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The Flynn effect in Korea: Large gains ☆

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ABSTRACT

Secular gains in IQ test scores have been reported for many Western countries. This is the first study of secular IQ gains in South Korea, using various datasets. The first question is what the size of the Flynn effect in South Korea is. The gains per decade are 7.7 points for persons born between 1970 and 1990. These gains on broad intelligence batteries are much larger than the gains in Western countries of about 3 IQ points per decade. The second question is whether the Korean IQ gains are comparable to the Japanese IQ gains with a lag of a few decades. The gains in Japan of 7.7 IQ points per decade for those born approximately 1940–1965 are identical to the gains per decade for Koreans born 1970–1990. The third question is whether the Korean gains in height and education lag a few decades behind the Japanese gains. The Koreans reach the educational levels the Japanese reached 25–30 years before, and the gains in height for Koreans born 1970–1990 are very similar to gains in height for Japanese born 1940–1960, so three decades earlier. These findings combined strongly support the hypothesis of similar developmental patterns in the two countries.

1. Introduction

1.1. The secular increase in average IQ test scores

Western, industrialized countries showed average gains on standard broad-spectrum IQ tests of 3 IQ points per decade between 1930 and 1990. Verbal tests showed gains of 2 IQ points per decade, and non-verbal (fluid and visual) tests showed gains of 4 IQ points per decade. Gains on specific measures, such as the Raven's Progressive Matrices when used for the assessment of military recruits averaged about 7 IQ points per decade.

Recently, however, studies from Denmark and Norway show the secular gains have stopped in Scandinavia and even suggest a decline of IQ scores (Shayer, Ginsburg, & Coe, 2007; Sundet, Barlaug, & Torjussen, 2004; Teasdale & Owen, 2007). However, an important part of the decline in IQ scores is most likely due to the increase of low-*g* immigrants (see te Nijenhuis, de Jong, Evers, & van der Flier, 2004). In a recent paper Lynn has shown that fluid intelligence measured by the Progressive Matrices has increased in Britain over the years 1979–2008 among 7–12 year olds, but not among 13–15 year olds, and that vocabulary has shown no increase in Britain over the years 1982–2007 among 5–11 year olds (Lynn, 2009a). There is also recent evidence of IQ test scores continuing to rise in countries in the former communist Eastern Europe (e.g. in Estonia, see Must, te Nijenhuis, Must, & van Vianen, 2009), in less-developed parts of the world, for example in Sudan (Khaleefa, Abdelwahid, Abdulradi, & Lynn, 2008), Kenya (Daley, Whaley, Sigman, Espinosa, & Neumann, 2003), and in the Caribbean (Meisenberg, Lawless, Lambert, & Newton, 2006).

Various causes have been hypothesized for the Flynn effect. Chief among them are improved nutrition and health care and education (see Lynn, 1990; see Jensen, 1998). Some theorists argue that the Flynn effect is a byproduct of outbreeding, testing artefacts, test sophistication, cultural changes, and decreasing family size.

1.2. Lynn's contribution to the area

The so-called Flynn effect was identified by Richard Lynn (1982) two years before Flynn (1984) identified the same phenomenon in the United States. Lynn's (1982) paper showed that intelligence had increased in Japan from the 1930s up to the 1970s. In 1987 he published a further paper documenting the increase in Britain during the half century 1936–1986 (Lynn, Hampson, & Mullineaux, 1987), which was followed by Flynn (1987) showing the same increase had taken place in a number of countries. Lynn and Pagliari (1994) documented gains in the US. However, although Lynn was

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certainly ahead of Flynn in identifying the increase of intelligence that occurred in many countries in the twentieth century, he was by no means the first to show this. The first major study to identify the Flynn effect was published some forty years earlier by Tuddenham (1948), who showed that the intelligence of American conscripts had increased by 4.4 IQ points a decade from 1917 to 1943. A year later an increase of intelligence was reported in Scotland over the years 1932–1949 (Scottish Council for Research in Education, 1949). In view of these early studies, the secular increase of intelligence arguably should properly have been called the "Tuddenham effect". Many studies on secular gains have developed from Lynn's pioneering work.

Lynn has published a number of further seminal papers on score gains. His principal contributions have been to document the effect and to argue that the principal factor responsible for the effect has been improvements in nutrition (Lynn, 1990, 1998, 2009b). In the last of these he showed that the FE of approximately 3 IQ points a decade has taken place in the developmental quotients of one and two year olds. He argues that this favors the nutrition theory and makes less plausible the alternative explanations of the Flynn effect that it is due to improvements in education, advanced by Flynn (2007). However, it could also be argued that this is explained by the trend towards turning infancy into a frantic learning experience.

Lynn and Hampson (1986) review five studies providing evidence on the secular trend of intelligence in Japan for the post World War II period. They conclude that two studies of the early post World War II period show substantial IQ gains of 9.9 and 11.4 IQ points per decade, giving an average of 10.7 IQ points per decade. Three studies of a longer period from approximately 1950–1975 – so for those approximately born 1940–1965 – show lower gains of 9.1, 8.3, and 5.7 IQ points per decade, giving an average gain of 7.7 IQ points per decade. This is the highest gain on a broad intelligence battery in the literature. Since the early part of this period was characterized by a greater rate of gain, it appears that since around 1960 the IQ gains in Japan have decelerated to approximately 5 IQ points per decade. However, there are, to this date, no studies of the Flynn effect in Korea. The present paper fills this important gap in the literature.

1.3. History of Korea

The Korean peninsula has a long integrated history with China and Japan. Korea was annexed by Japan in 1910 and subjugated economically, religiously, culturally, socially, and politically resulting in mass exodus. After independence in 1945, Russian forces and American forces entered Korea in an attempt to defeat Japan. The drawing up of what was originally a temporary demarcation line between North and South Korea would eventually lead to Korea's most troubled period in history. In 1948 the South was declared a Republic with the North following suit shortly thereafter proclaiming a Democratic People's Republic of Korea. South Korea's growth and development stand in marked contrast to the North. In South Korea's per capita GNI (2007) is $20,045 in comparison to North Korea for whom the figure is $1108 (2006). (US Department of State: Bureau of East Asian and Pacific Affairs, 2008).

The Republic of Korea's education system follows a similar general pattern as to that found in typical western countries with compulsory elementary schooling with a 100% enrollment figure (http://www.korea.net). Teacher-student ratios have declined since the 1960–1970s from high ratios to figures more in keeping with western countries. Table 1 details the education level of the population above the age of 25 from 1970–2005 and Table 2 details the enrolment figures from 1945–2002.

The increase in the South Korean national educational level in just over 30 years is quite dramatic as the data shows that between 1970 and 2002 the number of students in higher education increased with a factor 18, another indication of the spectacular increase in education.

Table 1
South Korea: Education level of the population above the age of 25.

Year	Elementary school or below elementary school (%)	Middle school(%)	High school(%)	University or above university(%)	Total(%)
1970	73.4	11.5	10.2	4.9	100
1975	65.5	14.8	13.9	5.8	100
1980	55.3	18.1	18.9	7.7	100
1985	43.4	20.5	25.9	10.2	100
1990	33.4	19.0	33.5	14.1	100
1995	26.6	15.7	38.0	19.7	100
2000	23.0	13.3	39.4	24.3	100
2005	19.1	11.2	38.3	31.4	100

Table 2
Enrollment in Higher Education in South Korea and Japan 1945–2002.

Year	**Korean** students in higher education as a percentage of the total population	**Japanese** students in higher education as a percentage of the total population
1945	0.034	–
1950	0.056	1.23
1960	0.404	2.9
1965	0.486	4.43
1970	0.62	7.18
1975	0.98	8.29
1980	1.69	8.03
1985	3.55	7.99
1990	3.89	9.9
1995	5.19	12.79
2000	7.11	14.2
2002	7.5	14.55

The height of a population is a good indicator of its health and the data in Tables 3 and 4 show spectacular gains in height. Table 3 illustrates how 17-year-olds in 2005 measured 167.3 cm whereas in 1965 they measured 160.3 cm.

Taking an *SD* of 5 cm (Korean Educational Development Institute., 1966–2006), this is almost a one-and-a-half *SD* increase in height in 40 years. Looking at 17-year-olds may not give the best impression, because boys stop growing around age 18, whereas girls stop growing around age 15 (Lynn, 1994). Again taking an *SD* of 5, 13-year-olds show a gain of 15.2 cm, which is the equivalent of 3 *SD*s, and 14-year-olds show a very similar gain of 15.1 cm. The greatest increases occurred for the 11-year-old age group with a gain of 18.1 cm. A gain in height of 3 *SD* in just 40 years is spectacular.

Chief among the various hypothesized causes of the Flynn effect are improved nutrition and health care and education (Jensen, 1998). As there are such large gains in height and education it is expected there are also large gains in IQ scores.

1.4. Same patterns of development in Korea and Japan?

Lynn and Hampson (1986) report a 7.7 IQ point gain per decade for Japanese born approximately 1940–1965; this estimate is based on a number of studies and therefore quite reliable. Various studies show large gains in height and years of education for the Japanese; these gains happened at the same time as the gains in IQ.

Korea changed dramatically after the Korean war ended in 1953, just as Japan had shown a dramatic change several decades before. From poor countries they both quickly developed to rich countries. It may be that the development of Japan and Korea in the 20th century shows the same patterns in gains in height,