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**Natascha Notten, Bram Lancee,
Herman G. van de Werfhorst & Harry
B. G. Ganzeboom**

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Educational stratification in cultural participation: cognitive competence or status motivation?

Natascha Notten · Bram Lancee ·
Herman G. van de Werfhorst ·
Harry B. G. Ganzeboom

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Abstract This article examines educational stratification in highbrow cultural participation. There are two contrasting explanations of why cultural participation is stratified. The status hypothesis predicts that people come to appreciate particular forms of art because it expresses their belonging to a certain social group. The cognitive hypothesis stipulates that cultural participation depends on a person's cognitive abilities, which is why educational stratification in cultural consumption is so evident, especially among consumers of high culture. However, to test these explanations, previous work predominantly relied on an individual's level of education, thus confounding the two mechanisms. We test the status and cognitive hypothesis using data from the International Adult Literacy Survey, covering 18 countries. First, by including an individual's literacy skills, we separate the effect of cognitive ability from that of education. The remaining effect of education can be seen as a better measure of the status-related motives for cultural participation. Second, we examine whether stratification varies across countries. The findings show that the status-related effect of education on cultural participation is smaller in societies with larger educational expansion and intergenerational educational mobility. This is in line with the status explanation, which holds that boundaries

N. Notten (✉)
Department of Sociology, Radboud University, P.O. Box 9104, 6500 HE Nijmegen,
The Netherlands
e-mail: n.notten@maw.ru.nl
URL: <http://www.nnotten.nl>

B. Lancee
Utrecht University, Utrecht, The Netherlands

H. G. van de Werfhorst
Amsterdam Centre of Inequality Studies, University of Amsterdam, Amsterdam, The Netherlands

H. B. G. Ganzeboom
VU University Amsterdam, Amsterdam, The Netherlands

between educational groups are less exclusionary in societies that are educationally less stratified. In contrast, the relation between cognitive skills and cultural participation is unaffected by distributional variation in education, as the cognitive hypothesis predicts.

Keywords Cultural participation · Educational stratification · Comparative research · Status signaling · Cognitive competency · Cultural reproduction · Multilevel modeling

1 Introduction

Research convincingly shows that throughout the world, participation in the arts and highbrow culture is extremely stratified across social groups (e.g., Bourdieu 1984; Chan and Goldthorpe 2007a). Strong status divides are evident in participation in various forms of arts and culture, such as theater, concerts, museums, and reading. Even genres regarded as “popular” or “lowbrow,” such as country and folk music, are stratified. Inequalities in cultural involvement exist in several dimensions, such as wealth, income, and occupation. However, they are particularly pronounced for education (see e.g., Ganzeboom 1982, 1989).

Cultural participation research offers two contrasting explanations of why cultural participation is stratified. The first hypothesis claims that cultural participation is predominantly a signal of social status. The “status hypothesis” predicts that people come to appreciate particular forms of art because it expresses their belonging to a certain social group. Related to this hypothesis is the concept of “embodied cultural capital” (Bourdieu 1986), defined as “widely shared, legitimate culture made up of high status cultural signals used in direct or indirect social and cultural exclusion” (Lamont and Lareau 1988, 156). The second hypothesis states that cultural participation depends on a person’s cognitive abilities, which is why educational stratification in cultural consumption is so evident, especially among consumers of high culture. According to the “cognitive hypothesis,” cultural activities are more rewarding to individuals who are better able to process complex information (Ganzeboom 1984). Empirical evidence favors both the status hypothesis (Chan and Goldthorpe 2007a; Collins 1979) and the cognitive hypothesis (Farkas 1996; Ganzeboom 1982, 1989).

Previous studies have tested and compared these two explanations by analyzing different types of cultural participation, for instance, reading books and classical concert attendance, as well as different dimensions of stratification, such as wealth and education (e.g., De Graaf et al. 2000; Rössel 2011). Reading, for example, has been argued to require more cognitive skills and to be less strongly influenced by status-signaling motives than collective and public forms of cultural consumption, such as visits to the theater and classical concerts. It has also been argued that cognitive competencies are particularly acquired in formal education. This suggests that the effect of education on cultural participation should be interpreted as a cognitive effect, whereas the effects of occupational status and family background are more aligned with status motives. However, this approach neglects that also with

regard to education itself, both the status and cognitive explanations for cultural stratification may be at work.

The current study disentangles status-signaling and cognitive explanations to produce a better understanding of the role of education in cultural participation. We use two distinct but related strategies. First, we separate the status related from the cognitive explanation of educational stratification in cultural participation. We do this by including an explicit measure of a person's cognitive abilities in the analyses, that is, their literacy skills. Since the cognitive explanation is captured by the skills measure, the net effect of educational level can then be assumed to represent non-cognitive effects. This approach is similar to the design used to assess the cognitive "human capital" explanation of why education is related to earnings (e.g., Bowles and Gintis 2002; Farkas 1996); research that tends to demonstrate a sizeable non-cognitive component of schooling that is rewarded on labor markets.

The second strategy adopts a comparative approach. To further test the status and cognitive hypothesis, we examine whether stratification in cultural consumption is more pronounced in societies with higher levels of inequality, as has been shown for other relevant social gradients (e.g., Wilkinson and Pickett 2009). We do so by relating the cognitive and status-related effects of education to distributions of educational attainment within a country. In line with the status hypothesis, status effects of stratification in cultural consumption should be weaker in societies where a larger share of the population has higher educational qualifications and where intergenerational educational mobility is higher. This is due to a blurring of boundaries between educational strata in these more egalitarian societies. From an information-processing perspective, however, the relation between cognitive abilities and cultural participation is not affected by distributional variations in education.

The study of stratification in cultural consumption is relevant for at least three reasons. First of all, by examining the extent to which different social groups have distinct lifestyles, we better understand the potential misbalance between social cohesion within subgroups and cohesion at the societal level. Second, it may contribute to insights in economic processes and microeconomic aspects of cultural consumption relevant for cultural policy (López-Sintas and Garzía-Álvarez 2002; Thorsby 1999). Third, cultural participation is an important factor in the intergenerational transmission of social and educational inequality (De Graaf et al. 2000; Lareau 1987). Studying the extent to which lifestyles are stratified helps to better understand processes of social mobility. These motivations benefit from a detailed understanding of cognitive and status-related explanations of cultural stratification.

The data that allow us to use this research design are from the International Adult Literacy Survey (IALS). It comprises 43,409 men and women in 18 countries interviewed between 1994 and 1998. The IALS measures both reading behavior and attendance at cultural performances. Next to information about respondents' educational levels, the IALS data offer high-quality measures of cognitive skills, including literacy. In addition, we rely on data from the more recent Programme for the International Assessment of Adult Competencies of 2012 (PIAAC) to replicate parts of our findings.

2 Theoretical background

2.1 Cultural activities and dimensions

This study aims to provide more insight into the importance of status-related and cognitive elements of educational differentiation in cultural participation. However, “cultural capital” and “cultural participation” include a range of activities and behaviors. Research traditionally defines two broad yet distinct areas of taste: highbrow culture and lowbrow (or popular) culture (DiMaggio 1987; Katz-Gerro 2002). Examples of highbrow culture, or fine arts, are visiting classical concerts and reading literature. Involvement in these activities is prestigious and requires cognitive skills. Lowbrow cultural activities, such as visiting fairs, may be considered less challenging and esteemed. This article’s examination of cultural participation refers predominantly to highbrow activities. In particular, it looks at attendance at cultural performances and reading books. These two activities represent both status motivations and cognitive aspects of cultural consumption (e.g., Chan and Goldthorpe 2007a; Rössel 2011).

Outward-oriented cultural behaviors are particularly useful for measuring the social impact or value of a person’s cultural disposition. This is because they are observable activities that demonstrate social boundaries in the public domain. Overall, cultural activities, such as attending a ballet or classical concert, are highly valued among the upper social strata. They attract an exclusive audience, representing social networks, and are associated with an elite lifestyle and cognitive abilities (Casarin and Moretti 2011; Ganzeboom 1982, Lizardo 2006; López-Sintas and Garzía-Álvarez 2002). The second type of cultural behavior under study is reading. Though it is closely associated with cognitive competencies and generally is an in-home activity, reading nonetheless creates or confirms social boundaries (Notten and Kraaykamp 2010; Park 2008). By providing material for communication and conversations in day-to-day social life, reading may play a role in creating and maintaining social relationships and networks (Chan and Goldthorpe 2007a; Lizardo 2006).

Recent research acknowledges that cultural activities are not so clearly demarcated between highbrow and lowbrow repertoires (Katz-Gerro and Jaeger 2013; Peterson 2005). The proportion of “cultural omnivores,” that is, persons consuming both popular and highbrow cultural products, has risen in the past decades, as well as the variety of their activities and preferences (Goldberg 2011; Lena and Peterson 2008). Nonetheless, highbrow activities are a relevant part of the omnivore cultural consumer pattern. Consequently, the modern cultural consumer or cultural omnivore is characterized, too, by high educational attainment and occupational status (Chan and Goldthorpe 2007b; Katz-Gerro and Jaeger 2013; López-Sintas and Garzía-Álvarez 2002).

2.2 Cultural participation and status motives

According to cultural capital and lifestyle theory (Bourdieu 1984; Bourdieu and Passeron 1990), people participate in cultural life mainly as an expression of their

social status. As such, individuals come to appreciate particular forms of fine art because it expresses their non-cognitive motivations to belong to a group with a certain level and composition of capital (Caldwell and Woodside 2003; Thorsby 1999). Hence, by demonstrating a particular lifestyle, members of status groups confirm existing social cleavages and rankings. From this perspective, it follows that specific cultural tastes are closely associated with social positions. Thus, highly educated individuals participate in high culture because it signifies their belonging to the elite. Cultural reproduction and stratification research clearly shows that it is highbrow cultural participation that matters when it comes to status attainment and social mobility (e.g., Lareau 1987).

Most research on the status dimension of cultural participation is at the individual level. Few studies examine differences across countries in the relation between individual characteristics and cultural participation. However, according to cultural capital theory, social context is highly relevant in choices related to cultural behavior (Bourdieu 1984; Casarin and Moretti 2011; Thorsby 1999). To the extent that cultural consumption is driven by non-cognitive motivations, here labeled as status motives, contextual characteristics are thus likely to be relevant in explaining variation in the association between education and cultural participation. Previous research indeed found different cultural consumption patterns, related to social background characteristics, in a range of countries including the United States, Great Britain, Finland, France, Spain, and the Netherlands (e.g., Alderson et al. 2007; Chan and Goldthorpe 2007b; DiMaggio 1987; Ganzeboom 1989; Van Hek and Kraaykamp 2013; Lamont 1992; López-Sintas and Garzía-Álvarez 2002; Purhonen et al. 2011; Ultee et al. 1993).

A society with a larger share of highly educated people implies that a larger proportion of its citizens belong to the social group that consumes high culture. In these societies, participation in high culture may be a more widespread consumption pattern and less representative of an elite lifestyle. In such a context, status incentives are less likely to explain educational differentiation in cultural participation. Hence, in current postindustrial and information-based societies with more uniform educational attainment due to the expansion of educational opportunities (Hauser and Featherman 1976; Rijken 1999), it might be harder to distinguish oneself by means of traditional highbrow cultural consumption. In these societies and to the extent that cultural participation is an expression of social status-related (non-cognitive) motivations, educational differentiation in cultural participation is likely to be less pronounced, especially when cognitive abilities are taken into account. We therefore hypothesize that in countries with a higher level of educational expansion, as in a greater share of highly educated people, the status-related (net) effects of education on cultural participation are smaller, once a person's cognitive competencies are controlled for (Hypothesis 1).

Educational mobility, too, is likely to affect the way that education stratifies participation in cultural activities (Beck 1992; DiMaggio 1987). Looser associations between the level of education of parents and children are indicative of societal "openness" (Lipset and Bendix 1959). In more open societies, where boundaries between educational levels are less apparent, high culture may no longer be the exclusive terrain of the well-educated social groups. Consequently, the status gains

conferred by cultural participation are lower in open societies and highly educated individuals may feel little or no need to emphasize their status position by attending cultural performances (e.g., Erikson and Jonsson 1996). This is further reinforced by the increased heterogeneity of the highly educated. Upwardly mobile people generally lack the requisite cultural socialization to develop a highbrow taste (Van Eijk and Knulst 2005; Van Eijk 1999). In countries with a high level of intergenerational educational mobility, large groups of highly educated individuals may not have been raised in a high status environment. In such a context, cultural participation is a less enduring and persistent form of stratification between status groups (Ultee et al. 1993). We thus expect high levels of intergenerational educational mobility to reduce the correlation between the status-related (net) effects of education on cultural participation, especially when filtering out the cognitive aspects of education (Hypothesis 2).

2.3 Cultural participation from a cognitive perspective

Although the status-signaling motive for cultural consumption is widely acknowledged, there are also scholars who argue that cultural participation is primarily a function of a person's cognitive capacity, mostly represented by education (Farkas 1996; Ganzeboom 1989; Scitovsky 1976). This view is in line with the neoclassical economic understanding of education (Becker 1996). In particular, information-processing theory (Ganzeboom 1984; Scitovsky 1976) conceptualizes educational level as a proxy for a person's intellectual capacities. People with greater information-processing capacities are said to seek cultural activities that offer more (complex) information in order to satisfy their cognitive needs and derive pleasure and fulfillment. If education is a proxy for a person's information-processing abilities, people with higher levels of education will participate more in highbrow cultural events. Thus, from the cognitive perspective, a person's educational level relates to a specific form of cultural participation not because of the status benefits that such participation may generate or express, but merely because of the information-processing competencies it requires (e.g., Farkas 1996; Purhonen et al. 2011).

We further test the information-processing theory by including a concrete measure of cognitive skills into our models, next to a person's educational attainment. Previous work demonstrates that including literacy skills captures the cognitive skills embedded in one's educational degree very well (see, e.g., Barone and Van de Werfhorst 2011; Cattell 1971; Gesthuizen et al. 2011). Research on the association between education and earnings uses a similar tactic to disentangle cognitive and non-cognitive aspects of schooling (see, e.g., Bowles and Gintis 2002; Farkas 1996). We argue that by including a measure of cognitive skills, we are able to better test the cognitive hypothesis, compared to previous work that uses only educational attainment as a proxy for cognitive capacity. Following information-processing theory, we thus expect a person's cognitive competencies, here conceived as a person's literacy skills, to capture a large share of the association between education and cultural participation (Hypothesis 3).

At the societal level and reasoning from information-processing theory, cultural participation is more widespread in nations with a higher proportion of highly educated citizens. In these nations, there are more people with the cognitive competencies to enjoy cultural activities. However, from a cognitive perspective, cultural participation as such is not dependent on the social context. That is, if a person's cultural participation is explained by cognitive competency, the relation between a person's educational level and his/her cultural participation will not be affected by the distribution of educational attainment within a society. Although inequality on the societal level may stimulate status signaling, it is highly unlikely to affect cognitive needs. Consequently, cognitive capacity affects the enjoyment of culture, but this is independent of the number of highly qualified or mobile persons in a country. We therefore expect that the level of educational expansion and level of intergenerational educational mobility in a society do not affect the relation between literacy skills and cultural participation (Hypothesis 4).

3 Data and measurement

3.1 Data

We derived our data from the International Adult Literacy Survey (IALS) 1994 and 1998. This large-scale, cooperative project involves governments, national research institutions, and the Organisation for Economic Co-operation and Development (OECD), in collaboration with and coordinated by Statistics Canada and the Educational Testing Service at Princeton University. The goal of the IALS is to fill a widespread need for information about literacy. Large international samples of adults were given the same test of their literacy skills between 1994 and 1998. The survey provides details on levels of adult literacy across nations and the relationship between literacy levels and a range of background and demographic characteristics (Microdata User's Guide, Statistics Canada). The IALS perfectly serves our research question since it contains international comparative measures of individual participation in cultural activities, educational attainment, and literacy skills, as well as relevant control variables such as parents' education. We used information from 18 countries ($N_2 = 18$) and included respondents aged 26 and older since these are likely to have finished their educational careers, an important constraint when studying the impact of educational attainment on behavioral outcomes. From the originally 19 participating countries in the IALS, Chile was not considered in our analysis because it is the only non-Western country. Furthermore, we selected respondents with valid scores on all relevant individual variables ($N_1 = 43,409$).

3.2 Measurement of cultural participation

We measured highbrow cultural participation as the frequency with which respondents reported *attending cultural performances* (movies, plays, or concerts) and the frequency of *reading books*. Respondents were asked the frequency of their participation in these two traditionally highbrow leisure activities by the following

questions: “How often do you attend a movie, play or concert?” and “How often do you read a book?” Answer categories were (0) never, (1) several times a year, (2) monthly, (3) weekly, and (4) daily. Attendance of cultural performances and reading books are commonly used as indicators of a person’s highbrow cultural participation in cultural stratification research (Katz-Gerro and Jaeger 2013; Kraaykamp and Van Eijck 2010; Purhonen et al. 2011). Unfortunately, our single-item measure of cultural participation also includes movies, which might contain lowbrow elements as well.¹ Hence, if we find support for our hypotheses regarding attending cultural performances, the effects are likely to be underestimated due to the downward influence of potential lowbrow activities.

3.3 Individual-level variables

IALS respondents were asked about the duration of their formal education: “In your lifetime, how many years of formal education have you completed beginning with grade one and not counting repeating years at the same level.” Thus, the current study measures *respondents’ educational level* by a variable indicating the duration of education in years, not counting repeated years at the same level (standardized between 0 and 1).²

To separate the non-cognitive (status) aspect of education from the cognitive ability aspect, we included the respondents’ cognitive competence as measured by their *literacy skills*. Literacy measures are a widely accepted proxy for a person’s cognitive ability (see, e.g., Cattell 1971; Green 2001). The IALS defines literacy as “the ability to use printed and written information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential.” The IALS measures three types of literacy: prose, document, and quantitative literacy. In each of these three domains, respondents performed tasks of different levels of difficulty, which were then constructed into scales ranging from 0 to 500.³ Factor analyses, both

¹ Additional factor analyses using 2006 EU Statistics on Income and Living Conditions (SILC) clearly show that the three included activities (visiting cultural events, cultural sites, and the cinema) positively correlate and form a reliable scale ($\alpha = 0.69$). This corroborates the predominantly highbrow content of our measure of visiting culture.

² The IALS offers educational level data both in years and in ISCED qualifications. Both qualifications and durations are acceptable measures of educational attainment, but neither is perfect. Besides conceptual differences, both measures will have been obtained with some degree of random measurement error. In all 18 included countries the two measures correlate strongly (around 0.85), indicating that both measures are good indicators of level of education. We chose educational level in years because of its better model fit. However, when estimating our models using ISCED qualifications the substantive findings are very similar.

³ The IALS Microdata User’s Guide, by Statistics Canada, defines the following dimensions: “(a) Prose literacy: the knowledge and skills needed to understand and use information from texts including editorials, news stories, poems, and fiction, (b) Document literacy: the knowledge and skills required to locate and use information contained in various formats, including job applications, payroll forms, transportation schedules, maps, tables, and graphics, and (c) Quantitative literacy: the knowledge and skills required to apply arithmetic operations, either alone or sequentially, to numbers embedded in printed materials, such as balancing a checkbook, calculating a tip, completing an order form, or determining the amount of interest on a loan from an advertisement.” For more information see the IALS Microdata User’s Guide, Statistics Canada (see also Kirsch 2003).

explorative and confirmatory, including all three domains showed only one dimension with an eigenvalue greater than 1, explaining 88 % of the variance. Therefore, and in line with previous research using the IALS data (e.g., Gesthuizen et al. 2011; Van de Werfhorst 2011), we constructed a single-scale measure for overall literacy. Our scale uses the mean score of all scales reflecting respondents' prose, document, and quantitative literacy skills (z-standardized). The index has a high degree of measurement reliability, both within and across countries (Cronbach's alpha's are around 0.98). We also estimated all models with the separate domains of literacy, but this did not yield different results.

We included several individual-level control variables, shown to affect both a person's educational level and their cultural participation (see, e.g., Yaish and Katz-Gerro 2012; Kraaykamp and Van Eijck 2010). First of all, we included the parental educational level, which prior research has used to indicate the non-cognitive aspect of a person's educational attainment (Bowles et al. 2001; Gesthuizen et al. 2011). Parental education has also proven to be a reliable predictor of a person's cultural participation. Hence, including it makes our analyses more accurate and less biased toward the status mechanism. We measured parental educational level as the highest of the father's and mother's education based on ISCED qualifications: (0) no education or only primary education, (1) lower secondary education, (2) higher secondary education, and (3) tertiary education.

We also included respondents' *age* in four categories: 26–35, 36–45, 46–55, and 56 years and older. Furthermore, we controlled for respondents' *gender* (1 = female), *rural* versus urban domicile, the respondent's *labor market status* (employed, retired, unemployed/looking for work, homemaker, other, unknown), and whether the respondent was born in the country of interview or *born abroad* (1 = born abroad). Table 1 presents the descriptive statistics for all variables.

3.4 Country-level variables

A country's share of higher educated people, also referred to as *a nation's level of educational expansion*, was measured as the gross enrollment ratio in tertiary education (ISCED 5 and 6) in the year of interview.⁴ It thus represents the general level of participation in tertiary education in a given country (UNESCO 2013). *Educational mobility* was measured as the country-specific association between parents' and children's educational attainment. We constructed this based on the IALS data. For each country, the measure consists of the coefficient of parental educational level when predicting the respondents' educational attainment (both standardized in a range of 0–1 within countries), obtained from country-specific OLS regressions. The equation is specified as follows, for each country: $y = \alpha + \delta d + \varepsilon$ where y is the respondent's educational attainment, d is the parent's education, and δ is our coefficient of educational mobility. We coded the variable educational mobility so (multiplying by -1) that a higher score represents a higher level of

⁴ UNESCO defines gross enrollment tertiary education is as follows: "Number of pupils or students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age." UNESCO (2013).

Table 1 Descriptive statistics

Variable	Mean	SD	Min	Max
<i>Dependent variables</i>				
Book reading	2.24	1.48	0	4
Attending cultural performances	0.94	0.83	0	4
<i>Individual-level variables</i>				
Years of education	0.36	0.11	0	1
Literacy skills	0.59	0.14	0	1
	Percentage			
Parents' education: no or primary	31		0	1
Parents' education: lower secondary	31		0	1
Parents' education: higher secondary	24		0	1
Parents' education: tertiary education	14		0	1
Gender (female = 1)	54		0	1
Age 26–35	29		0	1
Age 36–45	28		0	1
Age 46–55	22		0	1
Age 56 and older	21		0	1
Born abroad	8		0	1
Rural domicile	37		0	1
Employed	59		0	1
Retired	12		0	1
Unemployed/looking for work	5		0	1
Homemaker	8		0	1
Other	3		0	1
Labor market status not known	13		0	1
<i>Country-level variables</i>				
Educational mobility	−0.17	0.04	−0.25	−0.07
Educational expansion	50.9	18.54	22	89
GDP per capita PPP	20,740	5,417.01	6,794	28,093

Source: IALS 1994–1998

N1 = 43,409

N2 = 18

educational mobility, thus corresponding with a *lower* correlation between parents' and children's educational attainment (ranging from -0.25 to -0.07).

We measured a country's economic prosperity by *GDP per capita* in the year of interview, in PPP, current international dollars (Worldbank 2013). GDP per capita is a common indicator of a country's economic development; furthermore, it likely captures part of the national spread and accessibility of cultural supply (OECD 2006). Appendix Table 4 presents the country variables. For reasons of presentation and interpretation, all country-level variables are centered to their means and divided by 1,000 (GDP per capita) or 10 (educational expansion) when included in the multilevel analyses.

4 Descriptive analyses

Before estimating our multilevel models, we present some descriptive analyses of cross-national differences in the status-related effects of education. Figure 1 displays the proportion of the effect of education on cultural participation that remains after controlling for literacy, in relation to a country's level of educational expansion. The data points are obtained from separate country regressions (OLS) and refer to the coefficient of education that remains after controlling for literacy, divided by the coefficient of education without controlling for literacy. In line with our theoretical arguments, a value of 1 means that education represents only status-related (i.e., non-cognitive) aspects; 0 indicates no status-related (but only cognitive) effects of education on cultural participation. Consequently, the data points exemplify the status-related effects of education on cultural participation, construed as cultural performance attendance and reading books. Overall, Fig. 1 indicates that education becomes less of a status marker where educational expansion is higher. That is, in countries where the share of higher educated is larger, education has a smaller effect on cultural participation after controlling for literacy. Note that there are outliers, especially for reading books. In Hungary and Germany, the proportional effect of education, that is, the part that remains after controlling for literacy is rather high. In these countries, educational stratification in reading books highly correlates with status incentives. In contrast, in Ireland, Great Britain, and especially Canada, status-driven motives hardly seem to play a role in cultural performance attendance and, particularly, reading books.

Figure 2 plots the relation between educational mobility and the proportion of the education effect that remains after controlling for people's literacy scores. Although less clear, the figure shows a negative relation. Thus, in countries with higher levels of educational mobility, a person's educational level has a less pronounced effect on his or her cultural participation. This suggests that the status element of education is less important in countries where educational mobility is higher.

Figure 2 shows outliers as well, quite similar to Fig. 1. In Hungary and Germany, particularly concerning reading books and taking educational mobility into account, education exhibits more status-related aspects than in the other countries analyzed. Again, in Canada, Great Britain, and Ireland, the status aspect of education hardly affects cultural participation, and especially reading books, along the lines of the countries' educational mobility.

5 Empirical strategy

To analyze how educational attainment and literacy are related to cultural participation, we first estimate OLS regressions with country-fixed effects (Models 1 and 2). In a second step, to analyze differences between countries, we estimate multilevel models. Multilevel models enable us to simultaneously estimate differences between countries and between individual respondents (Snijders and Bosker 1999). We first estimated a model with a random intercept and individual-level predictors (not presented). The estimated variance component at the country

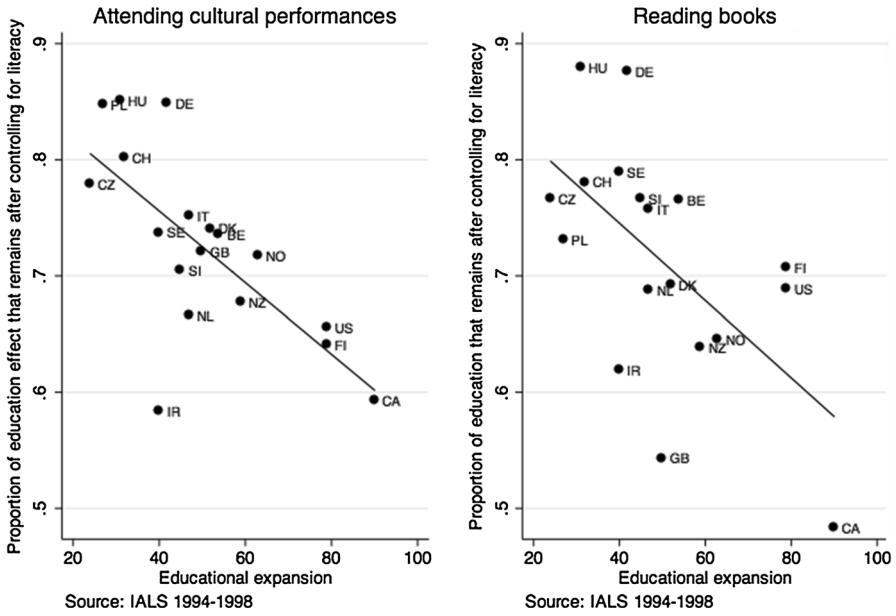


Fig. 1 Proportion of education effect that remains after controlling for literacy skills, by educational expansion

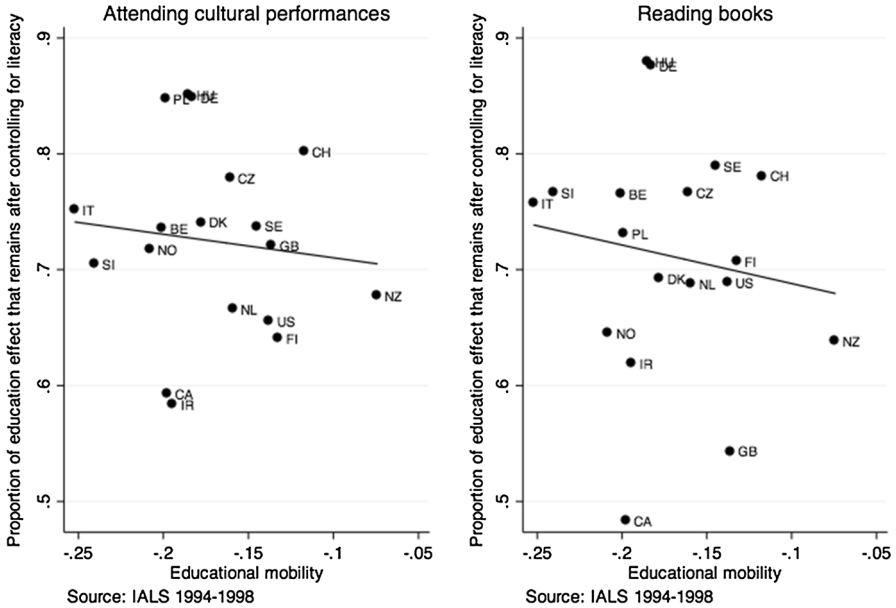


Fig. 2 Proportion of education effect that remains after controlling for literacy skills, by educational mobility

level is small but statistically significant (ICC reading books = 0.04; ICC attending cultural performances = 0.06). Hence, there is significant variation between the countries in cultural participation, even after adjusting for differences in individual characteristics. We estimated models with a random intercept and random slope. Model 3 assumes cultural participation to differ among countries (random intercept). Furthermore, the effect of educational level and that of literacy are allowed to vary between countries (random slopes), while the effects of all other variables are assumed to be stable (fixed). Model 4 estimates interaction effects of the individual-level measure of education and the country-level measures of educational expansion and educational mobility. In model 5, we estimate cross-level interactions with literacy.⁵ Note that we controlled for parental educational level in all models.

To assess the potential effect of influential cases on our findings, we carried out an outlier analysis for all of the models, following the procedure suggested by Van der Meer et al. (2010). Outliers affected none of the findings presented below.

6 Results

6.1 OLS and multilevel models on cultural performance attendance

Model 1 in Table 2 shows an OLS regression predicting cultural performances with individual-level predictors and country-fixed effects. In line with previous cultural consumption research, the estimates for model 1 show that more highly educated individuals attend cultural performances more frequently than their lower educated counterparts. Model 1 also shows that parents' educational level is highly predictive of a person's cultural participation, confirming prior studies on cultural consumption. Cultural participation is more common among women than men, and we find younger people to be more frequent visitors of cultural events. This may be because younger people are generally more active consumers of culture, though our youngest group is not that young (between 26 and 35). Respondents who are born abroad attend cultural performances significantly less often than natives, just like individuals who live in rural areas. Last, cultural participation varies considerably by labor market status.

Model 2 adds literacy. It shows that a person's literacy skills are strongly associated with their cultural performance attendance, reducing the coefficient of education by about 27 percent. This was predicted by Hypothesis 3. In model 2, where the effect of education is controlled for a person's literacy skills, the observed effect of education likely refers to non-cognitive aspects of educational attainment, interpreted as status effects. Hence, model 2 shows that both status-related and cognitive aspects of education are relevant in predicting a person's frequency of visiting cultural events, as we would expect based on the cognitive and status hypotheses. However, status incentives related to education seem to be more decisive when it comes to cultural participation. Note that including literacy also significantly reduces the effect of parental education. Being born abroad, no longer has a significant effect once controlling for literacy skills.

⁵ For reasons of collinearity we were unable to include all four cross-level interactions simultaneously.

Table 2 OLS and multilevel models on cultural performance attendance

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	se	b	se	b	se	b	se	b	se
Years of education	1.902***	(0.037)	1.396***	(0.041)	1.437***	(0.087)	1.414***	(0.078)	1.439***	(0.089)
Literacy			0.966***	(0.034)	0.964***	(0.056)	0.965***	(0.057)	0.969***	(0.056)
Educational expansion/10 × education							-0.088*	(0.042)		
Educational mobility × education							-1.879	(1.742)		
Educational expansion/10 × literacy									0.012	(0.029)
Educational mobility × literacy									0.761	(1.233)
Educational expansion/10					0.025	(0.030)	0.028	(0.030)	0.023	(0.030)
Educational mobility					0.901	(1.089)	0.983	(1.086)	0.796	(1.101)
GDP per capita ppp/1,000					0.002	(0.010)	0.002	(0.010)	0.002	(0.010)
Parents' education: no or primary	Ref.		Ref.		Ref.		Ref.		Ref.	
Parents' education: lower secondary	0.074***	(0.010)	0.051***	(0.010)	0.056***	(0.010)	0.055***	(0.010)	0.056***	(0.010)
Parents' education: higher secondary	0.180***	(0.011)	0.144***	(0.011)	0.145***	(0.011)	0.145***	(0.011)	0.145***	(0.011)
Parents' education: tertiary education	0.259***	(0.013)	0.219***	(0.013)	0.218***	(0.013)	0.218***	(0.013)	0.218***	(0.013)
Age 26–35	Ref.		Ref.		Ref.		Ref.		Ref.	
Age 36–45	-0.167***	(0.009)	-0.162***	(0.009)	-0.162***	(0.009)	-0.162***	(0.009)	-0.162***	(0.009)
Age 46–55	-0.209***	(0.010)	-0.192***	(0.010)	-0.191***	(0.010)	-0.192***	(0.010)	-0.192***	(0.010)
Age 56 and older	-0.258***	(0.012)	-0.219***	(0.012)	-0.218***	(0.012)	-0.218***	(0.012)	-0.218***	(0.012)
Gender (female = 1)	0.063***	(0.007)	0.066***	(0.007)	0.068***	(0.007)	0.068***	(0.007)	0.068***	(0.007)
Born abroad	-0.041**	(0.013)	0.020	(0.013)	0.020	(0.013)	0.021	(0.013)	0.021	(0.013)
Rural domicile	-0.143***	(0.008)	-0.137***	(0.007)	-0.139***	(0.008)	-0.138***	(0.008)	-0.139***	(0.008)
Employed	Ref.		Ref.		Ref.		Ref.		Ref.	
Retired	-0.127***	(0.014)	-0.101***	(0.014)	-0.109***	(0.014)	-0.108***	(0.014)	-0.109***	(0.014)
Unemployed/looking for work	-0.185***	(0.016)	-0.150***	(0.016)	-0.150***	(0.016)	-0.150***	(0.016)	-0.150***	(0.016)

Table 2 continued

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	se	b	se	b	se	b	se	b	se
Homemaker	-0.247***	(0.014)	-0.216***	(0.014)	-0.213***	(0.014)	-0.212***	(0.014)	-0.213***	(0.014)
Other	-0.260***	(0.020)	-0.219***	(0.019)	-0.215***	(0.019)	-0.215***	(0.019)	-0.215***	(0.019)
Labor market status not known	-0.051***	(0.014)	-0.030*	(0.014)	-0.032*	(0.014)	-0.031*	(0.014)	-0.032*	(0.014)
Constant	0.275***	(0.021)	-0.115***	(0.025)	-0.051	(0.050)	-0.051	(0.050)	-0.052	(0.050)
Country-fixed effects	Yes		Yes		No		No		No	
Adj. R ²	0.23		0.24							
<i>Variance components^a</i>										
Variance literacy slope					0.033		0.035		0.032	
Variance education slope					0.104		0.073		0.107	
Country-level variance					0.033		0.033		0.034	
Individual-level variance					0.508		0.508		0.508	
Log-likelihood					-46,971.6		-46,968.9		-46,971.3	
No. of countries	18		18		18		18		18	
No. of individuals	43,409		43,409		43,409		43,409		43,409	

Source: IALS 1994–1998

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, two-tailed tests

^a All variances significant at $p < 0.05$

Model 3 is a random intercept and random slope multilevel model, allowing us to test our comparative hypotheses. The results are similar to those presented in Model 2 and show no significant relation between cultural performance attendance and a country's level of educational inequality and GDP. Model 4 includes the cross-level interactions with a person's educational level and our measures of a country's educational inequality. In countries with a higher level of educational expansion, education has a significantly smaller effect on cultural performance attendance. This model also controls for a person's literacy skills, implying that status-related aspects of education are less important predictors of cultural participation in countries where educational attainment is more uniform. This is in line with the status hypothesis (Hypothesis 1): in countries with a larger proportion of highly educated individuals, attendance at cultural performances functions less as a status marker. Although the direction of the effect is as we expected (Hypothesis 2), we do not find educational mobility to significantly affect the relation between the status aspect of education and cultural performance attendance. Hence, regardless of the level of social mobility or "openness" of a country, the status-related or net effects of education on cultural performance attendance remain important. This might also indicate that in countries with more social mobility, early (within family) cultural socialization is not equally spread (yet).

Model 5 includes cross-level interactions with a person's literacy skills. Neither the interaction term with educational expansion nor the interaction with mobility is statistically significant. In other words, the association between people's literacy skills and their attending cultural performances is not dependent on a country's level of educational expansion and mobility. This supports the cognitive hypothesis (Hypothesis 4): A person's literacy skills are relevant for participation in cultural events because of the cognitive abilities that these activities require. As expected, country-level educational inequalities do not moderate the relation between cognitive capacities, measured as literacy skills, and cultural participation.

6.2 OLS and multilevel models on reading books

Table 3 presents the estimates for the frequency of reading books. Model 1 (including country-fixed effects) reveals a positive and statistically significant effect of a person's educational level on reading books, in line with previous cultural capital research. Model 1 also shows a positive and significant effect of parents' educational level on reading books. Furthermore, the intensity of reading books increases with age, women tend to read more frequently than men, and those living in rural areas read less frequently. Also in the case of the frequency of reading books, we find considerable variation by labor market status; employed persons read less than almost all other groups.

Model 2 includes a person's literacy skills, which are highly statistically significant in shaping reading behavior. Thus, at the individual level, both status-signaling motives and cognitive aspects of education are relevant predictors of reading books, with the effect sizes in favor of the status-signaling motivation for reading. In line with Hypothesis 3, the effect of education is substantially reduced once an individual's literacy skills are controlled for (the reduction is about 30 %).

Table 3 OLS and multilevel models on the frequency of reading books

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	se	b	se	b	se	b	se	b	se
Years of education	3.803***	(0.069)	2.615***	(0.076)	2.823***	(0.255)	2.686***	(0.162)	2.818***	(0.253)
Literacy			2.270***	(0.063)	2.148***	(0.115)	2.149***	(0.111)	2.139***	(0.114)
Educational expansion/10 × education							-0.290***	(0.088)		
Educational mobility × education							-14.201***	(3.664)		
Educational expansion/10 × literacy					0.033	(0.045)	0.038	(0.044)	0.032	(0.046)
Educational mobility × literacy					8.714***	(1.655)	8.883***	(1.613)	8.976***	(1.690)
Educational expansion/10					0.009	(0.015)	0.008	(0.014)	0.008	(0.015)
Educational mobility										
GDP per capita ppp/1,000										
Parents' education: no or primary	Ref.		Ref.		Ref.		Ref.		Ref.	
Parents' education: lower secondary	0.142***	(0.019)	0.089***	(0.019)	0.079***	(0.019)	0.079***	(0.019)	0.079***	(0.019)
Parents' education: higher secondary	0.297***	(0.020)	0.214***	(0.020)	0.207***	(0.020)	0.206***	(0.020)	0.207***	(0.020)
Parents' education: tertiary education	0.407***	(0.024)	0.311***	(0.024)	0.320***	(0.024)	0.320***	(0.024)	0.320***	(0.024)
Age 26–35	Ref.		Ref.		Ref.		Ref.		Ref.	
Age 36–45	0.137***	(0.017)	0.148***	(0.017)	0.147***	(0.017)	0.146***	(0.017)	0.147***	(0.017)
Age 46–55	0.194***	(0.019)	0.235***	(0.018)	0.233***	(0.018)	0.233***	(0.018)	0.233***	(0.018)
Age 56 and older	0.253***	(0.022)	0.343***	(0.022)	0.336***	(0.022)	0.336***	(0.022)	0.336***	(0.022)
Gender (female = 1)	0.609***	(0.014)	0.614***	(0.013)	0.616***	(0.013)	0.616***	(0.013)	0.616***	(0.013)
Born abroad	0.041	(0.025)	0.182***	(0.025)	0.165***	(0.025)	0.166***	(0.025)	0.165***	(0.025)
Rural domicile	-0.155***	(0.014)	-0.142***	(0.014)	-0.134***	(0.014)	-0.134***	(0.014)	-0.134***	(0.014)
Employed	Ref.		Ref.		Ref.		Ref.		Ref.	
Retired	0.150***	(0.026)	0.211***	(0.025)	0.225***	(0.025)	0.226***	(0.025)	0.225***	(0.025)
Unemployed/looking for work	0.090**	(0.030)	0.170***	(0.030)	0.171***	(0.030)	0.170***	(0.030)	0.171***	(0.030)

Table 3 continued

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	se	b	se	b	se	b	se	b	se
Homemaker	-0.045	(0.027)	0.028	(0.026)	0.043	(0.026)	0.043	(0.026)	0.043	(0.026)
Other	-0.006	(0.037)	0.092*	(0.036)	0.093*	(0.036)	0.093**	(0.036)	0.093*	(0.036)
Labor market status not known	-0.116***	(0.027)	-0.066*	(0.027)	-0.062*	(0.026)	-0.062*	(0.026)	-0.062*	(0.026)
Constant	0.263***	(0.040)	-0.652***	(0.047)	-0.637***	(0.078)	-0.634***	(0.076)	-0.636***	(0.078)
Country-fixed effects	Yes		Yes		No		No		No	
Adj. R ²	0.17		0.20							
<i>Variance components^a</i>										
Variance literacy slope					0.158		0.143		0.148	
Variance education slope					1.055		0.349		1.036	
Country-level variance					0.072		0.068		0.073	
Individual-level variance					1.744		1.744		1.744	
Log-likelihood					-73,754.2		-73,745.5		-73,753.6	
No. of countries	18		18		18		18		18	
No. of individuals	43,409		43,409		43,409		43,409		43,409	

Source: IALS 1994–1998

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, two-tailed tests

^a All variances significant at $p < 0.05$

Note that Model 2 also shows a substantial decline in the impact of parents' educational level and that respondents who were born abroad tend to read more books than natives.

Model 3 presents a random intercept and random slope multilevel model. Educational expansion and GDP are not statistically significantly associated with reading books, but educational mobility is associated positively with an individual's frequency of reading books.

Model 4, again, includes cross-level interactions. In line with Hypothesis 1, we find a negative and statistically significant cross-level interaction between educational expansion and educational attainment. This implies that the status-related aspect of education in relation to reading books is less relevant in countries with a large proportion of highly educated people. In line with Hypothesis 2, the positive effect of educational attainment on reading is also smaller in countries with more educational mobility. Hence, in countries where educational mobility is greater, the status-related aspects of a person's educational level are less relevant for the frequency of reading books. Overall, and in line with Bourdieu's cultural capital theory, our findings support the hypotheses regarding the status aspects of education when it comes to book reading. In countries with a greater share of highly educated individuals and greater educational mobility, a person's educational level becomes less relevant for reading books. In other words, cultural participation—conceived of as the frequency of reading books—functions as a significant marker of a person's social status, but this marker is less relevant in more egalitarian societies.

Model 5 presents estimates of the interactions with literacy score. The results clearly support the cognitive hypothesis regarding reading books (Hypothesis 4): The relation between a person's literacy skills and reading books is independent of a country's level of educational mobility and educational expansion.

In late 2013, the OECD released the Programme for the International Assessment of Adult Competencies (PIAAC) (OECD 2013). The PIAAC is largely comparable to the IALS, albeit with slightly different variables and participating countries. As a robustness check, we tried as much as possible to replicate our models using the PIAAC data.⁶ The PIAAC is more limited in measuring cultural participation and unfortunately only contains information on reading books; it does not provide information about visiting cultural events. As can be seen in the Appendix in Table 5, virtually all findings are the same as when using the IALS, which is reassuring the reliability of our findings.

Note, however, that a higher level of educational expansion no longer reduces the status-related effect of education and book reading, which contradicts Hypothesis 2 and our findings based the IALS data. Although our explanation for this divergence between the findings in PIAAC 2012 and IALS 1994/1998 is tentative, it is possible that high-cultural participation has 'lost' its distinctive character in determining lifestyles. Earlier studies have pointed out that cultural repertoires are subject to change, with younger generations being less strongly socialized toward traditional forms of high culture (Peterson 1997; Van Eijck and Knulst 2005). Moreover, as

⁶ Germany and Canada were not included because of missing recent data on level of educational expansion.

pointed out by Bellavance (2008), distinctions in 'new versus old' tastes replace the high–low distinction, and particularly reading books may suffer from emerging alternative forms of information gathering and reading as provided by computers and the Internet. Even if reading still has a status element to it, that status element will not differ across societies where new (digital) forms of behavior have entered the repertoire of young highly educated people (see also Table 6).

Furthermore, when educational expansion has reached its contemporary high levels, the context that we hypothesized to be essential for determining the status element of education may become indistinctive. With educational expansion reaching its current levels, tertiary participation may no longer be a good indicator for assessing the contextual status dimension of education. With educational expansion, inequalities in education 'move up' in the system, leading to more pronounced inequalities within tertiary education between first and second tier institutions (Shavit et al. 2007). This calls for more diversified measures of tertiary educational participation rates, which are currently not available for a large collection of countries. Nevertheless, generally, we may conclude that also using different data, cognitive aspects of education are highly relevant for reading books, regardless of a country's educational distribution, whereas the status-related (net) effects of education are lower in countries where educational mobility is higher.

7 Discussion and conclusions

The main question motivating this study was to what extent educational stratification in cultural participation is an expression of one's social status and to what extent does it reflect a person's cognitive capacity. Cultural participation is a significant driver of the transmission of inequality over generations. However, the question remains to what extent this has to do with status-related incentives or intellectual competencies. To answer this question, we examined individual educational differentiation in cultural participation, and, more important, at the same time, asking how this differentiation is affected by educational disparity at the national level. Two theories were drawn upon to explain highbrow cultural participation. Educational stratification in cultural participation can be understood as a result of differences in the amount of social status confirmation that is achieved by participation (Bourdieu 1984) or as a result of social differences in the intellectual competencies by cultural consumers (Ganzeboom 1984, 1989). In the current study, we disentangled status-related and cognitive aspects of the relation between education and cultural participation by including in our analyses a person's literacy skills, representing a person's cognitive abilities, alongside a person's educational level, which then was hypothesized to represent the non-cognitive, as in status-related part of education's effect.

Our findings, using IALS data from 18 countries, show that both cognitive skills and status-related incentives explain the relation between education and cultural participation, with the latter being more decisive. Moreover, in countries with lower levels of educational inequality (i.e., higher levels of educational expansion and mobility), cultural participation seems to generate less status rewards for the higher

educated, confirming the reduced status incentives for cultural participation in more equal societies. Our findings also suggest that the intergenerational transmission of status-related benefits, as in more elite cultural preferences and behaviors, is less relevant in more equal societies. This is highly relevant for governments and policy makers, since this study suggests that reducing educational inequality results in less inequality in other domains. By contrast, the relation between a person's literacy skills (i.e., the cognitive aspect of education) and cultural participation is stable, regardless of a country's educational inequality. This corroborates the cognitive aspect of the relation between educational level and cultural participation and refers to the relevance of literacy skills for participation in all societies.

In this study, we interpreted the non-cognitive aspect of education's effect on cultural participation as the (net) status effect. However, this may be disputed. For instance, part of this effect could relate to a person's income, expectations of experiencing relaxation, or may run via social networks such as peers and partners. Income, however, appears less relevant according to prior cultural capital research, especially when taking educational level or occupational status into account (Chan and Goldthorpe 2007a; Ganzeboom 1989; Van Eijk 1999). Also, cultural participation is found to affect a person's network and vice versa (see, e.g., Lizardo 2006). However, since we controlled for a person's cognitive skills, such network influences are most likely related to group identity, a form of status expression. Finally, recent studies show that cultural participation might be better understood by including emotional motivations, as in the expectation of relaxing and positive emotions (e.g., Casarin and Moretti 2011). Yet, these modes are considered as mediators of the impact of a person's cultural capital on cultural consumption (Caldwell and Woodside 2003), related to both cognitive and non-cognitive aspects of education. Nevertheless, we certainly acknowledge these influences in that the non-cognitive aspect of education might comprise a broad variety of social status-related motivations and aspects.

This study also encountered some data limitations. First, our measurement of cultural performance attendance covers multiple genres, some of which are not conceptually defined as highbrow. Classical concerts, after all, are significantly different from pop concerts and moviegoing. Due to this more general measure of cultural consumption, our analysis may even underestimate educational stratification in cultural participation. A more detailed measurement of cultural activities would be informative. Second, while the IALS is at present the most suitable cross-national dataset to answer our research question, it dates from the late 1990s and its coverage of cultural participation is restricted to rather traditional areas. Therefore, we replicated part of our study on the recent PIAAC data, which largely confirmed our findings. However, it also shows that educational expansion no longer reduces the status-related effect of education on reading books. This implies a need for more in-depth future research on cultural participation in modern societies. Unfortunately, the PIAAC does not contain other types of cultural participation. Since social cleavages are also found in "new" culture and media consumption patterns (e.g., DiMaggio et al. 2004; Notten and Kraaykamp 2009), it would be interesting to unravel the impact of context factors on status and cognitive motivations for contemporary forms of cultural participation, using more recent data as well. In modern and highly educated societies, other social boundaries or distinctions may

arise, which may be no longer or significantly less related to the traditional social and educational hierarchy (Beck 1992; Castells 1996; Katz-Gerro and Jaeger 2013; Peterson and Kern 1996).

Above all, this study shows that the status-based explanation of educational inequality in cultural participation is strongly dependent on distributional aspects of education, while the cognitive explanation does not significantly depend on distributional characteristics. Educational expansion and in particular intergenerational social mobility reduce education's function as a status marker. This finding is commensurate with the arguments of Wilkinson and Pickett (2009) on effects of social inequality. Although their work is about income inequality, we also find that if distributions change, so too does the status element of stratifying variables, such as education. Cultural consumption strongly depends on a person's intellectual abilities, in addition to status-related incentives. However, when the social context becomes less stratified, highbrow cultural consumption seems to lose its function as a marker of the status elite and, subsequently, plays a less dominant relevant role within the intergenerational transmission of inequality.

Appendix

See Tables 4, 5, 6.

Table 4 Country-level variables, IALS

Country	Educational mobility ^a	GDP per capita ppp ^b	Educational expansion ^c
Canada (CA)	-0.20	21,808	90
Switzerland (CH)	-0.12	28,094	32
Germany (DE)	-0.18	21,691	42
United States (US)	-0.14	26,578	79
Ireland (IR)	-0.19	19,544	40
Netherlands (NL)	-0.16	20,540	47
Poland (PL)	-0.20	6,794	27
Sweden (SE)	-0.14	20,679	40
New Zealand (NZ)	-0.07	18,108	59
Great Britain (GB)	-0.14	21,108	50
Belgium (BE)	-0.20	22,814	54
Italy (IT)	-0.25	23,863	47
Norway (NO)	-0.21	27,407	63
Slovenia (SI)	-0.24	15,688	45
Czech Republic (CZ)	-0.16	14,413	24
Denmark (DK)	-0.18	26,124	52
Finland (FI)	-0.13	22,557	79
Hungary (HU)	-0.18	10,631	31

^a Source: IALS 1994/1998 (own calculations), ^b Source: Worldbank (2013), ^c Source: UNESCO (2013)

Table 5 OLS and multilevel models on the frequency of reading books, PIAAC

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	se	b	se	b	se	b	se	b	se
Years of education	0.129***	(0.002)	0.092***	(0.002)	0.088***	(0.005)	0.086***	(0.004)	0.088***	(0.005)
Literacy			0.006***	(0.000)	0.006***	(0.000)	0.006***	(0.000)	0.006***	(0.000)
Educational expansion/10 × education							0.000	(0.000)		
Educational mobility × education							-0.159*	(0.077)		
Educational expansion/10 × literacy										
Educational mobility × literacy										
Educational expansion/10										
Educational mobility										
GDP per capita ppp/1,000										
Parents' education: primary/lower secondary	Ref.		Ref.		Ref.		Ref.		Ref.	
Parents' education: higher secondary	0.216***	(0.012)	0.169***	(0.011)	0.167***	(0.011)	0.167***	(0.011)	0.167***	(0.011)
Parents' education: tertiary	0.361***	(0.014)	0.269***	(0.014)	0.278***	(0.014)	0.278***	(0.014)	0.278***	(0.014)
Age 26–35	Ref.		Ref.		Ref.		Ref.		Ref.	
Age 36–45	0.142***	(0.013)	0.148***	(0.013)	0.150***	(0.013)	0.150***	(0.013)	0.150***	(0.013)
Age 46–55	0.262***	(0.014)	0.305***	(0.014)	0.310***	(0.014)	0.310***	(0.014)	0.310***	(0.014)
Age 56 and older	0.402***	(0.015)	0.474***	(0.015)	0.483***	(0.015)	0.484***	(0.015)	0.483***	(0.015)
Gender (female = 1)	0.631***	(0.009)	0.643***	(0.009)	0.645***	(0.009)	0.645***	(0.009)	0.645***	(0.009)
Born abroad	-0.021	(0.016)	0.153***	(0.016)	0.151***	(0.016)	0.152***	(0.016)	0.151***	(0.016)
Employed	Ref.		Ref.		Ref.		Ref.		Ref.	
Unemployed	0.033	(0.018)	0.082***	(0.018)	0.086***	(0.018)	0.086***	(0.018)	0.086***	(0.018)
Retired	0.094***	(0.017)	0.148***	(0.016)	0.141***	(0.017)	0.141***	(0.017)	0.141***	(0.017)
Homemaker	-0.079***	(0.019)	-0.059**	(0.018)	-0.054**	(0.018)	-0.053**	(0.018)	-0.054**	(0.018)
Labor market status not known	0.009	(0.031)	0.050	(0.031)	0.050	(0.031)	0.050	(0.031)	0.050	(0.031)

Table 5 continued

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	se	b	se	b	se	b	se	b	se
Constant	-0.059	(0.033)	-1.347***	(0.043)	-2.012***	(0.458)	-2.007***	(0.455)	-2.016***	(0.453)
Country-fixed effects	Yes		Yes		No		No		No	
Adj. R ²	0.18		0.20							
<i>Variance components^a</i>										
Variance literacy slope					0.000		0.000		0.000	
Variance education slope					0.000		0.000		0.000	
Country-level variance					0.196		0.193		0.192	
Individual-level variance					1.732		1.723		1.723	
Log-likelihood					-143,946.9		-143,944.9		-143,945.4	
No. of countries	19		19		19		19		19	
No. of individuals	85,068		85,068		85,068		85,068		85,068	

Source: PIAAC

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed tests

^a All variances significant at $p < 0.05$

Table 6 Country-level variables PIAAC

Country	Educational mobility ^a	GDP per capita ppp ^b	Educational expansion ^c
Czech Republic (CZ)	-0.11	25,300	64
Denmark (DK)	-0.064	40,588	74
Estonia (EE)	-0.087	20,092	64
Finland (FI)	-0.078	36,030	94
France (FR)	-0.17	34,276	57
Ireland (IE)	-0.15	41,013	66
Italy (IT)	-0.28	32,085	65
Japan (JA)	-0.084	33,668	60
Austria (AT)	-0.099	40,401	68
Korea (KO)	-0.11	28,613	103
The Netherlands (NL)	-0.07	41,673	65
Belgium (BE)	-0.11	37,828	71
Norway (NO)	-0.049	57,452	74
Poland (PL)	-0.14	20,036	72
Slovakia (SK)	-0.17	23,187	55
Spain (ES)	-0.18	31,575	78
Sweden (SE)	-0.043	39,251	74
United Kingdom (UK)	-0.089	35,294	60
United States (US)	-0.13	46,616	95

^a Source: PIAAC 2012 (own calculations), ^b Source: Worldbank (2013), ^c Source: UNESCO (2013)

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