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Demographics, Health, And Education Of Bantu Women In Logging Camps And Surrounding Villages In The Forests Of South-Eastern Cameroon: A Comparison Of Space And Time

INTRODUCTION:

Little information is available on the situation of women in the Central African rainforests, especially to the English-speaking academic community. In the past, conservation movements and concessionary companies have disregarded the people, both male and female, living in this region. Recently, this disregard of locals' rights is changing and there is now discourse of how to combine the needs of logging concessionary companies, conservation organizations, and the rights of people that live in the forest in order to bring about sustainable development (Carroll 1998, Debonnet 1998, Fotso 1998, Joiris 1998). However, a serious gap exists in the current literature: In analyzing the rights of local peoples, researchers tend to examine the economic activity of men and neglect that of women. This is a common occurrence of studies in the developing world because women's economic activities are often less definable and more multivariated than those of men (Dixon 1982). Both indigenous and immigrant women have become involved in the economic activities that surround logging communities in the form of prostitution, alcohol production, farming, and other means to supplement their income. In addition, the cash economy of the logging camps have not only a direct effect on women's economies, but also indirect effects on migration, social traditions, male-female relationships, and basic demography. As logging camps are a growing sector in an otherwise stagnant African economy, the social change revolving these communities will have an increasing effect on women in this region. My study attempts to identify and analyze the effect logging camps have on women in francophone Central Africa.

PRIMARY QUESTIONS:

Because there is no information in the literature on how logging camps affect the quality of women's lives, this study can be seen to be a preliminary analysis of these affects. My study was therefore predominantly a descriptive one. By comparison of women's lives in a logging camp and in surrounding villages, I hope to present a clearer understanding on this subject. In this portion of analysis, economic, health, marital status, and demographic variables were used. Other variables such as natural resource utilization, attitudes towards conservation, and general problems have yet to be analyzed.

Early on, it was evident that certain variables were more determined by age than location. Several analysis with age as a factor were thus also done to resolve whether space or time held more influence.

METHODS:

1. Locale

The logging camp I studied was located at Eboumetoum, one of the two sites of Pallisco Logging, a French logging company that provides select wood for luxury furniture. Eboumetoum is located in the South-east region of Cameroon, 250 km from the capitol of Yaoundé. Eboumetoum is accessible from Yaoundé by an alternating dirt and paved road and takes a total of around 6 hours by taxi bus (3 hours by private car). The total population of Eboumetoum is around 900 people.

Three villages were used in this study: Kompia, Nemeyong II, and Bintsina. Each village is located roughly 30 km from Eboumetoum, a 1.5-2 hour drive by motorbike. The roads were constructed by Pallisco 20 years ago, but are no longer maintained as they are not used by the company, and thus are in fairly bad condition. Each village has a population of around 200 people.

2. Questionnaire Methodology

I carried out this questionnaire with the help of a local African man named Loul Severin. He proved to be of invaluable assistance in speeding up data collection, reviewing questions for cultural sensitivity, language translation, and by acting as my "passport" into the trust of the women I was interviewing. However, because I did not personally fill out each questionnaire, there has been some messy data due to inconsistency of survey writing.

We pre-tested the survey on 2 women in the logging camp and 3 women in the village, and changed wording that caused confusion. It also became evident during this "mini-pilot study" that it was vital that men not be present during the questionnaire in order to ascertain veracity from the women on sensitive issues such as fidelity of husbands. The presence of men also created problems when opinion questions were asked because social custom dictates that the opinion of the wife is an extension of that of the husband. When M. Severin or I asked the wife a question, any male present in the room immediately presented his opinion to us, even after explanation that this was a survey on women's' behavior and attitudes.

3. How questionnaire was carried out

Women were selected at random. We started the questionnaire in one corner of Eboumetoum and worked from that corner to the rest of the camp, interviewing any Badjoué, Bikélé, and Maka women in her home at that time. The questionnaire was performed at different hours of the day to make sure that women who worked in the fields in the morning, or who performed other duties at specific hours that took them away from their home were not underrepresented.

Once we found a woman at home, M. Severin or myself would inform the women of the purpose of my research project in order to gain informed consent. M. Severin or I would explain that I was an American student who was working on a research project in order to finish my studies.

Because I was interested in the lives of African women, I decided to come here to carry out a comparative study between the lives of women in logging camps and villages. We never had a formal refusal, but occasionally a women would say she was tired or sick and that we should come back later.

After gaining the women's consent, we started the questionnaire. Generally M. Severin asked the questions as the women occasionally had difficulties understanding my American-accented French. I elaborated on an unclear question or helped M. Severin decide what to do with a response of a women that did not fall exactly into a category on the questionnaire.

At the end of completing the survey, I gave each woman a block of soap and 5 Maggi (bullion) cubes to thank them for their time. This helped spread word of my questionnaire and willingness to participate in the survey.

RESULTS:

1. Age

This data set includes a vast amount of variables, and thus for the purpose of this paper, I chose to only look at a few of them. Statistical description and a box plot of age distribution from the logging camp and villages shows the vast difference of age range:

Table 1. Basic descriptive statistics of age distribution in the logging camp and villages

	Mean	St. Dev.	Min	Q1	Median	Q3	Max	Range
Logging Camp (n=140)	24.929	8.052	15.00	18.25	23.00	29.750	51.00	36.00
Villages (n=146)	40.42	18.64	15.00	84.00	36.00	58.00	84.00	69.00

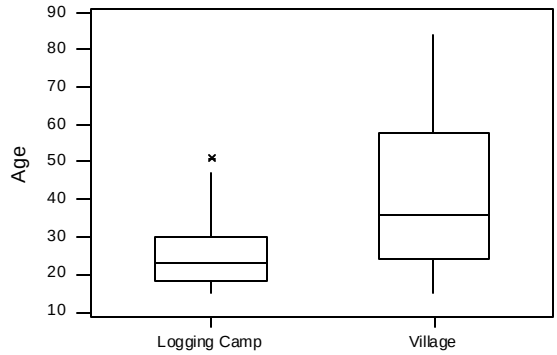

Figure 1. Age boxplots for women in the logging camp and the villages

By looking at the differing standard deviations and the range, it is clear that the spread of age is much larger in the village than in the logging camp. Age is also very skewed towards youth in the logging camp. Overall, logging camps appear to contain a younger, more homogenous population in terms of age.

The logging camp was established relatively recently in 1977. This could be an explanation for the lack of elderly women, or

this could be an indicator of the social structure of each location. Is the lack of elderly women in the logging camp an indicator, cause, or effect of decayed social constructs?

The age difference was striking enough to include age as a component for analysis of future variables.

2. Women's Economy

2.1 Occupation

Occupation and the following category, revenue, serve not only to look at women's involvement in their communities economies, but information about the general cash flow can be gleaned from the analyzations below. It was expected there would be more farmers in the village where everyone practiced subsistence farming, and more specialized professions such as merchant, waitress, housewife in the logging camp.

Data was collected by asking women to describe their occupation and sources of revenue. Women could list multiple occupations. This three way table (split by age) tabulates the percentage of women who identified themselves as holding this occupation or source of revenue.

Table 2. Counts of women's occupation in the logging camp and the villages

Occupation	Logging Camp				Villages			
	TOTAL (n=140)	15-25 (n=95)	26-40 (n=38)	41+ (n=7)	**TOTAL**	15-25 (n=40)	26-40 (n=47)	41+ (n=59)
Farmer	**21**	8	10	3	**126**	32	44	50
Housewife	**62**	40	19	3	**10**	2	5	3
Merchant	**48**	29	16	2	**43**	15	23	5
Waitress	**4**	1	3	0	**0**	0	0	0
Hairdresser	**3**	2	1	0	**0**	0	0	0
Clothes maker	**2**	0	0	2	**0**	0	0	0
Student	**3**	3	0	0	**3**	3	0	0
Basket Maker	**0**	0	0	0	**3**	0	1	2
Nothing	**24**	23	1	0	**6**	1	1	4
Other	**2**	0	2	0	**2**	0	2	0

Because there are so many zeros in several places, I condensed the above tables to be:

Table 3. Condensed counts of women's occupation in the logging camp and the villages.

Occupation	Logging Camp				Villages			
	TOTAL (n=140)	15-25 (n=95)	26-40 (n=38)	41+ (n=7)	**TOTAL (n=146)**	15-25 (n=40)	26-40 (n=47)	41+ (n=59)
Farmer	**21**	8	10	3	**126**	32	44	50
Housewife	**62**	40	19	3	**10**	2	5	3
Merchant	**48**	29	16	2	**43**	15	23	5
Nothing	**24**	23	1	0	**6**	1	1	4
Other	**15**	6	6	2	**8**	3	3	2

A chi-squared test was performed to see if the distribution of occupation was independent of location:

H_0: There is no relationship between the variables.
H_a: There is a relationship between the variables.

Because $p<0.005$, the null hypothesis can be rejected. Location is a significant indicator in the distribution of occupation. To examine this more thoroughly, a z-score to compare proportions of the occupations of farmer, housewife, and merchant between location.

Figure 2. Chi-Square Test of women's occupation between the logging camp and village

Chi-Square Test

```
Expected counts are printed below observed counts
       Logging  Village    Total
    1       21      126      147
          68.84    78.16
    2       62       10       72
          33.72    38.28
    3       48       43       91
          42.62    48.38
    4       24        6       30
          14.05    15.95
    5       15        8       23
          10.77    12.23
Total      170      193      363
Chi-Sq = 33.249 + 29.287 +
         23.720 + 20.893 +
          0.680 +  0.599 +
          7.047 +  6.207 +
          1.660 +  1.462 = 124.804
DF = 4, P-Value = 0.000
```

First, the listing of counts was changed into a table of proportions:

Table 4. Percentages of women's occupation in the logging camp and villages

Occupation	Logging Camp (%)				Villages (%)			
	TOTAL	15-25 (n=95)	26-40 (n=38)	41+ (n=7)	**TOTAL**	15-25 (n=40)	26-40 (n=47)	41+ (n=59)
Farmer	**15.00**	8.42	26.32	42.86	**86.30**	80.00	93.62	84.75
Housewife	**44.29**	42.11	50.00	42.86	**6.85**	5.00	10.64	5.08
Merchant	**34.29**	30.53	44.74	28.57	**29.45**	37.50	48.94	8.47
Nothing	**17.14**	24.21	2.63	0.00	**4.11**	2.50	2.13	6.78
Other	**10.71**	6.32	6.32	28.57	**5.47**	7.50	6.52	3.39

By looking at the percentages above, it is clear there are some definite trends between the two locations. In addition, by visual comparison of the total percentage to each age sub-division, a definite pattern emerges: Each age grouping shares a similar percentage to that of the total population. In fact there is only one extreme deviation from this pattern: farmers in the logging camp are disproportionately older.

The following z-score of proportions is testing the proportion of a certain occupation between logging camp and villages (i.e. proportions in bold above).

$H_0 : p_1 = p_2$
$H_a : p_1 \quad p_2$

$\hat{p} = (X_1 + X_2) / (n_1 + n_2)$

$SE_{Dp} = \sqrt{[\hat{p} (1-\hat{p}) (1/(n_1 + 1/ n_2)]}$

$z = (\hat{p}_1 - \hat{p}_2) / SE_{Dp}$

This data was then compiled into another table for easy comparison of two proportions:

Table 5. *z*-score proportion calculations

Population	*n*	X	$\hat{p}_X = X/n$	$\hat{p}$	SE_{Dp}	*z*	P-score
1) L. farmers	140	21	0.1500	0.514	0.0591	-12.064	0.000
V. farmers	146	126	0.8630				
2)L. housewif	140	62	0.4429	0.252	0.0514	7.284	0.000
V. housewif	146	10	0.0685				
3)L. merchant	140	48	0.3429	0.370	0.0571	0.848	1.605
V.merchant	146	43	0.2945				
4) L. nothing	140	24	0.1714	0.1049	0.0362	3.220	0.0012
V. nothing	146	6	0.0547				

The p-scores show that we can reject the null hypothesis for the occupations of farmer and housewives and those who held no occupation, but that we fail to reject the null hypothesis for merchants. Women are apparently more dependant on their husbands in the logging camp than in the village. This could be due to the fact that the logging camp economy was cash based, which puts women at a disadvantage as men are the only salaried people by Pallisco, the logging camp.

However, from a less feminist perspective, one could say that women in the logging camp are lazier than women in the village- they are more likely to be housewives or be doing nothing than actively participating in subsistence farming to feed their families. It is probable that women who listed themselves as doing nothing in the logging camp participated in the prevalent prostitution that goes on there (M. Severin estimated that 95% of unmarried women practice some prostitution- not a statistically-sound figure, but interesting nonetheless), while women who listed themselves as having no occupation in the village were too elderly to work. This is somewhat substantiated by examining the percentages in Table 4- The highest percentage of women with no occupation in Eboumetoum were in the youngest category, which the highest percentage of women with no occupation in the villages were in the eldest category.

To compare whether age was a significant factor, an ANOVA was done with age as the continuous response and occupation as the categorical factor:

Figure 3. One-way ANOVA of age and occupation in both logging camp and village (compiled)

One-way Analysis of Variance

```
Analysis of Variance for Age
Source     DF        SS        MS        F        P
Occupati    4     10480      2620    13.13    0.000
Error     359     71619       199
Total     363     82098

                                 Individual 95% CIs For Mean
                                 Based on Pooled StDev
Level       N      Mean     StDev  ---+---------+---------+---------+---
farmer    147     38.80     16.83                          (---*--)
housewif   72     27.56     10.60     (-----*----)
merchant   91     27.80      8.61      (----*----)
nothing    30     27.37     19.41  (--------*-------)
other      24     30.42     14.26      (---------*--------)
                                 ---+---------+---------+---------+---
Pooled StDev =    14.12            24.0      30.0      36.0      42.0
```

Both location and age were shown to have a statistically significant affect on women's occupation, as can be visually seen in Tables 3 and 4.

2.2 Sources of Revenue

Table 6. Counts of women's sources of revenue in the logging camp and the villages

Sources of Revenue	Logging camp				Village			
	TOTAL (n=140)	15-25 (n=95)	26-40 (n=38)	41+ (n=7)	**TOTAL (n=146)**	15-25 (n=40)	26-40 (n=47)	41+ (n=59)
Husband	**88**	61	23	4	**21**	9	6	6
Family	**5**	5	0	0	**10**	4	2	4
Restaurant	**7**	3	4	0	**0**	0	0	0
Salary	**5**	3	2	0	**0**	0	0	0
Alcohol	**16**	8	6	2	**78**	26	36	16
Commerce (non-edible)	**5**	2	3	0	**15**	7	5	3
Produce	**27**	12	11	4	**89**	21	29	39
Meat	**18**	10	7	1	**40**	21	16	3
Fish	**11**	5	6	0	**2**	0	2	0
Beignet	**22**	14	8	0	**12**	5	4	3
Palm Oil	**0**	0	0	0	**8**	0	0	8
Basket making	**0**	0	0	0	**3**	0	1	2
Nothing	**8**	8	0	0	**4**	0	0	4
Other	**13**	9	3	1	**5**	0	2	3

Because there are so many categories of revenue, and because some of these categories have many zeros, I compiled 'palm oil' into 'produce' (because palm trees are treated as a crop); 'restaurant', 'meat', 'fish', and 'beignet' into 'prepared food' ; 'basket making,' and 'salary' into 'other':

Table 7. Compiled counts of women's sources of revenue in the logging camp and the villages

Sources of Revenue	Logging camp				Village			
	TOTAL (n=140)	15-25 (n=95)	26-40 (n=38)	41+ (n=7)	**TOTAL (n=146)**	15-25 (n=40)	26-40 (n=47)	41+ (n=59)
Husband	**88**	61	23	4	**21**	9	6	6
Family	**5**	5	0	0	**10**	4	2	4
Alcohol	**16**	8	6	2	**78**	26	36	16
Produce	**27**	12	11	4	**97**	21	29	47
Prepared Food	**58**	32	25	1	**54**	26	22	6
Commerce (non-edible)	**5**	2	3	0	**15**	7	5	3
Nothing	**8**	8	0	0	**4**	0	0	4
Other	**18**	12	5	1	**8**	0	3	5

A chi-squared test was performed to see if the distribution of revenue was independent of location:

H_0: There is no relationship between the variables.
H_a: There is a relationship between the variables.

Because $p<0.005$, the null hypothesis can be rejected. Location is a significant indicator in the distribution of revenue. This follows the same pattern set by women's occupation in the previous section. Because of the similarity of the data between this section and the previous, a *z*-score of proportions was not performed (also due to lack of time

Figure 4. Chi-Square Test of women's revenue between the logging camp and village

Chi-Square Test

```
Expected counts are printed below observed counts
        Logging  Village    Total
    1       88       21      109
          47.90    61.10
    2        5       10       15
           6.59     8.41
    3       16       78       94
          41.31    52.69
    4       27       97      124
          54.49    69.51
    5       58       54      112
          49.22    62.78
    6        5       15       20
           8.79    11.21
    7        8        4       12
           5.27     6.73
    8       18        8       26
          11.43    14.57
Total      225      287      512
Chi-Sq = 33.569 + 26.317 +
          0.384 +  0.301 +
         15.506 + 12.156 +
         13.870 + 10.874 +
          1.567 +  1.228 +
          1.634 +  1.281 +
          1.410 +  1.105 +
          3.783 +  2.966 = 127.951
DF = 7, P-Value = 0.000
```

Table 8. Percentages of women's revenue in the logging camp and villages

Sources of Revenue	Logging camp (%)				Village (%)			
	TOTAL	15-25 (n=95)	26-40 (n=38)	41+ (n=7)	**TOTAL**	15-25 (n=40)	26-40 (n=47)	41+ (n=59)
Husband	**62.86**	64.21	60.53	57.14	**14.38**	22.50	12.77	10.17
Family	**3.57**	5.26	0.00	0.00	**6.85**	10.00	4.26	6.78
Alcohol	**11.43**	8.42	15.79	28.57	**53.42**	65.00	76.60	27.12
Produce	**19.29**	12.63	28.95	57.14	**60.96**	52.50	61.70	66.10
Prepared Food	**41.43**	33.68	65.79	14.28	**36.99**	65.00	46.81	10.17
Commerce (non-edible)	**3.57**	2.11	7.89	0.00	**10.27**	17.50	10.64	5.08
Nothing	**5.71**	8.42	0.00	0.00	**2.74**	0.00	0.00	6.78
Other	**12.86**	12.63	13.16	12.5	**5.48**	0.00	6.39	8.47

Some similar patterns to occupation are repeated here. Many more women receive revenue from their husband in the logging camp while many more women receive revenue from their fields (produce) in the villages.

I find the alcohol percentages of interest as it is much higher in the village. This may at first seem surprising, but can be explained by qualitative information gathered in-field. Women in the village have better access to palm trees, which make a popular local drink, "mutango", fermented palm sap. They can sell this product, as well as home-made "odontol," an extremely strong whisky-like drink, to a distributor in the logging camp. I was told women in the village sell about 2 gallons of odontol for 1000 CFA (750CFA=1US$), which then is sold in the logging camp for 2000 CFA. Because villagers do not have as

easy access to hard cash as salaried logging camp workers and their wives/girlfriends do, women depend more on brewing-brewing in the village than in the logging camps.

To see if age is also a predictor in sources of revenue, a one-way ANOVA was done with age as the continuous response and occupation as the categorical factor:

Figure 5. One-way ANOVA of age and revenue in both logging camp and village (compiled)

One-way Analysis of Variance

```
Analysis of Variance for Age
Source     DF        SS        MS        F        P
Revenue     7     17103      2443    12.32    0.000
Error     516    102345       198
Total     523    119448

                                  Individual 95% CIs For Mean
                                  Based on Pooled StDev
Level       N      Mean     StDev  -------+---------+---------+---------
alcohol    94     31.87     11.83         (----*---)
commerce   20     29.80     10.96   (--------*-------)
family     15     34.27     24.74        (---------*---------)
husband   109     26.37     11.24   (---*--)
nothing    16     41.81     23.95                   (---------*---------)
other      34     38.68     19.39                 (------*------)
prepared  112     27.05      8.65    (---*--)
produce   124     39.90     16.99                      (---*---)
                                  -------+---------+---------+---------
Pooled StDev =    14.08               28.0      35.0      42.0
```

3. Disease

Women were asked to describe any illness or symptom they had in the last year. Diseases were then grouped into six categories: respiratory tract infection (RTI), reproductive problems, skin problems, malaria (in its own category because it is so prevalent), diarrhea, and other. The total disease incident counts were:

To ascertain whether age or location was a more significant indicator of disease incidence, I ran a chi-squared test for of disease incidence by location and a one-way ANOVA analysis with age as the response variable and disease as the factor variable.

Table. 9 Compiled disease incidence counts

Disease	Logging	Village
RTI	20	35
Reproductive	13	15
Skin	4	8
Malaria	88	104
Diarrhea	6	1
Other	112	163

Figure 6. Chi-Square test of disease incidence between logging camp and village

Chi-Square Test

```
Expected counts are printed below observed counts
Logging  Village    Total
1       20       35       55
23.49    31.51
2       13       15       28
11.96    16.04
3        4        8       12
5.12     6.88
4       88      104      192
82.00   110.00
5        6        1        7
2.99     4.01
6      112      163      275
117.44   157.56
Total      243      326      569
Chi-Sq =  0.518 +  0.386 +
0.091 +  0.068 +
0.247 +  0.184 +
0.440 +  0.328 +
3.032 +  2.260 +
0.252 +  0.188 = 7.993
DF = 5, P-Value = 0.157
2 cells with expected counts less than 5.0
```

Figure 7. One-way ANOVA of age and disease incidence

One-Way Analysis of Variance for Age Total

```
Source     DF        SS        MS        F        P
Malady T    5      8138      1628     5.72    0.000
Error     563    160057       284
Total     568    168195

                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level       N      Mean     StDev  ----------+---------+---------+-----
-
Diarrhea    7     23.00      7.00  (------------*------------)
Malaria   192     31.20     15.04                    (-*--)
Other     275     38.41     18.18                         (-*-)
Repro      28     30.71      8.26               (------*-----)
RTI        55     38.29     19.95                        (---*----)
Skin       12     32.42     15.56              (--------*---------)
                                ----------+---------+---------+-----
-
Pooled StDev =    16.86                    20        30        40
```

The chi-squared test gave a p-value of 0.157, which means that there is no difference of disease incidence occurrence between. The ANOVA analysis gave a p-value of 0.000, which means that disease incidence occurrence is definitely correlated with age. It thus appears that age, but not location, is a statistically significant predictor of disease.

4. Family Life

The purpose of this portion of the study was to determine if there were significant differences in family life between the villages and the logging camp, Eboumetoum. A total of 286 women were surveyed, 140 in the logging camp and 146 in the villages.

4.1 Number of People Living Under One Roof

Africans often live in extended families, not nuclear ones. It was therefore more appropriate to ask each woman about the number of people who shared her dwelling. The mean number of people per house in the logging camp was 5.157, with standard deviation 3.417. The mean number in the villages was 7.130, with standard deviation 4.143. Thus, it appeared that women in the villages lived in larger family groups. To see if this was truly the case, a hypothesis test was performed.

Figure 8. Hypothesis test and T-test of number of people living under one roof between the logging camp and the villages

Sample mean # of people per dwelling in the logging camp $\mu_l = 5.157$
Sample mean # of number of people per dwelling in the villages $\mu_v = 7.130$
Sample standard deviation in the logging camp $s_l = 3.417$
Sample standard deviation in the villages $s_v = 4.143$

$H_0: \mu_l = \mu_v$
$H_A: \mu_l \quad \mu_v$

The 95% CI for the mean difference between the two groups is:
$(\mu_l - \mu_v) \pm t_{á/2} * \text{sqrt}(s_v^2/n_v + s_l^2/n_e)$

The standard normal score *z* was substituted for $t_{á/2}$ because the sample size was over 100 and fairly large.

95% CI: $(3.417 - 4.143) \pm 1.96 * \text{sqrt}(3.417^2/140 + 4.143^2/146)$
$= (0.152, -0.726)$

We are 95% confident that the true mean difference in weights between the 2 groups is between 0.152, -0.726. Since the P(true mean difference = 0) is > 0.05, we fail to reject the null hypothesis. Thus, the average number of people per dwelling in the villages is not statistically higher.

4.2 Familial Status

Marriage is a sign of social structure in a community. There were seven categories of familial status designated: civil marriage, custom marriage, concubinage (living with a man and having his children without a marriage), single with stable partner, single without single partner, divorced, and widow. The purpose of asking this question was to see if there was more divorce, concubinage, and singlehood in logging camp compared to the villages, as this would be indicative of decay of social structure.

The familial statuses were coded as follows.

Civil marriage = 1

Custom marriage = 2
Concubinage = 3
Single w/ a stable partner = 4
Single w/o a stable partner = 5
Divorced = 6
Widow = 7

The most current status was the one assigned. For instance, a woman may have been officially married but was divorced at the time of the survey. In that case, she would be classified as divorced.

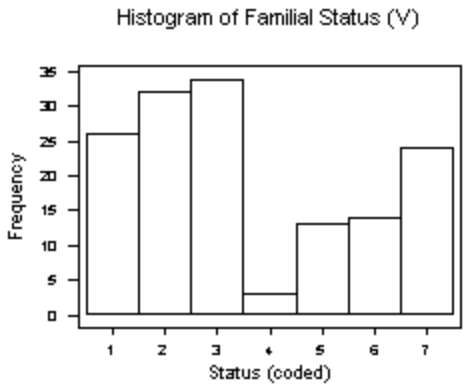

Figure 9. Histogram of familial status in the villages.

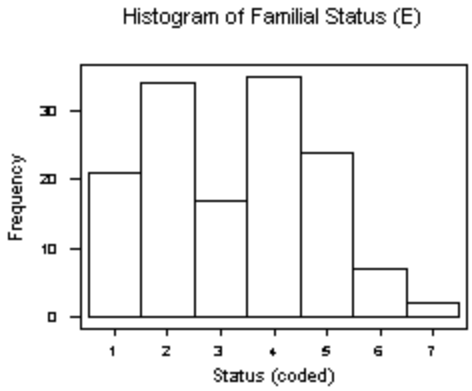

Figure 10. Histogram of familial status in the logging camp.

A few striking differences can be seen from these two histograms (figures 9 and 10). First, there are far fewer single women with a stable partner in the logging camp than in the villages. Second, there are substantially more widows in the villages. Overall, there were 16 single women in the villages and 52 in the logging camp. Comparisons must be made with some reservation, however. Since the women in the logging camp tended to be younger, it was more likely that they would be single as well.

Here was the data obtained.

Table 10. Familial status versus location.

Status	Village	Logging Camp	Total
1	26	21	47
2	31	34	65
3	35	17	52

4	3	35	38
5	13	24	37
6	14	7	21
7	24	2	26
Total	146	140	286

A chi-squared test was performed to see if the distribution of familial status was independent of location.

H_0: There is no relationship between the variables.
H_a: There is a relationship between the variables.

Figure 11. Chi-square Test of familial status between logging camp and village

Chi-Square Test

```
Expected counts are printed below observed counts
       Village  Logging    Total
    1       26       21       47
          23.99    23.01
    2       31       34       65
          33.18    31.82
    3       35       17       52
          26.55    25.45
    4        3       35       38
          19.40    18.60
    5       13       24       37
          18.89    18.11
    6       14        7       21
          10.72    10.28
    7       24        2       26
          13.27    12.73
Total      146      140      286
Chi-Sq =  0.168 +  0.175 +
          0.143 +  0.150 +
          2.693 +  2.808 +
         13.863 + 14.457 +
          1.836 +  1.914 +
          1.003 +  1.046 +
          8.670 +  9.042 = 57.967
DF = 6, P-Value = 0.000
```

Since the P-value was 0.000, the distribution of familial status was clearly not independent of location. This lead to some questions regarding relative risk: How much more likely is a woman from the logging camp to be single without a stable partner? How much more likely is a woman from the village to be living in concubinage? These questions were answered using the following data.

Table 11a. Distributions of familial status in the villages and the logging camp.

Status	Village	Logging Camp	Total
1	26	21	47
2	31	34	65
3	35	17	52

4	3	35	38
5	13	24	37
6	14	7	21
7	24	2	26
Total	146	140	286

Table 11b. Conditional distributions of familial status.

Status	Village	Logging Camp	Total
1	0.5532	0.4468	1.000
2	0.4769	0.5231	1.000
3	0.6731	0.3269	1.000
4	0.0789	0.9211	1.000
5	0.3514	0.6486	1.000
6	0.6667	0.3333	1.000
7	0.9231	0.0769	1.000

Table 12. Percent distributions of familial status.

Location	1	2	3	4	5	6	7	Total
Village	0.178	0.212	0.240	0.021	0.089	0.096	0.164	1.000
Logging Camp	0.150	0.243	0.121	0.250	0.171	0.050	0.014	0.999

Relative risk calculations were performed using Table 12. The relative risk of a woman from the logging camp to be single without a stable partner = 0.171 / 0.089 = 1.92. This indicates that a woman from a logging camp may be twice as likely to be single without a stable partner than a woman from a village. The relative risk of a woman from the village to be living in concubinage = 0.240 / 0.121 = 1.98. Thus, a village woman may be twice as likely to live in concubinage than a logging camp woman. These results give no definitive conclusions since they may have arisen by the chance composition of the villages and logging camp surveyed.

Breaking down the data further allowed for even more interesting comparisons. The percentages of civil marriages were compared to custom marriages, as shown below. The samples of single women were compared as well.

Table 13. Percent distributions among married women.

	Civil Marriage	Custom Marriage	Total
Village	0.456	0.544	1.000
Logging Camp	0.382	0.618	1.000

Relative likelihood of a marriage in the village to be civil = 0.456 / 0.382 = 1.19.
Relative likelihood of marriage in the village to be custom = 0.544 / 0.618 = 0.880.

Table 14. Percent distributions among single women.

	Single w/ stable partner	Single w/o stable partner	Total
Village	0.188	0.813	1.001
Logging Camp	0.593	0.407	1.000

Relative likelihood of a single logging camp woman to have a stable partner = 0.593 / 0.188 = 3.15
Relative likelihood of a single logging camp woman to lack a stable partner = 0.407 / 0.813 = 0.500

These conditional distributions indicated that a higher proportion of married women in the villages had civil marriages, and a far higher proportion of single women in the logging camp had stable partners. With further research, one may find that women in the logging camps are less likely to get married, or perhaps they may get married at a later age. At this point, however, one cannot say that there was definitive evidence for decay of social structure. The only conclusion that could be drawn was that was the villages had more divorce, concubinage, and singlehood with a stable partner, while the logging camp had more singlehood without a stable partner.

4.3 Polygamy

In a community with unlimited land for sowing (such as south-eastern Cameroon), it is more advantageous for a man to have more wives in order to increase the amount of fields he controls, as each additional wife means more labor power. One might then infer that men in the villages would be more likely to practice polygamy as villagers are more dependent on growing food for revenue than are the men of logging camps, who have a salary as their main source of revenue (Boserup 1989).

Men were considered polygamous only if they were married to multiple wives. Thus, a woman in concubinage may not have had a polygamous husband. The data were subject to inaccuracy since divorced or widowed women may have had polygamous husbands but did not say so because they did not have a husband at present.

Table 15. Polygamy Counts

Home	Husband polygamous	Husband not polygamous	Total
Village	21	92	113
Logging Camp	14	64	78
Total	35	156	191

H_0: There is no relationship between the variables.
H_a: There is a relationship between the variables.

A chi-squared test was performed using Minitab. These were the results.

Figure 12. Chi-Square test of polygamy between village and logging camp

Chi-Square Test

```
Expected counts are printed below observed counts
      Polygamo Not poly    Total
Village     31       86      117
         27.00    90.00
Eboum       14       64       78
         18.00    60.00
Total       45      150      195
Chi-Sq =  0.593 +  0.178 +
          0.889 +  0.267 = 1.926
DF = 1, P-Value = 0.165
```

Since the P-value is greater than 0.05, we cannot reject the null hypothesis that there are no relationships between the variables. It did not appear that men in the villages were more likely to be polygamous. Nevertheless, it is worth noting that a higher proportion of men in the villages were reported to be polygamous: 0.36 as compared to 0.22 in Eboumetoum.

5. Fertility

The initial purpose of this project was to look at reproductive differences between the women in the logging camps and villages. In fact, preliminary analyses of several variables suggested that a comparison between the camps and villages would be less illuminating than constructing a multiple linear regression model for the number of children a woman has had.

It is important to note several points before discussing the analysis. The response variable examined was number of children per woman. In fact, number of children included not only surviving children and those who died during adulthood, but also all pregnancies that ended in stillbirth or miscarriage, as well as children who died between the ages of 0 and 15. Possible predictors examined were:

- Woman's age: (a continuous variable).
- Child Mortality: This is the sum of the number of pregnancies ending in miscarriage or stillbirth plus the number of children who die before reaching the age of fifteen.
- Years of education. Non-response was a bigger problem for this variable than others. The first time information about education was collected in Eboumetoum, level (not year) of education was recorded. Attemps to refind the same women to complete the information were completely successful in the village, and somewhat successful in the logging camp. In part because women in the logging camps are so mobile, it was impossible to collect responses for "years of education" on all of them, so many of the 86 cases of nonresponse were due to the education variable.
- "Married" and "Stable Partner" are both indicator variables created to account for marital status. Seven categories of marital status were actually recorded, as described in Section 4. A value of 1 is given for "Married" if a women is married by law or custom; 0 is given for other statuses. 1 is given for "Stable Partner" if she lives in concubinage or is single with a stable partner; zero was given for another status. The third status includes women who are single without stable partners, divorced, or widowed. This status is accounted for in the model if a woman receives zeros for both "Married" and "Stable Partner"
- Age 1st enfant=the age at which a woman first gave birth
- Age 1st Homme=age at which a woman first cohabitated with a man

Because the initial aim of the study was to describe differences between women in the villages and the logging camp, side-by-side boxplots (Fig. 1) were made to gain a rough idea of the distribution of number of children born to women in the two locations. The median number of children born to women in the village was higher. A two-sample T-test was carried out to determine whether the difference between the means was significantly different.

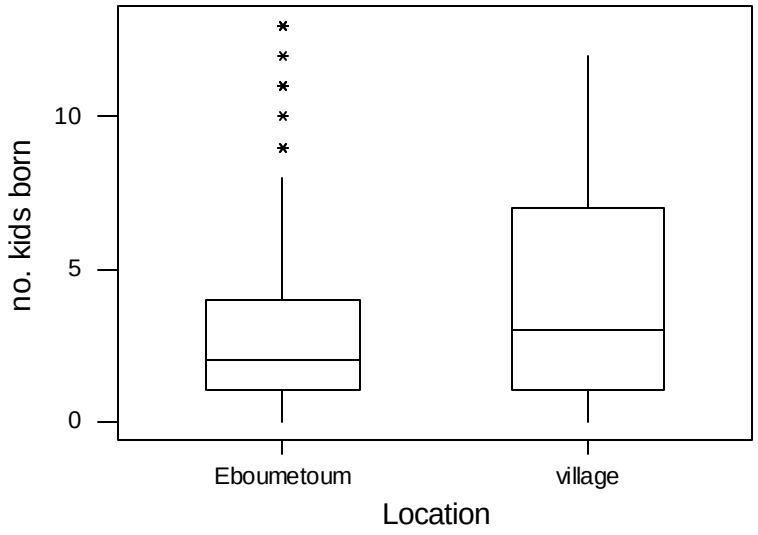

Figure 13. Comparison of number of children born to women in Eboumetoum and the villages.

Figure 14. T-Test of Nomber of children born between locales

Two-Sample T-Test and CI: no. kids born, Location

```
Two-sample T for no. kids born
Location      N      Mean     StDev   SE Mean
Eboumetoum  140      3.06      3.15      0.27
village     146      3.99      3.41      0.28
Difference = mu (Eboumetoum) - mu (village   )
Estimate for difference:  -0.936
95% CI for difference: (-1.701, -0.171)
T-Test of difference = 0 (vs not =): T-Value = -2.41  P-Value = 0.017  DF = 283
```

The two-sample T-test shows that the mean number of children per village woman is higher than that for the women in the logging camp ($P<0.05$). As discussed in Section 1, however, the mean age of the women in the logging camp is lower than that of the women in the villages.

A number of different ways to tease apart the enmeshed variables that might affect the number of children a woman has were considered. It was decided that a multiple linear regression to predict the number of children a woman has should be attempted.

First, a best subsets regression was carried out:

Figure 15. Best Subsets Regresssion to determine predictors for Number of Children

Best Subsets Regression: No. children giv versus Eboum=1, logAge, ...

```
Response is No. chil
156 cases used 130 cases contain missing values.
                                                  c Y   S
                                               E  h e M t A A
                                               b l i a a g g
                                               o o l r r b e e
                                               u g d s r l
                                               m A    i e 1 1
                                               = g m o e  s s
Vars   R-Sq    R-Sq(adj)        C-p         S   1 e o f d P t t
   1   45.9         45.6       64.6    2.3165      X
   1   32.6         32.2      117.9    2.5860    X
   2   58.6         58.1       15.8    2.0333    X X
   2   51.3         50.7       45.0    2.2051      X   X
   3   60.5         59.7       10.5    1.9944    X X   X
   3   60.3         59.5       11.0    1.9976    X X X
   4   62.2         61.2        5.7    1.9575    X X X X
   4   61.4         60.3        8.8    1.9776    X X   X     X
   5   62.6         61.4        5.8    1.9523  X X X X X
   5   62.5         61.2        6.3    1.9552    X X X X     X
   6   62.9         61.5        6.5    1.9498  X X X X X     X
   6   62.8         61.3        7.0    1.9536  X X X X X   X
   7   63.3         61.6        7.0    1.9467  X X X X X   X X
   7   63.0         61.2        8.5    1.9563  X X X X X X   X
   8   63.3         61.3        9.0    1.9533  X X X X X X X X
```

The problem with using so many variables is that there are likely to be one or more variables missing for any given woman. The probability of having some variable missing increases as the number of variables used in the model increases. The less variables used in the model, the larger the sample size that will be used to construct it. Thus, the simpler the model, the more likely it is to be a good predictor of number of children for the overall population of women.

The first model (1) examined used logAge, child mortality, years of education, and the indicator variable "married" to predict number of children. This model explained 68% of the variation in number of children a woman has. It makes sense that increasing age and child mortality increases the number of children a woman has, as does being married, but it is surprising that a higher level of education seems to correspond to greater fertility. This may be a consequence of the nonresponse problem described above.

Figure 16. Regressions Analysis for y= No. of children, x=logAge, Child mortality, years of education, and married?

(1) Regression Analysis: No. children versus logAge, child mortal, ...

```
The regression equation is
No. children given birth to = - 11.2 + 8.27 logAge + 1.36 child mortality
           + 0.204 Years of education + 0.955 Married

200 cases used 86 cases contain missing values

Predictor        Coef     SE Coef          T        P
Constant      -11.159       1.642      -6.80    0.000
logAge          8.273       1.067       7.75    0.000
child mo       1.3624      0.1211      11.25    0.000
Years of      0.20373     0.05788       3.52    0.001
Married        0.9549      0.3044       3.14    0.002

S = 1.876       R-Sq = 68.5%     R-Sq(adj) = 67.9%
```

```
Analysis of Variance

Source            DF          SS          MS         F        P
Regression         4     1492.21      373.05    106.04    0.000
Residual Error   195      686.01        3.52
Total            199     2178.22

Source       DF      Seq SS
logAge        1      878.62
child mo      1      535.50
Years of      1       43.47
Married       1       34.61

Unusual Observations
Obs     logAge   No. chil         Fit      SE Fit    Residual    St Resid
  8       1.64     10.000       6.180       0.317       3.820        2.07R
 82       1.48      1.000       4.868       0.387      -3.868       -2.11R
112       1.49      9.000       5.126       0.231       3.874        2.08R
162       1.60     11.000       6.042       0.291       4.958        2.68R
172       1.78      0.000       4.506       0.451      -4.506       -2.48R
184       1.80      1.000       6.044       0.420      -5.044       -2.76R
188       1.84     10.000      12.228       0.517      -2.228       -1.24 X
223       1.68      9.000       4.927       0.337       4.073        2.21R
224       1.78      0.000       4.506       0.451      -4.506       -2.48R
230       1.83      1.000       3.948       0.548      -2.948       -1.64 X
```

Years of education was discarded from the second model. Two hundred fifty-one women were included in this analysis, as opposed to only 200 in the four-variable model. All three coefficients had P=0 to three decimal places, and the three-variable model had an adjusted R-Sq value only 1% smaller than that of the four-variable model (1), indicating that its predictive power was almost as strong. One striking feature of the regression analysis was the large number of outliers (15) and influential points (7).

Figure 17. Regressions Analysis for y= No. of children, x=logAge, Child mortality, and married?

(2) Regression Analysis: No. children versus logAge, child mortal, Married

```
The regression equation is
No. children given birth to = - 8.11 + 6.97 logAge + 1.43 child mortality
           + 1.08 Married

251 cases used 35 cases contain missing values

Predictor        Coef     SE Coef          T        P
Constant       -8.115       1.200      -6.76    0.000
logAge         6.9741      0.8873       7.86    0.000
child mo       1.4259      0.1107      12.88    0.000
Married        1.0813      0.2668       4.05    0.000

S = 1.869       R-Sq = 67.3%     R-Sq(adj) = 66.9%

Analysis of Variance

Source            DF          SS          MS         F        P
Regression         3     1772.37      590.79    169.09    0.000
Residual Error   247      863.02        3.49
Total            250     2635.39

Source       DF      Seq SS
logAge        1     1098.69
```

```
child mo      1      616.30
Married       1       57.38

Unusual Observations
Obs     logAge   No. chil         Fit      SE Fit    Residual    St Resid
  8       1.64     10.000       6.199       0.285       3.801        2.06R
 11       1.60     13.000       8.418       0.261       4.582        2.48R
 34       1.57      9.000       4.248       0.229       4.752        2.56R
 43       1.59     11.000       6.915       0.205       4.085        2.20R
112       1.49      9.000       4.794       0.183       4.206        2.26R
113       1.58     13.000      11.114       0.442       1.886        1.04 X
142       1.75      1.000       5.159       0.343      -4.159       -2.26R
144       1.58     12.000      11.114       0.442       0.886        0.49 X
162       1.60     11.000       5.910       0.262       5.090        2.75R
172       1.78      0.000       5.368       0.364      -5.368       -2.93R
184       1.80      1.000       6.942       0.325      -5.942       -3.23R
188       1.84     10.000      12.921       0.453      -2.921       -1.61 X
223       1.68      9.000       4.692       0.300       4.308        2.33R
224       1.78      0.000       5.368       0.364      -5.368       -2.93R
230       1.83      1.000       4.621       0.462      -3.621       -2.00 X
237       1.67     11.000      11.758       0.432      -0.758       -0.42 X
262       1.80      5.000       4.434       0.440       0.566        0.31 X
264       1.79      1.000       5.467       0.374      -4.467       -2.44R
266       1.52      8.000       2.476       0.229       5.524        2.98R
268       1.63      9.000       3.277       0.309       5.723        3.10R
270       1.73     11.000       6.819       0.342       4.181        2.27R
274       1.59     11.000      11.193       0.440      -0.193       -0.11 X

R denotes an observation with a large standardized residual
X denotes an observation whose X value gives it large influence.
```

Examining the values of each variable for each outlier or influential point, the following was found:

Five of the women who were denoted as influential points had child mortality values of 5; in other words, they had five children miscarriages, stillbirths, or children who died before the age of 15 (obs. 113, 144, 188, 237, and 274). Each woman's health data (Section 3) was checked to see if any of she had suffered from any reproductive illness; in fact, the only one who had was obs. 144. The other two influential points were observations 230 (village, one child, 67 years old, not married) and 262 (village, 5 children, 63 years old, not married). Observations 230 and 262 are probably influential points mainly because they are so old.

10 of the outliers had exceptionally high numbers of children for their age (obs. 8, 11, 34, 43, 112, 162, 223, 266, 268, and 270); five others (142, 172, 184, 224, and 264) had exceptionally low numbers of children for their ages (all 56 years or older).

Below are the data for the outliers/influential points and some descriptive statistics for the variables logAge and child mortality.

Table 16: Descriptive Statistics: logAge, child mortality

Variable	N	N*	Mean	Median	TrMean	StDev
logAge	254	32	1.4251	1.3979	1.4189	0.1602
child mo	286	0	0.8776	0.0000	0.7364	1.2208

Table 17: Outlier and Influential Point Data

obs	location	eboum=1	no. children	age	logage	child mortality	married?
8	Eboumetoum	1	10	44	1.64345	2	0
11	Eboumetoum	1	13	40	1.60206	3	1
34	Eboumetoum	1	9	37	1.5682	1	0
43	Eboumetoum	1	11	39	1.59106	2	1
112	Eboumetoum	1	9	31	1.49136	1	1
113	Eboumetoum	1	13	38	1.57978	5	1
142	Village	0	1	56	1.74819	0	1
144	Village	0	12	38	1.57978	5	1
162	Village	0	11	40	1.60206	2	0
172	Village	0	0	60	1.77815	0	1
184	Village	0	1	63	1.79934	1	1
188	Village	0	10	69	1.83885	5	1
223	Village	0	9	48	1.68124	0	1
224	Village	0	0	60	1.77815	0	1
230	Village	0	1	67	1.82607	0	0
237	Village	0	11	47	1.6721	5	1
262	Village	0	5	63	1.79934	0	0
264	Village	0	1	62	1.79239	0	1
266	Village	0	8	33	1.51851	0	0
268	Village	0	9	43	1.63347	0	0
270	Village	0	11	54	1.73239	2	0
274	Village	0	11	39	1.59106	5	1

In order to improve the fit of the model without throwing out the outliers, Two new indicator variables, "fecund" and "zilch" were created. High outliers were given 1's for "fecund;" all other women received zeros. Low outliers were given 1's for "zilch;" all other women received zeros for this variable.

The regression analysis for the model including the indicator variables "fecund" and "zilch" is below (3). R-Sq increased about 10%. As expected, "fecund" had a large positive coefficient and "zilch" had a large negative coefficient. Analysis of this model revealed 27 points that were either influential points or outliers, five more than the first model. All predictors were significant ($P<<0.05$, $|T|>1$).

Figure 18. Regressions Analysis for y= No. of children, x=logAge, Child mortality, married?, fecund, and zilch

(3) Regression Analysis: No. children versus logAge, child mortal, ...

```
The regression equation is
No. children given birth to = - 7.94 + 6.77 logAge + 1.31 child mortality
           + 1.32 Married + 4.84 fecund - 4.03 zilch

251 cases used 35 cases contain missing values
```

```
Predictor        Coef     SE Coef          T        P
Constant       -7.942       1.075      -7.39    0.000
logAge         6.7687      0.8027       8.43    0.000
child mo      1.31093     0.09236      14.19    0.000
Married        1.3235      0.2171       6.10    0.000
fecund         4.8355      0.5086       9.51    0.000
zilch         -4.0313      0.7488      -5.38    0.000

S = 1.509       R-Sq = 78.8%     R-Sq(adj) = 78.4%

Analysis of Variance

Source            DF          SS          MS         F        P
Regression         5     2077.74      415.55    182.57    0.000
Residual Error   245      557.65        2.28
Total            250     2635.39

Source       DF      Seq SS
logAge        1     1098.69
child mo      1      616.30
Married       1       57.38
fecund        1      239.40
zilch         1       65.97
```

Adding a third indicator variable, "cm," was considered; cm would have denoted the child mortality influential points discussed earlier. This only added 1% to R-Sq, so that variable was not included in the final regression model.

The last regression model (4) included only one of the new indicator variables, "fecund." The purpose of running this model was to observe how much the variable "zilch" actually improved of the fit of the model. In fact, this model was the best. Like the one including both artificial indicator variables, all predictors were significant and had coefficients that were intuitively reasonable. Notice that despite using one more predictor than model (2), it had a larger F-statistic, in addition to accounting for 10% more variation in number of children per woman. The model is discussed in detail in the conclusion.

Figure 19. Regressions Analysis for y= No. of children, x=logAge, Child mortality, married?, and fecund

(4) Regression Analysis: No. children versus logAge, child mortal, ...

```
The regression equation is
No. children given birth to = - 5.76 + 5.09 logAge + 1.44 child mortality
           + 1.36 Married + 5.18 fecund

251 cases used 35 cases contain missing values

Predictor        Coef     SE Coef          T        P
Constant       -5.757       1.050      -5.48    0.000
logAge         5.0867      0.7803       6.52    0.000
child mo      1.43645     0.09431      15.23    0.000
Married        1.3563      0.2290       5.92    0.000
fecund         5.1760      0.5326       9.72    0.000

S = 1.592       R-Sq = 76.3%     R-Sq(adj) = 76.0%

Analysis of Variance

Source            DF          SS          MS         F        P
Regression         4     2011.77      502.94    198.40    0.000
Residual Error   246      623.62        2.54
Total            250     2635.39
```

```
Source       DF      Seq SS
logAge        1     1098.69
child mo      1      616.30
Married       1       57.38
fecund        1      239.40

Unusual Observations
Obs     logAge   No. chil         Fit      SE Fit    Residual    St Resid
  8       1.64     10.000      10.652       0.518      -0.652       -0.43 X
 11       1.60     13.000      13.234       0.543      -0.234       -0.16 X
 20       1.51      8.000       4.692       0.158       3.308        2.09R
 27       1.48      1.000       4.549       0.158      -3.549       -2.24R
 34       1.57      9.000       8.832       0.510       0.168        0.11 X
 43       1.59     11.000      11.741       0.526      -0.741       -0.49 X
109       1.67     13.000       9.850       0.297       3.150        2.01R
111       1.51      8.000       4.692       0.158       3.308        2.09R
112       1.49      9.000       9.798       0.538      -0.798       -0.53 X
142       1.75      1.000       4.492       0.300      -3.492       -2.23R
146       1.54      7.000       3.453       0.202       3.547        2.25R
155       1.60      9.000       5.185       0.179       3.815        2.41R
162       1.60     11.000      10.441       0.517       0.559        0.37 X
172       1.78      0.000       4.644       0.319      -4.644       -2.98R
184       1.80      1.000       6.188       0.287      -5.188       -3.31R
188       1.84     10.000      12.135       0.395      -2.135       -1.38 X
207       1.48      5.000       1.757       0.180       3.243        2.05R
223       1.68      9.000       9.327       0.541      -0.327       -0.22 X
224       1.78      0.000       4.644       0.319      -4.644       -2.98R
230       1.83      1.000       3.532       0.409      -2.532       -1.65 X
233       1.56      7.000       3.516       0.205       3.484        2.21R
262       1.80      5.000       3.396       0.390       1.604        1.04 X
264       1.79      1.000       4.717       0.328      -3.717       -2.39R
266       1.52      8.000       7.143       0.518       0.857        0.57 X
268       1.63      9.000       7.728       0.528       1.272        0.85 X
270       1.73     11.000      11.104       0.528      -0.104       -0.07 X
282       1.60      7.000       3.829       0.224       3.171        2.01R

R denotes an observation with a large standardized residual
X denotes an observation whose X value gives it large influence.
```
(27)

Because the aim of the study was to study the effects of logging camps on women's lifestyles, a final regression was attempted, with location as one of the predictors. In fact, this model explained less than 1% more variability than the initial three-variable model did, and location was the only non-significant (P>0.05) predictor in the model.

Figure 20. Regressions Analysis for y= No. of children, x=Eboumetoum?, logAge, Child mortality, and married?

(5) Regression Analysis: No. children giv versus Eboum=1, logAge, ...

```
The regression equation is

No. children given birth to = - 8.87 + 0.333 Eboum=1 + 7.39 logAge
           + 1.42 child mortality + 1.04 Married

251 cases used 35 cases contain missing values

Predictor        Coef     SE Coef          T        P
Constant       -8.872       1.329      -6.68    0.000
Eboum=1        0.3333      0.2528       1.32    0.189
logAge         7.3924      0.9410       7.86    0.000
child mo       1.4174      0.1107      12.80    0.000
```

```
Married        1.0449      0.2679       3.90    0.000

S = 1.866       R-Sq = 67.5%     R-Sq(adj) = 67.0%
```

Given the information available, the best multiple linear regression equation for number of children a woman gives birth to is the fourth one attempted (4). The equation is the following:

```
No. children given birth to = - 5.76 + 5.09 logAge + 1.44 child mortality
          + 1.36 Married + 5.18 fecund
```

- All coefficients are significant ($P<<0.05$, $|T|>1$).
- The y-intercept of the regression line is –5.76. This has no biological or sociological significance.
- The positive term 5.09logAge indicates that older women tend to have had more children than younger women. Taking the log of age makes sense because women can keep having children as they get older, but they generally become less fertile after some age (in this country, around 35 years old). Per-woman birth rate is always positive but decreases in magnitude as women age. For example, all other things being equal, a ten-year age difference will get you about one child if you're 25 but only half a child if you're 45 years old.
- 5.09log25 - 5.09log15 = 1.13
- 5.09log45 - 5.09log35 = .556
- Each instance of stillbirth, miscarriage, or child mortality increases the number of children a woman has had by 1.44. Obviously, each such instance really does add 1 to the number of children a woman has had, but an extra .44 children are explained by each instance of child mortality. This is intuitively reasonable; if there is a high risk of one of your children dying (e.g. from disease), a woman will probably have a bigger family than she otherwise would.
- Being married adds 1.36 children to the number a woman is likely to have.
- The coefficient of 5.18 for the categorical variable "fecund" makes women who would have otherwise been outliers lie closer to the regression line and thus improves the fit of the model.
- The fact that the F-statistic is large in relation to that of other models, even ones that contained less variables, is an indication of the descriptive value of every independent variable used.

Although the purpose of the study the data came from is to analyze the effect of logging camps on women's lifestyles, location was not a significant predictor of number of children in this multiple linear regression analysis. This should not be taken to mean that logging camps have no effect on birth rates. In fact, the variables predicting fertility probably large in number, complicated, and extremely enmeshed. This multiple linear regression model explains about 76% of the variation in women's birth rates, but its power is more descriptive than predictive.

6. Years of Education

Another analysis run to observe the effects of location versus age was on years of education by performing a best subsets regression with years of education as the response variable and age and location (logging camp yes/no as an indicator variable) as the free predictors:

The results listed to the left show the best model to predict years of education includes both age and location. The third model is the only model with a satisfactory C-p score (C-p r+1). This model also has the highest r-squared, which means that a combination of location and age can explain 53.3% of women's years of education.

Best Subsets Regression

Vars	Adj. R-Sq	R-Sq	C-p	S	A g e	L. C. ?
1	51.3	51.1	12.6	2.2323	X	
1	20.6	20.2	166.6	2.8522		X
2	53.7	53.3	3.0	2.1833	X	X

CONCLUSIONS ON STUDY:

I have left many variables and thus my conclusions are preliminary. Based on my quantitative analysis above and my qualitative observations in the field, I can conclude that logging camps do affect the lives of women in variables that are happening at that point in time. This would include economic variables, but not those variables that are dependant on a woman's culture or upbringing. This accounts for why occupation and revenue are more correlated with location than age, while years of education, a variable that affects a woman while she is growing up, appear to be more correlated with age than location.

Through spending time with women in both Eboumetoum and the villages, I found that they were not culturally different. They share the same language, and Bantu upbringing. This makes sense because logging camps are economic centers of migration. Women generally move there for economic incentive or to follow a spouse or boyfriend, i.e. once they are independent of their parents. Women in the logging camps thus had not grown up in the logging camp, but in the surrounding villages, some even from my control villages of Kompia, Bintsina, and Nemeyong II. I thus found that in terms of culture, older women differed more greatly from younger women than did women in Eboumetoum differed from those in the villages.

Older women tended to be much less educated than the younger women. All women under 40 spoke French, but I often had to use the services of a translator to communicate with the elder village women, who only spoke their native language. Of the 41 village women who did not speak French, only two were under age fifty. I am not sure how and when the education system changed, and this is a topic for further investigation.

By contrast, economy is a variable that is not as dependant on a woman's upbringing, but on the economic conditions of her current location. The logging camp had a cash-based economy while the village was much more dependant on subsistence trading. An employee of the logging company made between 40,000-350,000 CFA/month (700CFA=$1), depending upon his position. By contrast, the main source of hard currency in the logging camp were cash crops such as cacao, coffee, or peanuts. A diligent farmer could earn around 60,000 CFA/year for these goods, but this amount is highly variable to fluctuation dependant on farming conditions and demand. There is thus much more hard based currency at the logging camp than in the villages, which creates an interesting flow of money in the logging camp.

Men accounted for almost all of the salaried workers in the logging camp. The flow of currency passed from men to women through their services to men- chief among them prostitution, making-making, food preparation, or spousal. Women then distributed this smaller amount of cash by paying for the needs of their children and among themselves through services such as unprepared produce, clothing making, or hairdressing. This is reflected in the percentage distributions of women's economic activities and revenues. The highest source of revenue for women by far in the logging camp was from their husbands and boyfriends (63%). By contrast, only 14% of village women said they received revenue from their significant others. In the villages, 86% of women recognized themselves as farmers as opposed to 15% of women in the logging camp. However, only 61% of village women said they received revenue from produce. The difference can be

explained that women's produce is their livelihood to feed their families, but is not as important for a source of revenue.

Marriage is a variable that I expected would be affected both by age and location, which is shown to some degree in parts 4. I reasoned that because marriage is a social institution, marriage patterns would be expected to change as social customs changed through time. In addition, in observing the attitudes towards marriage between locales, I noticed that the term "marriage" is used more lightly in the logging camp.

Marriage describes a more economic condition than a social one in Eboumetoum as compared to the villages: A husband gave his wife a portion of his salary for their children, but this did not prevent him from seeing many other "girlfriends." The economic conditions and more urban setting of the logging camp reinforced this theme; more money and more people perpetuated prostitution and unfaithfulness in the logging camp. This social difference between locations can be seen in Figures 9 and 10: there are more single women with and without stable partners in the logging camp than there are in the village.

The difference in the amount of polygamous and non-polygamous marriages between Eboumetoum and the villages was not statistically significant, however there was a higher proportion of men in the villages reported to be polygamous (0.36 as compared to 0.22 in Eboumetoum). I did not have definite predictions regarding this variable because marriage can be seen as both an economical and a social institution. As mentioned in the result section, more wives mean more labor for husbands where land is not a limiting factor. As land was more of a limiting factor in the denser logging camp, one might have expected to see more polygamy in the village. This would also be compounded as polygamy can be linked to older social traditions. This could be examine by running polygamy against women's age and/or husband's age to note a trend.

However, marriages, both civil and custom, require the payment of a dowry from groom's family to bride's family. This economic factor would increase polygamous husbands in the logging camp where there is more money. These two factors may have been working against in eacother in the analyses in table 15 and figure 13. Separating these factors is necessary for further conclusions.

When preparing my survey, I expected both age and village location to negatively affect health. I classified health as a factor similar to economy- that is, one that is affected by current location because of the difference in sanitation between logging camp and village. Logging camp residents had access to a rudimentary clinic provided by the logging company. The houses provided for the workers and their families by Pallisco had wood-slat walls and floors and tin roofs. The villages had mud-brick houses with beaten dirt floors, and tin or thatched roofs. After spending a few nights in the typical red mud brick house of the village, I was immediately aware how much a wooden floor as opposed to a dirt floor decreased paradomestic insects.

Age is important to health as older women would be expected to have more ailments than younger women. As my statistical tests show, age is a significant predictor of health, whereas location is not. This could be an indicator that although village and logging camp houses may appear different in structure, the wooden homes are still rustic and dirty and thus are not an improvement in sanitation.

In conclusion, women's lifestyles differed greatly from logging camp to village, but their cultures did not. In terms of cultural similarity, age was a greater distinguisher, while in terms of current lifestyle variables, location was an important distinguisher. This topic can be further explored with other data I collected in my questionnaire.

POINTS FOR FURTHER ANALYSIS:

The logging camp has a much younger distribution of women than the villages. It would be important to determine whether all of the statistics done here comparing logging camp to village

hold true if age as a distinguishing factor was removed. This could be done by completing the same calculations for each age sub-group.

In terms of study set-up, there are several factors I would change if I were doing the project over again, the first and most important one would be to gather years of education rather than a coded education data set. I would also include a section on economic position, judged by the interviewer based on construction material of house, type and amount of furniture, presence of a television, radio, etc.

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