

This article makes the argument that the distributed, mutual contributions of individuals, their partners, and community institutions to planning can be studied with analyses that focus on one or another of these contributions, keeping key aspects of the others part of the analysis. This contrasts with common approaches that treat these contributions as independent factors or entities that can be understood without regard to each other. We illustrate our argument with a study of planning to remember during cookie sales and delivery by Girl Scouts, their mothers and customers and other companies, and the national scouting organization and the cookie baking company. We also use the observations to illustrate a method of qualitative data analysis that involves successive abstraction from ethnographic details of complex everyday activity to create generalities across specific cases.

Sociocultural theory suggests that the study of cognitive activity requires analysis of the mutual contributions of individuals, their partners, and the community/institutional traditions in which people participate. Usually, however, the development of planning has been studied with individuals doing set problems in laboratories, with little attention to contributions beyond those of the individual studied. Although social interaction with peers or parents in planning has sometimes been studied (Duran & Gauvain, 1993; Ellis, 1997; Gearhart, 1979; Radziszewska & Rogoff, 1988, 1991), this is only a small step in the direction of examining sociocultural aspects of planning.

Research has seldom examined institutional or community aspects of planning (with a few exceptions, see Baker-Sennett, Matusov, & Rogoff, 1992; Dunbar, 1995; Hutchins, 1995; Saxe, 1991). The social context as well as the goals and means available for problem solution have usually been staged by researchers, who have seldom studied their own roles in their subjects' planning. They have also rarely considered the roles of research traditions and academic institutions and practices in determining the problems and means available (or valued) to solve them.

It is difficult to investigate ourselves—the researchers—as actors, and to examine the institutions in which we function as sociocultural settings. People have notorious difficulty in studying themselves, as indicated by researchers who go to foreign communities and uncover assumptions that they otherwise take for granted as common sense in their own community (Berger & Luckmann, 1966; Rogoff, 1990, in press). Cultural understanding is sufficiently taken for granted that special efforts are needed to draw attention to important features of the obvious (Smedslund, 1984).

We studied a planning activity that was not devised and controlled by ourselves and our research institutions—Girl Scout cookie sales and delivery—to investigate planning to remember as a process to which individuals, other people, and cultural practices all contribute. The study is intended to illustrate a way of thinking about the relations between individuals and the world that treats these as mutual aspects of a larger whole, rather than self-contained entities.

Conceptualizing Individual, Interpersonal, and Community/Institutional Contributions to Thinking

Recent years have seen a shift from viewing cognition as an exclusively individual process. Many scholars are building on Vygotsky's (1978) argument that rather than deriving explanations of psychological processes from the individual's characteristics plus secondary social influences, analysis should focus on the social, cultural, and historical processes in which individuals develop (Wertsch, 1985; Wertsch, Tulviste, & Hagstrom, 1993).

Debate

Mutual Contributions of Individuals, Partners, and Institutions: Planning to Remember in Girl Scout Cookie Sales

Barbara Rogoff and Karen Topping, *University of California, Santa Cruz*, Jacquelyn Baker-Sennett, *University of British Columbia*, and Pilar Lacasa, *University of Alcalá*

Abstract

This paper argues that planning entails distributed, mutual contributions of individuals, their social partners, and their community institutions. We suggest that these mutually involved contributions can be viewed through shifts in focus of analysis, contrasting with analyses of cognitive development that treat individuals as though they exist apart from their social and cultural worlds.

We illustrate this argument with a study examining the distributed nature of planning to remember in a complex everyday task. We investigated the personal, interpersonal, and institutional cognitive contributions of 16 Girl Scouts, their mothers and customers and other companions, and institutions (the national organization and the cookie company) in keeping track of deliveries and planning collection of money in Girl Scout cookie sales and deliveries. The article also discusses an analytic methodology (Functional Pattern Analysis) for abstracting findings from the details of rich ethnographic data.

Individual scouts, their mothers, customers, and the scouting organization and cookie company all played significant roles in keeping track of progress. In particular, tools and supports provided by the cookie company played a key role in organizing the cognitive tasks, and the scouts collaborated in planning with other people (usually their mothers and customers). Our findings illustrate the importance of examining contributions beyond those of the individual, while still recognizing the active roles of individuals in thinking. We argue that conceiving of individual, interpersonal, and institutional/cultural contributions as mutually constituting aspects of cognitive activities supports this aim beyond the usual focus on separate individual and 'external' factors.

Keywords: sociocultural theory; cognitive tools; distributed cognition; planning to remember

Correspondence should be addressed to Barbara Rogoff, Psychology Department, Room 277, Social Sciences II, University of California, Santa Cruz, CA 95064, USA. Email: brogoff@cats.ucsc.edu

However, researchers still struggle with how to conceive of the contributions of companions and culture to cognition. The field often seems to be dominated by an either/or conception in which *either* the person *or* the outside world is regarded as responsible for development. To get beyond the study of self-contained individuals, the focus often seems to switch to the impact of partners or 'cultures,' leaving out the active contribution of individuals.

This amounts to a pendulum swing to 'social (or cultural) influences' from the earlier focus on individual efforts and characteristics (Rogoff, 1998). Social- (or cultural-) influence approaches credit the outside world, but *still maintain the individual as the basic unit of analysis*, treating the individual as the recipient of external influences. A boundary between individual and world is still assumed, with one side or the other (or sometimes each in turn) regarded as active. The assumed boundary encourages research that examines individual factors and social (or cultural) factors as though they exist independently of each other; the separated factors are related later through correlational or analysis of variance approaches that assume their independence in order to examine their 'interaction.'

This is a quite different conceptualization than sociocultural theory, which removes the assumption that the individual and the social or cultural world are self-contained entities, bounded off from each other. Instead, people are viewed as developing *in* their engagement in sociocultural endeavors with other people, as they make use of cultural tools, practices, and institutions inherited from previous generations, and simultaneously transform them in their use (Rogoff, 1998).¹

Sociocultural Activity as the Unit of Analysis

Sociocultural theory (also called cultural/historical theory) offers a major shift in the unit of analysis. The unit of analysis becomes the whole sociocultural activity. This unit replaces the usual use of the characteristics or behaviors of a self-contained individual as either the locus of learning or as a recipient of influences from social or cultural entities.

Vygotsky proposed that the most basic unit of analysis of human development and learning should be not the individual but a unit of analysis that preserves the inner workings of larger events of interest. He argued that using the individual as the unit of analysis separates human functioning into elements that no longer function as does the larger living unit. He sought a unit that 'designates a product of analysis that possesses *all the basic characteristics of the whole*. The unit is a vital and irreducible part of the whole' (1987, p. 46).

Leont'ev elaborated the concept of *activity* as the basic unit of analysis. He stated that 'if we removed human activity from the system of social relationships and social life, it would not exist and would have no structure' (1981, pp. 46-47). Relatedly, in discussing Ilyenkov's related approach to activity theory, Bakhturst claimed that

The study of mind, of culture, and of language (in all its diversity) are internally related: that is, it will be *impossible* to render any one of these domains intelligible without essential reference to the others. (1988, p. 39)

Other theorists have argued similarly. Dewey emphasized a change from the individual to the event as the basic unit of analysis (Dewey & Bentley, 1949), and Werner (1954) also argued for the necessity of analysis of meaningful wholes rather than trying to derive the totality from a synthesis of its elements. Compatible units of

analysis also seem to be employed by some researchers studying events in the brain (such as the functioning of neurons or the development of brain matter) and perception-and-action (such as coordination of limbs in the context of action in real circumstances). For example, Pribram (1990) discussed the hologram metaphor, which he attributed to the parallel distributed processing approach: 'The properties of holograms are expressed by the principle that "the whole is contained or enfolded in its parts," and the very notion of "parts" is altered, because parts of a hologram do not have what we think of as boundaries' (pp. 92-93; see also Gibson, 1982).

Using sociocultural activity as the unit of analysis shifts individuals from being viewed as self-contained entities, standing apart from the contributions of other people and cultural practices. Instead, the contributions of individuals along with those of their companions and their cultural traditions are treated as aspects of the whole unified sociocultural activity. Employing sociocultural activity as the unit of analysis allows us to see how cognitive processes extend across individual efforts, the participation of partners, and institutions and cultural traditions.

Cognition Distributed through Sociocultural/Historical Activity Rather than Isolated within Individual Boundaries

Efforts to address cognitive problems are inseparably tied to the material and sociocultural/historical context of the problems themselves (Baker-Sennett et al., 1992; Cole, 1995; Cole & Griffin, 1980; Ellis, 1997; Lave, Murtraugh, & de la Rocha, 1984; Moll, Tapia, & Whitmore, 1993; Rogoff, 1998; Scribner, 1984). As Hutchins (1991) pointed out in his studies of navigating large ships, cognition is distributed across people as they collaborate with each other and with historically developed tools designed to aid in the cognitive work. The skilled thinking that occurs in figuring out how to turn a massive moving vessel to dock in a small harbor is clearly handled through the coordination of many people working with cognitive devices developed by predecessors to handle some aspects of the data gathering, calculations, and interpersonal problem solving that are necessary.

Similar analyses identify the distributed nature of thinking in many everyday activities that are commonly thought of as individually accomplished. Vygotsky suggested that people rely on the mutual support of other people and of 'psychological tools' such as 'language; various systems for counting; mnemonic techniques; algebraic symbol systems; works of art; writing; schemes; diagrams, maps, and mechanical drawings; all sorts of conventional signs, etc.' (1981, p. 137).

The contributions of institutional practices and technologies to cognitive processes are increasingly noted in research on cognition (Hutchins, 1990, 1995; Lave, 1988; Pea, 1993; Rogoff, 1998). Examples include the use of artifacts such as the globe in children's understanding of astronomy (Schultz, Säljö, & Wynndham, 2001) and diagrams in the representation of ideas in a physics research group (Ochs, Jacoby, & Gonzales, 1994); the importance of discourse and material formats for setting problems to solve in classroom settings (Kobayashi, 1994; Rogoff & Toma, 1997); and the role of the computer as a cognitive tool (Hawkins, 1987; Pea, 1993; Schrage, 1990; Zellermyer, Salomon, Globerson, & Givon, 1991).

Thinking with artifacts involves people in remote collaboration with those who designed them. Pea (1993) provided an apt illustration of reconceptualizing intelligence to include contributions of other people and cognitive tools, in his description of a presentation by Seymour Papert of a computer program for building toy machines:

Papert described what marvelous machines the students had built, with very little 'interference' from teachers. . . . Although Papert could 'see' teachers interventions (a kind of social distribution of intelligence contributing to the child's achievement of activity), the designers' interventions (a kind of artifact-based intelligence contributing to the child's achievement of activity) were not seen. . . . [The child] could be scaffolded in the achievement of the activity either explicitly by the intelligence of the teacher, or *implicitly* by that of the designers, now embedded in the constraints of the artifacts with which the child was playing. (pp. 64-65)

A primary aim of this paper is to contribute to how we conceptualize the distributed nature of thinking, first by discussing concepts for focusing our analyses, and then by illustrating the mutual cognitive contributions of individuals, their companions, and their communities in Girl Scout cookie sales and delivery. We are attempting to make visible some aspects of cognitive activities that are often not noticed, due to researchers' embeddedness in our own research traditions and assumptions that artificially separate the mutual contributions of individuals, other people, and communities/institutions.

Three Foci of Analysis

Often the idea of analyzing whole, multifaceted sociocultural activities to understand cognition seems overwhelming. To make the process more manageable, Rogoff (1995) suggested a coordinated use across studies of three foci of analysis to examine the contributions of individuals, their companions, and their communities/institutions. A *personal* focus of analysis highlights individuals' contributions and change in the activity; an *interpersonal* focus of analysis highlights the contributions that occur as people communicate and coordinate efforts, whether face-to-face or more distally; and a *community* focus of analysis highlights contributions to the activity that derive from dynamic cultural practices and institutional traditions and tools.

Rogoff (1995) proposed that researchers can use the analytic foci like different lenses to bring one aspect of the activity into focus while the others remain less detailed in the background, in order to simplify questions and analyses in a particular study or line of studies, while considering other relevant information in a less detailed fashion to make sense of the main focus. The distinctions between personal, interpersonal, and community foci are analytic, created by the researcher to foreground one or another of them for the sake of a particular analysis, while keeping the others in the background of the analysis to provide essential information necessary to make sense of the primary focus (Rogoff, 1995; Rogoff, Baker-Sennett, Lacasa, & Goldsmith, 1995).

Thus researchers may consider a single person thinking, or the functioning of a whole community, as foreground—but still in relation to key information from the backgrounded aspects of the activity. In this way, contributions can be analyzed with the focused aspect understood in relation to the others, rather than treating individuals, partners, or cultural practices as though they stand alone, analyzable without regard to each other's contributions to the ongoing activity. Across studies (or disciplines), one focus or another serves as 'figure' and the others as 'ground,' with information from both figure and ground necessary to make sense of the phenomenon.

Rogoff (1995) referred to personal, interpersonal, and community *planes of analysis*, but many people seem to assimilate this idea to *levels* of analysis that treat these as self-contained real entities bounded off from each other in a hierarchically nested

structure. For this reason, Rogoff (in press) now refers to personal, interpersonal, and community *foci of analysis*,² in the hope that the analytic foregrounding and backgrounding of information by the researcher is not assimilated to the widespread concept of hierarchical 'levels,' which are usually treated as separate entities *in reality*.

The idea of an arbitrary boundary separating an individual and the rest of the world has created unnecessary complications for researchers in our efforts to understand processes of development and thinking as well as the relation of individual, interpersonal, and community processes. This problem was exquisitely illustrated by Gregory Bateson:

Suppose I am a blind man, and I use a stick. I go tap, tap, tap. Where do I start?

Is my mental system bounded at the handle of the stick? Is it bounded by my skin? Does it start halfway up the stick? Does it start at the tip of the stick?

But these are nonsense questions. The stick is a pathway along which transformations of difference are being transmitted. The way to delineate the system is to draw the limiting line in such a way that you do not cut any of these pathways in ways which leave things inexplicable. (1972, p. 459)

The three foci of analysis simply foreground different aspects of the whole activity. Rather than examining separately defined characteristics or behaviors of independent factors or levels, the three foci of analysis each simply involve a different grain of analysis of the whole activity. The point of the 'focus of analysis' framework is that individual, interpersonal, and community/institutional foci are differentiated by the analyst, as a simplification for the particular analysis—not as independently existing elements.

An Example Using the Three Foci of Analysis with an Episode in the History of Girl Scout Cookie Sales

In the Girl Scout scene presented in the photograph of Figure 1, we may use the three foci to analyze either what a particular individual was doing, what people were doing together, or the contributions of community institutions to the unfolding event. Understanding the creative process of the pictured moment requires consideration of the contributions of the individuals, their interactions with others, and the historical context of the community institutions, with the other forms of contribution considered in the background—not deleted from consideration—when one of them is the focus of the analysis.

With a *personal focus of analysis*, we may be interested in the creative process involved as young Virginia Marley baked cookies, with interpersonal and cultural information considered in the background. Imagine looking through a lens that focuses on Virginia and makes other aspects of the scene indistinct in detail but still informative in general form. With a *personal focus of analysis*, key background interpersonal information is that Virginia was accompanied in her efforts by Midge Meyer and other scouts. Key community/institutional information is that this scene occurred in 1932 in the window of the Philadelphia Gas & Electric Company, as scouts were aiding a community fundraising campaign by baking cookies to distribute in local day nurseries—and that this event was later claimed by the Archives of the Girl Scouts of Greater Philadelphia as the origin of Girl Scout cookie sales, as passersby reportedly asked to buy the cookies that the girls were baking (Carhart, 1961).³

With an *interpersonal focus of analysis*, Virginia's individual characteristics and actions (and those of the other people present) would be considered as background



Figure 1. In this photograph, the analyst can focus on Virginia Marley or Wilhelmed 'Midge' Meyer baking cookies (a personal focus of analysis), the interaction between the two girls and their companions in their scout troop and passersby who ask to buy cookies (an interpersonal focus of analysis), or the history of scouting, fundraising in the US, and the origins of Girl Scout Cookie sales as an institution (a community/institutional focus of analysis). Understanding each of these foci requires some attention to background information regarding the others. (Reprinted by permission of Midge [now Mason]; if Virginia Marley's whereabouts are known, Midge would like to be in contact.)

to the interactions of the scouts and of the passersby, as would the community/institutional contributions of the scouting organization and community fundraising traditions. Our lens would focus on the interactions between the two scouts and the passersby, blurring details of each of them as individuals and blurring details of the setting—but retaining enough personal and community information in the background to be able to inform the focus on the process involved as these people turn a baking demonstration into a sales event.

With a *community/institutional focus of analysis*, some understanding of the contributions of the individuals and their interactions would likewise be necessary as background for understanding the role of this scene in the development of Girl

Scouting and cookie sales. (See Rogoff et al., 1995 for such an analysis.) For example, without great detail, the contributions of the girls themselves and their interactions with each other and with the passersby would help to make sense of the relation of this event to the Girl Scout educational philosophy of the times:

Girl Scouting believes in the immense educational value of the small group, managing its own affairs and making its own plans as far as possible and learning in this way the first lessons of cooperation and good citizenship. (Girl Scout publication, April 1932, pp. 3–4)

In the background, personal and interpersonal information would likewise be needed to understand how the pictured event contributed to development of the community institution of Girl Scout cookie sales. By the 1990s, five varieties of Girl Scout cookies were among the top fifteen most popular cookies in America (according to the website of ABC Bakers, which has been baking cookies for the Scouts for over 60 years, and as of 1999, using 'ovens as long as a football field'). The national sales force has become 1 million girls, assisted officially by 400,000 adults (E. Christie, personal communication, 1991).

To illustrate the use of the focus-of-analysis approach, we present an investigation of the distribution of problem solving in Girl Scout cookie sales and delivery. We examined the ways that individual scouts, their mothers and customers, and cognitive tools and other institutional practices contributed to planning to remember four aspects in selling and delivering the cookies.

An Illustrative Study of Distributed Planning to Remember

We began our study of Girl Scout cookie sales and delivery as a 'real-life' analog of the imaginary errand-planning tasks that have been employed in laboratories (Hayes-Roth & Hayes-Roth, 1979; Radziszewska & Rogoff, 1988, 1991). With imaginary routes where circumstances are unchanging and known in advance, people can prioritize avoidance of unforeseen circumstances, however, efficient planning of routes seems to involve not planning too far in advance and instead creating local subplans that optimize flexibility (Fassolunghi, Brandimonte, & Cornoldi, 1995; Rogoff, Baker-Sennett, & Matusev, 1994). Most scouts delivered to small clusters of customers living in a particular direction, and returned home in between to deposit the boxes of customers who were not at home and pick up orders for the next cluster.

In the current paper, we focus on planning to remember what has already been done and what still needs to be done. The thinking involved in planning and keeping track of deliveries is related to the literature on *prospective remembering*, defined as 'processing that supports the realization of delayed intentions and their associated actions. As such, it is intimately associated with the control and coordination of future actions and activities' (Ellis, 1996, p. 1; see also Brandimonte, Einstein, & McDaniel, 1996; Ceci & Bronfenbrenner, 1985; Kreutzer, Leonard, & Flavell, 1975; Meacham & Leiman, 1982; Wilkins & Baddeley, 1978).

In imaginary planning tasks, planning to remember and developing strategies for keeping track of progress do not hold such obvious importance, because their timeframe is relatively brief, without intervening events that provide challenges for keeping track. In delivery of Girl Scout cookies, unanticipated consequences of current efforts

and other events create challenges to keeping track of progress, necessitating much greater attention to planning to remember than in controlled tasks.

Furthermore, in imaginary errand planning tasks, the cognitive tools provided by the researchers—maps of imaginary downtown areas and lists of errands along with handy pencils—have seldom been the focus of study, but play a large role in keeping track of progress in ongoing planning. A few exceptions are the work of Radziszewska and Rogoff (1991), which noted the extent to which participants made marks on the lists of errands to plan their routes and to keep track of what had already been done, and a study by Chalmers and Lawrence (1993), which examined planning an imaginary party with and without the use of a planning sheet provided by the researchers. As Rogoff, Gauvain, and Gardner (1987) pointed out, material tools and simulations such as maps, lists, and blueprints play key roles in planning, and have their own courses of development.

We quickly became aware of the cognitive importance of the order form provided by the cookie company, for the scouts to list the orders and the amounts that will be due later. The order form provided a key contribution to the process of planning to remember and to keep track, and its role became a focus of this study. Our study focuses on organizing information to plan for the future, as scouts, their partners, and the organization contributed to preparing orders for delivery, keeping track of completed deliveries and ones remaining to be done, determining the amount of money to be collected later, and keeping track of the money already collected.

Making the Observations

We observed the cookie sales and delivery process in two troops of Girl Scouts in Salt Lake City, Utah. (Scouts meet in 'troops' of about 10–12 scouts and one or two women leaders.) We first give an overview of the practice of cookie sales as organized by the scouting institution, and then we describe the participants and research procedure. We then describe the steps we took in the analysis of the extensive data set that resulted, describing the Functional Pattern Analysis methodology that we used to abstract general statements from the rich data of individual cases.

The Practice of Girl Scout Cookie Sales. The national Girl Scout organization was founded in 1912 and is dedicated to girls' moral education, development of home, academic, and outdoor skills, and career preparation (Kleinfield & Shinkwin, 1983; Penuel, 1996). According to the *Christian Science Monitor* (Atkin, 1990), 'the sale is considered an important educational tool for teaching courtesy, responsibility, goal-setting, business principles, and safety.'

By 1990, when we conducted our study,⁴ cookie sales by scouts were the organization's major annual fund raising effort. (See Rogoff et al., 1995 for an account of the historical development of the practice.) Girl Scout cookie sales are nationally recognized and widely advertised when the selling season arrives. Adults sometimes seek out scouts to make sure they get to buy cookies. Many female customers sold cookies in their childhood (as did three of the four authors); several customers reminisced about their own Girl Scout cookie selling to the scouts. In 1990, Utah Girl Scouts sold an average of 179 boxes of cookies each—the highest average in the nation ('Looking Back', 1991).

The Girl Scout organization and large baking companies licensed by the Girl Scouts of the USA provide organizational supports to the girls in their efforts to keep track

of sales, cookies, and money, and to manage their time and resources. The regional scout organization and the cookie companies train the 'Cookie Chairs' from each troop and provide sales incentives and materials designed to train scouts to become 'successful' salespeople. (These include institutionally sanctioned sales pitches, information on how to use the color-coded order forms, procedures for collecting money, and games for the scouts to practice their roles.)

The sales phase begins with the Cookie Chairs receiving the order forms provided by the cookie company from the national scouting office. On a specified starting date, a two-week period begins when the girls are encouraged to gather orders by going door-to-door and selling over the phone or at their parents' workplaces. About six weeks after the orders have been turned in by the Cookie Chair to the cookie baking company, the girls pick up the cookies from the Cookie Chairs and deliver them to their customers, collecting payment at the time of delivery.

Planning to remember is an issue when the girls face piles of boxes, the list of the orders they took weeks before, and a deadline to get the correct boxes to the correct customers. Delivery is a challenge, as one of the scouts noted to her younger sister who was helping with deliveries:

Delivering cookies takes so long and hardly anyone's home. If no one's home when you're ordering, you just say 'Oh, who cares, I won't sell to them then,' but with delivering it's impossible. . . . (She laughs.) I hope someone who bought three Samoas isn't home [because her mother would then have to buy these favorites and the family could keep them].

Our study examines the contributions of the scouts, their companions, and the institutions to the following challenging aspects of planning to remember: 1) organizing to-be-delivered orders, 2) keeping track of delivery progress and of deliveries yet to be made, 3) determining the amount of money to be collected, and 4) keeping track of collected money.

Participants and Procedure. Two troops of 10- and 11-year-old girls participated in the study. We have data for a total of 16 scouts (9 scouts from one troop, in which scouts sold a median of 138 boxes each [range 50 to 501] and 7 scouts from a troop in a less affluent neighborhood, who sold a median of 50 boxes each [range 0 to 167]).⁵ We combine the results from the two troops because no striking differences appeared between the two troops in the contributions of scouts, other people, and the organization in planning to remember.

By design, we observed in one troop and participated more centrally in the other. In the troop that we observed, the two troop leaders (mothers of two scouts) served as Cookie Chairs, with the help of a third mother. In the other troop (the less affluent one), three of us underwent the regional training and served as Cookie Chairs (and one of us was the mother of a scout in the troop). The responsibilities of Cookie Chair include orienting the girls for the sales, distributing and collecting order forms, ordering the troop's cookies, distributing them to the girls, collecting and depositing the money, and nagging the girls (and mothers) who do not meet deadlines.

We explained the study to the scouts in terms of our interest in understanding the complex and impressive decisions that kids make in this activity. In both troops, the troop leaders and girls were involved as collaborators; in fact, the girls of one troop suggested carrying tape recorders so we could listen in on the sales and delivery. While one of the researchers was explaining the study, a scout piped up, 'They are gonna follow us around in bushes.' The researcher replied, 'Well, the bushes is a

good idea, I hadn't thought of that. We'll wear camouflage. (Everybody laughed.) Then another scout suggested, 'We could wear tape recorder belts.' The researcher followed that idea with the suggestion of carrying a tape recorder inconspicuously in a notebook.

About half of the scouts recorded most of their sales trips, and most of the rest recorded some of their sales trips; however, few of the scouts recorded delivery trips. Some occasionally recorded preparations and planning at home, when they remembered to use the tape recorders.

The researchers also interviewed the girls and their mothers' about the prior year's sales—two-thirds of the scouts had sold cookies in at least one previous year—and about this year's strategies for sales and delivery. (In general, individuals reported following similar strategies from one year to the next.) Information was also available from the scouts' completed cookie order forms and from audiotapes of the weekly troop meetings.

Abstraction from the Observations, using Functional Pattern Analysis

We employed successive steps to abstracting the data, using Functional Pattern Analysis (Rogoff & Gauvain, 1986; Rogoff, Mistry, Göncü, & Mosier, 1993) to reduce the complexity of the data and use the most pertinent data to address our topic. We provide an overview of our use of Functional Pattern Analysis, because colleagues interested in methodology ask how we moved from in-depth analysis of naturalistic observations to coded data. The current analysis differs from Functional Pattern Analyses described in Rogoff and Gauvain (1986) and Rogoff et al. (1993) because the current data involved coordinating across multiple data sources regarding naturally occurring events (interviews of several people, audio-recorded events, records from completed order forms, and neighborhood maps), rather than describing videotaped episodes arranged by the researchers.

Functional Pattern Analysis integrates qualitative and quantitative approaches by systematizing case-based ethnographic data to discern patterns across the cases, while maintaining the sensitivity to the phenomenon that characterizes ethnographic work. It moves from the rich data of each case to generalizations across cases, based on successive rounds of abstraction that remove unnecessary details while retaining key information related to the question that the study addresses. A central aim of Functional Pattern Analysis is to be sure that generalized statements are grounded in the individual cases.

This method of analysis builds on Tukey's (1977) exploratory data analysis and ethnographic qualitative data analysis (Goetz & LeCompte, 1984; Miles & Huberman, 1984) and the work of a number of other researchers who have developed related ways of systematizing ethnographic or qualitative data (e.g., Cazden, Cox, Dickinson, Steinberg, & Stone, 1979; Green & Wallat, 1979; Mehan, 1979). In order to make general statements about ethnographic or qualitative data, Miles and Huberman advocated abstracting data from the idiosyncratic details of a case, and argued for the use of numbers when appropriate to characterize the textual data. In the present analysis, we summarize the data numerically. (Prior studies using Functional Pattern Analysis graphed and checked the strength of patterns statistically, in addition; see Rogoff & Gauvain, 1986; Rogoff et al., 1993.)

With our data, each step of analysis focused on examining the contributions of the scouts, partners, and the Girl Scout organization regarding planning and organizing

information for the future. The steps involved in abstracting the data for each case were creating synopses, developing an abstracting scheme, and coding the data in categories derived from the prior steps.

Synopses. The raw data—our maps of the sales and delivery trips, transcripts of the audiotaped trips, the interviews of the girl and mother, and copies of the order forms—were put into synopses by the four original researchers and a research assistant. Each synopsis, ranging from 15–45 pages, was a chronological narrative account of the approach to the task by each girl and her companions. Key topics were used to organize and focus the synopses (such as how the deliveries were kept track of by organizing orders and forms, how the amount that would be due later from customers was determined, and how routes were determined).

Every synopsis maintained a close link to the original data, by directly including the relevant selections from the raw data, but more coherently and concisely. For example, the following is an excerpt from one synopsis:

In her neighborhood, Mary made short delivery trips to a few houses at a time, putting orders in bags to carry them. She seems not to have marked the orders except occasionally with small orders, when she would put a rubber band around the boxes and put the name on a little stickum pad on them. (She says she thought this up. But it doesn't seem to be used for many orders.) In the Capitol Hill neighborhood, Mary would just have the cookies unsorted by order in boxes in the car, and compose each order as she got to it. When Mary and Louise went together, there were occasional complications from having both girls' sets of cookies in the same car. They tried to handle this by having one in the front seat and one in the back. But there were two little mixups anyway.

All cases were independently checked by at least two researchers for completeness and accuracy of the information relevant to our topics. Disagreements were few, but occasionally information was missed by one summarizer and caught by another.

Abstracting Scheme. Based on the synopses, the researchers developed a common language—the abstracting scheme—to use across the cases. The abstracting scheme was a series of questions targeted to our topic, which was designed to further sort relevant information for each case. For each case, the questions prompted us to write down every instance of evidence of the contributions of the scouts, partners, and the institution to each of four 'tasks': organizing orders for delivery, keeping track of delivery progress and deliveries yet to be made, creating a record of the amount of money to be collected later, and keeping track of money collected. For example, the abstracting scheme begins with the question 'What were the roles in organizing the to-be-delivered cookies by order?' For Mary's cases, the following notes relevant to this question were made, along with the page numbers in the synopsis where the information was found:

- Sometimes Mary put orders for a few nearby customers in bags to bundle orders.
- Occasionally she used rubber bands and post-it notes with customer names. She says she thought this up.
- She did the bundling herself.
- Her mother says this was when it was close to home; Mary just took a few orders at a time.
- Their more common strategy was to have unsorted boxes in the car.
- Mary reported that last year they just drove the boxes around in the car.

We concentrated on responsibility for decision making, not who actually carried out the decisions. For example, we focused on who was responsible for determining how to group the boxes of cookies into orders; involvement of a person who merely 'fetched' boxes of cookies for an order, under direction of someone else, was not of interest.

Coding in Categories. We further organized the data from the abstracts by creating categories and coding tables to examine contributions to each of the four cognitive tasks. The categories were developed on the basis of what we learned in creating the synopses and making the descriptions in the abstracting scheme. Contributions of the scouting organization/cookie company were indicated as present or absent, and the extent of contribution of the scouts and their companions was coded as none, solo, main, or minor, for each approach to these four tasks:

1. Organizing the to-be-delivered orders
 - Bundling up each customer's boxes of cookies and labeling them with the customer's name or address.
 - Other strategies for organizing orders (grouping orders by the region or sequence of deliveries or putting together the orders at the customer's home by driving the cookies in a car).
2. Keeping track of delivery progress and deliveries yet to be made
 - Checking off the order once a delivery was made.
 - Prompting tracking by someone else by reminding someone to check off completed deliveries, or requesting someone to recap the completed deliveries or to describe upcoming deliveries.
3. Developing an advance record of the amount to collect when cookies would be delivered
 - Completing the calculation box on the order form, indicating the price for 1 box (\$2.50), 2 boxes (\$5), 3 boxes (\$7.50), and so on up to 12.
 - Determining the amount due for each sale, in reference to the calculation box or in talk-aloud calculations.
4. Keeping track of the collected money
 - Keeping track of collected cash and checks during the delivery process.
 - Verifying that the amount collected matched the number of boxes delivered, at the end of the delivery process.

Reliability. To evaluate intercoder reliability, we examined the independent judgments of two coders for 13 cases. Each coder made independent coding decisions based on their own synopses and abstracting schemes; thus the reliability estimates give an indication of agreement on the synopses and abstracting schemes as well as the coding. The codings of the contributions of the scouts and other people were then compared using Cohen's kappa. A few variables with low reliability were eliminated; the kappas of variables used are all in acceptable ranges (Gelfand & Hartmann, 1975): strategies of organizing the cookie orders for delivery, .64 to .78; keeping track of the delivery process, .65 to .80; creating a record of the amount due later, .75 to 1.0; keeping track of the collected money, .80 to .90.

What Were the Contributions of Scouts, Others, and the Organization?

The distribution of planning responsibility was visible in the important contributions noted in each of the three foci of analysis—the personal, interpersonal, and

institutional—as the scouts, their parents, their companions, and the Girl Scout institution contributed to the cookie selling and delivery process. Distribution of responsibility for planning to remember predominated in all four tasks and in each case.

Contributions to Organizing the To-be-Delivered Cookies by Order. The task of organizing the boxes of cookies for delivery occurred with key contributions from the scouts, their mothers, and the scout organization/cookie company, with occasional assistance from others.

The contribution of the *scout organization/cookie company* included the arrangement of the order form and the products in ways that facilitate organizing the orders. The order form had a color-coded column for each of the 7 different kinds of cookies (for example, with green as the background color for thin mints). This same color was repeated on the cookie boxes themselves (that is, thin mints came in a box with a dominant green background color) and the cardboard cases containing multiple boxes were also printed in the same color (so a dozen boxes of thin mints came in a case with green ink indicating the contents). The color coding was explicitly used by some of the scouts in organizing the boxes and cases of cookies.

The participants usually organized the orders by bundling them in advance of delivery (in 13 of the 16 cases). They sorted the boxes of cookies destined for each customer, fastening them together with rubber bands or masking tape or placing them in bags, and labeled them with the customer's name and address and sometimes the amount due. In about half of the cases in which bundling occurred (7 of the 13 cases), the *scout* took sole responsibility for bundling the boxes of each customer's order. In the other half, the *mother* took either sole or major (4) responsibility for bundling the orders, or shared responsibility roughly evenly with the *scout* (2). (The only other people involved in bundling were one scout's sister and friend who played minor roles.)

The idea for bundling the orders was usually attributed solely to *other people* in the 10 cases on which we have such data (the mother in 4 cases and the father, friend, or neighbor in 3 cases), although the *scout* took solo or shared credit in 3 cases. Sometimes it was difficult for participants to distinguish whose idea bundling the orders was, as with one mother who responded, when asked where the ideas for bundling came from, '[They were] mine. . . . No, maybe they weren't mine, I think. She thought of most of the ideas. . . . But I gave them to her 2 years ago.'

Two other strategies for organizing the orders besides bundling were used occasionally. In 3 cases, the *scout* alone (2) or *with her mother* (1) grouped the bundles by the locations of the deliveries. In 5 cases, the *scout* and a *parent* put the cookies in a car and drove them around, putting together the orders only upon reaching the customer's home (the parent drove and sometimes also directed the scout in putting the order together).

Contributions in Keeping Track of Deliveries Made and Yet to be Made. The scouts, their mothers (and occasionally other partners), and the scout organization/cookie company all played important roles in tracking completed deliveries and those yet to be done.

Key to the process was the organization of the order form by the *scout organization/cookie company*, with a tracking column for checking off completed deliveries. At the top of a checkoff column, the order form instructed, 'CHECK WHEN PAID.'

The *scouts* seemed to take the most responsibility for tracking progress in delivery, with *mothers* and *others* helping keep track and prompting the scout to use some track-

ing strategies. The scouts were always involved in checking off completed deliveries and usually others were also, in the 8 cases where we have full information—5 scouts were the only people to check off deliveries and 3 collaborated in checking off deliveries with a mother or sister. Half of the scouts received reminders from others to check off deliveries, and their mothers also asked them to recap the completed deliveries and to track the deliveries that remained to be done. For example, one mother asked the scout which deliveries had been made and went over 3 recent deliveries to get them checked off. Another mother asked 'What more do you have?' and the scout then recapped the deliveries remaining to be done.

Contributions to Developing an Advance Record of the Amount to Collect when Cookies would be Delivered. Determined at the Time of the Sale. This aspect of preparing the information needed later was distributed across the scout organization/cookie company, cookie chairs, scouts, their sisters or scout buddies, and customers. (Parents rarely accompanied scouts on sales trips, which is when the calculations occurred.)

The scout organization/cookie company played a central role in preparing for the determination of the amount that would be due, by laying out the customer's line on the order form in columns that specified the number of boxes purchased and then the total amount due for each order. Literature from the cookie company (including on the back of the order form) directed the scouts to have the customers fill out their own amount due; this was rehearsed with the girls by the Cookie Chairs. This order form led record of what would be due later was completed in almost all cases, providing the scouts with a record of the plan to use at the time of delivery.

The order form from the cookie company also provided a calculation box at the top, with blanks for the price for 1 box, 2 boxes, 3 boxes, and so on up to 12, for the scouts to fill out before they began selling. The calculation box was in essence a tool provided by the cookie company to help the scouts develop a plan to remember the prices in the multiples that would be needed. In fact, not all scouts filled out the calculation box (8 of them filled it out completely; 3 filled it out partially, 4 did not fill it out at all, and I used a pocket order form that did not include the calculation box). Most who filled it out did so correctly.

During the time of the creation of the record of the amount that would be due, customers and scouts both referred to the calculation box provided by the organization, through the order form, to help them develop a record of the amount that would be due in the future. For example, as one customer began to determine the amount due, a scout suggested, 'There's a price thing in the corner there.' Reference to the calculation box during the (limited) available tapes seemed to be done about equally by customers and by the scouts. One scout had filled out the calculation box incorrectly, and usually warned customers away from using it, but a customer who had been a scout herself engaged in an extensive conversation to try to get the scout to correct the calculation box.

The out-loud calculations of the amounts that would be due at the later time of delivery were primarily carried out by the customers—which is not surprising given that they were supposed to fill out the amount due box. Customers sometimes asked the scouts to verify the amounts the customers calculated. In some cases, the scouts themselves or their companions (sisters or other scouts) also carried out some calculations. The fact that customers often calculated the amount that would be due out loud (rather than only silently) provided a chance for the scouts to participate together with the customers in verifying the process of developing the written record that would

later serve as the plan for collection of money.⁷ The order form and organization may have encouraged such talk-aloud calculation—probably inadvertently, as customers were encouraged (by the order form and the organization's training of the scouts) to create the record of the amount that would later need to be collected by the scouts, while the scout made the sale.

Contributions in Keeping Track of the Collected Money. Contributions to keeping track of the collected money were made by the scout organization/cookie company, the scouts, their mothers (and once, a father), and the Cookie Chairs.

One aspect of keeping track of the money was safeguarding the cash and checks collected during the delivery period. The scout organization/cookie company contributed by providing each scout with a manila envelope for the collection of the money. Most of the scouts (10 of the 16) played the role of actually storing the money in this envelope or some other receptacle; the other 6 shared this responsibility with their mothers or occasionally a Cookie Chair.

Another aspect of keeping track of the money was verifying, at the end of the delivery process, that the amount collected matched the number of boxes delivered. The scout organization/cookie company provided a column to indicate the amount due from each customer and formats on the order form and the collection envelope for summing up the amounts due. In 10 of the 16 cases, adults (8 mothers, 2 Cookie Chairs) counted the money by themselves, with no or very little involvement of the scouts. In the remaining 6 cases, scouts counted the money, with their mothers playing a minor role (4 cases) or no role (2 cases). Given that the parents signed for the responsibility for the money owed, it is not surprising that they played an especially large role in counting the money collected.

In most cases, the amount was correct. The few problem situations arose from difficulties in keeping track of who had been and who needed to be delivered to (or from siblings eating boxes of cookies they had not paid for), rather than actually miscounting or losing money.

Discussion: Distributed Planning to Remember

Throughout the four aspects of planning to remember in Girl Scout cookie sales and delivery, there were usually contributions from the scout organization/cookie company as well as at least 2 active people. None of the four cognitive tasks was consistently completed by a single individual acting independently of other people and the organizational supports.

The scouts were primary participants in all four tasks, and so were mothers and customers, all of whom relied extensively on the cognitive organization provided by the order form provided by the organization. Different people took varying roles in the four tasks, but in all of the tasks, thinking extended across several people and the cognitive tool of the order form. The order form organized the sales and deliveries by order, supporting the mothers and scouts in organizing the orders in advance of delivery. The order form provided a column for keeping track of delivery progress, and this was heavily used by scouts and mothers. Creating a record of the amount of money to be collected later was organized by the format of the customer's line on the order form, prompted by the scouts and supported by the calculation box on the order form, which provided scouts with a way to prepare a strategy to support the customer's calculations—in which the customers often involved the scouts. In keeping track of the

amounts collected, the scouts used the tool provided by the organization to safeguard the collected money during the collection process, and the mothers used the format on the order form for making sure at the end that the collected money matched the amount that the family owed.

The national Girl Scout organization, along with the scouts and their mothers and customers, had key, mutually involved roles throughout the process. We are most interested here in discussing the role of the order form, because the contributions of such cognitive tools are often taken for granted in research on cognition. Cognitive tools clearly play a key role in the process of thinking, themselves developing through the practices of their users.

Development of Cognitive Tools across Generations

The order form, a cognitive tool central to Girl Scout cookie sales, developed over decades into today's cookie order form. Personal, interpersonal, and community/institutional contributions can also be discerned in the development of this cognitive tool—not just in its use by the scouts whom we studied.

Individuals contributed to the development of the advance ordering system, requiring a record of the order, from the earlier practice of delivering cookies at the time of the sale.⁸ The advance ordering system apparently arose—in the Utah region at least—from issues faced by individuals and institutions in the earlier system:

Unfortunately, they occasionally miscalculated the number of boxes they could sell and a distraught cookie chairman was left with a garage full of cookies which she had to return to the manufacturer. This problem was remedied when they switched to pre-order sales in the 1950s. (Lund, 1986, p. 69)

In other regions, by the 1930s, scouts used a simple order stub for the purchaser to sign when ordering, and gave a sticker to the purchaser to put in the window to give notice that the household had already purchased cookies. By 1971, in Newton Massachusetts, a brochure provided calculation information for the Cookie Chairs (1 box . . . \$60, 2 boxes . . . \$120); later in the 1970s, the order form for that area had a chart for orders with a checklist and a calculation box for the scouts. By the time we conducted this study, the order form was a large color-coded glossy folded form that included many features to facilitate the scouts' cognitive work.

The transformations in the order form may not have occurred through careful study of the cognitive processes involved. According to the person in charge of cookie sales for the Utah area from the Little Brownie Bakers (of Louisville KY), a sales representative meets yearly with the Girl Scout Council to present any new ideas for changes in the order form or type of cookies to be sold. The Girl Scout Council itself sometimes makes small suggestions about modifications, but this is rare. The cookie company does not make any effort to ensure that the form is manageable for young children; company officials reportedly believe that young children are quite skilled, so few extra efforts need to be made to ensure that they will handle the task efficiently. Thus the design of the cognitive supports provided by the order form are likely to be pragmatic rather than closely built on cognitive developmental analyses of the salespeople.

Some developmental considerations appear in the ages of the salespeople. In some states, cookies are sold by Brownie Scouts as young as first grade, who are expected to follow the same practices as the older Girl Scouts. This early entry into the sales is

controversial, perhaps due to the challenges that this complex task may pose to such young children—and to their mothers and scout leaders, who as we have seen in this study are an essential part of the process. With very young children, the roles required of adults may become overly burdensome to the adults.

In any case, our results made it clear that the distribution of problem solving was not just across people who were in each other's presence but also included the contributions of technologies provided from a distance (in time as well as space). The organization of thinking provided by the cookie order form and the organization's instructions to the participants were central in both setting the cognitive tasks and providing strategies to handle them.

Cognitive Tools as Naturalized Culture

Cultural practices and material artifacts such as order forms, books, computers, mathematical procedures, and hammers are essentially social, historical objects. They transform with the ideas of both their designers and their later users, forming—and being formed by—the practices of their use, in historical and anticipated communities (Brown & Duguid, 1994; Gauvain, 1993; Rogoff et al., 1994; Wertsch, 1991). Artifacts amplify and transform as well as constrain human activity as the artifacts participate in the practices in which they are employed (Cole & Griffin, 1980; Karasavvidis, 1999; Wertsch, 1991).

Cognitive tools are representatives of earlier solutions to similar problems by other people, which later generations modify and apply to new problems, extending and transforming their use. Inheritors often take cognitive tools for granted, assuming that this is the way things are in some 'natural' sense. Berger and Luckmann (1966) pointed out that expected and accepted approaches become institutionalized as humans come to regard them as external to their functioning. Shotter described such institutionalization of accepted practices:

The *institutions* we establish between ourselves and others . . . implicate us in one another's activity in such a way that, what we have done together in the past, *commits* us to going on in a certain way in the future. . . . The members of an institution need not necessarily have been its originators; they may be second, third, fourth, etc. generation members, having 'inherited' the institution from their forebears. And this is a most important point, for although there may be an intentional structure to institutional activities, practitioners of institutional forms need have no awareness at all of the reasons for its structure—for them it is just 'the-way-things-are-done.' (1978, p. 70)

For example, literate people often take for granted the tool for thinking that written composition provides. However, this cognitive practice has evolved through the centuries from earlier roots in oral traditions, along with material inventions, in a collaboration of people extending over great periods of time. Before the Middle Ages in Europe, all elaboration of the ideas and expression of text occurred before the material was set to written form (Alcorta, 1994). The person who composed the text was not the one who wrote it—the author merely dictated it to a scribe who wrote it exactly on the parchment. In the Middle Ages, it became possible to work with an intermediate draft—with the innovation of using a wax tablet—and some authors began to fill all three roles: the composer of the text, the writer on the wax tablet, and the transcriber to parchment for the final, neat document. It was not until recently (the 1880s, in France, for example) that schoolchildren were expected to express themselves in writing, rather than only using writing to put lectures to paper. But soon, by

the middle of the next century, authors thought with their pencils and probably seldom regarded this as anything but natural.

Wertsch (1998) pointed out how unaware we usually are of the contributions, origins, and effects of the cognitive tools that we use, with this compelling example:

Consider the following multiplication problem: 343
× 822

If asked to solve this problem, you could probably come up with the answer of 281,946. If asked how you arrived at this solution, you might say, 'I just multiplied 343 by 822' and you might show me your calculations, which might look like this:

343
822
686
686
2744
.....
281946

... Was it really you (i.e., the isolated agent) who solved the problem? (After all, you said 'I multiplied...') To see the force of this question, ... consider what you would do in response to the request to multiply 343 by 822, but without placing the numbers in the vertical array used above. Most of us would be stumped at this point. ... A seemingly slight change in how the problem is written out seems to make our ability to multiply disappear. ...

The spatial organization, or syntax, of the numbers in this case is an essential part of a cultural tool without which we cannot solve this problem. In an important sense, then, this syntax is doing some of the thinking involved. We might be unaware of how or why this syntax should work, and we might have no idea about how it emerged in the history of mathematical thought. In this sense, we are unreflective, if not ignorant, consumers of a cultural tool. The extent to which our performance relies on it, however, quickly becomes clear when it is not available. This leads me to suggest that when asked who carried out such a problem, the more appropriate answer might be, 'I and the cultural tool I employed did.' (pp. 24–25)

Distributed Cognition in the Laboratory as well as Out

The 'naturalness' of institutionalized practices makes it very difficult for the users to notice the tools and traditions that they use. This contributes to the difficulty for researchers to notice our own contributions to laboratory observations, as well as the contributions of our research traditions and the institutional roles of 'subject' and 'experimenter'.

In laboratory studies, distributed cognition occurs as a researcher instructs the 'subjects' regarding the goals of the task and the means that are allowed for reaching the goals, both in direct conversation and in the materials and tools that are available. Likewise, the researchers' provision of maps of downtown areas for planning errand routes is a cultural contribution to the cognitive process. (Indeed, planning routes on maps is quite different than planning routes through known neighborhoods, as the scouts made clear when we asked them to generate maps of their delivery routes to supplement our recordings—even those who were quite deliberate and knowledgeable about their routes struggled to create bird's-eye-view maps of their routes.)

Researchers serve as collaborators in children's test performances more generally (Newman, Griffin & Cole, 1984; Scribner, 1976). For example, they attempt to tailor the problems on which children work to their age level or abilities (Tudge & Whithoff, 1993). The researcher's materials, instructions, and experimental script are

a form of communication with the children regarding what they are to do and how they are to do it.

In addition, academic practices of laboratory research make institutional contributions to cognitive processes in such studies. For example, 'subjects' accept the constraints on methods of solving the problem given by the experimenter, rather than asking the experimenter for advice or changing the problem by leaving the lab to get their own tools. Some focus has developed on the institutional aspects of the experiment, academia, and scientific inquiry from sociocultural perspectives (e.g., Bell, Gossen, & Perret-Clemont, 1985; Lave, 1988; Matusov, Bell, & Rogoff, in press; Pepper, 1942; Ravetz, 1971).

In conclusion, we suggest that it is fruitful to investigate—in laboratories and outside them—the mutual contributions of individuals, their relations with social companions near and far, and the cultural institutions and traditions in which they participate. We argue that the contributions of individuals, their partners, and the community can fruitfully be the focus of particular analyses, with recognition that the roles are mutually defined, rather than stand-alone elements that later 'interact.' To understand the role of each requires some background consideration of the roles of the others. Our argument, illustrated with Girl Scout cookie sales and delivery, is that thinking is a mutually constituted process of active individuals engaging with others and with the community/institutional tools of their predecessors in ways that build on and transform their own efforts as well as the practices of their communities.

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Notes

1. Statistical tools remain very useful, in this view, but the assumptions carried by these tools are not adopted as a statement of reality regarding the phenomena observed. Thus, in our sociocultural view, statistical tools are artifacts that can be used to support the thinking of researchers—but as with all sociocultural tools, they constrain as well as support thinking. The assumptions built into use of such tools should be examined rather than unreflectively accepted as features of the phenomena we are trying to understand. (See also Rogoff, 1998; Rogoff et al., 1993.)
2. With help from Karin Aronsson in the change in terms.
3. Several other origin stories are claimed by other regions of the country, however (see Rogoff et al., 1995).
4. We write of the situation in 1990 in the present tense, though of course, practices continue to evolve, and some features have changed by the time you read this.
5. All but one girl in each troop participated in the cookie sales (these two were not allowed by their parents to participate in this scouting activity). Two other girls participated in the cookie sales but declined to participate in our study. Another two girls did not provide sufficient data to include.
6. Our observations indicated that most mothers had some involvement, and only a few fathers did.
7. Listening scouts may have benefited from customers' and companions' talk-aloud calculations, which sometimes modeled the strategy of thinking of 10 as 10, plus 2 more, that's 15). Occasionally, a customer began using a column multiplication method as in standard arithmetic (for example, for an order of 4 boxes: '2.50 times 4. OK, 4 times 0 is...') and then switched to treating \$2.50 as a quarter of 10 (for example, for an order of 3 boxes: '2.50 times 3 is... two is \$5, so \$7.50')—giving scouts a chance to overhear the thought process involved in selecting a strategy for dealing with this particular type of problem. Simplification of the \$2.50 calculations to a quarter of 10 rather than column multiplication is reminiscent of everyday math strategies that build on the structure of monetary or marketing systems, by dairy workers, shoppers in US grocery stores, candy sellers on the streets of Brazil, and other out-of-school calculations (Guberman, 1999; Lave et al., 1984; Nunes, Schliemann, & Carrther, 1993; Saxe, 1991; Schreiber, 1984).
8. Ordering in advance seems to some audiences particularly 'American'—and apparently does not characterize scouting sales activities in several other nations.

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