DOCUMENT RESUME

ED 354 292 UD 029 051

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TITLE The Developmental and Sociocultural Foundations of Mentoring.
INSTITUTION Columbia Univ., New York, N.Y. Inst. for Urban and Minority Education.
SPONS AGENCY John D. and Catherine T. MacArthur Foundation, Chicago, IL.
PUB DATE [92]
NOTE 43p.
PUB TYPE Information Analyses (070) -- Viewpoints (Opinion/Position Papers, Essays, etc.) (120)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Adolescent Development; Adolescents; Apprenticeships; Behavior Standards; Children; Creative Development; *Developmental Psychology; *Helping Relationship; Interpersonal Competence; *Mentors; Modeling (Psychology); Role Models; Social Behavior; *Social Development; Socialization; *Sociocultural Patterns
IDENTIFIERS Culture Transmission; *Protege Mentor Relationship

ABSTRACT

This paper presents a series of propositions concerning processes that are at work in mentoring relationships, with each proposition accompanied by a brief discussion of the theory and research on which it is based. Examples are provided of the role of mentoring in the development of creative individuals. The propositions cover the following parameters: (1) the human capacity to form strong attachments; (2) the unique higher-order psychological functions originating in social interaction in the context of goal-directed daily activities; (3) the activity settings of everyday life that create interaction opportunities for children/novices/proteges; (4) the type of developmentally sensitive interactions in which assistance is provided that permits learners/proteges to perform at higher levels than they are capable of alone; (5) face-to-face collaborative interactions; and (6) the importance of speech and other signs and symbols that work to create intersubjectivity among participants transmitting meaning, values, affect, motivation, and culture. Further sections discuss mentoring as enculturation through which cultural inheritance is passed on in mentoring. An accompanying section describes mentoring processes in creative apprenticeships, including the sociocultural processes in creative mentorships noting that in collaborative activities, particularly in the zone of proximal development, higher psychological functions emerge and the protege experiences transformation of his own structuring of thought. Sixty-nine references are included. (JB)

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The development of this paper was supported by the John D. and Catherine T. MacArthur Foundation.

The opinions expressed in this publication do not necessarily reflect the posisitions or policies of the MacArthur Foundation or the Institute on Urban and Minority Education.

The authors thank Barbara Rogoff, Jennifer Coots, and Sandra Z. Kaufman for their critical reading of the manuscript and their helpful suggestions.

INTRODUCTION

When he departed for the Trojan War, Odysseus, King of Ithaka, left his wife and infant son Telemachos in the care of Mentor,

> .....who once had been the companion of stately Odysseus,
> and Odysseus, going on the ships, had turned over the household
> to the old man, to keep it well, and so all should obey him.
>
> .....Athene came to [Telemachos]
> likening herself to Mentor in voice and appearance.
> Now she spoke aloud to him and addressed him with winged words.
> 'Telemachos, you are to be no thoughtless man, no coward,
> if truly the strong force of your father is instilled in you;
> such a man he was for accomplishing word and action.
>
> I have no hope that you will accomplish all that you strive for.
> For few are the children who turn out to be equals of their fathers,
> and the greater number are worse; few are better than their fathers.
> But since you are to be no thoughtless man, no coward,
> and the mind of Odysseus has not altogether given out in you,
> there is some hope that you can bring all these things to fulfillment.'
> (*The Odyssey of Homer,* tr. by R. Lattimore, 1965, pps. 45-46)

The relationship of Mentor and Telemachus names and encodes what today is thought to be missing in the lives of too many youth. Mentor is older, wiser, and is experienced in ways and things a young person must master. He has values, integrity, and a personal commitment to his young protégé. His advice is at once supportive and challenging; he makes substantial demands and promises a bright future. He speaks with the confidence and authority of the gods.

The mythic relationship encodes many of the issues which confront those who would deliberately create mentoring relationships. Perhaps the most crucial is how the relationship came to be. Does the relationship arise from existing arrangements, or is it deliberately created?

Although he was assigned by King Odysseus to be Telemachus' advisor and surrogate father, Mentor's relationship to the household already existed. The features of the relationship evolved, in the context of everyday life of the royal family, over the young man's first 20 years; Mentor's relationship with the boy was based on his

companionship with the King. Such an origin of mentoring has been described as natural, in contrast to planned forms (Flaxman, Ascher, & Harrington, 1988, December). Natural mentoring relationships arise from contexts, sometimes accidental, which bring mentor and mentee into contact. Mentor roles are eminently familiar to us all, and include pseudo-parent, friend, teacher, and coach among others. Planned mentoring is deliberately structured and created, and following the man whose name it honors, the role is formally assigned.

The texture and quality of planned and natural mentoring also differ. Planned relationships are less intense, frequent and sustained; they are less likely to be disturbed by emotional complications which often accompany the parent-child features of natural mentoring relationships (Flaxman et al., 1988). Natural mentoring often addresses a wider range of issues than planned forms, including personal matters in addition to more instrumental ones.

In spite of these differences, *all forms of mentoring are special cases of more general developmental and sociocultural processes.* This article is organized as a series of propositions concerning processes that are deeply implicated in mentoring. Each proposition is followed by a brief discussion of the theory and research on which it is based. Each includes some implications for successful mentoring. These propositions will be followed by an integration and a more holistic presentation of the mentoring relationship and its possibilities. Finally, we will exemplify the theoretical analysis in a more detailed "case example" of the mentoring processes in creative fields of endeavor.

1. *The lifelong capacity of humans to form affectively strong relationships, broadly analogous to attachment/bonding processes of early infancy, is a foundational requirement for mentoring to occur.*

> Mentoring does not preclude concrete and practical help, but it presupposes an interpersonal attachment. More important, the relationship must be of sufficient intensity or magnitude that some identification take place (Flaxman et al. 1988, p. 27).

Several assumptions are present in this important quotation. Flaxman et al. suggest that mentoring requires an intense relationship, and that the eventual

identification of mentee with mentor depends on that intensity. The unpacking of this (undoubtedly correct) proposition will be one of the purposes of this chapter. For example, the initial attraction or resonance between the mentoring pair is certainly a variable of importance, but of how much import? As we will describe below, this "intense attachment" is also a product of the mentoring work, and we know much about the processes by which the mentee comes to identify with the mentor.

Further, the use of the term "attachment" implies that mentoring is a special case of more general socialization processes. Attachment (of infant to parent) and bonding (of parent to infant) have been proposed as reciprocal behavioral control mechanisms evolved by the human species to increase the survival of offspring (Bowlby, 1969). These attachments may be only the first of others that are formed over the life-span, including attachments to siblings, peers, mates, and mentors.

Despite many possibilities, humans seem to pursue only a small fraction of the number of opportunities to form relationships. Although personal attraction is not always a factor in the development of or a characteristic of an established relationship, it facilitates relationships (Berscheid, 1985). Attraction, and thus relationship formation, may depend on simple propinquity and sheer familiarity, and not how much the other is liked (e.g., favorable evaluation of the other's qualities or resources (Berscheid, 1985). Other factors influencing relationship formation include: social attention of others, physical attractiveness, and similarity. Some of the proposed mechanisms underlying interpersonal attraction are remarkably simple: For example, the "mere exposure" hypothesis (Zajonc, 1968) suggests that-all things being equal-attraction (and relationship) follow from increasingly frequent interaction, although there appears to be an upper limit.

These findings suggest that attachment and bonding are not unitary, delicate processes restricted to limited categories of biologically-based relationships and age periods (Matheson, Rose, & Howes, 1990). The process underlying attachment may be an evolved and adaptive capacity of the species, but its function and appearance are not programmed. Rather, it is a capacity that prepares individuals to respond to ecocultural

features for specific adaptive advantage. It is probable that these processes are available throughout the lifespan to meet social and ecological challenges of different lifestages.

By extrapolation, these processes should be available for and are likely factors in the formation of mentoring relationships. But not every pair can enter a mentoring partnership. With whom a learner/mentee attaches and identifies, depends on the personnel available for co-participation in the activities of everyday life.

Co-participation that rests on natural assortative pairing of mentor and mentee is well (though informally) organized in societies that depend on mentoring for socializing into significant cultural roles. John-Steiner and Oesterreich (1975) have described the ways that young Pueblo Indians observe potters from a distance, until the natural attraction of a potter to child, and of the child to potter (or pots!) eventuates in a pairing.

Neglect of this interpersonal attraction may doom attempts to plan mentoring. A number of years ago, in a bold attempt to increase the "reproduction rate" of Navajo medicine men, Rough Rock Demonstration School in Arizona attempted to incorporate a training program into a structure of formal schooling. It quickly foundered, and was terminated. The "open enrollment" system did not provide for a slow and careful exploration of resonances between healer and pupil, upon which this arduous training absolutely depends, so intimate and intense is the mentoring.

Successful mentoring, then, depends on enough interpersonal attraction to initiate the joint activity and to cement it together through the early stages of apprenticeship. This principle is well-known to all scholars. Each of us has experienced the sorting out of students and professors in graduate school, and we know that there must be some pleasure in the social plane, at least until the processes of working together begin to create attachment. However, the necessary degree of that initial attachment is not known; and as we will discuss later in our sixth proposition, the attachment that provides for identification follows from and is a natural outgrowth of the activities of successful mentoring itself.

2. *Higher-order psychological functions unique to humans have their origins in social interaction in the context of goal-directed everyday activities.*

This principle has the most profound implications for how we treat development and learning in general, and thereby the particular effects of mentoring in all its forms. It argues against a conception of the individual and the social world as separate influences, and for treating them as intertwined aspects of development. To understand and explain development, we must look not only at the individual, but at the external world which that individual inhabits.

> . . . any function in the child's cultural development appears twice, or in two planes. First, it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category. This is equally true with regard to voluntary attention, logical memory, the formation of concepts, and the development of volition (Vygotsky, 1981, p. 163).

Higher-order functions in this context include not only those identified by Vygotsky and more recent cognitive and metacognitive research (Rogoff, 1990), but also social cognitions of the sort that are a common focus of mentoring programs. For example, self-esteem can be thought of as a socio-cognitive function that begins as an interpsychological category. It is gradually internalized and becomes an intrapsychological category: It then functions as one of several self-schemas (Markus, 1977) or generalizations an individual holds about the self that guide social information processing in particular domains (e.g., independence-dependence, creativity-conformity). Like other schemata, self-evaluative schema provide easier and more consistent processing of social information and a filter for information that might negatively impact self-evaluation and disrupt an individual's functioning (Markus & Sentis, 1982, p. 62).

The social origins of self-evaluative schema—such as self-esteem—are in the repeated categorization and evaluation by self and others in *important or salient domains of joint social activity* (Markus & Zajonc, 1985, p. 146). This suggests that self-schema such as self-esteem are not transmitted by simply associating with individuals who positively evaluate themselves. Rather the development of self-schema depends on active

participation in joint activities, from which derives feedback on success and failure and an overall favorable social comparison (Rodin, 1985, p. 855).

Therefore, what is gained (cognitive and social cognitive functions) from a relationship (attachment) by a learner/mentee to an expert/mentor depends as much on the *nature of the activities* in which they are co-engaged as on the *affective quality of the relationship.* Given the propensity of humans to form affective bonds with others and the broad capacity to develop higher-order functions, the issue in the programmatic uses of mentoring does not end with arranging and managing relationships and selecting functions to develop. As important, if not more so, is *the arrangement and management of the activities* in which a bonded mentor and mentee engage. To explore this principle requires a further examination of the developmental impact of everyday activities and their ecocultural context. If mentoring depends so heavily on the activities in which a pair are jointly engaged, then it is vital to have a theoretical basis for analyzing activities in order to identify principles for designing activities that will scaffold planned mentoring.

3. *The activity settings of everyday life create opportunities for the child/novice/mentee to participate in interactions in which higher-order functions appear on the social plane and then on the psychological.*

> Imagine a satellite that could randomly sample the culture areas of the world. This imaginary satellite can focus on .... and can [record] their daily routines.... with whom children associate; how far they venture from home; what work they do at what ages; the nature and difficulty of the tasks; with whom they work and how that work is shared; and the characteristics of the play group, household, and domestic group...the data [would describe] the social ecologies of childhood and development around the world. For any group of children we would be able to define their ecocultural niche ..... (Weisner, 1984, p. 335).

In sociocultural theory, the basic unit necessary for analyzing all forms of socialization—including mentoring—is the *activity setting.* The activity setting is a construct that unites 1) objective features of the setting and environment, 2) the objective features of the motoric and verbal actions of the participants, with 3) the subjective features of the participants' experience, intention, and meaning. Combining these elements into a single construct is arguably the most important feature of the neoVygotskian,

Sociocultural movement. Radically disconcerting to western social science, because it immediately requires discourse among the separated disciplines of semantics, sociology, anthropology, linguistics, cognitive studies, and behaviorism, it is nevertheless a new beginning of the study of life at the level and in the units that we live and experience it.

Thus activity settings may be described in terms of the who, what, when, where, and whys of everyday life in school, home, community, and workplace. These features of personnel, occasion, motivations and meanings, goals, places, and times are intertwined conditions that together comprise the reality of life and learning. The catalog of activity settings comprises the everyday routine.

However, the activities of the everyday routine do not exist in a social vacuum; they are shaped by surrounding ecocultural features (Super & Harkness, 1980, 1986; Weisner, 1984). A family's ecocultural niche (Weisner, 1984) reflects material ecology as traditionally defined (features like income, public health conditions, housing and space, transportation, and distance from kin or services). The niche is also influenced by cultural features human beings use to understand and organize their everyday lives (features such as beliefs and goals relating to the good and moral life, the origins and causes of handicaps, and the culturally appropriate conduct of marriage and family relationships).

The idea that the cultural and social setting is a powerful influence on development is a long-standing one in the social sciences (e.g., Bronfenbrenner, 1979). The ecocultural (*eco*logical-*cultural*) theory which we use here was derived from the psychocultural model developed by John and Beatrice Whiting (1975; B. Whiting, 1976, 1980; B. Whiting and Edwards, 1988) and their students and associates (Munroe, Munroe, & Whiting, 1981; LeVine, 1977; Super & Harkness, 1980, 1986; Weisner, 1984). Ecocultural theory emphasizes that a major adaptive task for each family is the construction and maintenance of a daily routine through which they can organize and shape socialization of offspring (Gallimore & Goldenberg, in press; Gallimore et al., 1989; Gallimore et al., in press).

Ecocultural features touch people's lives through the people, activities, purposes, and scripts of everyday life. Who they are with, why, and what they are doing jointly and

independently, and the rules that govern their interactions are all influenced by distal and proximal forces. The everyday activities of life are where culture and the individual meet (Cole, 1985). It is also in such activities that mentoring must be rooted if it is to have its desired effects, and for this reason we must explore more fully the developmental implications of the concepts of activity setting and ecocultural niche.

Psychology's preoccupation with individual units-of-analysis delayed appreciation of the role of culture in development and learning. The problem this created has been recognized for a long time, certainly as long ago as Luria's field study of Uzbeki culture and cognition (Cole, 1985). Today, there is better appreciation of the role of a culture's leading activities in what developmental functions emerge. Although there is evidence of universal developmental endpoints—for example, short-term memory capacity appears to be equal across cultures—there are also variations in higher-order functions that are linked to ecocultural features.

For example, where subsistence is based on literacy and formal schooling is broadly available, certain higher-order functions appear which could be mistaken for universal developmental endpoints, e.g. memory for disconnected bits of information (Rogoff, 1990). Yet even a function such as literacy can produce differential consequences depending on how it is used as a cultural activity. In the Western academic tradition, meaning is treated as contained in the text, requiring the scholar to develop functions necessary for detecting logical inconsistencies and developing implications, as well as analyzing and interpreting the literal message. In profoundly religious groups, connections can be found between memorizing sacred scriptures and rote memory skill (Scribner & Cole, 1981).

There is evidence, for example, that higher-order functions develop related to subsistence activities other than literacy, such as pottery making (Price-Williams, Gordon, & Ramirez, 1969), weaving (Greenfield, 1974), and tailoring (Lave, 1977). Even simple domestic routines appear to produce activity-driven higher-order development: Children weeding, herding livestock, minding a shop, or running errands around a village or urban neighborhood are increasingly capable of a mix of self- and co-regulated activity (Nerlove et al., 1974). Berland (1982) reported that particular observation and discrimination

skills were essential functions required of members of nomadic magicians and performers in Pakistan.

All of these examples illustrate the powerful effects of activities on what children and young people internalize from the niches they inhabit. They confirm that any planned attempt to influence development of young people must carefully construct the activities in which the would-be influencers co-participate with the targets of their influence efforts.

Because of the focus of most research efforts, these initial examples of the impact of cultural activities are largely cognitive in nature. But there are other kinds of functions that are also activity-driven, many of which have been the explicit targets of mentoring programs. Most importantly for the purpose of this chapter, cultural activities shape the kinds of functions that are of most concern to those who would do planned mentoring. These include mentees' dynamic conception of self (Flaxman et al., 1988) and the self-schemas, self-regulation, and self-understanding of contemporary social cognition research (Weisner, 1984). The effect of cultural activities on self-schema is more evident in comparative analyses.

> American cultural goals emphasize egalitarian ideals and universalistic moral convictions regarding sharing and fairness. But the day-to-day activity settings in which American children typically find themselves (e.g., classrooms, sports, individual homework) in fact encourage individualism, autonomy, competitiveness, self-direction, and self-regulation. In contrast, while many non-Western cultures have public overt beliefs emphasizing differences between clans, castes, religious groups, or regions, in their daily routines, these children participate in cultural activities that emphasize shared functioning, coregulation of behavior, compliance to adults and older children and that discourage exploration or private self-aggrandizement (Weisner, 1984, pps. 351-352).

Because of their powerful effects on development, manipulating everyday activities is a principal socialization strategy available to families (Gallimore et al., 1989; Gallimore et al., in press; Rogoff, 1990). Although they are affected by very real constraints and pressures, families can take individual and collective action to modify and counteract niche conditions in order to sustain a desired and valued daily routine. Through their management of daily routines, they can affect children's experiences and

thereby influence the impact of their ecocultural niche on children's activity and development. To do so, they use whatever resources they have; they are guided by their values; they are proactive as well as reactive. One longitudinal study has shown that families of children with early developmental delays try to influence daily routines (and child development) in dozens of different ways: In specific cases, a mother returned to work to pay for special programs for his child; another mother worked nights to be available during the day; another mother quit work to take the child to medical appointments; a father closed his automobile repair shop and began a business at home so he could conduct exercises prescribed for his child. Over 680 such proactive efforts to affect three-year-old children's daily experiences were reported by 102 families (Gallimore et al., in press).

Rogoff's (1990) review suggested a number of major categories of activity structuring that are used to shape child experience and development. She included in her list allowing or discouraging youth from participating in work, recreation, and sacred activities. Weisner and Gallimore's (1977) review of child and sibling caretaking studies indicated that children in the U.S. and other Western societies are less likely than children elsewhere to be assigned childcare responsibilities. In many cultures, childcare responsibilities teach sibling caretakers to be responsible, nurturant, and prosocial, among other qualities that are sometimes the goal of mentoring programs.

Therefore, and by extension, a crucially important element of any mentoring plan must be the design of activity settings. However, even the most determined efforts to alter activity settings will not always have dramatic effects if they are designed without regard to the surrounding ecocultural conditions. This was the conclusion of Weisner and his associates (Weisner, Bausano, & Kornfein, 1983) who have studied American families determined to implement what they considered highly desirable, innovative, and sometimes countercultural patterns of child rearing. Some of these families adopted what were described as "pronatural" values and lifestyles; others focused on anti-materialism, religiousness, and egalitarianism (e.g., in sex typing). Some went to heroic lengths to put into practice their nonconventional beliefs.

For their efforts, many of the nonconventional families managed to make some changes. But over a period of years, their strongly held beliefs about the superiority of nonconventional practices faded, in many cases, into implementations that had symbolic but limited effects. Weisner and his associates believe that the press of American culture at "deeper" levels of the ecocultural niche—at the level of subsistence and domestic arrangements—gradually forced the nonconventional families to abandon or alter most of their innovative changes in childcare structures and practices. The unconventional families obtained only modest effects for their efforts, because they could not sustain their innovations in the daily activities of their children.

The experience of the nonconventional families is fair warning that good intentions and strong convictions alone are not likely to alter an individual's development or achieve the aims of a mentoring program. The families' experiences dramatically underscore a fundamental principle: Changes in individual behavior depend on sustainable changes in everyday activities which are development-sensitive.

The power of everyday activity settings has been recognized elsewhere by O'Donnell and Tharp (1990) who propose that they are properly the principal unit of analysis of community and family intervention. This means that the first step, for interventionists who wish to affect a individual's interactions, development and intrapsychic state, should be an assessment of the daily routine and whether that routine provides an "activity-slot-for-intervention"—i.e., the time, personnel, scripts, and other conditions within which a meaningful intervention can be sited (Gallimore, Goldenberg, & Weisner, in press; Goldenberg, Weisner, & Gallimore, 1991).

For example, Goldenberg, Reese, and Gallimore (in press) have demonstrated that immigrant Latino families are better able to sustain an innovation when it is "fitted" to existing activity slots. The families in their study were not entirely pre-literate, but there were relatively little few literacy "slots" for children to observe or participate in at home (Goldenberg, Reese, & Gallimore, in press; see also Teale, 1986). Thus, when teachers sent materials for young children and parents to use at home, the resulting activities constituted innovative practices in virtually all cases. Without exception, parents

were willing to introduce these innovations into their family routines, precisely because they value their children's school achievement so highly.

However, use of the materials was greatly influenced by the parents' cultural beliefs about how reading develops. For the parents, mostly from Mexico, reading is a matter of "breaking the sound-symbol code." They see learning to read as consisting, in essence, of learning to associate written language (letters, syllables, words, or passages) with the corresponding oral language. They do not attach nearly as much importance (if they attach any) to children's hearing books read repeatedly or to children having ample opportunities to learn to read, "pretend-read," or talk about simple books. As a result, the parents in the Goldenberg, Reese, and Gallimore (in press) study used little story books much the same way they used other homework—for children to practice and learn to associate the written and the oral. The innovation was sustainable in the existing everyday routines of the families, but it was qualified by cultural beliefs and scripts for use of literacy materials with children.

These results underscore the importance of considering the context that will *receive* an intervention (Goldenberg, Reese, & Gallimore, in press). Interventions are more likely to be sustained if they can be fitted into activities that are meaningful to parents. If whole new everyday routines, with new purposes, motives, and scripts, must be created, a change is less likely to survive once the apparatus of the intervention is removed.

By extension, designing and creating activity settings that can be sustained becomes the superordinate task of mentors and those who would create mentoring programs. Some principles for activity setting design were articulated by Tharp and Gallimore (1988) for school settings which can apply equally well to mentor/mentee settings. Adapted from the original, they include:

1. Whether or not the mentor is more competent for the task-at-hand, the ideal is for the mentor to participate at all times in at least one activity setting with the mentee.

2. The authority of the mentor should be exercised primarily to organize activity settings, and to make resources of time, place, persons and tools available to them. Within the activity setting, the authority of the mentor should be shared with the mentee, whose influence should be proportionate and specific to his/her competencies. The authority of the mentor should be asserted within the activity

setting only insofar as it is necessary to see to the continuation of the setting. Authority should not override the emerging intersubjectivity and problem-solving of the activity's members.

3. Each activity setting should have a product as its goal, a product that will be motivating for the participants, whether or not the ultimate goal of the mentor is shared by the mentee.

4. Each activity setting should have as its focus the ability of the mentor to assist the mentee; however, mentees can be assisted to assist one another in settings of cooperative learning, *and mentees should be assisted to assist themselves.*

5. Activity settings should be either "permanent" or "temporary" as dictated by the goal and product.

6. Insofar as the mentoring occurs in schools, community organizations, companies, or the like, there should be provision for joint productive activity of the mentee and the mentor in the structure of activity settings of the institution. In this way, opportunities that already exist for assisted performance by other experts and peers can also benefit the mentee.

7. The task of every supervisor in a mentoring program is to design activity settings; from those who create and manage the program, to those who act as mentors. This principle will create products, assist performance, evolve intersubjectivities, and promote growth of each individual.

4. *Developmentally-sensitive interactions—in which development and learning proceed most surely—are those in which assistance is provided that permits a learner/mentee to perform at a level higher than she/he can perform alone.*

In the everyday activity setting routines of their ecocultural niche, children and youth are influenced by *development-sensitive interactions* that are a concomitant of *joint activities* with more and less capable individuals. The conception of development-sensitive interactions and their activity contexts are derived from the ideas of Vygotsky, Leont'ev, Luria, G. H. Mead, and many contemporary contributors, among others, J. Bruner, Cole & Scribner, Greenfield, Ochs, Rogoff, Wertsch, and the authors of this chapter (John-Steiner, 1985; Tharp & Gallimore, 1988).

Vygotsky argued that *development-sensitive interactions* are those in which the learner/mentee is assisted to perform at a level higher than she could perform alone. Vygotsky described this particular condition as a *zone of proximal development,* which is the

> ..... *distance between the actual developmental level as determined by individual problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.* The zone of proximal development defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed the "buds" or "flowers" of development rather than the "fruits" of development. (Vygotsky, 1978, p. 86, italics original.)

Distinguishing the *proximal zone* from the *developmental level* by contrasting *assisted* versus *unassisted* performance has profound implications for efforts to influence development and learning (Tharp & Gallimore, 1988). It is in this proximal zone that teaching, counseling, mentoring, and any related activity may be defined in terms of development.

> We can therefore derive this general definition of teaching: *Teaching consists of assisting performance through the [Zone of Proximal Development]. Teaching can be said to occur when assistance is offered at points in the [zone] at which performance requires assistance.*
>
> By whom performance is assisted is less important than that performance is achieved, and thereby development and learning proceed. To the extent that peers can assist performance, learning will occur through that assistance. In terms of pedagogy, assistance should be offered in those interactional contexts most likely to generate joint performance.
>
> Vygotsky's work principally discusses children, but *identical processes can be seen operating in the learning [adolescent and] adult* (Tharp & Gallimore, 1988, p. 31).

Examples of developmentally-sensitive interactions abound in everyday life, often so mundane and embedded that their profound significance are not recognized by the participants. Among the most studied is the development of literacy-related functions. In societies where literacy is a subsistence tool, children are apprenticed from an early age in the uses of language and text.

> Skills for the use of cultural tools such as literacy begin to be practiced even before children have contact with the technology itself. American middle-class parents involve their children in "literate" forms of narrative in preschool discourse, as they embed their children in a way of life in which reading and writing are integral parts of communication, recreation, and livelihood (Cazden,

> 1988; Michaels & Cazden, 1986; Taylor, 1983). Picture books made of durable materials are offered to babies, and bedtime stories become a part of their daily routine (Rogoff, 1990, p.115).

Although direct tuition is used during literacy events, at first literate parents seldom intentionally "teach" language and letters. Instead, they are concerned with understanding the child and tailoring responses to the child's level so that a dialogue about a story or text can be maintained. In this way, adults create opportunities for children to perform at a level they cannot achieve by themselves, and in this way function in the zone of proximal development; children develop speech and thinking by being drawn into their use. From the child's point of view, these episodes occur when and where there is something to communicate and do, so that assisted performance takes place in goal-directed activity. The child develops literacy and other functions as a means to an end (Rogoff, 1990).

The indispensable criterion which the concept of assisted performance imposes is a formidable challenge in the development of mentoring programs. It reinforces the principle that interaction alone is not enough to achieve the developmental gains that we all wish for the mentored youngsters. It is not enough even that mentor and mentee are attracted to each other. For any gains to be achieved, a zone of proximal development must be opened, and in joint participation the mentee must be assisted to do what she/he cannot do without the assistance of the mentor. This is an exacting criterion by itself. But once it is met, the mentor must, in face-to-face interaction, provide assistance in effective ways, and then gradually diminish the assistance. Some principles of assisting performance which are now known are reviewed in the following section.

5. *Face-to-face interactions in collaborative activity provide assisted performance with the most profound implications for the development of a participating child/apprentice/mentee.*

The most common context of assisted performance is face-to-face social interaction of individuals engaged in joint activity. Assisted performance in social interaction shares task responsibility so that a zone of proximal development arises; in

this way a child/apprentice has an opportunity to perform at a level that he/she cannot perform alone.

Assisted performance is arranged by engaging children in joint-productive activities that provide opportunities for the means of assistance to be embedded in the interaction. The features of such interactions have been the subject of considerable study, reviewed recently by Rogoff (1990):

1. Help is provided on specific, limited aspects of a task, such as asking a timely question, or providing a verbal or nonverbal hint.
2. The more capable individual may provide a strategy that organizes a performance, which permits a successful performance by a child/apprentice capable of the individual acts but not executive control of the activity.
3. Assistance is tailored to the developmental level of the apprentice/child, and adjusted frequently and responsively.
4. The more expert other withdraws assistance or reduces it at crucial points in which the child/apprentice may benefit by greater independence.
5. As development and learning proceed, the assisting other increases the challenge or difficulty of the apprentice's share of the activity.

Rogoff's review includes other varieties of face-to-face assistance which emphasize the role of the more expert participant. But, she points out, the importance of the other/expert should not obscure the significant contributions of the child/apprentice to the process. Individuals—even the least competent—are not passive. They take an active role in managing situations in which they are joint participants, and thereby play an active role in managing the experiences they have and the assistance they receive. For example, apprentices as well as their assisting experts adjust the pace of instruction and guide the supportive efforts of others (Rogoff, 1990).

Much psychological research of the 20th century has been conducted in an effort to understand the means by which assistance may be effective (Tharp and Gallimore, 1988). Seven means of assistance have been studied with enough breadth and time that the effects are known and dependable. They are (Tharp, in press):

1. Modeling: offering behavior for imitation. Modeling assists by giving the learner information and a remembered image that can serve as a performance standard.

2. Feedback: the process of providing information on a performance as it compares to a standard. Feedback is essential in assisting performance because it allows the performance to be compared to the standard and thus allows self-correction. Feedback assists performance in every domain from tennis to nuclear physics. Ensuring feedback is the most common and single most effective form of self-assistance (Watson & Tharp, 1988).

3. Contingency Management: the application of the principles of reinforcement and punishment to behavior.

4. Instructing: requesting specific action; directing. It assists by specifying the correct response, by providing clarity, information, and decision making. It is most useful when the learner can perform some segments of the task, but cannot yet analyze the entire performance or make judgments about the elements to choose.

5. Questioning: a request for a verbal response that assists by producing a mental operation that the learner cannot or would not produce alone. This interaction assists further by giving the assistor information about the learner's developing understanding.

6. Cognitive Structuring: "explanations." Cognitive structuring assists by providing explanatory and belief structures which organize and justify new learning and perceptions and allow the creation of new or modified schemata.

7. Task Structuring: chunking, segregating, sequencing, or otherwise structuring a task into or from components. This assists learners by modification of the task itself, so that the units presented to the learner fit into the zone of proximal development, when the entire task is beyond that zone.

The means of assistance are drawn from social and behavioral science. Using these concepts provides a more differentiated analysis of "performance assistance," and moves teaching/learning analysis closer to a scientific base of understanding. However, the use of the means of assistance can never become narrowly prescriptive. Responsiveness to individual children's zones of proximal development (ZPD) requires individualization according to the exigencies of the moment and movement through the ZPD. However scientific our analysis becomes, assisting others to develop and learn will always require artful implementation (Shavelson, 1988).

The seven means of assistance are therefore not a recipe which prospective mentors can readily learn to follow. Tharp and Gallimore (1988) detailed at length the long, difficult process of apprenticeship which teachers must go through in order to become effective assistors of performance. The principle of such apprenticeship is that the would-be assistors of performance must themselves have their performance assisted.

> To change the way teachers teach, we must embed in the structure of their everyday lives continuing opportunities for assisted performance. There must be opportunities to observe others, be observed, get feedback, and to repeat this cycle throughout their professional lives. These others who will assist performance must themselves have fully internalized not only a new set of "teaching activities" and "scripts." They must also have internalized a new set of values and purposes of teaching—for example the understanding that the key phase in development is when "... a child has only partially mastered the skill but can successfully employ it ... with the assistance and supervision of an adult (op. cit.)." They must learn that performing with the assistance of another person provides the basis for the child internalizing that skill so that in the future it can be performed without assistance. This contrast between assisted and unassisted performance identifies the fundamental nexus of development and learning which Vygotsky called the *Zone of Proximal Development* (ZPD). This nexus is the only true teaching (Gallimore, 1990, p. 12).

In one form or another, analogous structures and experiences will be required to train mentors. Would-be mentors must first be mentees.

6. *In activity settings, the accompanying speech (and other signs and symbols) work to create intersubjectivity among the participants, thus transmitting meaning, values, affect, motivation, and indeed the planes of consciousness of mentors and entire cultures.*

Though an intimidating term on first exposure, *intersubjectivity* is a simple concept. It refers to the way that a group of people think and experience the world in similar basic dimensions, processes and content. To the degree that intersubjectivity is present, that values are alike, and that goals are alike, then more cooperation is possible, and thus more harmony. One of the joys of life is the achievement and the experience of intersubjectivity. And over the long course, productivity (of a group, of a community, or of an entire culture or nation) will rise and fall as does intersubjectivity. The

intersubjective dimension of joint activity serves as a reward to its members, for it is this aspect of the process that makes activities memorable, worthwhile, and gratifying to group members and motivates members to continue participation within the group (Tharp & Note, 1988).

One may argue as a corollary that deviant, alienated, non-participating members of a community almost certainly signal a lack of intersubjectivity with the larger unit that defines them as deviant—a failure to define the situation in the same way, to accept the same process for problem-solving, to accept the same goals of the organization, to accept the same values, to accept each other on the same basis.

As a consequence of emerging intersubjectivity, participants tend to develop more differentiated and pronounced feelings toward one another. To the extent that they are positive and reciprocal, they are likely to enhance developmental processes (Bronfenbrenner, 1979). This affective dimension is an aspect of intersubjectivity, a consequence of the evolution of shared "planes of consciousness." The development of intersubjectivities is a consequence of profound importance for individual development, for a satisfying community life and for the perpetuation of culture. Through the processes of intersubjectivity, community and individual create each other; culture and cognition create each other (Cole, 1985).

How are intersubjectivities created? It is through joint productive activity that these shared word meanings, concepts, motivations, beliefs and expectations are acquired. The activity setting is the social process common to the participants from which cognitive processes and structures of meaning develop, and activity settings are therefore the units by which community and cultural life are propagated. It must be emphasized that the *activity setting* is both phenomenological and objective. As discussed by Vygotsky (1981), and contemporary writers such as Leont'ev (1981), Wertsch (1985a, 1985b), Tharp and Gallimore (1988), Tharp and Note, (1988), and O'Donnell & Tharp (1990) activity settings incorporate cognitive and motoric action within the objective features of the setting. Activity settings are the events in which collaborative interaction, accompanied by speech and other semiotic events, creates intersubjectivity.

A basic condition for effective activity settings is "jointness." Without it, no supervisor can assist performance, affect cognitive structures of learners, or be affected by the emerging group intersubjectivity. Would-be mentors-whether professors, teachers, principals, curriculum specialists or any authorities who **merely** direct others to accomplish a task, but do not participate in the productive work itself-lose the opportunity to develop joint understanding, even that minimum of understanding that will allow them adequately to assess their subordinates. Joint activity requires dual input, which in turn allows a sharing of perspectives, and emerging shared understanding (Tharp, in press). Whatever the role relationships—whether peers or subordinates-or whatever the stage of mentoring—whether as teacher-pupil or as senior-junior colleagues—joint productive activity is the royal route to intersubjectivity.

Intersubjectivity is created during joint activity, through: 1) the use of signs and symbols-primarily of language, 2) the development of a common understanding of the purposes and meanings of the activity, and 3) by using common cognitive strategies and problem solving. During joint productive activity, language and other signs and symbols are used by more knowledgeable members as they assist novices. Peers themselves develop word meanings and discourse routines during their cooperative work. In the Vygotskian analysis, "word meaning" provides a link between social organization and individual psychological events, because the denotative, connotative, and affective components of word meaning are acquired in discourse accompanying action. Thus words, flags, badges, gestures, images, tunes and the full panoply of symbols are the "stuff" of the plane of consciousness. Common meaning of word, sign and symbol is the condition of intersubjectivity.

The attachment of these symbols to shared events creates a plane of meaning and value for activity and a discourse that become the binding structures of community life and culture. In joint activity, the signs and symbols, the development of common understanding of the purposes and meanings of the activity, the joint engagement in cognitive strategies and problem solving-all these aspects of interaction influence each participant and foster emotional and cognitive commonality. In new activity settings, new intersubjectivity is created and, for individual members, is internalized into a new

cognitive development. Thus who you are—the intramental, cognitive, value-laden selfhood—arises in the social plane and is made individual through the processes of communication and shared activity. In a way, each of us psychologically becomes those people with whom we work, talk, share, and grow.

Although we say that the symbolic mediation of intersubjectification is primarily through language, it should be emphasized that intersubjectivities are not necessarily carried by verbal symbols exclusively. In this there are differences in professions, in arts, and indeed in whole cultures. The modalities of representation receive different emphases across cultures. For example, among Pueblo Indians:

> Children listening to the many legends of their people learn to represent these visually . . . because they are not allowed to ask questions or verbally reflect on what they hear. They are to say only *aeh hae* to acknowledge auditory attention. As a result, while the verbal representations of some of these legends are fairly simple nursery tales, the inner representations of the same legends, for older children and adults, are replete with highly abstract visual and symbolic articulations of cultural values (John-Steiner & Oesterreich, 1975, p. 192).

MENTORING AS ENCULTURATION

Robert Bly's *Iron John* (1990), that extraordinary poetic and mythological study of male mentoring and initiation, says that whether man or woman, the initiator/mentor's job is to "prove to the boy or girl that he or she is more than mere flesh and blood. A man is not a machine only for protecting, hunting, and reproduction; a woman is not a machine only for protecting, gathering, and reproduction, but each carries desires far beyond what is needed for physical survival . . . " The mentor/initiator of the boy must "teach the young man how abundant, various, and many-sided his manhood is. The boy's body inherits physical abilities developed by long-dead ancestors, and his mind inherits spiritual and soul powers developed centuries ago" (Bly, p.55).

We know that this inheritance is handed over in the social and semiotic processes of mentoring, by assistance through the many zones of proximal development that the mentor/mentee traverse together, and through the transmission of cultural knowledges

and meanings. The amalgam and result is the perpetuation not only of the mentor's individual self but of the entire culture. Manifold indeed are the desires carried by us as a culture as well as by individual men and women, and that precious freight is passed from mentor to mentee as surely as are the focused skills and knowledges that comprise the focused purposes of their joint work.

In mentoring, and in the study of mentoring, the focus is most often on cognitive development, or perhaps more broadly the skill, performance. vocational or professional development. But apprentice- or mentor-ships provide the novice with access not only to the overt aspects of skill, but to the more hidden inner processes of thought—access that the mentor may not have to his or her own subjectivity. "It is only through close collaborations that the novice is likely to learn what the mentor may not even know: how he or she formulates a question or starts a new project" (John-Steiner, 1985, p. 200).

While studies of intellectual development have been the principal focus of sociocultural theorizing and research during the past decade, we must understand that cognitive activity and its associated skilled performances are but one aspect of the plane of consciousness. That plane, which can be thought to contain all the intertwined functional units of higher-order thinking and valuing, therefore includes dimensions of affect, motivation, role, voice, identity and spirituality. The plane of consciousness, so various, nevertheless develops as a unity, crystallizing from the "primal soup" of subjectivities shared with various fellow workers, teachers, and mentors.

Prolonged or repeated or overlapped experiences with mentors or teachers who share cultural, professional, or religious values, even when these experiences are focused on some narrower goal of skill, also fill the learner with shared word meanings, shared values, signs and symbols that mediate motivation and orientation, a way of talking, an entire language, a way of representing the world and a way of being in that world. In this way, the chemistry laboratory or the construction site or the athletic arena becomes the field of initiation where culture is taught, and boys and girls become men and women. Such an apotheosis of the ordinary daily routines can occur because in initiation, apprenticeship, and mentoring, more is learned than is taught, and what is learned is the variousness of being a woman or a man of this time and this kind.

But this too is an instance of basic socialization processes, manifested in mentoring, but by no means restricted to it. The passing from one generation to another of apparently simple symbolic meaning contains also the basic structures of a culture's communication.

"(Beth and her mother are looking at a book.)

	BETH	NORA (mother)
B points to picture.	duck/	
		What is that? That's a hen.
	duck/	
		Just call it a chicken. That's too hard for you.
	chicken/	
		Yeah.
B points to another picture	that a cat/	
		Oh, where?
B still pointing.	cat there/	
N points to picture of cat		No, that's a baby pig. There's the cat."

(Miller, 1982, p.85)

Through these word meanings, some of them negotiated, mother and child are building a catalog of the names of things. These are the primary elements of their emergent intersubjectivity, these signs and symbols of language and common visual experiences. But even this elementary activity of "reading the book" and "learning the names" teaches much more than just "language":

> Regardless of the particular goal of an interaction—to assert a claim, to name a picture, to recite a rhyme—the child is actively engaged in mastering the local resources of communication and the mother is actively engaged in lending her assistance. This is one way by which young children become acculturated: they develop the feelings, motivations, and intentions that enable them to speak and act like members of the community. (Miller, 1982, p. 128).

And this transmission of the community life and values is passed from generation to generation, each adding commentary, as it were, or elaboration, but in a long clear line of transmission from mentor to mentor.

> Some years ago two of our fine students, who were at that time quite young, in an audience with the revered Buddhist spiritual leader, the Dalai Lama, asked him:
>
> Students: I wonder if you have in your past any people who were important . . . teachers. . . or a kind of master that you think about now?
> The Dalai Lama: Those Indian pundits! Many centuries back . . .
> Students: No, I mean someone who influenced you when you were a child or a younger man, who was a master to you, and you his disciple.
> The Dalai Lama: Yes . . . the great Indian pundits of the past many centuries.
> Students: But no one living? I mean, not an actual person?
> The Dalai Lama: No. You see, those living persons, they are just carrying the messages of the great Indian pundits . . .
>
> (Hilgers & Molloy, 1981, p. 195, quoted in Tharp & Gallimore, 1988, p.160).

Through many centuries, the ancient mentors speak to us. By listening to their voices, we may discover our own mentors, through this

> . . . recognition of the importance of an intense and personal kinship [that arises from the work of another, even from the distant past]. Once such a bond is established, the learner explores those valued works with an absorption which is the hallmark of creative individuals. In this way, they stretch, deepen, and refresh their craft and nourish their intelligence, not only during their early years of apprenticeship, but repeatedly, throughout the many cycles of their work-lives (John-Steiner, 1985, p. 54).

MENTORING PROCESSES IN CREATIVE APPRENTICESHIPS

The importance of close, fine-tuned, sustained relationships between novices and experts are particularly well documented in the biographies of productive and creative individuals (Wallace & Gruber, 1989). In examining their lives within a developmental and sociocultural framework, various aspects of mentoring are vividly captured. These include the way in which a novice's joint activity with a mentor, and their sharing of

goals, contribute to his or her mastery of a domain. We have chosen a variety of examples from the rich literature of creativity to illustrate some of the principles put forth in the body of this chapter.

Initiation of Mentoring Relationships. How do apprentices choose a mentor, or how are they chosen? This is a question raised at the beginning of this chapter and it is one which the case example of creative apprenticeships can address in a limited fashion.

Some creativity researchers have highlighted the impact of certain early experiences of resonance. In seeking a mentor, the apprentice relies upon a sense of resonance with the work of a more experienced thinker. In a popular work on the networks of the mind, the neuroscientist, Michael Gazzaniga (1985), describes such a process:

> Twenty-five years ago...I read a most intriguing article in *Scientific American* written by my future mentor, Roger W. Sperry. I was then an undergraduate at Dartmouth College. He was one of the foremost brain scientists in the world....The 1960's were golden years for American science, when almost every reasonable research program could get funded. On what I thought was a long shot, I wrote Sperry for a summer job between my junior and senior years. To my surprise he wrote back...that the National Science Foundation had summer fellowships for the likes of me. I could not believe it, but nonetheless managed to accept the offer (pp. 9-10)..... That summer in 1960 convinced me that brain science, especially in terms of behavior, would be my life's work. (p. 25).

A sense of kinship is another experience some have highlighted. Joseph Walters and Howard Gardner (1986) suggest that certain experiences trigger a recognition on the part of the gifted individual, a recognition of kinship, or bonding involvement with a major intellectual movement of his or her time. The mathematician Evariste Galois grasped the entire structure of elementary geometry in one reading of a geometry textbook by Legendre, himself a creative mathematician:

> Some crystallizing experiences, which we term "initial," occur early in life and signal a general affinity between an individual and some large-scale domain in his culture: An example would be Galois's discovery of the excitement involved in mathematical proof (Walters & Gardner, 1986, p. 309).

Galois's experience of this "affective phase" produced, in the words of Walters and Gardner, a long-term change in his "concept of the domain, his performance of it, and his view of himself" (p. 309). Similarly, Stravinsky records his intense response to experiences within the domain of music: "As a child, he attended the theater weekly, and notes that he was greatly moved by the sound of Glinka's orchestra and the compositions of Tchaikovsky" (Walters & Gardner, 1986, p. 313). This experience moved Stravinsky, whose musical talent as a performer did not appear in childhood, to intuitively recognize his eventual career as a composer.

A different type of "crystallizing" experience is actually a "refining" experience, which Walters and Gardner characterize as occurring "well after an individual has undergone an initial attraction to a domain. In these refining cases, an individual discovers a particular instrument, style, or approach within a field to which he or she is especially attuned" (p. 309). Within the context of Gardner's theory of multiple intelligences, these encounters have value if "an individual is 'at promise' within a particular intelligence or domain. They are a useful construct for explaining how certain talented individuals may first discover their area of giftedness and then proceed to achieve excellence within the field" (p. 309).

The special nature of these examples from creative lives limits their instruction for mentoring in general. However, they suggest that the initiation of a mentorship is no simple matter of mutual attraction or interpersonal "chemistry." Through all of these accounts there runs a strong current of the role of the knowledge or competence domain itself and its appeal to the novice.

These examples alert us to the possibility that mentorships can begin through the novice's attraction to the domain of competence which prospective mentors have mastered, rather than to the masters themselves. Although this does not rule out initial attraction to the personality of the master and then to the domain, or attraction of the mentor to the mentee, it does introduce an important distinction that researchers of mentoring should take into account. It reinforces the view that apprentices are not merely passive vessels into which masters pour their matured competence and knowledge (John-Steiner, 1985; Rogoff, 1990).

DEVELOPMENTAL AND SOCIOCULTURAL PROCESSES IN CREATIVE MENTORSHIPS

In an often quoted passage, Vygotsky (1978) proposed that "what a child can do with assistance today she will be able to do by herself tomorrow" (p.87). In collaborative activities, particularly in "the zone of proximal development," higher psychological functions emerge. We see the transformation of apprenticeship experiences into the novice's own structuring of thought. Igor Stravinsky gave an interesting account of his own growth from cooperative work to the independence of a professional, in this description of his five-year composing apprenticeship with Rimsky-Korsakov:

> Once a week I took my work to him and he criticized and corrected it, giving me all the necessary explanations, and at the same time he made me analyze the form and structure of classical works. A year and a half later I began the composition of a symphony. As soon as I finished one part of a movement I used to show it to him, so that my whole work, including the instrumentation, was under his control (Stravinsky as quoted by John-Steiner, 1985, p. 147).

This passage shows clearly the value of learning with a master who first taught the novice some of the classical forms, then criticized the shorter works presented to him, and then eventually supported him in his longer more independent efforts. The process is similar to everyday examples of scaffolding and assisted performance described in this chapter and summarized by Rogoff (1990). The difference is that Stravinsky's description tells us about a complex, creative endeavor, which we frequently and romantically think of as given rather than achieved. This example highlights that the developmental trajectories of men and women of talent require lengthy interactions during which they slowly acquire the means to assist themselves very much like learning and mentoring in practical everyday situations.

Our concepts of learning have changed in the last two decades. We no longer emphasize simple information transfer, but see learning embedded in activity settings. When we consider the interactions of goals, relationships and activities as central to knowledge acquisition, the study of creative development is instructive. It provides details about sustained learning and productivity which are hard to obtain in less closely

documented lives. These details are informative for the planning of effective mentoring experiences in varied contexts. It also contributes to the construction of a general theory of apprenticeship (see John-Steiner, 1985; Rogoff, 1990).

One of the most striking accounts of the importance of mentoring and its development and qualities is provided by Harriet Zuckerman's study of Nobel laureates (1977). Future laureates search for established mentors to work with during their formative years, and the laureates, in turn, search for talented apprentices. These bonds across generations are significant for mentors as well as for their apprentices. They provide renewal for the more experienced member, and for those beginning their careers they permit the relationship with the mentor to be transformed into the growth of self-knowledge and domain fluency.

In a different context, that of Pueblo life, the continuity of learning and teaching throughout life is captured by the belief that one is always an apprentice to others who are older and more experienced (John-Steiner & Oesterreich, 1975). What the Nobel laureates and the Pueblo learners and mentors have in common is a strong sense of personal bonds between mentor and apprentice.

Vital relationships across generations, respect and love, and devotion to the work of one's mentor also emerged as themes in a recent study of Hungarian mathematicians (Hersh & John-Steiner, in press). In recollecting their early years, the mathematicians spoke of the lasting influence of Professor Fejer, a founder of the Hungarian School of Mathematics at the University of Budapest. One of his students, George Polya (a well-known Hungarian-American mathematician), described Fejer's influence. He wrote of how everybody in his age group was attracted to mathematics by Fejer. Polya and his friends recalled how Fejer would sit in a Budapest cafe with his students solving interesting problems and telling stories about mathematicians he had known (Alexanderson, 1987). Later in his life Polya was also known as an enthusiastic and influential teacher and warmly remembered as a mentor.

The internalization of a domain of knowledge is facilitated by both formal and informal interactions. The recollections of Pueblo teachers, as well as that of Hungarian mathematicians, stress the critical role of personal relationships in learning that goes

beyond the accumulation of facts. Engagement through close proximity with a more experienced thinker reveals the *processes* as well as the products of thought. By internalizing the consequences of joint activity, the novice acquires crucial knowledge about the domain and also starts to recognize his or her own strengths and weaknesses.

The application of a sociocultural framework to the development of creative individuals highlights certain emotional and cognitive features of mentoring interactions. One of these is the transformation of joint experiences into the foundation of an individual's own development. The independence of the mature individual seems to result in part from a productive interdependence that characterized an earlier stage of their lives. In a study of women mathematicians, Ravenna Helson (1971) found an interesting combination of openness to stimulation as well as a need for self-direction on their part. A dynamic tension between receptivity and control characterizes the way many creative individuals balance their needs to learn and absorb fully what their mentors have to offer, and still shift toward developing their own style or voice. This feature of mentoring is dependent, in part, on the willingness of mentors to acknowledge their mentees' growing ability to assist themselves (see principles for activity settings, p. 6).

Another important feature of creative and ordinary apprenticeships is *flexibility of roles.* Lengthy collaboration between more and less experienced members of a working dyad may result in the apprentice becoming too imitative. Experienced mentors are aware of such a danger, and they may be able to provide a changing, dynamic interaction that enhances the apprentice's depth of exposure while encouraging him or her to develop a separate artistic (or scientific) identity. Another way the creative novice can resist the danger of becoming a "clone" is to remain open to the influence of more than one mentor or "distant teacher." Gruber (1985) describes such a process in Mozart's life:

> Recently one of my students analyzed two series of string quartets composed by Mozart, the first in 1773 when he was 17 years old and the second, begun after a lapse of 9 years, from 1782 to 1785 . . . Both series were immediately preceded by the appearance of string quartets by Haydn, and both owed much musically to him. The first series are imitative, well

> schooled, formal and a little dull. The second series-richer, more subtle, and more flowing-were begun shortly after Mozart made his personal discovery of Bach whose music he then studied with ardor. Mozart dedicated the 1782-85 quartets to Haydn, and wrote to his friend and master a letter openly acknowledging his debt, avowing that Haydn was "the father, the guide and the friend" of these pieces...Thus like other young men leaving adolescence behind, when Mozart had grown musically independent of his older model, and had time to assimilate other influences into forms that were more and more "Mozartish," then he could acknowledge his origins with gratitude (p. 251).

There are some intriguing suggestions about novelty and creativity in this account. The ability to push beyond what is known by an individual (or by his/her community) is nourished by the joint commitment and activity of the apprentice with one or several mentors. Their intensity of engagement sustains experimentation. Effective relationships of mentors with their apprentices can have lasting consequences. When examined in creative contexts, the role of mutual choice becomes particularly apparent. The intensity with which the novice monitors the work of his or her more experienced mentor is possible because theirs is a constructed rather than an imposed connection. Participation in this construction allows the novice to recognize the more thoroughly internalized creative patterns of the mentor.

Joint, constructive interactions across generations are frequently followed by intense friendships, which lay the groundwork for artistic and scientific interactions during periods of paradigm shift (John-Steiner, 1992). In case studies of creative individuals as well as in the work of historians of science, the importance of personal friendships, sustained debates, and collaborative activities are stressed as part of an individual's ability to present new ideas and concepts (Wallace & Gruber, 1989).

The process of joint thinking among friends and colleagues was well-depicted by the physicist Werner Heisenberg in *Physics and Beyond,* in his evocation of their frequent and intense debates.

> Bohr's discussions with Schrodinger began at the railroad station and were continued daily from early morning until late at night...It is hardly possible to convey how passionate these discussions were, just how deeply rooted

> the convictions of each, a fact that marked every utterance (Heisenberg, 1971, p. 73).

The sustained and passionate conversations that Heisenberg describes contributed to a new physical view of our universe. Their shared language, akin to that which develops between mentor and apprentice, allows both to acquire a greater understanding of their shared problem while articulating each individual's perspective that he brings to their common task.

Heisenberg's description also reflects the inseparability of emotion and cognition. Similar descriptions of the great impact of a chief mentor on a young creative individual can be found in many fields. Many of these descriptions feature the role of emotion as well as cognition and knowledge. A compelling illustration of the inseparability of emotion and cognition in the mentoring process appeared in Leonard Bernstein's (1982) account of the transforming effect of Serge Koussevitsky, his own most stimulating model:

> He taught his pupils by simply inspiring them. He taught everything through feeling, through instinct and emotion. Even the purely mechanical matter of beating time, of conducting four beats in a bar, became an *emotional* experience, instead of a mathematical one. (p. 186).

Such strongly affective relationships may construct communicative tools far more sensitive and inventive than the more customary modes of communication. In a chapter on "The Development of Working Relationships," Gabarro (1990) lists some of the critical features that characterize developed relationships. He includes openness and self-disclosure, multimodality of communication (including a verbal "shorthand" specific to the relationship), and efficiency of communication. These are clear features of intersubjectivity; the semiotics of the shared activity create a symbol system that is then the basis of its own further development.

CONCLUSIONS

We have attempted to outline the developmental and sociocultural constructs most crucial for understanding mentoring activities, and we find them to be natural and ubiquitous in human life. We have emphasized the reach and power of joint thinking

and activities and the means of performance assistance as key analytic frames. The creative lives, examined in the final section, testify to the central role of mentoring, collaboration, and other joint activities in the production of the apparently most individual of capacities—the production of original thought. But even in the most mundane domain of skill and knowledge, cognition and emotion cannot be separated in understanding the foundations of mentoring. Effective learning and discovery engage participants in challenging as well as caring interactions.

Many interlocking features characterize a richly functioning mentorship—role flexibility, working habits, sensitivities, emotional sympathy. But we cannot conclude that such features of relationship were present and necessary for its initiation, that they are necessary and sufficient for a mentoring relationship to form.

It is our brief that joint activity is the foundational condition for the production of intersubjectivity and is necessary for the heightened intersubjectivity of a matured mentoring relationship. Even among individuals bonded by family or love, the emergence of the heightened intersubjectivity that distinguishes mentoring may only occur once a pair engage in joint productive activity. Both developmental and sociocultural theory and evidence argue for the primacy of joint activity in the creation of shared planes of consciousness.

However, we have also observed that some mutual attraction, some joint expectation of satisfactory work and learning is ordinarily present in the formation of mentoring relationships. Some features of a shared interpretation of the world and resonance to a domain, and some partial or nascent intersubjectivity may well characterize that initial attraction. Or it may not; little research evidence is present to help sort out the features of relationship that are necessary at initiation. This is clearly a fruitful line for future investigation.

In conducting that research, some design considerations can already be seen. A principal consideration is the dynamic nature of mentoring relationships. Mentorships often grow slowly and evolve over time, and to some extent may depend on a measured pace of development. Activities structured for the novice need to be frequent and engaging, and may change dramatically in nature and texture over time; they must be

supported by the mentor and sensitively monitored to prevent excessive dependence; and yet they must include the tailored assistance that moves the novice toward greater competence. These qualities suggest the possibility of relatively discontinuous stages, one following the other, which imposes severe limits on how much can be inferred from later stages about preceding ones.

To be most useful, study of mentorship initiation should be developmental and largely prospective, beginning before the beginning, and certainly when the joint activity begins and before the relationship is fully formed. Only then can it be determined how much mentoring depends on mutual attraction and selection. Initial magnetizing may or may not lead to a bonded mentor relationship. There are many examples of people who did not begin by liking each other, but for whom the anvil of joint activity forged lifetime bonds.

These and other processes and variables are not yet charted, but may be expected to yield to developmental study. Indeed, we may be optimistic for the discovery of many features that precede and accompany successful mentoring, and for an emerging understanding of the ways in which mentoring transmits skills, knowledge, and communication. Such study will eventually reveal how mentoring both perpetuates culture and the intelligence that transforms it.

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