Research in Developmental Disabilities 31 (2010) 1404–1411

Contents lists available at ScienceDirect

Research in Developmental Disabilities

Exploring the Flynn effect in mentally retarded adults by using a nonverbal intelligence test for children

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ARTICLE INFO

Article history:
Received 7 May 2010
Accepted 22 June 2010

Keywords:
Flynn effect
Mental retardation
SON
Nonverbal intelligence test

ABSTRACT

Increases in the scores on IQ tests across generations have been called the Flynn effect (FE). One of the unresolved questions is whether the FE affects all subsamples of the intellectual ability distribution equally. The present study was aimed at determining the size of the FE in moderately mentally retarded individuals. A nonverbal intelligence test developed for children, the Snijders-Oomen Nonverbal Intelligence Test (SON), was administered to 32 retarded adults with a mental age of 3–6 years. Sixty-nine children with a biological age in the same range and with normal intelligence served as a comparison group. Both an older and a more recent version of the SON were presented to all participants in a counterbalanced order. The proportion of items answered correctly was taken as a measure of the dependent variable. It was found that a FE existed in both the group of children and in the group of retarded adults, but that the FE was largest in the latter group. The importance of not using obsolete test norms when diagnosing mental retardation was stressed, and possible causes of the Flynn effect were discussed.

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1. Introduction

It was shown by Flynn (1984) that if the same group of subjects is given two IQ tests, one normed at an earlier date than the other, subjects generally score higher on the older test. Flynn interpreted this as an indication that population IQ rises across successive generations. Later Flynn (1987) showed, by comparing the performances of distinct cohorts of people on the same test, that true increases in IQ from one generation to the next are present in a large number of industrialized countries and from 1932 onwards. A lot of research on the so-called Flynn effect has been published since, some of it extending the start of the effect backwards in time (Flynn, 1998) or expanding it to developing countries (Daley, Whaley, Sigman, Espinosa, & Neumann, 2003). Other research has even suggested that the increase in IQ has come to a standstill or a reversal in recent years (Sundet, Barlaug, & Torjussen, 2004; Teasdale & Owen, 2008). Despite this, fundamental questions remain unanswered. These questions relate to both the meaning and the cause of the effect, as was put forward in a critical paper by Rodgers (1999). To gain more fundamental insight Rodgers proposed, among other things, to investigate select samples of participants (from either the upper or lower tail of the IQ distribution), to see whether the gains not only show up in the IQ scores but also in the raw scores themselves, and to look at distributional aspects of the scores.

In this article we set out to investigate the Flynn effect in mentally retarded individuals. So far, contradictory results have been obtained in studies on the size of the Flynn effect in groups whose IQ is below average. Flynn himself concluded that the

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doi:10.1016/j.ridd.2010.06.018

effect was affecting all levels of cognitive functioning including mental retardation about equally (Flynn, 1985, 2009b, pp. 135–137). This was confirmed by Kanaya, Scullin, and Ceci (2003). Bolen, Aichinger, Hall, and Webster (1995) and Spitz (1983) found that the effect in mentally retarded individuals was there, but they did not compare different levels of intelligence. The latter author showed some years later (Spitz, 1989) that the effect diminished both above and below the average IQ range, and that the effect was even negative in the retarded range, this implying that the retarded persons' IQs were higher on the most recent test. Negative effects were also obtained by Simon and Clopton (1984) and by Goldman (1987) in moderately retarded subjects. Sanborn, Truscott, Phelps, and McDougal (2003) investigated learning disabled children and found the Flynn effect increasing from lower to higher IQ levels, although this trend was not significant. Lynn and Hampson (1986) discussed and reanalyzed several published studies but did not find a consistent relationship between size of the Flynn effect and level of intelligence. Teasdale and Owen (1989) and Sundet et al. (2004), on the other hand, compared different IQ groups and found that the Flynn effect was most pronounced at lower IQ levels.

The above results leave us with ambiguity. This might be due to the fact that the studies were not uniform with regard to the ages of the participants or to what was considered "low IQ" or "retarded". But the inconsistent results might also be due to the choice of the measuring instrument. Wechsler scales or other IQ tests developed for their use in the general population were applied in most of the investigations carried out so far. These instruments might do well in samples of children or adults with an average ability, but they probably do not provide a sensitive measurement of IQ in those with mental retardation. This is because low or very low IQs are outside the range of IQs for which the test was normed (e.g. Wechsler, 1991, 1997). Another reason is that, by definition, persons with intellectual disability will find either the items or the instructions of general tests, or both, difficult and obtain scores that cluster in the lower range of the scale, with low discriminating power and low validity of the test outcomes as a consequence (e.g., see Walsh et al., 2007). In addition, the capability of retarded persons to comprehend language is often specifically affected (Merrill, Lookadoo, & Rilea, 2003); they achieve language levels that are either consistent with or, more commonly, below what their mental age would predict (Fowler, 1998). When items in a list have to be remembered, persons with mental retardation, like the general population, tend to perform better when the items are presented in visual than in verbal form (Cherry, Applegate, & Reese, 2002).

In the present research, we chose to use a test that fits in with the capabilities and with the mental age rather than with the biological age of the participants. The test we used here consisted of two consecutive versions of the Snijders-Oomen Nonverbal Intelligence Test (SON), which was developed for use in children aged 2.5–7 years. We tested both a group of individuals with intellectual disability who were biologically older but functioning mentally at that age level, and a group of normally gifted children within the given age range. An advantage of the SON test for use with individuals who evinced intellectual disability, apart from the fact that its difficulty level is in keeping with the respondents' capabilities, is that performance on the test does not rely on language skills. The instructions and examples given to the subjects are both extensive and nonverbal, so that they can easily be understood. Feedback is given to the subject during the process of test taking and the test has both an individual starting point and a point of termination after several wrong responses, which keeps administration time limited and the respondents motivated. By its very nature, the test is aimed at measuring fluid intelligence rather than crystallized intelligence (Tellegen, Winkel, Wijnberg-Williams, & Laros, 1998). It is on tests of fluid intelligence that the largest Flynn effects have been found (Flynn, 1998).

As far as we know this is the first time that an intelligence test developed for children, and a nonverbal one, has been used to report on the Flynn effect in adults with intellectual disabilities.

2. Method

2.1. Participants

The group with intellectual disabilities had 32 adults, 11 women and 21 men, who were residents in a regional institution for the intellectually disabled in the south of the Netherlands. Their ages ranged between 28 and 60 years, with a mean of 49 and a standard deviation of 6.9 years. These persons were all moderately retarded (with estimated IQ scores ranging between 35 and 55), and on the basis of clinical judgement they were considered to function mentally at an age level of 3–6 years. This level of cognitive functioning was confirmed by the outcome of the most recent version of the SON test (to be described in the next section), showing that the so-called reference age of the participants, i.e. the age of children for whom a total test score as actually attained by the adults would lead to an IQ of 100 (Tellegen et al., 1998), was 4.5 years in this group on the average.

The participants in the second group were 69 pupils of an elementary school in a large town in the south of the Netherlands. The children in this group (28 girls and 41 boys) were between 4.1 and 6.9 years of age. The mean age was 5.3 years, with a standard deviation of .65 years. The mean reference age according to the most recent version of the SON test was 5.9 years for this group, which indicates that the children with intellectual disabilities were somewhat more advanced than the adults and also this group of children performed better than could be expected on the basis of their biological age. In other words, their average IQ must also have been above 100. This, however, might have been caused by a Flynn effect in itself, since the most recent version of the SON test dated from 1996 (see next section), while both children and adults were tested in the period fall 2006 to spring 2008.

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