 50 to a mere seven. Her overview of the state of the art thus reflects the scarcity of empirical studies that have attempted to provide a valid bioecological account of literacy development to date. This scarcity is testimony to the novelty of Jaeger's attempt to show researchers how Bronfenbrenner's theoretical framework can be adequately extended to carry out investigations in the field of literacy.

After this literature review, Jaeger moves on to construct a novel bridge that explains how a bioecological model can be usefully generalized and extrapolated to

provide a comprehensive and systematic account of literacy development. This explanation is accompanied by a series of images that clarify how the different levels of analysis proposed by Bronfenbrenner's original framework can be translated into the domain of literacy. These include: (a) the reader's personal characteristics in terms of demand, resource and force, (b) the proximal processes taking place when readers interact in a school context, (c) the way several microsystems – including home, peers, school and community – interact at the level of the literacy mesosystem, and (d) how exo- and macrosystem forces may impact the literacy mesosystem.

The section entitled “Bioecological systems theory and its potential for literacy research” presents a summary report of an interesting exploratory study, conducted by the author, which uses Bronfenbrenner's model to account for some aspects of literacy development. This exploratory study illustrates novel ways in which a bioecological framework can be fruitfully applied in this latter field. Later in this section, Jaeger anticipates how additional and more encompassing confirmatory studies on literacy might be conducted from a bioecological perspective, so as to include a wide range of variables and levels of analysis. In so doing, she takes the field forward by providing a guide for future empirical research, one that aims to fully exploit the ample explanatory potential of Bronfenbrenner's theoretical model in a new domain. Such endeavor could wake us up to the challenges that must be faced when attempting to provide a broad and inclusive explanation of the development of literacy.

### **Future Directions and Challenges**

I conclude that the main contributions of Jaeger's article reside in (a) expanding our understanding of Bronfenbrenner's theory, (b) illuminating its affordances and potential as a useful framework to account for new and/or scarcely explored domains employing encompassing lenses, (c) envisaging what could eventually become a comprehensive and systematic framework for understanding literacy development, and (d) proposing an agenda for researchers interested in conducting studies on literacy from a bioecological perspective. Thus, the article contributes to advancing the field of literacy development, while at the same time highlighting some challenges researchers confront when trying to provide a comprehensive account of the complexities of human development. In this context, I believe one particularly thorny challenge faced by theoreticians and researchers lies in increasing the breadth of inquiry without sacrificing thoroughness, detail, and depth of understanding.

I close by pointing out some avenues for future exploration by scholars who use a bioecological systems framework in their research. These avenues, I believe, have great potential for moving forward the field of literacy development and that of human development more broadly. Firstly, although Bronfenbrenner considers language as a contributing factor in explaining development in his process/person/context/time model, he gives it a less central role than in other theoretical approaches, such as Halliday's [1985] systemic functional linguistic model and sociocultural theory. In Halliday's eloquent words: “When children learn language, they are not simply engaging in one type of learning among many; rather, they are learning the foun-

dations of learning itself” [Halliday, 1993, p. 5]. In addition, from a sociocultural perspective, Vygotsky [1962] described language as both a cultural tool (for the construction and sharing of knowledge among members of society) and a psychological tool (for structuring the processes and content of individual thought). He proposed that there is an inextricable relationship between the two so that “intermental” activity forges “intramental” psychological functioning. In particular, communicative and social interactions among members of diverse communities of practice are crucial for the appropriation of cultural knowledge [Rogoff, 1990]. This social communication is gradually reconstructed as internal speech or “voices of the mind” [Wertsch, 1991], contributing importantly to thinking, problem-solving, and self-regulation, among other central psychological functions. I would argue that underscoring the key role played by language at both personal and social planes could expand significantly accounts of human development from a bioecological perspective, including the one proposed by Jaeger [this issue, pp. 163–187] for explaining the development of literacy [John-Steiner, Panofsky & Smith, 1994; Littleton & Howe, 2010; Mercer, 2000; Rojas-Drummond, Littleton, Hernández, & Zúñiga, 2010].

Secondly, we need to provide more in-depth explanations of the role played by cognitive and psycholinguistic processes (among others), and multimodal forms of communication, as well as the intricate intertextual relations among talking, reading, and writing, in order to achieve a fuller understanding of the development of literacy [Jewitt, 2005; Maybin, 1994; Rojas-Drummond, Albarrán, & Littleton, 2008; Rojas-Drummond et al., 2016; Rojas-Drummond, Mazón, Littleton, & Vélez, 2012]. Such accounts will also require proper consideration of the social nature of literacy as a situated, human cultural practice [Lave & Wenger, 1991].

Lastly, I contend that we need to revisit the nature-nurture controversy, closely related to the person-environment interactions stressed by Bronfenbrenner’s classical theory, from a multidisciplinary perspective. In this context, Sameroff [2010] has recently proposed a “unified theory” which employs a dialectic approach to explain the reciprocal, dynamic and multidirectional influences of biology and environment in shaping the course of development.

In addition, recent and novel advances in the field of human behavioral ecology have brought back to the forefront and enlightened the nature-nurture debate. In particular, the concept of “cost” has implications for understanding human development. The costs individuals pay upon interacting with their environment greatly influence the probability that an individual will exhibit particular behaviors. At the same time, the same environmental variable can affect individuals differently, depending on their developmental stage and differences among individuals in their ability to pay environmental costs, and therefore withstand environmental pressures [Parker & Smith, 1990]. Another important construct from this field is “niche construction,” which refers to the organism’s (e.g., child’s) essential capacity to modify their own contextual systems or ecological variables. This capacity will in turn exert different pressures on them in the future (“reciprocal causation”) [Laland, Odling-Smee, Hoppitt, & Uller, 2013]. Thus, current psychological explanations of human development could be enriched by incorporating contributions from this exciting field, tending toward the eventual reconciliation of the enduring nature-nurture debate.

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