Available online at www.sciencedirect.com
ScienceDirect
Intelligence 35 (2007) 515–516
INTELLIGENCE

Book Review

What is intelligence? Beyond the Flynn Effect, J.R. Flynn, Cambridge University Press, (2007)

A warm welcome must be extended to this book in which the author discusses the issues raised by the Flynn Effect. There are two major problems. First, what are the factors responsible for the increase of intelligence that has been observed in a number of countries during the last 80 years or so? Second, why has this increase been so much greater in reasoning ability/fluid intelligence, as measured by the Wechsler similarities and non-verbal tests where it has averaged around 3.6 IQ points a decade, and the Progressive Matrices, where in some samples it has averaged around 7 IQ points a decade, than in tests that measure acquired knowledge/crystallized intelligence (vocabulary, information and arithmetic), where it has averaged only around 0.5 IQ points a decade.

Flynn's answer to the problem of the cause of the Flynn Effect is that increases in education have led the people thinking more scientifically and logically ("science has engendered a sea change … formal education played a proximate role"). He uses Piaget's concepts of concrete and formal thought processes to explicate this. Previous generations were as good as later generations at concrete thinking, but more recent generations have advanced to the formal stage where they analyse problems in terms of abstract concepts. But he does not mention that this theory has been disconfirmed by Fleiller, Jautz, and Kop (1989) who demonstrated that concrete thinking has improved at the same rate as formal thinking.

Flynn is by no means the first to attribute the Flynn Effect to improvements in education. Many others have done the same, including several of the early observers of the Flynn Effect such as Cattell (1973, p. 275): "the intergenerational changes … probably represent the unquestionably marked improvement in schooling".

The theory that improvements in education can explain the Flynn Effect encounters two problems. The first is that the cognitive abilities that are learned in schools (arithmetic, information, vocabulary, and math, science and reading tested in the American NAEP) have shown very little increase; it is the cognitive skills that are not learned in schools that have shown the large increases. This is the opposite of what would be expected if better or more education has enhanced cognitive abilities. A second problem is that the Flynn Effect has been found in 4–6 year olds who have had very little education, and even in infants (e.g. Hanson, Smith, & Hume, 1985). This suggests that an important contributor to the Effect lies in improvements in pre-natal and early post-natal nutrition, as argued in detail in Lynn (1990, 1998). It may be, however, that some of the large gains in fluid intelligence found in military conscripts are attributable to later cohorts having had more education than earlier.

Flynn attempts to refute the nutrition theory of the Flynn Effect by asserting that there is no evidence that nutrition has improved in the second half of the twentieth century. He asserts that there have been no increases in height (improvements in nutrition are indexed by increases in height) in the United States in children born after about 1952, although intelligence has continued to increase. Contrary to this contention (1) the data compiled by Komlos and Lauderdale (in press) show that height in the United States increased in those born from 1955 to 1975 (white men from 177.8 to 179.5; white women from 164.1 to 164.9); (2) height stabilised after 1975 and Flynn's own data show that intelligence gains decelerated after 1985 and turned negative in children from 1989 to 1995. In Europe also heights increased from 1960 to 1990 (Larnkjaer, Schroder et al., 2006); from around 1990 heights and intelligence have both stabilized in Denmark and Norway. The case for improvements in height running parallel with increases in intelligence, as predicted by the nutrition theory, is much stronger that Flynn allows.

Furthermore, the nutrition theory of the Flynn Effect explains why fluid intelligence has increased so much more than crystallized intelligence. Several studies have shown that sub-optimal nutrition impairs fluid intelligence more than crystallized intelligence. Hence as nutrition has improved over time, fluid intelligence has increased more. It has even been shown that the Wechsler

doi:10.1016/j.intell.2007.03.003

subtests that are most impaired by sub-optimal nutrition and improve most with nutritional supplements are those for which the Flynn Effects have been the greatest (e.g. arithmetic, similarities and block design) (Botez, Botez, & Maag, 1984).

Flynn proposes that the effect of better education on the increase in intelligence is enhanced by the "individual multiplier" and the "social multiplier". The concept of the "individual multiplier" is that the intelligent have a thirst for cognitive stimulation and this increases their intelligence. This again encounters the problem that the Flynn Effect is present in infants. The "social multiplier" posits "that other people are the most important feature of our cognitive development and that the mean IQ of our social environs is a potent influence on our own IQ". If this were so, the IQs of adopted children should be associated with the IQs of their adoptive parents, and there should also be a strong correlation between the IQs of unrelated children reared in the same adoptive families. Both these predictions have been disconfirmed. Scarr and Weinberg's (1978) study found that the correlation between the IQs of adopted children aged 18 and the IQs of their adoptive parents was .14 (i.e. zero), while the correlation between the IQs of unrelated children reared in the same adoptive families was −.03. The effectively zero correlation between the IQs of unrelated children reared in the same adoptive families has been confirmed in a study of 52 pairs aged 13 (r=−.16) (Plomin, 1986, p. 237).

Although I have not been persuaded by Flynn's arguments on the causes of the Flynn Effect, and I could not find an answer to the question "What is Intelligence?" beyond what is already widely accepted, I found his book to contain many interesting ideas and observations and I recommend it in the confident expectation that many potential readers will find the same.

References

Botez, M. I., Botez, T., & Maag, U. (1984). The Wechsler subtests in mind organic brain damage associated with folate deficiency. *Psychological Medicine*, *14*, 431−437.

Cattell, R. B. (1973). *Abilities: Their structure, growth and action.* Boston: Houghton Mifflin.

Fleiller, A., Jautz, M., & Kop, J. -L. (1989). Les reponses au test mosaique a quarante ans d'intervalle. *Enfance*, *42*, 7−22.

Hanson, R., Smith, J. A., & Hume, W. (1985). Achievements of infants on items of the Griffiths scales: 1980 compared with 1950. *Child: Care, Health and Development*, *11*, 91−104.

Komlos, J. and Lauderdale, B. E. (in press). The mysterious trend in American heights in the 20 century. Annals of Human Biology.

Larnkjaer, A., Schroder, S. A., et al. (2006). Secular change in adult stature has come to a halt in northern Europe and Italy. *Acta Paediatrica*, *95*, 754−755.

Lynn, R. (1990). The role of nutrition in secular increases of intelligence. *Personality and Individual Differences*, *11*, 273−285.

Lynn, R. (1998). In support of the nutrition theory. In U. Neisser (Ed.), *The rising curve: Long term gains in IQ and related matters* Washington, D.C.: American Psychological Association.

Plomin, R. (1986). *Development, Genetics and Psychology.* Hillsdale, New Jersey: Lawrence Erlbaum.

Scarr, S., & Weinberg, R. A. (1978). The influence of family background on intellectual attainment. *American Sociological Review*, *43*, 674−692.

Richard Lynn
4 Longwood House, Bristol BS8 3TL, UK
E-mail address: Lynnr540@aol.com.

2 March 2007