



Defrauding Cyril Burt: A reanalysis of the social mobility data



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ABSTRACT

In the last comprehensive review by Mackintosh et al. *Cyril Burt, Fraud or Framed?* (London: Oxford University Press, 1995) of the fraud charges posthumously leveled against the once eminent psychologist Sir Cyril Burt, Mackintosh and Mascie-Taylor asserted that statistical anomalies they detected in his social mobility data of 1961 provided crucial evidence of guilt. The anomalies included apparent departures from normality in some parts of the data, incommensurate cell totals, and suspicious uniformity within IQ bands across fathers and sons. It is shown here that the departures from normality were a natural consequence of unavoidable rounding when inverting the cumulative normal distribution to construct the class IQ bands used in the tables. Elementary procedures are given, known since at least the 1930s, which could have been used by Burt to simultaneously preserve both the normality of his IQ data and the desired population proportions of occupational classes. Other anomalies first noticed by the statistician Donald Rubin are explainable as artifacts produced by fixing marginal totals in the presence of rounding to IQ scores, then using the same weighting procedures to conform to margins. The grounds given by Mackintosh and Mascie-Taylor for finding fraud in Burt's social mobility data are therefore dismissed.

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In 1961 Cyril Burt published a paper arguing that social mobility was a predictable consequence of mismatches between cognitive ability and the intellectual demands of occupations, and of parental intelligence regressing to the mean among descendants in the presence of a stable class structure (Burt, 1961). He provided an illustrative example of this effect drawn from his earlier work when he was employed by the London County Council as its official psychologist. The paper and its data caused no stir at the time it was published.

Charges that Burt's social mobility data were "suspiciously perfect" were first made by the psychologist Michael McAskie in concert with his colleagues at the University of Hull, Clarke and Clarke (1974).¹ Soon after, they amplified these claims,

moving rapidly from vague trouble that they reported in determining how the data was collected and treated from Burt's references (Clarke & McAskie, 1976), to outright charges in *The Times* of definite fraud (Clarke, Clarke, & McAskie, 1976). Burt's biographer Leslie Hearnshaw (1979) endorsed most of these charges, relying chiefly on an unpublished analysis by McAskie.² In the meantime, the psychologist Dorfman (1978) had proclaimed in a lead article in *Science* that his own extensive statistical analysis of Burt's social mobility had "shown, beyond reasonable doubt" that Burt "fabricated data on IQ and social class".

Dorfman's charges were immediately rebutted, notably by Burt's pupil Banks (1979), followed by two prominent

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¹ The charges first appeared under the authorship of the Clarks, but as they acknowledged, they really owed them to McAskie. The original charges are dealt with in detail at the end of this analysis.

² Although this analysis was referenced by Hearnshaw as "awaiting publication" it was apparently never published, and cannot be traced. Exhaustive searches of McAskie's entire published output turned up empty. His output appears to consist of just four items, three of which concerned Burt directly and one indirectly. Joynton (1989) also reported that repeated requests to McAskie for a copy of the analysis met with no response (p. 199).

statisticians, Stigler (1979) and Rubin (1979), at first separately and then jointly (Rubin & Stigler, 1979). They argued that Dorfman's statistical methods were flawed and misinformed. As the "Burt Affair" erupted in the late seventies, the social mobility charges receded into the background, overshadowed by allegations about Burt's twin data, his IQ trend data, his apparently missing research assistants, and a host of supposed psychological defects, autobiographical quirks and economies with the truth that his biographer Hearnshaw claimed to detect. Exhaustively detailed accounts of the broader "Burt Affair" are given by Joynson (1989) and Fletcher (1991), followed up by the group presided over by Mackintosh (1995). Only the claims about the social mobility data will be considered here, for the rest the reader is referred to those sources.

In their detailed re-examinations of the Burt Affair, Joynson and Fletcher both deferred to Stigler and Rubin's rebuttals of Dorfman's analysis. Subsequently, when the broader Burt case was re-opened by Mackintosh and panel, it was indeed found that most of the *original* charges against Burt could not be sustained beyond reasonable doubt: "... the most suspicious feature of Burt's later claims and papers are usually *not* those actually identified by his initial critics" (Mackintosh, 1995, p. 147). As a result, the social mobility data rose again in importance. In the split verdict that emerged from the book, both of the contributors who found unambiguously against Burt, Mascie-Taylor and Mackintosh himself, cited the social mobility data as problematic enough to convince them that Burt was guilty. These were not the only grounds cited by Mackintosh — he also cited the failure of Burt to identify the secular increase in IQ scores now known as the "Flynn Effect", a charge we will not consider here — but they formed a key component of his anti-Burt findings. Mascie-Taylor was *only* concerned with the social mobility data in his contribution. Therefore it is worthwhile to re-examine the data and weigh the evidence and arguments produced, which were in the end *not* precisely those made by Dorfman.

The main argument used by Mascie Taylor and Mackintosh, which we will return to in full later, took the following schematic form:

1. The data presented could not have been normalized, and so must be treated as raw empirical data.
2. The data contained cryptic departures from normality and other peculiar anomalies and mysterious regularities revealed only by computation and comparison.
3. Therefore, the data was fabricated since at the very least the departures from normality would not be expected.

The methods used attempt, in essence, to assess how plausible it is that the data just happens to exhibit regularity of various kinds and irregularity of other kinds. Although Dorfman had originally argued that the IQ data was "too normal" overall, Mascie-Taylor did not accept that argument, since he believed that the conclusion depended on the sample size, which was not stated by Burt. The cryptic departures from normality and other anomalies mentioned above were actually first noticed in passing by Donald Rubin, who described them only as "suspicious" (Rubin, 1979), but they are made to work much harder here. Mackintosh himself placed great emphasis on the above anomalies: "The critical problem with these IQ

data is not their perfect normality ... it is the departures from normality ... those departures are not random, but show every sign of fabrication" (Mackintosh, 1995, p. 147). He speculated that Burt gave the game away by pushing assessments of intelligence in directions that suited him: "assessments were 'adjusted', i.e. moved from one side of a borderline to another, to give the answers he wanted" (Mackintosh, 1995, p. 146). The appealing feature implicit in this argument is that the resulting departures from normality are not immediately obvious and therefore we would not have to add stupidity to the fraud charges. Mackintosh sternly warned that "no trust can be placed in data such as these obtained by someone who knows in advance what results he wants" and that "I do not believe it possible to draw ... a hard and fast distinction between adjustment and fabrication of data" (Mackintosh, 1995, p. 147). As we shall see, arguments that depend critically on the idea that the data was not transformed, that it just happens to exhibit both regularity and irregularity, are entirely mistaken.

Before examining these arguments for fraud in more detail it is useful to first understand the role that the data in question played in Burt's paper, as this throws a great deal of light on his methods and possible motives. Burt's claims for the data turn out to be surprisingly modest. In response to an ongoing debate that he had been conducting with some sociologists, Floud and Halsey, about the influences of hereditary factors on occupational social mobility, he undertook to show how regression of intelligence to the mean across generations, in the presence of a stable cognitive class structure, necessarily implies substantial social mobility between cognitive classes. These classes defined by Burt are not the usual socio-economic status (SES) classes, but are based instead on the intellectual demands of the occupation, which is how he preferred to think of the problem. The generational social mobility that Burt derived would, he asserted, be over and above the redistribution caused by an imperfect match between intelligence and class *within* a generation. His main concern was to show how substantial this mobility would be, since his opponents had doubted the magnitude and importance of the effect. To reinforce his point, Burt offered an illustrative example using data he had collected from 1913 onwards when conducting investigations as the official psychologist of the London County Council (L.C.C.), the product of "cross-sectional surveys of pupils in London schools, initiated primarily for the purposes of educational or vocational guidance and selection" (Burt, 1961, pp. 3–4). This is the first of two data sets in the paper, the second being a longitudinal study with "subsequent inquiries ... carried out at intervals over a period of nearly fifty years ... from 1913 onwards" (Burt, 1961, pp. 3–4) which has not played any role in the fraud charges against Burt and will not be considered here.

Burt's demonstration of mobility induced by IQ-to-class mismatching and regression to the mean depends on some additional facts which he explicitly lists and takes as agreed upon by all. Those relevant to our purposes are extracted below (Burt, 1961, pp. 4–5):

1. "During the period covered by our inquiries the population, from which our samples are drawn, and to which we intend our conclusions to apply, greatly increased in numbers".

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