

Cultural Variation in Children's Social Organization

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This article examines how 31 triads of 6- to 10-year-old children from 3 cultural backgrounds organized their interactions while folding Origami figures. Triads of children whose families had immigrated to the United States from indigenous heritage regions of México (and whose mothers averaged only 7 grades of schooling) coordinated more often as an ensemble, whereas triads of European heritage U.S. children whose mothers had extensive schooling more often engaged dyadically or individually. When the European heritage children did engage as an ensemble, this often involved chatting rather than nonverbal conversation regarding folding, which was more common among the Mexican heritage children. Mexican heritage U.S. triads whose mothers had extensive schooling showed an intermediate pattern or resembled the European heritage children.

This study examined the extent to which triads of U.S. children of Mexican and European heritage engaged in coordinated ensembles, in dyads, or individually as they folded Origami paper figures. The central analysis compared the social organization used by European heritage middle-class children and by Mexican heritage children whose families were likely to be familiar with traditional indigenous Mexican practices. The study also explored the social organization used by children of a third cultural background: Mexican heritage children whose families we speculated were likely to have less connection with traditional Mexican indigenous practices due to mothers' extensive experience in Western schooling and related practices. Two further analyses supplemented our findings of cultural differences in the triads' engagement as coordinated ensembles:

One examined whether the children's coordination as an ensemble involved nonverbal conversation or talk or a combination. The second supplementary analysis examined whether the children's form of social organization related to attending simultaneously to ongoing events.

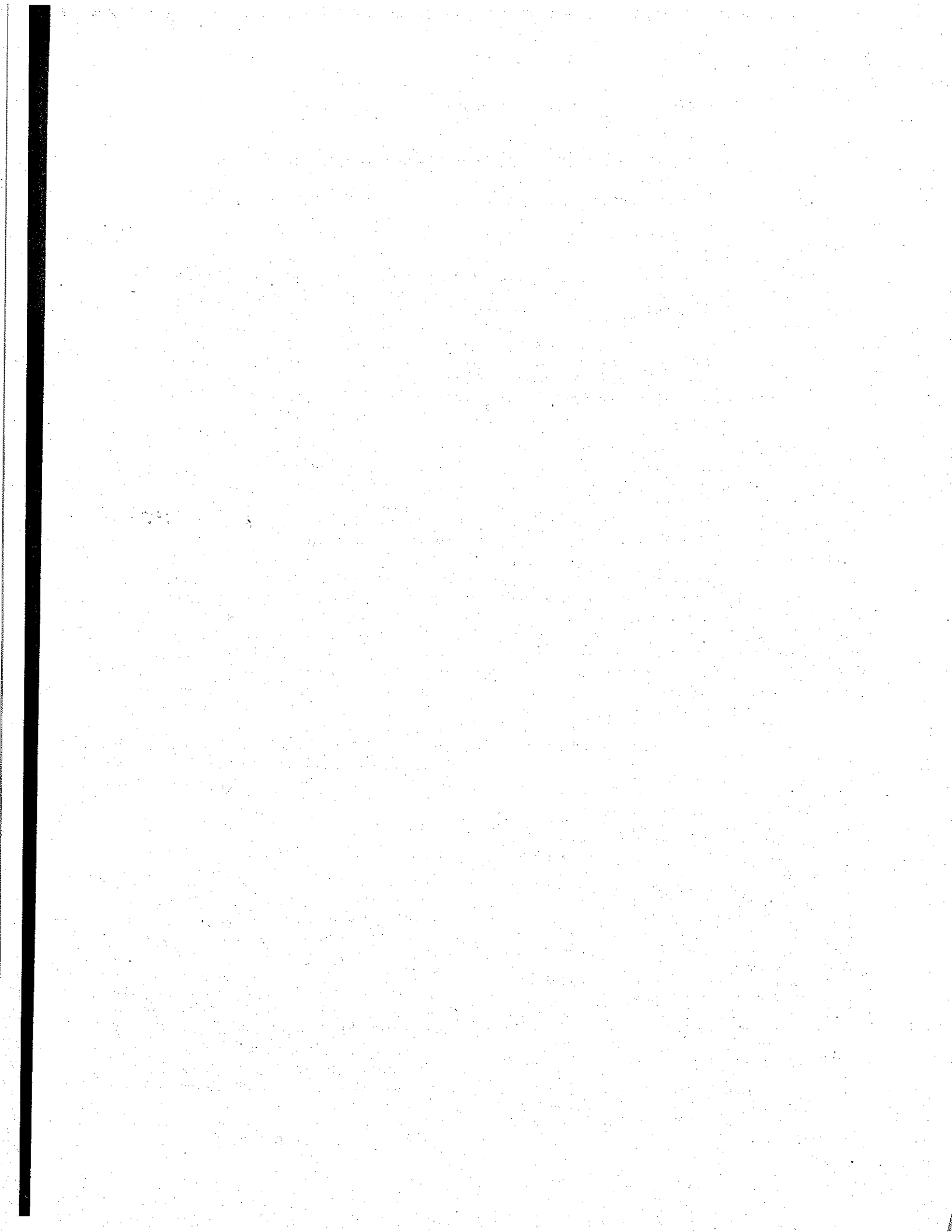
Because research has focused heavily on dyads, there is not much information on how children structure their engagements in larger groups. Studies on collaboration, whether conducted in the classroom or in research settings, often involve the researcher or a teacher managing the social organization, often by pairing participants or providing specific instructions regarding how to engage together. Our study provided the conditions for children to engage in triads, and examined cultural variation in how U.S. children of distinct backgrounds organize their collaborations—a topic that has importance for how groups may work together in schools and many other circumstances.

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Cultural Variation in Coordination in Groups

There are some indications that in middle-class European American communities, dyadic engagements may be common even in the presence of larger groups (Rogoff, Mistry, Göncü, & Mosier, 1993). In contrast, people from some indigenous heritage communities—especially those of the Americas—may often coordinate in larger groups (Chavajay & Rogoff, 2002; Lipka, 1991; Martini, 1996; Rogoff, 2003; Tharp, 1994). For example, middle-class U.S. mothers and children commonly used a dyadic prototype for interaction, in which group interactions were treated as a composite of multiple dyads, whereas



multiway intertwining of the contributions of several participants was often observed among Guatemalan Mayan mothers and toddlers as they coordinated with each other and with several other people in shared or overlapping activities (Rogoff et al., 1993).

Ethnographic studies suggest that group collaborative engagements may be common in indigenous heritage Mexican communities (Delgado-Gaitán, 1987; Gaskins, 1999; Romney & Romney, 1963). For example, children and adults in a Mazahua community in México often interacted with complementary roles, tacit collaboration, and simultaneous engagement among several participants (de Haan, 2001; Paradise, 1994, 1996). Collaborative engagements appear to be one important feature (along with others such as keen attention to ongoing events) of a tradition for organizing learning in indigenous heritage communities of Central and North America, which Rogoff and colleagues refer to as *intent community participation* (Rogoff, Paradise, Mejía Arauz, Correa-Chávez, & Angelillo, 2003; Rogoff, et al., 2007).

In the central analysis of the present study, we compared the extent of engagement in coordinated ensembles, in dyads, or individually by triads of U.S. Mexican heritage and middle-class European heritage children. These backgrounds were selected because they closely resemble the communities that have yielded the implicit contrasts discussed in ethnographic research.

The European heritage middle-class children were from families that had extensive involvement in Western schooling and related experiences, usually over several generations. The Mexican heritage children were from families that had for the most part immigrated recently from rural regions of México (primarily Michoacán and Jalisco) that have indigenous histories and limited contact with Western schooling and related experiences. Although parents in these rural regions are not likely to identify as "indigenous" owing to the often stigmatized position this carries in Mexican society, our identification of these communities, as well as children in our sample, as having indigenous origins and limited history of Western schooling is based on historical information as well as interviews in a formerly indigenous community in Jalisco. The interviews indicated that the parent generation generally has engaged only in basic schooling, previous generations had little or no schooling, and most families still engage in some practices with indigenous origins (Najafi, Mejía Arauz, & Rogoff, in preparation; see also Reese, 2002).

As an exploratory analysis, we also included children of Mexican heritage whose families have had extensive experience with Western schooling (and other related experiences). These children are likely to have less connection with ways of engagement traditional in communities with indigenous Mexican history than the children whose families have had little involvement in the form of organization used in schools.

Maternal Schooling and Social Organization

In many schools, children's participation is commonly organized in dyadic teacher-class engagements, with the teacher taking a turn between each student turn (McCollum, 1989; Mehan, 1979; Tharp & Gallimore, 1988; Wells, 1999; Wertsch, 1991). Although children are usually asked to perform alone, children of some Mexican indigenous heritage communities prefer to engage in classroom activities with other children instead of individually (Delgado-Gaitán & Trueba, 1985).

When children in turn become parents, their interaction with their children may reflect the practices of schooling that they have experienced (Laosa, 1980, 1981; LeVine et al., 1991; Mejía Arauz, Rogoff, & Paradise, 2005; Moreno & Valencia, 2002; Richman, Miller, & LeVine, 1992; Rogoff et al., 1993). For example, Guatemalan Mayan mothers with little experience with Western schooling organized their interactions with their children in more collaborative multiparty engagements than Mayan mothers with extensive schooling, who more often divided the group into dyads or individual participants, in a manner resembling the organization of schooling (Chavajay & Rogoff, 2002). Studies of U.S. maternal teaching styles have found that Chicana mothers tended to use more modeling to teach their children, compared with Anglo-American mothers, who tended to use more questions and praise, but the differences were minimized when maternal schooling was held constant (Laosa, 1978, 1980, 1982; Steward & Steward, 1973, 1974; see also Moreno, 2000). The ways in which mothers interact with their children may influence children's approaches to interaction in other situations; across generations, experience with the social organization of schooling, and related practices, may increasingly compete with indigenous communities' ways of organizing in groups.

Our focus on schooling is not meant to suggest that this institution operates alone in a mechanistic causal fashion, but to suggest that participation in this institution is one important aspect of a

constellation of related cultural practices that contribute to children's repertoires of familiar forms of social organization (Rogoff & Angelillo, 2002). In communities where schooling becomes pervasive, this change is often part of a constellation of related practices such as bureaucratic occupations, reduced involvement with extended kin and smaller family size, increased age segregation, and limited child care and economic contributions by children (Rogoff, Correa-Chávez, & Navichoc Cotuc, 2005). We examine differences in schooling as a marker of this whole constellation of practices, speculating that schooling provides key experience with a distinct form of social organization, but it does not act on its own.

Predictions of the Present Study

We expected that middle-class European heritage triads (of children whose mothers had completed high school, "EurHerit MoSchool") would engage relatively less in coordinated ensembles involving all three children, and more often in dyadic and/or solo interactions. The mothers of all available European heritage children had completed high school, as is widely the case for European American families for several generations (Bronfenbrenner, McClelland, Wethington, Moen, & Ceci, 1996).

Two U.S. Mexican heritage backgrounds were included, both from regions of México with indigenous historical roots, mainly rural Michoacán and Jalisco. One of the Mexican heritage backgrounds ("MexHerit Pueblo") consisted largely of children of immigrants whose connection with indigenous historical practices we assumed to be relatively strong. In such communities in México, Western schooling has been relatively unavailable and has not been a prominent part of life over generations (Najafi et al., 2007; Reese, 2002). In keeping with this pattern, the mothers of this background averaged 6.7 grades, mostly in México. We expected that children from these families would often coordinate in ensembles including the whole group—an approach often reported in the ethnographic literature in indigenous communities of México.

The other Mexican heritage children had mothers with extensive schooling—12 or more grades, often completed in the United States ("MexHerit MoSchool"). This background is likely to involve less contact with indigenous historical practices and more contact with many practices associated with schooling, a European- and U.S.-origin institution (Najafi et al., in preparation). We thought that the interactions of these children might be intermediate

between the other two backgrounds, due to being less rooted in traditional indigenous approaches than the MexHerit Pueblo children, and more rooted in indigenous Mexican approaches than EurHerit School children.

There was no principled reason to include European heritage children whose mothers have little schooling in this study. There is no evidence suggesting that their ways of engaging with their children would resemble the multiparty approaches that have been observed in indigenous groups of North and Central America, which is the central motivation for our study. However, a study of European heritage families from communities with little involvement in schooling (e.g., from Appalachia) would be of interest in future research, on an exploratory basis to see what forms of social organization might prevail in the rare European American communities where schooling has not been prominent over several generations.

Two supplementary analyses. After the central analysis focusing on social organization, the article presents two supplementary analyses of the children's engagement in ensembles. The first examines whether the coordination of all three children in ensembles occurred primarily through chat, nonverbal conversation regarding folding, or a combination. This question was suggested by our impression, from early looks at the data, that the shared engagement of the ensembles of Mexican heritage pueblo children seemed often to be based on nonverbal conversation regarding the folding, without much talk, whereas the shared engagement among the ensembles of European heritage children whose mothers had extensive schooling seemed often to involve chat. By *nonverbal conversation* we mean extended exchange of information through nonverbal reference to ongoing events as well as through gestures and other conventionalized nonverbal means.

Differences in nonverbal conversation would be consistent with research findings that nonverbal communication may be more emphasized in some communities of indigenous origin than in middle-class European American communities (Cazden & John, 1971; Lipka, 1991; Rogoff et al., 1993). For example, Navajo 9-year-olds effectively taught a younger child how to play a game through nonverbal and verbal instruction accompanied by informative nonverbal action, whereas half of the instruction given by European American 9-year-olds was solely verbal (Ellis & Gauvain, 1992). Likewise, for Warm Springs Indians, verbal and nonverbal modes of communication were used to fulfill different

functions and provide distinct channels to communicate (Philips, 1983). Hence our first supplementary analysis examines whether the MexHerit Pueblo triads would be especially likely to use nonverbal conversation for their engagement in ensembles.

The second supplementary analysis examines whether the children's coordination as ensembles was associated with attending simultaneously to several ongoing events, a practice that has been found to differ in these populations. In a prior study using the same videotapes, Correa-Chávez, Rogoff, and Mejía Arauz (2005) found the greatest use of simultaneous attention among Mexican heritage pueblo children. Similarly, Mayan mothers and toddlers attended simultaneously to ongoing events more than European American middle-class mothers and toddlers, who more often alternated their attention between competing events with interruption of attention to one activity when attending to another (Chavajay & Rogoff, 1999; Rogoff et al., 1993). Simultaneous attention may be related to cultural emphasis on learning through observation and collaboration in ensembles, in *intent community participation* (Rogoff et al., 2003, 2007). Hence, in the second supplementary analysis, we examined the relation between simultaneous attention and engagement as a coordinated ensemble, especially among the Mexican heritage pueblo children.

Method

The research used videotapes collected by Mejía Arauz et al. (2005; and also used by Correa-Chávez et al., 2005). These prior studies examined individual children's observation and attention. Our study addresses a distinct question regarding the triad as a unit, to study children's organization in ensembles, dyads, or not engaged together.

Participants

The participants were 93 children between ages 6 and 10 years, in 31 triads of same-gender children from adjoining grades (first and second or second and third) from two similar public schools. Triads were composed of children of the same cultural background: 10 triads of U.S. European heritage children (mothers had extensive schooling—12 or more grades, $M = 15.0$ grades, $SD = 2.1$), 10 triads of U.S. Mexican heritage pueblo children (mothers had basic schooling—11 or fewer grades, $M = 6.7$ grades, $SD = 3.0$), and 11 triads of U.S. Mexican heritage children whose mothers had extensive schooling (12 or more grades, $M = 12.8$ grades, $SD = 1.5$). Almost all of the children were born in the United States (see Table 1). Mexican heritage was determined by consulting each child's school record; the highest grade of maternal schooling was reported by the parents. Permission for their children to participate was given by 66% of the parents approached.

Procedure

The children folded two unfamiliar Origami figures: a simple pig and then a challenging jumping frog. The session occurred in a spare school room arranged casually, with colorful posters, cushions, and decorations. The children sat at a rectangular table with the "Origami Lady" on one side, one child opposite her, and the other two at the end of the table (see Figure 1).

The Origami Lady who showed the children how to fold the figures was a first-grade bilingual teacher in one of the schools. (Children in her class did not participate.) Of European American background, she was selected for her skill with children and because she participates warmly in family events of students

Table 1
Maternal Schooling, Birthplace, Gender of Triads, Ages of Children, and Number of Siblings

| | European heritage with maternal extensive schooling | Mexican heritage pueblo | Mexican heritage with maternal extensive schooling |
|---|---|---|--|
| Average maternal schooling (and range) | 15.0 grades (12–19) | 6.7 grades (0–10) | 12.8 grades (12–17) |
| Children's birthplace | All born in United States | 5 (of 30) reported as born in México | 2 (of 33) reported as born in México |
| Gender of triads | 6-girl, 4-boy triads | 5-girl, 5-boy triads | 7-girl, 4-boy triads |
| Average age (and age range) | 8 years 0 months (6 year 5 month–9 year 5 month) | 7 years 11 months (6 year 5 month–9 year 8 month) | 8 years 1 month (6 year 6 month–10 year 0 month) |
| Average number of siblings of triad members (and range) | 1.3 (0–3) | 2.0 (0–4) | 1.5 (0–3) |



Figure 1. A triad folds Origami figures as a coordinated ensemble; the Origami Lady is seated to the right, facing the children, just off camera.

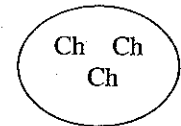
of both Mexican and European heritage. Her demonstration used either or both languages in accord with what the children used on the way to the session, accompanied by the bilingual Mexican researcher who also operated the camera. (All EurHerit MoSchool triads conversed in English. Of the MexHerit Pueblo triads, 2 conversed in English, 3 all or mostly in Spanish, and 5 in both languages. Of the MexHerit MoSchool triads, 9 spoke English during the session and the other 2 spoke both languages).

Each session started with a playful, casual warm-up of 3–4 min, to allow the children to get comfortable and interact with each other casually. The Origami Lady's script specified her pace, wording, how explicit her instructions should be, and her style of interaction, and included several occasions on which she encouraged the children to help each other and engage together. Two 1-min breaks, where the Origami Lady excused herself from the group during the folding, were also included to encourage the children to engage with and help each other. A procedural check verified that the Origami Lady followed the script, providing similar conditions for all the triads (see Mejía Arauz et al., 2005). When the children finished, in an average of 13.5 min for each background, they took their figures back to their classrooms.

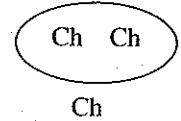
Coding Social Organization

Coding used 20-s segments in which the children focused mainly on each other and not heavily on the Origami Lady: the warm-up period and break during the folding of the pig and all folds of the frog except for segments led primarily by the Origami Lady (described below). The coding categories were

Coordinated ensemble



Dyadic engagement



None engaged together

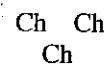


Figure 2. Diagrams for coding the predominant form of social organization of the three children (Ch) in each 20-s segment.

built on the diagrammatic coding schemes of Chavajay and Rogoff (2002) and Angelillo and Rogoff (2005). The social organization was diagrammed in terms of the predominant form in which the three children engaged with each other in each 20-s segment. The categories that we present here are simplified from more detailed diagrams used in coding, which were combined on the basis of conceptual similarity and indistinguishable patterns in the data. See Figure 2 for the diagrams used for each form of social organization.

Coordinated ensemble. The three children engage with each other, building on each other's contributions in a shared agenda in which the participants are "on the same page" with correspondence in their actions or coordinated follow-up across the children's speech and/or actions. Contributions build on the previous move of another child—not just taking turns, "collective monologue," or doing the same activity independently, such as all three children jumping the frogs. Engagement as a coordinated ensemble includes children observing each other, showing keen involvement, and keeping pace with the interaction. The interaction is the predominant form of engagement across the segment, with more than a single initiation and response.

Segments were excluded when the Origami Lady led the group and the children did not engage with each other (averaging 10 segments in each of the three backgrounds). Some segments were included in which the Origami Lady was part of the coordinated ensemble if the interaction did not focus on her instructions or leadership (averaging 14–17 segments in each background).

A subcategory of coordinated ensemble engagement was also coded: Triads coordinating as a *fine-tuned ensemble* engage together in a strikingly smooth, flowing fashion, with markedly the same rhythm and pace, and all three children adapt their contributions together seamlessly.

Dyadic engagement. In dyadic engagement, only two children at a time engage in a coordinated fashion; the other child is not engaged with them—either engaging solo or in parallel with the dyad with some contact but without building consistently on the others' ideas or actions. Across each background, 1–3 segments were excluded in which the Origami Lady led an interaction with two children, usually helping with folds, because these segments were neither truly dyadic nor did they involve the triad of children.

None engaged together. In these interactions, none of the children engage with others in a coordinated fashion, although they might have some contact. If the Origami Lady was engaged with one of them, but the three children were not engaged with each other, the children were coded as none engaged together (averaging 4–6 segments for each background).

Coding Engagement of the Ensembles Through Nonverbal Conversation, a Mixture, and Chat

Each 20-s segment that was coded as coordinating as an ensemble was also coded in terms of whether the coordination among the three children involved chat, nonverbal conversation, or a mixture of nonverbal conversation and talk.

Chat. The three children's coordination as an ensemble takes place through talk about the folds, the figures, or any other topic. (In fact, the children's talk was usually chat about topics other than the folding activity.) To be coded as chat, the three children could not coordinate their folding as an ensemble, although they could work on the figures individually or in a dyad as they talked. For example, three European heritage children whose mothers had extensive schooling chatted about the pig figures during a break, while each played with their figures individually:

- C: This is more like a dog to me.
 B: Not if you do it right.
 A: Yeah, *this* doesn't look like a dog (pointing to a model pig).
 B: Mine is a *clean* pig. (Her figure is made of white paper; the other two girls have brown paper figures.)
 C: Mine's been in the mud.
 A: Mine has been in the mud too.

Nonverbal conversation without talk. The coordinated engagement of the three children takes place through communicative references and gestures regarding the process of folding the figures (or sometimes playing with them). There is no talk between the children except an occasional attention-calling expression such as "Look," "How?," or "Oh!" An example involves three MexHerit Pueblo children, when Child A helps the other two children:

C pushes her figure to A, looking at her face to ask for help.

A stands up to get closer to C (seated on the other side of the table) and folds C's figure, showing her how to do it.

B also follows this very attentively.

When A goes back to her seat, B touches her arm, saying very softly "How?" as she gives her figure to A.

A takes the figure and folds close to B, to show her the fold, and glances at C who is also following this demonstration.

Combination of nonverbal conversation and talk. Both means of communication are used to coordinate the ensemble, although all three children do not necessarily use both. (In this combination, the talk was usually about the folding, unlike in the category of chat.) An example involves MexHerit MoSchool children, when the Origami Lady takes her break and the children are supposed to fold the second leg of the frog. However, two of them (B and C) are still struggling with the fold for the first leg:

C says, in a soft tone of complaint: "I don't know" to nobody in particular. At the same time, B seems to join C, with a kind of desperate facial expression and a gesture with her hands on the figure indicating that she cannot do the fold. Child A looks at them and says "Yes, like this" as she holds her figure up and moves the folded legs, opening and closing the folds as she says "Open the door, close door; open the door, close door." C looks and repeats, "I don't get it." Meanwhile, A turns to B saying, "You need help?" and takes B's figure to fix. Both B and C look at A's folds and soon C tries on her own figure. C then says, "Now I get it." A responds, "Like an ice cream cone, it looks like an ice cream cone."

Coding Social Organization and Attention

Coding from Correa-Chávez et al. (2005) was used for the children's attention, combining their pairs of

10-s segments to fit with the 20-s segments used in our coding of social organization. Their analyses focused on the middle child in each triad, whose posture and gaze was most visible.

Simultaneous attention involved attending to two or more events without an interruption in attention to one event for the sake of attending to another. For example, a child observing another child folding while working on her own folds would be using simultaneous attention if the target child maintained fluid observation of the other child's folding while folding her own figure, without any interruption to either activity. The other forms of attentional management that were coded included *alternating attention*, which is a quick back and forth between events, with interruption of one for the other; *shift of attention* to a new focus without quickly returning to the original focus; *appearing unaware* of an event that was judged to have been of interest; and *no need for timesharing of attention*. Within each segment, the predominant form of attentional management was coded—the one that was most salient, clear, and/or lasted the longest.

The coding of social organization used the coding scheme reported in our central analysis, with the difference that the data were recoded to focus on the social organization from the perspective of the middle child in the frog-folding task, as in Correa-Chávez et al.'s study. Also, the secondary analysis used the coding of each segment rather than a summary value for the session, to be able to link with segments of simultaneous attention.

Reliability. Intercoder reliability was calculated between a coder who was unaware of the hypotheses and the first author, for 84% of the data. For coordinated ensemble, Pearson's $r = .93$; fine tuned ensemble, $r = .87$, dyadic, $r = .91$, and none engaged together, $r = .80$. For the first supplementary analysis, reliability for chat, $r = .92$, nonverbal conversation regarding folding, $r = .99$, and combined nonverbal conversation and talk, $r = .99$. For the second supplementary analysis, intercoder reliability by segment was good: for attention management $\kappa = .77$ and for the middle child's form of social engagement $\kappa = .82$. The analysis was conducted using the coding of the blind coder.

Results

There were no differences between the three cultural backgrounds in the total number of segments (averaging 18 or 19 segments that were not led by the Origami Lady). The primary comparison regarding social organization used one-tailed t tests to examine

whether MexHerit Pueblo children coordinated as an ensemble more often than EurHerit MoSchool children, whom we expected more often to engage dyadically or not to engage together. Then, in an exploratory comparison, we used two-tailed t tests to examine whether the MexHerit MoSchool children's social organization would follow the pattern of either of the other two backgrounds or be intermediate. (To avoid mixing analyses of predicted differences and exploratory nondirectional comparison, we did not combine these analyses in an analysis of variance [ANOVA].) Analyses examined raw frequencies; analyses on proportions yielded very similar results. No gender differences appeared.

Primary Comparison of Social Organization: MexHerit Pueblo and EurHerit MoSchool

The results supported the prediction that MexHerit Pueblo children would engage as *coordinated ensembles* in more segments than EurHerit MoSchool children, $t(18) = 3.04$, $p = .007$. In fact, they did so twice as much. This was the most frequent form of social organization of the MexHerit Pueblo triads, and the least frequent structure for the EurHerit MoSchool triads. Furthermore, the MexHerit Pueblo triads coordinated in a very flowing and smooth *fine-tuned* manner more than four times as often as the EurHerit MoSchool triads, $t(18) = 2.27$, $p = .04$, in 23% versus only 10% of the total of coordinated ensemble engagements, respectively (see Table 2).

Also as predicted, the EurHerit MoSchool triads engaged *dyadically* more often than MexHerit Pueblo triads, $t(18) = 2.22$, $p = .04$. This was the most frequent form of social organization of the EurHerit MoSchool triads. Their number of segments in which *none engaged together* was not significantly more than that of the MexHerit Pueblo children, $t(18) = 1.76$, $p = .09$.

Exploratory Comparison of Social Organization: MexHerit MoSchool

The social organization of the MexHerit MoSchool triads resembled that of the EurHerit MoSchool triads to a greater extent than the MexHerit Pueblo triads whom, we presume, used a more traditional community-based approach. The MexHerit MoSchool triads engaged as *coordinated ensembles* in significantly fewer segments than the MexHerit Pueblo triads, $t(19) = 2.92$, $p = .009$, and showed no significant difference with the EurHerit MoSchool

Table 2
Mean Number of Segments and Standard Deviations With Each Form of Social Organization, Across the Three Backgrounds

| | European heritage with maternal extensive schooling | | Mexican heritage pueblo | | Mexican heritage with maternal extensive schooling | |
|--|---|-------------------|----------------------------|---------------------|--|-------------------|
| | M | SD | M | SD | M | SD |
| Coordination as ensemble | 4.00 | 2.31 ^a | 8.40 | 3.95 ^{a,d} | 4.00 | 2.93 ^d |
| Fine-tuned coordination as ensemble ^a | 0.40 | 0.70 ^b | 1.90 | 1.97 ^b | 0.64 | 1.21 |
| Dyadic engagements | 8.50 | 2.88 ^c | 6.00 | 2.11 ^c | 7.82 | 2.36 |
| None engaged together | 6.70 | 3.74 | 4.20 | 2.49 | 6.27 | 3.82 |

Note. Values with the same superscript letter differed significantly.

^aFine-tuned coordination as an ensemble is included in the figures for coordination as an ensemble as a whole.

triads. As with the EurHerit MoSchool triads, coordinated ensemble was their least frequently used form of social organization. The MexHerit MoSchool triads were intermediate in their coordination as a *fine-tuned ensemble*, with a nonsignificant difference with the MexHerit Pueblo triads, $t(19) = 1.79, p = .09$, and no difference with the EurHerit MoSchool triads.

The MexHerit MoSchool triads were also intermediate in their extent of *dyadic engagement*, showing a nonsignificant difference with the MexHerit Pueblo triads, $t(19) = 1.86, p = .08$, and no difference compared with the EurHerit MoSchool triads. Like the EurHerit MoSchool triads, dyadic engagement was the most common social organization used by the MexHerit MoSchool triads. The MexHerit MoSchool triads were also intermediate in the extent to which *none of the children engaged together*, with no significant differences from the other two backgrounds.

To summarize the social organization results: The Mexican heritage pueblo triads engaged more often as coordinated ensembles and showed more fine-tuned coordination than the European heritage triads with extensive maternal schooling, whose most prevalent form of engagement was dyadic. The or-

ganization of the Mexican heritage triads with extensive maternal schooling resembled that of the European heritage triads with extensive maternal schooling, or was intermediate between the two other backgrounds.

Supplementary Analysis 1: Engagement in Ensembles Through Nonverbal Conversation or Chat

The supplementary analysis of the nature of the children's engagement in the coordinated ensemble segments used proportions, due to the differences between the three backgrounds in frequency of coordination as ensembles. No gender differences appeared.

Both the EurHerit MoSchool triads and the MexHerit Pueblo triads had a large proportion of mixed segments that included both nonverbal conversation and talk. Mixed segments comprised about half of their segments of coordinating as ensembles, with no significant difference between these backgrounds (see Table 3).

More than 20 times as much of the EurHerit MoSchool triads' segments of coordinating as ensembles

Table 3
Mean Proportion and Standard Deviations of Segments of Ensembles Whose Coordination Involved Chat, Nonverbal Conversation Without Talk, or Combined Nonverbal Conversation and Talk, Across the Three Backgrounds

| | European heritage with maternal extensive schooling | | Mexican heritage pueblo | | Mexican heritage with maternal extensive schooling | |
|---|---|------------------|----------------------------|--------------------|--|------------------|
| | M | SD | M | SD | M | SD |
| Chat | .45 | .38 ^a | .02 | .05 ^a | .22 | .36 |
| Nonverbal conversation without talk | .02 | .05 ^b | .55 | .41 ^{b,c} | .21 | .35 ^c |
| Combined nonverbal conversation and talk | .53 | .38 | .43 | .38 | .57 | .39 |

Note. Values with the same superscript letter differed significantly.

Table 4

Mean Proportion and Standard Deviation of the Segments of Each Form of Social Organization in Which the Middle Child Used Simultaneous Attention, Across the Three Backgrounds

| | European heritage with maternal extensive schooling | | Mexican heritage pueblo | | Mexican heritage with maternal extensive schooling | |
|--|---|-----|----------------------------|-----|--|-----|
| | M | SD | M | SD | M | SD |
| Coordination as ensemble | .08 | .12 | .24 | .21 | .16 | .23 |
| Middle child engaged with one other child | .10 | .08 | .40 | .26 | .29 | .18 |
| Middle child not coordinated with anyone | .21 | .33 | .28 | .22 | .10 | .23 |

Note. If a particular form of social organization was never used by a triad, the proportion of use of simultaneous attention was considered to be zero for that triad in that form of organization.

focused on *chat*, compared with the MexHerit Pueblo triads, $t(17) = 3.50$, $p < .005$. In turn, the MexHerit Pueblo triads focused on *nonverbal conversation without talk* more than 25 times as much as the EurHerit MoSchool triads, $t(17) = 3.79$, $p < .001$. Almost all of the coordination in fine-tuned ensembles involved nonverbal conversation without talk.

The MexHerit MoSchool triads showed an intermediate position between the other two backgrounds in the proportion of coordinated ensemble segments in which they engaged only in chat; there were no significant differences between them and the other two backgrounds. The MexHerit MoSchool triads engaged in nonverbal conversation without talk half as often as the MexHerit Pueblo triads, $t(19) = 2.03$, $p < .05$, and not significantly more than the EurHerit MoSchool triads, $t(18) = 1.60$, $p < .10$. The MexHerit MoSchool triads were similar to the other two backgrounds in the proportion of their ensemble coordination that involved a combination of nonverbal conversation and talk. This was their predominant mode of coordination in ensembles, occurring more than twice as often as chat or nonverbal conversation without talk.

In sum, when the European heritage children with extensive maternal schooling participated as coordinated ensembles, a high proportion of their coordination involved only chat. In contrast, the Mexican heritage pueblo children predominantly coordinated their ensembles by means of nonverbal conversation without talk. Both backgrounds often combined coordinated action and talk, as did the Mexican heritage children with extensive maternal schooling, whose pattern stood in an intermediate position between that of the other two backgrounds.

Supplementary Analysis 2: The Relation of Simultaneous Attention to Coordinating in Ensembles

The results of the second supplementary analysis support the idea that collaborative organization and keen attention are features of a coherent constellation composing the cultural tradition of intent community participation, which appears to be commonly used in indigenous heritage communities (Rogoff et al., 2003). Simultaneous attention was much more frequently used by those Mexican heritage pueblo children who frequently engaged with the other two children as a coordinated ensemble, $r = .68$, $p = .015$. (The correlation was also high for EurHerit MoSchool children, $r = .74$, $p = .01$; the correlation was not significant for MexHerit MoSchool children.)

However, simultaneous attention was not more common during the specific segments in which triads engaged as coordinated ensembles. A repeated-measures ANOVA with arcsin transformation indicated a marginally significant difference in the use of simultaneous attention across forms of social organization, $F = 3.22$, $p = .056$. Pairwise comparisons showed that simultaneous attention was less common when the children engaged as coordinated ensembles than when they engaged as dyads. This pattern did not differ significantly across backgrounds (see Table 4). (Segments of fine-tuned ensemble coordination were also not more likely to involve simultaneous attention than in ensemble coordination as a whole.) In the two Mexican heritage backgrounds, simultaneous attention was most common when the children engaged with just one other child, and in the European heritage background, it was most common in segments in which the middle child was predominantly not coordinat-

ing with anyone. (This may seem puzzling. However, simultaneous attention could have occurred in a different portion of the 20-s segment than the engagements coded as the predominant form of social organization, and simultaneous attention could focus on events that did not involve other children, such as attention to the child's own folding and to the Origami Lady.) It may be that for young children, attending simultaneously becomes overly challenging when they are coordinating with two other children, but is more within their reach when coordinating with just one other child or no other child.

Discussion

The results of this study are among the first to examine how children's social interactions are organized when they work together in groups larger than two. Importantly, the findings suggest that the research literature's emphasis on dyads may mask important cultural differences in children's ways of collaborating with each other when more than one other child is present.

Consistent with research indicating that group multiway participation and cooperation are common in indigenous communities of North and Central America, Mexican heritage pueblo triads more frequently structured their participation in coordinated ensembles, compared with European heritage triads whose mothers had extensive school experience. The ensembles of the Mexican heritage pueblo children were often coordinated in an especially fine tuned, flowing, and smooth way. In contrast, the most common forms of engagement in the European heritage triads with extensive maternal schooling were dyadic or with none of the three children engaged together.

Mexican heritage triads whose mothers had extensive schooling interacted in ways that were intermediate or were similar to the European heritage triads whose mothers had extensive schooling. They engaged dyadically almost twice as much as they engaged as coordinated ensembles.

Constellations of Practice Related to Schooling and Indigenous Heritage

Our findings are consistent with suggestions that the practices of schooling and related experiences may compete with the forms of social organization that may be common in indigenous-heritage communities of MesoAmerica, fitting a tradition referred to as intent community participation (Rogoff et al., 2003, 2007). Differences in maternal schooling were

used in our study to distinguish the patterns of results that we found, but with recognition that differences in maternal schooling are accompanied by many other child, family, and community differences.

For example, the children of the three backgrounds themselves shared the same extent of schooling and the same U.S. schools (and almost all of them were born in the United States). However, they varied to some extent in the specific classrooms and pedagogies they have experienced in their U.S. classrooms, related to differences in their proficiency in English and Spanish. Because of this (and other possible differences in the children's schooling and many other experiences), we cannot be sure that differences in the children's contact with school practices result from interactions with mothers and other family members varying in familiarity with the interactional formats widely used in schools.

As we pointed out earlier, we do not regard schooling itself as the only "active ingredient" in differences between the cultural backgrounds. Our highlighting of maternal schooling is not a claim that school experience acts causally on its own; we regard experience with Western schooling as an important feature of a constellation of cultural practices that often cluster together (Najafi et al., in preparation; Rogoff & Angelillo, 2002). Other important features that differ across the constellations—such as parental occupations, religion, number of children in the family and proximity of other relatives, preschool and afterschool activities, and home languages—undoubtedly also give children experience with distinct practices that relate to children's ways of engagement (Chavajay & Rogoff, 2002; Gallimore & Goldenberg, 2001). For example, in communities where extended family is common, children may have extensive experience collaborating in group activities (Delgado-Gaitán, 1987; Heath, 1983; Martini, 1994; Philips, 1972; Tharp, Estrada, Dalton, & Yamauchi, 2000; Weisner, Gallimore, & Jordan, 1988).

Nonetheless, the practices of schooling itself seem especially likely to contribute to parent-child interactional patterns as generations of children become parents themselves and make use of the models of interaction that they have experienced over many years. Our findings are consistent with suggestions that European-origin formal schooling may be a key cultural experience contributing to the ways in which mothers interact with their children, giving familiarity with particular interactional practices (Crago, Annahatak, & Ningiuruvik, 1993; Richman et al., 1992; Rogoff, 2003). For indigenous mothers

of the Americas with extensive school experience, school practices may replace more traditional multiway collaborative organization that uses several communication channels during shared endeavors. For example, Mayan mothers with extensive schooling used more school-like division of labor and were involved in less multiway collaboration than Mayan mothers who had limited schooling (Chavajay & Rogoff, 2002). Chicano mothers with little schooling tended to teach with more modeling than Anglo-American mothers, who tended to use more questions and praise, but differences disappeared when maternal schooling was held constant (Laosa, 1980; Steward & Steward, 1974).

Future research with populations varying in experience with schooling and other related practices and with indigenous practices of the Americas could shed light on the ways in which experience with multiple practices contribute to the patterns that we have delineated. In particular, it will be of interest to examine differences in the formats of children's schooling itself, such as the use of traditional teacher-centered pedagogies versus cooperative learning formats, because children's own schooling experience may not correspond with the practices of their families. In addition, the contributions of children's experience tending younger children and coordinating in work or family groups would be of interest for understanding children's experience with coordinating in ensembles versus in dyads or solo.

It will also be informative in future research to examine participants' familiarity with indigenous practices more directly, rather than inferring greater experience with indigenous practices on the basis of historical and demographic information regarding the regions from which families have immigrated. A very promising direction for research with immigrant groups is to attempt to connect the practices of sending communities and the adaptations made as immigrants experience new practices in the receiving communities in which they settle. For example, future work would do well to examine the communicative means valued in sending and receiving communities to understand the ways in which children coordinate their engagements together, building on the differences found in the present study.

The Nature of Coordination in Ensembles: Talk and Nonverbal Conversation

The results of the present study show provocative differences in the role of talk and nonverbal con-

versation in the coordinated engagement of triads from different cultural backgrounds. In all three cultural backgrounds, when the children engaged as coordinated ensembles, they often combined talk and action-based communication regarding their work on the figures. However, Mexican heritage pueblo children also often used nonverbal conversation without talk, referring to their shared work on the figures by means of actions and gestures. In contrast, the coordination of ensembles of European heritage children whose mothers had extensive schooling more often solely involved chatting about other things than the folding. Mexican heritage triads whose mothers had extensive schooling were intermediate between the other two backgrounds.

The prevalence of nonverbal conversation in the triads of children whose families come from historically indigenous regions of México fits with research indicating that this form of communication, in addition to talk, is important in indigenous communities of North and Central America (Cazden & John, 1971; Ellis & Gauvain, 1992; Lipka, 1991; Philips, 1983; Rogoff et al., 1993). Children from communities that emphasize participating in ongoing activities may be unfamiliar with learning activities that rely rather exclusively on talk, as in many schools.

At the same time, children from communities that emphasize learning in settings that seldom involve shared endeavors, such as in many schools, may be unfamiliar with learning by observing others' strategies and communicating through action regarding the ongoing process of the activity. Extended nonverbal conversation can be central to communication when people engage in a shared endeavor (Ellis & Gauvain, 1992; Rogoff et al., 2003; Scribner & Cole, 1973). The well-known reliance on talk in formal schooling may occur partially because nonverbal conversation is difficult when interaction occurs out of the context of shared endeavors. Conversation without physical referents limits the channels available, contrasting with communicative possibilities in engagements that involve several channels including shared activity with physical reference (Erickson, 1996; Mejía-Arauz, 2000; Philips, 1983). This restriction may limit children's means of coordinating group problem solving (Barron, 2000).

Children's Simultaneous Attention as it Relates to Coordinating in Ensembles

An important aspect of collaborative engagement may involve monitoring ongoing events. A previous study found that Mexican heritage pueblo triads

were likely to attend simultaneously to several events, without interrupting one event for another (Correa-Chávez et al., 2005). Our supplementary analysis indicated that extent of coordination as an ensemble and extent of simultaneous attention were highly correlated for the Mexican heritage pueblo triads and the European heritage children whose mothers had extensive schooling. However, the greater frequency of attending simultaneously to several ongoing events by Mexican heritage pueblo children was not tied moment to moment with engagement as a coordinated ensemble. The results are consistent with the idea that indigenous heritage communities of the Americas often engage in intent community participation (Rogoff et al., 2003), a tradition that includes collaborative organization and keen observation.

Implications for Institutions That Include People From Multiple Cultural Backgrounds

As people from different cultural backgrounds engage together, unfamiliarity with distinct modes of interaction can create difficulties for communication. If the forms of contribution that are traditional in one cultural background are privileged as the only or the standard ways of doing things, this often excludes the participation of individuals and groups who may be unfamiliar with those ways or find those ways jarring.

Variation in children's patterns of engagement and participation may have important implications for coordinating interactions in classroom activities. Children often bring interactional practices learned in their homes to the classroom (Delgado-Gaitán, 1987, 1994; Philips, 1983). Interaction in dyads likely involves different timing and rhythm for coordination than interaction in coordinated ensembles (see also McCollum, 1989). Children may also have difficulties if the form of contributions is unfamiliar—talk out of the context of shared actions rather than coconstruction of shared endeavors.

If schooling would make use of alternative forms of organization available in other communities' traditions, children could learn varied ways of participation and collaboration. Group activities in U.S. classrooms often involve sitting together doing individual tasks rather than collaborative engagements (Delgado-Gaitán & Trueba, 1985). However, skill in collaboration has been increasingly called for in schools and workplaces over the last few decades. Mexican heritage children from backgrounds that emphasize collaboration may have facility in shared endeavors and finding solutions together, and their

approaches could show other children how to collaborate more fluently and smoothly.

At the same time, the results bring awareness to forms of participation that may be susceptible to profound change as indigenous-heritage families gain more experience with the Western institution of schooling and related practices. From our perspective, it would be valuable if traditional indigenous ways were retained and built on, at the same time as children learn the ways of institutions such as schools—both for children whose heritage stems from indigenous communities as well as for children whose heritage has emphasized schooling across generations.

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