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Women's Schooling and Other Ecocultural Shifts: A Longitudinal Study of Historical Change Among the Zinacantec Maya

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Women's schooling has been lauded as having a large, important impact on child socialization. Although there may be positive effects of schooling, there may also be effects from concomitant cultural changes that come with modernization. In this article we examine the findings that changes in textile production among the Zinacantec Maya over the past several decades have been coordinated with several cultural changes, including increased schooling for women, involvement in a growing commercial economy, and television. Understanding these various changes leads to a more nuanced picture of the effects of cultural change on women's activities. Our findings indicate that research on globalization and social change should consider multiple possible effects on cultural practices.

Throughout the world, women's schooling has been shown to have a dramatic influence over several important domains of their lives, such as the average number of children they bear and their socialization practices as mothers (LeVine, LeVine, & Schnell, 2001; Tapia Uribe, LeVine, & LeVine, 1994). Specific to socialization practices, Zukow (1984) found that Mexican mothers with more schooling shifted toward a more dialectic language-interactive style. Chavajay and Rogoff (2002) explored changes in the social organization of problem solving that they link to maternal schooling. Overall, the literature indicates that socialization patterns that shift as a result of schooling may affect more general cultural practices. The shift in socialization patterns may become especially visible in a culture where indigenous practices differ highly in form from school-based activities.

Several questions arise as to the extent to which women's and girls' schooling will affect their lives. Schooling may affect indigenous apprenticeship practices, changing their nature and function (Maynard, 2004). Another issue is to what extent will women alter their participation in those practices as a result of going to school? However, school may not be the sole

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factor affecting changes in socialization; women's other activities such as the use of media or involvement in the commercial marketplace may also affect the way they socialize their children. It is important to consider the effects of these various influences on child socialization.

In this article we discuss data from a two-generation study of learning and socialization carried out in Nabenchauk, a Zinacantec hamlet located in Highland Chiapas, Mexico. Our study focuses on the apprenticeship of the production of woven and embroidered textiles. The data come from field notes from ethnographic observations, census taking, and in-depth interviews. The first wave of the data collection included children and their mothers in 1969 and 1970 (Childs & Greenfield, 1980). The second wave of the study included the next generation, that is, the children from the first wave who had become mothers of a new group of children. Our earlier studies investigated the effects of commerce (Greenfield, Maynard, & Childs, 2000, 2003) but did not examine effects of schooling or the relationship between schooling, involvement in textile-related commerce, television, and the production of textiles. In this article, we first present data showing the historical change in rates of schooling for boys and girls, noting the relationship between schooling and Zinacantec women's activities. Second, we discuss changes in the textiles produced in the community and the relationship between changing rates of female schooling, textile production, and changing mother-daughter socialization. Third, we present findings on the relationship between other ecocultural changes in the community, including the use of television and females' involvement in commerce, and the production of textiles. Fourth, we demonstrate generational differences in the use of representational tools in weaving. These data and analyses taken together add to and further clarify our model of the effects of ecocultural shifts on weaving apprenticeship, cognitive representation, and the definition of creativity in textile design.

GENERATIONAL CHANGES IN SCHOOLING IN NABENCHAUK

We collected schooling data from samples in Nabenchauk in 1969/70 and 1991/93. Schooling data come from children and adolescents who participated in our research projects focused on weaving apprenticeship and cognitive representation (Childs & Greenfield, 1980; Greenfield et al., 2003). For the analyses included in this article, we included children and adults ages 5 through 22 (M = 11.62) who had participated in either or both of our projects from either period. There were 228 participants, including 125 females. Our data indicate that significant increases in both male and female schooling in the period between 1969 and 1991 (Figure 1) have had a dramatic effect on the culture. Overall, the rate of children attending school has increased from 29.35% to 50.38%. The largest change has occurred in the rate of girls attending school. The rate of male schooling has almost doubled, increasing from 47.06% to 75.93%. Female schooling has more than quadrupled, increasing from 7.32% to 32.91%. The average length of school has also increased. In 1969, boys attended school an average of 1.33 years and girls attended school an average of .13 years. By 1991, boys attended school an average of 2.32 years and girls went to school for an average of .51 years.

With the changes of the last several decades, schooling in Zinacantán has provided skills that are useful for participation in the growing commercial economy. These skills include basic math and the ability to speak Spanish, which is the language of commerce and is not spoken in the village. Both men and women have taken advantage of opportunities brought by the



FIGURE 1 Percentages of children with schooling in 1969–1970 and 1991/1993.

economic shift from agriculture to commerce. Indeed, the most economically successful men in the hamlet of Nabenchauk are commercial entrepreneurs with their own trucks and vans, the current symbols of success in Zinacantán. Although the rates of female schooling are low, it has had an important impact on the culture as a whole; for example, women now go shopping and communicate in Spanish in the colonial city of San Cristóbal de las Casas. Women also have participated more in productive commercial activities, including weaving some items to sell to tourists and to other Zinacantecs.

Schooling and Women's Activities

One of the most important female cultural domains in Zinacantán is the creation of textiles by weaving and sewing. Weaving is the indigenous counterpart of schooling, the most important technical skill for Zinacantec females. Schooling and weaving are seen as alternatives within the culture for girls, and accordingly, girls sometimes say they stop going to school in order to weave. Weaving, traditionally the hallmark of Zinacantec womanhood, is now seen as a choice for some women, many of whom pursue commercial activity instead of weaving. For example, women may go to the market to sell other women's weavings.

CHANGES IN TEXTILES

In the same period of time that schooling has increased for females, textiles and textile production have changed dramatically. However, although female schooling has increased in only a small segment of the population, textiles have changed in the entire community. There has been a movement from relatively little interindividual differentiation to greater differentiation in woven patterns (Greenfield, 2004). In 1969, learning to weave meant learning to create

about five specific patterns. The male ponchos virtually all looked alike. Today, we see a great variety in these woven artifacts, with no two looking alike. An individual concept of creativity in which the goal of textile design is also to identify a person as a unique individual has been added to a community concept of creativity, in which the goal of clothing textiles is exclusively to identify a person as a member of a community (Greenfield, 2004). This article begins to explore the relationship between increased female schooling and the proliferation of patterns in Nabenchauk.

The Impact of Schooling on Textile Production

Schooling has introduced one change in woven artifacts that is a tool for pattern innovation, individuation, and elaboration: external visual representations. At school, external representations come in two forms: textual and figurative representation (Figure 2). The latter have influenced textile design and techniques. Along with the introduction of figurative patterns has come the use of paper patterns for weaving and embroidery. Some, generally printed in Mexico City, are organized in grids and were designed as cross-stitch patterns (Figure 3). Girls also draw their own patterns (Figure 4).

Zinacantecs have adapted their use of these patterns for both embroidery and weaving. Paper patterns, such as those depicted in Figures 3 and 4, constitute the first external representational tool introduced into an indigenous Zinacantec activity. Paper patterns are a tool that involves external visual representation. No visual representations on paper had existed in 1969 and 1970, the earlier period of our study. In fact, the only figurative representations at that time were the statues of saints in the Zinacantec churches.



FIGURE 2 The school environment includes both text and pictures. Nabenchauk, 1991. © Lauren Greenfield/VII. (Original in color)



FIGURE 3 An example of a paper pattern organized in a grid and used for both embroidery and weaving. This pattern was printed in Mexico City; such patterns were originally designed for cross-stitch embroidery.



FIGURE 4 A girl draws designs to use for embroidery as her sister looks on. Designs that have already been drawn and cut out lie on the ground beside them. Nabenchauk, 1991. © Lauren Greenfield/VII. (Original in color)

Paper patterns are particularly difficult to use in weaving. The embroidery patterns used by some girls and women are arranged in a grid where the ratio of the length to the width of each square is 1:1. Weaving, however, does not have a gridlike form; there is no 1:1 relationship between the threads. There are simply threads going at right angles to each other, the warp or frame threads (stretched lengthwise between an endstick close to the weaver and an endstick at the far end of the loom), and the weft or cross threads (going from side to side across the warp threads). A code of correspondences must be developed for translating a grid into warp and weft threads. Weavers who use the patterns use a 1:1 correspondence in the warp (vertical) dimension. They often construct a 4:1 (four threads to one square) correspondence in the more complex weft (horizontal) direction. This translation from pattern to cloth makes the pattern appear regular in a woven design.

The question arises as to the extent to which female schooling has affected the development of weaving and embroidery skill. One hypothesis would be that women's schooling might have facilitated the use of paper patterns. Indeed, it is said that the first paper patterns were introduced into the community by school teachers. Beyond that, one mother told us that it is necessary to go to school to use paper patterns. In Tzotzil, school is called *chan vun* 'learning paper'. Reading is called *k'el vun* 'looking at paper'. The same term, "looking at paper," is used to talk about the "reading" of paper patterns. Referring to paper patterns, this mother told us that "To look at paper (i.e., read printed patterns) one must learn paper (i.e., go to school)."

Statistical tests of this ethnographic observation indicate an interesting relationship. For mothers studied in 1991 and 1993, we found a significant association between schooling and the use of paper patterns for weaving or embroidery (see Table 1). Unschooled women generally did not use paper, schooled women invariably did, χ^2 (1, 21)=4.127, p=.042.

The Impact of Maternal Schooling on the Next Generation's Textile Production. Women who go to school use external visual representations in the form of paper patterns for the creation and execution of textile designs. Women have key roles in the transmission and transformation of culture from generation to generation, particularly as they socialize their daughters. Women's schooling can therefore also influence the next generation through changed socialization practices and processes. Our data indicate that mothers who have been to school are more likely to have daughters who do not proceed to the highest level of weaving the brocade patterns in the men's ponchos (Table 2) and therefore have no need to use paper patterns in weaving. This is a paradoxical effect.

The way maternal schooling relates to the way these mothers socialize their daughters explains this paradoxical effect. Mothers who have been to school place less emphasis on their

TABLE 1 Maternal Schooling by Use of Paper to Weave or Sew.			
Mother Uses Paper to Weave or Sew	Mother Has Been to School		
	No	Yes	
No	13	0	
Yes	6	2	

	Mother Has Been to School	
Weaving Experience	No	Yes
Girl hasn't woven yet	18	4
Girl can weave the easiest item	10	4
Girl can weave two kinds of easy item	5	2
Girl can weave three kinds of easy items	4	1
Girl can weave three easy items and a more difficult item	14	0
Girl can weave the most difficult item	12	0

TABLE 2 Maternal Schooling and Daughters' Weaving Experience.

daughters becoming very expert weavers. Of interest, it is the mother's level of schooling that influences their daughters' level of expertise in weaving, not the girls' own level of schooling. Hence, it is not merely a matter of having less time to weave if you go to school; instead, maternal schooling seems to have changed mothers' socialization priorities, moving them away from the indigenous modality of weaving. This has led us to explore other ecocultural features that might impact child development and socialization.

OTHER ECOCULTURAL CHANGES IN NABENCHAUK

Other influences besides schooling have been operating on girls and women in the processes of social change over the last 25 years. Two of the most salient changes in the culture are television and female participation in commerce.

Television

Our census data show that television, not present in 1970, has been the major source for bringing visual representations into Zinacantec homes. For example, our field data indicate that no families had televisions in their homes in 1970, whereas almost 26% of the children were exposed to television in their homes in 1991. The number of mothers in the 1990s who had television in their homes far exceeded the number of mothers who had been to school. Follow-up data from later samples show that television in homes is rapidly increasing. We hypothesized that television could influence the use of visual representations in traditional textile production. For mothers studied in 1991 and 1993, television in the home was strongly related to the use of paper patterns in weaving or embroidery, χ^2 (1, 21)=15.368, p=.0000. That is, mothers who had televisions. This may be related, in part, to their involvement in the money economy, because both televisions and paper patterns are commercially bought items. It could also be related to the fact that television makes them familiar with "foreign" patterns or, more likely, external graphic representations.

Female involvement in commerce

The most important way that females were involved in commerce was in the domain of textiles—weaving and embroidering textiles for sale. We devised a scale of involvement in textile commerce based on census interviews with mothers and their daughters. The scale included items such as "mother weaving on order for others," "daughter weaving on order for others," "mother winding thread for money," "daughter winding thread for money," "mother selling weaving," and "daughter selling weaving." Scores on the textile commerce scale ranged from 0 to .89.

Our ethnographic observational data support the census information that produced the scale. It became typical to see women selling *servilletas* (placemat-size woven cloths embroidered for decoration) on the road. In addition to weaving and selling items to tourists, some girls and women began doing weaving work for other Zinacantecs. For instance, some teenage girls who knew how to do fancy brocade weaving and embroidery did it on order for other Zinacantecs for money. The buyers were often older women who had not learned these techniques or women who were too busy with children to weave their own clothes. About 10 years after our quantitative study had terminated in 1993, girls began to buy sewing machines and use them to embroider for money; because of the speed the machine allowed and the higher prices, this was much more lucrative.

Textile commerce may have played a role in the use of paper patterns as well. Paper patterns, with their tremendous variety, could be useful in textile-based commerce because of pressure to create novel figurative patterns for tourist items and complex figurative patterns for internal cultural consumption. However, our scale of female involvement in textile commerce (of which making *servilletas* for sale and weaving on order for others were items) did not show a significant relationship to mothers' use of paper patterns, F(1, 21) = 1.98, p = .081. This is probably because there was an alternative way to create the same complex patterns without using paper patterns: observe and copy the designs of another family member.

GENERATIONAL DIFFERENCES IN THE USE OF REPRESENTATIONAL TOOLS IN WEAVING

In 1969 and 1970 we studied a group of girls as they learned to weave. In 1991 and 1993 we studied those same individuals, who had become mothers to a new generation of weavers. In the second generation (1991/1993), the use of paper patterns for embroidery had become highly generalized in the culture. In other words, from mothers to their daughters there was a dramatic intergenerational increase in the use of paper patterns to embroider and weave. Mothers who were learning to weave in 1970 had not used paper patterns in childhood because there were none available. Many of these women did not start in the 1990s. A large number of their daughters (69%), however, used paper patterns in the 1990s. Many girls in the 1990s began to draw their own patterns on paper, then transferred the design to a woven or store-bought cloth to be embroidered (Greenfield, 2004). Drawing on paper then evolved into drawing directly on the woven cloths themselves. Girls first used dark markers to transfer the design. However, this method did not work when girls wanted to draw a design on a dark cloth. Girls began to use a white correction fluid in a tube with a penlike tip to draw designs onto any

cloth of any color (except white). The designs were then filled in by embroidery. Sometimes some of the white correction fluid would still be seen if the embroidery did not completely cover it.

We have seen that even rare and short-term maternal schooling had an effect on daughters' use of paper patterns in textile production. We hypothesized that the use of paper patterns must also be linked to other more widespread factors. We found a significant association between daughters' use of paper patterns and mother-daughter participation in textile commerce, F(1, 57) = 6.899, p = .013. In mother-daughter pairs who were above the median in their textile commerce activities, the daughters were more likely to have used paper patterns for weaving or embroidery (M = .851) compared with those mother-daughter pairs who were below the median in textile-related commerce (M = .631). Even though participation in textile-based commerce did not influence the mothers' use of paper patterns (perhaps because of the limiting factor of a very low rate of schooling), it did influence their daughters' use of this fairly recent representational tool. Thus mothers influenced the learning of the next generation not only through maternal formal education but also through participating with their daughters in commercial activity.

In addition to its effects on the use of figurative representations in weaving, mother-daughter involvement in commerce also had a potent influence on the process of weaving apprenticeship itself. The change has been from a more interdependent to a more independent style of learning. Our hypothesis was that this change in the apprenticeship of textile production was caused by the economic development of commerce. Commerce tends to make the generations and individual family members more independent of each other (Maynard, Greenfield, & Childs, 1999). For example, mothers can travel to town and are home less, often leaving elder siblings to care for younger ones. Thus, the younger generation becomes used to functioning in the absence of elders. Through commerce, individual family members can gain some financial independence. For example, females can earn their own money by selling woven *servilletas*; thus, individual weavers can become a bit less dependent on the family as a whole.

The historical shift from 1969 and 1970 to the 1990s toward greater involvement in textile commerce is coordinated with greater independence of weaving apprenticeship (Greenfield et al., 2003). Commerce is a mediating variable between historical period and a more trial-anderror, independent style of weaving apprenticeship. In a previous article (Greenfield et al., 2003) reporting a structural equation model of this historical shift and its relation to textile production, we found that the historical period of one's weaving acquisition is positively related to greater involvement in textile commerce. Involvement in textile commerce is then statistically related to the greater independence of girls' weaving acquisition. Girls in the 1990s who were, along with their mothers, more involved in commerce spent more time weaving independently as they were learning. Moreover, learners in the 1990s were preventing and correcting their own mistakes, some of the time, rather than having interventions from their teachers, as was the predominant case in 1969 and 1970.

We believe that independence of weaving apprenticeship and learner prevention and correction of errors are linked to the greater proliferation of woven patterns. Just as genetic mutations are often adaptive for a species to exploit a new or changing niche, what might be called "mistakes" under a model of the maintenance of tradition are sometimes serendipitous new creations for the advancement of fashion in textile production. Indeed, skill in representing

novel patterns in an experimental context was significantly correlated with an independent style of weaving apprenticeship (Greenfield et al., 2003).

Of interest, neither mothers' nor daughters' school was found to mediate relationship between textile commerce and apprenticeship (Greenfield et al., 2003). Thus the formal education of women and girls was not a factor in the historical transformation of weaving apprenticeship to a more independent learning process. Commercial involvement was a much more potent influence than schooling in changing the way women transmit and transform cultural knowledge to the next generation.

CONCLUSIONS

We have found an historical increase in the rate of female schooling in Zinacantán between the late 1960s and the early 1990s. However, in the context of schooling's specific social function for Zinacantán—to provide commercially viable skills—this increase in the rate of schooling has been much smaller than in other Maya communities of Highland Chiapas, such as Mitontik, where schooling has taken on value as a professional credential (Zambrano, 1999).

Nonetheless, female schooling, where it has occurred in Zinacantán, has had multiple effects in both the immediate culture, affecting the use of paper patterns and the socialization of the next generation, that is, in the extent to which mothers encouraged their daughters to become expert weavers. Schools changed women's traditional weaving on the backstrap loom when teachers introduced paper patterns into Zinacantec communities. Paper patterns have now moved from Ladino school teachers to indigenous markets, shops, and homes. Our data show that going to school, even for a very short time, affects women's willingness and ability to use paper patterns in their own textile production. Most important, women's schooling—even just a few years—also impacts the maternal socialization process, undermining the importance of weaving, the epitome of indigenous education for girls. Thus the education of women erodes the importance of traditional cultural activities through its impact on the socialization process.

Schooling has, however, been but a small part of a more general social change of the last 30 years in Zinacantán. This more general change has consisted of a movement toward commerce, money, and consumer technologies. In the area of visual representation, one consumer item—television—has brought iconic or figurative representations into Zinacantec homes, even more than schooling. Even though women who had been to school were more likely to use paper patterns as representational tools for creating textiles than women who had not been to school, we found that having a television in the household had an even greater influence. Finally, we found that mother–daughter involvement in textile commerce was positively associated with a significant increase in daughters' use of such representational tools, even as it produced a major transformation in the very process of cultural apprenticeship.

Through our study of Zinacantán over two generations, we have confirmed the general point that changes in women's psychologies change the intergenerational reproduction of culture. Women's schooling is but one element involved in changing the psychology and activity settings of women. Other factors such as women's participation in commerce and women's use of mass communication technologies may, under particular social conditions, be equally or even more influential.

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REFERENCES

- Chavajay, P., & Rogoff, B. (2002). Schooling and traditional collaborative social organization of problem solving by Mayan mothers and children. *Developmental Psychology*, 38(1), 55–66.
- 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.
- Greenfield, P. M. (2004). Weaving generations together: Evolving creativity in the Maya of Chiapas. Santa Fe, NM: SAR Press.
- Greenfield, P. M., Maynard, A. E., & Childs, C. P. (2000). History, culture, learning, and development. Cross-Cultural Research: The Journal of Comparative Social Science, 34(4), 351–374.
- Greenfield, P. M., Maynard, A. E., & Childs, C. P. (2003). Historical change, cultural apprenticeship, and cognitive representation in Zinacantec Maya children. *Cognitive Development*, 18, 455–487.
- LeVine, R. A., LeVine, S. E., & Schnell, B. (2001). "Improve the women": Mass schooling, female literacy, and worldwide social change. *Harvard Educational Review*, 71, 1–50.
- Maynard, A. E. (2004). Cultures of teaching in childhood: Formal schooling and Maya sibling teaching at home. Cognitive Development, 19(4), 517–536.
- Maynard, A. E., Greenfield, P. M., & Childs, C.P. (1999). Culture, history, biology, and body: Native and non-native acquisition of technological skill. *Ethos*, 27(3), 379–402.
- 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: Lawrence Erlbaum Associates.
- Zambrano, I. M. (1999). From na' to know: Power, epistemology and the everyday forms of state formation in Mitontik, Chiapas (Mexico). Unpublished doctoral dissertation, Harvard University, Cambridge, Massachusetts.
- Zukow, P. G. (1984). Folk theories of comprehension and caregiver practices in a rural-born population in Central Mexico. *The Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 6, 62–67.