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SOCIAL PROCESSES IN EARLY NUMBER DEVELOPMENT

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COMMENTARY

THE CULTURAL UNCONSCIOUS AS CONTRIBUTOR TO THE SUPPORTING ENVIRONMENTS FOR COGNITIVE DEVELOPMENT

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This *Monograph*, by Geoffrey B. Saxe, Steven R. Guberman, and Maryl Gearhart, represents a major contribution to our understanding of early numerical abilities. It presents a wealth of data from a large battery of number tasks (or interviews) administered to children and mothers who represent both lower- and middle-class samples. It is especially good to have the data on the common numerical skills of lower- and middle-class 2-year-olds and the related findings on the common educational goals of the two classes of mothers. Saxe et al. also show, with careful analyses of videotaped sessions, that mothers "teach" their charges in the context of a novel number game and do so especially well when their "lessons" build on the child's numerical goals. Hence, the authors conclude that children's numerical goals are very much an integral part of the nature of the environmental input they receive from adults, in this particular case, their mothers.

For us, this *Monograph* raises a deep theoretical issue for all who study cognitive development, be it in the numerical domain or not. As soon as one takes the position that children are actively involved in their own cognitive development, the need for a theory of what is and what is not a supporting environment becomes especially noteworthy. This *Monograph* is full of information about the kinds of numerical props that can be found in the young child's environment. Saxe et al. remind us that it offers books, games, rhymes, and toys that both lower- and middle-class parents buy. It also contains adults who can, when asked, articulate a developmental agenda for their children's number skills.

By themselves, these facts about the environment do not guarantee that children will learn numerical concepts. It is one thing for a stimulus to be present in the environment and quite another matter for the novice learner to notice it and then treat it as do those who already treat these props as part of the numerical environment. How one characterizes the learner has consequences for an account of what is a relevant supporting environment. To illustrate, consider one common characterization of the learner. Couched in terms of numerical concepts, the view is that numerical concepts develop as children are reinforced by adults who provide and model the use of the necessary materials, materials they define as relevant. Over time, as a function of amount of experience and reinforcement, children acquire the various component skills that together will build toward an understanding of number.

According to the foregoing account (one that is most readily identified with the association theory of mind), children are simply receivers of the stimuli they are offered. There is no need to speak of them structuring, let alone creating, their own supporting environments. We are sure that Saxe et al. would not approve of this conclusion. As we said, they contend (and show) that children are very much involved in the determination of what adults will try to teach them. For Saxe et al., children are very actively involved in their acquisition of numerical concepts and skills. Indeed, they are seen as taking the lead by setting themselves numerical goals, goals that reflect their level of competence at a given point in development. Adults then respond to the numerical goals children initiate, by both supporting the children's current efforts and trying to move them to a somewhat more advanced goal level. If this negotiation is successful, then the adult succeeds in providing the child with a socially organized experience that is critical in any account of cognitive development insofar as it constitutes the "material" out of which children produce novel cognitive developments.

In sum, this *Monograph* develops the view that cognitive development is a process of negotiation between the child's own goals and a guiding adult who takes these into account. Environments do not simply impress themselves on the child because the child determines her own numerical goals and does so as a function of her level of competence. If the environment made available is not suited to this goal, it will, presumably, be ignored.

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Readers will recognize the foregoing argument as a variant of the Vygotskiian account of cognitive development, a similarity clearly acknowledged, indeed sought after, by the authors. Insofar as it gives children a central role in their own cognitive development, it also overlaps with both the Piagetian and our account of cognitive development. As Liben (1987) notes, our general position (Gelman, 1986) is very close to Piaget's. Although we grant more initial competence, we share Piaget's view of the child as self-motivator and self-generator of activities that lead her to find and use appropriate supporting environments. Thus, like Saxe et al., we too characterize children's numerical activities in terms of goals they set. Our analysis of the variables that contribute to their goals includes social as well as nonsocial context factors, such as the nature of the talk between the child and others in the setting, the nature of the props that are provided or need to be found, and the extent to which children have developed an understanding of the mathematical meaning of terms. In fact, we argue that the acquisition of mature mathematical concepts is very much dependent on the development of symbolic representations that stand for the implicit numerical knowledge young children have (see esp. Gelman & Greeno, in press; and Gelman & Meck, 1986).

As compared to Saxe et al., we are inclined to place even more control of early cognitive development, and hence the definition of supporting environments, in the hands of the children. We assume that young children are motivated to develop further mathematical competence for much the same reasons Piagetians contend they are. Available structures are taken to be self-motivating. Thus, individuals actively pursue and even create environments that can support the development of available structures—even if they do not encounter the competent adult teacher so well characterized by Saxe et al.

It is not that we think that mathematical concept development can proceed without a supporting environment or that this environment is not social. At some level of description, almost anything we might treat as a supporting environment for the development of number concepts is social in nature. This follows from the fact that, with development, children acquire the conventionalized mathematical symbol system. There would be no sense to make of the idea that numerical symbol systems are conventional if they were not shared by, and did not communicate between, people. But this characterization of the environment as social is very different from one that holds that adults have to package it as a function of the child's level of competence. It is simply a statement that transmission of numerical knowledge, by whatever means, involves the transmission of the meaning of mathematical language and its rules of usage. For development to proceed then, there must be examples of the language and its use in the culture. How one comes to understand the meaning of these examples is a separate question.

An example from a somewhat different domain of cognition, knowledge of visual perspective, helps make this point.

Landau and Gleitman (1985) show, contrary to the assumption of John Locke and many others since him, that congenitally blind children do learn how to use visual terms such as "show," "look up," and "see" correctly. Locke's conclusion that they could not followed from the assumption that it was obvious that the supporting environment for visual concepts is the visual sense data picked up by the eye. But, despite the blind child Kelli's inability to sense the presumed essential visual data, she did learn the meaning of visual terms as evidenced by her ability to face forward when asked, "Show me your face," to turn around when asked, "Show me your back," and to take the difference between transparent and opaque barriers into account when showing things to sighted people. After examining a number of possible environmental sources that could have been used here, Landau and Gleitman arrived at the conclusion that syntactic variables that govern the use rules of these verbs provided some of the necessary input. On a priori grounds, it is not clear that one would expect a young child to use this aspect of the environment to figure out how to interpret this kind of verbal data. That she probably did underscores for us the distance we have to go before we have a satisfactory theory of a supporting environment.

One way to summarize Saxe et al.'s contribution is to say that it starts us down the road toward a theory of the environment. To say that the authors have but started is not to minimize their contribution. For it seems that most do not even realize that a constructivist theory of development alters the standard assumptions about what is or is not part of a supporting environment. What counts as an environment, whether different environments may lead to similar outcomes, and the role of various environmental components in conceptual development in different domains all are issues we believe must now be addressed.

The adult-child negotiated, socially organized experiences of the kind Saxe et al. document are surely candidate supporting environments. But to say they may be one kind of supporting environment is not to say they are *the* supporting environment and therefore necessary inputs. There are two classes of reasons to exercise caution here. First, it is conceivable that other supporting environments will do as well or better. In fact, we believe that it has to be that there are other kinds of environments that can and do suffice. There is the obvious fact that mother-child interactions vary widely across cultures. This is so even in the case of language acquisition, for which it would seem safe to assume that all children will become competent. (For further discussion of this issue, see Schieffelin & Ochs, 1986.) But, even within our own culture, any of a variety of other people (children included) can now catch a young child, so to speak, on the fly and offer food for thought. And it is not only people who serve this function.

Our cultural unconscious is permeated with mathematical artifacts, and children have a potential smorgasbord of supporting props, should they be inclined to seek out mathematically relevant inputs for the various goals they establish. They accompany their parents on shopping trips; hear numbers used in talk about time, birthdays, and how many presents they will or will not get; and ride elevators in buildings with many floors. Long-distance driving and the consequent talk about how far one has gone or has yet to go "to get to grandma's" is not uncommon. They watch the Count on the television program "Sesame Street" talk about his passion for counting different set sizes, or Zorro looking for nothing so he can count zero things, or even a puppet dressed up in a black leather jacket singing "Born to Add" set to the tune of a popular rock and roll song.

The latter examples make the point that findings from the study of cognitive development have found their way into the public domain and dramatically altered the array of props children can find on their own. Similarly, developments in the history of mathematics have made their way from discovery to standard availability. Ponder how different things are since Peyps's days, when one went to university to learn to do long division. And it was not that long ago when different units served those who measured length, cloth, land, and so on. Now we take a common unit of length and the long division algorithm for granted. We even take it as given that these should be taught in the first 4 years of elementary school.

There have been more recent changes in our mathematical cultural unconscious. It was only 20 years ago that those who study cognitive development denied the preschooler any arithmetic prowess at all. Who could anticipate the current debate as to whether we should offer formal instruction in the preschool years? But, more important, since even those who studied the numerical abilities of preschoolers talked mainly about the absence of these, it is unlikely that we were also participating in negotiated, mathematically meaningful goal structures. Yet, those early studies replicated. Somehow the children were using their environment to get the intellectual nourishment they needed.

Karmiloff-Smith and Inhelder's (1974/1975) description of block balancing as well as the DeLoache, Sugarman, & Brown (1985) accounts of stacking cup behavior provide particularly compelling cases for the idea that children are self-motivated to change their interpretation of the self-same environmental prop. As they do so, their use of the materials reveals a developmental progression of their understanding of the conceptual domain the materials serve. Environments can also be creations (or logical experiences, in Piagetian terms) generated by the mind from existing mental structures, as when children set themselves the task of counting as high as they possibly can. From interviews with children as young as 5, we know that some children even conclude, on their own, that they need never stop counting and so there cannot be an end to the numbers. It is hard to forget the 4-year-old who said she was not ready to leave the playground to participate in one of our ongoing research projects. Even though she seemed to be doing nothing, she reported that she was "busy counting to a million." When asked when she would be ready, she said she was not sure because she had been counting for a very long time already and had not gotten all that far.

That children in our culture can sample and impose their own interpretations on the rich mathematical environment is one reason we are impressed with how hard it is to follow Saxe et al. in their pursuit of a theory of a supporting environment for those who help construct their own knowledge. Additionally, the very adults who are competent to serve as members of negotiated learning interludes may not reveal this competence in all settings and for all domains. Whether adults in our culture behave with their children as mothers did in the Saxe et al. studies could depend very much on the setting they and their charges find themselves in (cf. Laboratory of Comparative Human Cognition, 1983). We develop this point by sharing some preliminary findings on the way adults and children use a museum that specializes in exhibits for children.

Philadelphia offers young children the Please Touch Museum, which is designed for children younger than 7 years of age. Since the museum's clients are too young to be on their own, the community assumes that this is a place where children visit either in school groups (during the weekday mornings) or with one or two parents (caretakers). The latter is the norm on weekday afternoons and during the weekends. The contents of the museum are what one might expect given a staff who specialize in the culture of the preschooler. There one finds what we classify as *skill-oriented* exhibits (e.g., blocks, puzzles); *sociocultural* exhibits (e.g., a grocery store, a health center with medical equipment and displays, and an old-fashioned trolley), *fantasy exhibits* (e.g., dress up, be in the circus, be in a puppet show), and *more formal learning activities* (e.g., a variety of items for learning about physical mechanisms, a number exhibit, a sound calliope, and live animals). Additionally, considerable care is taken to present the social history of toys, either through the medium of special display items or by the inclusion of toys from the "olden days." From our point of view, this particular setting offers a wide variety of instantiations of what our society's cultural unconscious contains as it bears on the interests preschool-aged children either do or should have.

Our notion that number-relevant materials have achieved this status is reinforced by the very fact that the museum staff developed a number exhibit, called "1-2-3-Go!" Although we read scripts and edited staff-prepared materials for parents and children, we did not develop the "1-2-3-Go!" exhibit. Our plan to observe the use of the exhibit developed 2 years later, when we taught a laboratory class and the museum served as the research setting. That many of the displays in the exhibit offered many of the numerical goals studied by Saxe et al. reflects the staff's general view that they should base their exhibits on what is taken as known and not on what one group of basic researchers might choose. There were displays for constructing and comparing sets, ordering, finding numerals, creating a given cardinal value, counting, and so on—a virtual feast from the number world of the preschool literature.

It is important to us that this exhibit was but one of many that children and adults could visit. Surely, readers will have wondered how many of the Saxe et al. interaction data can be attributed to the fact that neither adult nor child had a choice of other activities. Both child and adult were watched or interviewed in a setting in which numerical activities and goals clearly set the agenda. Would adults, who were competent as "teachers" in the reported studies, do the same things if they were not specifically set to think about the similar materials as numerically relevant ones—if they could wander off to talk to another adult, if they could sit down on a nearby bench and read as they monitored their children, and so on? Similarly, the nature of the child-adult interaction could be influenced by whether the child knows there is anything else to do. It may be that research that targets only one shareable activity is problematic for those who seek an account of the causal relations between children's skeletal competences and the environments that support the development of these. For, in doing this, it makes explicit to the participants the goal of the study (i.e., the nature and quality of adult-child interactions, how to structure use of materials, etc.). It also limits what adults take to be an important social right, to choose their partners and settings depending on what goal they want to achieve. If so, what are we to make of the idea that numerical concept development requires the kind of negotiated shared interactions Saxe et al. study? To repeat, it is one thing to find that such interactions occur in a given setting or set of settings and quite another to assume that they are required or common enough to account for the acquisition in question.

There are well-known pitfalls of the kind of research we have been doing in the museum (see, e.g., Altman, 1974; Garfinkle, 1967; Lofland & Lofland, 1984). First and foremost is the concern that we will stand out as nonmuseum people and therefore cause a change in the very behaviors we want to watch (Goffman, 1974). Several factors helped us become participant observers. Staff and volunteers constitute a legitimate sample of adults who can be in the museum unaccompanied by a young child. We were especially fortunate to have a staff willing to help us get to the point where we could "pass" (Goffman, 1963). We all either had or were given museum titles and badges to so identify ourselves. Similar badges identify all adult nonvisitors, whether personnel or volunteers on the floor. Staff offered their space for the class meetings at the museum and often sat in on them. They shared what they knew as we talked freely about what we were seeing

and doing. Before any focused observations were started, we spent a lot of time simply being on the floor, often while counting the distribution of people at the various exhibits (see below). Counts occurred at fixed times; otherwise, we did what others with our title might do on the floor, including answering adults' questions, helping children, and so on. All these activities added to our participant status (museum personnel are always counting something). More important, they offered a chance to watch and garner hypotheses about the use of the museum. If we were at the museum together, we would gather somewhere away from the main exhibit floor and simply talk and take notes. (We did not allow ourselves the use of electronic recorders for this kind of activity, and we agreed to do counts that sampled floor use at different times of the day and on different days, including weekends.) After more than a month of this kind of activity, we started to focus on areas of interest, doing so separately or in pairs. This generated hypotheses about the activities that took place at the chosen site, what to code in terms of interaction variables, and what conditions (if any) to vary. Finally, after about 2½ months serving as participant observers, some detailed observations of a few limited sites—including the number exhibit—were made. The positions of observers were selected so as to be out of the main flow of activity and yet to provide a clear line of sight. If tape recording seemed necessary, the equipment was placed inside or under an item in the target setting.

To summarize, our observations were of three kinds: (1) simple counts of the distribution of children and adults at the different areas on the floor, as function of time of day (morning or afternoon), section of the week (weekday or weekend), and sex (in all, we collected over 40 separate counts); (2) the kind of activity type (or, in Saxe et al.'s terms, goal) on a given item or exhibit; and (3) the degree and nature of child-adult interactions on an item or a display.

Since school groups can make reservations during weekday mornings, adult-child interaction patterns are of two kinds. Morning visits are made by both school groups and dyads of child and adult. During weekday afternoons and all day on weekends, the norm is a dyad of one child and one adult. For example, weekend counts taken in the winter and early spring yielded adult-child ratios of 1.00 and 1.02. For obvious reasons, the morning weekday ratios are never this high. Whenever we counted, the ratio of boys to girls was either 1.0 or very nearly so. In contrast, adult women far outnumber adult men during the week. The weekend female-male adult ratios, taken at the same time as the above child ones, were 1.1 and 1.2, indicating a slight tendency for women to outnumber men.

To get general levels of interest in the different sites at the museum, we divided the floor into 10 areas so that all display areas were covered and yet the people we had to count could be seen clearly. No matter how we analyze these counts, the number exhibit was very popular for everyone. Once differences in overall attendance baseline rates are adjusted, we find little in the way of consistent sex or age differences in attendance rates at the different viewing areas in the afternoon or on weekends. Focusing on the weekend sample, when both children and adults of both sexes were present, we determined that the "1-2-3-Go!" exhibit area was the second most popular for both adults and children. The most popular area for the children included several different displays: a somewhat scaled-down, but otherwise realistic, trolley car; a table with gears and dominoes (in the spring) or inclined planes (in the winter); a full-sized telephone booth; and an old-fashioned kitchen, equipped with actual pre-1900 items. This complex was adjacent to the area adults favored, one that provides a lot of comfortable places to sit and watch a somewhat protected tot area, to visit with others, and to monitor the trolley and grocery store areas.

The primary focus of our intensive observations in the "1-2-3-Go!" exhibit was a display titled "How Many?" It consisted of a freestanding cube, approximately 3 feet high, 2 feet wide, and 2 feet deep. Each of the four vertical faces contained six red doors, each of which could be lifted by a knob to reveal a picture underneath. At the top of each face of the exhibit was the phrase "How many . . ." in large bold letters. A completion of the question for each picture was written across the door covering the picture. For example, a door covering a photograph of a car might ask, "How many headlights on a car?" while the question accompanying a photograph of a building might ask, "How many windows on this building?" Almost all the set sizes represented varied from two to 10; two pictures portrayed 12 items (e.g., eggs in an egg carton) and one more than 30 (the petals on a daisy). Thus, appropriate interaction with this exhibit approximates some of the tasks in Saxe et al.'s study by asking visitors to count and determine cardinal values for sets of various sizes.

Although the age range is broader in our museum sample, the age distribution overlaps with the sample in this *Monograph*. Specifically, three museum subjects were younger than 2 years, 16 were 2 years old, seven were 3 years old, 15 were 4 years old, 12 were 5 years old, six were 6 years old, and one was 7 years old. (For children attending the museum in groups, the ages were usually known. In other cases, the observers estimated the children's ages. To check the accuracy of their estimations, they asked some of the adults, at the end of the observation period, the age of the children with them.) Subjects in the museum during the times of the focused number observations were predominantly middle class. Thus, our museum observations were based on a sample that overlapped Saxe et al.'s middle-class samples. Additionally, our observations were made in the context of a task much like that Saxe et al. used when they videotaped mother-child interactions. So, despite the quite different circumstances, we think there is enough overlap to make the comparison informative.

Two independent observers recorded data in a series of observation periods planned to take place within a given time frame but at different times of day and on different days of the week. Morning sessions were oversampled with a view to observing as many children who did not go to the museum with their parents as possible. The first child (and accompanying adult, if any) to enter the area during these times was the first observed. As soon as the data collection was completed for that subject, the next child to approach the exhibit plus any adults accompanying that child served as the subject for the next set of observations. Seventeen children were observed by themselves at the target exhibit; 43 children were observed in the company of an adult. Observers used a data sheet already marked with a hierarchy of behaviors. The hierarchy was developed by the observers at an earlier time and represented increasingly intensive interactions with the display, ranging from merely opening the doors and looking at the pictures, to labeling and pointing at them, to counting, counting correctly, completing a count, and stating a cardinal value for a set. In addition, records were kept of when an adult asked a "how many" question for a picture, requested the child to count, or praised the child.

Of the 43 adults observed, 13 did not interact at all with either the display or the child; the children with them never did more than open the doors and look at the pictures. As a matter of fact, children who visited the exhibit by themselves were more likely than the children accompanied by a noninteracting adult at least to point and label the pictures, though none counted—even though they were, on the average, 4 years old and, therefore, overlapped with Saxe et al.'s 4-year-old group. To us, the most surprising result is how little numerical behavior, on the part of either children or adults, took place at this display. Of the 30 adults who did interact with the children, only 14 asked a "how many" question, and only eight either counted, requested the child to count, or stated a cardinal value. Only six of the 60 children engaged in any sort of counting, and only five children stated a cardinal value for at least one of the sets. Children who were accompanied by an adult who either engaged in numerical behavior or encouraged the child to do so were significantly more likely to count and to exhibit cardinality. But a substantial majority of the adults observed did neither.

Given that so few adults participated at a level that encouraged numerical thinking in the young children they were with, we have to question whether the kinds of adult-child interactions described in this *Monograph* are common enough outside of an experimental setting to serve as a primary source for children's conceptual development in this domain. It startled us that the adults did not even read the very large sign that said "How many . . ." to their children. These children were, after all, preliterate and needed someone to read the sign for them if they were to know what goal the museum wanted them to set when using the exhibit. By simply reading the sign, adults could at least support the child's use of the material by letting them know the role the setting was meant to serve. Although we knew that adults often fail to read signs in museums for themselves and older children (e.g., Borun, 1979), we still were not prepared for so many of them to ignore a sign painted in large print right on the display itself that they surely knew none of their charges could read.

Why do the adults do so little to encourage numerical thinking in an attractive setting designed to encourage counting? We can only offer some guesses. Recall that parents preferred what we call the tots area. In fact, their next most preferred areas after the number exhibit shared what we see is an essential feature—a place to sit down and both socialize with other adults and monitor their children. This will not be surprising to those who study the functions museums serve. They are seen variously as places to go to get out of the rain or meet a friend, excuses for a family outing, places to have fun and buy things or eat unusual things, places to watch other people, and places to see things that are not familiar (e.g., Alt & Shaw, 1984; Diamond, 1981). Our informal conversations with adult visitors to the Please Touch Museum support these findings. We have heard that they think of the museum as a kind of park, a bigger and better living room than they have at home, as well as a nice place to bring their young charges.

But this cannot be the whole story, for it is clear that parents do teach in some, if not all, settings at the museum. We have seen a lot of label teaching in the tot area. Additionally, we have seen a very interesting kind of teaching in the grocery store and health center areas, a kind that resembles the parent-as-teacher model that Saxe et al. outline. Here, adults seem to stand by, often on the side, and watch their children role play shopper, clerk, nurse, doctor, sick child, and so on. If matters are proceeding smoothly, children seem to be left pretty much alone. However, when a child does something that is not standard or when the child encounters a novel item, the adult standing by is quick to provide the pertinent input. For example, the grocery store is more like a corner Mom and Pop store than a supermarket, and it has a real cash register, albeit a vintage one. We have come to know that the child on the cash register predictably will check others out by first doing something that looks rather bizarre to an adult—this is to slide a to-be-sold item across the front drawer or top of the register. With a little reflection about children's actual grocery shopping experience, one realizes the child is doing what a clerk at a supermarket does who has an automatic scanner to read the computer-marked prices on most of the items in the store. For the children, checking out groceries involves scanning the object, whether it is marked for this purpose or not and even when no such device is present. That they assume this helps make our point that our culture is full of props that children employ, unbeknownst to the adults who use them, to learn about number-relevant domains. But more to the point here, their action is so salient that it invariably leads the adult, who has simply been watching, to say something. That "something" can be a lesson in social history or one about the difference between corner grocery stores and supermarkets. Similarly, adults "teach" their charges about the X-rays and wheel chairs in the medical center. If detailed observations bear these preliminary ones out, we have one possible account of why the same adults treat the various exhibits so differently.

All normal adults are, in fact, experts on the socio-politico-economic roles their culture expects them to share. Competent adults in our society are expected to have the requisite skills for shopping, going to the doctor, using local transportation, and so on (Edgerton, 1967). In contrast, adults are not presumed to be experts in mathematics, physics, or how to read. Related to this difference is the fact that we assign different teaching functions to different adults. Parents are expected to socialize their children regarding everyday interactions like going to the store and taking the trolley. By and large, we pay teachers to teach math, reading, and other "school subjects." So, even though we might be competent to serve in the latter role, we have an option not to do so. In contrast, we have much less of an option regarding the teaching of daily scripts of interaction.

Might the differences between the Saxe et al. data and our observations reflect this difference in options? In this regard, we draw attention to Greenfield's (1984) finding that Zinacanteco women scaffold their input as a function of the novice weaver's level of knowledge. Greenfield's notion of scaffolding is much like the Saxe et al. one of negotiated goal setting. Her results fit our conjecture that a parent's teaching style might well resemble the one described by Saxe et al. when the content domain in question is one in which the parents do think of themselves as the experts.

We should not rule out the possibility that our observations are due in part to some adults accepting the media's argument that we are an illiterate population with regards to math and science. If so, why not leave the use of a number environment to others to teach even the simplest of numerical concepts? An alternative account of the observed difference is that the adults know how very simple the math is that is represented in the display. So they assume that it is already known. Since there are other ways their children can find to use the display, why not let them do so? Or perhaps the adults think that numbers are work and museums are for play? Conceivably, they do not even realize that they are in a number exhibit. Merkin's (1986) exit interviews of museum patrons lend some credence to all these possibilities. This brings us once again to our major point.

The unstated premise of the above considerations is that learning in different domains might require or tolerate different kinds of supporting environments and that parents are more or less comfortable as tutors for these different domains. If so, it follows that all domains are not equal. If we are right that domains do differ as to what inputs yield learning about them, this has to be a variable in any theory of a supporting environment. Basically, we still know very little about the variables that make up a supporting environment for cognitive development. Readers who are interested in this issue will find some clues in a related literature, that on the nature and effect of mother-child language interactions (e.g., Gleitman & Wanner, 1982; Nelson, 1985; Pinker, 1984; Snow & Ferguson, 1977). The account will surely benefit from analyses that let children give us the clues here. We should be looking for more cases of making up price scanners when none are present or turning to the syntactic rules for verbs of seeing when their eyes fail them if we are even to know how to catalog this thing called a potentially supporting environment. The data that Saxe et al. have collected surely help. Without them, we would know even less about the class of inputs to which children bring their interests and self-generated goals.

Environments offer more than social interactions and an opportunity to develop a shared symbol system. They offer many different institutions and artifacts and a cultural unconscious that children will come to share and use to support and develop their burgeoning cognitive abilities. Sometimes, they will benefit from the fact that adults have the competence described by the authors of this *Monograph*. But they surely cannot depend on it. For the same adults have other interests, interests that might well take over when other adults are present, when they and the children can choose among a variety of goals and materials. The same adults cannot be all things at once. Finally, adults in the same roles in different societies may not share our cultural unconscious, and, hence, their children must look elsewhere for supporting inputs (Atran & Sperber, 1987). Everything points to the requirement that, whatever our classification scheme turns out to be, it will have to have redundant cases of supporting materials for a given domain. A theory of supporting environments for cognitive development must eventually evaluate what environments yield what kinds of conceptual growth and whether environments that take different forms and serve different learning paths may nevertheless lead to equivalent developmental outcomes.

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