

CHAPTER

2

SCAFFOLDING AND SELF-SCAFFOLDING: CENTRAL ASPECTS OF DEVELOPMENT

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Scaffolding is usually conceptualized in terms of informational or coordinative supportive behaviors that one or more person engages in for the benefit of another, usually an infant or child. The function that these supportive behaviors serve, however, is generally left at a fairly intuitive level of understanding, without much of an explicit model. The intuition is basically that scaffolding by others allows the child to accomplish tasks that he or she might otherwise be unable to accomplish (Bruner, 1975; Fischer & Lazerson, 1984; Sroufe & Cooper, 1988; see also discussions of the zone of proximal development in Vygotsky, 1978; Wertsch, 1985). In this chapter I propose a model of the functional nature of scaffolding (Bickhard, 1980), and then show on the basis of this model that scaffolding permeates all of development, with a most important version being self-scaffolding, and a central instance of self-scaffolding being provided by attachment.

VARIATION AND SELECTION CONSTRUCTIVISM

The model begins with a base in interactivism and its direct consequences (Bickhard, 1980; Bickhard & Richie, 1983; Campbell & Bickhard, 1986). In particular, interactivism logically forces a constructivist view of development, and the ultimate absence of prescience forces that constructivism to be a variation and selection constructivism (Bickhard & Campbell, 1989). Interactivism forces constructivism in that the locus of development in this view is

the systems that engage in the interactions, and system organization cannot be passively imposed from the environment—it must be constructed from within. Prescience, or foreknowledge, is impossible as a general solution to the problem of knowledge, and, therefore, those constructions must in the limit be random or heuristic variations that are tested against potential selections (Bickhard, chapter 4, Vol. 1). This is not to contest the possibility of innate supports for such constructions in the individual, but any such supports would themselves constitute knowledge constructed via variation and selection in evolution.

FUNCTIONAL SCAFFOLDING

The functional nature and usefulness of scaffolding emerges from the properties of variation and selection constructivism. First, development must proceed from points of stability to points of stability, that is, from constructed organizations that survive selection to further organizations that survive selection. Second, the change from one point of stability to the next must be a “nearby” change relative to the available processes of construction and its resources for construction. The point here is that only such easily constructed new organizations have a sufficient probability of being constructed by the variation processes for there to be any realistic likelihood that they will be constructed at all—thus, evolution and development alike involve a form of gradualism (Bickhard, 1979). Points of potential stability that require too much construction to be reached from their nearest earlier points of stability are thereby unlikely to ever in fact be accidentally constructed. On the other hand, if far points of stability are connected by a trajectory of pairwise nearby points of stability, then that trajectory may have a quite high probability of being traversed, point by point, with each stable point serving as a ratcheted (stable) foundation for the constructive search for the next stable point. Simply, constructions that do not work are selected out, and if too much construction is required before any product of that construction will work, then it is correspondingly unlikely that that particular version of complicated constructions will happen to occur such that the distant point of stability will be reached. If there are no nearby points of stability, the system will be stuck.

The key to the functional nature of scaffolding derives from the realization that both functional stability and its converse of selection-out are not intrinsic properties of either a system or its environment, but are instead relative properties of the functional relationships between system and environment. In particular, if selection pressures can be muted or blocked or suspended, then points of accessible construction that would *not* otherwise be functionally successful—that would otherwise be selected-out—can *become* successful, and thereby stable, relative to that altered environment. If sufficient

and appropriate such artificial points of interactive stability are created, then the system may be able to traverse the resulting developmental trajectory to a point of unartificial stability that does not require any such bracketing of normal selection pressures. Functionally, scaffolding is precisely the creation of such bracketed trajectories of potential development through artificially created nearby points of stability. In other words, it is only partially correct that the function of scaffolding is to allow the child to accomplish something that he or she could not otherwise accomplish alone—it also allows the child to develop further *competencies* through being provided with such bracketings of normal selection pressures. It is this further variation and selection development, made possible by the context-dependent successes, that makes scaffolding a critical aspect of the development of less context-dependent abilities.

Scaffolding reduces the complexities of problems and breaks them down into manageable chunks that the child has a real chance of solving. It can do this by reducing the complexities demanded by normal selection pressures, or by providing resources that are otherwise unavailable. Functionally, either approach accomplishes the same thing. It is clear that adults can and do serve such functions for infants and children, and at times children do so for younger children, but it has not been so clear how ubiquitous this general function is in all of development. In particular, within the standard view of scaffolding, it would seem an internal contradiction to posit a person's providing scaffolding for himself. Scaffolding has been seen as the provision of knowledge or skill that is otherwise absent—therefore self-scaffolding would be the provision of knowledge or skill by the individual that that individual did not have. The bracketed creation of otherwise absent points of stability, however, does not necessarily require the circularity of “already knowing what you need to know in order to construct it.” Within the interactive view of variation and selection constructivism, self-scaffolding becomes both possible and immensely important.

A NEURAL MATURATIONAL SCAFFOLDING

As an example of functional scaffolding that is outside the normal range of the concept—though not yet self-scaffolding—consider the organization and function of neural maturation. There is a pattern in the maturation of the infant's nervous system from lower level systems to higher level systems. Lower level systems become functional, and then become differentiated and organized by higher level systems, which, in turn, are differentiated and organized by still another functional layer, and so on—the classic pattern of differentiation and hierarchical integration (Gallistel, 1980; Moshman, Glover, & Bruning, 1987; Werner, 1961). Why should there be any sequence at all

in neural maturation, and why this particular sequence? Consider for a moment the developmental problem that would be posed if the nervous system were to mature all at the same time: The constructive processes of learning and development would be faced with a massive version of the "too much construction required before anything could possibly work" problem. All of the neural subroutines and servomechanisms, their hierarchies, and all of their hierarchical intercoordinations would have to be constructed before any of that organization would work. Anything left unconstructed, or constructed wrongly, would interfere with any part that might have been constructed correctly. From another perspective, to a system facing simultaneous construction of all parts of the nervous system, the parts of the system that require correction—reconstruction—in the face of error would be maximally unclear. The problem of assignment of responsibility for error would be unsolvable. Sequential maturation reduces the neural-learning problem to a trajectory of manageable subproblems: The foci of new organizational learning at any one time are restricted to specific parts of the nervous system, thus simplifying both the construction problem and the error assignment problem.

Furthermore, the particular sequence of neural maturation corresponds generally to the resultant hierarchy of servomechanisms through which the mature nervous system functions. The sequence of maturation focuses on this hierarchy from the bottom to the top, with each level of servomechanism achieving some minimal level of functional adequacy before the next differentiating and coordinating servomechanism levels begin to be organized. It would be difficult to organize a coordinator via variation and selection processes before there was something functionally present to be coordinated (foreknowledge, as in the a priori design of a bureaucracy, would mitigate this consideration somewhat). Successive layers of servomechanism serve as the intermediate points of stability in the trajectory to the full functioning nervous system. Neural maturation, then, not only serves as an example of functional scaffolding—provided by the maturational sequence for the constructive processes involved in the nervous system learning how to control the body—it also provides an example of the tendency for variation and selection constructions to yield hierarchies of semicoupled units, servomechanisms in this case, in which each unit could serve as a successful—stable—point of construction at the time of its first emergence. The hierarchy of units, then, maps the trajectory of constructively nearby points of stability. In fact, the original evolution of the anatomical foundations for this servomechanism hierarchy is itself another example of the tendency for variation and selection processes to proceed in terms of hierarchies of units in order to achieve trajectories of nearby stabilities (Simon, 1969). The maturational sequence is a partial recapitulation of this evolutionary pattern, for similar reasons.

ATTACHMENT AS SCAFFOLDING AND SELF-SCAFFOLDING

I would like to shift attention now from biological maturation to individual development. In particular, consider the interactive problem that is faced by the child in a novel environment—even more particularly, in a typical “strange situation.” One aspect of the task facing the child is to determine whether or not the environment is dangerous. The reactions of a reliable adult who is also in that situation, if available, might serve as a good source of relevant information that the child might have learned to rely on. This is one small part of attachment behavior as usually discussed. There is a more basic level of consideration from the child’s perspective that I would like to introduce, however. Any new environment yields unknowns of interaction for the child, and unknowns intrinsically generate arousal, and arousal—unless soothed or shifted into explicitly positive modes—intrinsically becomes anxiety (Sroufe, 1984). Novel situations, then, constitute problems of anxiety management for the child. Furthermore, they constitute problems that the young child is not likely to be able to solve alone—too much learning about this environment, too much development of internal emotional regulation, would be required before the management problem would be adequately mastered.

If a caregiver—a minimally reliable and competent comforter of upset emotions—is present in that same new environment, then the overall problem that is posed to the child by that combination of novelty and comforting resource can be changed. In particular, the child can have learned, in similar situations, to rely on the caregiver as a resource in managing his or her anxieties. That is, the caregiver can be used by the child to provide a resource that the child alone is lacking—a resource that may make the overall problem of the new environment *plus resource* a manageable problem, where the original problem of novel environment alone may not have been manageable. This point is in effect an embedding of the intuition of *felt security* as the organizational principle of attachment (Sroufe & Waters, 1977) within the functional perspective of developmental scaffolding. The infant uses, and learns to use, the attachment figure as a resource for tension management (Sroufe, 1984). The child’s use of a comforting resource in this manner is clearly an instance of scaffolding of the basic emotional management problem, and, furthermore, because it is the child who must (learn to) make use of the resource, if available, it is a kind of *self-scaffolding*. Still further, it is not just an instance of self-scaffolding in any single, novel, strange situation—any such self-scaffolding instance is itself a manifestation of a kind of self-scaffolding *skill* that the child has acquired.

Note that simple functional scaffolding by means of the strict blocking of selection pressures does not necessarily involve or require any cooperation or skill on the part of the child. Attachment, in contrast, involves the provision

of a resource that *can* be used to diminish the demands of the task of emotional management—thus scaffolding the development of emotional management skills—but in this case the child *must use*, and must *learn to use*, those resources. The child's active use of—and ability to use—caregivers' emotional management resources is an essential aspect of attachment relationships, and that use and corresponding ability is the self-scaffolding aspect of attachment.

THE EVOLUTIONARY VIEW OF ATTACHMENT

Compare this view with the evolutionary view on attachment behaviors (Bowlby, 1969). It is proposed that proximity-seeking behaviors in a strange situation have as an innate base a goal-corrected set point created in response to evolutionary selection pressures to help keep the child close to the protection of caregiving adults and out of dangerous situations. This evolutionary rationale for proximity-seeking behaviors in strange situations may well have important validity, and there might even be some corresponding innate support for the development of such tendencies. But the evolutionary rationale alone cannot explain how the individual child is involved in the development of attachment except as a kind of marionette of these evolutionarily created innate mechanisms. The evolutionary rationale—for example, attachment as selected for in evolution for serving the function of reducing infant and child mortality—does not explicate a problem that is psychologically real for the child himself or herself, and correspondingly does not explicate any sort of solution that is constructed by that child for his or her own reasons. The intuitions and empirical results of attachment researchers and research clearly go beyond such a marionette model—the child is deeply involved not only in proximity-seeking behaviors in strange situations, but also in the individually motivated construction of far more extensive and foundational-to-the-person relationships with caregivers as well. The evolutionary rationale, however, fails to give a theoretical base to such intuitions and results. The evolutionary rationale *per se* either leaves no ground at all for much of attachment theory in the broader sense, or else it requires (or would require, if a purely genetic model were seriously proposed) an *ad hoc* proliferation of evolutionarily constructed innate set points for each of the multitudinous aspects and manifestations of attachment throughout the life span.

The model of the self-scaffolding of emotional management provides a child-level understanding of strange situation behavior. Insofar as emotional tension management is an intrinsic problem from the perspective of the child, then attachment is a child-level functional self-scaffolding of that problem, and there are functional reasons *for the individual child* to construct attach-

ment skills in the service of coping with that problem. However much it may be that attachment serves evolutionary functions, and might (or might not) have innate supports, the functional logic of attachment as a self-scaffolding of emotional tension management is an individual developing-child level of functionality that, at least in principle, suffices to explain the developmental construction of attachment skills. At a minimum, it adds a critical child-level functional explanation of attachment to the evolutionary explanation without which much of attachment and its forms and consequences are inexplicable.

Furthermore, it does so in a way that connects with results concerning the relationships between styles of caregiving and forms of attachment (Ainsworth, 1979; Egeland & Farber, 1984; Sroufe, 1985)—the styles of caregiving constitute variations in the reliability and competence of the adult as emotional management resource. From the evolutionary perspective, these either remain intuitive with no explanatory model, or require the addition of child-level developmental considerations to the basic innate proximity-seeking set point model. Similarly, the self-scaffolding aspect of attachment provides a partial framework for understanding the contributions of children's individual differences to attachment relationships.

ATTACHMENT AND HUMAN SOCIALITY

The self-scaffolding model does not explain attachment among human beings in a broad sense. But, then, neither does contemporary attachment theory. The evolutionary theoretical base is simply too narrow. Fundamental questions remain unanswered: What is the ground for the powerful intrinsic openness to sociality that we find in humans? What other aspects of general attachment require their own submodels for explanation? What is the nature of the clearly present deep connection between early social experience and later constitution of the person? (Note that the approach to attachment in the broader sense in terms of internal working models [Bowlby, 1973, 1982] already presupposes that internal working models of social relationships are of critical importance to human beings. That is, it presupposes rather than addresses or answers the question concerning the ground for the intrinsic socialness of humans.)

The standard orientation within the attachment literature is to supplement the narrow evolutionary base with a generally psychoanalytic filling out of the theoretical ground for human relating. An alternative filler is social-learning theory. Unfortunately, whereas the evolutionary base is relatively strong but narrow and incomplete, the psychoanalytic ground is desperately weak and almost empty (Crews, 1986, 1988; Eagle, 1984; Grunbaum, 1984).

THE GROUNDS FOR HUMAN SOCIALITY

Concerning psychoanalysis in general, there is a hesitancy to acknowledge its logical, conceptual, and empirical emptiness—a reluctance to admit that the emperor is stark naked and to challenge the claim of regalia. Historically, psychoanalysis has set itself above the standards of logic and empirical test that characterize science (Eagle, 1984; Grunbaum, 1984), and there is still a tendency to accept it on its own antirational terms—or, at least, to not challenge it. (See Appendix at end of chapter.)

For deep and multiple reasons—empirical, logical, conceptual, and moral—psychoanalysis does not provide a satisfactory context for filling out the evolutionary base of attachment theory. On the other hand, as a complement to an evolutionary framework for attachment theory, the social-learning literature stands on stronger scientific ground, and contains far fewer egregious gaffes of rational understanding. However, it simply does not address—and excludes from legitimate consideration—the most central issues of human nature and sociality. Its pseudo-behavioristic restriction of permitted mental ontologies—the absence of ontologies such as purposes, values, self, and identity, and intrinsic rather than secondary sociality—forbids any such central concerns. Attachment theory, then, remains without an adequate theoretical complement to its evolutionary base.

The self-scaffolding of emotional management in children does not answer more than a few questions regarding the sociality and social development of children. The general function of self-scaffolding, however, does provide perspectives on a number of broader attachment and social development phenomena. In fact, once the functional nature of scaffolding is understood, self-scaffolding proves to be a ubiquitous aspect of all of development, social and cognitive and other domains alike.

Before considering briefly some additional aspects of social development, I propose a framework for approaching the intrinsic socialness of human beings within which these further aspects of social development can be viewed. This framework is not a scaffolding phenomenon per se, though it certainly relates to such, with respect to both evolution and development. There are undoubtedly innate supports for the development of various aspects of socialness—for example, perhaps, responses to faces, smiling and responses to smiling, language development supports, and so on—though the specifics of such support are open to much question, and the overblown claims and the representational homuncularism of contemporary innatists leaves very unclear what the actual nature of such supports might be (Chomsky, 1975; Fodor, 1975, 1981, 1983; Piattelli-Palmarini, 1980; see also Bickhard, in press; Campbell & Bickhard, 1987). But, whatever the nature and form of such innate developmental supports, they cannot be the reason for the intrinsic sociality of human beings without rendering that sociality merely an epiphenomenon

of the relevant genes. This would give our sociality a purely marionette character, with the genes pulling the strings. Such a position is a priori a logically possible one, and probably fits the "sociality" of, for example, "social" insects, but, among other problems, it most emphatically does not fit our experience. Within such an innatist view, the personal experience of intrinsic sociality requires some other explanation—an explanation of how we are so deluded in our sense of ourselves as to think that we are social in a personally intrinsic sense. (This position is logically similar to the one that advocates of pure determinism face, in that they must account for our delusion of free will.) Furthermore, as mentioned earlier, such an innatist position requires a proliferation of ad hoc innatenesses to account for all of the various aspects and manifestations of attachment. Still further, any such approach must account for the developmental openness of attachment, together with the intrinsic social, cultural, and historical context sensitivity of the development of such attachment. Clearly, any adequate account for these aspects of sociality leaves little ground for any specific or direct innate cause of sociality. Sociality is in some way intrinsic to our ultimate constitution as *persons*, not just as organisms, and any model of the biological ground for the tendency for a social constitution must acknowledge and account for its developmental constructive nature and its resultant sociocultural-historical openness and context dependency.

The approach to human intrinsic sociality that I wish to suggest derives from the initial observation that human beings are highly adapted to environmental niches that involve and require interaction with highly temporally complex situations. The adapted niche for human beings is one of quick shifts in time—of planning, coordination, learning and learning to learn, and so on. It is not with respect to relatively static and unchanging aspects of the world that we are more adapted than other species, but with respect to the changing properties of the world. Human beings are primarily adapted to the niche of adaptability (Bickhard, 1973).

But in being intrinsically *adapted* to such temporal complexity of interactions, human beings intrinsically *offer* such potential complexity to others. Such temporal complexity is manifested most directly in the shifting patterns of form and topic of communication—in social interaction. The niche to which we are most adapted is *by virtue of that fact* mostly constituted by others—the *openness to sociality* is intrinsic in our biological adaptedness to temporal complexity. The sociality itself is then developed. This view converges with the position in evolutionary biology that the primary source of evolutionary pressures that yielded the extremely rapid increase in brain size in the recent evolution of genus *Homo* was not an external pressure of food access or other direct survival issue, but instead the pressure to be able to participate in sociality—in interactions with others—in order to share in the resources available, including mates, within the social group (Humphrey, 1976).

If we now consider that what we are and who we are as persons is constituted primarily in our abilities for, and manners of, interaction with our worlds, then it follows directly that our constitutions as adults will be deeply and intrinsically social because our *worlds* are deeply and intrinsically social (Bickhard, chapter 4, Vol. 1). Our openness to sociality is intrinsic in our adaptability to a complexity that is provided primarily by other human beings, and our sociality per se is constitutively constructed in the development of our ways of such social interacting. We are, in large respect, our relating to others.

IDENTIFICATION

Let me now return to more specific issues of social development, and involvements of self-scaffolding, from within this perspective. Within the larger task of social development is the subtask of constructing manners and skills of interacting that are competent both with respect to the selection pressures of the particular issues of interaction involved and with respect to the selection pressures of the general issues of self and self-values (Bickhard, 1989; Campbell & Bickhard, 1986). As is becoming familiar, this task is a large and complex one—one not likely to be solved all at once by the child alone. If there were some way for the child to reduce the demands on construction involved, some resource that could provide guidance on powerful modes of interacting to be constructed, the child could make use of that resource to scaffold the overall task of constructing social and other competencies. Such a version of self-scaffolding would require that the child implicitly identify one or more individuals as constituting such resources of power and respect in the world, and, once identified, that those resources be made use of in the construction of new manners of interacting. Such a version of scaffolding could not, without requiring prescience, anticipate with high success exactly *which* aspects of the individuals' manners of interacting were actually sources of such interactive power, and thus we could expect to find both relevant and irrelevant examples of drawing from such resources. When we find this form of self-scaffolding in children—or adults—we call it identification. When we note a more restricted version of this kind of scaffolding, of constituting a resource for guidance in development and for the muting of selection pressures, in professional domains of development, we call it mentoring.

In this view, both attachment in the strict sense and identification are versions of self-scaffolding, but not the same version. They are scaffolds with respect to differing developmental problems, and require the identification of and the learning to make use of different sorts of resources. An immediate set of questions concerns the relationships between them, but for now, I simply point to such questions. They are a subset of the questions concerning

the relationship between early social experience and later constitution of the person.

COGNITIVE, ENVIRONMENTAL, AND PERMANENT SCAFFOLDS

At this point, I would like to indicate the pervasiveness of scaffolding and self-scaffolding by mentioning several other examples from across the range of development. Scaffolding is essentially the reduction in the demands of a problem for the sake of the eventual solution to the full problem. Thus, any form of simplifying a cognitive or social problem on the way to solution of the original problem will constitute a version of scaffolding. Simplifying cognitive problems, temporarily suspending constraints on problem solutions, breaking down problems into subproblems, moving to ideal cases, using analogies with already or better understood problems—all these show that not only is self-scaffolding ubiquitous in cognitive functioning, but the development of self-scaffolding skills is central and essential for cognitive development. Pretend play, games with rules, peer relations of equality and hierarchy, and so on all constitute *mutually* scaffolded task domains that help form developmental trajectories toward social competence and self-respect. Institutional scaffolding is provided, for example, by schools, youth groups, and, at the adult level, halfway houses. Learning how to self-scaffold in the multitudinous domains of development is among the most central sorts of tasks that children must master. The provision of scaffolding by adults and society is equally critical to development both of children and adults. I would suggest that failures in the development of these skills provide an interesting perspective to take on developmental difficulties, and that the external provision of such scaffolding is similarly an interesting perspective to take on facilitating child and adult development. For example, psychotherapy serves a scaffolding function for the development of the person.

The functional notion of scaffolding is important in itself, but, as a theoretical notion, it also grounds theoretical extensions that are themselves of critical importance, and that would not likely be discerned or understood without it. A first example, of course, is the phenomenon of self-scaffolding. A second example is the possibility of *environmental* scaffolds for the development of *self-scaffolding*, in children or in adults. A significant aspect of the scaffolding of language acquisition, for example, is not just the scaffolding of communicational performance per se, but the scaffolding by an adult of the development of the communicational skills—for example, the questions and question forms—by which the child aids, self-scaffolds, his or her own further language learning. There are likely similar adult scaffolds for the development of attachment self-scaffolding skills—for example, the provision

of comfort in response to even the most primitive versions of indications of the need for, requests for, and other forms of seeking that comfort. Still another extension of the functional notion of scaffolding is to recognize the possibility of scaffolds in the sense of muting or blocking otherwise present selection pressures, but not in the sense that those scaffolds are ever removed—to recognize *permanent* “scaffolds.” In *Cognition, Convention, and Communication* (Bickhard, 1980), for example, I analyze social conventions as constituting, in effect, permanent scaffolds: Social conventions make possible coordinations of interaction that otherwise would be impossible, or at least enormously costly. In fact, I propose an explication of the emergence of the social realm out of the psychological realm in terms of institutionalized and noninstitutionalized conventions (see also Bickhard, chapter 4, Vol. 1).

It should be noted that, although functional scaffolding is a ubiquitous and fundamentally important form of influence from the environment to the developing child and adult, it is not the only form of such influence. As a context for the exclusive focus on scaffolding in this discussion, it is worth mentioning that the environment also provides selection pressures as well as scaffolds. It also provides models, which, however, require a form of self-scaffolding to be made use of, and instruction, which should provide good scaffolding—and scaffolding for self-scaffolding—but seldom does.

FUNCTIONAL SCAFFOLDING AND THE CLASSIC NOTION

At this point, a more direct comparison of the functional notion of scaffolding with the classical notion seems in order. As mentioned earlier, the usual conception of scaffolding is that of the provision of something lacking in the child in order to make possible performances that otherwise would not be possible, and, therefore, to aid the development of the capabilities underlying those performances. This notion is closely allied to Vygotsky's ideas of the zone of proximal development and internalization. The zone of proximal development is the range of capabilities that can be manifested with appropriate support—in terms of the functional explication of scaffolding, this corresponds to the range of abilities and performances that are within the constructive and interactive competency of the child *so long as certain, generally higher level, selection pressures are suspended or blocked*. This range will be limited in extent at any given time because, from below, some already well-developed competencies will not require any suspension of selection pressures, and, from above, only those selection pressures that are relevant to task domains that are real for the child, only those selection pressures that the child can *experience* as selection pressures—as task successes and failures—will be relevant to the performances and the developmental

constructions of the child. Thus, the *zone* is the range from the already well-adapted competencies through the potential competencies for which the child can recognize errors and successes, but cannot in all cases avoid those errors. Support within this range is postulated to aid development via the *internalization* of the supports provided.

It is with respect to internalization that the primary difference between the functional notion of scaffolding and the Vygotskian notion appears. Internalization is a metaphor of the moving of something from outside to inside—the movement of the skills involved in the supports being given. In order for the metaphor to apply, there must be something explicitly being provided to be moved inside, and this is the ground for the notion of scaffolding as the provision of positive skill or knowledge. It is an inappropriate metaphor for the consideration of variation and selection constructive processes and the possibility of blocking some of the selection pressures. It is not, therefore, a metaphor within which the functional notion of scaffolding can be developed. It is not a metaphor that is consistent with the notion of *self-scaffolding*—how could an individual *internalize* something that is not external to begin with?

Vygotsky's notion of internalization was more sophisticated than just that of the movement from outside to inside. He postulated an internal reconstructive process that could in general yield a change in that which was being internalized (Wertsch, 1985). This more sophisticated notion, however, still is not consistent with the functional notion of scaffolding and of self-scaffolding: It still requires the external positive content to be internalized, however much it may be that it is changed in the process of internalization. Another important aspect of Vygotsky's conception is its focus on language and communication. In particular, Wertsch and Stone (1985) have argued that Vygotsky's conception of internalization is constituted as the internal mastery of external sign forms. This general process of the child coming to be a member of society and developing a mastery of the cultural tools available (Rogoff, 1989) is certainly among the most important processes in the development of the child. This social and cultural focus is convergent with the notion of the permanent scaffolds of the social realities of institutionalized and noninstitutionalized conventions, with language itself being among the most important institutionalized conventions (Bickhard, 1980 and chapter 4, Vol. 1). The functional notion of scaffolding and of the constructions within a scaffolded environment, however, are broader than this focus. They include social scaffolding and the scaffolded development of social and language skills and knowledge, but also include the possibility, for example, of scaffolding by physical materials, such as with some Montessori materials, or of the social scaffolding of nonsocial skills, such as of how to throw a stone or catch a ball, or of the range of self-scaffolding, such as of the development of the skills involved in making use of the noncultural resource of an emotional comforter as in attachment, and so on.

SCAFFOLDING: FUNCTION AND FUNCTIONAL CONSTRAINT—NOT A UNITARY PROCESS

It should be noted that scaffolding and self-scaffolding have been defined in functional terms, not in process terms. Scaffolding and self-scaffolding are functionally essential to all of development, and the development of skills of self-scaffolding itself will constitute a central kind of development, but the forms and processes and skills that serve those scaffolding and self-scaffolding functions will be of enormous variety. Self-scaffolding is *not* a single or unitary skill. It is not even clear if there is much learning-to-learn about self-scaffolding, except perhaps within more restricted problem domains.

The essentialness of self-scaffolding, then, is a functional *constraint* on all of development—derived from the variation-and-selection constraint requiring developmental trajectories through nearby points of stability—that generates its own *field* of specific developments for serving that function in various domains, but that does not become (except in restricted senses) a *domain* of development of its own. The core of this distinction between fields and domains of development is that a *field* of development is unified by a commonality of selective function served by the particular developments in the field, whereas a *domain* of development requires in addition that that unifying function be represented internally as an internal selection principle—a goal or value of learning and development—not just as a selection principle operating from outside of the system (Campbell & Richie, 1983). Such explicit principles of self-scaffolding will at times develop, but they will be explicit in limited senses, such as a scientist or mathematician learning the skills of simplification, idealization, analysis, and so on in his or her speciality, and, even more to the point, learning that it is necessary to develop such skills in order to function in the field.

Scaffolding and self-scaffolding, then, do not provide a new domain of development per se. They are, however, functional necessities that constrain all of development. As such, they constitute powerful perspectives on a great many aspects of development.

THEORETICAL PREREQUISITES FOR A MODEL OF FUNCTIONAL SCAFFOLDING: RECURSIVE AND METARECURSIVE VARIATION AND SELECTION CONSTRUCTIVISM

Scaffolding and self-scaffolding are not, however, perspectives that can be understood coherently from within most of developmental psychology: The functional model of scaffolding that makes the notion of *self-scaffolding* a coherent conception depends on an underlying model of development as

involving recursive and metarecursive variation and selection constructivism, and such models of development are vanishingly rare. To the extent, then, that self-scaffolding makes sense, it counts against most current models of development. In particular, without a constructivism, the basic problem of scaffolding cannot be defined. Similarly, without a variation and selection constructivism, the function of muting selection pressures cannot be defined. By a recursive constructivism is meant a constructivism in which the results of prior constructions are available as resources for further constructions. Without such recursivity, the function of scaffolding cannot be served: All constructions would have to be grounded on the same primitive basis regardless of what prior constructive successes had occurred, and, therefore, there could be no ratcheting of stable intermediate successful constructions that could ground further construction toward a next stable point. By a *metarecursive* constructivism is meant a constructivism in which the procedures of construction are themselves subject to construction—and to recursive construction in the sense that prior constructive procedures provide resources for the construction of new constructive procedures. Without such metarecursivity, *self-scaffolding* procedures could not themselves be constructed, and, therefore, self-scaffolding skills in any form could not develop.

Without the foundation of a recursive and metarecursive variation and selection constructivist developmental model, then, the notion of self-scaffolding, and the general notion of functional scaffolding, cannot be coherently defined. But such developmental models are rare. Production-rule models focus on synchronic abilities, and have a hard time being constructivist or developmental at all (Klahr, Langley, & Neches, 1987), and, although some constructivist intuitions are present, other general information-processing models of development have a similar intrinsic difficulty in modeling them (e.g., Siegler, 1984; Sternberg, 1984; see also Campbell & Bickhard, 1986). In no case is metarecursiveness to be found. Neo-Piagetian models are both constructivist and recursive (Case, 1985; Fischer, 1980), but have no model of variation and selection, and are not metarecursive. Social development models are still often simple or reciprocal causal models—which can be marginally constructive and recursive, though rarely with any developed constructive model—or, at best, neo-Piagetian—which captures a constructivism and recursiveness, but not a variation and selection model nor a metarecursiveness (Damon, 1983).

Piaget's model itself is probably the closest to providing the essential characteristics for modeling a functional scaffolding, and thus self-scaffolding. It is clearly constructivist, and it is also directly recursive—new structures are constructed out of and on the basis of previously constructed structures. But Piaget's model is explicitly opposed to variation and selection developmental models—arguing that variation-and-selection constructivism is insufficiently powerful to account for any important aspects of development (Bickhard,

1988). Furthermore, Piaget's model is not, and has no logical room for, a meta-recursiveness: All construction is via equilibration, and, although equilibration can take several forms (Piaget, 1985), there is no allowance in the model for the construction of new procedures of equilibration per se (Bickhard, 1988).

CONCLUSIONS

The function of scaffolding and the developmental field of self-scaffolding are ubiquitous and fundamental to all of development. The theoretical modeling of these phenomena, however, requires several specific theoretical prerequisites that, although reasonable and seemingly obvious when specified, are almost nowhere jointly available in the contemporary developmental literature. Functional scaffolding and self-scaffolding, then, form not only an interesting field of development and perspective on development, they also constitute powerful and clear constraints—selection pressures—on developmental theory in general.

APPENDIX

In the spirit of not conforming to the willful blindness of psychology concerning psychoanalysis, and of making my own small contribution to the moral task of repairing some of the scientific integrity within psychology which psychoanalysis has corrupted, I point out that the list of flaws—conceptual, logical, empirical, and ethical—in the psychoanalytic literature is very long and is very serious:

1. The inability to transcend the unrealistic psychic energy model in the historical progression from Freud's original libido energy, to Hartmann's neutralized libido energy dedicated to the ego, to the object relations theorists' energies or energylike affects dedicated to "objects" or relationships, to Kohut's narcissistic energy dedicated to the self.
2. The historically parallel sequence of patchwork fix-ups (Eagle, 1984; Gedo, 1979)—often just the dedication of an ad hoc new sort of energy—of flaws in the system in order to address realities of human nature that had been obvious to thinkers and astute grandmothers long before, such as the importance and pervasiveness of the reality functioning of the person (ego psychology), the intrinsic sociality of human existence (object relations theory), and the centrality of the self (self-psychology).
3. The marionette model inherent in psychoanalysis itself—the experiencing person is basically just a marionette of unconscious energies, memories, and representations (Shapiro, 1981).

4. The elevation of reified metaphor to an accepted art form in place of genuine theorizing—psychic energies; neonatal autism, narcissism, and other adultomorphic excesses; agglutinations of memories of events *with* a person as a model of the construction of a representation *of* that person; ad infinitum.

5. The imputation of impossible cognitive capacities, such as representations of “objects,” to infants, and the reliance on discredited notions of the ground of representation and memory, such as the assumption of memory traces of past events as constituting the foundation for all of cognition (Christopher & Bickhard, 1990a).

6. The pervasive violation of basic logic, rationality, and ontology, such as the substitution of self-representations for a self, and the positing of fragmentations of self-representations as explanations of an experiential sense of personal fragmentation (Christopher & Bickhard, 1990b).

7. The history, sociology, and politics of a cultish faith, more concerned with orthodoxy, legitimacy of descent, and schismatics than with its purported subject matter of human beings (Crews, 1986, 1988).

8. The corresponding hermetic sealing of the literature from issues of data or rationality:

It is yet another mark of a degenerate tradition that it has contrived a set of epistemological defences which enable it to avoid being put in question or at least to avoid recognising that it is being put in question by rival traditions. This is . . . part of the degeneracy of modern astrology, [and] of some types of psychoanalytic thought . . .” (MacIntyre, 1977, p. 461)

And on and on.

There is little ground for rational reliance on psychoanalytic writings as providing a theory or theories in any legitimate sense of the word (Crews, 1986, 1988; Eagle, 1984; Greenberg & Mitchell, 1983; Grunbaum, 1984; Reppen, 1985; Shapere, 1984; Shapiro, 1981; Suppe, 1977).

Furthermore, there are serious moral issues involved in not acknowledging these egregious defects, not investigating them, not confronting them, and in continuing to uncritically teach—and not criticize the teachings of—such a flawed perspective. That is, there are moral issues as well as scientific issues involved in exempting—*de jure* or *de facto*—psychoanalysis from the same standards of rational and empirical criticism to which any scientific work is subject. The ontologies are disastrous—for example, emotions and motivations as fluidic energies, structural representations as experiencing agents; the reasoning is egregious—for example, pervasive reifications, *ad hominem* defenses; the epistemology is circular—for example, self-confirming clinical data; and the values of orthodoxy, schismatics, and insularization are corrupt. There are certainly many gems of intuition and poetics of empathic evocation in psychoanalytic literature, but separating the validities from the

errors and sillinesses is a task with small and uncertain rewards: There is gold there, but it is a very low-grade ore. In fact, the errors and distortions, the incoherent ontologies, the pervasive reliance on unacknowledged, flagrantly invalid forms of thought, and the lure of a promised elite initiation into a cult of deep and hidden mysteries, are all among the several constant dangers of unguarded—uncriticized—consideration of this literature.

The tradition that psychoanalysis has spawned deserves, but, unfortunately, will not receive, a quick and thorough demise: It is long past time to have ceased tolerating the epistemological blindness guarded by the conceit of revealed truth from the master, the rationalistic front of an antirationalist cult, the certainty in—and the deep allure of—higher forms of mysterious and powerful “truths,” the ad hominem dismissals of critical positions, the substitution of orthodoxy for reason and evidence, and *the damage of training thousands to ignore evidence and reason in mastering those orthodoxies*. The subject matter of human persons and sociality requires and deserves a fresh beginning, unencumbered by the multitudinous errors, flaws, and metaerrors and metaflaws of the psychoanalytic tradition. It is time for honest and open science—genuine inquiry—instead of cultishly loyal, antirational orthodoxy.

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