DISCUSSIONS AND CONCLUSIONS

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Sub-Culture

An examination of the test (CCFT) performance data by means of analysis of variance with main independent variable -- sub-culture, indicates that the subjects of different sub-culture groups viz., urban, semi-urban and rural group subjects differ significantly on general intelligence dimension. The test (CCFT) used in the present study was non-verbal and has high saturation on 'g'. Though the CCFT was used (for its failure to show culture fairness in the present study, see the last Section of this Chapter) in the present study, it was found from the direction of differences between means that urban subjects on an average scored higher in general intelligence than semi-urban subjects and semi-urban subjects than rural subjects. One possible explanation for such an effect may be that of urbanisation. It appears that urbanization may very well have had an effect on urban and semi-urban subjects than on rural subjects. The varied environment they have had may perhaps be more responsible, and thereby generating significant regional differences in intelligence.
The main reasoning behind this may be due to the existing differences in their environment which is one of the main predictors (determinants) of the test performance. The environment here, is meant, that all extraneous factors which influence the performance level of the testee on CCFT.

The testee has to follow certain conditions to complete the test. One of the conditions put to the testee was that he/she should find out the correct answer for every item from the alternatives given in the text and to write the answers in the separate answer sheet. From the analysis of the answer sheet, it was found that most of the rural subjects are not familiar with this type of examination; but in the case of urban subjects it was not so.

Another condition put to the testees was to complete the test in a stipulated time as the CCFT is a speed test. It was found from the present study that most of the rural subjects had a liberal concept of speed. But most of the urban subjects had the correct concept of speed and so they exhibited better performance than that of rural subjects. Having the correct concept of
speed might have favoured the urban subjects to score high on CCFT than rural subjects.

In a situation like "testing situation" which operates on certain principles and techniques, the urban subjects show a better performance than the rural subjects. This is because urban subjects sometimes have the experience of tackling problems like CCFT which appear in weekly magazines or in many learning situations. Most of the rural subjects are not familiar with problems involving geometrical figures, and they had no opportunity to solve such problems. The cumulative effect of these factors might have helped the urban subjects to do better on CCFT than the rural subjects. To put it more directly, lack of facilities which keep away the rural subjects to participate in the test situations may be another reason for them to show poor performance on CCFT.

It was also observed, during the test period, that most of the rural subjects feel hesitant to face testing situation. These subjects require rigorous training to face such a situation with high confidence. This is not a problem in the case of urban, semi-urban subjects.
Another condition put to testees was to select correct answer from the alternatives given, if not, to guess the answer. Guessing, no doubt, demands one's reasoning. A thorough examination of answer sheets of the subjects, it was noticed that in case of urban subjects (in most of the cases) most of the questions were answered either by selecting right answers or by guessing; but it was not the case with the rural subjects. Rural subjects might not have thought of guessing. Guessing might have helped urban subjects to score high on CCFT. It is also a fact that the rural subjects very rarely go for guessing.

Lack of good schooling might be another reason for the rural subjects to show poor performance on CCFT. This idea was supported by many educators.

The "selective migration" may be another factor which accounts for rural-urban differences in intelligence. There is a tendency that the brighter people like to leave the country side and go to Cities. This idea was supported by Schmidt -- (quoted in Sarason; 1958; 123). In other words, brighter people have a liking towards urbanization and they move from countryside
to cities, thereby providing brighter population sample. This may be another reason that the performance of the urban subjects on CCFT is somehow better than that of the rural subjects.

In cities, through the stimulation and competition induced by large number of inter-personal relationships, and through the wider range of experiences available, it provides a better opportunity to develop the skills important for an intelligence test. More favourable opportunities exist for developing an effective curriculum in an urban as against a rural setting. The argument for this point of view runs as follows: Large schools with large number of students close at hand permit not merely separate class rooms and teachers for grades, but often a division of grades on the basis of the capacities of the various students. Another advantage lies in the opportunity to employ more teachers of specialised subjects. Furthermore, although the rapid growth in urban population has unquestionably created serious problems of over-crowding, it should be borne in mind that it has also resulted in the building of large numbers of new school buildings whose architecture
and facilities are generally superior to the rural schools. All of these factors combine to afford the child better educational opportunities and at the same time to provide more satisfying environment for learning as well as teaching, thus helping to attract more and better teachers.

Rural schools have also a greater attendance problem. Bringing children in from a distance can be seriously impeded by poverty and other factors which have little effect on city schools. In agricultural rural areas, parents often withdraw their children from school to help them in fields in certain seasons, as a result of which some schools have to close down during the season.

The summary of the discussion held so far may be presented as follows: The main causes of rural-urban differences in the performance on CCFT are:

i) the tests have a slant towards urban culture,

ii) the semi-urban, rural and tribal life is not fast like the urban,
iii) CCFT are highly timed tests which mostly favor urban subjects,

iv) the average scores on CCFT individual tests are very low. As such their discrimination power is also low.

v) Rural and tribal life is more homogeneous and less varied. Intelligence increases with heterogeneity of life. The more varied (enriched) environment, the better it is for the growth of intelligence.

In view of the above discussion, the rural, semi-urban and urban differences may account for the differences observed in the scores of various groups of sub-culture subjects. This fact was confirmed by thorough examination of the findings of earlier studies, and findings of this study substantiates the findings of earlier studies. A large number of studies are available which consistently show that persons, both children and adults, who live in cities are found score more on intelligence tests than those who live in rural areas. The fact was also established in the present study. Most of the studies conducted in the USA have revealed
the fact that regional differences in intelligence correspond rather closely to regional differences in urbanisation; and most of the conclusions have been drawn favouring rural–urban differences as a factor which resulted in significant regional difference in intelligence.

Similar rationale of significant differences was expressed by Sarason, S.B. & Gladwin, T (Sarason, 1958). They have reviewed a plenty of research papers and concluded that the regional differences as one of the factors which affect intelligence.

In a similar study, Husen (as cited in Sarason, 1958: 123) analysed the results of large-scale administration of Swedish Army group intelligence test and found that migration from lower to higher population density areas was significantly more frequent among those with high test scores, and that the migrants generally had scores comparable to the average for the higher density area into which they moved.

Similarly, Fairbank (1933) compared a "normal" and subnormal" group 17 years after they were first studied in Baltimore and found that the normals more
frequent than subnormals, had the initiative and resources to move to other parts of the city in search of more varied employment opportunities.

Gist and Clark (1938) conducted a carefully controlled follow-up of 2,544 high school student from rural communities in Kansas. These people were tested at the time of their graduation from high school in 1922-23, and then in 1935 their places of residence were compared with their I.Q's at graduation. There was a progressive increment in average intelligence among those resident in 1935 in each of four categories of cities graded by increasing size, the highest scores living in metropolitan centres, or emigrating out of the State entirely. Evidence of this sort, pointing clearly to the operation of selective migration among some groups, was readily coupled with regional differences.

Klineberg (cited by Sarason, 1958) also tested a number of children who had moved from the South into New York City schools and found that I.Q. showed a fairly high correlations with years of residence in New York. Similar studies conducted by Mc Aplin and Long (1932), supported with identical findings in the
Similar rationale was expressed by Sarason and Gladt (Sarason: 1958). In their review, they have emphasized the fact that the Negroes, particularly Negro children who arrive in the cities of North are intellectually inferior to those born on long residence there, but with the passage of time and in particular with continued attendance in Northern schools, this deficit is largely made up. And in their conclusive remarks stated that:

the rise in I.Q. of those Negro children who moved into Northern cities can fairly be explained on the basis of the schools available to them in the North, which were superior to those they had previously attended. The greater possibility for job advancement in return for good school grades undoubtedly also increased in motivation toward schooling for some. But it is probably also that living in these cities, particularly for those children who come from rural areas, provided specific experiences which increased their ability to cope with the sorts of problems posed by intelligence tests.

They have also reviewed the book entitled "the uneducated" published by Ginzberg and Bray in 1953. According to the reviewers view this book contains a searching
and illuminating analysis of men who were rejected on the grounds of mental deficiency for military service in World War II. From Table 3.2, it is found that gross difference in mental capacity among various racial, ethnic and regional groups. The reviewers account this difference due to their existing differences in the following aspects:

1) regional - cultural difference,
2) minority group membership and
3) rate of expenditure for educational facilities.

This idea was also supported and substantiated by the present study in many respects.

**Socio-Economic Status**

Analysis of variance with main independent variable - socio-economic status - indicates that subjects of different socio-economic status groups differed significantly on general intelligence dimension. From Table 6.8, it is evident that almost all pairs of SES groups (except upper and upper middle groups) showed significant 't' values. To point it more directly, subjects of upper
socio-economic groups on an average score high in general intelligence than lower SES groups. In case of upper and upper-middle pair 't' was not significant. One possible explanation for this may be that of lack of motivation (a primary thing in test situations) in case of subjects of the upper SES group. One of the possibilities for significant difference in general intelligence among various SES groups could be that the home or school environment of the subjects of lower SES groups did not foster abilities represented in the CCFT as much as the environment of higher (upper) socio-economic groups. In Karnataka, subjects of higher SES groups are readily attracted by schools which provide brighter or better environment, thereby indicating high average performance on CCFT. But, in case of lower SES groups, it is not possible (in most of the cases) to seek admission in such schools. Usually the lower SES group subjects seek admission in Government schools and other schools of low standards which do not provide better environment. Relatively upper SES groups will have better home environment than lower, SES groups, and moreover they (higher SES groups) are less disturbed. Subjects of lower SES groups, some-times, experience the problems which are
similar to the problems posed by rural subjects which we have discussed already in the preceding section.

In the present study the SES scale used is a common scale for the rural and urban subjects which contains three important elements viz., father's occupation, parent's educational level and material possessions (See Appendix - B). No doubt, these factors are the better predictors of I.Q. It is evident from the study that lower SES groups will score less on the scale due to their impoverishment opportunity and thereby fail to secure bright environment which would help them do better in a new learning situation like testing situation. The implications here is that the environment of the lower SES groups was not as stimulating towards new learning situations as that of upper SES groups (with an exception to upper class).

Those findings are similar to the findings of Ira J. Semeler and Ira Iscoe (1963), Samuel, et al (1976), V.C. Hall and D.B. Kaye (1977). The results of these studies provide the evidence of the effect of SES and race differences in causing difference in mean I.Q. scores.
A similar rationale was expressed by Loevinger's (1940) review. In his review he had concluded that father's occupation and educational level of the parents (which are functions of social class, of course) as factors which showed substantially higher correlation with I.Q. of the subjects. Another study conducted by Honzik (1940) on California school children provided similar conclusions. She found that the social status factor as a predictor of I.Q.s. of the subjects. A similar study conducted by Robinson and Meenes (1947) showed substantial high correlation with the economic factor (which is, of course, an element of SES) and emphasized much upon the SES of neighbourhood as correlates of I.Q.s.

In one of his studies, Thorndike (1951) found the following correlations with I.Q.s. to be significant (in decreasing order of significance): educational level of adult population, proportion of persons owning their own homes, quality and cost of housing, proportion of native born white persons, rate of employment of women (a negative correlation) and the population of professional workers in the population. In other words, Thorndike's study provides an evidence of the influence of SES of
neighbourhood as correlates of I.Qs.

Angelino and Shedd (1955) undertook to evaluate the culture fairness of Davis-Eells Games by administering the test to two groups of children in Oklahoma City, 152 of lower class and 155 of upper class, utilising the class criteria employed by the Chicago Group. Approximately equal numbers were taken from each of the six grades of two elementary schools. With the exception of the second grade, the difference in mean scores exceeded 15 points, and all the differences were significant at one percent level. The differences favoured the upper class in Grade 2 through 6. In the first grade, the lower class children were marked by superior to the upper class. Although it is impossible to determine the meaning of the first grade reversal, one is forced to agree with the authors that this study strongly suggests that the Davis-Eells is probably still contaminated with cultural factors (Sarason, 1958).

Similar studies on upper and lower class groups were made by series of scientists, and more or less, providing the similar results and favouring the SES factor as correlates of I.Qs. The present study
substantiates the studies mentioned here and serve as the initial study to evaluate the culture-fairness of CCFT in India.

**Caste**

From Table 6.6 and 6.9 (b), having caste as a main independent variable, it was found that various caste group subjects differed significantly on general intelligence dimension. 't' values for all the three pairs were found to be significant at 0.01 level of significance. It was found from the direction of difference between various pairs of means that Forward Caste (Fc) subjects on an average score high in general intelligence than Backward Caste (Bc) subjects, and Bc subjects than scheduled caste (Sc) and Scheduled tribe (St) group subjects. The main reasoning behind the significant difference may be due to the existing difference in their antecedents. The general intelligence is mostly innate and inherited and runs through generations. From Table 6.1 and 6.2, it was found that the means of various caste groups differed significantly though the other factors (SES and sub-culture) were statistically controlled. This is because, as per one opinion,
different caste group subjects had already received a separate gene pool from their parents which remains with them during their whole life.

In an extreme case of a caste society (Indian society) each caste has to be seen genetically as a separate gene pool and therefore provided there a random mating within caste and equal fertility between them, the distribution of innate intelligence is stable.

As is known, India is a caste bound society in which marriages are taking place within the caste groups (with some exceptions). This tendency of mating within the group as per one opinion, is likely to produce a gene pool which is defined and constant. This may be one of the reasons that different caste group subjects differ significantly on general intelligence dimension. In this study, Bc and Sc and St group subjects showed low performance on CCFT than Fc group subjects. This may be due to the reason that these subjects (Bc and Sc and St) may have had poor genetic determinants and these genetic determinants may not foster abilities represented in CCFT as much as the genetic determinants of Fc group subjects. Many psychologists do not agree with this
view of gene pools.

As per their opinion, the effect of environment on these subjects should not be denied. The poor and lower caste (Sc or St) groups may not have had the rich environment which may foster abilities represented in CCFT as much as the environment of Fc group. The low performance of these lower caste group subjects on general intelligence dimension that Fc group subjects might perhaps be due to their poor and impoverished environment. Hence, it is felt that the environment of the subjects of various groups may perhaps be more responsible in providing the evidence of significant differences in general intelligence among different caste group subjects.

From the above discussion, it is made to know that both genetic determinants and environmental factors of the subjects operate simultaneously in providing the evidence of significant difference in general intelligence among different caste group subjects.

Raymond B. Cattell (Cattell, 1971: 291) himself has stated that "there exists small but real
difference in mean fluid general ability among various racial groups, sub-groups and racial mixtures". He has accounted these differences by the dominance effects of genetic mechanism.

A similar rationale was expressed by A.H. Alsey (1958) and Burt (1958). The significant difference in general intelligence among various racial group subjects was found in their studies and these differences were accounted for by the genetic determinants of the subjects.

Tyler (1969) made a survey of research studies on general intelligence of negro and whites. She concluded that negroes are lower in measured intelligence than white. She further added that these differences may stem from more fundamentally perceptual defects.

A study of Davidson et al. (1950) whose subjects were Whites and negroes (Matched) showed significant difference on Wechsler-Bellevue Test, with negroes scoring lower on Arithmetic and on all the performance sub-tests. The authors interprets this as a culturally conditioned difference in psycho-motor speed.
Sperrazo and Wilkins (1959) found the same sort of race difference on coloured Raven's Progressive Matrices in a group of 480 school children. Even, after reanalysis of the data, after dividing the group subjects on the basis of socio-economic status, showed that the negroes in all the groups scored lower than the whites on this test.

Shuey (1966) has summarized more than 200 investigations. On both individual and group tests, the average for Negro and White children of all ages from the preschool age onwards and the averages for adults tested during both World wars have consistently been found to differ by 10 to 20 I.Q. points.

A.R. Jensen (1974) in his study used 2612 subjects. Out of which 1,489 were White and 1,123 were Black children enrolled in regular classes of 4th, 5th and 6th grades from all 14 schools of Berkely Unified School Districts of California. In his study, he found racial difference in level I and level II abilities. On an average Whites scored more than Blacks even on level II ability scale which is said to be a best measure of general intelligence and have high general intelligence loading like those of the non-verbal, fluid-intelligence,
culture-fair variety. In most of his studies Jensen has expressed that there exists Negro-White difference in general intelligence.

Thakral (1977) in his study, used Indian children as subjects. These subjects were divided into two groups such as Sc and non-Sc groups. He found significant difference in general intelligence (CCFT) among these two group subjects. He concluded that Sc subjects are lower in measured intelligence than non-Sc subjects. He further added that these differences may stem from their genetic determinants.

The Klineberg (1963) studies furnished some definite evidence as to the effect of improved environment in raising the average test score of a group. Similarly, Lee (1951) obtained convincing evidence of the relationship between I.Qs. and periods of time spent in Northern schools. The Klineberg and Lee research findings showed quite conclusively that Negroes' I.Qs. increased significantly under favourable educational circumstances. Reviews by Dreger and Miller (1960) and by Klineberg (1963) suggested two possible reasons for differences in intelligence between Negroes and Whites. First, there is some
doubt as to whether tests designed for White subjects are altogether adequate measures of Negro intelligence. Second, some developmental influence other than educational and socio-economic handicaps may be having a consistently depressing influence on the mental growth of Negro children.

Some studies conducted in the area have supported the view that the difference in intelligence are due to their existing difference in racial factors as well as genetic factors and some studies supported the view that the environment in which they live is of more importance than other racial factors in bringing any changes in their intelligence.

The results of the present study agree with most of the studies mentioned here and substantiate their findings in many respect.

Cattell Culture Fair Test of Intelligence

In the present study one of the hypotheses to be studied was whether CCFT is really culture fair in Indian Society. To test this hypothesis a sample from Karnataka State was drawn which was a representative
sample. In some of the studies conducted in Gujarat and Rajasthan States, it was found that the CCFT did not prove its culture-fairness as it was claimed by its author. Though the sample drawn for the present study was small, but a representative sample of Karnataka. Hence the interpretations of this study are confined to that sample only.

From Table 6.6, it is found that the performance of various sub-groups (sub-culture, SES and Caste groups) differed significantly on CCFT at 0.01 level of significance. As it has already been discussed in preceding sections, the main reasoning behind the significant differences in the performances of various sub-culture group subjects may be due to their cultural and regional differences. The main reasoning behind the significant difference in the performance of various SES group subjects may be due to the existing difference in their socio-economic environment. The environment here, is meant, all the extraneous factors (physical, social, educational etc.) which contribute total environment. The main reasoning behind the significant difference in the performance of various caste group subjects may be due
to their existing difference in their antecedents and environment. It is established in the study that CCFT tests have a slant toward urban culture and are highly timed tests which mostly favour urban subjects.

From the above discussion, it is understood that the measures of CCFT vary from group to group for one reason or the other. Because of its failure to produce concurrent results on different sub-groups, one can safely conclude that CCFT is not culture-fair to Indian Society (particularly to Karnataka population), as was claimed by Cattell. No doubt, CCFT is highly saturated with 'g', but it cannot claim that it is culture-fair. To some extent it is culture-bound. The interpretation is confined to Karnataka Population from which the sample was drawn for the present study.

In support of this, the findings of the study and discussion held so far, some of the studies conducted in the area and views of eminent reviewers are given below:

K.G. Desai (1981), in his study selected subjects of various sub-cultures from Gujarat State and CCFT was
administered to these subjects. He also found the significant difference in the performance of sub-culture group subjects on CCFT, and it was also proved that CCFT was not so culture fair as it claims. He further added that these variations may perhaps be due to variations in their environment.

Many doubts are expressed by many reviewers regarding the culture fairness of an intelligence test in general. But in particular, it is worth quoting the review of J.E. Milholland and A.J. Jannenbaum.

Milholland (Milholland, cited in Buros, (Ed), 1965: 718-723), in his review doubted the validity of CCFT. As he states "Pictorial tests still involve cultural influence, which performance tests often avoid intelligence in avoiding culture". Milholland is of the opinion that no test can be completely "culture free" or even "culture constant", since the content of any test will tend to favour one or the other culture. While reviewing the test, he states:

A sound rationale, however, is no guarantee of successful execution. No one yet has produced a satisfactory culture-fair test, and the need to see the evidence bearing on the
extent to which Cattell's test meets its goals of providing a test of 'g' that is minimally susceptible to cultural influence. The manuals are worth fully inadequate in meeting this requirement. (cited in Buros; (Ed) 1965: 722).

Another reviewer A.J. Jannenbaum (cited in Buros, (Ed) 1965: 718-723) has reviewed CCFT and questioned the success of this test in eliminating the so called contaminating effects of culture. Similarly, he argues:

At least one can answer that success is partial. Moreover, there is evidence to data revealing a positive correlation between the test scores and socio-economic status in the country (USA).

In essence, then it must be admitted that long pursued goal of demonstrating equality among national and inter-national sub-populations on some measures of general ability has not been reached by this test.

It might be argued that the efforts to eliminate cultural bias in the test is only derivative of an attempt to assess latent potential rather than learned skills. This is after all, a test designed to measure fluid, not crystallised, intelligence and the assumption is that although there may be individual difference in fluid intelligence, group differences are unthinkable except to racist. It should be borne in mind, however, that the concept of fluid intelligence is fixed and its growth predetermined. It assumes that nature and nurture are additive components contributing to human behaviour. Recent commentary
on the subject, however, marshals considera-
ble evidence to suggest that the two ele-
ments (nature and nurture) may be inter-
active instead. A valuable encounter with
environment enriches mental functioning
just as proper nutrients contribute to
physical development. It is quite possi-
ble that heredity and environment affect
each other in setting the growth limits
in both instances. There is even reason
to believe that experimental impoverish-
ment early in life inhibits intellectual
growth regardless of how much compensatory
experience may be supplemented in later
years. It is therefore by no means certain
that any test of talent potential can obtain
a score that is free of culture "contamina-
tion" if the very essence it purports to
measure may itself be so "contaminated"

The emphasis in the test is on the location
of "hidden potential" or "real capacity". If
such exists in the fixed, pure sense as
assumed by the test author, it should be
possible to forecast accomplishment by
combining test data with an analysis of the
learning environment. Or it could have
predictive validity in circumstances where
it is possible to control human experience
and opportunity. This has yet to be tested
until such an evaluation is made, one is
forced to suspend endorsement of the test
and of its underlying theory of fluid
ability.

The experience of psychologists does not encourage one
to consider the Cattell test culture-free either. Eells
observes that:

If by a "culture - free" intelligence test
is meant one in which "intelligence" of a child is somehow measured entirely apart from the impact of any culture-experience of the child, the term is practically a nonsense term...... The very fact of requesting the children to work with material that looks meaningless to them introduces problems of culturally-determined work habits and attitudes.

(Cited in Sarason; 1958: 141)

Similarly Anastasi and Cordora administered the test to Puerto Rican children in Harlem and concluded:

No test can be completely "culture-free" or even "culture constant", since the content of any test will tend to favour one or another culture. The elimination of specific culturally limited information from a test is only a partial and superficial solution. Each culture stimulates the development of certain abilities and interests, and inhibits others. The resulting psychological differences will inevitably be reflected in test performance, as in any other behaviour of individuals reared in diverse cultural settings. In the Cattell test, for example, the items consist almost exclusively of abstract geometric forms and patterns; and the test is of course, of paper and pencil variety.

(Cited in Sarason; 1958: 141)

Sarason and Gladwin (1958: 140-142), after reviewing the culture free test, did not agree with the premise implied by its name that it is free of cultural
bias and concluded:

The Cattell test, then, is simply not culture free. It has been standardized against other widely-used intelligence tests in our own culture and could therefore presumably be used as a substitute for them in our culture, but this would have to be viewed as a convenience, not an improvement. We have no basis whatever for believing that this test is any more fair for a substantially retarded child than is any other.

From the above discussion and the argument cited by reviewers one could understand the stability of the Cattell test. In view of the above discussion and analysis of data of the present study, it was found that CCFT is not culture-fair to Indian Society, particularly to Karnataka population.

In concluding the discussion, as a general remark, the researcher is of the opinion that the growth and development of general intelligence is resulted due to the interaction of both heredity and environment; and CCFT has yet to establish its validity in different cultures to prove its validity in all cultures. It has also been believed by A.H. Halsey (1958), A.K. Kidd (1962), Vernon C. Hall and D.B. Kaye (1977), James J. Hannessy and P.R. Merrifield (1976) and R.B. Cattell (1971) that...
heredity effects are much more than the environmental effects. In most of these studies, it was found that the effect of heredity in an appreciable amount on general intelligence than effects of environment. K.G. Desai (1981), in his study emphasizes the environmental effects more than the effects of heredity in producing significant difference in general intelligence among different sub-culture groups subjects.