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Changes in Co-survivorship of Adult Children and Parents: Ju/'hoansi of Botswana in 1968 and 1988

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INTRODUCTION

Population aging is a world wide phenomenon and is best documented in the developed world where gains in longevity have increased dramatically since the turn of the 20th Century. In the western world the expectation of life at birth has increased since the mid 19th Century from 40 years to nearly 80 years at the present time and the percentage of the population over age 65 has increased from about 5% to about 15% currently, and is projected to increase to about 25% by the middle of this century. Increased numbers of elderly are also reported for less developed parts of the world, though government statistics are often not precise. The difficulties of estimating changes in population aging in these places are especially pronounced for a number of reasons. Records are often not uniformly available documenting the time of birth and death. In the absence of literacy and numeracy, people in remote areas may not know their own calendar ages, though they will have good local understanding of their ages relative to neighbors and family members. In some cases it can be advantageous for a person to claim an age older or younger than his actual age. These distortions can lead to errors in estimating the actual frequencies of people of different ages (Howell 1979: 24–25; van Arsdale 1980: 67). The factors responsible for population aging in the so-called Third World are declining fertility and declines in child and maternal mortality that are associated with improvements in public health and supply of food (Olshansky, Carnes, and Cassel 1990). These same advances, however, have been accompanied by increases in population size which often carry negative effects. For example, when large numbers of people move from rural to areas of denser settlement, it creates demand for housing, water, sanitation, police services and consumer goods that may outstrip the ability of local governments and markets to meet. More congested living promotes a variety of health hazards that can increase morbidity and promote shortening of the life span. In the less developed world we observe these two countervailing forces: technological improvements that promote health and longer life span together with the negative feedback that comes with crowding and population mobility and the consequent breakdown in traditional mechanisms of social control (Gage,

McCullough, Weitz, Dutt *et al.* 1989).

Statement of problem

Our study addresses these issues in a sociological microcosm that makes questions about population aging particularly interesting. The group on whom we report are the Ju|'hoansi (!Kung) of western Ngamiland, part of the Kalahari Desert of Botswana. They constitute a noteworthy case for several reasons. Discussion of modernization and its impact on the lives of elderly in traditional society has focused most often on agricultural and peasant societies, rather than on economically simpler groups such as hunter gatherers¹). Ju|'hoansi, though now living in permanent settlements, have a recent past of mobile hunting and gathering. Over the past sixty years, Ju|'hoansi have experienced serious social disruption, a fact far from unique in less developed parts of the world. However, in the case of the Ju|'hoansi, during this period of change anthropological reports and research have accumulated, making it possible to make comparisons of "before" and "after" concerning aspects of old people's lives. In this paper we compare changes in adult longevity measured at two time intervals, 1968 and 1988, and ask, "Has sedentism and population aggregation improved or worsened chances for a long life?" Although life tables and census age distributions are not available from official sources for this remote area, the authors compare changes in the co-survivorship of adult children and their parents at the two intervals. During these two decades the many social forces that had been gathering during the mid 20th Century to bring about the end of full time hunting and gathering reached full expression. By the late 1980s, all the Ju|'hoansi of northwestern Botswana were effectively settled and making only limited use of hunted and gathered foods. Some people experimented, mostly unsuccessfully, with animal husbandry and crop raising, and all were experiencing a type of rural poverty brought on by population concentration, inability to pursue their traditional economy, and increasing contact with economically superior ethnic groups.

The comparison of longevity at the two time periods can be particularly fruitful since the life courses of many people had unfolded under quite different circumstances. Adults and their parents who were interviewed in the 1960s had experienced relatively modest encroachment of outside influence during their past lives (Lee and Hitchcock 2001). Most adults had reached maturity before the former British Bechuanaland became Botswana. The border between Bechuanaland and the then South West Africa (now Namibia) was not fenced or patrolled allowing Ju|'hoansi, many of whom were born in South West Africa, to move at will in an area that became increasingly politically demarcated after 1966 when Botswana became an independent country. Bantu-speaking pastoral people were present in the region but in small numbers. Some Ju lived and worked at Bantu cattle posts but many subsisted largely on bush foods with periodic visits to relatives who lived with Bantu. Vehicle traffic into the area was rare; the schools, health clinics, police posts, and wide circulation of modern currency were unknown. In contrast, the adult Ju of

the late 1980s had witnessed these alterations.

In order to put the significance of secular changes in context we review major features of the social organization and economy the Ju|'hoansi practiced while living in the bush and consider the advantages and disadvantages of that life, particularly as it must have affected elderly. Next, we raise the same topic of advantage vs. disadvantage for Ju once they were settled at sources of permanent water.

Ju|'hoansi who lived largely by foraging could not count on the surpluses of food that create an economic cushion for farmers and herders. Even so, their mobile life style and detailed knowledge of plants and animals and reliable forms of social cooperation based on kinship and marriage provided them with a stable and good quality diet (Lee 1979: 159–249, 464–488; Wehmeyer, Lee, and Whiting 1969). The expectation of sharing among relatives and members of the same living group was widely upheld, a rule which served to even out temporary shortages that individuals or family groups might experience (Draper and Howell 2005; Lee 1979; Marshall 1961; Wiessner 2002). Furthermore, living in small groups and moving because of seasonal changes in food supply, they avoided the diseases known to plague people living in permanent residences at higher concentrations (Froment 2001, pp.250–251). Reports on the health status of Ju|'hoansi in the 1960s are generally positive, indicating good overall health and absence of markers of morbidity seen elsewhere in southern Africa (Metz, Hart, and Harpending 1971; Nurse and Jenkins 1977; Trusswell 1979; Trusswell and Hansen 1976). Not all Ju of western Ngamiland were living exclusively by hunting and gathering in the decades before 1960, however, those who lived at Bantu cattle posts were similarly isolated from frequent outside influence. In these times Ju|'hoansi had little exposure to epidemic diseases and to chronic health problems associated with congested living conditions, such as tuberculosis, and to intestinal diseases that come from contaminated water supplies and poor management of human and animal waste. In the bush, their hold on their traditional lands was mostly uncontested, mainly because the part of the Kalahari they inhabited lacked sufficient standing water to attract in-migration by large numbers of pastoralists who were concentrated further east and north in Botswana. Although Ju|'hoan life was impoverished by standards of farmers and herders, they did not have close contact with technologically more advanced people and therefore suffered little sense of status inequality. In fact, given that they had no animal transport, it was essential that the foraging Ju|'hoansi keep their material possessions limited to what could be carried on their backs.

Their foraging life was hard, lacking the social and economic insurance that is provided to people who grow crops or keep domestic animals and live in higher population densities. A particular deficit of the wandering lifestyle was the shallow source of social support that could be provided, given the small band sizes that typically contained only 20 or 30 people of whom some were children and old people who were not economically productive. When an able-bodied adult fell ill or became injured, the resources to make up for that person's contribution were extremely limited. Isolation, while shielding foragers from some disease exposures,

may also have rendered them immunologically inexperienced with the result that when they encountered strangers, they may have been more susceptible to infection (Harpending and Wandsnider 1982). Further, if the food supply failed locally, everyone had to move, posing a heavy burden on both the infirm and their caretakers. When reports of senilicide by Ju|'hoansi and other hunter gatherers occur they are typically mentioned in the context of this kind of duress. Elders were abandoned because a long trek was planned and people could no longer physically carry the old person²).

In the intervening decades since the mid 20th Century, Ju|'hoansi have left their wandering life in the Kalahari bush and have settled down in permanent villages where the population densities far exceeded those seen in former times. The innovation that made these settlements possible was deep water wells. The earliest wells in the region were made by skilled well blasters. Since the turn of the 20th Century, pastoral people, mostly members of the Herero and Tswana tribes, have moved gradually into the areas previously used only by the hunter gatherers. Initially the pastoralists came in small numbers and stayed only during the rainy season when standing water could support their animals. The herders paid for the well blasting since they knew a reliable water supply was essential if they were to extend their use of the Kalahari range for year round grazing. Later, in the mid-1970s some Ju|'hoan communities began the process of hand-digging wells. The Botswana government provided diesel-powered deep borehole installations in certain locations of Ngamiland, particularly those already occupied by pastoralists. Starting in 1970s, the Botswana government provided health services into rural areas and primary education in selected locations such as !Angwa and |Ai|ai. Government relief food has been an important source of subsistence since the early the 1980s and 1990s when severe drought affected the region on several occasions (Katz, Biese, and St. Denis 1997: 67–50)³). Ju|'hoansi and other ethnic groups living in Ngamiland, benefited from access to government provided health clinics, as will be discussed in more detail later in the paper.

As Ju|'hoansi abandoned the bush life, they settled at places of permanent water where it was more and more likely that small groups of Herero and Tswana pastoralists and their copious numbers of domestic livestock such as cattle, donkeys, goats and horses had also taken up residence. When Ju|'hoansi aggregated in permanent settlements, they lost the benefits of their isolated and mobile lifestyle, yet they “traded up” to ready access to water, more durable shelters, and the ability to live with more kin and affinal relatives. Ju|'hoansi also saw an advantage to living near the pastoralists who employed some Ju men as herders and trackers and a few women as food processors and house builders. Ju|'hoansi hoped to become farmers and herders themselves, though this goal has eluded most Ju (Biese, *et al.* 1989; Hitchcock and Biese 1997).

The disease environment for settled Ju worsened, principally because of contaminated water and fly borne diseases, though dietary changes leading to a less diverse source of foodstuffs probably also played a role in reducing the levels of

important critical nutrients (Fernandes-Costa, Marshall, Ritchie, van Tonder *et al.* 1984; Kent and Lee 1992: 180–181). Diseases such as tuberculosis became common among Ju|'hoansi. Tuberculosis had not been a problem for the foragers when they lived in small groups and spent most of their time out of doors. Once in the settlements, Ju|'hoansi began to build more durable mud and thatch roofed houses, rather than the simple grass structures they used in the bush (Yellen 1985). The rates of tuberculosis among them drastically increased as the conditions for spread of the disease improved because people slept inside rather than out of doors. Socially, the settled Ju|'hoansi occupied the lowest rung of the status ladder. Although the Ju|'hoansi were the original “owners” of the territory, the pastoral people were wealthier, better educated and better able to deal with outside government representatives.

In this sociological microcosm it is possible to consider separately some of the effects of economic development on population health and population aging. The former life style of the Ju|'hoansi provided many benefits in the form of good diet, relative freedom from disease and absence of human competitors. Yet the requirements of mobility and the small scale of living groups meant that selection against the infirm and elderly must have been severe. Settlement brought different benefits but accompanying disadvantages of other types, as we have suggested above. Having seen Ju|'hoansi in the 1960s when some continued to live as foragers while others lived part time with pastoralists and also in the 1980s when the transition to settled life was complete, the authors were acutely aware of the social, economic and health disadvantages that Ju|'hoansi experienced at the permanent villages. At the time of the second study in 1987–1988, HIV-AIDS, although known elsewhere in the region of Southern Africa, was not apparent in the remote area of Ngamiland in which our data were collected.

The question raised in this paper is: how has the variety of changes discussed above affected the health of the Ju|'hoan population, as reflected in longevity? The measure we use is whether the percentages of surviving parents of the several hundred adults, whom we have interviewed at an interval of twenty years, has increased at the later time period. Said another way, at the later date, is there a larger supply of elderly parents? Admittedly, estimating changes in longevity by calculating the co-survivorship to two adult generations is not the most precise way of approaching age changes in population structure: we would prefer to have a census age distribution and a life table to measure longevity. This metric (comparing co-survivorship of generations) is also used by demographers, sociologists and historians to offer a socially textured way of understanding the practical and familial implications of increased longevity (Gee 1990; Hagestad 1986; Uhlenberg 1996). The present authors resort to this technique out of necessity. Previous ethnographic work done by Howell and Richard Lee provided a reliable basis of estimated age for the several hundred adults who were censused and interviewed in 1968. However, it was not possible for them to give an estimated age to all of the parents of these interviewees unless, of course, they were actually alive and unless they were living

in the region in which Howell and Lee conducted their research.

Estimates of individual ages were based on two techniques. First, Howell and Lee carried out detailed interviews with people who were asked to compare themselves in age to other known individuals of their same general cohort. This produces an age ranking in which, theoretically, all known persons can be arranged from oldest to youngest. The second step is to fit a stable-age distribution curve to those ranked individuals and check the resulting age estimates by developing an event calendar for the region and asking people to state their approximate age at the time of well known historical events that had affected the entire region (Howell 2000: 23–46). This method was cumbersome but wholly necessary as Ju|'hoansi had no means of writing or recording the time of birth events. During the 1960s and including the time of the authors' second study, there was no bureaucratically imposed policy of recording births and deaths in the region.

DATA SOURCES, DATA COLLECTION

This report is based on two time periods: approximately 1968 and 1988. The authors compare adult Ju|'hoansi who were interviewed at the two time periods on whether they reported their parents were still alive. The intent of the study was to find out whether, over time, there were age differences in the likelihood that our two sets of adult interviewees had surviving mothers and fathers. A related discussion can be found in Howell (2002) who considers reports by various researchers that have accumulated in recent years to the effect that longevity was improving in the study area. Her prediction was that the expectation of life at birth would improve to around forty-five to fifty years (Howell 2000: 376). We intended to track changes in longevity of the parent generation and to determine whether changes in longevity for the parent generation occurred smoothly across age classes of adult children or whether there were discontinuities by cohort or by gender.

Data from the earlier time period (1967–1968) were collected by Richard Lee and Nancy Howell in the Dobe and |Ai|Ai regions of western Ngamiland, Botswana. Information on intergenerational survivorship came from Howell's reproductive interviews conducted with 165 adult women, the women who are the basis of her monograph, *Demography of the Dobe !Kung* (Howell 2000). These interviews contained information not only on the adult women but also the whereabouts and survivorship of their parents. Other sources of data on intergenerational survivorship came from genealogical and census information gathered for the entire population by Lee and from genealogies collected by Draper, in 1968 and 1969.

In 1987 and 1988 Draper returned to the field site and collected similar information by interviewing over 300 adult Ju|'hoansi living in the same area⁴. There had been a good degree of residential stability among the Ju|'hoansi in the intervening years. In many cases Draper interviewed the same adults interviewed by Howell and Lee. In other cases she interviewed their respondents' adult children

and grandchildren⁵). Unfortunately, in 1988 Draper did not construct an age ranking for the population, as was done in the former wave of data collection. Therefore, for the purposes of the analyses presented in this paper we use only those individuals known to Howell and Lee and to whom unique identifying numbers had been given by them in the 1960s and who were also known to Draper in the late 1980s. The authors confine their subject pool to the overlapping individuals in the two studies because the ages of those people could be reliably estimated.

The findings

Our findings regarding the co-survivorship of adults and their parents at the two time periods can be seen in Figure 1. The top two lines indicate for 1988 the percentages of parents surviving to adults of average ages displayed in the X axis. The clear message is that parents of adults are surviving at higher percentages in 1988 in comparison with 1968.

We supply Figure 2 which describes comparable data on the co-survivorship of adult children and their parents for the United States. These data are from the 1992–1994 wave of the National Survey of Family Health (NSFH)⁶.

The distribution of our subjects in 1968 by ages and the numbers of parents they named are reported in Table 1. The numbers of parents are in all cases fewer than the numbers of children because in some cases siblings within the same age cohort reported on the same parent. It is important to keep in mind that we are interested in the extent to which interviewees who are of comparable age cohorts, and who were living at the two time periods, had available to them either a mother

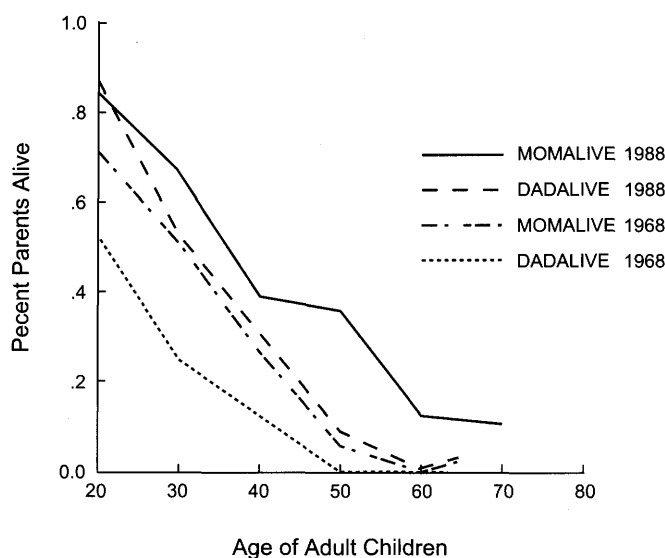


Figure 1 Ju | 'hoansi adults of different ages and the percent of their parents who are alive.

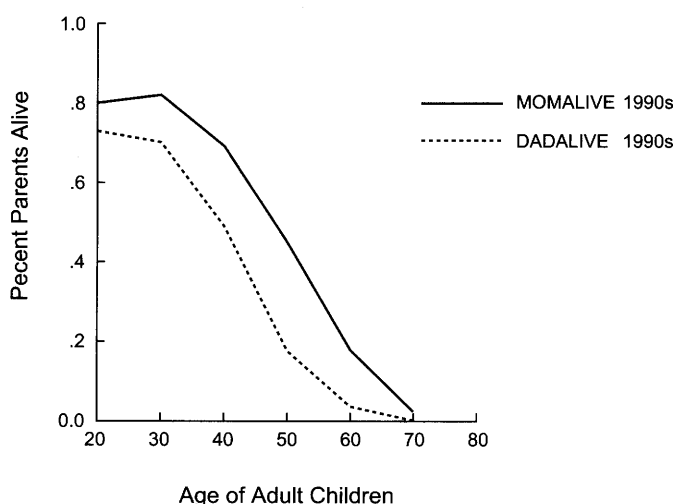


Figure 2 Adults of different ages and the percent of their parents who are alive. 1990s.

or a father or both. There were many adults living at both time periods who had lost both parents. The graphic image in Figure 1, portrays the co-survivorship of parents and adult children and concerns only adults at least 20 years of age in 1968 and 1988 and the percentages of their parents who were alive, out of the total pool of parents who belonged to the adult children of the several age groups.

For the 1968 sample (see Table 1) the initial pool of subjects was 313 adults of known ages. After eliminating some cases because of missing information on one or both parents, the final counts were: 269 adults about whom we knew the status of their 234 mothers and 278 fathers. There were no differences between male and female interviewees in the probability that they had a living father or mother at various ages. The 269 adults include cases of siblings and therefore some mothers and fathers were reported more than one time; others were half sibs and did not name identical parents. For both the 1968 and 1988 data sets, if an individual's mother's or father's survivorship was unknown, that individual was dropped for the count of the relevant parent but retained for the parent whose survivorship status was known.

For the 1988 study, Table 2, Draper interviewed 319 adults, of whom 239 could be identified as having been assigned an identifying number in 1968 and who, therefore, were of known ages twenty years later. This group of 239 was further reduced to 233 because of missing information about whether the mother or father was alive or dead. The final total included 233 adults who named 196 mothers and 232 adults who named 198 fathers.

Table 1 1968. Number of adult interviewees by age group and percent of their mothers and fathers who were alive

Age Intv'ee	No. Intv'ees	No. Moms	Pct Moms Alive	No. Dads	Pct Dads Alive
20s	60	52	(37/52) .71	51	(26/51) .51
30s	69	58	(29/58) .50	57	(14/57) .24
40s	66	53	(14/53) .26	54	(6/54) .11
50s	39	37	(2/37) .05	37	(0/37) .00
60s	35	34	(0/34) .00	33	(0/33) .00
Totals	269	234		278	

Table 2 shows the numbers of interviewees in a way that is mostly comparable to the format of Table 1. It can be read in the following manner: forty adults in their twenties reported on 32 different mothers. A slightly different number, 39 interviewees, reported on 30 different fathers. For the older age groups of interviewees, Draper collected reports on the status of both mothers and fathers.

Table 2 1988 Numbers of adult interviewees by age and the number of mothers and fathers they identify as living or dead. 1988.

Age of Intv'ee	No. Intv'ees Who Report On Mom	No. Moms	Pct Moms Alive	No. Intv'ees Who Report On Dad	No. Dads	Pct Dads Alive
20s	40	32	(27/32) .84	39	30	(26/30) .86
30s	40	30	(20/30) .67	40	29	(15/29) .52
40s	33	29	(11/29) .38	33	28	(8/28) .29
50s	47	40	(14/40) .35	47	38	(3/38) .08
60s	45	37	(4/37) .12	45	36	(0/36) .00
70s	20	20	(2/20) .10	20	20	(1/20) .05
80s	8	8	0 .00	8	8	0 .00
Tot Adults	233	196		232	198	

DISCUSSION

Returning to Figure 1, which details the falling percentages of parent survivorship with rising age of adult children, it can be seen that the percentages of surviving parents rises impressively in the twenty years. The two lower lines correspond to the percentages of fathers (bottom line) and mothers (second from bottom line) in 1968 who co-survived with their adult children of the ten year age intervals. The top two lines describe the survivorship of fathers (second from top line) and mothers (top line) of adult children who were of the same average ages in 1988. The very worst prospects for survivorship are shown in the percentages of fathers who survive in the 1968 period. (Refer to Tables 1 and 2 for the actual numbers that contribute to the points on this graph.) In 1968, for men and women in their twenties, only about 50% (26/51) of the fathers of this group were living. The percentage survivorship of fathers of adults in their thirties, forties and fifties falls precipitously to 24%, 11%, and 0%, respectively⁷⁾.

As can be seen in Table 1, the mothers of young adults survived substantially better than the fathers in 1968, though the decline in their survivorship is still steep. (This decline is also seen in the U. S. survivorship, shown in Figure 2.) For Ju|'hoansi of the age decades of twenties, thirties, forties and fifties, mothers survived at the 71%, 50%, 26% and 5% percentages only.) Ju|'hoan adults of the 1968 study whose average age was 65 years had no surviving parents, male or female. Notice that a higher proportion (71%) of the mothers of young adults in their twenties survive than the comparable proportion (51%) of fathers of young adults. Most of the gender gap in survivorship is accounted for by the differences in age of men and women when they married. Mothers of our adult informants married men 7 to 10 years older than they (Howell 2000; Marshall 1959) and it is predictable that their husbands, who are the fathers of the informants, would die sooner.

The downward trajectory of survivorship for mothers and fathers of the 1968 adult children is approximately parallel, though offset by approximately 10 years. Among adult children who are about 25 years old 50% of their fathers have died, whereas adult children are about 35 years old when a comparable percentage (50%) of their mothers are dead. Among adults who are 35, only about 22% of their age group's fathers are alive, whereas a similar proportion of living mothers is held by the interviewees when they were about age 45. The mostly parallel slope of the two lower lines suggests that parents are dying at approximately the same rate and that there is no gender specific selection hastening the death of either men or women, except that fathers tend to be older than the mothers⁸⁾.

A final comment comes from comparing Tables 1 and 2. Notice that in 1968 virtually none of the adult children who were in their fifties and sixties had living parents (2/37 mothers survived for the people in their fifties; 0/33 fathers survived for people in their sixties). By the late 1980s, small numbers of elderly adult children had surviving parents: 4/37 quite elderly mothers lived for the 60–69 year

old adult children and 2 of 20 elderly mothers survived among the 70–79 year olds. Not surprisingly, in 1988 no male or female parent of an 80 year old survived, though there were 8 individuals 80 or more years old alive at the time.

By looking at Figure 1, one can see that the improvement in survivorship of fathers across the two time periods is greater than that for mothers. Notice that in 1968, for children of the average age of 25, only about 50% of their fathers were alive. However, by 1988 over 80% of the fathers of the 25 year olds were living. This is a jump of 30 percentage points and much more striking than the still impressive gains represented by the mothers of these young adults. Around 70% of the mothers of 25 year olds survived in 1968. That figure had improved to slightly over 80% in 1988, about the same as fathers. The gains in preservation of parents are still apparent at the average age of 35 years: these adult children had close to 60% of their parents living. Particularly for adults in the 25 to 45 year age range, the survivorship of mothers in 1988 is not as much improved as it is for fathers, in comparison with the 1968 figures.

Overall, we see that survivorship among elderly people has improved in the twenty year interval of our study and that the mothers of our adult interviewees survive better than the fathers at both time periods⁹). In particular notice the top most line in the graph, the one describing the percentages of mothers of adult children who survived in 1988. Adult children who are 45 to approximately 55 years of age realize almost no change in the survivorship of their mothers, whereas the survivorship of fathers of these same age groups in the 1988 study closely tracks the line that describes the steeply descending survivorship of mothers in 1968. In other words, it appears that elderly mothers, perhaps 75 to 85 years of age, had very low mortality as evidenced by the 1988 study. This is apparently not an artifact of especially small numbers. As can be seen in Table 2, in the 1988 sample for adults in their forties, there are 11 living mothers out of a total of 29. Among the adult children of the average age of 55, 14 mothers were living out of a possible 40.

Even a brief inspection will convey the fact that once past the age decade of the 20s, the percentages of surviving parents for adult Ju|'hoansi are below those of the US, for most ages until the age decade of the fifties when the lines again converge, reflecting the fact that the upper limit of survivorship for parents has been reached when the parent generation are in their late seventies and eighties. For adults in their thirties in 1968, 20% of their fathers survived whereas this same percentage of surviving fathers is available to people in their fifties in the US 1992–94 sample.

The conclusion from the comparison of the survivorship of the parents of adult children of different ages is that the Ju|'hoansi are living longer under conditions of settlement, access to western medicine and improved water supplies. The government provision of relief food supplies during periods of drought has undoubtedly played a role in buffering this population of former foragers as they have adapted to unfamiliar economic practices and living conditions.

Aside from the overall temporal gains in survivorship, the finding that fathers and mothers of adult children have not posted more equal gains in survivorship in

the 1980s is puzzling. Fathers of adults in their twenties, thirties and forties in 1968 survived at approximately the 50%, 30% and 10% rate, respectively, in comparison with the rates for fathers in 1988 of over 80%, around 60% and 30% for fathers of comparably aged adult children. What circumstances could the 1988 sample of fathers of interviewees have taken advantage of that enabled them to survive so much better than their age mates in 1968? One should look to features of secular change in lifestyle, although secular change, of itself, cannot explain the gender difference in improved survivorship of parents. If men improved their survivorship by as much as 30% could not women have achieved similar results?

INFORMATION ON THE TREATMENT OF ILLNESS

During 1987 and 1988 Draper interviewed 105 Ju|'hoansi intensively on a number of subjects including asking about past serious illnesses, what kind of treatment they had received, and who had provided it. These longer interviews give additional information that bears on the subject of gender difference in mortality. Briefly, it appears that men and women differed in the kinds of treatment they received during a period of past illness. What follows is short description of the location and accessibility of medical clinics during the ten or more years prior to the 1988 research.

Since the mid 1970s the people of the research area have had access to medical treatment via government-funded clinics which were located within a one to thirty kilometer radius of most settlements. Over time the staffing of these clinics improved. When Draper was collecting her information, the clinic at the regional center of !Angwa was open most days and was staffed by a trained nurse. It offered very basic medical services such as wound care, antibiotic drugs, lying in for pregnant women, well baby services, and drugs for malaria. The clinic was also the place that TB treatment began. People acutely ill with TB were removed to a hospital in Maun, Botswana, about 200 kilometers distant. After many months of treatment, people were released to their home areas. Once returned they were monitored by the clinic staff to insure they kept up with oral TB medicine. The clinic staff and driver made a circuit to each of the villages on a monthly basis to treat people who for various reasons had not or could not come on their own to the main clinic in !Angwa (Howell 2000: 369–371).

The benefits of the !Angwa clinic and its mobile "circuit rider" cannot be overstated. Before the health clinic was established at !Angwa in the 1970s the only people who could get western medical treatment were those who could arrange transport out of the area. In former times, pastoralists, but not Ju|'hoansi owned horses and donkeys and could provide their own transport to hospitals or clinics in distant, eastern towns of Botswana, such as Nkaneng or Maun. The Tswana and Herero, having cash from the occasional sale of their cattle, could sometimes pay for rides on transport vehicles or veterinary vehicles that occasionally came through the area giving them another option for seeking western-style medical treatment.

Anthropologists sometimes transported acutely ill Ju|'hoansi to distant hospitals, and more often practiced an imperfect bush medicine, treating sick Ju with antibiotics and anti-malarial drugs from their personal stores of medicine. However, anthropologists were by no means constant in their residence in the study area and therefore cannot be considered a significant medical resource for the entire population. In short, before the arrival of government medical services into the area, most Ju|'hoansi were not able to travel to distant locales, either in Namibia or in Botswana, for treatment with western medicine. They either recovered or died of their illnesses.

Even in the post clinic era, one should not assume that medical treatment was universally available on a “drop in” basis. In the 1980s there were three regional clinics in western Ngamiland. These three clinics were 30 or more kilometers distant from many of the villages in the areas they were intended to serve. Not all Ju were willing or able to go to the clinic for treatment outside the time of the monthly visit by the mobile clinic staff. For some who lived in small villages it was a long walk or donkey ride to the health clinic — an undertaking that a seriously sick person would avoid, even if animal transport could be arranged. In any case, the nurses spoke the Bantu languages of SeTswana, sometimes OchiHerero, but not SeJu|'hoansi. Many female Ju|'hoansi were reluctant to go to the clinic unless they could arrange for someone, usually a man to accompany them to the clinic to act as translator (Vlassof 1994). Men more commonly spoke one of the Bantu languages than women, in part because men rather than women were likely to have worked for local pastoralists as cattle hands.

The interview questions that were put to Ju|'hoansi about their past serious illnesses are described below. The interviewees ranged in age from about 20 to 80 years. The questions were framed in this way:

Think of a time when you were very sick — so sick that you could not do your normal daily work. How many days were you down? Who helped you? What did the helper do for you? What gender was the helper? What age was the helper? What kinship relationship, if any, did you have to the helper?

The interviews about episodes of serious illness revealed that men, particularly older men, were more likely to have taken advantage of western medicine than women. Men of all ages reported a higher frequency of receiving western medicine than women. However, of the men who reported receiving western care, over 80% were older men, over the age of 45 years. A smaller percentage of older women (60%) named western medicine as the help they received. The interview sample for the questions about sickness overlapped with but was not the same as the larger sample used for the construction of co-survivorship among adult children and their parents in 1988. Therefore, we cannot make a strong argument that the answers to questions about sickness episodes explain all of the gender discrepancy in mortality gains. On the other hand, these interview data suggest a mechanism (not based on speculation

such as changing ages of marriage or of age separation between spouses) that may have produced the finding that fathers improved their survivorship more than mothers in 1988.

CONCLUSION

In the absence of other sources of inference, it is likely that the improvements in the longevity of the parent generation over the two time periods come from two sources. First, the rigors of life have been relaxed with sedentism. The challenges to individual survival under the conditions of isolation, small group size and nomadic foraging may have been more severe than originally thought by anthropologists and the medical researchers who collaborated with anthropologists in assessing the health of the Ju|'hoansi in 1968. This is not to dispute the characterizations that medical researchers made at the time. For example, Ju|'hoansi have been reported as one of a small number of known traditional populations in which obesity was almost unknown and in which blood pressure readings did not rise with age. Rates of dental caries, blood levels of sodium and serum cholesterol were extremely low. The extant population was apparently highly fit. On the other hand, many other people had been removed from the study, not just by out migration but by death. When the Ju|'hoansi became fully settled, some of the challenges to livelihood were relaxed. Water was regularly available and people could rest from the high levels of physical exertion demanded by foraging for plant or animal food and making the periodic treks associated with moving camps.

The environment of acculturation into which Ju|'hoansi were absorbed offered many forms of support to Ju|'hoansi which they had not formerly known. The advent of clean, deep well water and government provided medical service has been discussed previously. Severe droughts, often more than one per decade in the 1970s and 1980s, were ameliorated by government distribution of drought relief food¹⁰. These measures averted what could have developed as serious region-wide starvation (Hitchcock, Ebert, and Morgan 1989). Outside Non Government Agencies (NGOs) initiated various craft purchasing programs that operated in the late 1970s and into the 1980s. For a population previously unused to handling even small amounts of cash, the craft purchasing projects put surprisingly large amounts of cash into the population (Kent and Lee 1992). People could acquire blankets, kerosene lanterns, shoes and metal tools, all of which improved the quality of life and improved productivity. Further, people could purchase foodstuffs to supplement the distribution of drought relief foods which, as described earlier, were extremely important, though often unpredictable in when they would be brought in by transport vehicles. All these innovations must have created buffers to individuals and to families who, as has been mentioned above, were by then settled down in larger villages in which the possibility of kin living close to one another on a sustained basis was greatly increased.

The advantages of settled life come linked with disadvantages, particularly

some that are harmful to health and well-being, such as communicable diseases (TB) and the social breakdown that goes with opportunity to consume alcohol, an option rarely available before Ju|'hoansi had access to cash and consumer goods such as refined sugar, for making home brew, and bottled beer and hard liquors. These shortcomings notwithstanding, the settled people observed in 1988 are doing much better than the ones of 1968, at least by the measure of the co-survivorship of adult children and their parents. Ju|'hoansi, like most peoples around the world during the demographic transition, have benefited more from the improvements in diet and the availability of medical care than they have suffered from the consequences of higher population density and the pressures of new diseases. Whether this will continue to be true in the face of the HIV/AIDS epidemic of southern Africa remains to be seen.

In this paper we have discussed the facts of changed longevity over time and gender differences, but we have not considered the implications that living longer can have for the social and familial relations among Ju|'hoansi. Longer lived elderly mean more time for members of different generations in the family to be associated. Several institutions seem particularly likely to be affected. For example, Ju|'hoansi preferentially name children for the paternal grandparents and to a lesser extent for maternal grandparents. The grandparent-grandchild dyad created by the bestowing of the name belonging to the "old name" on the younger "small name" forges an important bond that entails close association, mutual support and an implied spiritual connection. In the past, few children had living grandparents (namesakes or otherwise) and even fewer children had a grandparental namesake who co-survived with the child into adulthood. That possibility is now a reality as can be seen on reexamining Figure 1. Many of the adults whose parents are surviving in the 1980s have children as old as twenty or thirty years of age. The new persistence of grandparent-grandchild links creates a new reservoir of social support for families (Haney 2004; Draper and Haney, 2005). On the other hand, grandparents can now live a long time in a relatively frail state which could not occur under most conditions of bush life. The support of frail elderly must be provided by kin although the Botswana government provides welfare relief to old people, creating an independent resource base for elderly that may give them an enhanced bargaining power vis-à-vis other family members (Dowd 1975; Howell 2000: 367–370).

At the time of publication of this paper it will be approximately 38 years since the first data set on longevity was compiled and about 18 years since the second data set was compiled. This paper provides an uncomplicated basis on which further comparisons can be made and the authors look forward to the possibility that a current generation of researchers will compile a third wave of information. New data will be intrinsically interesting for their indication of maintenance or perhaps improvements in survivorship of older people. In addition, the extension of life has important implications for changes in several Ju|'hoan institutions such as inheritance practices, intergenerational cooperation in child rearing, management of property and residential arrangements, to name a few.

NOTES

- 1) But see (Bieseke and Howell 1981; Collings 2001; Draper and Harpending 1994; Guemple 1983; Hart, Pilling, and Goodale 1979; Rosenberg 1997; Sharp 1981; Wiessner 1986).
- 2) See these sources for commentary on senilicide in simple technology societies Glascock, 1981 #1792} (Kjellstrom 1974/75; Maxwell, Silverman, and Maxwell 1982).
- 3) In the mid 1990s (after the data collection described in this paper) an epidemic of bovine sickness (Contagious Bovine Pleuropneumonia) triggered a government-managed slaughter of thousands of head of cattle. This development would have been catastrophic for both the pastoralists and the Ju|'hoansi, had not the government provided relief rations for people living in the area of the epidemic and whose livelihoods were suddenly and dramatically threatened.
- 4) Draper's research was supported by the National Institute of Aging Grant No. P01AG03110 to Christine Fry and Jennie Keith. This period of field research lasted for 15 months in 1987 and 1988.
- 5) Nancy Howell and Draper have previously published their findings separately (Draper and Buchanan 1992; Draper and Hames 2000; Draper and Harpending 1994; Harpending and Draper 1990; Howell 1976, 1979, 2000) and only recently have they begun to make comparisons of the demographic profiles of the Ju|'hoansi from the two time periods (Draper and Howell 2005). A time comparison of intergenerational survivorship in this population could not take place until both data sets had been entered into relational data base format. Draper had previously entered the 1988 data in this manner. In the summer of 2002 she entered the data collected by Howell and Lee into a relational data base. Some data could be downloaded from the University of Toronto Archives where it has been stored by Nancy Howell. In other cases Draper used the unpublished "Male and Female Lineages", compiled by Howell and Lee. Draper also drew on census and genealogical data which she had collected as a graduate student, working on the Kalahari Research Project, 1967-72. Another necessary step was determining which exact people were known in the two time periods and making sure that they were identified in both data sets by an identical and unique number. This task is made difficult by the fact that Ju|'hoansi share a small number of personal names. Names differ by gender but appear sometimes dozens of times in the same small population of a few hundred people.
- 6) The data providing a comparison with modern US longevity statistics were run by Professor Lynn White, University of Nebraska, on data from the 1992-94 National Survey of Family Health. Approximately 13,000 were interviewed in 1986-87 and approximately 10,000 were re-interviewed. The sample is national, chosen by area probability sampling and interviewed in person. The authors are grateful to Dr. White for providing this material.
- 7) An interesting comparison can be made with data on Yanomamo and Ache provided in separate accounts by Chagnon and Hill and Hurtado (Chagnon 1982: 299-300; Hill and Hurtado 1996: 257-259). Notice that Chagnon's calculations are based on whether the parent is alive and also co-resident with children of varying ages. The variable of co-residence is not factored into the present study of co-survivorship for Ju|'hoansi parents and adult children.
- 8) We have some anecdotal information that in the years after 2000 there has been a trend in which young Ju|'hoansi adults living in Namibia marry in their teens and to spouses who are approximate age peers (Wiessner, personal communication). However, the parents of the 1988 adult children would have been marrying at a time when this secular change is not likely to have developed.
- 9) Reduced mortality is also reported for Ache who were censused under the easier conditions of

reservation settlements (Hill and Hurtado 1996)

- 10) Especially severe droughts occurred in 1969–71; 1973–74, 1979–80, and 1987 (Hitchcock, Ebert, and Morgan 1989).

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