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Cultural Change, Human Activity, and Cognitive Development

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Introduction

We recently presented results of a cross-cultural study in which the presence in small-scale traditional societies of various features common to industrial societies was associated with differences by children on a suite of cognitive tests (Gauvain & Munroe, 2009). Since then, we found similar findings from analyses of the same dataset pertaining to children's exposure to wood burning fires in the home (Munroe & Gauvain, 2012), use of explanatory or "why" questions (Gauvain, Munroe, & Beebe, 2013), and engagement in everyday activities. Our general conclusion is that these results say something meaningful about culture and cognitive development.

We adopt the view that changes in cultural features are inextricably linked to changes in human activity and, in turn, to cognitive development. Our ideas are informed by sociocultural theory that sees cognitive development from the vantage point of historically situated activities, mediated by symbolic and material artifacts and institutions of the culture (Cole, 1996). When children participate in cultural activities, they are introduced to conventional ways of thinking and acting, and cognitive development emerges from these transactions (Lawrence & Valsiner, 1993). So now to our question: how do changes in children's thinking over childhood, or ontogenesis, and changes in society, or sociogenesis, inform and transform one another?

To study this question, we examined how cognitive development relates to changes in communities as they incorporate the technology, practices, and institutions common in industrialized societies. Our work coincides with research on societal changes related to greater involvement in a cash economy or formal schooling (e.g., Greenfield, 2004; Saxe, 2008). However, we concentrate on changes such as switching from candle power to electricity (which changes daily activities), the establishment of institutions in addition to schools (e.g., post offices, gathering places), different forms of transportation (making distances from kin or the workplace less onerous), changes in daily subsistence activities (e.g., methods of heating and cooking), and a home-based water supply (which frees up time and lowers health risks).

Considered together, these changes transform a society and the lives of the people

who live there. Such changes can affect, on a daily basis, the work people do, the way children are cared for and educated, and the nature and strength of the links between the community and the world beyond it. In other words, children are exposed to changing modes of acting and interacting both inside and outside the home. Consequently, these community changes have direct relevance to human development, including cognitive growth.

First, a caveat: although we concentrate on features associated with industrialized societies, our research is not informed by classic modernization theory, which reflects a Western bias (Kagitçibasi, 1998). Unlike this view, we do not presume social progress from these societal changes. Rather, our take is pragmatic and reflects the notion that these changes relate to psychological development. Because these are the types of changes occurring round the world today at unprecedented rates, research is needed on the consequences of these changes for psychological development that avoids untested assumptions of earlier eras.

To illustrate these ideas, we discuss data collected in the late 1970s in four small-scale traditional communities that underwent, to varying degrees, societal changes as they adopted the technologies, institutions, and practices common to industrialized societies (Munroe et al., 1997). Although the data are archival, this is an advantage for our purposes. The processes we want to study benefit through being viewed from historical distance. Moreover, the sweep of changes in which we are interested is increasingly difficult to study because many people and communities around the world have already adopted features of industrialized societies

The sample was comprised of 192 3-, 5-, 7, and 9-year-olds spread evenly among four communities, Garifuna in Belize, Logoli in Kenya, Newars in Nepal, and Samoans in American Samoa, which differed geographically and linguistically and had no contact with each other. We measured the possession of communicative and literacy-based resources typical in industrial societies, including writing tablets and books, electricity, a home-based water supply, radio and television sets, and ownership of a motor vehicle.

Cognitive performance

The children were administered seven standard cognitive measures under conditions controlled by the same researcher (R. H. Munroe), who trained and supervised local experimenters. The measures assessed perception, block building, motor coordination, perspective taking, gender understanding, memory, and willingness to explore novel objects. Some were presented as they are in Western settings and others were adapted to the cultural setting by using familiar materials and experiences.

Findings replicated typical age-related improvements in cognitive performance. The adoption of elements from industrial societies, scored individually (e.g., radios in the home) and at the community level (e.g., postal stations), predicted better performance on all measures. American Samoan and Garifuna communities had more of these ele-

ments and children in these communities, even the 3-year-olds, outperformed the Newar and Logoli children, where there were fewer such elements. Schooling was associated with good test performance, but societal adoption of these elements was as strong a predictor. These relations do not explain the processes of cognitive change involved. There are many possibilities, and we have studied three of them using this same data set.

Exposure to open-fire cooking

Research shows open-fire cooking — with its emission of harmful substances — poses a risk to healthy physical development (Munroe & Gauvain, 2012). The risk is especially high among young children because of changes to the brain and other organs during this period (Couperus & Nelson, 2006). Young children may also be at higher risk because they spend much time in and around the home area where the fires burn.

Parents in the four-culture samples were informants about modes of cooking. In two communities (Logoli; Newars), open-fire cooking (with wood, dung, or straw) was used at all times indoors. In American Samoa, cooking was done on kerosene stoves, which is less hazardous to health. Garifuna families differed, some cooked with open-fire (with wood) and others used kerosene.

We found moderate to strong negative relations between open-fire cooking and cognitive performance. Relations were stronger for younger children and remained for all age groups (educational levels controlled). Intra-cultural examination with Garifuna families (controlling for SES) showed the same patterns. These correlational outcomes cannot indicate causality, but our findings are consistent with research on open-fire cooking and its negative developmental consequences, especially in the early years (Smith et al., 2004).

Children's 'why' questions

Now we turn to processes that relate to socialization (Gauvain et al., 2013). One intriguing difference between Western children and those in our four cultures was the use of “why” questions in daily interaction. Chouinard’s (2007) analysis, using the CHILDES database, showed that almost one-quarter of the information-seeking questions asked by 3- to 5-year-old American children are ‘why’ questions that sought explanation rather than isolated factual information.

Why-type queries made up fewer than 5% of the children’s questions in our samples. We believe this difference reflects the operation of two factors. First, in small-scale traditional societies, there is an unspoken acceptance of the greater authority of adults vis-à-vis children (Stephens, 1963). For a child to often ask “why” would be to challenge that authority (LeVine, 1970). Second, in these societies children can see their meaningful part in relatively stable socioeconomic fabrics and, therefore, seldom need to ask for explanations. In industrial societies, however, question-asking (at least in the middle class, Tizard & Hughes, 1984) is seen as a “teachable moment,” and the demands of life — new devices and techniques, ever-widening knowledge — make asking of explanatory-type questions a highly adaptive way of coming to terms with its complexity.

Children's activities

Finally, we assessed children's behaviors using observational data of the sample children during normal, everyday activities (Munroe & Munroe, 1990a, 1990b, 1991). We estimated the proportion of activities that involved symbolic play including formal and informal games, role-playing, imaginary play, and play with toys (Gowdy et al., 1989). The overall proportions were higher among the Samoan (19%) and Garifuna (17%) children than the Newar (6%) or Logoli (9%) children. Even 3- and 5-year-olds Samoan and Garifuna children averaged two to three times more engagement in these activities than young Newar and Logoli children. Thus, with a mode of measurement quite different from those discussed earlier, we find that children's daily play in the two more industrialized groups entailed very different cognitive routines than that of children in the other two communities. These differing routines occurred frequently and emerged early, before schooling.

Some implications of these findings

Taken together, our results are consistent with the idea that societal changes that involve the adoption of features common in industrialized societies contribute to certain types of cognitive skills, similar to those implicated in the Flynn effect (Flynn, 1987). What our results showed is that these changes were not only temporal, that is, measurable over time – as Flynn demonstrated – but also evident at the same time when cultures were compared on dimensions regarding certain types of cultural changes. Of course, it is not these changes per se that explain the differences. Rather, adjustments in cognitive activity associated with societal changes register in a range of activities, including the everyday transactions that cultural members have with one another and in socialization efforts. Given our findings, we concluded that in terms of cognitive development, (1) not all small-scale traditional societies are the same, and (2) the adoption of features common in industrialized societies has something to do with it.

Conclusions

These results are important in relation to other extant findings. With few exceptions, traditional peoples have done poorly on Western tests of cognitive performance, even when children are assessed before entering school (Munroe & Gauvain, 2010). The implications have made Western researchers concerned with bias, and there have been many reasons advanced for the relative poorer performance including nonliteracy, unfamiliarity with test materials, emphasis on rote learning, low tolerance of questioning of authority figures, educational levels, and inexperience with the discourse and modes of representation used in school.

Interpreted liberally, all these factors have societal change of a particular sort embedded within them. Taken together they might constitute a complex explanation, one in which changing environmental conditions contribute to cognitive development. This

view opens the door to examining how societal changes affect cognitive development and challenges the idea that performance by people living in small-scale traditional societies on Western-based assessments are uniform or can be understood separately from cultural institutions, tools, and practices. Our conclusion stands in contrast to relativistic views (e.g., Berry, 1974) and is closely aligned with that expressed by Mishra (1997) who stated, “[W]e can conclude . . . that valid inferences about [cognitive] competencies can be drawn only by situating assessment in the broader cultural life of individuals or groups” (p. 156).

We want to make another claim about our findings. They suggest that, on average, individuals brought up in communities that have adopted features common in industrial societies have certain cognitive tendencies relative to individuals living in small-scale traditional societies with minimal adoptions of these elements. It is important to understand what these tendencies amount to, in terms of benefits and limitations. Principally, these tendencies represent cognitive functioning as conceptualized and assessed in Western science. Individuals in today’s industrialized societies understand that the community at large possesses vast knowledge, and an important skill is knowing how to access this knowledge. It includes the knowledge that there are principles that can be consulted and generally relied upon, and that concrete problems can often be solved through abstract reasoning. This approach is embedded in formal schooling and manifested daily in the operation of the sociocultural system.

What mechanisms might make this sort of change to culture and cognition possible? There are several social psychological mechanisms evident in our findings: changes to children’s everyday activities, interactions with adults, participation in school, and household resources pertinent to child health. The nature and amount of children’s play may be especially important, and these patterns are not explained by the time children have available to play. In our sample, children living in the two less industrialized groups differed sharply in the amount of work they did; Logoli children worked the most and Newar children worked the least of all children in the sample. Other potential mechanisms may be a willingness in industrialized societies to distribute cognition across individuals and a willingness of community members to take on specialty roles that support the activities of others. This ‘off-loading of the mind’ opens avenues for learning and thinking that may be less common in small-scale traditional societies where understanding and knowledge as experienced first hand are valued differently (see Luria, 1976).

The distribution of knowledge in the industrialized world has benefits and costs. Among its benefits is the vast amount of collective knowledge that is known and passed across generations. But, the profound distribution of this knowledge, even among educated and well-employed individuals, may convey a false security and make individuals feel they are more knowledgeable than they actually are.

Although our illustrations could be viewed as characterizations of cognitive dif-

ferences between “traditional” and “industrialized” ways of living, this is not our aim. What we seek is a way of discussing how changes in culture change cognitive development, and we draw on data available to us to investigate this process. People living in communities around the world participate in diverse activities – activities through which cognition is formed and expressed – and we have attempted to describe this intricate relation by examining such variations across cultural settings. The cultural changes we studied are neither random nor unique, but part of a larger and common set of changes that make up globalization – a process that may make it increasingly difficult to study these connections as the world becomes more homogeneous in its artifacts and institutions.

This said we fully understand the dissonance inherent in examining cultural differences in cognitive performance. So long as such differences across cultures are viewed solely in terms of relative advantage and not as emblematic of important properties of the human mind, including flexibility, responsiveness, and adaptation, serious examination of societal elements that contribute to cognitive development will not occur. Any seeming advantages need to be considered in relation to their function in a society at a point in time. In our view, the tendency in contemporary psychological research to avoid studying cognitive changes associated with industrialization is problematic. Change is a normative feature of culture and widespread changes to the social environment become embodied in the mind through the process of cognitive development. The difficult but essential issue is to identify and describe these changes without taking an evaluative stance toward the individual or the culture.

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