The best approach is to directly test the observed sex load of 0.159 for significance. I did this, and found that the male lead in *g* is highly significant ($N = 1{,}369$; $p < 0.000$; Fisher $z = 0.160361$). This is all the more remarkable as the Colom *et al.* study operates with an excellent and probably entirely uncontaminated Schmid-Leiman transformed *g* identified in a representative sample.

Thus, rather than showing null sex differences, the overall conclusion of this methodologically sober study is that males significantly excel females in general intelligence *g*. The study gets one point for a representative sample, two points for using many and varied tests, one for a hierarchical factor analysis, and one for the Schmid-Leiman transformation. The earned total of five points indicates that the outcome of this study requires serious attention. I will take the last point for significance testing!

4.2.10. The Nyborg (2003) study. A final study — "Sex related differences in general intelligence, *g*, and group factors: A representative hierarchical orthogonal Schmid-Leiman type factor analysis" — found no sex difference in *g* before age 14, but identified a significant sex difference in the adult group of 52 males and females (as reported in Nyborg, 2001).

This is arguably the most carefully sampled study of those reviewed so far (Nyborg, unpublished data). The selection procedure began with a computer search in the late 1970s in the Danish Folkeregister for every twentieth child that was either 8, 10, 12, 14 or 16 years old, either a boy or a girl, and attending a school either in the countryside, in a suburb or in a larger city. Information about the socio-economic status of the parents, defined by father's occupational status, was also collected and categorized at five levels. If the twentieth child, or the parents, refused participation in the scheduled 20 years cohort-sequential study, the twenty-first (or in two cases the twenty-third) child on the computer list was invited. No particular pattern of reasons to refuse participation could be spotted in retrospect. Five preliminary age categories were established on basis of the results from this preliminary search protocol. The groups consisted of 8, 10, 12, 14 and 16+ year olds, respectively. When about 50% of the children were tested and filed, the distribution of all socio-economic and personal characteristics of the children were inspected for each group. The categories were then filled up with additional children, so that each age category finally mustered a total of 15 boys and 15 girls. During the fill-up process, great care was taken to ensure that each and all categories ended up being representative with respect to the general Danish socio-economic population distribution while also conforming to the nationwide proportional representation of rural, suburban and city residency. Data on children participating in the cross-sectional parts of the study were included in the present analysis, as were data on children participating in the longitudinal part of the study, but who had been examined only once. The particular selection procedure resulted in a total of 376 children and adults, with an identical number of girls and boys in each category.

All subjects were exposed to a large and varied battery of 20 or 21 ability tests (20 for the pooled 8 to 14 year-old-group, and 21 for the 16+ year-old group, with one subtest, Coding, making up the difference). The substantial number of highly varied tests permitted application of a hierarchical oblique factor analysis, which was supplemented with the Schmid-Leiman transformation. The factor structure coefficients

for boys and girls were close to unity. A second order factor *g* and seven first-order factors were derived. Point-biserial correlations were computed, fitted into the inter-test correlation matrices, and factored in order to inspect the loading of sex on *g*, and tested for significance. The study also included a correlated vector analysis for Jensen effect, in addition to a traditional d effect analysis.

Point of departure for the analysis was a test of Lynn's prediction of a moderate but significant sex difference in *g*. The prediction could not be supported for the pooled 8 to 14-year-old children's sample, but the results of the adult sample actually confirmed the hypothesis. Thus, the point-biserial loading of sex on *g* was thus only 0.009 in children (ns), but reached 0.272 in the adult hierarchical orthogonal *g* factor analysis, which is significant (one-tailed $p=0.026$) despite the very low $N=52$. A correlated vector calculation reached significance neither for the children nor for the adult group, also as expected. Children's average sex difference d effect size was 0.18 or 2.62 IQ points, and the corresponding adult values were 0.26 or 3.94 IQ points, with positive signs indicating a male advantage in intelligence in general. The adult raw sex difference in *g* was 0.37 SD or 5.55 IQ points.

The study earns one point for being representative, and two for operating with a large battery of highly varied tests that allows for an adequate operational definition of *g*. It earns three points for factoring in the point-biserial correlations, for taking the hierarchical factor approach, for optimal orthogonalization through the Schmid-Leiman transformation, and for testing the loadings for significance. In other words, all likely precautions were taken against the likelihood of *g*-contamination in this study, due to the carefully chosen sample, the particular analytic approach, and the presence of a rich, varied and highly *g*-loaded test battery. The maximum of six points earned means that we can ascribe at least the same degree of confidence to the conclusions of this study as we did to the Colom *et al.* (2002) study.

This concludes the selective review of studies. Studies earning less than five points on the quality scale may either find a female advantage, a male advantage, or no sex difference in *g*, but none of these can be trusted due to the risk of contamination. Only two recent studies obtain five or six points, and both studies identify a significant adult advantage in *g*.

5. Discussion

This chapter specifically addressed the problem why sex difference research on *g* has been plagued for so long by analytic inconsistency and incompatible findings, and thus has provided little guidance for a scientifically based opinion whether there is in fact a sex difference in general intelligence which could explain, at least in part, the obvious sex-differentiated achievement in education, jobs, and societal power structures, as well as the repeated observation of an average male advantage in brain sizes.

The strategy chosen was to take point of departure in the analytic and empirical disagreement among two of the most prominent combatants in the field. On the one side, there is Lynn (1994, 1999) who uses the sum standardized scores, and finds an average significant male superiority in general intelligence, and uses the on average larger male

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