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Processing Proximal Processes: What Bronfenbrenner Meant, What He Didn't Mean, and What He Should Have Meant

Although Bronfenbrenner's bioecological theory is heavily cited, one of its major concepts—proximal processes—has received relatively little attention. We explore the definition and properties of proximal process as the "engines of development," analyze how proximal processes are distinguished from Bronfenbrenner's discussions of "process," and consider whether proximal processes are always positive. Bronfenbrenner viewed proximal processes as having positive effects on development (by increasing competency or buffering dysfunction); to expand this concept, we propose the notion of inverse proximal processes, which in higher levels produce dysfunction and reduce competency. In keeping with Bronfenbrenner's thinking, these inverse proximal processes would have stronger effects in disadvantaged environments. We thus offer a broader framework for understanding the impact of everyday activities and interactions occurring over time in human development. Discussions of the sort we propose here are essential to the advancement of theories of human development, and, we hope, their more appropriate use.

Bronfenbrenner's bioecological theory calls attention to the importance of the synergistic aspects of human development and, being considered a contextualist theory, is well suited to apprehend the complexity of development (Tudge, 2008b) within various microsystems, including the family (one of the primary contexts of development). From a contextualist point of view, development results from interactions among different influencing factors (e.g., environmental and biological), which cannot be treated independently and whose effects are greater than the sum of their parts. Nonetheless, the theory is often viewed as fitting a mechanist paradigm—one that assumes that different factors of development are independently causal and can be treated separately in an additive manner.

Also problematic is that some researchers claiming to use Bronfenbrenner's theory pay minimal attention to its most important concept, proximal processes, which are considered the main force promoting development

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(Bronfenbrenner & Morris, 1998, 2006; Tudge, Mokrova, Hatfield, & Karnik, 2009; Tudge et al., 2016). We believe that this misuse of the theory may be partly due to the lack of clarity in what Bronfenbrenner wrote about proximal processes in his writings from the mid-1990s onward (Rosa & Tudge, 2013). For instance, it may not be clear how proximal processes differ from interactions in general, from Bronfenbrenner's discussions of process during the 1980s (e.g., Bronfenbrenner, 1988) or from his examples of molar and molecular interactions (Bronfenbrenner, 1979). The main goals of this article are therefore (a) to discuss the definition and properties of proximal process, (b) to analyze how proximal processes are differentiated from other ideas of processes discussed by Bronfenbrenner, and (c) to reflect on the positive effects of proximal processes. In so doing, we intend to shed light on what is special enough about the concept of proximal process that warrants its pride of place in the theory. We also argue that he did not go far enough in developing the concept. We thus seek to contribute to a richer understanding of proximal processes and their importance when basing research on bioecological theory, particularly given evidence that use of the theory is on the rise (Rosa & Tudge, 2017).

Defining Proximal Processes

It was in the third and last phase of Bronfenbrenner's theory development (in the 1990s) that he first explicitly defined proximal processes and emphasized its role in human development (Rosa & Tudge, 2013). A greater emphasis on processes was one of the most important changes that occurred as his theory developed from the 1970s, with proximal processes becoming the core concept of bioecological theory. Bronfenbrenner and Morris (1998) defined and provided examples of proximal processes in their first theoretical proposition, as follows:

> Especially in its early phases, but also throughout the life course, human development takes place through processes of progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of *time*. Such enduring forms of interaction in the immediate environment are referred to as *proximal processes*. Examples of enduring patterns of proximal processes are found in feeding or comforting a baby, playing with a young child, child-child activities, group or solitary play, reading, learning new skills, athletic activities, problem solving, caring for others in distress, making plans, performing complex tasks, and acquiring new knowledge, and know-how. (p. 996)

Although these processes are the main mechanisms producing human development, Bronfenbrenner and Morris (1998) argued that their power and direction vary considerably as a function of personal and contextual characteristics. For instance, personal characteristics of proximal processes. Likewise, features of the environment may either encourage or interfere with the development of proximal processes. Thus, in a second proposition, Bronfenbrenner and Morris (1998) expanded the idea of proximal process by describing how it is synergistically influenced by characteristics of the developing person, the context, the developmental outcome, and time:

> The form, power, content, and direction of the proximal processes effecting development vary systematically as a joint function of the characteristics of the *developing person*; of the *environment*—both immediate and more remote—in which the processes are taking place; the nature of the *developmental outcomes* under consideration; and the social continuities and changes occurring over *time* through the life course and the historical period during which the person has lived. (p. 996)

Given the specific meaning attributed to proximal processes, Bronfenbrenner and Morris (1998) further specified some of the properties for them to occur. To be considered proximal process, (a) the developing person must be engaged in activities either with other people, objects, or symbols (b) "on a fairly regular basis, over an extended period of time" (p. 996); (c) these activities must take place long enough to become "increasingly more complex" (p. 996). Furthermore, (d) "effective proximal processes are not unidirectional; there must be influence in both directions. In the case of interpersonal interactions, this means that initiatives do not come from one side only" (p. 996). Also, (e) given that proximal processes can involve interactions with objects and symbols, these must invite attention and exploration for reciprocity to occur. Last, (f) "the powerful moderating factors specified in Proposition II produce substantial changes in the content,

timing, and effectiveness of proximal processes" (p. 997).

These two main propositions make clear the contextualist nature of the theory, calling attention to the synergistic relations among the elements of the model (process, person, context, and time). However, Bronfenbrenner and Morris (1998) also noted that the definition of proximal processes and conditions for their effective operation needed better specification and suggested that "science in the discovery mode" was therefore necessary. Rather than test previously formulated hypotheses, discovery-mode science requires that increasingly more differentiated hypotheses are successively formulated and reformulated as resulting patterns emerge and are analyzed. Bronfenbrenner and Morris therefore drew on findings from multiple studies, including Drillien (1964) and also Steinberg, Darling, and Fletcher (1995), and from two unpublished reports (Moorehouse, 1986; Small & Luster, 1990).

However, several questions arise. One is related to the novelty of the concept of proximal process itself; considering that interactions have been the focus of research in human development and family studies for many years, does this concept add anything new? Or is it simply another name for a long-existing, much-discussed concept? Furthermore, given the ecological characteristics of Bronfenbrenner's theory since its onset (Tudge, Payir, & Merçon-Vargas, in press), can we identify any version of the idea of proximal process in his earlier writings? As we will see, although Bronfenbrenner wrote about interactions from the start, they did not have the same meaning as proximal processes in the final phase of the theory's development.

Another question, one that certainly needs more clarification, is related to the nature of proximal processes. In many of his writings, Bronfenbrenner argued that proximal processes have positive effects; even when talking about developmental dysfunction, proximal processes appear to buffer or reduce this negative outcome (depending on the context and person's characteristics). Thus, we may ask whether detrimental or harmful interactions could be considered proximal processes (assuming that they check the other proximal processes' properties, such as being bidirectional, happening over an extended period of time, and becoming more complex).

Is the Idea of Proximal Process Something New?

The Ecological Nature of Bronfenbrenner's Ideas

Despite the fact that proximal processes were officially defined only later in the development of the theory, from the start Bronfenbrenner's theory fitted an ecological paradigm, in which development is viewed as emerging from the interaction between individuals and the contexts in which they are situated (Tudge et al., in press). For Bronfenbrenner (1977), the ecology of human development is the study of progressive and mutual accommodations taking place across the life span between individuals and their changing immediate environments; relations taking place within and between the immediate settings, as well as the larger formal and informal social contexts (in which these settings are embedded), have an impact on this accommodation process.

Considering the ecological nature of the theory, with its focus on person–environment mutual or synergistic interactions, within any given microsystem the other people with whom the developing individual interacts are the most important. This is demonstrated in several of Bronfenbrenner's writings about family relations (especially between parent and children). For example, in 1961 he wrote about the importance of having a research model seeking to understand parent–child relationships in the social context:

> We needed first to discover the factual phenomena that require theoretical explanation. Only then could we fruitfully attempt to build appropriate conceptual models. Accordingly, with references of problems of socialization, we should begin by identifying the observed regularities in parent–child interaction in our society and noting the manner in which these regularities are mediated by sex of parent, sex of child, and the family's social position. (pp. 90–91)

This idea was also present in Bronfenbrenner's writings in the late 1960s, 1970s,and 1980s. At that time, he wrote about what makes human beings human and the ecology of human development, in which the process of development was viewed as facilitated by the participation "in progressively more complex reciprocal interactions"

(Bronfenbrenner, 1969, 1971, 1973, 1985). For instance, in 1969, he stated:

> Although mere exposure to the model exhibiting a new pattern of behaviour can lead to the induction of that behaviour in the child, the optimal condition for learning from a model is one in which the child is engaged in *increasingly more complex patterns of reciprocal interaction* with the model—for example, conversation that gradually invokes wider vocabulary and complexity of structure, or games involving progressive development of basic skills. (p. 10, emphasis added)

Also in 1971, discussing children's basic needs in child care, Bronfenbrenner said that a "child's development is fostered primarily through his participation in a pattern of *progressively more complex reciprocal interactions*, involving both imitation and reinforcement, which occurs in the context of a close, continuing relationship with an adult—usually one or both parents" (p. 89, emphasis added). Likewise, in 1973, describing the social ecology of human development, he posited the following integrating principle: "The psychological development of the child is enhanced through his involvement in *progressively more complex, enduring patterns of reciprocal contingent interaction* with persons with whom he has established a mutual and enduring emotional attachment" (p. 119, emphasis added). In 1985, Bronfenbrenner reinforced this idea in one of his propositions, stating:

> The psychological development of the child is brought about through continuing involvement in *progressively more complex patterns of reciprocal activity* with persons with whom the child develops a strong and enduring mutual emotional attachment. What do I mean by progressively more complex patterns of reciprocal activity? I mean a ping-pong game in which the players begin slowly and simply, but then engage in even longer and more complicated strokes and volleys. (p. 175, emphasis added)

Besides the idea of a progressively more complex pattern of reciprocal interaction, Bronfenbrenner (1979) introduced the nature and function of what he called molar activities (taking place within microsystems, particularly the family), a term that he seemed to have abandoned later. In contrast to molecular activities (short-lived activities), molar activities emphasized persistence through time and salience in the phenomenological field of the developing person and of others in the setting. According to Bronfenbrenner, these molar activities are the main means for the direct influence of the environment on the developing person. Moreover, Bronfenbrenner (1979) wrote about "lines of forces, valences, and vectors" (p. 23) sent out by objects, activities, and other people that attract and repel, steering development; here we seem to see the start of some obscure force deemed important for development (still located in the immediate environment) but as yet undefined.

Thus, proximal processes as a concept in itself emerged only later in Bronfenbrenner's writings, being better articulated and differentiated from the concepts previously used by him; these later formulations illustrate the uniqueness of the concept and its importance to the theory. Before getting to the concept of proximal processes, however, Bronfenbrenner wrote about processes (not yet proximal), as we discuss next.

The Emergence of Process

In the 1980s (e.g., Bronfenbrenner, 1983, 1988; Bronfenbrenner & Crouter, 1983), Bronfenbrenner discussed some of the models (implicit or explicit) incorporated into research, describing the advantages of more comprehensive conceptual and operational research designs. In this endeavor, Bronfenbrenner (1988) took as his starting point Lewin's formula, simply substituting behavior for development, as follows: "D = f(PE) [development is a joint function of person and environment]" (p. 25). In this formula, it is possible to identify explicitly three dimensions important to understand human development: the developmental outcome (what develops), the person characteristics, and the environment. More important for understanding the development of Bronfenbrenner's theory, however, are the two other dimensions implicit in the formula, the first of which is related to the possibility of interrelations between the elements (Bronfenbrenner, 1988). As posited by Bronfenbrenner (1988):

> Since that equation defines development as a *joint* function of person and environment, the question arises, what forms can such joint influence take? As we shall see, despite theoretical assertions to the contrary, most developmental investigations employ analytic models that assume only *additive* effects; that is, the influences emanating from the

> person and the environment are treated as operating independently of each other, with the net effect estimated from an algebraic sum of the various factors included in the model. Yet, in those instances in which more complex schemas have been applied, they have revealed important interactive effects. (p. 26)

The other implicit dimension in the formula is related to what Bronfenbrenner (1988) called "the mysterious realm designated by the letter *f*" (p. 27), which stands for *function*. This denotes that the relation among development and person and environment is not simply a statistical association "but involves a set of *processes* through which the course and consequences of development are determined" (Bronfenbrenner, 1988, p. 27).

For Bronfenbrenner (1988), some research models do not specify the mechanisms through which development takes place, failing to indicate what these processes would be. Citing Lewin (1931, 1935), Bronfenbrenner stated that these models can be termed *class-theoretical*, in which phenomena are explained by the categories to which they are assigned (linked to static concepts). In contrast, field-theoretical paradigms are those in which processes that bring about the observed phenomena are addressed. Bronfenbrenner (1983) also called attention to the importance of "the intervening structures or processes through which the environment might affect the course of development" (p. 151).

As representative of class-theoretical models, Bronfenbrenner (1988) pointed to (a) the social address model (use of environmental labels with no attention to the characteristics or activities taking place in that environment; e.g., social class); (b) the personal attributes model (models addressing how personal characteristics observed early in life affect the course of later development; e.g., birth weight); (c) the sociological niche model (using interactions that allow researchers to identify the intersection of two or more social addresses; e.g., type of employment and level of education); and (d) the person–context model (in which the research includes groups differing in their personal characteristics; e.g., social class and gender). None of these research paradigms includes any consideration of the processes through which person or environmental factors interact to promote development, leaving the *f* unspecified.

Regarding models involving processes, Bronfenbrenner (1988) mentioned that there are different types of mechanisms or processes functioning at different levels: "The first, and most common, pertain to the effects of proximal environmental and organic influences on human development. Such proximal influences emanate either from within the person, or from physical features, objects, and persons in the immediate face-to-face setting" (p. 32). Within what Bronfenbrenner termed the *microsystem process model* (i.e., face-to-face settings), four types of proximal influences to development had been mostly studied at the time he was writing: (a) genetic transmission; (b) effects of the physical and physiological states of the organism in early childhood; (c) interpersonal interactions, relations, and attitudes (particularly in families); and (d) effects of the immediate physical environment. For Bronfenbrenner, whereas the first two of these models consider the causal process of development as influenced by personal characteristics, the other two have a focus on the individuals' immediate surroundings.

To provide an example of processes influencing development, although in a process–context model (not considering the personal characteristics), Bronfenbrenner (1988) cited Tulkin's (1970, 1977) work on social class differences in the relation between mothers' behaviors and attitudes and their daughters' school performance six years later. According to Bronfenbrenner, the implicit paradigm in Tulkin's work both specifies proximal processes promoting developmental changes and allows for investigation of whether and how those processes vary as a function of broader context (e.g., the family's social class position).

A process–person–context model would expand that scope to include a variable related to differences in a personal characteristic, such as gender. For example, Bronfenbrenner (1988), citing Cochran's research (Bronfenbrenner & Cochran, 1979; Cochran & Woolever, 1982), highlighted the finding that mother–child joint activity facilitated the child's school performance; this association was stronger for boys. Furthermore, when an interaction term between maternal education and joint activity was introduced into the model, the results showed that the relation between joint activity and school performance was found only for mothers with education beyond high school. In contrast, the relationship was not significant for mothers with

a high school education or less. As Bronfenbrenner stated, in this example the power and the direction of the process varied as a joint function of the personal characteristics (child's gender) and the context (mother's educational background), indicating that the effects of context and person are interactive and not simply additive.

Later, Bronfenbrenner (1989) proposed another reformulation to Lewin's formula, adding subscripts *t* to represent the time that a given developmental outcome is observed, and *t-p* to indicate the period during which person and environment were jointly operating to produce the developmental outcome observed; *t-p* appears twice in the equation to indicate that "the process producing developmental change is not instantaneous, but one that takes place over time, and, like the other terms in the equation, can change over time" (p. 190); the new formula reads as follows: $D_t = f_{(t\text{-}p)}\ (PE_{(t\text{-}p)})$.[1]

It is thus clear that Bronfenbrenner wrote a good deal about the importance of process to understand development before formally defining proximal processes. Moreover, the sense in which he used the term *process* was different, and "proximal processes" have some clear properties. As Bronfenbrenner and Morris (1998) stated explicitly:

> What is meant by process is never specified [in earlier writings], and the overwhelming majority of the examples cited do not include a proximal process component as defined in Proposition I. The same holds true for developmentally relevant characteristics of the Person. . . . In these and other respects to follow, today's bioecological model goes far beyond its predecessors both with respect to basic constructs and their bidirectional, synergistic interrelationships. (p. 997)

Thus, Bronfenbrenner (1988) called "proximal mechanisms" the processes happening within microsystems such as the family, and he also mentioned the "distal mechanisms through which features of the environment beyond the immediate setting can influence the power and direction of the proximal processes that affect development directly" (p. 38). However, it was only in the last phase of the theory's development that Bronfenbrenner and Morris (1998) pointed to the need to make a critical distinction between environment and process:

> It may be useful to point out that traditionally such phenomena as parent–child interactions—or, more generally, the behavior of others toward the developing person—have been treated under the more inclusive category of the environment. In the *bioecological model*, a critical distinction is made between the concepts of "environment" and "process," with the latter not only occupying a central position, but also having a meaning that is quite specific. (p. 996)

A main reason for this distinction, according to Bronfenbrenner and Morris (1998), was the realization, through the analysis of others' studies (looking at what they called latent paradigms), that proximal processes turned out to be the most potent force producing developmental outcomes. Bronfenbrenner considered interactions, joint activities, and parent–child relations to be important influences on human development since he began writing about the ecology of human development in the 1970s, but they were simply treated as a part of the microsystem. By giving pride of place to proximal processes in bioecological theory, Bronfenbrenner emphasized specific types of face-to-face relations within families (or other important microsystems), going beyond the study of isolated factors on human development.

In understanding the concept of proximal processes as something new in the development of the theory, there are two important things to consider; the first is that it was only when writing about proximal processes that the idea of engines of development emerged; that is, Bronfenbrenner never talked about processes as the main force of development in early variants of the theory. Furthermore, Bronfenbrenner went from writing about a person–process–context model (as though process simply connected the two more important constructs—person and context) in the 1980s (Bronfenbrenner, 1986a, 1986b; Bronfenbrenner & Crouter, 1983), to a process–person–context model (Bronfenbrenner, 1988, 1989). This is not a simple change in placement; it indicates a change in thinking about the role of process. Later he added time, proposing the process–person–context–time

[1] Originally, Bronfenbrenner (1989) stated the formula as $D_t = f_{(t\text{-}p)}\ (PE)_{(t\text{-}p)}$. However, representing the (t-p) inside the parenthesis may better mathematically represent the joint operation of person and environment over time; we, therefore, adapted the formula.

model (Bronfenbrenner & Morris, 1998). In this last model (the PPCT), person and context are discussed as elements exerting their influence on the most important factor—proximal processes.

This became even clearer in his chapter with Morris in 1998, in which Bronfenbrenner stated his intentions to introduce changes and innovations in the form and content of the ideas discussed 15 years earlier (Bronfenbrenner & Crouter, 1983), introducing and giving pride of place to proximal processes. Thus, according to Bronfenbrenner and Morris, "The dual nature of the shift is telegraphed in the titles of the two chapters—in the 1983 Handbook: 'The Evolution of *Environmental* Models in Developmental Research'; in the present edition: 'The Ecology of Developmental *Processes*'" (p. 993).

Not only is this idea of proximal process new to Bronfenbrenner's theory; it can be distinguished from process as viewed by other family theories, such as symbolic interactionism or family systems theory. The former prioritizes language-mediated interactions among family members, and the latter primarily focuses on the complex web of interactions among family members, with influence from outside in cases of families with more permeable boundaries (Dilworth-Anderson, Burton, & Klein, 2005). By contrast, proximal processes not only are conceptualized as "effective" and the "engines of development" when occurring regularly and with increasing complexity but also serve as the crucible in which characteristics of both the person and context (from micro to macro) affect each other over time (Bronfenbrenner & Morris, 1998). Masten (2011; Masten & Monn, 2015) has thus called for increasing linkages to be made (at least in the area of child and family resilience) between developmental systems theories such as Bronfenbrenner's and more traditional family systems theories.

In the 1998 chapter and subsequently, Bronfenbrenner wrote about proximal processes consistently as having positive effects (i.e., high levels of proximal processes producing competence or buffering dysfunction). He seemed to ignore, however, that face-to-face interactions happening daily and becoming more complex over time could be of different kinds (Tudge, 2008a; Tudge et al., in press), including proximal processes that at higher levels could be detrimental to development, such as hostility. If we consider these types of interactions, the relation between them and developmental outcomes would be the inverse of what Bronfenbrenner proposed—higher levels of such interactions (e.g., hostility) would lead to higher levels of dysfunction and lower levels of competence. We discuss this issue in more depth next.

Are the Effects of Proximal Processes Always Positive?

A main feature of proximal processes, according to Bronfenbrenner and Morris (1998), is that they are synergistically interdependent from other factors of the model, namely person, context, and time. Proximal processes are the primary engine of human development, but an engine cannot produce its own fuel (Bronfenbrenner & Ceci, 1993). That is, we can understand proximal processes only by considering how the person and the context have an impact on them, in an interactive manner, over an extended period of time. As posited in the second proposition of bioecological theory, the form, power, content, and direction of the proximal processes should be considered systematically as a function of the other elements of the model.

Hence, personal and contextual characteristics serve as moderators to understand the processes in which development is brought about, and attention should be given to the nature and range of those moderating effects. A moderating variable is one that changes the nature of the relationship among two or more variables. In statistical terms, moderating variables represent a nonadditive model but a multiplicative one. Bronfenbrenner and Morris (1998), talking about the results from Drillien's study, stated, "The combination of Person and Context exhibit a mutually reinforcing, *multiplicative*, indirect effect on the power of proximal processes as the 'engines of development'" (p. 999). They further wrote:

> It follows that any research design based on a bioecological model must allow for the possibility of such interactions. However, it is also essential, especially in the discovery phase, that the particular interaction to be examined be theoretically based, and that—insofar as possible—their anticipated direction and form be specified in advance. (p. 1001)

Considering these moderating forces and the ability to change the proximal processes, Bronfenbrenner seemed to imply that proximal processes vary in degrees of strength (being stronger

or weaker depending on the moderators); thus, generally higher levels of proximal processes produce positive effects, either by fostering competence or by buffering disruptive outcomes. For example, as stated by Bronfenbrenner and Morris (1998), "Heritability (h^2) will be higher when proximal processes are strong and lower when such processes are weak" (p. 1018). Furthermore, variations in the proximal processes will have differential impact according to the nature of the developmental outcome (as stated in Proposition 2). According to Bronfenbrenner and Morris:

> The greater developmental impact of proximal processes on children growing up in disadvantaged or disorganized environments is to be expected to occur mainly for outcomes reflecting developmental *dysfunction*. By contrast, for outcomes indicating developmental *competence*, proximal processes are posited as likely to have greater impact in more advantaged and stable environments. (pp. 1001–1002)

Related to that, Bronfenbrenner and Evans (2000) asked, "If proximal processes are indeed the 'engines of development, what are the differences between those that produce dysfunction vs. competence?" (p. 118). Although no answer was given to this important question, they provided an indirect "corollary" about exposure to proximal processes, arguing that developmentally disruptive outcomes would be linked to a brief or infrequent exposure to proximal processes, or when such exposure happens erratically. Also, Bronfenbrenner and Morris (1998) wrote, "Proximal processes cannot function effectively in environments that are unstable and unpredictable across space and time" (p. 1019). However, none of these points actually addresses the question, which was not about exposure to proximal processes but about proximal processes that produce dysfunction. There are, unfortunately, environments that are predictable across time and space in which parent–child or peer interactions (or, indeed, interactions between a developing child and the objects in the environment) are not only negative but also becoming increasingly complex in their negativity. Abusive parent–child and partner relationships can be of this type, and in more recent years social media interactions can be of this type (e.g., Batzer, Berg, Godinet, & Stotzer, 2018; Capaldi et al., 2009; Charalampous et al., 2018; Drapkin, McCrady, Swingle, & Epstein, 2005; Kowalski & Limber, 2013; Ma, Lai, & Wan, 2015; Tippett & Wolke, 2015). We might also consider interactions in other microsystems beyond the family such as the school, for instance, the ways teachers often treat children who are tracked low in schools; mind-numbing interactions on a regular basis over an extended period of time surely count as engines of development (e.g., Quin, 2017; Peterson, Rubie-Davies, Osborne, & Sibley, 2016; Urhahne, 2015), even if one might be hard-pressed to find much in the way of increased complexity.

Bronfenbrenner (2001) stated that "high levels of such patterns of parental behavior as 'neglect, abuse, or domination' can serve as powerful mechanisms for actualizing genetic potentials for developmentally maladaptive behaviors that both disrupt proximal processes and produce developmental disarray" (p. 6968). It is unclear, however, why these negative "patterns of parental behavior" are viewed as disrupting proximal processes and not as proximal processes themselves. Bronfenbrenner clearly believed that proximal processes are necessarily positive, but it seems to us that Propositions 2 and 3 can apply equally to negative and positive interactions.

In our opinion, there are a few possible reasons for Bronfenbrenner to treat proximal processes as invariably positive; first, it may be that he failed to address "negative" proximal processes because he was so interested in public policy. Bronfenbrenner, like many other researchers in human development and family studies, was interested in positive development, describing how children and adolescents become increasingly competent (e.g., Bronfenbrenner, 1971, 1985, 1994). Nonetheless, theories such as Bronfenbrenner's may also serve as a basis for studying the developmental impact of detrimental reciprocal interactions that become more complex over time, including the ones occurring within families (e.g., abusive parent–child relations, aggressive relations within couples).

Thus, we argue that "progressively more complex patterns of reciprocal interactions" can be of all sorts (and not only those producing positive effects), which should be more explicitly recognized in the bioecological perspective. In this case, the relation between levels of proximal processes and development would be the inverse of what Bronfenbrenner proposed—higher levels

of these types of interaction would produce lower levels of competence and higher levels of dysfunction; in contrast, lower levels of these types of interaction would be related to higher levels of competence and lower levels of dysfunction.

To give a proper definition, based on the concept of proximal process described in Proposition 1, we may call this type of interaction inverse proximal processes, which would be enduring forms of detrimental interactions in the immediate environment that take place over extended periods of time on a fairly regular basis, becoming increasingly more complex. Contrary to proximal processes as described by Bronfenbrenner, higher levels of these inverse proximal processes would be negatively related to healthy developmental outcomes. Examples of inverse proximal processes are aggressive and violent interactions, hostility, and conflictual communication.

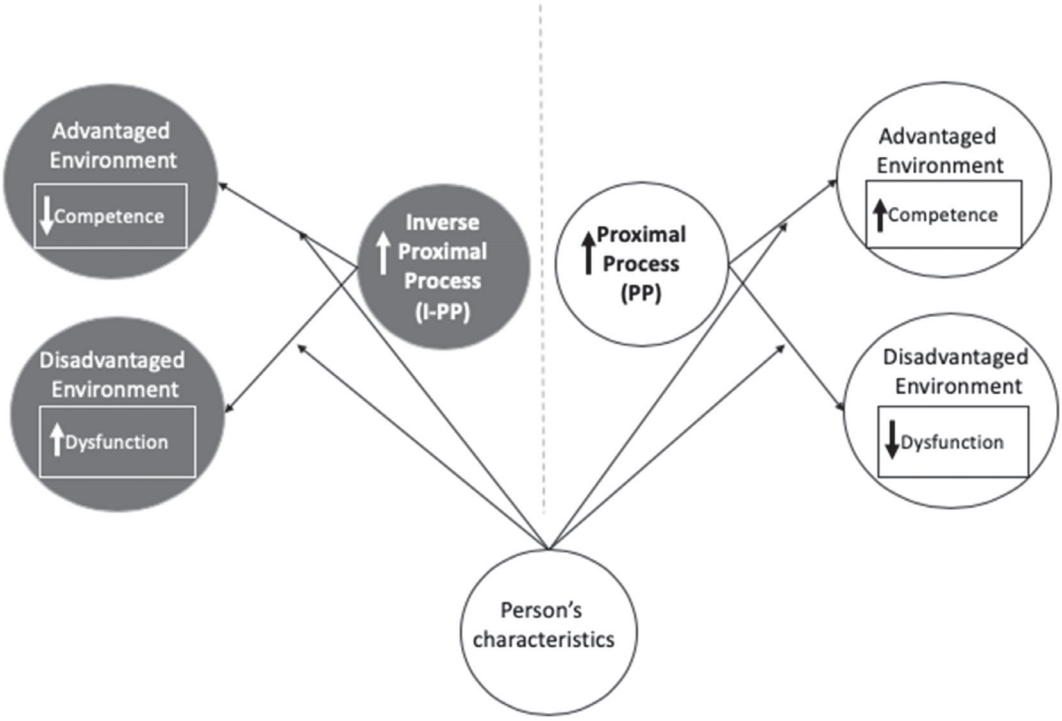
One question that we can pose is whether the synergistic relations among processes, context, and person in inverse proximal processes would work in similar ways to what Bronfenbrenner and Morris (1998) proposed. Although an in-depth analysis of this issue is not within the scope of this article, we suggest that the patterns for this type of process would be similar to those described by Bronfenbrenner but with the associations inverted (e.g., higher inverse proximal processes linked to higher dysfunction and lower competency); Figure 1 depicts the proposed synergistic effects for proximal processes and its mirrored counterpart, considering different immediate contexts (advantageous and disadvantageous). In line with Bronfenbrenner and Morris's (1998) ideas, inverse proximal processes in disadvantaged family environments would contribute to even higher levels of dysfunctional outcomes and hamper even more the development of competency than in advantaged environments. Similar to the proximal processes described by Bronfenbrenner, at higher levels of these inverse proximal processes, contextual differences would become smaller (e.g., both in disadvantaged and advantaged families, a very high level of hostility would be linked to similar levels of dysfunctional outcomes).

There is some supportive evidence that high levels of inverse proximal processes in disadvantaged environments are linked to greater developmental dysfunction; for instance, Chen, Deater-Deckard, and Bell (2014) found that the relation between maternal negativity and child maladjustment was significant only for children presenting poor effortful control (a person characteristic) living in chaotic homes (disadvantageous environment). According to the authors, "in chaotic homes (i.e., disadvantaged environment compared to calm, predictable homes), expressed maternal negativity during parent–child interaction would have the most substantial association with variance in child maladjustment among those with the poorest self-regulation capacity (i.e., low effortful control)" (p. 10).

However, showing that understanding development in a systemic way is more complex than that, Benson and Buehler (2012) showed a mesosystemic effect counter to what they had expected in their longitudinal study about aggressive tendencies and behaviors among youth; they found that peer deviance affiliation (an inverse proximal process) led to less aggressive behaviors for youth in families with less warmth or more hostility. According to the authors, "peer contexts, even when deviant, can serve some adaptive goals that compensate for the tension or disregard in a family" (p. 1223). Furthermore, the association between affiliation with deviant peers and aggressiveness was stronger for youth from upper-income families. In the same direction, Benson and Buehler found that affiliation with deviant peers (inverse proximal process) for youth experiencing emotional turmoil (a personal characteristic) was also associated with declines in aggression. The authors summarized: "Affiliation with deviant peers provides a context that buffers the influence of family hostility, lower warmth, and emotional distress on the trajectory of aggression" (p. 1225).

Considering a developmental outcome of competence, the study of Behnke, Plunkett, Sands, and Bámaca-Colbert (2011) addressed the relations between Latino teens' cultural conflicts with mothers and fathers (inverse proximal processes) and self-esteem and depression. Although self-esteem was considered a mediation variable in the study, it can also be considered a developmental outcome of competence. In line with our suggestion that higher levels of inverse proximal processes would be linked to lower levels of developmental outcomes of competence, the authors found that more intense conflict with mothers over cultural issues was negatively related to self-esteem

Figure 1. Relations Between (Inverse) Proximal Processes and Developmental Outcomes in Different Environments.



for girls; however, this effect was reversed for boys. According to the authors, "Boys might feel emboldened through the process of standing up against their mothers in relation to cultural issues, whereas girls who generally rely more on the mother/daughter relationship may experience adverse effects on their sense of worth" (p. 1190). In contrast, conflict over cultural issues with fathers was negatively related with self-esteem only for boys. Unfortunately, the authors did not look at the relations between cultural conflict with the parents and self-esteem for different neighborhood-risk perceptions. However, they found that Latino boys' self-esteem was associated negatively with neighborhood risks (more than for girls). In accordance with our suggestion, the link between cultural conflict and self-esteem would be stronger for youth living in neighborhoods with higher perceived risk.

Considering the proposed inverse proximal processes, one may question whether there would be any reciprocity in those—a requirement of proximal processes. This is an issue that deserves more attention in future studies; for that, it may be important to consider the unbalanced power in the relationship between parents and young children, with the former usually holding greater knowledge and skills to structure the child's experience (Bronfenbrenner, 1988) or gender inequality in couple relationships. Moreover, because reciprocity was not extensively discussed by Bronfenbrenner, another issue that should be further addressed is how much reciprocity is needed for an interaction to be considered a proximal process.

Conclusion

The present article aims to contribute to the discussion of the central concept of the bioecological theory of human development—proximal processes—in hopes of adding to both theoretical advance and use of the theory in empirical research in the area of human development and family studies. Specifically, drawing on the definition and properties of proximal processes, we first discussed how this concept is

distinguished from interactions and other related concepts. Second, we considered whether the effects of higher proximal processes are necessarily always positive by increasing competence or buffering dysfunction.

Although person–environment interactions are present in Bronfenbrenner's writings since the early 1970s (hardly surprising, given their ecological nature), the notion of process became more differentiated with time. Initially, Bronfenbrenner talked about interactions and relations within the microsystem. Later, in the 1980s, he wrote about process as the mechanisms or intervening variables missing in many studies and crucial to understanding development. The need to distinguish processes from environmental influences was driven by the dearth of attention paid to the mechanisms producing development as well as to some studies showing the great predictive power of interactive processes in promoting development. In the final phase of his theory's development, he proposed proximal processes as the main mechanism through which development was brought about, gaining its own deserved pride of place as the engine of development.

Regarding the second issue, as discussed by Rosa and Tudge (2013), Bronfenbrenner saw proximal processes "as almost always acting in a positive way on developmental outcomes" (p. 252), either by promoting competence or decreasing the occurrence of dysfunctional outcomes. Here, we propose an extension to the concept of proximal process, one not considered in Bronfenbrenner's writing, which we termed *inverse proximal processes*. These processes constitute primarily harmful interaction, with a reversed relation with the developmental outcome than that proposed by Bronfenbrenner; that is, higher levels of inverse proximal processes would lead to greater dysfunctional outcomes (whereas Bronfenbrenner proposed that higher levels of proximal processes would lead to lower dysfunction). Similar to what Bronfenbrenner had suggested, this relation would be stronger in disadvantaged environments.

By introducing the notion of inverse proximal processes, we offer a broader framework for understanding the diverse impact of proximal processes that happen over time. The inclusion of the possibility of studying detrimental proximal processes within bioecological theory may allow for a more inclusive and expansive use of the theory and involve the study of relations in which violation of rights occur, including detrimental relations within families (topics already addressed by many researchers). It is worth noting, for example, that in Benson and Buehler's (2012) study, family hostility and peer deviance had a greater impact in explaining adolescent aggression than did family warmth (i.e., it had a greater harmful effect on adolescent aggression). Likewise, Chen et al. (2014) found more associations between parental negativity and child maladjustment than between parental positivity and child maladjustment. Thus, it is important to consider the different nature of interactions; as suggested by Mills-Koonce et al. (2016), although lower parental sensitivity may fail to provide the needed basis for child self-relation, harsh parenting may serve as elicitor of dysregulation.

Furthermore, we think that there should be more discussion of the importance and functionality of reciprocity in proximal processes, including in the "inverse" forms of proximal processes and the consequences for development long term. As this is the first tentative step to explicitly expand the idea of proximal process, more empirical and theoretical discussion is needed. Future studies should explore whether the properties and propositions related to proximal processes correspond in a mirrored way to the inverse proximal processes, in which the association signs between proximal processes and developmental outcomes would be the inverse (i.e., instead of high proximal processes → low dysfunction, we would have high inverse proximal processes → high dysfunction, as suggested in Figure 1).

In addition, although the discussion here is meant to start the debate regarding specific issues in the conceptualization of proximal processes, particularly considering the relations in families, it is important to expand the conversation in future research to include contemporary topics in human development. For instance, how are we to understand proximal process, and its inverse counterpart, in a technological world in which interactions happen less face-to-face and more mediated through electronic devices? What are the consequences of such interactions for proximal processes, family relations, and long-term development? Would such interactions be considered proximal processes, as defined by Bronfenbrenner, or does a more expansive or different conceptualization have to be developed? These are some

of the present-day issues in which researchers should engage, to ensure that the theory does not "merely fade away as people lose interest" (Meehl, 1978, p. 806).

In conclusion, discussions of the sort we propose here are essential to the advancement of theories of human development and family studies, and, perhaps, their more appropriate use. Although the misuses of theories may have various sources, such as a mismatch in the pace at which theories and methods develop and are learned (Tudge et al., 2016), open discussion can only help their progress. That is, as theories develop, not only new and innovative methodological approaches need to be created to deal with their assumptions and propositions; researchers also should share opinions and discuss their implications. Other than that, we should promote more specific guidelines for how to operationalize the concepts in an interconnected way, including proximal processes and inverse proximal processes. This will contribute not only to a better use of the theory but also to ways of expanding the concepts and propositions based on contemporary demands.

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