

## Schooling and Traditional Collaborative Social Organization of Problem Solving by Mayan Mothers and Children

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Traditional indigenous social organization in the Americas has been characterized as involving horizontal multiparty engagements, in contrast with schooling, which often relies on hierarchy and division of labor. This study examined whether the social organization of problem solving of Guatemalan Mayan indigenous mothers and children varied with the mothers' extent of experience with school. We observed 47 mothers as they constructed a puzzle with 3 children (ages 6-12 years). Mayan mothers with little schooling (0-2 grades) were involved more in horizontal, multiparty engagements, whereas Mayan mothers with extensive experience with schooling (12 or more grades) were involved more in hierarchical, division-of-labor engagements with the children. The results suggest that Western formal schooling contributes to the reshaping of traditional collaborative social organization among indigenous Mayan people.

Sociocultural research increasingly points to the importance of understanding the social organization of teaching and learning interactions (Lave & Wenger, 1991; Rogoff, 1990, 1998; Wenger, 1998). It has been suggested that indigenous American ways of learning in the family and community are qualitatively different from the ways learning occurs in traditional Western schooling, emphasizing cooperation and mutual responsibility in groups rather than adult direction and assignment of discrete roles and responsibilities to children (Childs & Greenfield, 1980; Paradise, 1987; Rogoff, 1990; Tharp, 1994).

In this study we examined how traditional indigenous forms of social organization of problem solving vary with mothers' experience in formal schooling. Taking advantage of within-community variation that was due to rapid change in local involvement in schooling, we compared the social organization of problem solving by Guatemalan Mayan mothers with almost no schooling with that of Guatemalan Mayan mothers with extensive formal schooling as mothers engaged with three related children. Groups involving Mayan mothers with almost no schooling were expected to coordinate their problem-solving engagements primar-

ily in a horizontal multiparty fashion, whereas groups involving Mayan mothers with extensive schooling were expected to more often use hierarchical division of labor.

### Indigenous Structures of Group Coordination

Ethnographic research indicates that the social organization of indigenous groups of the Americas often involves shared multiparty engagements among several group members, with mutual and fluid negotiation of roles and responsibilities and consensus-based decision making (Lamphere, 1977; Paradise, 1987; Rogoff, Mistry, Göncü, & Mosier, 1993; Sindell, 1997). Indigenous group-oriented social organization has been characterized as cooperative and *horizontal*, contrasting with *vertical* or *hierarchical* organization, in which some people manage others' participation.

Pelletier (1970) illustrated such horizontal organization of indigenous groups in his description of problem solving among Canadian Manitoulin people:

While it didn't have a vertical structure, our community was very highly structured. So highly structured that there wasn't anything that could happen that somebody couldn't almost immediately, in some way, solve, whatever problem arose . . . . If somebody died in the community, nobody ever said: We should dig a grave. The grave was dug, the box was made, everything was set up . . . the one who baked pies baked pies. Everyone did something in that community, and if you tried to find out who organized it, you couldn't. (pp. 26-27)

Difficulties arose when outsiders in Manitoulin tried to use a hierarchical structure to manage how activities were carried out by others. As an example, over many years, the community had put together a beautiful buffet without a foreman or boss, to honor the visit of the Prime Minister.

Every year they turned out a beautiful meal for him, and he never knew who to thank because it was just all of a sudden there; it was done. The people just got together. There was no foreman or boss. There was no vertical structure, and it just happened.

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[However, in 1964, a woman from Toronto who was unfamiliar with Manitoulin practices took charge of setting up the buffet.] You should have been there in '64. It was chaotic. There were no knives, no desserts, nobody had cut up the heads of lettuce that were all over, because this woman came there and gave orders, and the people wouldn't do anything until she told them what to do . . . There was someone in charge. Had there not been anyone in charge it would have gone off fine. It was a real mess. This is the difference. Here you organize, and you know those kinds of structures, and they mean something to you. You instinctively behave in certain ways to those things. (Pelletier, 1970, pp. 26–27)

Pelletier (1970) noted that the consequences of the differing forms of social organization have been serious for the community:

And yet we have the Department of Indian Affairs coming and telling us we have no organization . . . Every time somebody comes into the community they disrupt the pattern. Every time you remove a resource person from the community you disrupt the pattern. You break it up, and they have to reorganize. But in a lot of communities this is very hard to do, and some of them have been too hurt to make it. Indian resource people begin to drop out of sight and white organizers take over, making it even more difficult for Indian people to function. (pp. 28–29)

Such a fluid, horizontal form of organization has been observed in several indigenous communities of North and Central America in which children learn through keen observation and extensive participation in ongoing mature community activities (Cazden & John, 1971; Childs & Greenfield, 1980; Gaskins, 1999; Greenfield, 1984; Kaulback, 1984; Lipka, 1990; Nuñez, Ajú, Xocóp, & Chavajay, 1990; Paradise, 1991; Philips, 1983; Rogoff, 1990; Suina & Smolkin, 1991; Tharp, 1994).<sup>1</sup> Also common among these indigenous groups is an emphasis on learning to work together cooperatively within the home and community. Often, 4- and 5-year-old children share family work responsibilities and place family and community well-being over self-gratification, with their sense of group responsibility fostering and being fostered by cooperative relations with others (Briggs, 1970; Cancian, 1964; Chisholm, 1983; Eggan, 1956; Kramer, 1991; Medicine, 1985; Mosier & Rogoff, 2000; Williams, 1958).

### Western School Structure of Interaction

In contrast with horizontal, group-oriented social coordination, traditional Western schooling has been characterized as involving hierarchically organized interactions in which an adult directs children's roles and responsibilities, often in a dyadic structure even though others are present (Lipka, 1994; Rogoff et al., 1993; Scribner & Cole, 1973; Tharp, 1994). This hierarchical organization of learning is exemplified by Philip's (1972, 1983) observations of a "switchboard participant structure," in which teachers decide which children contribute to class activities, when, and for how long. The hierarchical structure is reflected in the Initiation–Reply–Evaluation format observed in many U.S. classrooms (Cazden, 1988; McCollum, 1989; Mehan, 1979). It has also been observed in traditional Western schools attended by indigenous children (Lipka, 1994; Nuñez et al., 1990; Philips, 1972, 1983; Sindell, 1997; Tharp, 1994).<sup>2</sup>

Western formal schooling was imposed on indigenous groups of the Americas in European and U.S. efforts to "assimilate" or

"civilize" them to follow foreign values, religion, language, and customs (Akinnaso, 1992; Dumont & Wax, 1969). Despite such efforts, many indigenous people still maintain some forms of their traditional cultural practices (Collier, 1973; Medicine, 1985), although their lack of complete assimilation is sometimes interpreted as a deficit by school authorities. Indigenous people have often referred to their experiences as living in two different worlds, continually negotiating European school and indigenous ways of life.

In many European American middle-class families, social organization at home corresponds with that of school. Parents often engage with young children in question-and-known-answer routines and manage lessons that resemble the hierarchical, division-of-labor organization of school (Delgado-Gaitan, 1987, 1994; Heath, 1983, 1989; Lipka, 1994; Michaels, 1981; Ochs, 1988; Rogoff et al., 1993).

However, the "switchboard" structure of school participation contrasts with the participation structure characteristic of indigenous children's homes and community, where individuals' turn taking is not assigned by any particular individual, and teaching and learning do not emphasize individual performance (Lipka, 1994; Philips, 1983; Tharp, 1989). In school, indigenous children often attempt to collaborate with classmates even when they are discouraged from doing so by teachers (Greenbaum & Greenbaum, 1983; Nuñez et al., 1990; Philips, 1983; Wolcott, 1997).

Research has suggested that contact with the social organization of schools may change the ways indigenous caregivers shape their engagements with their children to resemble school-like social engagements (Crago, Annahafak, & Ningiuruvik, 1993; Rogoff et al., 1993). For example, younger Inuit caregivers, who had attended school, were more likely to involve their children in question-answer routines and labeling of objects—and to expect these to be useful in preparing children for school—than were older Inuit caregivers (Crago et al., 1993). Similarly, Guatemalan Mayan mothers with 6–9 years of schooling used more language lessons and were more likely to attempt to enforce their own agendas with their toddlers (resembling European-American middle-class caregivers) compared with Mayan mothers with little or no schooling, who rarely adopted school-like relations in interacting with their toddlers (Rogoff et al., 1993). As LeVine et al. (1991) suggested, mothers "have acquired language skills in school that remain with them in their childbearing years" (p. 491). Consequently, schools may socialize specific practices that can be seen in former students' own ways of doing things when they become parents.

<sup>1</sup> Similar patterns have been observed among other groups, so the pattern is likely to be broader than indigenous American cultural practices. We hesitate to generalize more broadly, however, until research can examine patterns of cultural similarities and variations more fully.

<sup>2</sup> Although some indigenous teachers working in Western schools organize their classrooms in support of horizontal interactions among class members—interacting with students in a collaborative manner—often their acculturation in mainstream pedagogy results in teaching practices that emphasize directive, hierarchical organization of participants' involvement (Barnhardt, 1981; Erickson & Mohatt, 1982; Lipka, 1991).

### The Present Study

We compared the social organization of problem solving in groups of three children working with indigenous mothers who differed in the extent of their experience with formal schooling. In this study, many cultural aspects were constant because the comparisons were within a single community, the town of San Pedro, Guatemala, where people share Mayan indigenous heritage, history, geography, cultural institutions, and often kinship. Schooling has become prevalent only in recent generations, with successively more children attending for a longer time since the current grandparents' generation (when few attended school and when those who did completed only a few grades). The recent rapid growth of school participation in San Pedro has been accompanied by related community changes (such as changes in occupations and facility in a new language, Spanish). Likewise, in Mexican rural and urban communities, greater maternal schooling has been related to reduced fertility and child mortality; new attitudes toward health behavior, family size, and child care; and new modes of mother-infant interaction (LeVine et al., 1991; Tapia Uribe, LeVine, & LeVine, 1994; Zukow, 1984).

Changes in schooling in San Pedro can be regarded as a central feature of a constellation of changes in the past few generations, against a background of relative homogeneity within the community. This situation provides an opportunity to examine within-community cultural differences in social organization related to varying participation in an important cultural institution, formal school.

Mayan mothers differing in formal schooling and three related children constructed a three-dimensional jigsaw puzzle together. Groups involving mothers with very little formal schooling, compared with groups involving mothers with extensive schooling, were expected to engage in more traditional horizontal multiparty collaboration, in which the whole group supports each other's efforts while constructing the same aspect of the puzzle. Groups with mothers with extensive schooling were expected to divide up problem solving in a more hierarchical fashion, and these mothers were expected more often to direct children in what to do and to propose explicit division-of-labor plans.

### Method

Forty-seven Mayan groups, each composed of three related children (6–12 years old) and mothers (of at least two of them), were videotaped working together on a puzzle. Families were recruited through word-of-mouth invitations, by Pablo Chavajay and a female research assistant, both of whom are natives of San Pedro, speak both Tz'utujil and Spanish, and are familiar with the participants. Information on the community and families came from observations Pablo Chavajay made while growing up and Barbara Rogoff made while living in this community and from interviews conducted with the families and with the superintendent and principals of the schools.

### Community Background

San Pedro is a Mayan Tz'utujil town of 10,000 people in a compact area on the shore of Lake Atitlán in the highlands of Guatemala. Although the town's economy is primarily agricultural, it is becoming increasingly commercial, and residents engage in much more frequent travel (by boat or bus) to regional cities. Families have increasing access to Western tech-

nology, including four public telephones, U.S. cable television in some families, a library, and one computer connected to the Internet.

The number of schools and the amount of schooling achieved by community members have increased rapidly. Schooling in San Pedro is a foreign institution (originating with the Spanish colonization). Although the native language is Mayan Tz'utujil, the language of the schools is Spanish—the national language—and the curriculum is developed by the Guatemalan Ministry of Education.

In 1936, a few children of varying ages (mostly boys) were taught in one room by one non-Mayan schoolteacher, usually for only a year; third grade was the highest grade available in town for several years. Sixth-grade schooling was available in town only after 1944, and for many years, most teachers were non-Mayan. Seventh- through ninth-grade schooling began in 1973, and in 1995, a private school for Grades 10 to 12 was opened to train and certify bilingual Mayan-Spanish elementary school teachers. At the time of this study (1997), in addition to the teacher-training program, there were a number of public and private elementary schools, along with five private schools serving students from Grades 7 to 9. As of 1997, most teachers employed in these schools were natives of San Pedro (114 of the 130 teachers; 12 others were from other Mayan communities, and 4 were not Mayan).

Among people who are currently parents of school-age children, the extent of schooling varies widely. Approximately a quarter have never attended school, another half have some years of elementary schooling, and the remainder have gone beyond elementary school. Most children now start preschool at age 4–5 and first grade by age 6–7. They generally finish sixth grade, and many continue on to junior high and higher (in San Pedro or other cities).

Approximately 100 students are currently attending public and private universities, and 7 people with university degrees are working on advanced professional degrees. Several local people now have medical, law, and psychology degrees, and a few hundred local people have teaching degrees (San Pedro is well known for staffing the local and regional schools).

*Mothers' schooling groups.* Reflecting San Pedro adults' variation in school experience, the 47 groups included mothers with three levels of schooling, as follows: (a) 12 family groups involved mothers with from 0 to 2 grades of schooling; (b) 14 family groups involved mothers with from 6 to 9 grades of schooling; and (c) 21 family groups involved mothers with 12 or more grades of schooling. Table 1 gives additional information on mothers' and fathers' schooling (and parents' ages). It also lists grandparents' schooling, which was at most a couple of grades, even for the group of mothers with more than 12 grades of schooling.

The reason we selected more mothers for the 12+ grades group was so that we could examine whether professional pedagogical expertise might account for differences, rather than experience with schooling per se, because most San Pedro mothers with more than 12 grades of schooling are teachers. Among mothers with 12 or more grades of schooling, the ratio of teachers (14) to nonteachers (7; accountants, nurses, and a medical doctor) was similar to the corresponding ratio for the town as a whole. All local nonteachers who had at least two children of the appropriate ages were included in the study, as were most of the local teachers. Analyses indicated no differences in the social organization of their interactions with the children; hence, teachers and nonteachers were combined for the 12+ grades group. The similarity of their approaches suggests that participation in school for many years, rather than professional exposure to school pedagogy, may make the difference in the social organization used by mothers with 12+ grades of schooling.

The mothers' occupations at the other two grade levels were more traditional, as would be expected. In the 0–2 grades group, they were very traditional—10 were weavers (weaving for home use and for sale), and 2 were seamstresses. In the 6–9 grades group, mothers' occupations were mostly traditional—3 were weavers, 6 were seamstresses, 1 was a cook—but 4 were merchants or salespeople.

Table 1  
Means and Ranges for Mothers' and Fathers' Highest Grade Completed and Age (in Years) and for Grandparents' Schooling

Parent or grandparent	Mothers' schooling groups					
	0-2 grades		6-9 grades		12+ grades	
	Grade	Age	Grade	Age	Grade	Age
Mother						
<i>M</i>	0.5	37	6.5	33	13.0	34
Range	0-2	28-50	6-9	27-38	12-18	31-42
Father						
<i>M</i>	2.0	41	6.4	36	12.0	36
Range	0-6	29-55	0-15	32-44	4-17	30-42
Grandparents						
Mother's mother	0.0		1.2		0.7	
Mother's father	0.6		1.8		2.4	
Father's mother	0.4		0.1		0.8	
Father's father	0.4		0.6		1.8	

The fathers' occupations followed the same pattern: Fathers whose wives had 0-2 grades had rather traditional occupations (masons, farmers, agricultural day laborers, and a fisherman). Fathers whose wives had 6-9 grades were mostly masons, farmers, and agricultural day laborers, with a few less traditional occupations (3 teachers, a merchant, and a shoemaker). Almost all fathers whose wives had more than 12 grades had nontraditional occupations: teachers (7), truck drivers (4), accountants (2), a health technician, a telegrapher, an agronomist, an adult literacy coordinator, a police officer, and a blacksmith; there were only 2 farmers.

As would be expected from the use of Spanish as the literate language, use of Tz'utujil and Spanish differed across schooling groups,  $F(1, 46) = 7.62, p < .0001$ . Only a generation ago, all San Pedro families used Tz'utujil in the home; a reason given then for attending school was to learn Spanish, the language of commerce and national government. All families in the 0-2 grades group reported speaking only Tz'utujil at home (although half of the families reported speaking some Spanish to visitors, usually by the fathers and older children). In the 6-9 grades group, all but three parents reported speaking Tz'utujil at home (and half of them also reported sometimes addressing their young children or visitors in Spanish). All the families in the 12+ grades group reported speaking primarily Spanish at home, although most of them also reported speaking Tz'utujil to children and adults in the community.

We examined whether the three schooling groups differed in other family characteristics. There were no significant differences in family religion, with a fairly even mixture of Catholics and fundamentalist Protestants. There were also no significant differences in family structure: All mothers and all but two fathers lived together with their children, and about half of the families of each group lived in extended families, while the remaining half lived in nuclear families.

There were significantly fewer children per family for mothers with more grades of schooling,  $F(1, 46) = 13.00, p < .0001$ . The 0-2 grades group averaged 5 children per family (range = 2-9); the 6-9 grades group averaged 3.5 children per family (range = 2-5); and the 12+ grades group averaged 2.5 children per family (range = 2-4). However, even for those who have few children of their own, a great deal of multiage, multiparty interaction is the norm in San Pedro, with extended family living in very close proximity.

*Children's group composition.* In all groups, the three children were relatives of the mother and were almost always two siblings and one cousin, with the exception of two to four cases in each schooling category in which all three children were siblings. In the three maternal schooling categories, similar proportions of boys and girls participated; most groups were composed of mixed genders (19 groups of two girls and one boy; 14

groups of two boys and one girl; 7 groups of three girls; and 7 groups of three boys).

All child participants were enrolled in local schools. There were no significant differences across the three maternal schooling categories in the children's number of grades attended (averaging 2.8 grades across the three children) or ages (averaging 8.8 years of age across the three children; see Table 2).

### Procedure

Each group constructed a three-dimensional totem pole jigsaw puzzle (see Figure 1) at a table in a rented room of a local home. Participants considered the three-dimensional puzzle to be a novel and fun experience, as revealed in their comments.

The three schooling groups did not differ noticeably in familiarity with constructing puzzles. None had seen a three-dimensional puzzle, but at least one child in every family group reported having put together a 6-12-piece two-dimensional puzzle (generally obtained from a Pepsi-Cola truck that sells its product to the local stores). Only three mothers (all with 12+ grades) reported that they or their spouses had bought puzzles for their children; no parents in any groups reported having constructed puzzles with their children, and all the mothers who were teachers reported not having used any puzzle in their classrooms.

Before the research assistant presented the puzzle to each group, the mother studied a completed model of the puzzle for 2-3 min while the children were outside the room. Then the research assistant invited the children back to the room to join the mother in constructing a totem pole like the model:

I thought that you might be interested in constructing a puzzle like this one here [pointing to the model on the table]. I would like you all to help one another in constructing the puzzle. All the pieces that you need to make the puzzle are here in this little basket [near the model]. You can tell me when you finish or don't want to continue anymore, even if you don't complete it.

We included the request to help each other because our pilot work suggested that without such a suggestion, parents often thought we wanted them to avoid helping the children. (We did not refer explicitly to "teaching," because this would likely have biased all groups toward their conceptions of school-like instruction.)

Table 2  
Means and Ranges for Children's Grade in School and Age (in Years)

Children	Mothers' schooling groups					
	0-2 grades		6-9 grades		12+ grades	
	Grade	Age	Grade	Age	Grade	Age
Oldest						
<i>M</i>	4.7	11.4	4.5	10.5	4.2	10.4
Range	3-6	8-12	3-6	7-12	2-6	8-12
Middle						
<i>M</i>	2.2	9.0	2.6	8.7	2.8	8.6
Range	1-5	7-12	1-5	7-11	1-6	6-11
Youngest						
<i>M</i>	1.0	7.0	1.4	6.9	1.5	7.2
Range	1-0	6-8	1-3	6-9	1-3	6-10
Average for the 3 children	2.6	9.1	2.8	8.7	2.8	8.7

All sessions were videotaped, and only groups that finished constructing the puzzle were included in the analyses.<sup>3</sup> The length of the sessions varied across groups. For the 0-2 grades group, the sessions averaged 29 min (range = 15-40); for the 6-9 grades group, the sessions averaged 21 min (range = 11-33); and for the 12+ grades group, the sessions averaged 22 min (range = 9-33).

### Coding

The most prevalent form of social organization for each family group was diagrammed for each 1-min segment of videotape. One-minute segments were chosen because they were small enough not to overburden coders' memory and large enough to do justice to the contextual meaning of the participants' contributions. The diagrams distinguished four patterns: shared multiparty engagement, division of labor, the mother directing the children, and group members not all coordinating with one another. In addition, the videotapes were coded for the frequency of mothers' and children's explicit proposals of division-of-labor plans and suggestions of what needed to be done.<sup>4</sup>

*Social organization of the group.* Participants' positions around the table were diagrammed during each minute according to the scheme outlined in Figure 2. In *shared multiparty engagement*, all participants worked together in a coordinated and fluid way, mutually engaged in the

same aspect of construction (e.g., same row of the puzzle). Some group members may have been in supporting or observing roles, but all four needed to be involved in the same cohesive focus.<sup>5</sup> In *division of labor*, participants worked on different aspects of the puzzle, occasionally checking in with each other. A few of them may have worked together. In *mother directs the children*, the mother unilaterally and explicitly directed the children, as a unit (like a teacher directing a class), to carry out specific aspects of puzzle construction, without conferring with them. In *noncoordinated engagement*, not all four group members were jointly coordinated with each other, although all members were engaged in the puzzle construction. Some individuals or dyads worked without checking in with the others. We also coded whether any participants were not involved in constructing the puzzle. Being *off task* was coded in only two 1-min segments of all the data, and consequently the category was dropped from analysis.

*Proposal of a division-of-labor plan.* This was coded when a participant explicitly suggested different jobs for different people (that may have included her- or himself). An example would be a mother suggesting, "Let's each do one side of the puzzle and then we'll put the sides together."

*Suggesting what needs to get done.* Participants suggested what needed to be done by making explicit proposals for upcoming steps or by identifying the structure of the puzzle. In *explicit proposal of a step plan*, a

<sup>3</sup> Six groups that did not finish constructing the puzzle were excluded (4 from the 0-2 grades group, 1 from the 6-9 grades group, and 1 from the 12+ grades group).

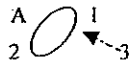
<sup>4</sup> We also coded whether mothers assumed special roles that might connect with school or hierarchical practices (insisting on an authority role by refusing to accept help or suggestions from the children, struggling with the children over whose idea to follow, and making school-like evaluations of children's performance, such as "You did a great job" or "You need to do better than that") or that indicate insecurity with a leading role in this setting (helping children only when asked, seeking help uncertainly from the children). With the exception of two instances in which a mother struggled with her oldest child over whose idea to follow, no mothers used any of these roles.

<sup>5</sup> Extent of observing others during the task construction was also examined separately; no significant differences were found across groups. However, the youngest children in each of the three maternal schooling groups observed what others were doing more often than did middle and oldest children; youngest children whose mothers had 0-2 grades of schooling observed slightly (not significantly) more than did the youngest children from the other two groups.



Figure 1. Photo of a group constructing the 47-piece totem pole jigsaw puzzle.

### Shared multiparty engagement



A, 1, and 2 construct the back side of the totem pole together as 3 observes attentively.

### Division of labor



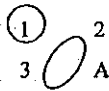
A searches for all the red pieces of the puzzle, as 3 and 1 construct the front side of the totem pole, and 2 works on the back side.

### Mother directs children



The mother describes the structure of the totem pole puzzle to the children and tells them what pieces to find.

### Noncoordinated engagement



1 constructs the second wing of the totem pole by himself, while 3, 2, and A construct the fifth row of the totem pole; neither subgroup connects about their agenda.

Figure 2. Examples of diagrams showing social organization of the groups. A = mother; 1 = oldest child; 2 = middle child; 3 = youngest child.

participant proposed specific steps for task construction. For example, a child might tell the group, "Let's finish the back before we put on the wings" or "Let's put all the red pieces over here." In *stating the structure of the puzzle*, a participant pointed out aspects of the structure of the puzzle to get others to notice new attributes of the puzzle that might facilitate its construction. An example would be a mother pointing out, "Look, the totem pole has birds on top of each other."

**Reliability.** Coding of the 47 videotaped sessions was conducted by the research assistant, who was unaware of the hypotheses. A second reliability coder (Pablo Chavajay, also a native Tz'utujil speaker) overlapped coding of 40% of the data. Reliabilities (Pearson correlation coefficients) were as follows: shared multiparty engagement,  $r = .91$ ; division of labor,  $r = .98$ ; mother directs children,  $r = .88$ ; noncoordinated engagement,  $r = .95$ ; proposal of division-of-labor plans,  $r = .90$ ; step-plan proposals,  $r = .87$ ; and stating structure,  $r = .85$ .

## Results

To account for the differences in the length of total puzzle construction time across groups, we based our analyses on proportions (of total 1-min segments). Trend analyses were used to test predicted linear trends across the three schooling categories; significance levels are at the  $p < .05$  level unless otherwise noted.

### Social Organization of the Groups' Interactions

The results supported the predicted differences in the patterns of group social organization associated with differing extents of maternal schooling (see Table 3).

Shared multiparty engagements occurred more in groups in which mothers had little or no schooling than in groups with more maternal schooling, with a significant decreasing linear trend from 0–2 grades to 12+ grades,  $F(1, 46) = 8.20, p < .006$ . [There was

no significant departure of the observed trend from linearity,  $F(1, 46) = 0.25, p > .62$ , indicating a good fit.]

Interactions structured with division of labor were more common in groups with greater maternal schooling, with a significant increasing linear trend from 0–2 grades to 12+ grades,  $F(1, 46) = 10.38, p < .002$ . [There was no significant departure of the observed trend from linearity,  $F(1, 46) = 1.25, p > .27$ , indicating a good fit.] As described below, mothers were usually the ones proposing division-of-labor plans.

Mothers' direction of children's engagement during puzzle construction was more common in groups with more maternal schooling, with a significant increasing linear trend from 0–2 grades to 12+ grades,  $F(1, 46) = 7.13, p < .01$ . [There was no significant departure of the observed trend from linearity,  $F(1, 46) = 2.24, p > .14$ , indicating a good fit.]

Noncoordinated engagement, in which the members did not all coordinate with each other, did not differ with varying extent of maternal schooling, with a nonsignificant linear trend from 0–2 grades to 12+ grades,  $F(1, 46) = 0.47, p > .50$ .

### Mothers' Division-of-Labor Proposals

We regard mothers' proposals of division-of-labor plans as indicating a relatively hierarchical organization among participants as mothers attempt to organize the group's work (though in a more suggestive manner than when they direct the children's engagements). The idea that division-of-labor proposals involve a hierarchical structure is supported by the fact that mothers were most commonly the individuals making proposals to divide the work (see Table 4).

Because making multiple division-of-labor proposals may be simply repetitious, rather than adding information incrementally,

Table 3  
*Mean Proportion of Segments (and Standard Deviations) in Which the Groups Used Each Type of Organization*

Schooling group	Shared multiparty engagement	Division of labor	Mother directing	Noncoordinated engagement
0-2 grades	.80 (.22)	.14 (.14)	.00 (.00)	.06 (.14)
6-9 grades	.63 (.28)	.35 (.26)	.00 (.00)	.02 (.03)
12+ grades	.54 (.28)	.40 (.25)	.03 (.09)	.04 (.05)

division-of-labor proposals were analyzed in terms of whether individuals made no division-of-labor proposals at all or made one or more.

The number of mothers proposing any division-of-labor plans differed significantly with maternal schooling,  $\chi^2(2, N = 47) = 28.14, p < .001$  (see Table 4). More mothers with 12+ grades proposed division-of-labor plans than mothers with 0-2 or 6-9 grades,  $\chi^2(1, N = 33) = 48.61, p < .001$ , and  $\chi^2(1, N = 35) = 11.24, p < .01$ , respectively. [Mothers with 0-2 and 6-9 grades did not differ significantly,  $\chi^2(1, N = 26) = 3.41$ .] Not only were the mothers with the most schooling more likely to propose any division-of-labor plans, they also were the only mothers to propose division-of-labor plans more than once or twice.

Only the mothers with 12+ grades were more likely to propose division-of-labor plans than the oldest children<sup>6</sup> with whom they worked,  $t(20) = 3.22, p < .004$ . Neither mothers nor oldest children in the 0-2 and 6-9 grades groups made many division-of-labor proposals; the differences between mothers and oldest children in these limited-schooling groups were not significant,  $t(11) = 0.08, p > .94$ , and  $t(13) = 0.42, p > .68$ , respectively. Thus, mothers with more schooling engaged in a more hierarchical structure of interaction with the children.

### *Suggesting What Needs to Get Done*

Although the oldest children seldom proposed who should do what, they did suggest next steps in constructing the puzzle and point out the structure of the puzzle to others. These contributions, which focused on the task to be done rather than on how to divide the work among people, were made by oldest children equally as often or more frequently than by mothers in the 0-2 grades groups; in contrast, they were more commonly made by mothers than by oldest children in the 12+ grades groups (with the 6-9 grades group intermediate; see Table 5 and analyses below).

In *proposing the next steps* for constructing the puzzle, groups involving Mayan mothers with little schooling followed a rather horizontal structure. The proportion of segments with step-plan proposals made by the oldest children and the proportion made by the mothers with 0-2 grades of schooling did not differ significantly,  $t(11) = 1.6, p = .14$ . Oldest children contributed proposals in almost two thirds (63%) as many segments as did mothers with 0-2 grades of schooling.

In contrast, in groups with mothers with 12+ grades of schooling, a more hierarchical structure was followed, with a greater proportion of step-plan proposals coming from the mothers than from the oldest children,  $t(20) = 7.2, p < .001$ . Oldest children's step-plan proposals occurred in only 20% as many segments as those contributed by mothers with 12+ grades. [The 6-9 grades

group was intermediate between the 0-2 and 12+ grades groups; the oldest children provided proposals in 48% as many segments as the mothers with 6-9 grades,  $t(13) = 3.3, p < .006$ .]<sup>7</sup>

Likewise, for *pointing out the structure* of the puzzle to others, mothers with extensive schooling made a greater proportion of these orienting statements than did older children; this was not so in groups with mothers with little or no schooling. In the 12+ grades group, oldest children contributed statements regarding the structure of the puzzle in only half as many segments as the mothers; the difference between oldest children and mothers was significant,  $t(20) = 3.71, p < .001$ . In contrast, the oldest children in the 0-2 grades group provided such statements in more than twice the number of segments than the mothers; this difference between oldest children and mothers was significant,  $t(11) = 2.23, p < .05$ . [The 6-9 grades group's balance was also in the direction of greater contributions by the children than the mothers—twice as many—but the difference was only marginally significant,  $t(13) = 1.97, p < .07$ .]<sup>8</sup>

Thus, in groups with mothers with relatively little schooling, the oldest children contributed suggestions regarding the puzzle almost as extensively or more often than did the mothers—clearly not reflecting hierarchical organization from the mothers. Mothers with extensive schooling made such suggestions much more extensively than did the oldest children, which supports the idea that with schooling, mothers play a more dominant role, thus creating a more hierarchical structure.

### Discussion

Taken together, the results support the idea that experience with Western schooling practices may shape traditional indigenous

<sup>6</sup> Oldest children's contributions were used in these analyses (although differences between older and younger children were not significant), because in all three schooling groups, the oldest child routinely took a slightly larger role than the middle or youngest child.

<sup>7</sup> More schooled mothers made more step-plan proposals, with a significant increasing linear trend from 0-2 grades to 12+ grades,  $F(1, 46) = 9.36, p < .004$ . [There was no significant departure of the trend from linearity,  $F(1, 46) = 0.31, p > .58$ , indicating a good fit.]

<sup>8</sup> More schooled mothers made more statements about the structure of the puzzle, with a significant increasing linear trend from 0-2 grades to 12+ grades,  $F(1, 46) = 16.54, p < .000$ . [There was a marginally significant departure of the trend from linearity,  $F(1, 46) = 3.97, p < .053$ .] Oldest children's extent of step-plan proposals and statements about the structure of the puzzle did not differ significantly across groups. The oldest children in each of the three groups proposed step plans and stated the structure of the puzzle slightly (but not significantly) more often than did the middle and youngest children.



Table 4  
*Proportions of Mothers and Oldest Children Proposing Division-of-Labor Plans*

Schooling group	Mothers				Oldest children			
	No proposals	Some proposals			No proposals	Some proposals		
		1-2	3-4	5-10		1-2	3-4	5-10
0-2 grades	.92	.08	.00	.00	.83	.17	.00	.00
6-9 grades	.64	.36	.00	.00	.79	.14	.07	.00
12+ grades	.14	.48	.24	.14	.81	.19	.00	.00

American horizontal collaborative engagements to resemble the relatively hierarchical structure of schooling, in which adults often attempt to manage children's roles. Consistent with characterizations of indigenous social organization (Lamphere, 1977; Paradise, 1987; Pelletier, 1970; Philips, 1983; Rogoff et al., 1993), at all three levels of maternal schooling (from 0 to more than 12 grades), groups consisting of Mayan mothers and three children usually engaged in a shared, collaborative horizontal social organization of whole-group problem solving. They fluidly constructed the same parts of the puzzle together, making suggestions and handing pieces of the puzzle to one another while closely monitoring and following each other's moves.

With greater levels of maternal experience of formal Western schooling, the groups of Mayan mothers and children less frequently used shared multiparty engagement. They more frequently used a hierarchical division of labor, working on different aspects of the puzzle (often solo or in dyads), and the mothers more often attempted to manage the children's efforts. Almost all of the most schooled mothers (86%) proposed division-of-labor plans, and 30% of them directed the children; in contrast, only 8% of the least schooled mothers suggested division-of-labor plans, and none of them directed the children in what to do.

#### *Mothers' Schooling and Other Changes in Community Practices*

It is reasonable to ask whether schooling is central to the differences observed between groups in this study, because the

extent of schooling in settings like San Pedro fits with a constellation of related social and cultural changes. Developmental changes occur not only in individuals but also in the communities and institutions in which the individuals participate. In this section, we consider several other aspects of the families' backgrounds that vary along with the mothers' extent of schooling, in integrated constellations of related features of community life. Extent of schooling holds a central (though not a unique) role in changing practices of social organization of adult-child interactions (Crago et al., 1993; Laosa, 1980, 1982; LeVine et al., 1991; Rogoff et al., 1993).

An illustration of the need for considering changes holistically has to do with the children's own level of schooling, which was similar in the three groups owing to the increasing universality of schooling in San Pedro. Holding a single feature like this one constant is often seen as grounds for not considering it to be responsible for observed differences. However, the similarity of the children's schooling could contribute to the differences in how the mothers organized their engagements with the children, because the children's extent of schooling differed *relative* to the mothers' schooling. The children's schooling was greater than that of the mothers with 0-2 grades of schooling, it was comparable to that of the mothers with 6-9 grades of schooling, and it was less than that of the mothers with 12 or more grades of schooling. The constant level of children's schooling does not necessarily contribute similarly in the three groups; the children who had more schooling relative to the mothers may have played more of a leadership role.

Table 5  
*Mean Proportions of Segments (and Standard Deviations) in Which Mothers and Oldest Children Made Step-Plan Proposals and Stated Puzzle Structure, and the Percentages of These Contributions Made by the Oldest Children*

Schooling group	Step-plan proposals	Ratio of proposals by children to proposals by mothers (%)	Stating structure of puzzle	Ratio of statements by children to statements by mothers (%)
0-2 grades				
Mother	.19 (.11)		.08 (.09)	
Oldest child		63	.20 (.18)	250
6-9 grades				
Mother	.33 (.21)		.10 (.09)	
Oldest child	.16 (.19)	48	.21 (.14)	210
12+ grades				
Mother	.41 (.23)		.26 (.14)	
Oldest child	.08 (.07)	20	.13 (.11)	50



Many cultural changes taking place in this community could have developed along with increasing school attendance, and some of them might relate to the social organization of problem solving, along with greater experience with schooling (see also LeVine et al., 1991; Tapia Uribe et al., 1994). For example, Spanish was reported to be the predominant language of communication used at home by the more schooled parents and their children, whereas the families with less schooling reported relying primarily on the Mayan language. Fluency in Spanish, the language valued in schools as well as by the dominant society, may have encouraged the more schooled families to organize their everyday interactions in ways that resemble the formats of schooling.

Other community changes that may relate to the differences between the schooling groups are parental contact with city life and occupations that have prerequisites that can be fulfilled primarily in schools (with attendant financial advantages). The mothers with the most schooling and their spouses spent several years in cities to acquire professional credentials and jobs, whereas the less schooled mothers and their spouses spent most of their lives in San Pedro. The differences in exposure to urban life and to nonagricultural occupations with schooling prerequisites may also have encouraged parents to use school practices with their children.

A further cultural feature differing between the schooling groups—family size—could also have contributed to the patterns of engagement between mothers and children. The mothers with little schooling had more children per family than the mothers with greater schooling; their greater prevalence of shared multiparty engagements could relate to the need to coordinate with more people in the home. However, in San Pedro, multiparty group interaction is common for families of different schooling backgrounds.

We believe that a constellation of such related cultural practices, inherently involved in the generational changes of schooling in San Pedro, contributes to explaining differences in how mothers organized their interactions with children. Mothers' schooling experience is likely to be a particularly significant contributor to such differences. The extent of socialization to school ways of talking and acting during 12 or more years of schooling seems likely to be incorporated into how mothers subsequently organized their interactions with children.

Other research also supports our emphasis on the role of schooling in cultural change in the social organization of adult-child interaction in Native American, Latino, and other communities (Crago et al., 1993; Delgado-Gaitan, 1994; LeVine et al., 1991; Richman, Miller, & LeVine, 1992; Rogoff et al., 1993; Wertsch, Minick, & Arns, 1984; Zukow, 1984). In particular, the social organization of groups involving Mayan mothers with 12 or more grades of schooling in this study is similar to mother-child interactions observed in research involving Anglo-American and Mexican-descent mothers with comparable schooling backgrounds (Laosa, 1980, 1982; Richman et al., 1992).

However, we do not think that the social organization of groups including Mayan mothers with 12 or more grades of schooling would be just the same as that of European American middle-class groups with similar amounts of maternal schooling. On the basis of related research (Chavajay & Rogoff, 1999; Rogoff et al., 1993), we speculate that Mayan mothers with high levels of schooling would engage more often in shared multiparty engagements with

their children than would U.S. middle-class mothers with their children. Indeed, in this study, this was the most common approach among San Pedro mothers at all maternal schooling levels.

We also expect that European American middle-class groups may spend more time off task than the groups in this Mayan community (where being off task surprisingly almost never occurred). This would be consistent with differences in attention to ongoing events observed by Chavajay and Rogoff (1999) and by Rogoff and colleagues (1993) and consistent with Zinacantecan Mayan novice weavers, who almost never showed inattentiveness as they observed more experienced weavers (Childs & Greenfield, 1980). Similarly, Ellis and Gauvain (1992) observed that whereas triads of Navajo children attended to a game even when they were not controlling the game moves, European American children were distracted when they were not controlling the game, sometimes to the point of leaving the task.

Across generations, Western practices learned in schools may modify, replace, or become integrated into indigenous family practices. Indigenous people around the world have learned to navigate between differing settings according to the formal and informal modes of learning emphasized in each setting. The revision process may be quick for some school practices (such as use of lessons) and take several generations for other school practices (such as patterns of time-sharing attention, as suggested by the findings of Rogoff et al., 1993; see also Chavajay & Rogoff, 1999). Research on social organization in other indigenous communities in which traditional Western schooling varies in prevalence would provide a window to further understand how Western schools change indigenous cultural practices.

### *Integrating Community and School Practices*

Ongoing discussions consider how to facilitate the school performance of children from cultural communities whose practices contrast with those of the schools (e.g., Trumbull, Rothstein-Fisch, Greenfield, & Quiroz, 2001; Valdés, 1996). Indigenous children's lower school performance may relate to discontinuities between home and school practices (Au & Kawakami, 1991; Erickson & Mohatt, 1982; Philips, 1983; Tharp, 1989), whereas the successful school performance of European American middle-class children may relate to the similarity between family and school practices (Beals & Tabors, 1995; Greenfield, Quiroz, & Raeff, 2000; Heath, 1983; Macias, 1987).

We propose that indigenous children's school learning may be enhanced by use of familiar interactional formats alongside the formats typically used in schooling and, in addition, that school use of indigenous social organization may enrich the repertoires of both indigenous and mainstream students. Children of all cultural backgrounds may benefit from learning to participate in horizontal, shared multiparty organization and to assume greater responsibility for their own and others' learning instead of relying so heavily on teachers' control. Multiparty engagement is an important condition in the U.S. workplace, where groups of people learn to coordinate with each other's efforts in accomplishing common goals. We assume that fluency in several cultural systems is a strength, rather than assuming that one or the other must prevail (see also Chavajay & Rogoff, 1999; Delgado-Gaitan, 1994; Rogoff, in press; Rogoff et al., 1993).

In the United States, some schools have incorporated ways of organizing learning that are somewhat compatible with the fluid, horizontal structure of indigenous families, with children having greater responsibility for their own and others' learning and assuming a more collaborative role rather than a directed role with their teachers (e.g., Brown & Campione, 1990; Dewey, 1915; Larson, 1997; Lipka, 1990, 1991; Moll, Tapia, & Whitmore, 1993; Rogoff, 1994; Rogoff, Goodman Turkakis, & Bartlett, 2001; Rothstein-Fisch, Greenfield, & Trumbull, 1999; Sharp & Gallimore, 1988). In addition, it has been observed in Japanese elementary school classrooms that children and teachers engage in multiparty interactions, with shared responsibility for developing ideas (Cook, 1999; Hatano, 1994; Rogoff & Toma, 1997). Ongoing efforts to develop the cultural institution of schooling seem promising for building on the diverse ways of organizing learning in children's varying communities.

In sum, the findings of this study indicate that groups involving traditional indigenous Mayan mothers with little formal Western schooling organized their interactions in a horizontal, shared multiparty structure, whereas groups with Mayan mothers with extensive experience in school organized their interactions in a format more similar to school practices, with a hierarchical division of labor. Our study calls attention to varying cultural resources for learning that occur in the social organization of group problem solving; awareness of these variations may be helpful to researchers, educators, and policymakers who are interested in improving the quality of schools, especially for indigenous children for whom familiarity of structure may be an issue, but also for other children, who can benefit from fluency with social organization built on collaborative and mutual engagement.

### References

- Akinnaso, F. N. (1992). Schooling, language, and knowledge in literate and nonliterate societies. *Comparative Studies in Society & History*, 34, 68-109.
- Au, K. H., & Kawakami, A. J. (1991). Culture and ownership: Schooling of minority students. *Childhood Education*, 67, 280-284.
- Barnhardt, C. (1981). Tuning-in: Athabaskan teachers and Athabaskan students. In G. Spindler (Ed.), *Doing the ethnography of schooling: Educational anthropology in action* (pp. 132-174). New York: Holt, Rinehart & Winston.
- Beals, D. E., & Tabors, P. O. (1995). Arboretum, bureaucratic and carbohydrates: Preschoolers' exposure to rare vocabulary at home. *First Language*, 15, 57-76.
- Briggs, J. L. (1970). *Never in anger: Portrait of an Eskimo family*. Cambridge, MA: Harvard University Press.
- Brown, A. L., & Campione, J. C. (1990). Communities of learning and thinking, or a context by any other name. In D. Kuhn (Ed.), *Contributions in Human Development: Vol 21. Developmental perspectives on teaching and learning thinking skills* (pp. 108-126). Basel, Switzerland: Karger.
- Cancian, F. M. (1964). Interaction patterns in Zinacanteco families. *American Sociological Review*, 29, 540-550.
- Cazden, C. B. (1988). *Classroom discourse: The language of teaching and learning*. Portsmouth, NH: Heinemann.
- Cazden, C. B., & John, V. P. (1971). Learning in American Indian children. In M. L. Wax, S. Diamond, & F. O. Gearing (Eds.), *Anthropological perspectives on education* (pp. 252-272). New York: Basic Books.
- Chavajay, P., & Rogoff, B. (1999). Cultural variation in management of attention by children and their caregivers. *Developmental Psychology*, 35, 1-12.
- Childs, C. P., & Greenfield, P. M. (1980). Informal modes of learning and teaching: The case of Zinacanteco weaving. In N. Warren (Ed.), *Studies in cross-cultural psychology* (Vol. 2, pp. 269-316). London: Academic Press.
- Chisholm, J. S. (1983). *Navajo infancy: An ethological study of child development*. New York: Aldine.
- Collier, J., Jr. (1973). *Alaskan Eskimo education: A film analysis of cultural confrontation in the schools*. New York: Holt, Rinehart & Winston.
- Cook, H. M. (1999). Language socialization in Japanese elementary schools: Attentive listening and reaction turns. *Journal of Pragmatics*, 31, 1443-1465.
- Crago, M. B., Annahatak, B., & Ningiuruvik, L. (1993). Changing patterns of language socialization in Inuit homes. *Anthropology and Education Quarterly*, 24, 205-223.
- Delgado-Gaitan, C. (1987). Traditions and transitions in the learning process of Mexican children: An ethnographic view. In G. Spindler & L. Spindler (Eds.), *Interpretive ethnography of education: At home and abroad* (pp. 333-359). Hillsdale, NJ: Erlbaum.
- Delgado-Gaitan, C. (1994). Socializing young children in Mexican-American families: An intergenerational perspective. In P. Greenfield & R. Cocking (Eds.), *Cross-cultural roots of minority child development* (pp. 55-86). Hillsdale, NJ: Erlbaum.
- Dewey, J. (1915). *Democracy and education*. New York: Macmillan.
- Dumont, R. V., & Wax, M. L. (1969). Cherokee school society and the intercultural classroom. *Human Organization*, 28, 217-226.
- Eggan, D. (1956). Instruction and affect in Hopi cultural continuity. *Southwestern Journal of Anthropology*, 12, 347-370.
- Ellis, S., & Gauvain, M. (1992). Social and cultural influences on children's collaborative interactions. In L. T. Winegar & J. Valsiner (Eds.), *Children's development within social context* (pp. 155-180). Hillsdale, NJ: Erlbaum.
- Erickson, F., & Mohatt, G. (1982). Cultural organization of participation structures in two classrooms of Indian students. In G. Spindler (Ed.), *Doing the ethnography of schooling* (pp. 132-174). New York: Holt, Rinehart & Winston.
- Gaskins, S. (1999). Children's daily lives in a Mayan village: A case study of culturally constructed roles and activities. In A. Göncü (Ed.), *Children's engagement in the world* (pp. 25-61). Cambridge, England: Cambridge University Press.
- Greenbaum, P., & Greenbaum, S. (1983). Cultural differences, nonverbal regulation, and classroom interaction: Sociolinguistic interface in American Indian education. *Peabody Journal of Education*, 61, 16-33.
- Greenfield, P. M. (1984). A theory of the teacher in the learning activities of everyday life. In B. Rogoff & J. Lave (Eds.), *Everyday cognition: Its development in social context* (pp. 117-138). Cambridge, MA: Harvard University Press.
- Greenfield, P. M., Quiroz, B., & Raeff, C. (2000). Cross-cultural conflict and harmony in the social construction of the child. In S. Harkness, C. Raeff, & C. M. Super (Eds.), *Variability in the social construction of the child* (pp. 93-108). San Francisco: Jossey-Bass.
- Hatano, G. (1994). Introduction: Conceptual change—Japanese perspectives. *Human Development*, 37, 189-197.
- Heath, S. B. (1983). *Ways with words: Language, life, and work in communities and classrooms*. New York: Cambridge University Press.
- Heath, S. B. (1989). The learner as a cultural member. In M. L. Rice & R. L. Schiefelbusch (Eds.), *The teachability of language* (pp. 333-350). Baltimore: Brookes.
- Kaulback, B. (1984). Styles of learning among Native children: A review of the research. *The Canadian Journal of Native Studies*, 11, 27-37.
- Kramer, B. J. (1991). Education and American Indians: The experience of the Ute Indian tribe. In M. Gibson & J. Ogbu (Eds.), *Minority status and schooling: A comparative study of immigrant and involuntary minorities* (pp. 287-307). New York: Garland.

- Lamphere, L. (1977). *To run after them: Cultural and social bases of cooperation in Navajo community*. Tucson: University of Arizona Press.
- Laosa, L. M. (1980). Maternal teaching strategies in Chicano and Anglo-American families: The influence of culture and education on maternal behavior. *Child Development*, 51, 759-765.
- Laosa, L. M. (1982). School, occupation, culture and the family: The impact of parental schooling on the parent-child relationship. *Journal of Educational Psychology*, 74, 791-827.
- Larson, J. (1997). Indexing instruction: The social construction of the participation framework in kindergarten journal-writing activity. *Discourse & Society*, 8, 501-521.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.
- LeVine, R. A., LeVine, S. E., Richman, A., Tapia Uribe, F. M., Correa, C. S., & Miller, P. M. (1991). Women's schooling and child care in the demographic transition: A Mexican study. *Population and Development Review*, 17, 459-496.
- Lipka, J. (1990). Integrating cultural form and content in one Yup'ik Eskimo classroom: A case study. *Canadian Journal of Native Education*, 17, 18-32.
- Lipka, J. (1991). Toward a culturally based pedagogy: A case study of one Yup'ik Eskimo teacher. *Anthropology and Education Quarterly*, 22, 203-223.
- Lipka, J. (1994). Schools failing minority teachers. *Educational Foundations*, 8, 57-80.
- Macias, J. (1987). The hidden curriculum of Papago teachers: American Indian strategies for mitigating cultural discontinuity in early schooling. In G. Spindler & L. Spindler (Eds.), *Interpretive ethnography of education: At home and abroad* (pp. 363-380). Hillsdale, NJ: Erlbaum.
- McCullum, P. (1989). Turn-allocation in lessons with North American and Puerto Rican students. A comparative study. *Anthropology and Education Quarterly*, 20, 133-156.
- Medicine, B. (1985). Child socialization among Native Americans: The Lakota (Sioux) in cultural context. *Wicazo Sa Review*, 1, 23-28.
- Mehan, H. (1979). *Learning lessons: Social organization in the classroom*. Cambridge, MA: Harvard University Press.
- Michaels, S. (1981). "Sharing time": Children's narrative style and differential access to literacy. *Language in Society*, 10, 423-442.
- Moll, L. C., Tapia, J., & Whitmore, K. F. (1993). Living knowledge: The social distribution of cultural resources of thinking. In G. Salomon (Ed.), *Distributed cognition* (pp. 139-163). Cambridge, England: Cambridge University Press.
- Mosier, C., & Rogoff, B. (2000). *Privileged treatment of toddlers: Cultural aspects of autonomy and responsibility*. Manuscript submitted for publication.
- Núñez, G., Ajú, C., Xocop, G., & Chavajay, P. (1990). *Patrones de crianza del niño Maya guatemalteco (area Kaqchiquel)* [Patterns of socialization of Guatemalan Mayan children]. Guatemala City, Guatemala: Universidad Rafael Landívar, Programa de Desarrollo Integral de la Población Maya-PRODIPMA.
- Ochs, E. (1988). *Culture and language development: Language acquisition and language socialization in a Samoan village*. Cambridge, England: Cambridge University Press.
- Paradise, R. (1987). *Learning through social interaction: The experience and development of Mazahua self in the context of the market*. Unpublished doctoral dissertation, University of Pennsylvania.
- Paradise, R. (1991). El conocimiento en el aula: Niños indígenas y su orientación hacia la observación [Cultural knowledge in the classroom: Indigenous children and their orientation towards observation]. *Infancia y Aprendizaje*, 55, 73-85.
- Pelletier, W. (1970). Childhood in an Indian village. In S. Repo (Ed.), *This book is about schools* (pp. 18-31). New York: Pantheon Books.
- Philips, S. (1972). Participant structures and communicative competence: Warm Springs children in community and classroom. In C. Cazden, V. John, & D. Hymes (Eds.), *Functions of language in the classroom* (pp. 370-394). New York: Teacher College Press.
- Philips, S. (1983). *The invisible culture: Communication in classroom and community on the Warm Springs Indian reservation*. New York: Longman.
- Richman, A. L., Miller, P. M., & LeVine, R. A. (1992). Cultural and educational variations in maternal responsiveness. *Developmental Psychology*, 28, 614-621.
- Rogoff, B. (1990). *Apprenticeship in thinking*. New York: Oxford University Press.
- Rogoff, B. (1994). Developing understanding of the idea of community of learners. *Mind, Culture, & Activity*, 1, 209-229.
- Rogoff, B. (1998). Cognition as a collaborative process. In W. Damon (Series Ed.) & D. Kuhn & R. S. Siegler (Vol. Eds.), *Handbook of child psychology: Cognition, perception, and language* (Vol. 2, pp. 679-744). New York: Wiley.
- Rogoff, B. (in press). *The cultural nature of human development*. New York: Oxford University Press.
- Rogoff, B., Goodman Turkkanis, C., & Bartlett, L. (2001). *Learning together: Children and adults in a school community*. New York: Oxford University Press.
- Rogoff, B., Mistry, J., Göncü, A., & Mosier, C. (1993). Guided participation in cultural activity by toddlers and caregivers. *Monographs of the Society for Research in Child Development*, 58(7, Serial No. 236).
- Rogoff, B., & Toma, C. (1997). Shared thinking: Community and institutional variations. *Discourse Processes*, 23, 471-497.
- Rothstein-Fisch, C., Greenfield, P. M., & Trumbull, E. (1999). Bridging cultures with classroom strategies. *Educational Leadership*, 56, 64-67.
- Scribner, S., & Cole, M. (1973, November 9). Cognitive consequences of formal and informal education. *Science*, 182, 553-559.
- Sindell, P. S. (1997). Some discontinuities in the enculturation of Mistassini Cree children. In G. D. Spindler (Ed.), *Education and cultural process: Anthropological approaches* (pp. 383-392). Prospect Heights, IL: Waveland Press.
- Suina, J. H., & Smolkin, L. B. (1991, July). *From natal culture to school culture to dominant society culture: Supporting transitions for Pueblo Indian students*. Paper presented at the Continuities and Discontinuities in the Cognitive Socialization of Minority Children workshop, Washington, DC.
- Tapia Uribe, F. M., LeVine, R. A., & LeVine, S. E. (1994). Maternal behavior in a Mexican community: The changing environments of children. In P. Greenfield & R. Cocking (Eds.), *Cross-cultural roots of minority child development* (pp. 41-54). Hillsdale, NJ: Erlbaum.
- Tharp, R. G. (1989). Psychocultural variables and constants: Effects of teaching and learning in schools. *American Psychologist*, 44, 349-359.
- Tharp, R. G. (1994). Intergroup differences among Native Americans in socialization and child cognition: An ethnogenetic analysis. In P. Greenfield & R. Cocking (Eds.), *Cross-cultural roots of minority child development* (pp. 87-105). Hillsdale, NJ: Erlbaum.
- Tharp, R. G., & Gallimore, R. (1988). *Rousing minds to life: Teaching, learning, and schooling in social context*. Cambridge, England: Cambridge University Press.
- Trumbull, E., Rothstein-Fisch, C., Greenfield, P. M., & Quiroz, B. (2001). *Bridging cultures between home and school: A guide for teachers*. Mahwah, NJ: Erlbaum.
- Valdés, G. (1996). *Con respeto: Bridging the distances between culturally diverse families and schools. An ethnographic portrait*. New York: Teachers College Press.
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, England: Cambridge University Press.
- Wertsch, J. V., Minick, N., & Arns, F. J. (1984). The creation of context in joint problem-solving. In B. Rogoff & J. Lave (Eds.), *Everyday cognition: Its development in social context* (pp. 151-171). Cambridge, MA: Harvard University Press.

- Williams, T. R. (1958). The structure of the socialization process in Papago Indian society. *Social Forces*, 36, 251-256.
- Wolcott, H. F. (1997). Why have minority groups in North America been disadvantaged by their schools? In G. D. Spindler (Ed.), *Education and cultural process: Anthropological approaches* (pp. 96-109). Prospect Heights, IL: Waveland Press.
- Zukow, P. G. (1984). Folk theories of comprehension and caregiver practices in a rural-born population in Central Mexico. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 6, 62-67.

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