A negative Flynn effect in Finland, 1997–2009

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ABSTRACT

The average IQs of approximately 25,000 18–20 year old male military conscripts in Finland per year are reported for the years 1988 to 2009. The results showed increases in the scores on tests of Shapes, Number and Words over the years 1988 to 1997 averaging 4.0 IQ points a decade. From 1997 to 2009 there were declines in all three tests averaging 2.0 IQ points a decade.

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1. Introduction

Numerous studies have shown that performance on IQ tests of around 3 to 5 IQ points per decade has improved during much of the twentieth century (Flynn, 1984, 1987, 2012; Lynn, 2013). From the mid-1990s these increases went into reverse in Norway, Denmark, Australia, Britain, the Netherlands and Sweden. These negative Flynn effects are summarized in Table 1. In Denmark, Borge Priene's Prove is the average of tests of letter matrices, verbal analogies, number series and geometric figures. In Norway, the General Ability test is a combination of arithmetic, word meaning and figures (resembling the Progressive Matrices). In Sweden, the General Ability test is a combination of instructions (verbal comprehension), synonyms, metal folding (spatial ability), and technical comprehension. In the Netherlands, the GATB is the Dutch version of the General Aptitude Test Battery. Contrary to these declines, IQs have continued to increase in Estonia (Must, te Nijenhuis, Must, & van Vianen, 2009) and for vocabulary and non-verbal reasoning ability measured by the progressive Matrices from 1979 to 2008 for children aged 5 to 12 years, although there was no increase in the IQs of older children aged 13–15 (Lynn, 2009). In the present paper we present data showing a decline in the average IQs of military conscripts in Finland over the years 1997–2009.

2. Method

In Finland, military service ('maanpuolustusvelvollisuus') of at least six months is compulsory for every able young man aged 18 years or over. They can defer the service if they have sound reason to do so but they can only postpone it until they are 28. Conscripts are paid a modest salary, which varies according to their rank. Around 88% of the eligible Finnish male population underwent military service every year in the years between 1988 and 2001 (Koivunen, 2007). The remaining 12% have been rejected or excused for various reasons. Around 5% have been rejected on grounds of poor health (Appelqvist-Schmidlechner, Upanne, Henriksson, Parkkola, & Stengård, 2010). 3% of those who do not undertake military service opt for 'civil service' (siviilipalvelus) (which lasts 362 days) on the grounds that they are conscientious objectors or have religious objections. However, in some cases they began military service and dropped out. In 2007, 15% of conscripts failed to complete their military service and 12% dropped out in the first two weeks (prior to the administration of any IQ test) with the remainder dropping out towards the end of the service period (Helsingin Sanomat, 08/10/06). According to a representative of the Finnish civil service organization (pers. comm. 4/03/13),

Table 1
IQ declines in six countries.

Country	Age	Test	Years	IQ decline	IQ decline per decade	Reference
Norway	18–19	General ability	1996–2002	0.23	0.38	Sundet, Barlaug, and Torjussen (2004)
Australia	6–11	CPM	1975–2003	3.00	1.07	Cotton et al. (2005)
Denmark	18–19	Borge Priene's Prove	1998–2003/4	1.50	2.70	Teasdale and Owen (2008)
Britain	11–12	Piagetian	1975–2003	12.00	4.30	Shayer and Ginsburg (2007)
Britain	13–14	Piagetian	1976–2006	7.50	2.50	Shayer and Ginsburg (2009)
Sweden	18–19	General ability	1992–1993	0.026	0.26	Ronnlund, Carlstedt, Blomstedt, Nilsson, and Weinehall (2013)
Netherlands	Various	GATB	1975–2005	10.05	1.35	Woodley and Meisenberg (2013)

this has meant that, overall, 7% of each year group undergoes civil service work with around 3% initially opting for it, and this has been stable since the 1980s. Refusal to pursue either form of service leads to 182 days in prison (this being the minimum length of military service) with no parole. Practicing Jehovah's Witnesses are exempted from military and civil service.

Since 1955, an intelligence test developed by the Finnish Army and called the *Peruskoe* (literally 'Basic Test') has been administered to all Finnish conscripts in their third and again in their sixth week of military service. Since 1981 this test has been designated *Peruskoe-1* (P1). The test is composed of three sub-tests: Shapes (*kuviotesti*), a non-verbal test resembling the Progressive Matrices, Number (*numerotesti*) and Words (*sanatesti*). In terms of Carroll's (1993, p.626) taxonomy of eight major second order (stratum 2) factors, Shapes (*kuviotesti*) is a non-verbal test resembling the Progressive Matrices and is a measure of Carroll's stratum 2 F Fluid Intelligence. Number is measures of Carroll's 2 F Fluid Intelligence and stratum 1 Quantitative Reasoning. Words (*sanatesti*) is a measure of Carroll's stratum 2C Crystallized Intelligence and stratum 1 Verbal Language Comprehension. There are 40 multiple-choice questions in each sub-test, ordered in increasing difficulty. The army uses the results to decide, in part, who should be selected for Non-Commissioned Officer School and who should begin training at Reserve Officer School.

The Finnish Army has declassified P1 test results obtained between 1988 and 2001 and has released these and the results for 2009 to the authors. These contain data for 382,022 Finnish conscripts for 1988 through 2001, and for a further 25,144 recruits for 2009, giving a total sample of 407,166. The recruits took P1 when they were aged either 19 or 20 and were born between 1968 and 1982.

3. Results

The average raw scores for each year from 1988 to 2001 and in 2009 on the P1 tests are given in Table 2. The time series showing the increases and declines in scores in *ds* (sd units) are shown in Fig. 1. It will be seen that scores on Shapes increased over the time period from 1988 to 1997, followed by a small decline. Scores on Words and Number show a rise to 1996/1997 and then fall far more sharply. Because of the very large sample sizes of approximately 25,000 in each year, all of these differences are statistically significant.

4. Discussion

The results show three points of interest. First, IQs measured by tests of Shapes, Number and Words increased in Finland over the years 1988 to 1997, showing the Flynn effects that have been reported in numerous studies. The largest increase took place in the Shapes test ($.46d = 6.9$ conventional IQ points), and smaller increases took place in the Number and Words tests ($.22d = 3.3$ and $.12d = 1.8$ conventional IQ points, respectively). The larger increase in the non-verbal Shapes test than in the Number and Words tests is consistent with results in numerous previous studies (Flynn, 1984, 1987, 2012; Lynn, 2013). The average of the increases from 1988 to 1997 in the three tests is 4.0 IQ points per decade and therefore about the same as that reported for military conscripts in a number of previous studies (Flynn, 1987, 2012).

Second, the results show a decline of IQs in Finland for the years 1997–2009. This confirms the studies noted in the introduction showing that average IQs declined from the mid-1990s in Norway, Denmark, Australia, Britain, Sweden and the Netherlands. The largest declines in the present study took place in the Number and Words tests ($-.22d = 3.3$ and $-.34d = 5.1$ conventional IQ points, respectively). The smallest decline took place in the Shapes test ($-.18d = 2.7$ conventional IQ points) for which scores peaked in 1997, followed by only a small decline and then a plateau thereafter. The 1991 cohort was an anomaly in so far as it was brighter for some unknown reason.

Table 2
Average raw scores of Finnish conscripts on P1 test between 1988 and 2009.

Year	Shapes test (sd)	Number test (sd)	Word test (sd)
1988	24.337 (5.81)	19.724 (8.08)	22.750 (7.46)
1989	24.535 (5.70)	19.932 (7.98)	22.724 (7.44)
1990	24.715 (5.68)	19.966 (7.95)	22.563 (7.32)
1991	25.454 (5.48)	21.251 (7.84)	23.549 (7.14)
1992	25.262 (5.55)	20.605 (7.91)	22.816 (7.18)
1993	25.813 (5.44)	20.830 (7.79)	22.942 (7.01)
1994	26.226 (5.38)	21.159 (7.79)	23.201 (6.98)
1995	26.417 (5.32)	21.181 (7.69)	23.485 (6.92)
1996	26.718 (5.27)	21.402 (7.63)	23.591 (6.85)
1997	26.891 (5.34)	21.460 (7.63)	23.413 (6.90)
1998	26.780 (5.38)	21.245 (7.54)	22.986 (6.85)
1999	26.284 (5.70)	20.595 (7.61)	22.113 (6.97)
2000	26.419 (5.67)	20.525 (7.63)	22.055 (6.98)
2001	26.345 (5.67)	20.285 (7.56)	21.804 (6.99)
2009	26.49 (5.88)	19.81 (7.60)	21.26 (6.96)