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BENGAL ANTHROPOMETRIC SURVEY, 1945 : A STATISTICAL STUDY

By D. N. MAJUMDAR AND C. R. RAO

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FOREWORD

During the 1941 census of India, at the instance of M.W.M. Yeatts, at that time the Census Commissioner of India, Dr. D. N. Majumdar collected certain anthropometric measurements on castes and tribes of Uttar Pradesh (then United Provinces). While the data were being analysed at the Indian Statistical Institute, I felt that a similar investigation in Bengal would throw some light on the various controversial issues relating to the ethnic composition of the inhabitants of this province. I therefore requested Dr. Majumdar to undertake a tour of Bengal and collect measurements on individuals belonging to different social groups. I also had something else in view. Having undertaken in 1925 a study of race mixture in Bengal,¹ based on the measurements taken by Sir Herbert Risley, I was eager to know how far the conclusions reached in my paper would be substantiated by measurements taken by another investigator.

It was also becoming increasingly evident, and the analysis in Chapter 4 of this report confirms this, that if comparisons are to be made, of physical measurements, between any two groups of individuals, the measurements to be used for this purpose should preferably be taken by the same investigator. With the data collected in Bengal by Dr. Majumdar, it was hoped it would be possible to secure comparable material for studying intra- as well as inter-state differences.

The survey was undertaken in 1945. We now see, in retrospect, that but for this timely survey the chances would have been remote of obtaining such a long series of comparable measurements on a number of social groups living in various parts of undivided Bengal.

It may be noted that the survey was undertaken immediately after the World War II, when there were considerable difficulties in travelling in different parts of Bengal, in contacting people, and in taking their measurements. As a result, the geographical coverage of the survey was not as wide as had been originally intended; and only 14 out of 29 districts of Bengal could be surveyed. Some of the districts in the Chittagong division (*Chattala*), from where valuable information could have been collected, were not visited, as the district authorities there felt that proper facilities could not be provided for Dr. Majumdar to carry out his work. It must, therefore, be noted that the conclusions drawn in this report apply only to the area covered, and not necessarily to the undivided Province of Bengal as a whole.

As in an earlier report, on the U.P. Anthropometric Survey,² the authors of the present report adopted a neutral word 'group' and classified all the individuals measured, into a set of suitably defined 'groups'. A 'group' consists of individuals

¹ *Analysis of Race Mixture in Bengal, Presidential Address, Anthropological Section, Indian Science Congress, 1925, Journal of Asiatic Society of Bengal, 23(3), 301, 1925.*

belonging to the same caste, religion or tribe and living in the same district, that is, the classification adopted is two-way, one representing caste, religion or tribe, and the other geographical habitat (district). Any further division on the basis of sub-caste, clan, endogamy etc., would have resulted in a large number of groups; and a much larger survey would have been necessary to obtain a sufficient number of individuals under each such group to be amenable to reasonable statistical analysis. It is clear that the ultimate aim should be to treat the several endogamous units as separate groups; and gradually to build up a knowledge of their differences by a series of surveys. This could not, however, be done in an efficient way in a single survey spread over a short period of time.

In any case, this preliminary survey with good coverage of different areas of Bengal and a broad classification of the individuals into social groups should be useful for planning a more comprehensive series of surveys with a more detailed grouping of individuals on lines indicated above. From this point of view, the present contribution is a welcome addition to the anthropological literature on Bengal, containing as it does, a critical evaluation of the previous work on race elements of Bengal, a statistical analysis of the present material designed to throw information on the various issues involved, tentative inferences about the ethnic composition of the inhabitants of Bengal, and suggestions for future surveys.

One of the important contributions of the present analysis is the demonstration of regional differences within a social group, that is, between individuals adopting the same caste, tribal, or religious name (label), but living in different areas (Districts). This shows that a term like 'Brahmins of Bengal' has to be used with some caution; and when an investigator measures a sample of Brahmins, it is necessary to specify the localities to which the individuals belong. Many previous reports on anthropometric surveys, unfortunately, do not provide this information, without which the interpretation of the observed differences could be misleading.

Another interesting feature indicated by the present study is that sometimes there is closer resemblance between caste groups within a district than between individuals of the same caste group belonging to different districts. If this finding is corroborated by further investigations, it would present a serious problem of eliminating regional or geographical differences in comparing groups of individuals belonging to the same caste or group but living in different regions of the State.

On the statistical side, I am happy to find that the Generalised Distance (D^2) introduced in 1925 for purposes of classification of a number of groups, on the basis of their mean positions in a p -dimensional character-space, has become a useful tool in a wide variety of fields. In the present report, while the Generalised Distance is used as a precision tool for studying the affinities of a closer order, as between groups of people living within the same state, some simpler tools were evolved to examine broad differences which may exist between groups of individuals belonging to widely separated geographical regions. This was done by providing new definitions of size

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and shape factors suitable for investigations of the present nature; and comparing the various groups with respect to the estimated values of those two factors. This technique used for inter-state comparisons, in Chapter 5 of the report, led to some interesting classifications of the groups belonging to different states, confirming some previous observations made by me about higher caste groups in the study of race mixture in Bengal.

The report also contains a critical assessment of the available data on blood groups relating to Bengal which clearly indicates the need for a more systematic and comprehensive blood group survey.

This report brings out very clearly that specialized knowledge of both anthropology and statistics is demanded in anthropometric investigations; and that collaboration between specialists in these fields can be of great value. Since the publication of the report on U.P. Anthropometric Survey under the joint authorship of an anthropologist (Majumdar) and two statisticians (Mahalanobis and Rao), a number of reports have appeared based on the joint work of anthropologists and statisticians. I hope the practice would continue to the best advantage of research in both the fields.

New York, 2 May 1958

P. C. MAHALANOBIS

ACKNOWLEDGEMENTS

1. We are deeply indebted to Professor P. C. Mahalanobis, Director of the Indian Statistical Institute, who took the initiative in getting this survey started. But for his foresight in insisting on the collection of data inspite of the unsettled conditions prevailing in 1945 in the midst of World War II, the long series of measurements relating to the people of undivided Bengal would not have been available. Without the resources of the Institute having been made available to us, it would not have been possible to have undertaken this detailed investigation.

2. Anthropometry, as it exists today, needs critical appraisal and as long as we are conscious of its limitations, our conclusions must be put forward in a way which even if it cannot reconcile all differences, should aim at narrowing them down as far as possible. Hero helpful criticism is most welcome. In this aspect we are thankful to Dr. R. K. Mukherjee of the Indian Statistical Institute, who kindly read the manuscript and has already given us informed criticism of the anthropological inferences drawn by us.

3. We are grateful to our colleagues, Shri Shivendra Bahadur, Dr. Radha Govinda Laha, Dr. Sujit Kumar Mitra working at the Indian Statistical Institute, for their valuable and unstinted co-operation in the highly skilled and difficult task of scrutiny of field records. Much of the credit in making the primary data free from errors is due to them.

4. We are also thankful to Shri Manoj Chatterjee and Shri Ranjit Kumar Naha for helping us in specialised computations.

5. Our thanks are also due to Shri Brijesh Kumar Verma and Shri K. Madhava Sarma for their help in obtaining measurements of stature in the morning and evening on a number of individuals as reported in Appendix S.3.

6. We are indebted to the field team for their whole hearted co-operation and healthy team spirit without which the data could not have been collected specially because the political situation at the time of the survey was not very congenial for an anthropometric survey.

D. N. MAJUMDAR

C. R. RAO

PREFACE

1. This report is the product of a co-operative effort by an anthropologist and a statistician. Showing the distinctive roles played by each, the report is divided into various parts with individual authorships.

2. Though we were working at different places (Majumdar at Lucknow and Rao at Calcutta), we had several opportunities to meet and plan the analysis of the material and drafting of the final report. The report consists of ten chapters arranged under four parts, besides appendices.

3. In Part I is described the collection of data in the field, where also mention is made of the difficulties experienced, specially due to the fact that the survey was undertaken in 1945, immediately after the termination of World War II. Although it was originally intended to cover the entire state of undivided Bengal, only 14 out of 29 districts could be visited. This is, however, an unfortunate limitation for with a wider coverage more general conclusions could have been drawn. The technique of measurements adopted is given in detail in Chapter 2. Altogether 3240 individuals belonging to 41 social groups have been measured for about 14 characters. The individual measurements are reproduced in Appendix A of this report.

4. Part II of the report deals with the statistical analysis of the data collected and inferences. The importance of scrutinising field records is emphasised in Chapter 3. It also contains general recommendations for minimising errors in recording the primary data and at various stages of statistical computations. Some of the basic statistics such as estimates of standard deviations and correlations between measurements are given in Chapter 4. Chapter 5 deals with difficulties of interstate comparisons, due to investigators in different states using different techniques of measurement, inadequate coverage of social groups, and non-recognition of regional differences within the same ethnic groups, even within a state. In this chapter new definitions of size and shape factors are given and their estimates used to compare social groups belonging to different states for which comparable data were available. Clear-cut distinctions have been observed between the states specially with respect to the shape factor leading to interesting speculations about the Brachycephalic element in Bengal.

5. Mahalanobis' Generalised Distance (D^2 Statistic) is used in Chapter 6 to obtain a classification of the social groups within Bengal. An interesting finding in this chapter is the existence of closer resemblance between different social groups belonging to the same district rather than between individuals of the same social group living in different districts.

6. Part III deals with the anthropological conclusions, where an interpretation is given of the observed distances (physical resemblance or dissimilarity). Some

tentative inferences are drawn about the origin of the various groups. Chapters 7 and 8 examine the several racial theories advanced in recent years. Various lacunae in the theories of origin of ethnic types, and the difficulties of correlating evidence from various findings have been pointed out. Much research needs to be done before any valid construct on the ethnic contours of any state can be advanced.

7. In Chapters 9 and 10 of Part IV, a critical evaluation has been made of the available data on blood groups of Bengalees and the need for a comprehensive survey using well-trained personnel is stressed.

8. Our interest in anthropometry has been aroused by the fact that work in physical anthropology in India so far has been primarily concerned with anthropometry. Out of about 40 Presidential addresses at the annual meetings of the Anthropology Section of the Indian Science Congress Association, at least 30 percent have been devoted to a study of ethnic elements in India on the basis of anthropometric measurements. But the situation with regard to the validity of the comparison of the methods and techniques adopted in the various anthropometric studies has remained practically fluid and thus, much of the efforts and time seem to have been wasted. Critical appraisal of the methods and techniques, as also of the scope and aims of anthropometry, in Europe and America, have been of great help in analysing work on proper lines, but in India it has not been possible to do so, due to lack of adequate contacts between workers and due to the absence of any association of anthropologists as in the other countries. The Indian Statistical Institute has raised hopes for anthropometry by encouraging some critical studies and research in statistical techniques for the analysis of anthropometric data and organising large scale anthropometric surveys on scientific lines.

9. No one has given or can easily give the last word on the race elements in India and no one can do so merely on the basis of anthropometric evidence. The limitations of field anthropometry are well-known. Efforts are to be made to improve techniques, to understand the significance of physical traits and their genetic background. While we are conscious of the limitations of the conclusions drawn, we hope the present report would serve a useful purpose in drawing the attention of the anthropometricians to some urgent problems needing investigation and in emphasising the quantitative approach in the study of ethnic types.

May 1958

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