VERBAL ABILITY OF LOW-EDUCATED PEOPLE IN THE NETHERLANDS: THE DOWNSIDE OF EDUCATIONAL EXPANSION

MAURICE GESTHUIZEN AND GERBERT KRAAYKAMP*

Abstract

In this study, we investigated how education affects achievement in verbal ability, and to what extent the composition of the group of low-educated people has changed with regard to verbal ability. Employing data representative of the Dutch population in 2000 (N=1,301), the results show that, in each birth cohort, people with primary and lower secondary education scored lower on verbal ability than higher-educated people. In addition, family background was found to affect a person's verbal ability achievement. Culturally active parents, parents with cultural occupations, and mothers who were not too young when their children were born encourage the development of verbal ability in their children. As a consequence, low-educated people from advantaged backgrounds have the opportunity to achieve higher levels of verbal ability despite their relative disadvantage in schooling. Signs of marginalization were found in the changing composition of the group of low-educated people. For the low educated, the results show an outflow of relatively talented people over birth cohorts. This process has resulted in a group of low-educated people that is more homogeneous with respect to verbal ability nowadays and in which hidden talent has become increasingly scarce.

* Maurice Gesthuizen is a Ph.D. Candidate at the Department of Sociology/ICS, University of Nijmegen. His research focuses on the causes and consequences of social inequality, and more specifically, on the life course of low-educated people in the Netherlands. He investigates whether low-educated people have been subject to a process of social and economic marginalization. Address all correspondence to: Department of Sociology/ICS, University of Nijmegen, PO Box 9104, 6500 HE Nijmegen, The Netherlands. E-mail: M.Gesthuizen@maw.kun.nl. Gerbert Kraaykamp is Assistant Professor at the Department of Sociology/ICS, University of Nijmegen. His main fields of interest and current works are in the areas of social stratification and life-style differentiation. More specifically, his research focuses on the causes and consequences of educational inequality. He has published on these subjects in Dutch and international journals.

Introduction

In Western societies, educational expansion was a major development during the last three decades (Shavit & Blossfeld 1993). For many people, the opportunities to realize their talents improved through a modernized educational system directed at the development of individual qualities. It is generally believed that, as a result of educational expansion, own achievement (a person's educational accomplishments) became more important in the status attainment process, while ascribed characteristics (parental background) became less important (Blau & Duncan 1967; De Graaf & Luijkx 1992). Although meritocracy may be perceived as beneficial for society in general, it may have negative consequences for specific groups. Increased educational opportunities may have led to a marginalization of the group that remains low educated. While in the past, relatively many talented children from disadvantaged backgrounds remained unschooled (Van Heek 1968), the talented from the lower classes nowadays often attain diplomas. Therefore, the people who are low educated nowadays constitute a more distinctive group that scores low on cognitive talents and, consequently, has few opportunities in life. In this study, we investigated to what extent this process of marginalization has occurred. The aim was to gain insight into the possible negative consequences of educational expansion for the (remaining) group of low-educated people in the Netherlands. Since changes in both association and composition are considered to be signs of this process, we concentrated our research on the association between education and cognitive ability, and paid attention to the differences in composition of the group of low-educated people over time with regard to cognitive ability.

Cognitive ability is an appropriate indicator to study the process of marginalization. Although it is relevant to consider cognitive ability as a central allocation criterion (Sewell & Hauser 1975; Herrnstein & Murray 1994; Hauser & Huang 1997), it is rarely disentangled from education in research into the allocation of occupational positions. If cognitive abilities are separated from education, they are mostly seen as initial abilities, measured at a young age, that help children to be successful at school. Employers, however, select workers on the basis of their current cognitive abilities, which were partly nurtured at school. Employees with abundant human resources are believed to be better trainable, more productive, and, therefore, more attractive (Thurow 1975; Wolbers, De Graaf & Ultee 2001). It may also be assumed that cognitively able people occupy a better position in the marriage market (Kalmijn 1998), and are better equipped for the consumption of high culture like literature, art objects, and theater plays (Kraaykamp & Dijkstra 1999). Therefore, abundant cognitive abilities enhance a person's life chances in several domains.

There are at least three reasons to examine cognitive ability separately from education in the process of marginalization. First, if cognitive ability increases

during a person's life, this is certainly a result of educational curriculum attained at school. The higher levels of education pay more attention to the development of cognitive capacities than the lower levels. Accordingly, educational attainment cannot be regarded as a simple indicator of cognitive ability, but cognitive ability can be studied as a learning effect of schooling.[1] In this respect, in our research, we also recognized the fact that, in surveys, cognitive test scores are mostly measured after a respondent's educational career is finished. Second, it is likely that cognitive ability is a better measure of a person's talents than education. It has a strong association with general intelligence, and, therefore, it may serve as a more appropriate indicator of a person's talents than education to predict life chances. Moreover, education not only measures ability, but also indicates that some parents are more successful in the intergenerational transmission of family resources than others (Coleman 1988). Consequently, educational attainment is a far from perfect indicator of ability. A third reason to disentangle education from cognitive ability is that educational attainment is associated with credentialism (Arrows 1973; Collins 1979). Since educational qualifications express selection based on capabilities and on ascribed credentials, failing to separate both concepts means that it is impossible to be sure whether a person has an advantage because of the cognitive capacities associated with education, or as a result of the credentials attached to the obtained diploma.

In this study, we examined the differences in cognitive ability between, and compositional changes within educational groups. A word recognition test was used to measure the verbal component of cognitive ability (Thorndike 1942). Since the mid-1970s, a comparable word recognition test has been employed on a regular basis in the U.S. General Social Survey (Alwin 1991; Glenn 1994, 1999; Alwin & McCammon 1999; Wilson & Gove 1999a, 1999b). With this Dutch measurement, a connection was made with the research of Alwin (1991, 1999), who also considers verbal ability to be part of a larger concept of cognitive ability, measured it using a word-recognition test, and considers it to be dependent on educational attainment.

Measures of vocabulary knowledge are usually highly associated with tests of general cognitive ability and are assumed to be good indicators of the verbal component of standard intelligence tests (Alwin 1991). Nevertheless, verbal ability may not be regarded as a direct measure of initial talents. Thorndike (1942) describes it as a test score that predominantly indicates past learning, i.e., proven talents. Cattell's (1971) distinction between fluid and crystallized intelligence is, therefore, relevant. Fluid intelligence is defined as the capacity of a person to understand complex relations independently of the social environment in which he or she has been brought up. Crystallized intelligence results from specific investments in fluid intelligence and may, therefore, depend on parental resources and school environment (Cattell 1971; Alwin

1999). In this study, we considered verbal ability as a measure that exemplifies past learning. Depending on education and family background, verbal ability improves over the life course. Research that concentrates on the causal relationship between initial cognitive talent and school success was, therefore, considered to be less relevant for our purpose (e.g., Sewell & Hauser 1980; Dronkers & De Graaf 1995; Dronkers 1999). A link was sought with studies that explain proven talent (e.g., Alwin 1991; 1999). Assuming that a person's verbal ability increases through training at school in reading, writing, and word recognition, we formulated the first general research question: *To what extent does educational attainment affect verbal ability?*

Parental economic, cultural, and social resources also influence a person's opportunities to invest in verbal ability (Alwin & Thornton 1984; Alwin 1991). These parental resources may be both directly and indirectly influential (through educational attainment). To answer the first research question, it was important to take account of this selection based on parental resources. It was assumed that a less advantaged educational career and less advantaged parental resources pose obstacles for the development of initial talents. The more initial talents a person has, the more the school and the family influence the final level of verbal ability (the person has more potential for development). If two persons have the same level of initial talent, the one with the less advantaged educational career and family background will attain the lower verbal ability score.

Nowadays, talented children have more opportunities to attain a higher educational level than in the past. In the earlier cohorts, talented children were withheld from the higher levels of schooling because of a lack of parental resources and a less developed school system. We expected, therefore, that the group of low-educated people from the earlier cohorts would contain more talented people than the group from the later cohorts (Van Heek 1968). This process may, on the one hand, be expressed in a changing effect of educational attainment on verbal ability, but, on the other hand, in a change in the composition of educational groups. The second research question was: *To what extent have the effects of educational attainment on verbal ability changed, and to what extent has the group of low-educated people become more homogeneous in verbal ability over birth cohorts?* If more talented students attain higher levels of education nowadays, the average level of verbal ability will increasingly differ between educational groups over birth cohorts. As a result, the effect of education on verbal ability should increase over cohorts. However, if the effect does not change, an increasing homogeneity of the group of low-educated people with regard to verbal ability may also indicate growing marginalization. Stability in the association between education and verbal ability could then be caused by an increased homogeneity of the low educated, accompanied by an increased heterogeneity of other educational groups. To draw sensible conclu-

sions about the marginalization of the low educated we, therefore, investigated compositional changes next to changes in the association between educational attainment and verbal ability.

Theoretical background

Education and verbal ability

People enhance their verbal ability at school. In the Netherlands, at least at secondary school levels, native and foreign languages are taught and attention is paid to reading, writing, and word recognition. At the higher levels of the educational system, interest in the development of literacy through teaching is much higher than at the lower levels. Moreover, the higher the educational level, the longer it takes to complete it. Assuming that verbal ability is fostered by past learning and that educational attainment indicates the level of exposure to cultural literacy and competence, the main-effect hypothesis was: *Low-educated people score lower on verbal ability than high educated people*.

Since the 1960s, the greater opportunities to enroll in higher education have caused an increase in the average level of education in society (Shavit & Blossfeld 1993). Especially growing welfare and governmental educational policies have resulted in better access to the educational system for talented people. At the beginning of the 20th century, enrollment in higher education was relatively expensive and, consequently, most students originated from advantaged parental backgrounds. Also, compared to parents from higher backgrounds, parents from lower backgrounds are presumed to be less willing to invest in the educational careers of their children (Boudon 1974; Breen & Goldthorpe 1997). Thus, potentially able students from the lower strata did not receive the opportunity to attend the higher levels of schooling. Therefore, if it is true that a person's verbal ability depends on the possibility of investing in cognitive potential, talented people from the lower strata were less likely to reach high levels of verbal ability.

In the 1960s and 1970s, the Dutch educational system was reformed in such a way that talented children from less advantaged backgrounds gained new opportunities to enroll in higher education. We expected to find that this led to an increase in the association between education and verbal ability over time. More people received the chance to prove their talents. The expansion of the educational system may, therefore, have led to an increasing importance of schooling in the opportunities to improve in cognitive ability. If this is the case, low-educated people from later birth cohorts should score lower on verbal ability than low-educated people from earlier birth cohorts, as compared to higher-educated people. Lack of schooling is more disadvantageous nowadays. Additionally, we considered it possible that the composition of the educational groups with respect to verbal ability has changed substantially. Since almost all

talented individuals have the possibility of enrolling in higher education nowadays, the group of low educated should consist of more people with low verbal ability than in the earlier birth cohorts. These two processes depict an increased marginalization of the low educated. Therefore, the educational subgroup hypothesis was: *Low-educated people from the later birth cohorts score lower on verbal ability, and are more homogeneous in verbal ability than low-educated people from the earlier birth cohorts.*

Selection based on parental resources

As mentioned above, the relationship between educational attainment and verbal ability is possibly affected by a selection based on parental background characteristics. People's possibilities of investing in educational achievements as well as in the acquisition of cognitive abilities are shaped by features of the parental home (Alwin & Thornton 1984).

Parental economic resources. Growing up in an affluent family increases the possibility that parents can take care of the costs of higher education (Duncan, Featherman & Duncan 1972; Coleman 1988). This positive association between parental economic resources and educational attainment is well established (De Graaf, De Graaf & Kraaykamp, 2000). The direct association between economic resources and verbal ability is investigated less often. It is presumed that children from affluent families are socially more active and are introduced frequently to the higher social strata. They are more often in situations which encourage the development of literacy. Therefore, the expectation was that children who grew up in affluent families would score higher on verbal ability than children who grew up in economically disadvantaged families.

Parental cultural resources. Research into the intergenerational transmission of social inequality has established that parental cultural capital is relevant in predicting educational attainment (Bourdieu & Passeron 1977; DiMaggio 1982). Children from families with abundant cultural qualities are believed to be better in recognizing the dominant cultural codes taught in schools. This familiarity with cultural codes is reflected in tastes, preferences, and behaviors that are rewarded in the higher levels of education (Lamont & Lareau 1988). Parental cultural resources also seem to be relevant in predicting verbal ability. Most cultural activities that parents undertake are directly linked to verbal ability measures. For instance, the reading of literature (Farkas 1996; Kraaykamp & Dijkstra 1999) and cultural participation (De Graaf et al. 2000) involve the enhancement of cultural literacy and thereby knowledge of words (i.e., verbal ability). Hence, we expected that children from culturally advantaged families would score higher on verbal ability than children from culturally disadvantaged families.

Parental social resources. To reproduce resources from one generation to the next, intensive social interaction between parents and their offspring is a

necessary condition (Coleman 1988). There are, however, situations in which social interaction is problematic. First, growing up in a single-parent family is considered to be disadvantageous for educational attainment (Schneider & Coleman 1993). A two-parent family provides a better home environment for the development of children than a single-parent family (Amato 1993). Alwin (1991) recognized the importance of the family configuration for the explanation of verbal ability achievement. In most single-parent families, children lack an important resource for support, practical help, information, and supervision (Alwin 1991).

A second social aspect of the home is the size of the family. The resource dilution hypothesis (Blake 1989; Steelman & Powell 1989; Downey 1995) argues that parental resources are not inexhaustible. If parental resources have to be shared with brothers or sisters, less resources like attention and supervision are available for each child (Downey 1995; Sui-Chu & Willms 1996; Kraaykamp 2000). Therefore, we expected that, in large families, children would have less opportunity to improve verbal ability than in small families.

The mother's age at the birth of her children is a third social factor we considered. Motherhood at an early age can result in a home environment with few economic resources and unfavorable emotional conditions (Mare & Tzeng 1989). Motherhood at a late age, however, is associated with less parental involvement in school and friends. Emotional and practical aid is difficult when the age-gap between mother and child is too large. In line with this reasoning, a curvilinear effect of the mother's age (at the birth of the respondent) on verbal ability was expected. A 'too-old' and a 'too-young' mother negatively affects verbal ability.

Data and measurements

Family Survey of the Dutch Population, 2000

In this study, we employed the Family Survey of the Dutch Population, 2000 (De Graaf, De Graaf, Kraaykamp & Ultee 2000). This survey consists of a computer-assisted face-to-face interview in combination with a self-administered questionnaire. The sample of the non-institutionalized Dutch population between 18 and 74 years old was drawn randomly from the registers of randomly selected Dutch municipalities. In total, 1,561 respondents were interviewed successfully (response rate: 41 per cent). The moderate response rate was due to the fact that both partners had to be interviewed for a successful response. The distribution of the educational level of the sample resembled that of the population to a high extent. Therefore, the most important variable in this research did not suffer from selective response. The data set was restricted to respondents from 30 to 74 years of age, who did not live with their parents. We

applied this selection to account for possible age-effects in verbal ability. After the age of 30, relatively few changes in verbal ability may be expected as a result of age-effects (Alwin 1991, 1999). After we omitted the cases with missing values on central variables and after we applied the selection criteria, the working data set consisted of 1,301 respondents.

Measurement of verbal ability

The verbal ability measurement was constructed following a vocabulary knowledge test for survey measurement (Thorndike 1942; Alwin 1991). A word recognition test similar to the GSS word recognition test (Alwin 1991) was developed for the Netherlands. This version consisted of twelve words, the correct meanings of which the respondents had to choose from five possible answers. Answers were considered to be incorrect if respondents answered 'do not know' and if respondents did not fill out the verbal ability test, but did answer the questions in the self-administrated questionnaire which directly followed the test.[2] The respondents' scores on the recognition of the twelve words were put into an additive scale (α=.76) for which values ranged from 0 to 12.[3] One disadvantage of the measurement of verbal ability was that some words were more common in the past than they are nowadays. It is possible the that respondents from younger birth cohorts had a lower scale-score than respondents from older birth cohorts as a result of this; they are less often exposed to this specific selection of words. In Table 1, the percentages of correct answers are depicted for the twelve words.

Table 1: Description of word recognition items

Word recognition items	Percentage of correct answers
Word nr.1	95.9
Word nr.2	94.9
Word nr.3	88.5
Word nr.4	75.0
Word nr.5	51.0
Word nr.6	69.9
Word nr.7	93.3
Word nr.8	67.9
Word nr.9	54.0
Word nr.10	49.2
Word nr.11	22.2
Word nr.12	9.2

Source: Family Survey of the Dutch Population, 2000 (N=1,301)

Table 1 shows that the difficulty of the words increased. The first three words were relatively simple (around 90% correct answers), while the last three words were relatively difficult (more than 50% incorrect answers). The seventh item did not reflect this pattern, and must be labeled as too easy. Overall, there was much variation in the percentage of correct answers (mean=7,80; s.d.=2,47).[4]

Measurement of the independent variables

To measure educational attainment, four educational groups were distinguished. Individuals who did not attain any diploma at secondary school were categorized in 'primary school'. People who completed lower general education (mavo) or lower vocational training (lbo/vbo) belonged to the group of 'lower secondary school'. Both categories were considered low educated. In the discussion of the results we focus on these two categories. The third educational category, 'higher secondary school' was rather broad. It consisted of people who had finished higher general secondary education (havo/vwo) and people who had finished intermediate vocational training (mbo). Finally, the category 'tertiary school' was composed of people who finished vocational college (hbo), or attained a college degree (university).

Birth cohort was measured in two ways. First, in the multi-variate models, cohort effects were investigated using a linear term, ranging from 0 (1927) to 44 (1971). Second, four cohort groups were constructed (1=1927-1939; 2=1940-1949; 3=1950-1959; 4=1960-1971) to analyze the changing composition of the educational groups with regard to verbal ability. In looking at cohort effects, a major drawback is that it may be unclear whether an increase or decrease in verbal ability is caused by a cohort- or age-effect (Alwin & McCammon 1999; Glenn 1999; Wilson & Gove 1999a, 1999b). It is clear that age-effects in verbal ability are most profound early in life. The school and the family as socializing agents are predominantly meaningful in a person's young adulthood and adolescence. Since our analyses were limited to people of 30 years and older, possible age-effects were eliminated to a large extent. As a result, it was assumed that reasonable conclusions on the changes over birth cohorts could be drawn.

The *parental material resources* were indicated using twelve items referring to the situation in the parental home when the respondent was around 15 years of age. The scale measured the presence of a car, garage, camera, freezer, VCR, central heating, dishwasher, antique furniture, cleaning lady, television, holiday, holidays abroad (α=.79). Since these were not all available to the early birth cohorts, the scale was standardized for the four birth cohorts. The scale was linearly transformed, and, therefore, ranged from 0 to 1. Thus, unstandardized regression coefficients may be interpreted as the maximum difference in verbal ability between respondents with the least and the most parental material resources.

A respondent's *cultural resources* were represented using three parental characteristics. First, parental educational level was measured using the parents' years of schooling. The higher of the father's and the mother's scores was taken. A missing score was imputed, using the father's occupational status, in 0.5% of the cases. The variable ranged between 0 and 16. Second, to measure parental cultural participation, use was made of the respondent's reports of parental reading of Dutch literature, translated literature, popular scientific books, and literature in a foreign language when the respondent was 15 years of age. It was also asked how often parents visited architecture, classical concerts, opera and ballet, historical museums, art museums, and theater plays. The twelve items on cultural behavior were put into an additive scale (α=.84). The scale was standardized for birth cohort and linearly transformed (ranging from 0 to 1). Third, parental cultural occupational status was constructed using the scale of De Graaf and Kalmijn (1995). Respondent reports of parental occupations when the respondent was 15 years of age were taken (the higher of the father's and the mother's scores). Missing information was replaced using parental educational attainment (3.1 % of the cases). This variable ranged from 0 to 3.97.

Table 2: Description of the variables

Variables	average	standard deviation	minimum	maximum
Verbal ability score	7.80	2.47	0	12
Primary education	0.14	0.35	0	1
Lower secondary education	0.27	0.44	0	1
Higher secondary education	0.31	0.46	0	1
Tertiary education	0.28	0.45	0	1
Birth year	26.24	11.39	0	44
Female	0.50	0.50	0	1
Parental economic resources	0.50	0.29	0	1
Parental educational attainment	3.27	3.88	0	16
Parental cultural participation	0.50	0.21	0	1
Parental cultural occupational status	1.13	0.88	0	3.97
Single parent family	0.05	0.21	0	1
Single child	0.05	0.21	0	1
One or two siblings	0.43	0.50	0	1
Three or more siblings	0.52	0.50	0	1
Age difference mother-respondent	0.03	5.86	-16	18
Age difference mother-respondent squared	34.33	47.24	0	324

Source: Family Survey of the Dutch Population, 2000 (N=1,301)

With respect to *parental social resources*, it was first measured whether the respondent's parents had divorced before the respondent reached the age of 18. Second, the number of siblings in the parental home was constructed (1=no brothers/sisters; 2=1 or 2 brothers/sisters; 3=3 or more brothers/sisters). Third, the age difference between the respondent and the mother was calculated. To facilitate interpretation, 30 is subtracted from this variable, which has resulted in a range of -16 to 18. The square of this variable was also calculated to model a curvilinear effect.

Gender was included as a control (0=male; 1=female). It was expected that gender would be associated with verbal ability. First, in the past, men went to school longer than women, and they may, therefore, have higher scores on verbal ability than women. Second, in traditional families, parents are willing to invest more in boys than in girls with respect to their future life chances. As a result, the verbal ability of women was expected to be lower than that of men. In Table 2, the descriptive statistics for all variables are shown.

Results

Descriptive analyses

In this section, we will first present some descriptive information. After that, the multi-variate results will be discussed. We found a strong association between verbal ability and educational attainment (r_{xy}=.42). This association indicates that educational qualifications are important in predicting verbal ability. It also implies, however, that education and verbal ability are not similar. Studying both concepts separately, therefore, seems appropriate and preferable. Figure 1 shows the trends in verbal ability for four educational groups. The trends reflect the influence of birth year on the level of verbal ability for each educational group. The average verbal ability score was calculated for each birth year. To correct for random variation, a moving average of five years (including the two years before and the two years after the birth year) was used.

Figure 1 depicts a clear pattern of association between educational attainment and verbal ability. For almost all birth years, the verbal ability scores of the lowest educated are below those of the other educational groups. For each educational group, the level of verbal ability decreases over time. Since the lines for the educational groups do not converge or diverge, there seems to be a similar association between education and verbal ability over cohorts. To what extent do these trends reflect age- or cohort effects? Only people older than 30 years were included in the analysis, and since it is reasonable to assume that age has its strongest influence early in life, these trends probably refer to cohort effects. Previous research into verbal ability (Alwin & McCammon 1999) indicates that age only explains a small part of the inter-cohort differences in verbal ability. Therefore, the preliminary conclusion is that, over

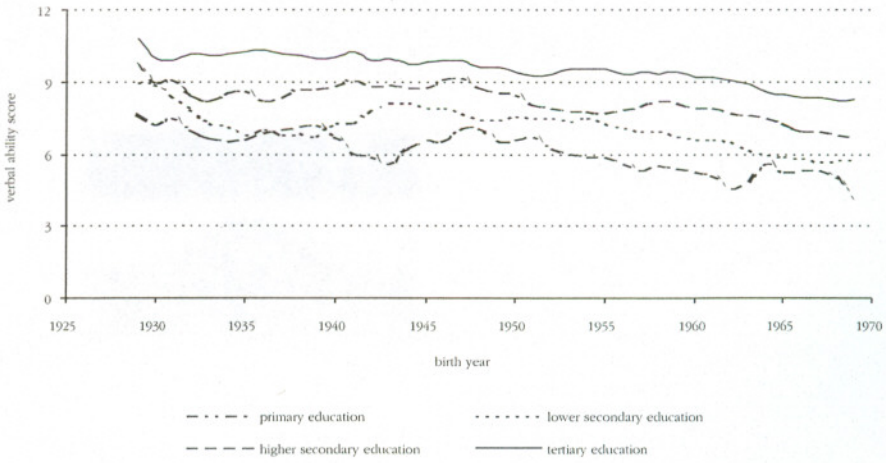

Figure 1: Verbal ability of educational groups over time (5 year moving averages)

cohorts, the level of verbal ability declines more or less equally for all educational groups.

Multi-variate analyses

To test the hypotheses, three OLS regression models were estimated. The baseline model depicted the bivariate association between educational level and verbal ability. Besides gender and birth cohort, the parental economic, cultural, and social resources were accounted for in the second model. In the third model, interactions between the educational groups and birth year were included. For marginalization of the low educated to take place, the interactions between having a low level of education and birth cohort must be negative.

The results shown in Table 3 (Model 1) show that, on average, respondents with primary education have a verbal ability score 2.883 points lower than respondents with tertiary education; on a scale between 0 and 12, this is a substantial difference. Respondents with lower and higher secondary education scored respectively 2.183 and 1.387 lower than the highest educated. Model 2 controled for parental features, birth cohort, and gender. Apparently, the educational effects remain highly significant, indicating that educational attainment is important in predicting verbal ability, controlled for the possible selection based on parental and demographic background characteristics. The unstandardized coefficients for the educational groups drop slightly.

Table 3: Regression of verbal ability on educational attainment, cohort, and control variables

Variables	Model 1 B	Model 2 B	Model 3 B
Educational attainment			
Primary education	-2.883**	-2.748**	-2.727**
Lower secondary education	-2.183**	-1.879**	-2.059**
Higher secondary education	-1.387**	-0.984**	-0.837*
Tertiary education (ref)	*ref.*	*ref.*	*ref.*
Female (0/1)		-0.359**	-0.354**
Birth year (0-44)		-0.055**	-0.055**
Parental resources			
Parental economic resources (0-1)		-0.248	-0.244
Parental educational attainment (0-16)		0.037	0.037
Parental cultural participation (0-1)		0.932**	0.930**
Parental cultural occupational status (0-3.97)		0.192*	0.191*
Single parent family (0/1)		0.035	0.026
Single child (ref)		*ref.*	*ref.*
One or two siblings		0.474	0.479
Three or more siblings		0.299	0.297
Age difference mother-respondent (-16-18)		0.024*	0.025*
Age difference mother-respondent squared (0-324)		0.000	0.000
Cohort*Education interactions			
Primary education*birth year			-0.001
Lower secondary education*birth year			0.007
Higher secondary education*birth year			-0.005
Tertiary education*birth year (ref)			*ref.*
Constant	9.233**	9.571**	9.583**
Adjusted R-squared	0.181	0.283	0.282

Source: Family Survey of the Dutch Population, 2000 (N=1,301)
** $P < 0.01$; * $P < 0.05$

Model 2 also indicates that the more advantaged the parental background of a respondent, the higher the person's verbal ability score. The cultural background of a person is particularly important; people from culturally advantaged families have on average a verbal ability score 0.932 points higher than people from culturally disadvantaged families. Furthermore, it seems to matter whether parents work in cultural occupations, like in teaching, writing, and journalism (b=0.192).

Surprisingly, the educational level of parents does not affect a person's verbal ability. Once the educational qualifications of a respondent were taken into account, parental educational attainment was no longer associated with the person's verbal ability.[5] No significant effect of the amount of parental material resources on verbal ability was found. For parental social resources, however, Model 2 shows that the larger the age gap between the respondent and mother, the higher the respondent's verbal ability. The other parental social resources were insignificant.

The influence of gender was negative and significant; women were found to have an average of 0.359 points lower verbal ability than men.[6] This finding contradicts the findings of research into educational gender differences. It has been shown, for instance, that women are better educated than men nowadays (Ganzeboom 1996; Keuzenkamp & Oudhof 2000).

Like in the GSS (Alwin 1991, 1999), a negative effect of birth year on verbal ability was found; people from the later birth cohorts scored lower on verbal ability than people from the earlier cohorts (b=-0.055). There are several possible explanations for this effect. First, fertility may differ between social groups (Cook 1951; Preston & Campell 1993). If groups that on average score lower on general intelligence have an above average level of fertility, the population level of intelligence logically declines. However, family size and birth order (Zajonc & Bargh 1980; Zajonc 1986) did not seem to explain inter-cohort differences in verbal ability (Alwin 1991). Second, Glenn (1994) showed that a general decline in literacy as a result of a decreased level of reading, and an increased level of television watching may explain a part of these inter-cohort differences. A third explanation may be that the test-taking abilities of people have changed over time (Tittle & Rotolo 2000). If people were taught to learn factual knowledge in the past, while children learn to apply knowledge nowadays, it is possible that children are less able to score well on word recognition tests that rely on factual knowledge of words nowadays. A fourth explanation can be found in the 'cumulating knowledge deficit hypothesis' (Hayes, Wolfer & Wolfe 1996), which argues that, if texts in schoolbooks became less complex over time, children nowadays have less reading and general language abilities than in the past. A final explanation that is found in the literature is that the observed decrease in SAT scores and other measures of cognitive abilities is due to the incomparability of measurements over time (e.g., Alexander 1997; Roeleveld 2002). Since each respondent in the present cross sectional study was exposed to the same test, this explanation does not seem to be valid here.

Model 3 in Table 3 shows that all interactions of education and cohort were insignificant. Therefore, it cannot be concluded that educational differences in verbal ability increased over cohorts when those with primary education are compared with the academically educated. The same is true if persons with a lower secondary education are compared with the highest educated. We conclude that the educational group hypothesis was not confirmed in this respect. Low-educat-

ed people from the later birth cohorts did not have lower verbal ability scores than the low educated from the earlier birth cohorts if their scores are compared with the scores of the highest educated.

The homogeneity of the educational groups

Looking at the association between education and verbal ability, it was found that the low educated did not experience marginalization in verbal ability over cohorts. However, marginalization may also be indicated by increasing homogenization. The stable relationship between education and verbal ability that was found may be caused by an increased homogeneity of the group of low educated, while at the same time, the group of high educated became increasingly heterogeneous with respect to verbal ability. The question is whether this process has taken place. To investigate this phenomenon, we assumed that verbal ability is characterized by a normal distribution. Marginal values in verbal ability (upper

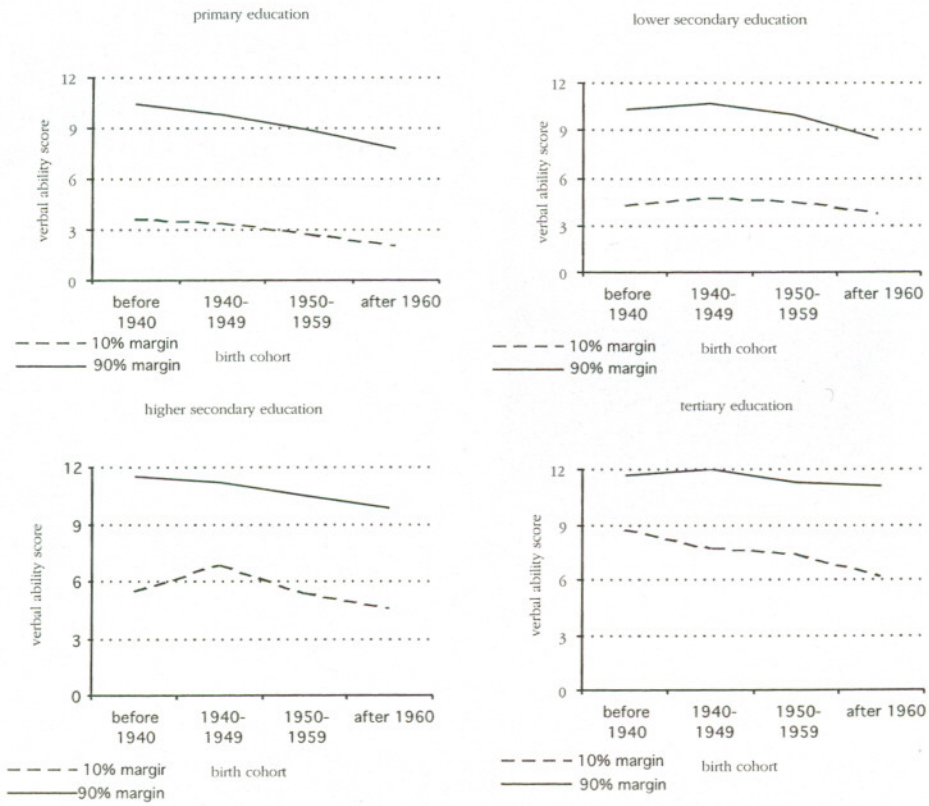

Figure 2: Marginal values in verbal ability of educational groups over birth cohorts

10% and lower 10%) were calculated for educational groups per birth cohort, expressing between which verbal ability scores 80 per cent of the people in such an educational group (in a cohort) is situated. For instance, those with primary education from the first cohort (before 1940), scored an average of 7.06 on verbal ability (s.d.=2.63). A calculation of marginal values then leads to 3.69 for the lower margin, and 10.43 for the upper margin (+1.28 = (x - 7.06)/2.63 =-1.28).

Table 4: Marginal values for upper-lower 10 per cent of the verbal ability score distribution for four birth cohorts

Variables	Verbal ability Marginal values	Standard deviation
	Primary education	
Birth cohort		
Before 1940	3.69 – 10.42	2.63
1940-1949	3.48 – 9.76	2.45
1950-1959	2.80 – 8.84	2.36
After 1960	2.11 – 7.80	2.22
	Lower secondary education	
Birth cohort		
Before 1940	4.24 – 10.38	2.40
1940-1949	4.79 – 10.75	2.33
1950-1959	4.47 – 9.94	2.14
After 1960	3.78 – 8.46	1.83
	Higher secondary education	
Birth cohort		
Before 1940	5.49 – 11.53	2.36
1940-1949	6.88 – 11.18	1.68
1950-1959	5.41 – 10.55	2.01
After 1960	4.58 – 9.82	2.05
	Tertiary education	
Birth cohort		
Before 1940	8.77 – 11.66	1.13
1940-1949	7.71 – 12.00	1.70
1950-1959	7.43 – 11.30	1.51
After 1960	6.22 – 11.03	1.88

Source: Family Survey of the Dutch Population, 2000 (N=1,301)

The marginal values are shown in Figure 2. This shows that, for the lowest educated (primary education), a slight trend towards convergence is apparent. The lowest educated have become somewhat more homogenous with respect to ver-

bal ability over time. Although Table 4 shows a decreasing variance for the lowest educated between the first and the last birth cohorts (from 2.63 squared to 2.22 squared), this trend towards increasing homogeneity does not reach significance ($F=1.40$: critical F-value=1.85 for $p < 0.05$). However, this may be due to a relatively small number of cases for both cohorts. Moreover, since the average verbal ability has dropped, and since the dispersion decreased, the figure shows an outflow of more talented people over time. It is concluded, therefore, that marginalization of those with primary education has taken place. The group with lower secondary education also shows a trend towards convergence. Since the difference in variance between the first and the last cohorts is significant ($F=1.72$: critical F-value=1.45 for $p < 0.05$), it is concluded that, for the group of lower secondary educated, convergence in verbal ability also took place. Figure 2 illustrates that the group with higher secondary education is fairly stable with respect to verbal ability. The marginal values of the educational groups show a more or less parallel pattern over cohorts. The difference between the variances of the first and the last birth cohorts for this educational group is insignificant ($F=1.33$: critical F-value=1.52 for $p < 0.05$). The highest educated (tertiary education) clearly express a pattern of growing heterogeneity in verbal ability; the lines in Figure 2 show divergence over cohorts. There also is a significant difference between the variances over the cohorts ($F=2.75$: critical F-value=1.58 for $p < 0.05$). Therefore, increasing homogeneity in verbal ability occurs for the low educated, and increasing heterogeneity was found among the highest educated. The fact that both developments go hand in hand explains the insignificant interaction coefficients between education and birth year in Table 3, but at the same time, gives rise to the conclusion that the low educated are becoming increasingly marginalized.

Conclusion

In this paper, two research questions were stated in respect of the relationship between education and verbal ability. The first research question was: to what extent does educational attainment affect verbal ability? The results show that there is a strong association between education and verbal ability. Since, in the higher levels of education, more attention is paid to literacy education, people with low educational attainment score low on verbal ability. Education is not the only important factor for the prediction of verbal ability; parental resources are also important. Parental cultural occupational status and parental cultural participation especially promote verbal ability. In addition, having a mother who is not too young helps a person to achieve a higher level of verbal ability. As a consequence, low-educated people from advantaged backgrounds have the opportunity to achieve higher levels of verbal ability despite their relative disadvantage in terms of schooling.

The second research question dealt with the issue of how the effects of educational attainment on verbal ability changed over birth cohorts, and to what extent the group of low-educated people became more homogeneous over cohorts. Since better opportunities to attain a higher education were created for each group in society, it was assumed that talented people can more easily find their way in the educational system nowadays. Therefore, it was expected that the relationship between education and verbal ability would be found to have become stronger over time. The regression analyses did not confirm this expectation. Yet, this research into the homogeneity in verbal ability of educational groups does reveal that the low educated experience marginalization. Besides an outflow of talented people from the group of low-educated people, another consequence of the growing openness of the school system has been that the highest educational levels are more easily attainable for moderately talented people. Thus, over birth cohorts, the low educated have become more homogeneous in verbal ability whereas the highest educated have become more heterogeneous. Although a decrease in ascription-based allocation of talents in the school system has not led to a stronger relationship between education and verbal ability, it has changed the composition of the educational groups with respect to verbal ability. A downside of educational expansion, therefore, is that it has marginalized the low educated with respect to their cognitive abilities.

The increasing marginalization of low-educated people may have implications for research into the allocation of social positions. Especially in studies of occupational status and unemployment risks of low-educated people, it seems relevant to take into account that the low educated nowadays are less talented than they were in the past. Although their average level of verbal ability compared to that of high-educated people has not changed, the group of low-educated people nowadays may be perceived by employers as less productive than in the past; there is little hidden talent left in this group. The inclusion of explicit measures of cognitive ability in this kind of research can, therefore, serve as an enrichment.

NOTES

1 In this study it was assumed that cognitive ability is enhanced if a person's socialization is advantaged. It was supposed by Thorndike (1942) and Alwin (1999) that verbal ability as an element of cognitive ability is a measurement of 'crystallized intelligence' (Cattell, 1971). Knowledge of words is something that has to be taught and, therefore, causally follows education. Although the authors recognize that the causal order of education and verbal ability is disputable, they consider that verbal ability may be investigated as a consequence of education without incorporating a pre-test of verbal ability.

2 The verbal ability test was skipped by 13 respondents, while the questions immediately following the test were answered. This was considered as having answered incorrectly, because

we supposed that, if they knew the correct meanings of the words, they would not have skipped the questions. It shows that 10 of the 13 persons are low educated. The inclusion of these respondents hardly alters the multi-variate results.

3 In the American literature, the items are mostly treated as Likert-scale items (Alwin 1991, 1999). However, since the items differed in difficulty, Guttman-scaling (Rho = 0.77) was also employed. The results of regression models in which a word recognition scale was included that was weighted on the basis of these difficulties did not differ substantially from the results of this study.

4 Like in the GSS the twelve words are not presented because they will be used in future surveys. It must, therefore, be ensured that future respondents will not become familiar with these words through publications on this topic. If researchers wish to replicate this study, they can obtain the words from the authors.

5 Model 2 was estimated without the dummies for respondent's level of education, and the results showed a coefficient of 0.106 with a p-value of less than 0.01 for parental educational attainment.

6 The internal consistency was calculated for the scale of verbal ability for women and men separately. The coefficients did not differ from each other. It was also studied whether labor market participation explains the difference in verbal ability; men do not score higher because they work more hours than women.

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