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**ANTHROPOLOGICAL VISION AND
RESEARCH LOGIC:
AN EPI INFO PRIMER
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INTRODUCTION

An Example of Interdisciplinary Analysis: The Need and the Opportunity

This work draws on some of the results of the seminar held in the fall of 1997, *The Life Course and Intergenerational Relations in Contemporary Africa* at the Program of African Studies, Northwestern University. Several African Demographic and Health Surveys individual recode data sets were converted into Epi Info, a statistical/data entry program created by the Centers for Disease Control. The analytical potentials of this program were used to promote interdisciplinary collaboration between anthropologists and demographers to develop a life course approach to fertility.

The 1980s and 1990s have seen a quantum leap in the number of surveys of demographic and economic dynamics carried out in non-Western countries, financed largely by USAID and The World Bank. Although the analyses are preliminary, they seem at once to confirm and undermine established theories of economic development and the demographic transition. In particular, as Africanists we are faced with the challenge of now knowing in some quantitative detail that African development only partially tracks established pathways of growth and change in the modern era. Regardless of theoretical persuasion, we are all now implicitly working with a concept introduced by cultural theorists, namely “alternative modernities,” which transposes theories of a unitary and replicated modernization process. It is the unexpected combination of general and particular characteristics in the course of modern change that puts a new premium on bringing together disparate and theoretically opposed approaches.

At the same time, opportunities for new scholarship on these issues have been created. Internet posting and new analytical technologies have made survey data realistically accessible and in more comprehensive detail to a wider range of scholars than ever before. Cultural and historical research has developed critical approaches to standard methods, and in all disciplines there is an increased participation of non-Western scholars. This convergence of conditions in intellectual life opens up an unprecedented possibility for interdisciplinary analysis, synthesis and debate. Hence, there is need for experimental methods of study to which this primer is a contribution.

Preceding the seminar, Bledsoe had explored the potential that Epi Info offered to anthropologists working on demographic data. Through experimentation with the program and extensive discussion, we reached a consensus that in order to broaden and deepen discussion, the potential of the program to facilitate flexible interdisciplinary thinking was worth conveying to others. The anthropologists in the seminar became convinced that the large data sets, collected according to standardized procedures, could be mined for cultural and social insights, contrary to the usual critiques from our discipline. And the demographer and sociologist became convinced that the kind of insights gained could refocus their own efforts in certain respects. Hence the idea of a primer emerged: an introductory guide for people trained in either anthropology or demography/sociology to extend critique and debate across the disciplines.

By working through a series of schematic examples from the DHS data sets, we aim to show how one can make use of the rapid maneuverability of the data for exploratory analysis in ways that follow iterative anthropological logic, as well as drawing on statistical methods. Rather than working through the classic interdisciplinary collaboration, with Epi Info, one now can work through complementarity of logics between classically quantitative and qualitative approaches. This is possible because the technology can be made to approach the speed of the mind, giving full reign in finding questions to ask, testing hypotheses and drawing comparisons across subgroups of populations and countries. By moving back and forth from exploratory to standard statistical modes, each is tested by the other, thus eroding the barrier between quantitative and qualitative enquiry. We hope that a concrete example such as the one we describe will encourage a much wider range of social scientists to take advantage of the new opportunities that now exist.

Disciplines and Logics of Enquiry

It is useful to point out our long term discussions have been very salutary in that we have discovered whole ranges of convergence, divergence and sheer ignorance of both classic and current work in our respective disciplines. Basic epistemologies in both disciplines have explicit and conventional dimensions, many of which we had to unpack in order to express both the differences and the unities. We

are not yet fully knowledgeable in each others' disciplines, nor are we in agreement on all points. But we do agree that without attention to underlying logic, the case analyses presented here would be diminished in their intended role as exemplars of navigation through observations, hypotheses, inferences and cross-checks, that could be extrapolated to completely different domains of enquiry.

The designations of "quantitative" and "qualitative" do not refer only to method in the narrow sense of techniques. They indicate different basic assumptions. The quantitative social sciences have found their maximum analytical potential to be realized through methodological individualism; individual behavior is the unit to be characterized and measured. Anthropology, by contrast, has always started with the social relationship (in social anthropology) and with culture and language (in cultural anthropology). The tensions and connections between the two approaches and the efforts that their practitioners make to create a viable space for experimentation are constantly shifting. In this era of resurgence of rational choice theory and methodological standardization in the social sciences, there is now a wide spectrum of theory within the social sciences with respect to how deeply relationships, cultural concepts and social institutions influence the framing and interpretation of research.

In order to work on the complementarities our own solution is to typify, perhaps beyond what is warranted, for clarity and economy in the presentation of the material, we use particular works to stand for whole disciplines. Since the DHS stands as one prime example of vital work within contemporary demography, and its authors are impressively open to secondary analysis of the primary data, herein we address "demographic analysis" as it is instantiated in those surveys and the analyses that typically work from them. Conversely, we take the analytical position as manifested here - even though it might well be considered equally debatable or incomplete within anthropology - to stand for "anthropological analysis." These are shortcuts, necessary for exposition and subject to our continuing reservations about them.

Outline

The primer addresses interdisciplinary work on two levels. It outlines and exemplifies anthropological modes of thinking, and how those can be applied to numbers through the capacities of the Epi Info program. At a more practical level it uses particular material to guide the reader through setup and analysis.

Section I briefly describes the relationship between sociocultural anthropology and quantitative methods, as these enterprises have been practiced in recent decades. Then, focusing on elements of thinking that could create a new relationship between the two enterprises, it considers some of the features of Epi Info that facilitate this. Section II describes an example from the Demographic and Health Surveys, contraceptive use in Sudan, where this type of thinking is put into practice. To supplement the DHS analysis and illustrate a critical feature of Epi Info, this section also includes a small piece from a survey from the Gambian projects¹ that displays open-ended commentary. Appendix A provides some tips for fluid movement within Epi Info files. Appendix B, a technical section, describes a method of converting SPSS files into Epi Info files through the use of DBase and DBMS/Copy.

¹ This project, conducted in 1992-95 in collaboration between Caroline Bledsoe and Allan Hill, began as a study of the use of high-technology Western contraceptives. The initial findings were that these contraceptives, which are exported to Africa to limit fertility, are actually used for very "African" purposes, to ensure the survival of many children by spacing their births carefully. Subsequent findings from the study will emerge in the proceeding pages of this primer.

I. ITERATIVE THINKING AND THE USE OF EPI INFO: QUANTITATIVE AND ANTHROPOLOGICAL RESEARCH CONVENTIONS

A Thumbnail Sketch of Assumptions

Although their methods may differ markedly, quantitative conventional practices and ethnographic methods are rigorous in their own ways. Both derive inferences based on evidence and test these inferences. They tend to work, however, with alternative, even competing, assumptions about the research process and the investigator's relationship to the data, with different assumptions about human behavior.² Let us look first at some of the characteristics of research methods that tend to characterize the quantitative social sciences.

1 • QUANTITATIVE RESEARCH PRACTICES

The tension between centrality and variation is key to all the social sciences, with variants proving the rule by following the lines predicted from a principal thesis. In any particular quantitative study the logic is one of applying standardized techniques to universally-defined variables, to make arguments about behavior on the basis of descriptive and inferential statistics. In a survey, key variables are incorporated into questions and a range of response choices is created to derive the variation by which to test hypotheses. In conducting the survey, questions are organized into certain thematic clusters that will facilitate subsequent analysis; in demography, for example, they are grouped into "background" or "socioeconomic information," "marriage," "fertility preferences." The interview proceeds in the order the questionnaire writers deem logical by these analytical criteria, and it is drafted with the wording and flow that the investigators predict will make sense in a conversation. After the questionnaire is administered, recodes may be used to group myriad variants into manageable categories and to group together responses that occur in tiny numbers. Anthropological methods are increasingly used in quantitative work, with increasing confidence and insight, to help define variables accurately, and interpret quantitative findings. In general, however, they are used to explore what are seen as discrete qualitative dimensions of behavior in ways that do not enter into the statistical analysis itself.

For the purposes of statistical analysis, much of the work in the quantitative social sciences treats a person as a modular actor, an independent case conditioned by discrete and identifiable characteristics and motivated by calculative intentions. While considerable nuance can be included by imaginative specification of relevant variables, the basic model is that the person is a locus of self-referential information, separate from the immediate contexts in which action takes place.³ Explanation rests on using the list of variables to identify the logic in which action is rational, according to current established understandings about the world. Prediction projects into the future the aggregate pattern of past decisions.

The identification of "background characteristics" is partly conventional, resting on classic theories of social morphology and socialization, much as Parsons (1964:207-226) described in his discussion of the "socialized actor." That is people who have had more socialization in, or exposure to, a certain value are likely to behave in ways that are consonant with it. Exposure is indexed by one's position in the social order: by class; gender; urban/rural residence and so on. While the model allows scope for individual personality and experience, the predominant assumption is that action stems from the individual's composite absorption into a social role. The model is highly flexible. The variable "years of

² These practices have evolved as part of the culture of today's research climate. They are not inherent to the methodological or theoretical bases of the disciplines.

³ Despite the overall tendency toward individual analysis, some important examples of multilevel research have focused on individuals nested within families, families nested within households, households nested within communities, communities nested within provinces/states, provinces nested within countries, etc. Examples on the topic of contraception include Hirschman and Guest, 1990, Entwisle et al. (1989, 1996, 1997), and Steele et al., (1996). Almost no studies of this kind, however, have used the DHS, even though the variables are available to do so.

education” is accorded particular prominence as a summary of a woman’s understanding of her place in society and its implications for fertility behavior. Increases in schooling for women and girls are said to contribute to greater empowerment of women, a postponement of the age of marriage and a reduction in the size of families through the use of modern contraception.

2 • ELEMENTS OF THE ANTHROPOLOGICAL TRADITION

Like the quantitative disciplines, sociocultural anthropology is also interested in core relationships and it often deals implicitly with questions of quantity. At the core, however, its practitioners are looking for the special characteristics of cases that will extend the range of understanding and imagination with respect to social life and cultural meaning. Anthropology tends to assess the significance of phenomena on grounds of logical coherence, expressive centrality, or transformative power, rather than on their magnitude or frequency. Once a topic is identified, anthropologists typically begin description from terms that exist within the culture itself. Since few of the cultures we study extend enumeration to domains of life in the ways that we do, skepticism has been expressed by the leadership of the discipline about counting things without respect to cultural and historical context and meaning (see Sahlins 1983:519). As a result of such attacks, cultural anthropology, while not in principle opposed to quantification, affords it a far less prominent place in the toolkit than other social sciences. The possibility of mutual support between quantitative and cultural evidence was, in fact, developed within social anthropology, but a sharper polarization has occurred over the past two decades, due to the rise (in one camp) of a reductive version of rational choice theory with its attendant reification and measurement scales, and (in the other) a deconstructive stance towards all descriptive categories, even to the point of discounting empirical evidence altogether. These developments have driven the two methods into two quite separate theoretical camps, where contemporary anthropological practitioners see the use of numbers and the achievements of cultural insight as mutually exclusive enterprises. Indeed, many anthropologists see the use of numbers and statistics as the tools of nomothetic analyses that, in attempting to establish universal scientific truths, dismiss localisms and flux as minor variations on grand themes.

Since the basic assumptions of anthropological research design are seldom spelled out, it is worth devoting a section to addressing them in more detail than the assumptions of quantitative methods. These assumptions include the fact that the subject is interactive rather than modular and the necessity for constant iterative thinking within research due to the expectation that our own concepts and criteria of importance are likely to diverge from those of the people in the study. These assumptions are quite general to the discipline, regardless of specific theoretical conviction and they entail characteristic modes of working. There exists an open-ended approach to most components of the enquiry, a value placed on the production of “redundant” data, and a consistent attempt to listen for people’s own “voice” and to pay particular attention to “anomalies.” One can easily see how these approaches could be understood as contrasting sharply with those of survey methods. Since our effort, by contrast, is to show how they might be used precisely on survey data, it is worth spelling them out in detail.

Interactive persons

The central unit of analysis in anthropology has always been either the social relationship or a cultural entity. Contemporary anthropology views persons as interactive, engaged in relationships that are mediated through their own concepts of meaning. An interactive person is networked in time and social space, and engages in the creation of meaning. A person is a recipient of transactions initiated elsewhere and previously, an initiator of actions that are linked in purposive ways to a future, and an interpreter of these actions. The interactive person lives not only in a position within a structure but navigates temporary conjunctures of events. Such persons are viewed not so much as rational in a universal sense but rather as reasonable in a particular sense. They think through and assess how to go forward in their own contexts. They work from cultural templates but they have far more of these templates in view than a unitary structural model would imply, and they maneuver fluidly and imaginatively within and between them.

Over time, through circumstance and people's own rethinking, the repertoire of templates that guide action will be transformed. The search for explanation thus involves identifying orientation or what people are trying to achieve, given the entire configuration of their situations in life and the meaning given to them. In this primer, for example, much of the analysis follows closely the logic of what is called the biological "proximate determinates" approach to fertility in demography (e.g., Davis and Blake, 1956; Bongaarts and Potter, 1983). However, instead of seeing biology as placing irrevocable limits on behaviors, we emphasize actors' efforts to maneuver within biological parameters for reasons specific to their situations.

Modular and interactive views of the person offer different angles on the same phenomena. The first offers powerful methods to detect aggregated patterns in the variables, the interactive model asks how life situations are configured in contexts that may differ from those that conventional views of background variables have suggested. Cast in a navigational metaphor, this involves a shifting of mental planes, from a "God's eye" view of a surface far below to the perspective of a navigator attempting to maneuver on the surface itself.⁴

Iterative thinking and the expectation of being wrong

If anthropology's foundational rationale can be boiled down to one premise, it is this: we can be profoundly misled by our preconceptions and, therefore, need techniques that allow us to be systematically skeptical of established concepts, theories and methodologies, no matter how apparently illuminating they are. In fact, success has to be considered dangerous when approaching new material. Empirical patterns track the pathways in our minds in deceptive ways, masking what may be quite large and original departures that lie in the shadow (see Guyer, 1998). To a discipline whose practitioners anticipate both the inevitability and the productivity of being wrong, what is demanded in the methods is a mode of iterative thinking. In this mode, each step is informed by the rethinking occasioned by the last. The expectation is that the most relevant patterns in the data are very likely unknown at the outset and will be discerned only through careful sifting and inspection from many angles, drawing on people's own guidance and the library of comparative ethnographic knowledge. The conviction that we do not always understand the variables—which ones are relevant, how they should be described and measured, or which functions should be explored in which combinations—all this inspires a continual search for new clues and an effort to test them against established findings. The iterative effort seizes upon any possible edge of insight for opening up new lines of inquiry or new bases for understanding, whether it comes from published tables, anecdotes, newspapers, ethnographic classics, demographic tables, or people's awkward uses of English. The choice of genres is entirely secondary to the insights they may yield. By shifting the vantage point and surveying the scene from different angles, we may encounter previously hidden material, bringing an expanded range of usable data within reach. Variables can be redefined in midstream and detours can invite exploration as the results open up new possibilities for interpretation. Central to iterative thinking are four guiding tenets.

⁴ For traversing a numerical landscape and listening for the voices of numbers, metaphors of "navigation," whether applied to land or water travel, are useful. In this vision, navigators steer through obstacles, and survey the landscape to get their bearings. They orient themselves to particular constellations or landmarks to keep track of their positions and recalibrate their bearings. They take tangents, tack back and forth between points of reference, triangulate on shifting perspectives, search for landfalls along a coastline on route to their destination, and plot further courses. When there is a confusing pattern of directional cues, they must be able to pick out the most regular ones. (For an engaging description of navigational principles in Polynesia among those who sail without a compass, see Finney, 1994.)

Listening for "voice"

In the dual hope of better understanding behavior and of deriving hints about hidden realities, we privilege attention to people's "voice," statements about their lives over the application of concepts, or formulas from the conventional research repertoire. The notion of voice opens up the methods to the distinctive insights people give from their own standpoints. To hear their voices through our own inevitably distorted cultural filters and—in the case of surveys—through translation, we need to try to stay as close as possible to the terms in which people describe their experiences.

An open-ended approach

Basic to the iterative style of thinking is an open-ended approach that seeks to elicit characteristics that are likely to be unknown at the outset. To remain open to the possibility of new insights, this approach demands that we walk around phenomena, mentally sorting and re-sorting ideas about their meaning, including new elements as they arise and adjusting the "zoom lens" that offers different levels of resolution. Since the questions posed in one framework, or in a certain conversational order, may be misleading to informants, we may reorder questions, or re-sort the responses already collected, to look for new ways in which people themselves are grouping their observations and experiences. The tightest and most revealing way of doing this is to use the same data set for all analyses, thus ensuring that the results are not an artifact of the methods. This is the rationale behind the "community study," where the variables are examined within one social matrix. Although the community study has been heavily critiqued for its limited views of embeddedness within wider regions and politics, most anthropologists remain comfortable working in a milieu where the same people interact in multiple ways, or where interaction—even of large numbers of people—can be assumed and explored: workplaces; meetings; laboratories; trade networks; urban hinterlands; and so on.

Valuing redundancy

Another methodological implication of a mind set of expecting to be wrong is the need to create redundant data. Redundancy, in the sense of a broad, rich range of copious and overlapping information, is one of the most fundamental tools of research. In conversations, we can ask different questions to the same respondent, the same questions to different respondents and the same questions endlessly rephrased to the same respondents—all with the object of using divergences to gain clues about centrality and variation. Ethnosemantics is possibly the most systematically developed anthropological methodology in this vein. Issues that may have seemed central at one point in the research may eventually be shifted by the accumulation of new overlapping cases, but having a grasp of the entire process and the entire range of data is foundational to the method and to confidence in the findings. The attempt to collect redundant information usually results in the accumulation of far more information than we can ever fully analyze. The more important the question, the more we build up redundancy around it.

Searching for anomalies

A final methodological element of iterative thinking involves the handling of the extremes of variation or improbable results that we call exceptions or anomalies. In anthropology anomalies are treated as potentially critical handles for working toward new questions. In them we may hear the voices of respondents who speak from other cultural orders and to entirely different concerns than those we imagined at the outset. These cases, occurring in tiny numbers at the extreme edges of the logic, are easy to dismiss as noise. Some are indeed noise. Others, however, may, when reframed, comprise critical clues to an order in which they are no longer exceptions but predictable variations or even indicators of a new

range of phenomenon altogether (e.g., Durkheim, 1951). By the very power of their *il*-logic, anomalies offer the handles needed that may force reconsideration of the entire pattern.

This combination of approaches aims not to find ways to test established theory by an accept/reject standard, but to uncover patterns whose contours are assumed to be unknown at the outset. It seeks to make powerful configurational arguments about phenomena whose possible deviation from all conventional understandings is always retained as one of the possible findings.⁵ One can see the potential for bringing such a method to bear on the apparent partially divergent pathways of world development at the cusp of the 21st century. For example, demographic and sociological studies have suggested that all societies are urbanizing, but are they urbanizing in the same way and with similar implications for the life pathways of their citizens? All societies seem to be reducing fertility levels, but it is not likely that people are combining and recombining the cultural templates and situational possibilities in their lives in ways so simple that a few proxy variables can account for the process. There is a great deal to be gained by taking different views, applying different methodologies and considering a range of theoretical positions.

3 • MAKING NUMBERS TALK

In addition to skepticism they maintain about the methodological individualism that underlies much statistical social science, sociocultural anthropologists are often skeptical about the quality of quantitative survey data as well. Data that have been culturally stripped—converted from talk to numbers and filtered through innumerable standardized questions, translations, recodes and cross-checks—dimly retains the voice that anthropologists persistently seek. One solution, which is illustrated in the primer, involves filling in the spaces with a combination of simple calculations, ethnographic source material, and inferences drawn from juxtaposing numbers with each other and with any available commentary. For the most part, however, it is the questionnaire with its copious, overlapping, and "redundant" information that holds the semantic keys to the conversation that occurred between interviewer and respondent.

In wording a questionnaire, the authors try to frame precise, universally applicable questions. Local trainers and supervisors try to interpret these questions for interviewers who, in turn, try to interpret them for respondents.⁶ Respondents, on their part, try to give meaningful answers within the frames of reference they know and in ways that they imagine will be comprehensible to us—whoever they imagine us to be. Respondents, therefore, are not just reporting characteristics and decisions rather, they are trying to place themselves in a conversation in which they must try to convey the meaning and value in their lives. In analyzing the results of the conversation in which these responses were elicited, we are sure that a particular person is always there. Evidence of this person's idiosyncracies and of her cultural terms of understanding—and even her possible exasperation with, and leanness of, the questions—are clues to her own reality, to the social situation and web of meanings from which she speaks. Listening through the questionnaire for this other voice, imagining it configured interactively within a certain social and cultural context, we can exploit its jagged edges in search of different cultural logics.

Once we have access to the original questionnaires and data, rather than tables and other compilations, then this world can be entered. By looking closely at discrepancies and redundancies as

⁵ To be sure, an iterative approach is not distinct to anthropology; much of anthropology is decidedly formulaic. Conversely, many population researchers continually try to reformulate, reassess, and reinterpret their focus as new issues arise. They also collect new data not anticipated at the onset, and devise methodological techniques that are quite different from the ones initially planned. (See, for example, Roberts and Burstein, 1980; Skinner et al. 1989; Kuate Defo, 1999).

⁶ This, of course, assumes a situation where the principal investigator is foreign to the setting; this is not always the case (e.g., the research by Kuate Defo in Cameroon).

well as the tails of the normal curve and the unusual single case, we may discern a facet of reality that was not envisaged when the survey was written or directly documented in any of its questions but to which it bears witness. Some respondents give apparently inconsistent responses, which may become a guide to our alternative formulations. With the original data set, we are not deprived of such anomalies by the increasingly sophisticated checking programs that erase what is considered to be "noise" or recodes that group responses that imply slightly different meanings into the same category. A key example in the discussion below concerns *family planning* and *contraceptives*. Western demographic convention treats these two categories as one. However, the database shows a small but arresting group of respondents whom we call *disapproving users*, individuals who say they are "using contraceptives" but nonetheless "disapprove of family planning." To be sure, apparent inconsistencies like this may stem from translation problems, despite the length to which the DHS goes to translate its questions into the major local languages. Yet quite irrespective of the care with which translations were done and interviewers were trained, both respondents and interviewers often operate with understandings of certain questions that differ from that of those who wrote the English version. And the meaning that is conveyed in a conversation is inevitably influenced both by the context and by the chemistry that is struck up between the participants (see Briggs, 1996). Encountering findings like those on disapproving users gives us tiny facets to use as leverage on new possibilities for interpretation.

As the example of disapproving users suggests, some of our best clues may also be found in the redundancy among questions and response choices, which the database still includes. The DHS for example, like any good survey, creates enormous redundancy among the categories of pivotal interest to it. In the DHS the cultural preoccupation that stands out above all is that of contraception.⁷ The reason is that "modern" contraceptive use rates are seen as an index of fertility reduction. The DHS for Ghana (for example) contains forty-one questions on exposure to or practice of contraception. And this figure does not even include recodes of contraceptive type or proximate domains such as breastfeeding, coitus, marriage or menstrual patterns. Here are just a few examples of the 41: the respondent's knowledge of any method; ever use of any method; type of method, knows method; ever used method; current method; pattern of use; and preferred future method.

Besides the number of questions on contraceptives, the DHS' cultural preoccupation with high fertility is manifested in the variety of response choices contained in its questions on contraception. For the question of contraceptive "*method*," Wave I of the earlier version of DHS lists twelve response choices: none; pills; IUD; injection; diaphragm/foam/jelly; condoms; female sterilization; male sterilization; periodic abstinence; withdrawal; Norplant; abstinence; and other. (DHS Waves II and III list the same twelve, but add three country-specific possibilities.) All twelve (or fifteen) of these responses are then recoded in another variable as contraceptive "*type*," which includes "modern," "traditional," and "none." To these three types, Waves II and III adds a fourth, "folkloric." Despite the richness offered by the "methods" variable, analyses using DHS data almost always bypass it and focus on the recoded "types." Indeed, most analyses examine only "modern contraceptives," treating everything else—whether traditional contraceptives, folkloric, or no measure at all—globally as one contrastive category. Strategies like this are obviously forged in contexts that devote enormous professional interest to modern contraceptives and almost none to anything else.⁸

⁷ Some would argue that this is more accurately phrased as "political preoccupation." Clearly the DHS effort is funded by USAID with the goal of reducing high fertility in developing countries, since uncontrolled population growth in developing nations has been seen as threatening world security. Still, the politics have created a culture in the classical sense of the term: as a shared system of beliefs, and the "natives" of the culture have come to believe in the veracity of its tenets.

⁸ Since we are interested in the logic of conventional studies, this primer will use the term "contraception" to what is conventionally called "modern contraception." As for the category called "folkloric" methods in Waves II and III, this will be combined with "traditional" methods, since its

The richness of a survey's response choices offers further opportunities to hear other voices. An example is the DHS question which asks why a child stopped breastfeeding. It includes choices like the following: mother ill, weak; child ill, weak; child died; nipple, breast problem; insufficient milk; mother working; child refused; child reached weaning age; mother became pregnant. Several of these choices can be diverted from their original purpose in a fertility limitation framework—ascertaining the correlates of child health and maternal postpartum infecundity—and put to use in a framework that emphasizes the mother's health. Similar diversions are possible for questions on (for example) twin vs. singleton birth, the size of a child at birth and husband's sentiments about their wife's contraceptive use.

In sum, the biases in the language and intent of the questions in international surveys are easy targets for critique. However the answers to exploratory questions posed to original data, particularly aggressive recoding efforts, may offer landmarks to identify alternative analytical paths beyond conventional and misleading views. In the iterative mode of analysis even the most awkwardly conceived questions are valuable if they help to unearth patterns where none were originally anticipated in the survey design. This kind of approach simulates the field conversation: the opening question; the only partially comprehensible answer; the follow-up; the exasperation that leads to explanation; the redefinition; and the painfully slow but incomparably rewarding process of understanding how reasoning works from another situation and life experience, in another cultural mode.

4 • ITERATIVE THINKING IN EPI INFO'S ANALYSIS MODE

If a questionnaire encodes, however imperfectly, pieces of alternative realities that were conveyed in a conversation, decoding the questionnaire demands that we be able to experiment in the freest possible way. For such an enterprise, moving through a data set should be frictionless. This is possible in the use of Epi Info's fluid ANALYSIS mode. Like other statistical packages, Epi Info can analyze quantitative data in terms of their numerical significance through frequencies, tables, means, regressions. It can also sort, define, set conditions, recode and so on. Yet ANALYSIS achieves its flexibility by making all angles of a numerical data set remarkably visible and accessible, and very rapidly so.

Researchers working in most software packages are far closer, visually, to the data than they were when mainframes were the chief form of access to large data sets. The Windows interface of most software programs (e.g., SPSS, STATA, MLWin, GLIM, LIMDEP) can now be used to read and navigate between and within records. Epi Info, however, seems to have two features that set it apart from the others. The first is its capacity to record and display commentary features. Epi Info allows up to eighty characters for string variables and hence has the capacity to record and display responses to open-ended questions. Several of these "comment" fields can be strung together to show lengthier quotes. The second is its navigational potential, which seem to facilitate particularly close control over vision and movement. In SPSS, for example, one cannot know what the variable means without going back and forth between the codebook and the coded responses. SPSS also confines the analyst to horizontal format when dealing with individual records, making it difficult do deal with multiple columns of variables. Using a mouse to navigate in the interface poses particular hazards. With twenty people on the screen it is easy to move to the wrong person. One must take constant precautions either to remember line numbers of certain records, or to maintain tight linear control with the mouse over the physical movement of the cursor, to avoid the loss of continuity with a particular record. These problems are compounded when the codes for numeric labels must be looked up several steps away in a codebook. In moving back and forth within or among records, one loses many seconds between each movement and in doing so, loses continuity of thought. Given all these potentials for error and delay, navigation can be frustrating. Epi Info, by contrast, allows streamlined and reliable vertical access through various levels of the data and it allows an immediate access to the questionnaire to read through, to use both as a reference for the variables and to

variations are not those on which our examples centrally rest.

browse an individual record. Whereas SPSS can "list" several variables across the screen, navigation remains cumbersome. Epi Info, by comparison, allows for the much quicker display of a limited number of variables in UPDATE mode. Using this mode, one can rapidly switch the order of variable displays, expand the vision or zoom in tightly on selected subgroups.⁹

With the highest level of detail accessible to us, two powerful directions of iterative thinking can be pursued, allowing one to exploit both the central and the redundant information in data sets. First, with the entire questionnaire available for instant visual reference, we can exploit a full data set. Second, by continually reframing the numbers and changing their visual context, we can better interpret their meaning. By switching among screens and selections, we gain a ground-level inspirational impetus, a "feel" for the situation and the people. We can explore rapidly, in minute detail and at innumerable levels of complexity, the characteristics of groups, subgroups and even individuals. Working back and forth so fluidly from the command/calculation screen to the questionnaire code-book to the selection of individual cases and variables, we can almost literally interact with numbers. We can walk in directly among the respondents, selecting groups by age, number of surviving children, presence of cowives, educational profile, or current contraceptive use. We can "interview" subgroups and individuals—for example, women in the later stages of postpartum abstinence or women with no cowives—to identify meaningful variation in their sexual and contraceptive practice. Being able to interact with the data easily we can transform an anonymous set of numbers into a society of thoughtful, interactive people who will forever continue to address new questions we put to them. Mentally juxtaposing emerging patterns against the ethnography from a field situation, we can sift through groups of respondents, turn over their answers for inspection, and resurface to walk around them and reflect on their configurations and commentary from multiple angles. The results of these exercises can be checked through comparisons with other groups or countries and the statistical mode can be reentered. The researcher still has tried and true interpretive resources at her/his disposal; the more familiar programs like SPSS, and the ethnographic field notes and library are not far away, nor are other individuals with the ability to interpret responses through visits, the telephone or e-mail.

Acquiring such a combined capacity for speed, vision and rigor parallels what open-ended ethnography or interviews can do in a more recognizably qualitative format. It facilitates short-cut searches for operative principles that differ from the current conventions in the discipline. It also allows the technology to approach the speed of the mind. As quickly as new questions come to mind, the responses can be sorted, resorted and tabulated in infinite new combinations.

Playing with the numbers and, particularly, with the numerical and semantic anomalies in the ways that Epi Info allows inevitably leads down more cul-de-sacs than highways towards truth. However, with persistence, the maneuvers may lead to a more comprehensive understanding than conventional quantitative or ethnographic analyses have achieved separately. This is not, we stress, simply an exercise in applying ethnography to interpret the numbers. In the process we also learn ethnography. Juxtaposed against one another, numbers become points of insight into the societies that produced them.

5 • USE OF THE EPI INFO SCREENS AND COMMANDS

Having described the general advantages of Epi Info's ANALYSIS mode for iterative thinking, we now turn to some of its specific features.

⁹ Epi info's main drawback in the ANALYSIS mode is its inability to display value labels. Unless these are entered as alphabetical characters or as numeric variables, it is sometimes difficult to interpret the responses without switching back to the questionnaire screen.

The screens

ANALYSIS has three principal screens by which one can view various aspects of the data. The COMMAND/CALCULATION screen can be used to run tabulations and tests, to get an overall sense of patterns in groups or selected subgroups. The SPREADSHEET screen which appears when the BROWSE or UPDATE commands are typed expands our visual horizons. Although statistical calculations and tables can identify the unexpected, laying out several variables for visual inspection gives precedence to the power of the ethnographic imagination and mental association to spot connections among variables. Whenever desired, we can also look at individual records in the QUESTIONNAIRE mode. This mode, restricting the vision to one individual at a time, takes the visual logic to the extreme. As we scan down a single record to gain a full view of every response, including full comments, a picture of an individual begins to emerge.

Commands

The SPREADSHEET mode is especially useful when entered with UPDATE and SELECT, both critically important commands. Because the validity of the preconceived thematic clusters in a questionnaire can be deceptive, UPDATE can string together variables in any order, to look for associations that were not apparent when the questionnaire was originally constructed and administered. It is particularly powerful when used in combination with several other commands. Used with SELECT, which isolates sub-groups, UPDATE allows us to construct a three-dimensional picture of the population by continually shifting selections of groups, changing resolutions of focus and making outliers stand out starkly. Of vital interest also are the visual effects of UPDATE and SELECT in combination with RELATE, a command that joins two files. These three commands can visually link the variables in two separate files through a common identifying variable and can reconstitute the units within them, allowing us to see, for example, the records in an entire household or village. COMMAND/CALCULATION can achieve the same numerical results. However, it is the visual effects of UPDATE and SELECT, in their combined ability to highlight sort combinations of variables, that bring ideas most immediately into view. UPDATE and SELECT are most powerful when used to place alpha-numeric variables alongside COMMENTARY variables by which an individual gives an open-ended explanation of her short-answer response. (For example, "Are you using anything to avoid pregnancy?" If so, "Why?") By contrast to focus groups quotes that are abstracted from individual cases, using UPDATE and COMMENTARY variables in combination allows us to make not simply "numbers" talk, but *specific* numbers and to do so in prose. Looking closely at both UPDATE mode responses and at individual situations in the QUESTIONNAIRE mode, we may make some quite serendipitous discoveries that may contradict the image of the person the static framework may have led us to expect. As possible patterns or oddities are spotted, we can switch to the calculation screen to do some quick frequencies or tables, to see if the observed patterns apply more widely, or if patterns occur in ways that were previously unnoticed.

Though SPREADSHEET and QUESTIONNAIRE modes are best for groping among small numbers, COMMAND/CALCULATION can calculate large numbers. However, the use of all three modes combined is most powerful. Ideas gleaned from one mode can be used to test and generate ideas from the strengths of the others.

II. EXAMPLES

The following analysis of a case drawn from the demography of Africa illustrates several tactics that Epi Info facilitates in pursuit of a problem. It seeks to demonstrate the step-by-step generation of ideas and their refinement in the framing of the question. It represents a distillate of many experiments and explorations that were done both with the Gambian data and with the DHS files at hand. It would be impossible to document exhaustively all these steps the analyses took and the patterns that emerged. Since the purpose is to show the logic and the method, only the useful threads are followed out here. When working alone on one's own project there are far more jumps, stops and sharp turns.

Drawing on a body of published work from The Gambia on child spacing, contraceptive use and women's reproductive health in West Africa,¹⁰ the steps recapitulate the logic by which some of the conclusions were derived. These data were generated from a set of research protocols that were not set up to capture the themes that became so important in the end. The example does not pretend to "prove" this alternative interpretation nor does it attempt to show cumbersome diagrams in the text for each tiny step in the iterative logic. The aim is rather to show how easily Epi Info can be used for exploration. To use data that are available to everyone, the main example is contraceptive use in Sudan, using a public domain source, the Sudan 1989 Demographic and Health Survey. It shows a very low rate of current contraceptive use of 5.1% of respondents. Comparative forays will be made into the 1993 Ghana DHS, showing a higher, though still moderate level of modern contraceptive use (9.3%) and the 1993 Kenya DHS, which represents a country undergoing a fertility decline and having a much higher rate of modern contraceptive use (21%). Others examined more peripherally are the DHS surveys from Mali (1995), Kenya (1993), Zambia (1992), Nigeria (1990), and Senegal (1992).

To convey the combined sense of systematicity and open-ended playfulness that Epi Info allows, the examples are at times tight and logically ordered. At other times they drift into tangents. For the exercise, we employ a mixture of statistical tabulations and close-in scrutinies. Occasional tests are done in the manner of hypothesis testing. Since navigation between the frames is intended to be swift, however, the nomenclature of "questions," "explorations," and "examples" is employed rather than that of "hypothesis testing," with the connotations of research design and statistical rigor that this terminology has come to imply. It is more important to move forward with the ideas as they emerge in an evolving synthesis than to document each step exhaustively. Although the tactics pursued here might appear to draw conclusions without the usual degree of empirical documentation, the intent is to document possible pathways through the problem. For simplicity, and since many of the maneuvers involve numbers that are very small, we include levels of significance only in the table displays. We begin by assuming a "modernization" understanding of contraceptive use¹¹ and move on from there.

The DHS Data

The variables in the DHS files draw on the standard recodes, which contain a mixture of core

¹⁰ e.g., Bledsoe, 1987, ms.; Bledsoe et al., 1994, 1996; Bledsoe and Hanks, 1998; Bledsoe and Hill, 1998.

¹¹ The aim of these explorations is, of course, less to test the "modernization thesis" than to use the thesis as a launching point. In any case, the modernization thesis could not be fully tested, even if we narrowed the scope to refer to modern contraceptive use. Beyond the problems in how contraception was defined in the DHS are limitations in the definition of "current use" of contraceptives, the variable on which we focus most closely. One woman may be defined as a "current user" if she was using contraceptives for ten years. Another woman who was using contraceptives within the same ten year window but stopped just before the survey was conducted because her husband left temporarily. Yet another woman may be defined as a user if she started using contraceptives only last month. Depending on the time frame of reference, the type of method used, and the ebb and flow of sexual life, "current use" therefore covers very different time horizons among women.

variables as well as variables from supplemental modules (e.g., men, AIDS, maternal mortality, child anthropometry, [contraceptive] service availability). In a number of cases, there are also "country-specific" variables, those requested by the local country. These files have been converted from SPSS data files which we downloaded and converted into an Epi Info format. For each country we have created two files, one for women only (in the case of Sudan, SDWONLY.REC) and one for all their children (SDIRKID.REC, Sudan individual recode - kid). The mother's record has been attached to each of the children's records, meaning that the "children" file is much longer than that for women alone. For our purposes, the woman remains the center of attention. When we are using the "children" file, therefore, we will avoid multiplying all results for individual women by their number of children by selecting only the last birth which will give us all variables from both the last child's record and the woman's record.

The variables in the Epi Info files contain the same values as the standard recodes. Yet they differ in two ways. First, the variables have been renamed from letters and numbers (e.g., V311, V242J, and SMQ302F) to words or word derivations that are recognizable to an English speaker -- e.g., CURRMTH (current method) or PREG (currently pregnant) or AGE. Second, the variable numbers are fewer. Whereas in SPSS the standard recodes contain several hundred variables, the Epi Info files contain somewhere between 100 and 125 each, plus about twenty-five variables in the files that contain the records for the children. Shrinkage was a necessity, since the program can only handle a questionnaire of 500 lines or 2048 variable characters. It was also necessary to maintain quick visual and manual control over the variables. (See Appendix B for a technical description of the file conversion.)

Here is a list of the main DHS variables used, from both the "children" and the "individual recode [women]" files. Epi Info "child" variables are prefixed by "CH."

Epi Info variable name

DHS name

Child file

CASEID	mother's case identification number	caseid
CHLAST	last child born (yes/no)	(dummy variable)
CHTYPE	type of birth: single or multiple	b0\$01
CHALIVE	last child alive (y/n)	b5\$01
CHIMPDTH	child's imputed age at death in mos	b7\$01
CHCURAGE	last child's current age	b8\$01
CHPBINT	last birth interval before child	b11\$01

Woman file

CASEID		
AGE		v012
AGE5YR	age - 5 year groups	v013
RELIG	religion	v130
EDYRS	education in years	v133
CURRMAR	currently married (y/n)	v501
TYPRESID	type of residence (urb/rur)	v102
COWIVES	number	v505

CEB ¹²	number of children ever born	v201
SURVCHR	surviving children	v218
BLAST5	births in the last 5 years	b208
AFB	age at first birth	v212
CURRMTH	current contraceptive	v312
CURRTYPE	current type of method	v313
REASCMTH	reason for current method	v375
LCHWANT	last child wanted (y/n)	v367
CURRBF	currently breastfeeding (y/n)	v404
CURRAMEN	currently postpartum amenorrheic (y/n)	v405
FREQINT	frequency of intercourse	v526
APPROVFP	approves of family planning (y/n)	v612
HUSAPFP	husb approves of fam planning (y/n)	v610

Since the emphasis is on attaining the "feel" of the program, data will be displayed in a number of tables. The Epi Info selections and commands, together with the resulting screen, are shown beneath the table's title. In tables that contain non-numeric contraceptive variables, the labels are shown in English instead of the DHS's number codes that Epi Info actually displays. Above the tables, we highlight the question addressed or (in the case of UPDATE tables) the nature of the search for relevant factors. Where relevant, we also include a chart that points to new questions generated by the findings.

Cautions

While it is possible to draw inferences about the use of contraceptives to prevent sexually transmitted disease or even simply to manage one's sexual life, we focus on contraception for pregnancy prevention, the purpose for which contraceptives have most been promoted in Africa and around which the DHS is implicitly constructed.

In the analysis, several cautions are in order. First, in using the DHS' largely cross-sectional data on contraceptive behaviors, calculations using age cannot support inferences about women over time but only about current use of contraceptives among current groups. Since age cohorts of women share a common history by virtue of when they were born, it is risky to use cross-sectional data to draw longitudinal inferences about past reproductive behaviors of women. Further, our heavy reliance on the variable "current use" of contraceptives runs the risk of creating mismatched groups. Thus, "current users" might include a woman who just began using contraceptives after ten years of reproductive life but it would exclude a woman who used contraceptives for ten years, then stopped once she married and started childbearing. These problems are compounded for the Sudan DHS which asked about "ever-use" of a method but did not ask women about their age or marital status when they first used it. The problem with "ever-use" is that it is likely to be under-reported for modern methods but clearly so for traditional ones. (The highest ever-use rates of modern contraception among the oldest group (45-49) of Sudanese women is only 18% and the highest ever-use rate of traditional methods is only 10% for women aged 20-24). If both types were reported, modern contraceptive use seems to have overridden reports of traditional

¹² We do not deal with questions about ideal or excessive numbers of children: questions that entail enormous problems of interpretation.

use.

The Sudan DHS itself poses further limitations. Because of civil war in the south at the time the survey was conducted, the DHS data included only the largely Islamic north. Further, the survey was confined to ever-married women, meaning that the 15 to 19 age group in the sample is only about a quarter the size of the 25-30 age group. Hence, the fertility-relevant behaviors of the great bulk of the young female population, though they can be inferred through oblique filters, are largely invisible to us. On the other hand, the age at marriage in the Muslim north is relatively young. Given strong Muslim cultural injunctions on young women's sexual lives, there was likely minimal fertility-relevant activity report on before these individuals became visible as married women in the DHS.

A much larger problem for the African DHS data sets is that the Demographic and Health Surveys, despite their name, include no core variables that directly assess women's health. There are, of course, many health variables but all refer to children since the aim was to understand child mortality both for its own importance but especially as it related to the mother's fertility status and behaviors. Only with respect to maternal mortality and HIV/AIDS modules are there other health variables for women. Closely related to this problem is the fact that until a few years ago the core DHS variables included questions only on live births. Systematically excluded were outcomes such as stillbirths, miscarriages and abortions, events that added no members to the living population but that nonetheless might indicate reproductive trauma. Despite these limitations we believe that some exploratory inferences about age, child spacing, etc. are warranted.

The Sudan example to follow is strongly oriented toward the question of the end of childbearing. This may seem an odd focus because women nearing menopause typically make minimal contributions to overall fertility levels. Additionally, the fertility implications of early marriage among a highly fecund age group has attracted by far the most demographic attention (National Research Council, 1993). Yet in many ways, the question of how reproduction ends is more critical than how it begins. This is a phase of female life in which radical changes in marriage, residence and social status may occur, for better or for worse. In addition, there is far more variation in the age at which women cease childbearing. Thus there are numerous points of potential variance that can be exploited for greater understanding. Individuals arrive at the end of reproduction in very different physical states and having had very different fertility histories. Some have had four easy pregnancies and uneventful deliveries while some have had seven difficult pregnancies and are left with no children at all. The most obvious way in which the "demographic and health surveys" fails to live up to its name, is its failure to exemplify the health effects of high fertility: anemia; depletion of fat reserves; injuries incurred in childbirth; and so on. Moreover, given that women usually have primary responsibility for the health of children, it is critical that they survive in order to make a living to care for the health and nutritional needs of their children. Children whose mothers are dead or impaired often have fewer opportunities for advancement and lower chances of survival. Finally, knowledge of the dynamics of the end of reproduction may better explain how women conduct their reproductive lives in societies where high fertility is valued.

Although we follow only one series of questions about the end of the reproductive life here, we point out that the UPDATE and case analysis potentials of Epi Info would allow a very rich exploration of the entire spectrum of variation. One should be able to tease out some aspects of the varying experiences women have had, construct retrospective reproductive and health histories, and attempt to see the marital and parenting careers that have shaped and been shaped by the reproductive process as it is manifest in the survey responses. We have no doubt that the results would be surprising and illuminating. Although we use the example here to continue the same inquiry into how far a modernization framework can take us in understanding contraceptive use, we also draw attention to the potential of this method to open up new fields altogether or to address more routine questions. The methods are adaptable to different kinds of research endeavor.

6 • CONTRACEPTIVE USE IN SUDAN

Although there are clear signs of fertility decline in some sub-Saharan countries, high fertility

retains a high value elsewhere and this remains the region with the lowest levels of contraceptive use in the world. A modernization approach to fertility would work from the assumption that Africa is “behind” other places yet still on the same trajectory. Consequently, the data would be combed with a view to identifying the forward edge of change: the categories of women involved; the relationship to age; parity; and marital status. That is, one starts with findings from other parts of the world and maps African data onto those patterns, assuming the users one discovers to be “modern.” An alternative way of looking at the data is to treat the users as one would any other small category, as a mystery to be solved. Thus, in a social milieu where fertility control may not be valued, why would anyone use devices that are primarily intended for limiting numbers of children? The world may not consist of users and nonusers, those at the forefront of contraceptive use and those practicing “tradition.” Instead of stopping with identifying users and their characteristics, we might look at the place of contraceptive use in women’s reproductive lives. Why would anyone be using contraceptives, ever, in a population where use is not the norm?

Education, Fertility and Youth

The family planning literature posits that a woman is likely to use contraceptives if her particular constellation of background characteristics predisposes her. These characteristics might consist of youth, education and urban residence. These women are thought to be willing to experiment with innovation and to throw off tradition by trying to limit births. To do so they may delay entry into childbearing or space births.

When we look at the Sudan DHS, using the cross-tabulation command TABLES, these expectations at first seem to be met unambiguously. As we see first in Table 1A, women using modern contraceptives did indeed have far more years of education than those using no methods at all, 6.1 years versus 2.4 years respectively. Similar results (not shown) are found in Kenya and Ghana.

QUESTION: Are women with more education more likely to use modern contraceptives than those with less ?

Table 1A: Mean number of years of education among women using various types of contraceptives (Sudan)

Command:

MEANS EDYRS CURRTYPE

<u>CURRTYPE</u>	<u>Obs</u>	<u>Total</u>	<u>Mean</u>	<u>Variance</u>	<u>Std Dev</u>
none	5383	12677	2.355	13.643	3.694
trad	170	1006	5.198	25.401	5.040
modern	298	1819	6.104	22.309	4.723

p<.001

Similar to these results on education, urban residents in all three countries are more likely to use modern contraceptives than rural ones. Table 2 shows that 10% of urban women in Sudan are users, compared to only 2% of rural residents.

QUESTION: Are urban residents more likely to use modern contraceptives than rural residents?

Table 2: Users of various types of contraceptives, by residence (Sudan)

Command:

TABLES TYPERSD CURRTYPE

TYPERSD	CURRTYPE			Total
	none	trad	mod	
urban	1845	113	223	2181
	> 84.6%	5.2%	10.2%	> 37.2%
rural	3547	57	75	3679
	> 96.4%	1.5%	2.0%	> 62.8%
Total	5392	170	298	5860
	92.0%	2.9%	5.1%	

p<.001

The expected age patterns, however, are not entirely borne out. Table 3 shows that Sudanese women using modern methods are on average older, not younger, than those using traditional methods: ages 32.1 vs. 31.3 years.

QUESTION: Are younger women more likely to use modern contraceptives than older ones?

Table 3: Mean ages of users of various contraceptive types (Sudan)

Command:

MEANS AGE CURRTYPE

CURRTYPE	Obs	Total	Mean	Variance	Std Dev
none	5392	166943	30.961	69.906	8.361
trad	170	5327	31.335	51.798	7.197
modern	298	9552	32.054	53.593	7.321

p<.1

Similar findings on age arise in Kenya (31.7 vs. 27.6) and in Ghana (30.8 vs. 29.4), countries whose residents might be assumed, because of their much higher rates of modern contraceptive use, to have a more overall "modern" outlook. The results sound plausible insofar as older women who have already borne children would be more likely to use contraceptives if they are ready to limit having more. But this interpretation would assume a population whose members are trying to limit their births. Whereas Kenya is now considered to be a limiting population, Sudan in 1988 certainly was not. (Such findings of higher levels of contraceptive use among older women are consistent in African populations; Bledsoe et al., 1994.)

A more intensive look in several directions reveals an even more complicated picture. First, let us revisit the tables that seemed to support the vision of a "modern" actor. A closer look at the figures on education in Table 1—current type of contraceptive by number of years of education—reveals that "no method" and "modern contraception" were not the only categories computed. "Traditional methods," a category habitually sidelined in conventional analyses was there as well. As the "B" version of Table 1 shows in its highlighting of this number, Sudanese women using traditional methods had almost as many years of education as those using modern methods (5.9 and 6.1 years, respectively).

Table 1B: Mean number of years of education among women using various types of contraceptives (Sudan)

Command:

TABLES MEANS EDYRS CURRTYPE

CURRTYPE	Obs	Total	Mean	Variance	Std Dev
none	5383	12677	2.355	13.643	3.694
trad	170	1006	5.918	25.401	5.040
modern	298	1819	6.104	22.309	4.723

p<.001

Comparisons with the other countries reveal findings that undermine modernization expectations in similar ways. In Ghana, modern and traditional users had the same amount of education, 7.1 years for both. In Kenya, traditional users actually had more education: 7.1 versus 6.8 years. The fact that traditional contraceptive use increases as consistently with education as the use of modern contraceptives has lain almost literally in the peripheral vision that the DHS "contraceptive type" category automatically generates.¹³

Further, age complications cloud the picture when we look closer at residence. While urban women in Sudan use modern contraceptives more often than rural women, urban users of traditional contraceptives were younger than users of modern contraceptives (31.7 vs. 32.5 years, respectively). They were also younger than women using no contraceptives (31.8 years). (Tables not shown.)

Since a number of holes have already opened up in the question of age and contraceptive use, let us focus more intensely on the age group that the modernization thesis would identify as the most likely users of modern contraceptives, namely, women under 20. Contrary to expectations of a simple modernization thesis, only 2% of this group of teenagers (8/380) was using modern contraceptives. To be sure, these eight users had more schooling on average, 6.9 years than did teenaged nonusers (6.9 vs. 3.0 years). Yet a

¹³ See also Bledsoe et al., 1999.

scrutiny of these eight users through an UPDATE string that contains several possibly relevant variables (Table 4) reveals an equally important fact; all had at least one birth. A more contextually informed explanation would thus point out that once the process of reproduction has been initiated few young married women in a predominantly Muslim society like Northern Sudan use contraception early in their reproductive career.

SEARCH: for factors related to modern contraceptive use among young women .

Table 4: UPDATE display of women under 20 using modern contraceptives (Sudan)

Commands:

```
SELECT AGE<20 AND CURRTYPE=2
```

```
UPDATE CASEID AGE TYPERESD EDYRS CEB CURRMTH
```

REC	CASEID	AGE	TYPERESD	EDYRS	CEB	CURRMTH
453	23 14 4	17	1	9	1	pills
502	26 19 2	19	1	8	2	pills
1119	63 70 2	17	2	8	1	pills
1123	64 6 6	17	2	5	1	pills
1124	64 6 7	19	2	5	1	pills
1759	268 64 2	18	2	5	2	IUD
2095	360 21 2	19	2	7	1	pills
2138	361 94 2	19	2	8	3	pills

**** Reminder: Glossary of variable names is located on page 13.**

Finding: All women under 20 using modern contraceptives had at least one birth.

New questions: Is the use of contraceptives related to marriage? If so, are young married women more likely to use them than older ones?

**** Note now that as we shift from scrutinizing only those questions that were set up at the beginning of the research, we have begun to launch new questions iteratively, as each previous question is answered.**

So far we have stayed close to the original variables. Let us now seek a broader view of, for example, marriage. If childbearing has already begun in virtually all cases of contraceptive use (and assuming, still, that contraceptive use is an indicator of desires to limit fertility), then women who use contraceptives once they marry would be attempting to limit fertility, and they would be delaying births in order to do so. Since we have almost no variation in the Sudan DHS on young women's marital status (the sample included only ever-married women), we turn in Table 5 to Ghana, which surveyed all women ages 15 to 49. Here we see that married women below age 25 who have borne no children are hardly the wave of a contracepting future. They are less likely than their never-married age counterparts (who would be younger and have much lower parity). Indeed, the great majority (85%--46/54) of all under-25 users with no births were never married. Similarly, in Kenya, twenty-nine of the thirty-one women under age 25 with no children were never married (figures not shown).

QUESTION: Are young women who are married more likely to use modern contraceptives than young women who are not married?

Table 5: Current type of contraceptive by marital status; women under age 25 with no births (Ghana)

Commands:

```
SELECT AGE <25 AND CEB=0
```

```
TABLES CURRMAR CURRTYPE
```

CURRMAR	CURRTYPE				Total
	none	folk	trad	mod	
never mar	653	1	73	46	773
	> 84.5%	0.1%	9.4%	6.0%	> 84.9%
married	69	0	3	3	75
	> 92.0%	0.0%	4.0%	4.0%	> 8.2%
living tog	45	0	7	4	56
	> 80.4%	0.0%	12.5%	7.1%	> 6.1%
divorced	2	0	0	0	2
	> 100.0%	0.0%	0.0%	0.0%	> 0.2%
not liv tog	3	0	1	1	5
	> 60.0%	0.0%	20.0%	20.0%	> 0.5%
	0.4%	0.0%	1.2%	1.9%	
Total	772	1	84	54	911
	84.7%	0.1%	9.2%	5.9%	

New question: What factors *are* related to contraceptive use among young women?

Taken together, these results lend support to an ethnographic fact we have long known for Africa; marriage is an institution intensely focused on childbearing. Young women who have not yet entered a stable union are more apt to use contraceptives because delaying childbearing may sometimes be in one's best interest. Once they marry, young women, irrespective of their educational achievements or urban residence, stop contraceptive use quickly and decisively upon marriage. They rarely use modern contraceptives until they have had a child or two. Even young contraceptive users with greater-than-average years of education who are married do not use contraceptives to delay entry into childbearing but rather, as we will see shortly, to space their births. It is may be the case that young contraceptive users are trying to limit the number of children but we have little evidence of it. What *is* clear is that these young women are not yet in stable unions. In fact, given the strength of the numbers we might suspect that the few childless users who said they were married may have been in unions that were more informal than they let on to the interviewers.

**** Note that these findings have drawn our attention from our original focus on background factors of education and urbanization as explanations of contraception and turned it instead to the immediacies of conjugal life and childbearing.**

In line with the effort to expand our view of the context in which contraceptive use is occurring, let us focus now on fertility itself among the same under-20 contraceptors that we had in the "women" file, but we switch now to the "children" file, and look at some of the records from the women's file alongside some from the child's file. UPDATE Table 6 examines a mixture of "woman" and "child" variables that we speculate may have some bearing on the problem.

SEARCH: for factors related to modern contraceptive use among young women, both married and unmarried.

Table 7: UPDATE display of women under 20 using modern contraceptives-last-child variables added (Sudan)

Commands:

```
SELECT CHLAST=1 AND AGE<20 AND CURRTYPE=2
UPDATE CASEID AGE CEB CHYOB CHALIVE COWIVES CURRBF FREQINT
```

CASEID	AGE	CEB	CHYOB	CHALIVE	COWIVES	CURRBF	FREQINT
23 14 4	17	1	89	1	0	1	10
26 19 2	19	2	88	1	0	0	2
63 70 2	17	1	89	1	0	1	3
64 6 6	17	1	88	1	0	1	4
64 6 7	19	1	89	1	0	1	0

268	64	2	18	2	89	1	0	1	12
360	21	2	19	1	87	1	0	0	4
361	94	2	19	3	88	1	0	1	10

Finding: Young women using modern contraceptives tend to be those at risk of an early pregnancy with an unweaned child.

New Questions: Are women using contraceptives to limit children? If not, what *are* they using contraceptives for?

The resulting display reveals that all of these women have last-born children still alive, all but one have resumed sex, six are breastfeeding and none has a cowife who might distract the husband's sexual attentions.

As we have already seen in this examination of the fertility context of contraceptive use among young women in Sudan, the observed patterns in these countries show marked departures from a straightforward modernist reading or, more generally, from a socialized actor prototype that might be inferred from a flat reading of background characteristics. A close scrutiny of the circumstances surrounding the most recent birth quickly began to reveal holes in both logics.

Child spacing

Let us recall our initial question. Why would anyone in high fertility Africa be using modern contraceptives? The alternative to the view of contraceptive use as intended to limit fertility is a recognition that women in "nonlimiting" populations sometimes use contraceptives to "space" births. Family planning analysts sometimes define the use of contraceptives for child spacing to mean the use of contraceptives now even though more children are wanted later. This definition, however, is so broad that it could potentially cover practically all cases of contraceptive use. As such, it is unhelpful in analyzing fertility in the detail that we need. Since people recognize that a breastfeeding child's nutritional status may be jeopardized by the birth of a sibling that arrives too quickly, we need a view of child spacing that incorporates efforts to lengthen the duration between births. We need a view that focuses on the precise conjunctures of temporalities surrounding breastfeeding.

To look at these conjunctures empirically, let us return to the eight young modern contraceptive users in Sudan we saw before in Table 6, six of whom were breastfeeding. Looking now in more detail at the screen, we see that all eight have borne at least one living child and seven are no longer amenorrheic, their fecundity had resumed.¹⁴ Of the seven fecund women, five are breastfeeding and hence are probably using contraceptives to avoid overlapping a breastfeeding baby with a new pregnancy. Further, a search into individual records shows that one of the two women who are not breastfeeding had two births in the

¹⁴ This pattern holds quite strongly in the young half of the female population. Although women under 30 who were breastfeeding and non-amenorrheic comprised only 15 % of the DHS sample in Sudan, they comprised 43 percent of the population of modern contraceptors. Much the same was true in the other DHS surveys used for this exercise. In Mali the respective percentages for ever-married women were 18 and 34; Kenya, 24 and 34; Zambia, 17 and 46; Senegal, 13 and 30; Ghana, 18 and 22; Nigeria, 12 and 15. Only in Cameroon, were the percentages reversed, and then only slightly: 15 and 14.

last five years. Her previous birth interval was only 17 months, far shorter than the 27 month average previous birth interval of all the teenaged women in the DHS with more than one birth.

In this group of eight women the one at the bottom, nineteen year old #361-94-2, is an extreme case of a young user of modern contraceptives that proves the rule. Let us go into the highest resolution, QUESTIONNAIRE mode, to look at her situation in detail (see Case 1). For presentation purposes, most of the variables in the questionnaire have been removed in both this case and in Case 2. We include, however, a few responses that seem slightly at odds with the points emphasized here to convey the slight disequilibrium alluded to earlier, whereby one begins to sense that some of the respondent's questions may have been answered from a different perspective than that of the survey or the analyst. The answers to be highlighted in the discussion that follows are starred.

Case 1

QUESTIONNAIRE SELECTIONS -- 19 YEAR OLD MODERN CONTRACEPTIVE USER IN SUDAN

LAST CHILD

CASEID	<u>DHS var no.</u>	Case Identification	361-94-2
AGE	(v012)	Current age -respondent	19 *
CHALIVE	(b5\$01)	Child is alive	1
		0 No 1 Yes	
CHCURAGE	(b8\$01)	Current age of child	1
CHPBINT	(b11\$01)	Preceding birth interval	20

WOMAN

EDYRS	(v133)	Education in single years	8 *
HUSLIVES	(v504)	Husband lives in house	1
		1 Living with her 2 Staying elsewhere	
COWIVES	(v505)	Number of other wives	0
AGEMARR	(v511)	Age at first marriage	14 *
CEB	(v201)	Total children ever born	3 *
SURVCHRN	(v218)	Number of living children	1 *
BLAST5	(v208)	Births in last five years	3 *
AFB	(v212)	Age of respondent at 1st birth	15 *
LICHFUSE	(v310)	Living children at first use	1
CURRMTH	(v312)	Current contraceptive method	1 *
		0 Not use 1 Pill 2 IUD 3 Inject	
		4 Diaph/Foam/Jel 5 Condom 6 Fem Ster	
		7 Male Ster 8 Per Abst 9 Withdr 10 Other	

		11 Norplant 12 Abst	
CURRTYPE	(v313)	Current use by method type	2
		0 No mth 1 Trad meth 2 Mod meth	
LCHWANT	(v367)	Wanted last child	1
		1 Wanted then 2 Wanted later 3 Wanted no more	
CURRBF	(v404)	Currently breastfeeding	1 *
		0 No 1 Yes	
CURRAMEN	(v405)	Currently amenorrheic	0
		0 No 1 Yes	
CURRABST	(v406)	Currently abstaining	0
		0 No 1 Yes	
SOLIDFD	(v414)	Gave child solid or mushy food	1
		0 No 1 Yes	
FREQINT	(v526)	Frequency of intercourse	10 *

The woman in Case 1 has eight years of education, her husband has twelve and she is using pills. Yet whereas we might imagine that education could explain her behavior or even the behavior of the couple, this explanation does not take us far. This woman had an early and fast-paced start to childbearing. Married at fourteen and bearing her first child at fifteen,¹⁵ she had three births (all singleton) in the last five years. She now has a seventeen month old unweaned child (data not shown) and reports a previous birth interval of twenty months and ten instances of sex in the last month. No longer amenorrheic, she is a prime candidate for powerful contraceptive protection. Note also that although this woman bore three children, only one survives, a fact that hints at a strong anxiety to ensure an adequate birth interval. This woman is almost certainly trying to space her births. This woman, *despite* her age rather than because of it, is using modern contraceptives. She thus appears to be sizing up a situation and acting accordingly. The fact that she and her husband were educated may have facilitated her access to birth control pills. But since only 6% of the under-20 women in the Sudan sample with eight or more years of education were using a modern method, this suggests that contraceptive behavior is dominated overwhelmingly by more pressing situationally-specific events.

If fertility limitation is the predominant factor inducing women to use modern contraceptives, this thesis is defensible in only one case out of the eight married teenaged users, #360-21-2, who after only one now-weaned child is now contracepting. She is an anomaly one would want to find and interview in depth to learn what is going on. Analogues from the Gambian study might suggest that her marriage is not on track and she may be trying to abort. On the other hand, since she reports that she did not have a period in the last 6 weeks, she may have been advised to take pills to regularize her menstrual periods. Alternatively, she may have had a catastrophic pregnancy from which she is trying to recover, a pregnancy that we cannot see in the live-births-only record. Exceptions like this beckon for in-depth investigation.

As this discussion implies, starting with young married women to address "fertility limitation" in a setting high fertility is not a useful way to think about fertility in the African context. "Users" and "nonusers" do not tend to be discrete groups of women or those who use modern methods versus those

¹⁵ In this woman's case, of course, pregnancy may have curtailed her education, rather than the other way around. In most African countries it is difficult for a young woman to continue her schooling once she becomes visibly pregnant. Given the densely packed sequence of fertility and marriage events in this woman's history, together with the difficulty of dating past events, she may have married because she was pregnant and had to drop out of school.

who do not. There is considerable fluidity of movement back and forth between traditional and modern methods, a fact that implies much similarity among groups of women. Similar findings have long been reported in the biomedical research with respect to health-seeking behavior in much of Africa; educated and uneducated alike use a combination of modern and traditional medicine.

**** What the reader should notice, however, is that by now we have altered entirely our perspective from where we began. Before, we saw this young contraceptive (#360-21-2) with a weaned child as a normative case in a "limitation" view of contraceptive use -- someone who, by virtue of her education, is recognizing the need to limit births and is taking appropriate measures early on to do so. We now see her as a perplexing anomaly in the new child spacing vision.**

Given the transition in perspective we have undergone, one other case in Table 6's UPDATE list, stands out as an exception that proves the new rule. This young woman, seventeen year old breastfeeding #23-14-4, is in a state of what demographic terminology calls "double protection." She is using pills *and* she is amenorrheic. In the US, such contraceptive behavior would be unsurprising. Analysis of other DHS surveys, however, shows that amenorrheic women rarely use modern contraceptives, especially after having borne only one child. The fact that this woman reports much sexual activity in the past month (ten times) with a very young baby (not yet a year old) hints at a possible anxiety about the risk of a new pregnancy that would lead her to seek strong contraceptive protection. This woman, like the last one, would be someone to track down and interview in depth.

Let us now turn the question around and create a more general "spacing" question that can take us beyond the level of our one case. Women whom we believe to be least desirous of a new pregnancy for child spacing reasons will likely be protected in some way whether through contraception or something else. For young women, one such group would be nonpregnant women under-20 with three or more children, the last of which is breastfeeding. Since there are only a few cases, let us look at an UPDATE string showing these women alongside their last-birth data in the SDIRKID.REC file. Table 7 shows the 8 cases.

QUESTION: Are nonpregnant young women with more than two children ever born and a last child breastfeeding likely to be protected in some way against pregnancy?

Table 7: UPDATE display of women under age 20 with 3 or more births; last child alive (Sudan)

Commands:

```
SELECT AGE<20 AND CEB>2 AND PREG=0 AND CURRBF=1
```

```
UPDATE CASEID AGE EDYRS CEB SURVCHRN CURRAMEN FREQINT CURRMTH
```

Caseid	Age	edyrs	ceb	survchn	curramen	freqint	currmth
45 11 2	18	6	3	2	1	4	0
51 9 2	18	0	3	3	1	2	0
311 63 3	19	0	3	3	1	0	0
361 94 2	19	8	3	3	0	10	pills
370 50 2	19	0	3	3	1	0	0

506	47	9	19	3	3	3	0	0	0
657	37	2	18	4	3	2	1	1	0
769	62	2	19	0	3	3	0	1	0

Breastfeeding teenagers with three or more births are likely those who have trouble sustaining amenorrhea long enough to wean a child safely. How are these highly fertile teenagers coping? Once again we find ourselves pondering individual cases in the ease that UPDATE allows. One woman (#361-94-2) is using pills (CURRMTH=1. She is, not surprisingly, one of the individuals who appeared in Tables 4 and 5 as a contracepting teenager. As we might expect both from disciplinary convention, which assumes educated women are likely to use contraceptives to limit children and from the findings on spacing explained above, this woman is the most educated of the group, she reports eight years of schooling. But before we retreat to a modernization thesis, let us look at the group with respect to two variables CURRAMEN (currently amenorrheic) and FREQINT (frequency of intercourse). In virtually every case, these breastfeeding women are either amenorrheic or are abstaining -- or both. Of the five who are engaging in sex, four are amenorrheic and the one reporting the most intercourse is the pill user. In sum, almost every one of these very young women is "protected" in some way from pregnancy.

There is one exception, #769-62-2, who is having both sex *and* periods without contraceptive protection. She is also breastfeeding a child whose birth (she reports elsewhere in her record) she would have preferred to delay. Because she reports only one episode of intercourse, we can speculate that she is counting on minimal sex to lessen the risk of a new pregnancy, a possibility that emerged in the Gambian findings. (In the Sudan DHS as a whole, 87 % of the breastfeeding women using modern contraceptives were no longer amenorrheic.) In any case, this woman, like the other anomalous cases we have identified, is one we would want to track down and interview in detail.

**** Note again, however, that we now see an "anomaly" in a way that differs from what we might have seen before. Whereas we might have expected all nonpregnant women, particularly young ones, to be trying to get pregnant, we are now surprised when a nonpregnant, sexually active breastfeeding woman appears to be without protection from pregnancy.**

Summary and inferences

From these results, and particularly the discussions surrounding Tables 4-7, we can infer that women who worry about the improprieties of bearing a child before a secure conjugal relationship is in place use contraceptives more often than their age peers. Once a marriage is secured, childbearing is the order of the day and contraception ceases almost entirely. Also women use contraception not before they begin to reproduce but when spacing needs arise. This is especially the case with women who struggle with the longstanding problem of an idiosyncratically early return of fecundity after childbirth. Since a woman's particular pattern does not become clear until after two births, married women at the outset of their reproductive careers rarely use contraceptives. This observation raises questions of how people identify differences in patterns of fecundity and what they do about them. It also brings us back to questions of education and urbanization or how these factors fit into the new picture of marriage and child spacing. We might speculate that educated and/or urban women, because of their greater access to contraceptives, can address the spacing/amenorrhea problems that all women face by using family planning sooner in their reproductive careers (or in the birth interval) than other women.

**** Although women with more education are indeed more likely than those with less to solve their spacing problems with contraceptives, almost all variation among young women can be explained simply by looking at their**

situation in more interactive terms by how women must be sizing up the momentary convergence of circumstances of marriage, breastfeeding, amenorrhea and intercourse.

So far, what has been the character of our methodological excursions? We began by recreating standard tables to see if conventional expectations held up. At first they seemed to. But the more we looked, the larger the problems became. Seeing this, we highlighted cases that seemed to contradict the theory. We looked particularly closely at the age group that is expected to be at the forefront of change, namely the under-20s, and focused on the numbers indicating stage of life rather than educational or “modernizing” characteristics. We further focused in on marital status, parity and stage of postpartum childcare, using the UPDATE command to generate lists of all the cases that fall into a particular category so that their range of common characteristics came into clear view. We also went into individual records to look at unusual and possibly instructive configurations of personal circumstances. The expectation was that by understanding the outlines we might appreciate factors that are important to all cases but that lie in peripheral vision because - for most women - our known categories seem to approximate them. For example, in these cases we see active care for the reproductive health of an “at risk” young woman and her not-yet-weaned baby. That care may be general throughout the female population but is rendered invisible because most women return to an active sexual life after a baby’s weaning with no health problems and therefore look as if they are simply observing a standard number of nine months between pregnancies. Narrowing down through categories and subcategories in the database allows us to consider whether apparent anomalies are in fact simply idiosyncratic cases or exceptions that allow us to test the rule, that lead us forward to new ideas or that remain puzzles for further investigation. As the ideas developed, our sense of which cases constituted anomalies shifted dramatically.

7 • BEYOND SPACING: RESTING AND REPRODUCTIVE TRAUMA

Within the child spacing framework that we have just explored, contracepting can be seen as primarily a strategy to complete breastfeeding a child. In theory, then, there should be no reason to use contraception once a child is weaned and a new pregnancy can begin without endangering the toddler. This puzzle returns us to the full dataset for tabulation of the patterns. As Table 8 shows, we find that only a third (one hundred) of all 298 Sudanese DHS respondents with one or more births who were using modern contraceptives were actually breastfeeding. (For contrast, “traditional” contraceptives are omitted from this table).

QUESTION: Are women who have finished breastfeeding a child less likely to use modern contraceptives than those who have not?

Table 8: Type of contraceptive by breastfeeding status (Sudan)

COMMANDS:

```
SELECT CEB >0 AND CURRTYPE <>1
```

```
TABLES CURRTYPE CURRBF
```

CURRTYPE	CURRBF		Total
	no	yes	
none	2848	1968	4816
>	59.1%	40.9%	> 94.2%
	93.5%	95.2%	
modern	197	100	297
>	66.3%	33.7%	> 5.8%
	6.5%	4.8%	
Total	3045	2068	5113
	59.6%	40.4%	

p<.1

New question: Why would women use modern contraceptives when there is no obvious reason to protect the last child from a new pregnancy?

Indeed, modern contraceptive users who have had at least one birth are breastfeeding only half as often as those who are not breastfeeding (66% versus 34%).

The fact that two thirds of users apparently had in mind some motive for their contraceptive use other than spacing to finish breastfeeding makes little immediate sense in a "nonlimiting" population. Results like this require us to look beyond the simple "child spacing" view of contraceptive use. Clearly we are confronting not just one type of spacing but multiple. Because myriad theories could be pursued at this point we take a shortcut and clue the reader into the direction the logic will now head.

Following the Gambian study's results, the explorations will suggest that many of the anomalies we see in the DHS materials are best resolved by a *medical* logic of cumulative wear on the body rather than a

demographic one. In rural Africa, with its high and risky fertility conditions, a woman's ability to bear children safely lessens in response to the cumulative effects of hardship she has experienced and to the vagaries of personal history, particularly those of obstetric trauma. A difficult birth, a poor diet, strenuous work responsibilities--all these can exact what women experience as disproportionate bodily tolls and intensify the pace of decline. In this region, where reproduction is so critical to conjugal credit that temporal delays would seem to be a woman's chief enemy, in fact time spent in "resting" seems to be considered largely irrelevant to ultimate child numbers. The most traumatic health assaults therefore produce the strongest efforts to delay a new pregnancy in order to "rest," to avoid pregnancy past the time of weaning.¹⁶ In this action, a woman seeks to heal and recuperate from the exhaustion and ill health that would jeopardize not only her own health or that of her surviving children but her future ability to reproduce.

With respect to the theme of contraception and fertility then, we begin to encounter distinct hints of a more interactionist model. One is that of "*spacing*," the use of contraceptives to avoid pregnancy while breastfeeding. Even the "spacing" model itself, however, contains variations that must be unraveled. Among the most important is variants of spacing, therefore, is the notion of "*resting*" (as Gambian women phrase the strategy), contracepting after weaning a child or after the death of a child. At first the variants of spacing relate closely to the child. As the woman moves toward the end of the reproductive life, however, her own health and well-being become the critical points to which contraceptive use is indexed. The phenomenon of "rest" becomes increasingly important, we will shift our attention from young to older women.

Seeing the world through this "contingency" framework--that it is not time that limits fertility but the course of events and the body's resources-- we find ourselves again having to shift both how we see the norm and how we look for anomalies. This contingency view explains the oddities of greater use of traditional contraceptives among the young rather than the old (contrary to the predictions of modernization theory) as a function of young women's fears of impairing their fertility by the use of strong modern contraceptives. The latter being more likely, under the theory of cumulative wear, to seek "rest" periods.

**** At this point, of course, we are running strongly against the grain of the DHS. However, the reader should bear in mind that it is the richness of the survey's questionnaire and the response codes allow us to see this.**

To glean further clues about women's motives of contraceptive use, let us look at the circumstances of their most recent birth. We shift to the "children" file and select again only the current users of modern contraceptives.¹⁷ Let us look at just one page of individual cases of mothers in the children file through the UPDATE command string (Table 9).

¹⁶ The word "resting" is an English translation of a local word, yet its meaning here, applied to the effort to delay a birth past weaning, is quite different from how contemporary Western natives would understand it. The word began to emerge in the Gambian study quite independently of the research design. Once it began to arise so strongly in open-ended interviews with women, it was incorporated into a survey question to ask on a monthly basis.

¹⁷ In this file, there are 297 modern contraceptors; one of the 298 nonbreastfeeding users in the "women" file is now out of view because she had no children.

SEARCH: for factors relevant to contraceptive use after a birth.

Table 9: Sample UPDATE page of modern contraceptive users (Sudan)

Current selection: chlast=1 and currtype=2

UPDATE CASEID AGE EDYRS CHYOB CURRBF CURRMTH

CASEID	AGE	EDYRS	CHYOB	CURRBF	CURRMTH
3 27 2	31	12	88	1	pills
3 44 3	30	2	88	0	pills
3 66 10	40	0	84	0	pills
4 42 2	37	9	82	0	pills
4 65 2	31	8	89	0	pills
4 82 2	25	8	89	1	IUD
4 91 2	29	19	87	0	pills
5 2 2	30	19	88	1	condoms
5 16 3	29	17	88	1	IUD
5 34 2	28	10	88	0	IUD
6 60 2	46	1	88	1	pills
6 94 2	22	8	89	1	pills
6105 2	20	6	89	0	pills
7 38 2	41	16	88	0	pills
7 43 2	42	4	85	0	pills
7 45 2	33	6	88	0	condoms
7 73 7	33	15	86	0	pills

Finding: Some women using modern contraceptives are not breastfeeding .

New question: Why?

If we concentrate on the CHYOB and CURRBF columns, one of the oddities that soon comes to light is the fact that in six cases (highlighted in boldface), the last child's year of birth is recent (1988 or 1989 in this 1989-90 survey), yet the mother is not breastfeeding. This is particularly odd in the cases of two of the three women who reported a last birth as late as 1989. Adding the variable TINMILK to the UPDATE string (not shown) does not solve the mystery. Only 4% is feeding their last-born child this way

(only one woman in the sample page shown above), and almost all who are doing so are also breastfeeding. Another possibility is that these nonbreastfeeding contraceptors may have children who have died. Let us add CHALIVE to the string and put it next to the child's year of birth for a stronger visual effect (see Table 10).

SEARCH: for factors relevant to contraceptive use after a birth .

Table 10: Sample UPDATE page of modern contraceptive users - CHALIVE added (Sudan)

```
SELECT CHLAST=1 AND CURRTYPE=2
```

```
UPDATE CASEID AGE EDYRS CHYOB CURRBF CHALIVE CURRMTH
```

CASEID	AGE	EDYRS	CHYOB	CURRBF	CHALIVE	CURRMTH
3 27 2	31	12	88	1	1	pills
3 44 3	30	2	88	0	1	pills
3 66 10	40	0	84	0	1	pills
4 42 2	37	9	82	0	1	pills
4 65 2	31	8	89	0	0	pills
4 82 2	25	8	89	1	1	IUD
4 91 2	29	19	87	0	1	pills
5 2 2	30	19	88	1	1	condoms
5 16 3	29	17	88	1	1	IUD
5 34 2	28	10	88	0	1	IUD
6 60 2	46	1	88	1	1	pills
6 94 2	22	8	89	1	1	pills
6105 2	20	6	89	0	0	pills
7 38 2	41	16	88	0	1	pills
7 43 2	42	4	85	0	1	pills
7 45 2	33	6	88	0	0	condoms
7 73 7	33	15	86	0	1	pills

Finding: Some women using modern contraceptives are doing so after the last child died .

New question: Why would women be using contraceptives when there is no child to space?

Adding variables to the string helps to solve the mystery of why half of these six contracepting

women who had a recent birth were not breastfeeding. Their child was no longer alive. This was also the case for 9% of nonbreastfeeding contraceptors (18/197). Indeed, more of the users of modern methods had suffered the death of their last child than had nonusers (19.1% vs. 7.6%). These findings raise even more puzzling mysteries. The great majority of contraceptors in this nonlimiting population were not using contraceptives to finish breastfeeding a child (Table 8). Some of these women were very likely trying to have a surviving child and failed. Some may be sterilized, in which case the question of continuing breastfeeding is irrelevant. But for other women, continuing to use contraceptives after a child died does not make sense for how we have understood the dynamics of child spacing. Why would anyone in this "nonlimiting" population be contracepting in such a predicament? The fact that a number of women are contracepting when there *is* no last child to space suggests that attempts to explain contraceptive use simply in terms either of limiting and/or of spacing children are partial at best and wrong at worst.

**** The anomalous finding among women whose last child was not alive but were nonetheless using Western contraceptives has given us a crucial handle. The conclusion toward which we are moving is that "births" are not necessarily the same thing as "children." Although these two terms are conflated in demographic terminology, women may try to limit their "births," particularly the risky and traumatic ones that yield sickly or dead children and leave the mother debilitated. But this does not mean that they are trying to limit the number of their "children."**

If we are now calling into question the childspacing framework itself, how should we proceed? With the possibility in mind that extreme cases often hold the best clues to wider unseen truths, let us scrutinize these extreme cases: women who had lost their last child.

Sterilization, child loss, and maternal trauma

As we turn to the UPDATE Table 12, the eighteen cases in which a woman is contracepting after her last child died, a surprising pattern--and another handle on the problem--emerges.

SEARCH: for factors relevant to modern contraceptive use following a child's death.

Table 12: UPDATE display of women using modern contraceptives; last child dead (Sudan)

Commands:

```
SELECT CHLAST=1 AND CURRTYPE=2 AND CHALIVE=0
UPDATE CASEID AGE EDYRS CHYOB CURRMTH
```

CASEID	AGE	EDYRS	CHYOB	CURRMTH
4 65 2	31	8	89	pills
6105 2	20	6	89	pills
7 45 2	33	6	88	condoms

25	64	3	32	11	87	steril
37	17	2	38	8	87	pills
50	39	14	32	8	89	pills
52	97	4	40	0	88	pills
62	173	9	25	0	85	pills
64	219	2	42	0	78	steril
202	19	2	43	8	78	pills
268	58	2	31	0	86	steril
404	65	2	30	9	89	steril
466	50	2	30	3	87	steril
503	49	3	37	4	87	IUD
504	8	2	39	0	83	pills
506	22	2	45	0	78	steril
904	41	2	35	0	80	steril
904	140	2	38	0	90	steril

Finding: Some women using modern contraceptives are doing so after the last child's death.

New question: Why would a woman be sterilized after failing to have a child?

Eight of these respondents (44%) reported in the variable CURRMTH that they were sterilized 9 (marked in boldface in the right hand column). The numbers are tiny but their proportion of the whole is far greater than the 13% (37/279) of contraceptive users whose last child had not died. We might explain this finding simply as a function of the fact that older women who are more likely to be sterilized ended their childbearing in the past when child mortality was higher. Yet the looming question is whether these births had anything to do with the sterilization outcome. Given the sparsity of information in the early Sudan DHS, the answer is difficult to discern. One source of clues is the age of the child at death. A frequency calculation of child's imputed death in months reveals that in fully two thirds of these cases, these last children had died close to birth, as neonates (months at death = 0).

The modernization thesis might posit that sterilization, an extreme measure, may have been enacted to limit children by just a few of the most advanced women. Yet if "advanced" is measured by years of education or urban residence, this can hardly be the case. Among all sterilized women, the educational level was well below the years of education of users of other modern methods (3.0 years vs. 4.8 years). Forty-two percent of the forty-five sterilized women had no education at all. And whereas 71% of sterilized women were living in urban areas, they were less numerous than the users of other modern methods (76%). Certainly sterilized women were older than users of any other method, modern or traditional. And, as we might imagine, sterilized women as a whole had many births (a mean of 8.0) and many surviving children (6.8). However, variation was wide. While eleven women had nine or more surviving children, ten had four or fewer. Three sterilized women had only two surviving children. These facts, together with the fact that the last child had died close to birth in eighteen of these forty-five cases of sterilization--all suggest that limitation of children is a highly incomplete explanation for sterilization.

These scrutinies of last-child deaths and of sterilization suggest that women who are contracepting are doing so for reasons that depart sharply from those of limitation or avoiding overlapped births. The fact that a child's death was so often followed by contraception, whether sterilization or some other method, lends support to the thesis that the Gambian data brought to light. Cases of child death and sterilization may reflect maternal trauma at birth that may have caused, or was exacerbated by, the mother's ill health. These contraceptors may have been extreme cases of debilitated women who were attempting to "rest."

Some of the most telling cases are those of women contracepting after a nonlive birth. As noted earlier, the DHS does not have data on last pregnancies that did not survive. Nor does it have commentary variables. Some of the Gambian files contain both, however, and it is possible to use them in combination to enhance and explain what we have seen in DHS. Selected here are four women whose last pregnancy did not survive and who were using Western contraceptives. In the Gambian data, these contraceptives are almost entirely Depo Provera and birth control pills. As described above, this would be a very puzzling group by all known demographic theories of fertility, yet they are the most revealing of the more fundamental principles of health and "wearing out" that guide reproductive behavior. Women using Western contraceptives were disproportionately those who had suffered a nonlive birth or an otherwise difficult pregnancy termination. The comments recorded over the months from these four women --all of whose last pregnancy had been a nonlive birth-- show far more starkly than an academic description could do why this is the case. While the results in Table 14 cannot be exhaustive on these points, they are illustrative of the commentary capacity of Epi Info.

We display an example of a short-answer question and its follow-up commentary from the fifteen month multi-round survey administered during 1993 and 1994 to approximately 270 women each month in eight of the forty villages. This monthly structure helped to catch changes in individuals' postpartum sexual, reproductive and contraceptive patterns more accurately than a one-time survey allowed. The rounds included a core fertility questionnaire with quantifiable questions, several "please explain" follow-up questions, and one lengthy open-ended question theme that varied each month. The commentaries are a selection from four women. These commentaries are placed alongside the following variables: woman's ID number; round number; age; a yes/no question on whether the woman is trying to take a rest from a new pregnancy; and a follow-up "please explain" question to the "take-rest" question.¹⁸ Since Epi Info only accepts commentary strings up to a limited length, four variables were strung together to allow more extensive answers. In this case, the question "are you trying to take a rest" was question #13, and the commentary responses to it were numbered accordingly. Hence, the command is: UPDATE SURNO ROUNDNO AGE TAKEREST Q13COM1 Q13COM2 Q13COM3 Q13COM4.

Table 13 is a somewhat cleaner version than how an actual Epi Info screen appears. We show only the first two commentary variables at the top, although the answers sometimes extended into the third commentary variable.

¹⁸ In three instances, these women responded "no" to the question, "are you trying to take a rest?" However, it appears from their comments that the initial question had somehow been put to them in a way that led them to respond "no," when in fact the thrust of their comments was "yes." We see one such anomaly displayed in the case of the third woman.

Table 13: Short-answer + commentary variables; Gambian rounds

CURRENT SELECTION: LASTPREG>1 AND AVOID = "D"

[last pregnancy is not alive and woman is using family planning to avoid pregnancy]

#	RD	AGE	TAKRST	Q13COM1	Q13COM2
1	7	33	Y	Delay for one year to enable to prepare more for the n	ext preg.
1	9	33	Y	I need to rest for I am tired.	
1	10	33	Y	My last preg resulted to an abortion at the 4th month a sick.	nd after the abortion I felt
1	11	33	Y	I want to delay the next preg for a short time because year and I was very ill so I decided to delay the next p	I had an abortion last reg.
1	12	33	Y	.	
1	13	33	Y	.	
1	15	33	Y	Because I want to rest.	
2	7	30	Y	I would like to have a rest because I always have diffic	ulties when b/f
2	8	30	Y	Because I want to regain my health and strenght for a another child.	while before getting
2	9	30	Y	Because I face lots of difficulties during pregnancy.	
2	10	30	Y	Because I used to suffer a lot before I delivered. I use labour or more I want to rest and also to regain my st	d to have 5 days in rength.
2	11	30	Y	I want to delay my next preg so as to to rest.	
2	12	30	Y	.	
2	13	30	Y	.	
3	1	37	Y	Because I have quite a number of kids and I want to restore my own health.	
3	2	37	N	I am resting.	
3	3	37	Y	I have delivered a lot! I really want to rest a while to g et healthier.	
3	4	37	Y	I am using the injection (depo-provera) after a stillbir th 4 months ago. I want to rest before another pregnancy. I took the injection	forty days after the stillbirth.
3	6	37	Y	I had difficulties with my previous preg so I want to delay the next preg for 5 yrs.	
3	7	37	Y	Because I face lots of difficulties and I want to rest for awhile to regain health and strength.	
3	8	37	Y	I am delaying my next preg because I am not healthy a	nd want to rest.
3	9	37	Y	I am delaying the next preg because I am adviced by th	e doctor to rest.
3	10	37	Y	Because my husb is ill for a long time. I want to rest.	
4	8	26	Y	Because difficulties in taking care of the family and als	o to be healthy.
4	9	26	Y	To be healthy with my family.	

KEY

RD Round number
TAKRST Want to take rest after weaning
Q13COM1 Question 13 comment 1

Q13COM2 Question 13 comment 2

Case 2 from Sudan

The Gambian findings suggest that there are likely links among female sterilization, child morbidity and mortality, and maternal morbidity. They also suggest that aberrations that appear to be most extreme from the perspective of limitation or child spacing may have much to tell us.

Among the more striking anomalies in Sudan are women who were using modern contraceptives yet had suffered many child losses. In this category, the most extreme case in Table 11 is thirty-one year old #268-58-2. Having borne eight children but left with only four, she is sterilized even though half of her children are dead. Let us explore her situation in detail (Case 2). Again, we flag the most relevant responses with an asterisk (*).

Case 2QUESTIONNAIRE SELECTIONS -- 31 YEAR OLD STERILIZED WOMAN IN **SUDAN**LAST CHILD

CASEID	Case Identification		268-58-2
AGE	(v012)	Current age -respondent	31 *
BRTHORDR	(bORD\$01)	Birth order number	8
CHYOB	(b2\$01)	Year of birth	86
CHALIVE	(b5\$01)	Child is alive	0 *
		0 No 1 Yes	
CHIMPDTH	(b7\$01)	Age at death (months-imputed)	0
CHPBINT	(b11\$01)	Preceding birth interval	26

WOMAN

EDYRS	(v133)	Education in single years	0
NOUNIONS	(v503)	Number of unions	1
AGEMARR	(v511)	Age at first marriage	14 *
CEB	(v201)	Total children ever born	8 *
SURVCHRN	(v218)	Number of living children	4 *
BLAST5	(v208)	Births in last five years	1
AFB	(v212)	Age of respondent at 1st birth	15 *
CURRMTH	(v312)	Current contraceptive method	6 *
		0 Not use 1 Pill 2 IUD 3 Inject	
		4 Diaph/Foam/Jel 5 Condom 6 Fem Ster	
		7 Male Ster 8 Per Abst 9 Withdr	
		10 Other 11 Norplant 12 Abst	

CURRRTYPE	(v313)	Current use by method type	2
		0 No mth 1 Trad meth 2 Mod meth	
LSOURTYP	(v327)	Last source for users by type	1
		1 Govt Clin/Pharm 2 Govt Home/Comm deliv 3 Priv Clin/Deliv	
		4 Private Pharmacy 5 Church, friends, books 6 Other	
LCHWANT	(v367)	Wanted last child	2
		1 Wanted then 2 Wanted later 3 Wanted no more	
APPROVFP	(v612)	Respondent approves FP	0 *
		0 Disapproves 1 Approves	
IDEALCHD	(v613)	Ideal number of children	96
		96 Non-numer resp	
FERTPREF	(v602)	Fertility preference	3
		1 Have another 2 Undecided 3 No more	
		4 Sterilized 5 Declared infecund	
DESMOCHD	(v605)	Desire for more children	5
		1 Wants w/in 2 yrs 2 Wants aft 2+ yrs 3 Wants, unsure tim	
		4 Undec 5 Wants no more 6 Declared infec	
HUSAPFP	(v610)	Husband approves FP	8 *
		0 Disapproves 1 Approves 8 DK	
PDISCFP	(v611)	Discussed FP with partner	0
		0 Never 1 Once or twice 2 More often	
SHDESCHD	(S604A)	Husbands desire for children	8
		1 Have another 2 No more 8 DK	

This woman reports being married at 14 and bearing her first child at 15. She would have been 27 when the last child was born in 1986 (about four years before the survey). This would give her an average birth interval length (assuming no nonlive births) of 1.5 years. The birth interval preceding this last child was 26 months, and she reports that she had wanted the birth, though later than when it actually occurred. Her fertility record in the child file, beginning in 1973, shows the following birth interval months: 14, 9, 8, 28, 21, 54, 26. Some of these intervals are unlikely to be accurate. Still we begin to compile a picture of a woman who has led a hard reproductive life of closely spaced childbirth events. It seems quite plausible, then that she is sterilized because the birth of this last child, which died as a neonate, may have been traumatic for a tired mother and it was deemed necessary to foreclose the possibility of any further dangerous pregnancies. Clearly this woman, in her contraceptive action, represents a very different case from that of the young women who were responding to closely spaced births by contraceptive use in order to delay births. This is not a case of child spacing, but rather a permanent rest.

A surprise and a tangent: "disapproving users"

As we have seen, a key potential of Epi Info is its multiple capacities to draw sharp attention to heuristic anomalies. We now encounter a single response in the Case 2 that starkly exemplifies this potential. It is an anomaly of such proportions that it justifies a sharp right angle detour.

As we scan down the responses in Case 2, we come to the question of whether the respondent approves of family planning and encounter a surprising answer from this sterilized woman; she does not. She is in effect a "disapproving user" of contraceptives. Moreover she has never talked to her husband about family planning and does not know whether he approves of it. Whatever does she mean by all this? Was she sterilized involuntarily and resents what happened to her? Does she believe that it is wrong to limit births even though she herself appears to be doing so? Or is she even talking about a measure such as sterilization at all? The English translation may have been scrambled and she may somehow be referring to herself as "sterile," meaning "infecund" in the broadest sense. This is unlikely, however, since she reports that the "source" for her current method was a government clinic or pharmacy. What we have encountered is a response whose aberration of logic is so striking that it calls for some quick detours to pursue a few of its myriad tendrils of logic.

Let us take religion. If this woman is conflicted on religious grounds--perhaps she is using contraceptives although she knows her religion disapproves--then such religious conflicts on this matter may be reflected more broadly in the populace. Though we have no measure of degree of religious sentiment that the respondent may feel we do have different types of religion to test. Our expectation (given strong Catholic doctrine on the subject of contraception, compared to immense local variation in Islamic interpretations) is that Catholics would be most opposed and Protestants least with Muslims somewhere in the middle. The results for six African countries examined are quite different. In Sudan religion made no difference: Fifty-one percent of both Muslim and Christian women (even though they comprised only 2% of the sample) said they approved of family planning. However, in the other countries (Nigeria, Ghana, Kenya, Zambia, and Cameroon), Catholics are on the whole *more* approving than Protestants but both are more approving than Muslims. Religion, in sum, provides little help on the matter of disapproving use.

Where can we go from here? There is a possibility that sterilization is so different from other contraceptives that it is not considered a contraceptive. However, this speculation fails as well. Among all 298 modern contraceptive users in the Sudan DHS, six disapproved of family planning. Among this group of disapproving users, two were using female sterilization and the other four were using pills, IUD or condoms.

We can also ask: If a user disapproves of family planning, what does her husband think? Out of the six disapproving users, four had husbands who also disapproved. Adding to the general bafflement, this group includes one disapprover who reported using condoms.

In Sudan, then, about 2% of female users of a variety of modern contraceptives (as well as 2% in Ghana and 3% in Kenya) disapprove of family planning; several of these disapprovers say they are using condoms, yet their husbands *also* (say the women) disapprove of family planning. In Kenya, the group of disapproving wives with disapproving husbands includes all five cases of disapproving women who reported using condoms.

These findings raise the question of what proportion of all husbands whose wives are using condoms approve (according to their wives) of family planning. In Ghana, fully 45% of all women using condoms --compared to 38% of all users of other modern contraceptives-- have husbands who (say their wives) disapprove of family planning. In Kenya and Zambia, this is 41%; in Nigeria 46%; in Mali 66%. Indeed, in most of these countries husband disapproval of family planning was actually highest among women who reported using condoms. Whether this implies that the men were associating condoms with disease prevention or with child spacing rather than limitation is not clear. Nor is it clear who the woman is referring to when she reports condom use. She may have been using condoms with someone else and not with her own husband.

This detour through some of the puzzles of disapproving users, which has so dramatically benefitted from the redundancy that DHS has built into its surveys, has turned up findings that raise basic anthropological questions. How do contraceptors define their own actions? Furthermore, when people answer questions on ideals, what do their answers refer to? Are they referring to their own behavior or to

that of a generalized “other?”¹⁹ In asking these questions, we are forced to confront the fact that we may be seeing reproduction and contraception very differently from how our subjects do. Are all contraceptive measures one category of action? Or are there not only many kinds of measures, each of which has multiple potential meanings? What we have is a case that sets us, in our iterative mode, on to new questions.

8 • CONCLUSION

Where are we, then, with respect to our original thesis that modern contraceptives are used to limit or space births? We moved beyond a simple "limiting" explanation for contraceptive use and toward a view of contraceptives use as intended to space births in order to protect a breastfeeding child. The realization that as many as two thirds of users had either finished breastfeeding or had suffered a loss of a child led in turn to a realization that contraceptives are not used simply in situations of high risk of overlapping births but in situations of reproductive trauma. Exploring the case of sterilized women led to the discovery and exploration of a small but consistent group of "disapproving users" of contraceptives, both female and male, in several countries. This finding, by suggesting slight differences of meaning in redundant questions, highlighted more than any of the other exercises described here the fact that actions can have multiple meanings. Moreover, the meanings we have assigned to them in the past have distorted how we analyze demographic reports.

We thus find ourselves back to the point where we started; have we understood even a fraction of the rich meanings that are attached to contraceptive use in Africa? Seen through the lenses of a Western survey instrument and through the tiny window of contraceptive use, a number of apparently incongruent results have given us a handle on a much broader phenomenon of health and practice. The flexibility of the Epi Info program has allowed us to work from numerical methods into increasingly refined sub-categories of the female population whose situation and experience exemplify specific issues or seem to offer illumination to specific puzzles or incongruencies. We work with the database as if each encounter with it represented a follow up study where we reinterview people to ask more searching questions. The capabilities of the program allow repeat “visits” putting various characteristics of the cases together on the screen in response to particular questions. The burden is on the analyst to conduct the inquiry as if they were still in the field, able to rephrase questions, rediscover and recontextualize past answers, and try experiments with alternative concepts. The “big picture” and statistical testing can be reinvoked at any time as necessary.

In the past, there has been a tendency among culturalist/interpretive advocates to condemn quantitative data as reductionist and empiricist. Quantitative experts, by contrast, have tended to see qualitative data and methods as drawing very long inferences about very small groups on the basis of thin evidence. There has been mounting interest in the social sciences and the biomedical fields in employing both quantitative and qualitative research methodologies to reinforce each other to better inform our understanding of human behavior. This interest hinges on the conviction that robust conclusions require the use of multiple data sources and methodologies. Still, many social scientists as a result of their training and research interests, remain familiar with either quantitative or qualitative methods but not both equally. They feel reticent to use the one with which they are least familiar. They also shy away from using the data that are conventionally associated with this "unfamiliar" domain. This primer has sought a different approach specifically tailored to making new and imaginative use of the vast data sets that have been collected over the past ten years. Concentrating on an exploratory approach to public-domain survey data, particularly the richness offered by the DHS, we have sought to draw on the logics of both quantitative and qualitative disciplines and encourage recourse to a variety of sources for ideas about

¹⁹ Older Gambian women, often using Depo themselves, may speak in highly disapproving tones of the promiscuous actions of young women who use "family planning." In this, they allude to the attempts of insubordinate young women to limit children or, more precisely, to limit the children of their husband and his family, of which they (the respondents) are members.

questions to put to the data.

We have not summarized the findings of the exercise itself in any detail but it is worth pointing out three considerations. First, by taking an anthropological approach one is not necessarily going to confirm a vast variety of different cultural patterns, as many generalizing disciplines may fear. In this case, it appears as if there is a very widespread set of reproductive principles in Africa. These vary in their implementation, according to historical circumstance, particular regional experience, or possibly religious or kinship injunctions. To move away from the current generalizations does not open a Pandora's Box. Secondly, we can bring historical reconfiguration of reproductive life into the analysis as something people do rather than a force or trend to which they submit. It should be possible to be as creative about the composition of trends as we hope this method is with respect to basic reproductive rationales.

Finally, we note that the method described here has the potential to open the door to a much wider range of scholars. On the one hand, those who characteristically are restricted to quantitative data and methods gain quick and visible access to traces of social and cultural dynamics that may explain the numerical patterns. On the other, those who have little training in either computer technology or quantization can find a new world of information that is now opening up in such unprecedented ways by international public access surveys.

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APPENDIX A: CREATING AND NAVIGATING WITHIN EPI INFO FILES

This brief section does not attempt to guide the reader through the construction of an Epi Info data set and questionnaire or to describe how Epi Info is set up and operated. The instructions on these matters are summarized in the program's manual and in its tutorial (see also Appendix B of this primer, for a description of the conversion of files, in this case DHS, from SPSS into DBase and then into Epi Info). Rather, this section highlights tips for creating Epi Info sets and maneuvering within them in ways that facilitate working within the iterative techniques the primer describes.

A few words about the sections to follow: Section 1 describes the reason for using an older version of Epi Info in the ANALYSIS maneuvers described in this primer. Section 2 describes ways to construct Epi Info questionnaires in the ways that facilitate visibility and rapid maneuvering. Section 3 describes setting up alpha-numeric variables and especially variables that can exploit the potential for encoding commentary in a way that we saw in the example from the Gambian data. We assume that variables have already been chosen from the SPSS files and that a DBase file has been created. Section 4 describes tips for movement within the three ANALYSIS screens.

1 • EPI INFO VERSION 5.0 VERSUS 6.0

The best version of Epi Info for the use of ANALYSIS in the way described in this primer is 5.0 (produced in 1991). The reason is that subsequent versions cannot handle the combination of multiple selections for subgroups and lengthy questionnaires. However in Epi Info 5.0 the UPDATE mode, which is central to maneuverability, carries a danger. Epi Info is a "data entry" program and UPDATE is the mode it provides to change or correct already-collected data. This means that in using it for ANALYSIS one can overwrite data by mistake. Epi Info 5.0 makes any changes automatically; subsequent versions of Epi Info (6.0 and higher) ask whether any change made should overwrite previous data. When using Epi Info 5.0 save a backup copy of the file in case mistakes occur.

2 • THE EPI INFO QUESTIONNAIRE

It is best to set up the questionnaire in ways that maximize ease and speed of reading. One way of doing so is to keep the total length of the questionnaire short. In the DHS files we have used here, the number of variables has been trimmed sharply to eliminate sections that appeared less immediately relevant to fertility and to eliminate repetitions, recodes, etc. An additional consideration for size is that Epi Info questionnaires can be up to 500 lines long, a length that must include questions, variables and labels. For our purposes of iterative thinking, 500 lines is more than enough. For example in the SETUP menu, Epi Info allows one to change the screen colors so that the line in which each variable appears can be a different color from the lines containing the labels. It is also useful to compress the questionnaire so that one can see as much as possible on a single screen. Finally, it is useful to align the variables and labels on the screen, to allow quick scanning and comprehension. The Cases (1 and 2) in the previous section give examples.

The questionnaire is saved as ASCII text and its extension must be ".qes".

Assuming that the data files are in Dbase, when the questionnaire is done, go to the "IMPORT FILES" menu (when first entering the program, it is one of several options under "PROGRAMS") and import the DBase files into an Epi Info ".rec" file (instructions are in the program). This

creates an Epi Info file that can be manipulated but does not have the questionnaire template.

To make the data set visible through the questionnaire, go into the "ENTER DATA" mode under the "PROGRAMS" menu, enter the name of the new Epi Info .rec file, and press "3" for revising the structure of the data file.

Note: If the original data come from files like SPSS, one can always create a new DBase file to include more variables from the original SPSS files. And the Epi Info questionnaire can be revised so as to reorder the questions or drop from sight certain variables.

3 • THE VARIABLES

Alpha-Numeric variables

The Epi Info files we created are entirely different from the SPSS files in which DHS data are distributed. The questionnaire has been retyped, using the "MAP" file as a base but they were often restructured into different ordering of thematic clusters. Most important, the names of the variables have been changed to be user-friendly. In the DHS map file, all the variables have the names that are for the most part numeric. For example, V013 is 5 year age groups and the 7 labels on the right show which number refers to which age group. In the Epi Info questionnaire, the variable names have been changed into English derivations, so they can be recognized quickly and used easily. The original SPSS names have been included in parentheses, to allow full information to be checked in the map file. The variables and labels were given short names to allow more of them to fit on the screen in the UPDATE mode.

Commentary variables

Epi Info has the capacity to enter open-ended responses as string variables. These variables can contain up to 80 characters. However, any number of comment variables can be strung alongside each other in the questionnaire, allowing long comments to be recorded in pieces. We can thus ask a question with a short-answer response, and follow it up with a question designed to elicit an explanation of why this particular response was given. Thus, a 2-space numeric variable:

"How old were you when you married?" ##

This variable might be followed by 4 commentary variables, each consisting a long string character:

"Why did you get married then?"

{q1com1}	<A	>
{q1com2}	<A	>
{q1com3}	<A	>
{q1com4}	<A	>

The respondent's comment is thus pieced out continuously through all the space needed or compressed into the total number of spaces available if necessary. It is easy to see these responses in their entirety in an individual's record (in QUESTIONNAIRE mode) but difficult to see them together in the spreadsheet mode because they may be strung out over several screens. If desired, long comments entered in Epi Info can be transformed later through word processing into more readable text together with whatever short-answer responses are useful to accompany it.

4 • TIPS FOR INTERACTIVE ANALYSIS IN EPI INFO

The screens

Each of Epi Info's three screens in the ANALYSIS mode -- COMMAND/CALCULATION, SPREADSHEET, and DATA ENTRY -- can be exploited for wading directly into the data constantly, in order to wend one's way through the facets of a problem. The most useful commands (aside from the usual tabulation commands such as **FREQ**, **TABLES** and **MEANS**) are:

-**SELECT**, in the command screen, to create a small, focused subpopulation

-**UPDATE**, in the spreadsheet screen, to see several variables in combination on the screen at once.

Two general principles may help to maximize the ability to move around. The first is speed. Keep hands off the mouse, typing is faster. Second is visibility. Spend time looking at the data on the screens and keep moving among screens. Here are some descriptions of the three screens in ANALYSIS and some tips for moving around in each.

A. COMMAND/CALCULATION

This screen can be used to check on overall frequencies, means, tables, regressions --including working with subpopulations through the **SELECT** command. A series of Epi Info and DOS commands is visible by pressing **F2**. Pressing **F1** after typing a certain command gives help for that particular command. Pressing **F3** makes all the variables appear for reminders. Each can be typed in to the command line or tagged (with "+") to enter a longer list.

Movement:

-pageup/pagedown (scrolling quickly through the output lines)

-contr-PgUp/PgDn (scrolling slowly through the output lines)

B. SPREADSHEET (get into it through **F4** or "**UPDATE**")

In this screen, one can scroll across the records. It is especially useful after some "**SELECTIONS**" are done, to examine particular populations.

UPDATE is one of the most useful commands in this mode. Typing **UPDATE** + several variables while in the command and calculation mode (e.g., **UPDATE VAR1 VAR2 VAR3 VAR4 VAR5**) shows a few of these variables across the screen for each person in the selected pool. In addition, one can play with the order in which the variables are listed in **UPDATE** to look for clusters of patterns that can be discerned visually by trying them out in different configurations and relationships with one another (e.g., **UPDATE VAR3 VAR1 VAR5 VAR2 VAR4**). One can also **SORT** variables by different criteria to watch for further visual patterns on the screen. When using **UPDATE**, it is best for visuality to restrict the variables being examined to a number that will fit on the screen.

Movement:

- home/end keys (beginning/end of file)
- contr-R/L arrow keys (beginning/end of line)

C. QUESTIONNAIRE (F4 [or UPDATE], then another F4)

For people who are selected out as having interesting or important characteristics, these can be examined through the **QUESTIONNAIRE** screen, in which the entire survey template is made visible. Here, individuals appear fleshed out as complete case studies. Given infinite license to restructure the order of the survey questions while typing the questionnaire template, it is even possible to imagine their life histories or all the circumstances that may have led them to give particular answers. Having selected out a subset of individuals, we can also scroll (in Epi Info 5.0) through individuals while holding constant one screen of the questionnaire.

Movement:

- pageup/pagedown
- arrow keys
- F7 (to previous record)
- F8 (to next record)

APPENDIX B: CONVERTING DHS FILES FROM SPSS TO EPI INFO: DATA MODIFICATIONS USING SPSS SOFTWARE

In this primer exercise SPSS software was used for maneuvering and modifying the DHS data. DHS data is available in the ASCII mode data. ASCII format is easily convertible to several statistical softwares (such as SAS or Excel) and was used in SPSS given its user friendliness and availability to the authors.

Several systematic steps in SPSS were followed in working with the DHS data sets. The steps along with the rationale and examples are provided below. For present purposes, we limit the description to Ghana's individual recode data downloaded from the Internet in a rectangular format. One should note that there are several other data sets, e.g., couple's recode, household raw and male recode. The data sets also exist in three formats: hierarchical; flat; and rectangular. For our purposes rectangular format was best suited. For detailed descriptions of other surveys, formats and other details (e.g., naming convention of the files, variables, year when data was collected, file size, etc.) refer to the information available on the Internet at <http://www.macrint.com/dhs/>.

STEP I: REGISTERING WITH DHS

To identify specific countries desired for the analysis and obtain permission from DHS for using the data sets, log into DHS homepage at <http://www.macrint.com/dhs/>, click on the REGISTER icon and download the necessary registration forms, complete the forms and email them to DHS.

STEP II: FTP'ING THE FILES FROM DHS

On confirmation and receipt of the USERID and PASSWORD, log on to the web address and FTP the data sets on to your hard drive. The data sets can be unzipped using PKUNZIP OR WINZIP program. In addition, download the recode manual as it provides useful description of the variables in the data sets.

STEP III: CONVERTING THE ASCII DATA SETS INTO SPSS READABLE DATA

To accomplish this task, open the *.SPS file (and in our example open GHIR31RT.SPS file) in SPSS program. This file contains the commands that help identify and assign data in a particular column and row. It first provides variable names for data in different columns. The variable names have a maximum length of 8 characters and hence hard for a naive reader to understand. The command that assigns variable names to data in particular columns is called the: DATA LIST FILE.

Example:

```
DATA LIST FILE='C:\DHS\GHANA\GHIR31RT.DAT'
```

```
/CASEID 1-15 (A)
```

```
V000 18-20 (A)
```

```
V001 21-28
```

```
V002 29-32 (and continues for data in all columns and records in the data set)
```

The cryptic variable names are then assigned more detailed labels that helps secondary researchers

using the data set. The command is called **VARIABLE LABELS**:

Example:

VARIABLE LABELS

/CASEID "Case Identification"

/V000 "Country code and phase"

/V001 "Cluster number"

/V002 "Household number" (and continues for all variable names)

The next command assigns labels for values that each variable could possibly take. For example variable name "sex" could have two possible values 1 or 2. It is important to know what these values refer to. That is, "1" refers to male and "2" refers to female.

Example:

VALUE LABELS

/V014

1 "Month and year"

2 "Month and age -y imp"

3 "Year and age -m imp"

4 "Y & age -y ignored"

5 "Year -a, m imp"

6 "Age -y, m imp"

7 "Month -a, y imp"

8 "None -all imp" (and continues for all variables)

Not all values that a variable could possibly take are meaningful (e.g. 9, -99, 99, 999, 0, etc). Sometimes interviewers use values that indicate skip patterns or data that is intended to be missing. The next command identifies values for variables that are meant to be missing. Assigning values to be missing is extremely important as the missing values should not be used in statistical computation.

Example:

MISSING VALUE

/V015 (9)

/V026 (9)

/V028 (999)

/V029 (99) (and continues for all variables)

Once the ASCII data is read into SPSS format, the next task is to save the file using the **SAVE** command.

Example:

```
SAVE OUTFILE='C:\DHS\GHANA\GHIR31RT.SAV'
```

STEP IV: SAVING A SMALLER SPSS DATA FILE

The original DHS FILE contains hundreds of variables, all of which might not be of interest to the researcher. After identifying variables of interest (this can be accomplished by reviewing the *.map or *.doc file (in our example the GHIR31RT.MAP or GHIR31RT.DOC), it is easier to save a smaller file with only the required variables. This enhances and simplifies future data manipulations and analysis.

In the rectangular format of the individual DHS data file, each record of the data is for a particular woman who was interviewed. If there are 4520 records in the GHIR31RT.SAV, it means that there were 4520 women who participated in the interview. All data pertaining to a woman and all of her children are stored in different columns. Information up to a maximum of 20 children who were alive was collected. However not all woman have had 20 alive children. By identifying the maximum number of children and saving only those variables for children who were alive saves space and limits confusion.

Example:

```
GET FILE='C:\DHS\GHANA\GHIR31RT.SAV'
```

(**running frequencies on the bord\$* --refers to birth order of the child-- variables provides information on how many women had children from 01 to 20)

```
freq vars=bord$01 bord$02 bord$03 bord$04 bord$05 bord$06 bord$07 bord$08 bord$09  
bord$10 bord$11 bord$12 bord$13 bord$14 bord$15 bord$16 bord$17 bord$18 bord$19 bord$20
```

(**frequencies indicated that no women had more than 14 children hence, in the next command we save out only variables of up to 14 children)

```
SAVE OUTFILE='C:\DHS\GHANA\GHIR31S.SAV'
```

```
/keep caseid b0$01 b0$02 b0$03 b0$04 b0$05 b0$06 b0$07 b0$08 b0$09 b0$10 b0$11 b0$12 b0$13  
b0$14 b1$01 b1$02 b1$03 b1$04 b1$05 b1$06 b1$07 b1$08 b1$09 b1$10
```

```
b1$11 b1$12 b1$13 b1$14 b2$01 b2$02 b2$03 b2$04 b2$05 b2$06 b2$07 b2$08 b2$09 b2$10  
b2$11 b2$12 b2$13 b2$14 (continue the list of all other variables that are of interest).
```

STEP V: CHANGING THE STRUCTURE OF THE GHIR31S.SAV FILE

As discussed above, information pertaining to all the children who were alive for a women was recorded in different columns with a suffix of *1 or *2 or *3. This suffix indicates the information for child 1 or 2 or 3. This format of data arrangement, though useful for some kinds of analysis, was not suited for our purpose. A decision was made to change the format. The new format would have each child's information in separate records but under the same column. That is if a woman has fourteen children she would have fourteen records. Information pertaining to her would be identical on all fourteen records but each child's information will be different depending on the child. Instead of 4520 records, the new format may contain more than 10,000 records. Identifiers will be placed to indicate the birth order of the child.

There are a total of five steps involved in changing the structure of women level file into child level file. Explanations for each of the steps are provided before the examples.

STEP Va.

First open the small version of the DHS data set, in the example GHIR31S.SAV.

```
GET FILE='C:\DHS\GHANA\GHIR31S.SAV'
```

Next recode the birth order of children, setting missing data to be equal to -99 and the rest to be the same.

```
RECODE bord$01 bord$02 bord$03 bord$04 bord$05 bord$06 bord$07 bord$08  
bord$09 bord$10 bord$11 bord$12 bord$13 bord$14 (sysmis=-99) (else=copy)
```

Using the temporary select command, select out women who had the same number of children. For instance to select women who had fourteen children, select all birthorder variables (up to fourteen) whose values was not equal to -99 (that is not missing data). Then save out the file.

TEMP.

```
SELECT IF (bord$01 ne -99) and (bord$02 ne -99) and (bord$03 ne -99) and  
(bord$04 ne -99) and (bord$05 ne -99) and (bord$06 ne -99) and  
(bord$07 ne -99) and (bord$08 ne -99) and (bord$09 ne -99) and  
(bord$10 ne -99) and (bord$11 ne -99) and (bord$12 ne -99) and  
(bord$13 ne -99) and (bord$14 ne -99)  
SAVE OUTFILE='C:\DHS\GHANA\GHIRC14.SAV'
```

To select all women who had thirteen children, select all birthorder variables (up to thirteen) whose values was not equal to -99 (that is not missing data) and the fourteenth birth order to be equal to -99 (that is missing data, as these women had only thirteen children). Save this file and continue in a similar fashion up to no children.

TEMP.

```
SELECT IF (bord$01 ne -99) and (bord$02 ne -99) and (bord$03 ne -99) and  
(bord$04 ne -99) and (bord$05 ne -99) and (bord$06 ne -99) and  
(bord$07 ne -99) and (bord$08 ne -99) and (bord$09 ne -99) and  
(bord$10 ne -99) and (bord$11 ne -99) and (bord$12 ne -99) and  
(bord$13 ne -99) and (bord$14 eq -99)  
SAVE OUTFILE='C:\DHS\GHANA\GHIRC13.SAV'
```

STEP Vb:

Now get each of the above saved files (that is, files with women who had the same number of children) and save out a new file for each child and the variables that are of interest to you. Rename the variables to names that are easily identifiable. Make sure you keep the variable names the same across all files. Also compute values for first and last child to be 1 and all else to be 0. The example is women with fourteen children.

```
GET FILE='C:\DHS\GHANA\GHIRC14.SAV'
```

(save all data pertaining to the first child and common mother data)

```
SAVE OUTFILE='C:\DHS\GHANA\GHIR141.SAV'
```

```
/keep=caseid b0$01 b1$01 b2$01 b3$01 b4$01 b5$01 b6$01 b7$01 b8$01 b9$01
```

```
bord$01 b11$01 b12$01 m4$1 m5$1 m7$1 m9$1 m12$1 m16$1 m17$1 m18$1 m19$1 m20$1  
m21$1 v002 v003 v012 v013 v025 v026 v101 v103 v108 v110 v112 v119 v129
```

```
/rename (b0$01=chtype) (b1$01=chmob) (bord$01=brthordr) (b11$01=chpbint)
```

```
(b12$01=chsbint) (b2$01=chyob) (b3$01=chdobcm) (b4$01=chsex) (b5$01=chalive)
```

```
(b6$01=chdthage) (b7$01=chimpdth) (b8$01=chcorage) (b9$01=chguard) (m4$1=chbfdur)  
(m5$1=chbfmo) (m7$1=chammmo) (m9$1=chabstmo) (m12$1=chantcrd) (m16$1=chprem)  
(m17$1=chcaes) (m18$1=chbsz) (m19$1=chbwt)
```

```
(m20$1=chnobf) (m21$1=chrstbf).
```

In a similar fashion continue saving data for the remaining thirteen children within this group of women who had fourteen children.

Then get the file that contains data for women who had thirteen children and save out data for each child within this group. Continue doing the same for groups of women who had 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, and 1 child).

STEP Vc: COMPUTE 2 NEW VARIABLES, FIRST CHILD=1 AND LAST CHILD=0.

Get each of the individual child data files and if the child is a first born or if the child is a last born compute CHFIRST=1 or CHLAST=1. For example if you obtain the data set for the first child from a group of women who had fourteen children, compute CHFIRST=1 and CHLAST=0. However if you obtain a data set for the fourteenth born child compute CHLAST=1 and CHFIRST=0. In all other data sets of children born between 1 and 14 values on both CHLAST and CHFIRST will be computed to be 0.

Example: first born child data file of those women who had 14 children

```
GET FILE='C:\DHS\GHANA\GHIR1414.SAV'
```

```
COMPUTE CHFIRST=1
```

```
COMPUTE CHLAST=0
```

```
SAVE OUTFILE='C:\DHS\GHANA\GHIR1414.SAV'
```

Example: second born child data file of those women who had 14 children

```
GET FILE='C:\DHS\GHANA\GHIR1413.SAV'
```

```
COMPUTE CHFIRST=0
```



```
COMPUTE CHLAST=0
SAVE OUTFILE='C:\DHS\GHANA\GHIR1413.SAV'
```

Example: 14th born child data file of those women who had 14 children

```
GET FILE='C:\DHS\GHANA\GHIR1401.SAV'
COMPUTE CHFIRST=0
COMPUTE CHLAST=1
SAVE OUTFILE='C:\DHS\GHANA\GHIR1401.SAV'
```

STEP Vd: CREATE A SINGLE CHILD FILE FOR WOMEN WITH THE SAME NUMBER OF CHILDREN

Here the interest is to combine all individual child data set for women who had the same number of children. Saving this file will provide a data set for all women who had the same number of children (example 14 or 13 or 12). If two woman had fourteen children, then the fourteen children file will contain twenty-eight records. Similarly if ten women had ten children, the ten children file will contain one hundred records.

Example:

```
GET FILE='C:\DHS\GHANA\GHIR1414.SAV'
ADD FILES /FILE=*
/FILE='C:\DHS\GHANA\GHIR1413.sav'
/FILE='C:\DHS\GHANA\GHIR1412.sav'
/FILE='C:\DHS\GHANA\GHIR1411.sav'
/FILE='C:\DHS\GHANA\GHIR1410.sav'
/FILE='C:\DHS\GHANA\GHIR149.sav'
/FILE='C:\DHS\GHANA\GHIR148.sav'
/FILE='C:\DHS\GHANA\GHIR147.sav'
/FILE='C:\DHS\GHANA\GHIR146.sav'
/FILE='C:\DHS\GHANA\GHIR145.sav'
/FILE='C:\DHS\GHANA\GHIR144.sav'
/FILE='C:\DHS\GHANA\GHIR143.sav'
/FILE='C:\DHS\GHANA\GHIR142.sav'
/FILE='C:\DHS\GHANA\GHIR141.sav'
```

(To cross check the combination, run a frequency on chfirst and chlast).

```
FREQ VARS=CHFIRST CHLAST
SAVE OUTFILE='C:\DHS\GHANA\GHIR14F.SAV'
```

STEP Ve: CREATE A COMPLETE CHILD LEVEL DATA FILE

Add all of the *F.SAV files created in the above step and the file of women who had no children to obtain a complete child level data file.

Example:

```
GET FILE='C:\DHS\GHANA\GHIR14F.SAV'
```

```
ADD FILES /FILE=*
```

```
  /FILE='C:\DHS\GHANA\GHIR13F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR12F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR11F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR10F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR09F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR08F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR07F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR06F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR05F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR04F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR03F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR02F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR01F.SAV'
```

```
  /FILE='C:\DHS\GHANA\GHIR00F.SAV'
```

(To cross check the combination, run a frequency on chfirst and chlast).

```
FREQ VARS=CHFIRST CHLAST
```

(make sure you recode the birthorder value -99 to be system missing, as this variable was earlier coded to be -99).

```
RECODE BRTHORDR brthordr (-99=sysmis) (else=copy)
```

(now sort the data by the caseid of the women)

```
SORT CASES BY CASEID
```

```
SAVE OUTFILE='C:\DHS\GHANA\GHIRKID.SAV'
```

STEP VI:

Essentially by this step the same individual data set is now available in two levels, the woman's level (from the original DHS data set) and child level. Now we rename all other variables that were not renamed in the earlier steps to enhance readability and ease of identification. When recoding make sure the names are consistent between both files.

Example:

```
GET FILE='C:\DHS\GHANA\GHIRKID.SAV'
```

```
RNAME VARS ( v002 =hhno) (v003 =lino) (v012 =age) (v013=age5yr) ( v025 =urbrur) (v026 =dfactore) (v101=region) ( v103 =residch)....(continue the renaming process or all other variables).
```

```
SAVE OUTFILE='C:\DHS\GHANA\GHIRKID.SAV'
```

STEP VII:

The women level and child level files are quite large and cumbersome if someone wants to work only with child or women variables. As a next task a file with only woman variables and child variables was saved.

Example:

```
GET FILE='C:\DHS\GHANA\GHIR31S.SAV'
```

```
SAVE OUTFILE='C:\DHS\GHANA\GHWMONLY.SAV'
```

```
/KEEP=Caseid hhno lino age age5yr urbrur region residch liter tv radio relig ethnic edyrs  
inschool edattain relhhh ceb ...(all other woman only variables).
```

STEP VIII:

There are some variables that are similar across countries while others are specific to a particular country. In order to further refine and make the data sets user friendly, the woman and child only data sets were broken down into general and country specific data sets. In essence by the end we have eight kinds of data sets (all obtained from the original DHS data set). At the child level we have one file containing both woman and child information, a second containing only child information, a third contains country specific child data and a fourth containing cross-countries general data. At the woman level, the same four files are created.

STEP IX: CONVERTING THE 8 DATA SETS INTO DBF FORMAT FOR IMPORTING INTO EPI INFO OR OTHER PLATFORMS

Epi Info does not handle missing values that are set to anything other than a blank. For example value 9 or 99 or -99 cannot be read as missing in Epi Info. Hence before saving the data sets into DBF format it is imperative that the missing values are set to system missing in each of the eight data sets. This can be accomplished by using the MISSING VALUE and RECODE commands.

Example:

```
GET FILE='C:\DHS\GHANA\GHWMONLY.SAV'
```

```
MISSING VALUES approvfp cashwork residch currmar cpregwan
```

```
currtype currwork ( )
```

```
RECODE approvfp cashwork residch currmar cpregwan currtype currwork
```

```
(9=systemis) (else=copy)
```

```
SAVE TRANSLATE OUTFILE='C:\DHS\GHANA\GHWMONLY.DBF'
```

```
/TYPE=DB4 /MAP /REPLA
```

Software called DBMS copy can be used to convert data sets between different platforms. If DBMS copy is available to the researcher then there is no need to assign missing values or recode missing data as DBMS copy set will handle this. DBMScopy is a handy software which lets one convert data sets to and between different platforms yet also allows data manageability during conversion. For example, during conversion it is possible to delete variables, compute new ones, change the format of a variable and even sort the data set by a particular variable.

**ANTHROPOLOGICAL VISION AND RESEARCH LOGIC:
*AN EPI INFO PRIMER***