"Galton’s Asset" and "Flower’s Problem": Cultural Networks and Cultural Units in Cross-Cultural Research

(Or, Male Genital Mutilations and Polygyny in Cross-Cultural Perspective)

ABSTRACT  Edward Tylor had envisioned anthropology to be comprised of ethnology and ethnography in equal parts, but today ethnography dominates the field. In this paper, we examine two reasons for the refugee status of ethnology. First, we look at the notorious “Galton effect.” Second, we examine the problem of defining and using cultural units, particularly when positivistic and static theories and methods of culture have been largely discredited by anthropology. We argue against any formulaic solutions to these problems and show that for each research question one needs to reconsider the criteria for how to construct cultural units and how to ensure that the cultures under study are not merely replicas of one another. We show that previous solutions to these issues are limited because they fail to appreciate the contingent and multidimensional nature of culture. We also argue that, instead of a “Galton problem,” there is actually a “Galton asset,” which can be used to study historical and emergent communicative networks. [Keywords: cross-cultural research, Galton problem, cultural units, methods and theory]

Edward Tylor had envisioned anthropology to be comprised of ethnology and ethnography in equal parts. Today, it is ethnography that predominates and ethnology has a sort of refugee status in anthropology. Why is this? David J. Strauss and Martin Orans write that “an extremely pessimistic appraisal of the possibility of verifying lawful relations between cultural traits . . . has doubtless profoundly shaped anthropological research” (1975:573). This “pessimistic appraisal” can be traced back to Sir John Galton, who, in discussion of Tylor’s 1889 talk on cross-cultural research, said:

It was extremely desirable for the sake of those who may wish to study the evidence for Dr. Tylor’s conclusions, that full information should be given as to the degree in which the customs of the tribes and races which are compared together are independent. It might be, that some of the tribes had derived them from a common source, so that they were duplicate copies of the same original. [Tylor 1961:26; originally 1889:272]

In 1975, Strauss and Orans wrote what may have been the last major “traditional” proposal for solving “Galton’s problem.” Traditionally, Galton’s problem was formulated as a purely statistical problem concerned with assuring the independence of the cultures being compared. As all manner of exchanges occur between cultures, particularly those that are near each other, the question that needed (and still needs) to be answered is how do we know that the similarities across cultures are not a result of diffusion or “exogenous replication” (Strauss and Orans 1975:581)? The solution proposed by Strauss and Orans aimed to reduce or eliminate the effects of diffusion through a “cluster reduction method” that allows us to deduce what the cultures of our study were like in a “pristine state” at some time zero, prior to cultural contact (as they recognize, time zero is a theoretical and not an empirical baseline) (Strauss and Orans 1975:581).¹ They describe the gist of their method as follows: “[w]e take each trait combination and eliminate cases until the observed number of consecutive pairs matches that expected by chance. We hope thereby to get a reduced sample more representative of the pristine world than the original sample” (1975:582).
Hence, this methodology implies a solution that takes all the cultures that share the selected traits under study (i.e., "hits"), calculates how many of those cultures by chance would be adjacent to each other or separated by one or by two cultures from each other; the number of proximate cultures above what one would expect by chance are then eliminated. The same procedure is performed for "misses."

This technique is of course difficult to apply in concrete cross-cultural studies. Furthermore, we are not convinced that this technique can fully, or even partially, reduce the "Galton effect." The central ethnographic example they use to validate their method is the cross-cultural correlation between male genital mutilations and polygyny. The relationship between these variables before the application of the "cluster-reduction method" looks as follows (see Table 1; see also Strauss and Orans [1975:583, table 18]; Whiting 1964b):

After the application of their "cluster-reduction" technique, the relation between the variables, according to Strauss and Orans, was as follows (see Table 2 [Strauss and Orans [1975:583, table 19], we include corrections of a few technical mistakes in the Strauss and Orans version): We were not convinced by Strauss and Orans's presentation of the relationship between male genital mutilations and polygyny, and we had a strong suspicion that the significant positive correlation in this case was still a result of the "Galton effect." We tested this relationship for the Circum-Mediterranean region in the strict sense of this term (i.e., Europe, North Africa and Near East; excluding Sudan and the Ethiopian Horn). These data were easily collected and checked by us using the Ethnographic Atlas. The immediate result of this test looked as follows:

The results of this test are overwhelmingly more convincing than the tests for the whole sample. However, these results would not look quite so convincing to anyone who has a minimum knowledge of the religious and social history of the region, as it would be immediately evident that we are dealing here with an obvious "Galton effect." The strong correlation is produced by the combined action of "Christian" and "Islamic" factors; in other words, it is a result of the functioning of two historical networks—the Islamic and Christian ones. Circumcision (although not enforced on the Muslims by their Holy Book) is still a virtual obligation among Muslims, as it has strong support in the Holy Tradition (al-Ahadi:th). The acceptance of polygyny (in conjunction with the fact that the Muslim societies of the region were stratified and the social status of women in traditional Islamic societies was low) led, almost inevitably, to the practice of at least occasional ("elite") polygyny in all the Muslim societies of the region, even in those that had been monogamous prior to Islamization (as happened with the Albanians).

Christianity, on the other hand, strictly prohibits polygyny but does not directly prohibit circumcision. Actually, it is hardly possible to find support for such a prohibition in any Christian texts considering that Jesus Christ himself was circumcised and the supposed date of his circumcision is one of the most important Christian Holy Days. Nevertheless, the Christian church (unlike Islamic and Jewish religious authorities) does not impose circumcision in any way. Consequently, during the Middle Ages the absence of "male genital mutilation" became an important marker distinguishing Christians from Muslims and Jews (with whom Christians were often in a hostile relationship during this period). Thus, for Christians, circumcision was, at this time, virtually unheard of. As a result, the diffusion of Christianity in the region resulted in the simultaneous diffusion of a prohibition on polygyny and a virtual (and quite effective) prohibition on circumcision. Conversely, the diffusion of Islam resulted in the simultaneous diffusion of precisely the opposite pattern. In this region we have evidence of a classical "Galton effect." Hence, it is not surprising that the deletion from the sample of Christian cultures results in dropping the correlations to an insignificant level:

<table>
<thead>
<tr>
<th>Male Genital Mutilation</th>
<th>Polygyny</th>
<th>Polygyny</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>Absent</td>
<td>560</td>
<td>115</td>
</tr>
<tr>
<td><strong>Note:</strong> Phi = 0.185; p &lt; 0.05.</td>
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</tbody>
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<thead>
<tr>
<th>Male Genital Mutilation</th>
<th>Polygyny</th>
<th>Polygyny</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>79</td>
<td>50</td>
</tr>
<tr>
<td>Absent</td>
<td>497</td>
<td>98</td>
</tr>
<tr>
<td><strong>Note:</strong> Phi = 0.211; p &lt; 0.05.</td>
<td></td>
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</tbody>
</table>
They write that "no one stepped forward to deal with the [Galton] problem until the 1960s" (Strauss and Orans 1975:

TABLE 4. Male Genital Mutilation * Polygyny cross-tabulation (for the Circummediterranean region; version 2 [omitting Christian cultures]).

<table>
<thead>
<tr>
<th>Polygyny</th>
<th>Absent</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Genital Mutilation</td>
<td>Absent</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Present</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: Phi = 0.18; p = 0.34.

573). However, in 1950 Beatrice Whiting had applied a very simple "Galton-solving" technique. In her study on the relationship between the presence of authoritative political officials and witchcraft attribution, she computed the correlation between these variables by using only one tribe from each cultural area (Whiting 1950). Three years later the same technique was applied by John W. M. Whiting and Irving L. Child in their famous monograph (1953). At present, most worldwide cross-cultural researchers apply this technique (though sometimes, perhaps, unknowingly) simply by using the Standard Cross-Cultural Sample (SCCS), in which George P. Murdock and Douglas R. White (1969) tried to include only one culture from each designated cultural area.

What is surprising is that this simple method seems to work in many cases. Why? To answer this question we need to recollect that in addition to Galton's response to Tylor's lecture at the Royal Anthropological Institute, at least one more important observation was expressed (and recorded) during the discussion of this lecture. Flower observed that any cross-cultural method "depended entirely upon the units of comparison being of equivalent value" (Tylor 1889:27). This can be interpreted as similar to Galton's question but expressed slightly different manner—it is the other side of the same problem. Thus, Galton's problem cannot be appropriately treated without also considering the problem of "cultural units."

In cross-cultural research, the problem of cultural units is not quite identical with the problem of units of comparison (though both problems are connected). An effective solution to the problem of comparison was proposed by Whiting (e.g., 1964a), who suggested that the unit of comparison is community and not culture. The problem of delineating cultural units arises immediately when the researcher has to decide which communities to select for his or her study. As the very notion of cross-cultural research implies, the communities that are to be used for comparison have to belong to different "cultures." Clearly, the inclusion of a number of communities that belong to the same "culture" could result in producing spurious correlations confirming false hypotheses, or, alternatively, rejecting genuinely significant correlations. Actually, at this point, it is clear we have already confronted Galton's problem.

To avoid this sort of bias in our samples, we should just choose one community from each culture. We can consider all communities in which the majority of people speak the same language to belong to the same "cultural unit"; that is to say, to the same "culture" (e.g., Ember and Ember 1998). This implies a "linguistic definition" of culture by which people speaking the same language over a contiguous region are members of the same culture and people speaking a different language belong to another culture. Indeed, in most cases, the "linguistic definition of cultural unit" will provide a solution to Galton's problem.

The definition of culture we find most useful for cross-cultural research is the one recently proposed by Brumann who argued that "culture should be retained as a convenient term for designating the clusters of common concepts, emotions, and practices that arise when people interact regularly" (1999:51). This definition has important consequences for cross-cultural research by (albeit unintentionally) clarifying "Galton's problem."

Communities that interact frequently over time eventually generate a cultural network consisting of "clusters of common concepts, emotions, and practices" (1964a: 305). Hence, what may, at first glance, appear to be a number of different cultural cases could, in fact, turn out to be copies of just one case. This would lead to the problems specified above and result in the confirmation of false hypotheses or the rejection of correct ones (i.e., "Type 1" and "Type 2" errors). We frequently find such clusters of traits among communities using the same language or a mutually intelligible dialect. Consequently, we colloquially use the name of a language to signify a national-cultural identity. For example, we use such qualifiers as "Russian," "French," "Japanese," and "Turkish" to identify both a language and a culture. Obviously, this correspondence makes sense for everyday speech and is often justified as a commonsensical theory of language, culture, and identity. But we must also question whether or not cultures cluster only at the level of language.

Obviously not. We frequently observe cultural clusters comprised of communities which use different dominant languages. By adopting the approach offered by Brumann, it seems perfectly reasonable to speak about Islamic or Indian cultures. With regard to cross-cultural research this implies that we should consider the possibility that the cultural units we want to select for our research can be formulated at different levels of abstraction or specificity. This implication leads to the reappearance of Galton's problem, but, now, from a very different and much more contingent perspective; a perspective that necessitates a hermeneutic as well as a statistical approach to determining what the appropriate cultural units should be.

As was mentioned above, the most widespread sifting technique is the Standard Cross-Cultural Sample (Murdock and White 1969), which includes one community from one cultural area. However, we believe that this solution does not solve Galton's problem once and for all. In other words, we do not believe that the identification of
cultural areas of a certain type as cultural units should be applied, in a mechanical fashion, to any and all types of cross-cultural research problems.

We demonstrate why we think this by applying the "simple-sifting" solution, via the Standard Cross-Cultural Sample, to the hypothesis with which we started this report—the one on the possible significant relationship between polygyny and male genital mutilation. When we test our hypothesis using the most recent full electronic version of the Ethnographic Atlas (Murdock et al. 1999) and then the Standard Cross-Cultural Sample the results are as follows:

A rather surprising thing about this test is that it has produced almost the same growth of the correlation strength (34 points; 0.200-0.166 = 0.034) as the application of the Strauss and Orans cluster-reduction technique (26 points; 0.211-0.185 = 0.026). However, on closer inspection we find that this is not surprising. The "cluster-reduction" method increased the Galton effect by decreasing the number of Native American cultures (which were not affected by the "galtonizing" influence of the spread of male genital mutilation practices as happened in the Old World through historical networks) in the sample. However, the use of the Standard Cross-Cultural Sample produced a similar effect. If we compare the respective samples, we shall find that in the Ethnographic Atlas we have 395 Native American cultures and 65 "narrow" Circummediterranean region, whereas in the SCCS you would find 65 Native American cultures and 16 "Circummediterranean" ones. Hence, the use of the SCCS leads to the reduction of the "Galton-free" Native American cultures by a factor of 6.1, whereas the "Galton-infected" Circummediterranean cluster is reduced by a factor of 4.4. Hence, the application of both techniques, which some cross-cultural scholars had believed capable of reducing the Galton effect, actually increased the effect.

At present, a number of the most influential cross-cultural researchers argue that Galton's problem is not serious at all. For example, Carol Ember and Melvin Ember write:

We believe that random sampling of cases is the best way to prevent sampling bias. Also, the sample societies in most cross-cultural studies usually speak mutually unintelligible language, which means that the speech communities involved have been separated for at least 1,000 years. If two related languages began to diverge 1,000 or more years ago, many other aspects of the cultures will also have diverged. So, such cases could hardly be duplicates of each other. [1998:678; see also 2001:89]

But, as we have shown above, such cases could still be duplicates. In addition, even cultures coming from apparently different regional cultural clusters could be duplicates of each other. The question remains: Should we really bother with Galton's problem? We still think that researchers should be concerned about this effect. Most contemporary cross-cultural researchers use the Standard Cross-Cultural Sample (SCCS) to eliminate the Galton effect from their research. But is the SCCS really immune to the Galton effect?

There are seven Christian and 23 Islamic cultures in the SCCS. Could they produce a Galton effect within the model specified above? In fact, two competing historical networks comprising only 16 percent of all the cases could still make a significant difference, even in the SCCS. If we leave just one representative of both Islamic and Christian historical networks in the original ethnographic sample comparing male genital mutilation with polygyny, we believe the correlation will become insignificant. We tested this hypothesis below:

As we see, if we use religion as the criterion for delineating and selecting cultural units, the relationship drops to an insignificant level and we can finally reject our hypothesis.

We conclude our discussion of cultural units by declaring that it is simply not possible to know beforehand what criteria to use for selecting one's cultural units for cross-cultural research. The criteria will vary on a case-by-case (or, rather, hypothesis-by-hypothesis) basis. If we see culture as a "cluster of cognitions, emotions, and practices," then we have to determine what criteria are responsible for organizing the cluster. Under certain circumstances, we need to be aware that cultural clusters are not

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<table>
<thead>
<tr>
<th>Polygyny</th>
<th>Male Genital Mutilation</th>
<th>Absent</th>
<th>Present</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>141</td>
<td>592</td>
</tr>
<tr>
<td></td>
<td>Present</td>
<td>15</td>
<td>253</td>
</tr>
</tbody>
</table>

Note: Phi = 0.166; p < 0.05.

TABLE 6. Male Genital Mutilation * Polygyny cross-tabulation (for the Standard Cross-Cultural Sample; version 1).

<table>
<thead>
<tr>
<th>Polygyny</th>
<th>Male Genital Mutilation</th>
<th>Absent</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Present</td>
<td>3</td>
<td>48</td>
</tr>
</tbody>
</table>

Note: Phi = 0.200; p < 0.05.

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TABLE 7. Male Genital Mutilation * Polygyny cross-tabulation (for the Standard Cross-Cultural Sample, leaving one culture from the Christian and Islamic historical interaction networks).

<table>
<thead>
<tr>
<th>Polygyny</th>
<th>Male Genital Mutilation</th>
<th>Absent</th>
<th>Present</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>26</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Present</td>
<td>3</td>
<td>30</td>
</tr>
</tbody>
</table>

Note: Phi = 0.12; p = 0.12 (0.093 by Fisher's Exact Test, one-tailed).
ability to study communicative networks and historical study network autocorrelation effects, thus impairing our lem. In addition, they make it impossible to properly structural samples do not automatically solve Galton's probabilistic samples, such as the HRAF 60-Cultures Probability Sample, should be regarded as partially defective, because they were designed explicitly to eliminate Galton's problem. Thus, we believe that in many cases the answer to this question could hardly be discovered a priori. Hence, our practical advice is that cross-cultural researchers should start with as large a cross-cultural data set as can be obtained (at present, this would mean the Ethnographic Atlas database whenever it contains the appropriate data for testing a given hypothesis). After the initial tests, it will be necessary to test for any network autocorrelation ("Galton") effects.3

Finally, we would like to mention some practical suggestions regarding sampling techniques for worldwide cross-cultural comparisons. From what has been said above, it must be clear that we believe that the answer to the question "What cultural units should be used as units of comparison?" will be different for different cross-cultural comparisons depending on what kind of hypothesis is being tested. Furthermore, we believe that in many cases the answer to this question could hardly be discovered a priori. Hence, our practical advice is that cross-cultural researchers should start with as large a cross-cultural data set as can be obtained (at present, this would mean the Ethnographic Atlas database whenever it contains the appropriate data for testing a given hypothesis). After the initial tests, it will be necessary to test for any network autocorrelation ("Galton") effects.3

From what has been said, it must be apparent that we strongly favor treating the Galton problem as a network autocorrelation one (see, e.g., Burton and White 1987:147, 1991; Doe 1981, 1982, 1984; White et al. 1981). In so doing, researchers will be able to obtain optimum samples for testing their hypotheses and also for studying communication networks and the historical diffusions that affected the distribution of the variables under consideration. In this case, "Galton's problem" will appear not as a problem for cross-cultural comparison, but rather as an asset.

From the discussion above, it is clear that we believe in the indispensable importance of Murdock's Ethnographic Atlas as a cross-cultural research database. "Representative" samples, such as the HRAF 60-Cultures Probability Sample, should be regarded as partially defective, because they were designed explicitly to eliminate Galton's problem. As we have shown, for many cases these cross-cultural samples do not automatically solve Galton's problem. In addition, they make it impossible to properly study network autocorrelation effects, thus impairing our ability to study communicative networks and historical diffusion effects (which are by themselves of no less interest than testing worldwide hypotheses). Such ready-made "Galton-free" cross-cultural samples prevent the creation of optimum samples for the given cross-cultural research projects. Irrespective of their undeniable merits, it is simply not correct to treat these respective databases as genuine substitutes for the Ethnographic Atlas.

Perhaps no other fact has as negatively affected the flowering of worldwide cross-cultural research as much as has the virtual termination of incorporating new work into the Ethnographic Atlas in 1973. Not a single case has been added to the 1,267 cases "in stock" in 1973. The project was and is very far from completion (e.g., in the version currently available, one would not find any information on hundreds of well-researched cultures, particularly those of Eurasia). Thus, we believe that reviving the Ethnographic Atlas should be regarded as the most pressing current task of worldwide cross-cultural researchers. Therefore, this report should be also regarded as an invitation to our colleagues to think about practical ways to resume this essential anthropological database.

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**NOTES**

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1. We would like to stress that we do not think that this assumption, even in the form of "a theoretical and not an empirical baseline" is necessary for cross-cultural comparison.

2. Murdock and White themselves did not consider the Standard Cross-Cultural Sample to be "Galton-free." In fact, they showed the severity of Galton's problem within the SCCS, using a test for diffusion in adjacent societies (Murdock and White 1969).

3. In fact, Harold E. Driver argued for a very similar approach (Driver 1956).

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