Formal versus Informal Estimates of Cultural Stability

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For reports of other aspects of life in Mexiquito see Arthur J. Rubel 1960· Arthur J. Rubel and Joseph Spielberg. (In press.)

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FORMAL VERSUS INFORMAL ESTIMATES OF CULTURAL STABILITY

INTRODUCTION

One method for evaluating the stability of a culture is to observe it over an interval of years. While this strategy yields unassailable conclusions, it is grossly inefficient. It requires too much manpower and makes too little use of the intrinsic structure of the data. A more practical strategy would estimate an answer by exploiting such structural features. This paper describes the transformation of one such structural feature into an estimation procedure.

Such estimation procedures may be quite simple. McIlwraith (1948:174) described a childless Bella Coola couple which had formally bestowed some of their ancestral names on their dog. Clearly a condition necessary for the stability of Bella Coola culture is no longer satisfied; a culture will not remain stable if there is an excess of social roles over qualified occupants.

Criteria for cultural stability that derive from other features of a culture, however, are often less visible. For example Lounsbury (1956:173) notes that among the Pawnee there exists an identification of the father's father's father's uterine kin group with ego's own kin group. He suggests that the marriage rule: "wife" is ego's father's father's sister's daughter's daughter would result in such a pattern of lineages. The actual Pawnee marriage rule is not recorded in the ethnographic literature. However by using symbolic logic the writer was able to "prove" Lounsbury's conjecture in the sense of deducing this marriage rule from the observed lineage structure (Hoffmann 1959). That is, Lounsbury's marriage rule is implicit in the observed lineage structure and hence must have been observed if this structure were to remain stable. It was a necessary condition for the stability of Pawnee culture.

An estimate of the stability of Pawnee culture which exploits this condition rests on a complex transformation of the observed lineage data. The proof that this was indeed a necessary condition required eleven preliminary theorems and a final theorem of 24 steps.

Is such an effort worth while? Formal proofs lay bare a myriad of interrelationships and thus aid the comprehension of functional links in a culture. They may also generate estimation procedures which are more powerful than their intuitive counterparts. This is the case in the Ethiopian example which follows. An application of the writer's algebraic criterion for the stability of Galla age grades requires far less empirical information than does the intuitive criterion suggested by Prins (1953:76).

These estimates of cultural stability dealt with features of social organization. Clearly much else is involved in sustaining the life of a tribe. For example Carneiro (1960:230) discusses the significance of soil depletion in the maintenance of tropical forest villages. He presents a number of formulas that will estimate village stability as a function of cultivable land. It is impossible, however, to be certain that a sufficient number of different estimates have been made. The presence of unsuspected but critical variables, say an impending epidemic, can never be ruled out. The sufficient conditions that would guarantee cultural stability are beyond our grasp.

ON THE STABILITY OF ETHIOPIAN AGE GRADES

Age grades are a structural device that assign cultural attributes to people according to impersonal chronological criteria. They are a conspicuous feature of many East African cultures, including the Shoa Galla. Murdock (1959:326) describes their structure as follows: " . . . One basic system prevails throughout both the pastoral and sedentary Galla tribes. This consists of five grades, typically named the Daballe, Folle, Kondalla, Luba, and Yuba grades. Age sets, in which membership endures for life, spend eight years successively in each grade, with a spectacular ceremony marking each transition. When there are five, a son belongs to a set bearing the same name as his father's, and is initiated into the first grade when his father retires from the fifth, i.e. exactly forty years later."

It is evident that the stability of Galla communities is threatened by the arbitrary interval of 40 years that is interposed between the generations. Since this interval is often greater than the actual chronological difference between generations, the ages of some of the people in the grades may become progressively greater. This can result in humiliation and incongruity. An old man, entering the first grade, would be required to abstain from sexual activity and to wander around with its youthful members, begging food from the married women. Further, if he should die before attaining the higher grades, important administrative, judicial, and priestly offices may go unfilled.

Is it possible to predict under what conditions this state of affairs will not arise? That is, is it possible to deduce from the formal structure of Shoa Galla age grades necessary conditions that will insure cultural stability? If this were the case it would be possible to look for these conditions during field work and to predict whether this institution would remain stable or not.

We begin with a definition and a postulate. Age grade systems which tend to maintain a realistic relationship between age and role behavior over many generations are defined as being stable. Further, we postulate that a realistic relationship between age and role behavior can be maintained if, between any arbitrary number of generations, the ages at which an ancestor and his distant offspring entered the first grade are equal.

Under what conditions will this criterion be met? We deduce an answer to this question from an algebraic analysis of the ages at which fathers and sons enter the first grade. This analysis will use the following notational convention. Capital "A" will represent the number of years that a person has lived before he joins the first grade. Capital "P" will represent his age as he becomes a father. Subscripts denote generations. That is, A_1 and P_1 are ages of ego. A_2 and P_2 are ages of ego's children. A_4 and P_4 are ages of ego's great grandchild. The constant 40 denotes the number of years any person remains in the grades.

We begin with ego. At age A_1 he enters the first grade. Forty years later, i.e. at age (A_1+40), he leaves them. At this point his son may enter the grades. According to our notational convention, the son will now be A_2 years old. What, then, is the relationship between A_1 and A_2? The time interval (A_1+40) can be divided into two parts. During the first, ego's son is not yet born. It ends as ego becomes a father at age P_1. Hence this interval will be P_1 years long. During the second part, ego's son waits for his father to leave the grades so that he can enter them himself. The length of this interval will be A_2, since it coincides with the age of the son as he enters the grades. Thus the interval (A_1+40) has been divided into the two parts, which are P_1 years and A_2 years long. These two parts, by definition, exhaust the interval (A_1+40). That is, $(P_1+A_2)=(A_1+40)$. Thus the desired relationship between A_1 and A_2 has been established. It will become clearer if P_1 is subtracted from each side of the equality:

$$A_2 = A_1 + 40 - P_1. \tag{1}$$

This states that the age at which ego's son enters the grades is equal to the age at which ego entered the grades a generation earlier, plus the number of years one remains in the grades, minus the number of years that ego lived before he became a father.

Earlier we assumed that a community has a stable age grade system if, between any arbitrary number of generations, the ages at which an ancestor and his distant offspring entered the first grade, are equal. Under what conditions will this criterion be met? To begin with we will investigate the case of adjacent generations. That is, under what conditions will A_2 and A_1 be equal? Consider the expression $A_2=A_1+40-P_1$. In the event that the quantity $(40-P_1)$ were to vanish, the expression would reduce to $A_2=A_1$, which is the desired result. Now the sum $(40-P_1)$ will vanish only if P_1 equals 40. This means that ego and his son will enter the grades at the same age only if ego becomes a father at an age which equals the number of years one spends in the grades; 40 in this particular tribe.

This result can be generalized to any number of generations as follows. The expression $A_2 = A_1 + 40 - P_1$ links the ages of ego and his son, i.e. those of adjacent generations; it is equally valid for linking those of ego's son and grandson. The same reasoning applies as before, since the initial selection of an ego could have been made anywhere along the tribe's history. However, according to our notational convention, the subscripts now become

$$A_3 = A_2 + 40 - P_2. \tag{2}$$

That is, the age at which ego's grandson enters the grades is equal to the age that ego's son entered them, plus 40 years, minus the age at which ego's son became a father.

Under what conditions will ego and his grandson enter the grades at the same age? That is when will $A_1 = A_3$? The answer may be deduced by substitution for A_2 its equivalent, i.e. $A_1 + 40 - P_1$, in the preceding expression (2):

$$A_3 = (A_1 + 40 - P_1) + 40 - P_2.$$

This simplifies to:

$$A_3 = A_1 + 2 \cdot 40 - (P_1 + P_2).$$

Clearly, A_3 will equal A_1 only if the expression $2 \cdot 40 - (P_1 + P_2)$ vanishes. This will occur if P_1 and P_2 add up to 80.

Note that the desired condition does not state that either "P" must equal 40, but merely that their sum must equal 80. It is quite possible for ego to become a father at age 30 and for his son to become a father at age 50, and still meet the criterion that ego and grandson enter the grades at the same age. For example consider the following circumstances:

(1)	If ego enters the grades at age 25 and becomes a father at age 30, then his son will enter the grades at age 35. (Since: $A_2 = A_1 + 40 - P_1$, i.e. $A_2 = 25 + 40 - 30$.)	$A_1 = 25$ $P_1 = 30$ $A_2 = 35$
(2)	If ego's son becomes a father at age 50 then ego's grandson will be 25 years old when he enters the grades, two generations after ego's entry. (Since: $A_3 = A_1 + 2 \cdot 40 - (P_1 + P_2)$, i.e. $A_3 = 25 + 80 - (30 + 50)$.)	$P_2 = 50$ $A_3 = 25$

That is, ego and his grandson both enter the grades at the same age, even though ego and his son became parents at rather widely divergent ages. Reiteration of these arguments leads to the expression covering three generations:

$$A_4 = A_1 + 3 \cdot 40 - (P_1 + P_2 + P_3)$$

or, continuing indefinitely, to one covering any number of generations:

$$A_{n+1} = A_1 + n \cdot 40 - (P_1 + P_2 + \cdots + P_n).$$

This can be denoted by the expression:

$$A_{n+1} = A_1 + n \cdot 40 - \sum_{i=1}^{n} P_i \tag{3}$$

This states that the age at which an offspring of ego "n" generations away will enter the grades is equal to the age at which ego entered them, plus the quantity "$n \cdot 40$" minus the sum of the ages of parenthood of ego and his descendants to the n^{th} generation.

This "n" spans any arbitrary number of generations; thus expression (3) relates the ages at which ego and his distant offspring entered the grades. Earlier we assumed that a community has a stable age grade system if, between any arbitrary number of generations, the ages at which an ancestor and his distant offspring entered the first grade were equal.

The conditions under which this criterion will be met can be deduced from expression (3). If the quantity

$$n \cdot 40 - \sum_{i=1}^{n} P_i$$

were to vanish, then:

$$A_{n+1} = A_1.$$

That is, if

$$n \cdot 40 - \sum_{i=1}^{n} P_i = 0, \tag{4}$$

then ego and his descendant "n" (i.e. $(n+1)-1$) generations away will enter the grades at the same age. Consider expression (4). The quantity

$$\sum_{i=1}^{n} P_i$$

may be added to each side without altering its import. This results in:

$$n \cdot 40 = \sum_{i=1}^{n} P_i$$

Further, both sides can be divided by the number "n":

$$40 = 1/n \sum_{i=1}^{n} P_i. \tag{5}$$

This, however, is the expression for the mean of "P_i." That is, if the average age of parenthood from ego to the father of his distant offspring were equal to the number of years one spent in the grades, then the community has a stable age grade system. Again, it is not necessary that every age of parenthood equal 40, but merely that they fluctuate about a mean of 40.

FORMAL VERSUS INFORMAL ESTIMATION PROCEDURES

How efficient is this formally derived estimation procedure? It requires only a sample of ages of parenthood in order to yield an estimate of cultural stability. We may compare this to the estimation procedure developed by Prins (1953) by essentially informal means.

Prins proposes that if the period of procreation were confined to the last two grades, then the age grade system would remain stable. That is, children would enter the first grade in early adolescence. This would preserve a realistic relationship between age and role behavior.

First of all the formal analysis developed here can be used to prove that Prins' estimation procedure is not tenable. In other words it is *not* a necessary condition for the stability of Galla age grades that procreation be confined to members of the last two grades. The example discussed in the preceding section involved a man still in the first grade. Yet, after only two generations had passed, stability had once more been restored. That is, ego and his grandson both entered the grades at the same age, even though ego and his son became parents at rather widely divergent ages.

Second, assuming that Prins' estimation procedure had withstood a formal attack, we may note the amount of empirical data required for its application. Not only does Prins require ages of parenthood, but also information on the particular grade occupied by each person as he becomes a father. Thus he requires twice as much information to estimate the stability of age grades as does the writer.

The saving of time implicit in this is not overly important. What is important, however, is the existence of data. Ages of parenthood are much more likely to be recorded in official censuses than membership in particular age grades. In other words, the formally derived criteria for cultural stability have a much greater chance of actually being used than the more demanding estimation procedures that were developed informally.

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