Chapter 26

Social Cage
(socio-economic status and intelligence in Hungary)*

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These days we need to explain to our children what the historical notion "conscription" meant. Not too many people feel sorry about the abolition of the compulsory military service in Hungary. But it had at least one desirable side effect: It created the opportunity to test a very large and representative cross section of the population within a well defined age-group.[26.1] In this article we report some results from one such study.

Out of the 73 thousand conscripts in 1998, a representative sample of 8000 18 year old male conscripts was selected by the Hungarian Central Statistical Office (HCSO)[26.2]. Almost 7000 of them completed the Standard Progressive Matrices **Plus** (SPM+) and a questionnaire covering many background variables. This chapter explores the interesting relationships between these variables themselves and with SPM+ scores.

Our working definition of socio-economic status (SES)

Because very few of the conscripts answered the direct questions about the incomes of their families - which could have led to a more sophisticated classification of their background socio-economic status - it was necessary to construct an index based on the *Combined Educational Level of their Parents* (CELP).

There is ample evidence from other studies that education and income are strongly correlated. Kézdi (2005), based on Hungarian national statistics, shows that this is also true in Hungary (Figure 26.1).[26.3] The Hungarian national statistics also show that, not only is there a strong correlation between education and income, but that the income yield of an additional school year to the "standard" 8 years of schooling steadily increased between 1989 and 2002, thus reinforcing the common belief that knowledge – or at least credentials – is/are getting more and more important in the labour market (Figure 26.2).[26.4]

We calculated our CELP (Combined Educational Level of Parents) indices by summing the educational levels of both parents (coded individually) according to the following scheme (cases where data was not given for one or both parents were omitted from the calculations):

- 0 points - unfinished elementary school
- 1 point – finished elementary school
- 2 points – secondary school
- 3 points – higher education

The published statistical data about the education of the Hungarian people present a depressing picture: Almost a million adults did not

Figure 26.1. **Income Yield of Schooling in Hungary**[*]
Hungarian Statistical Bureau, 2002
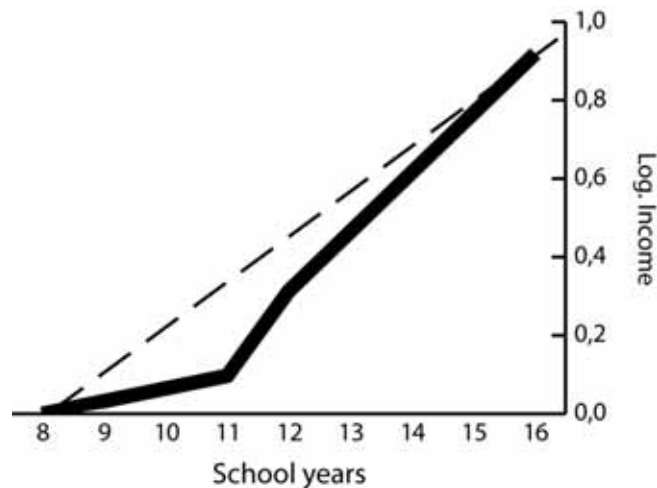
[*] Extracted from Gábor Kézdi (2005), Education and Earnings pp. 31-37 *in* Károly Fazekas and Júlia Varga (eds.), *The Hungarian Labour Market Review and Analysis, 2005*. Budapest: Institute of Economics HAS - Hungarian Employment Foundation.

Figure 26.2. **Income Yield of an Additional School Year to the Standard Eight Years of Schooling (in Percentages)**
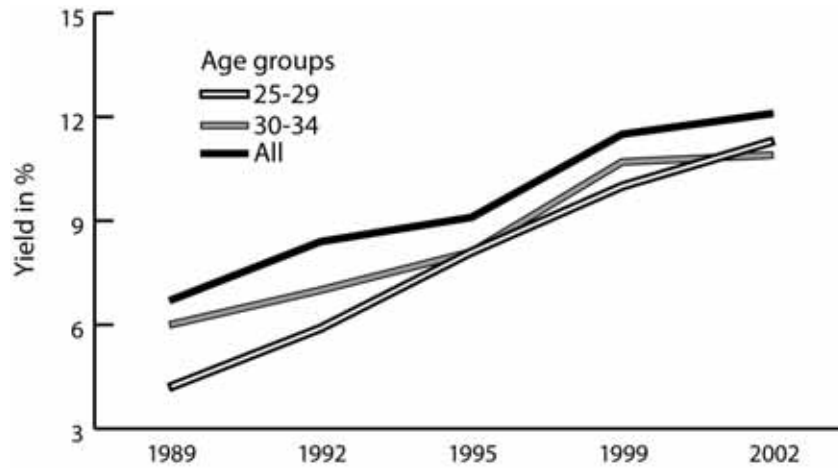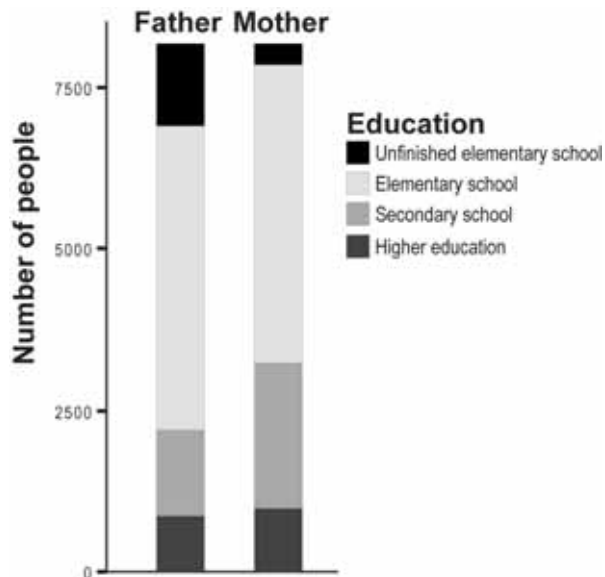Hungarian Statistical Bureau, 2002

Figure 26.3. **Education of Parents**
1998 Sample of Conscripts

complete elementary education (and males were less likely to do so than females). These overall statistics are well reflected in our data (Figure 26.3).

In what follows we will use our Combined Educational Level of Parents (CELP) indices as a proxy for the 18 year olds' socio-economic status (SES).

Looking at the distribution of the CELP (Figure 26.4) we see a distribution skewed to the left where most families would have a combined educational level of 2. As we can see this is mostly as a result of both parents having only an elementary school education.

Figure 26.4. **Distribution of the Combined Educational Level of Parents**
1998 Sample of Conscripts
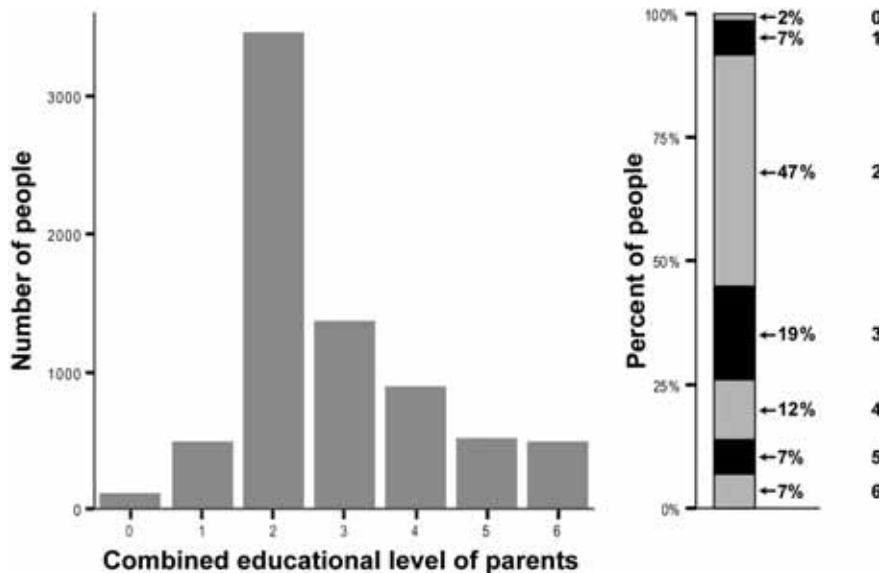
The re-generation of socio-economic status in society

In this part of the paper we explore how SES regenerates itself. We explore this issue in three stages (Figure 26.5)

1. **Before birth effects**
   Parents tend to marry from the same SES than themselves. The environment and habits of parents have a significant effect on the attributes of their child at the earliest age.

2. **Childhood effects**
   Through the environment and habits of the family - and increasingly through the personal choices of the son himself - the effects of SES are amplified during the years of childhood and education.

3. **Habits, education and intelligence (at the age of 18)**
   By the age of 18, the difference between the SPM+ scores of young people from families having different CELP indices is significantly different not only statistically but also in absolute terms: CELP – and so probably SES – largely determines the level of education of the young generation in Hungary (see later).

We will consider these three stages in more detail now.

Figure 26.5. **Steps to Regenerate Socio-Economic Status**
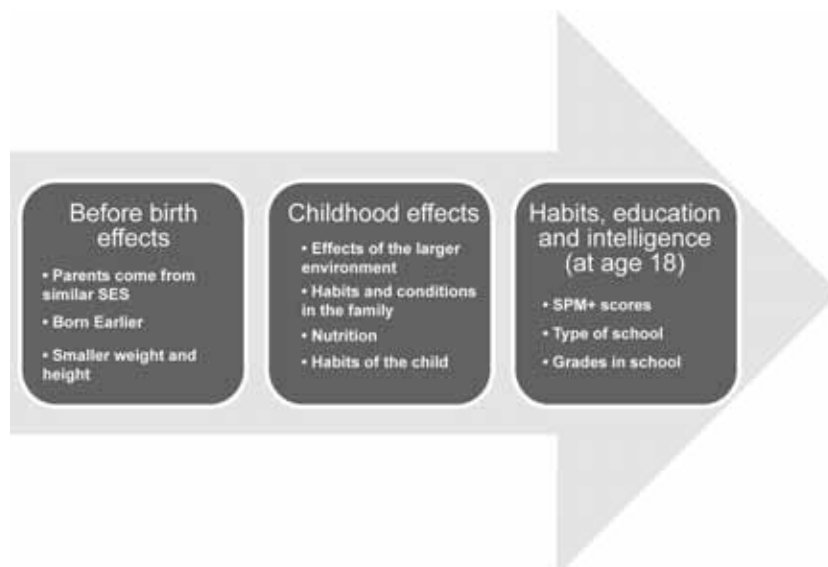
1. Before-birth effects

There are many indications that SES affects the future of the unborn babies through the nutrition, type of work, habits (like smoking, drinking etc.) of parents (especially the mother). After demonstrating how similar parents' educational levels in Hungary are, we will see that low SES children are born sooner, with smaller height and weight.

We seem to live in social cages – marriages are most likely made among people with very similar educational levels. The correlation between the educational levels of parents was 0.57. The difference between the educational levels of parents is most likely to be zero (Figure 26.6). In fact two-thirds of the parents in our study had identical educational levels (mostly they both had only elementary education; Figure 26.7).

In families with very low socio-economic status (CELP 0 or 1) children are born significantly sooner (Figure 26.8) with lower height (Figure 26.9)

Figure 26.6. **Difference between Educational Levels of Parents**
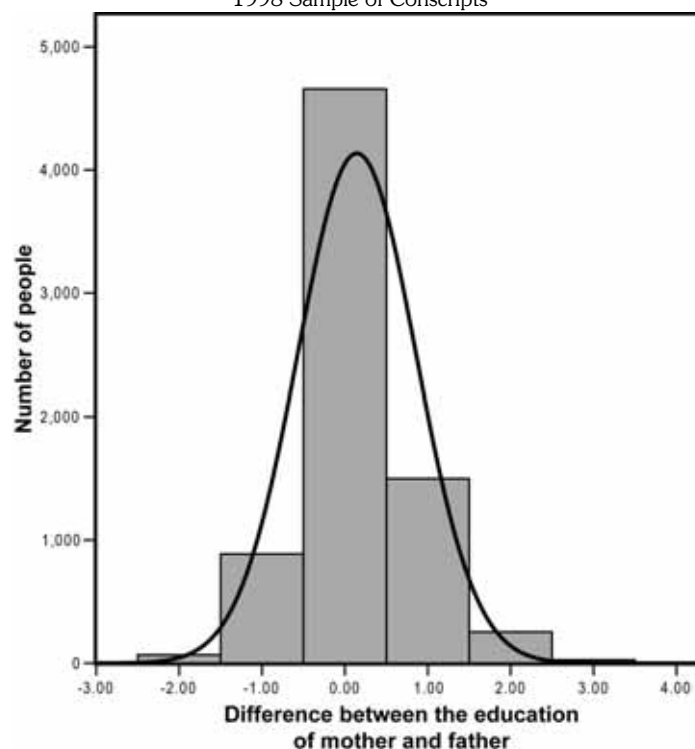1998 Sample of Conscripts

Figure 26.7 **Educational Level of Parents**
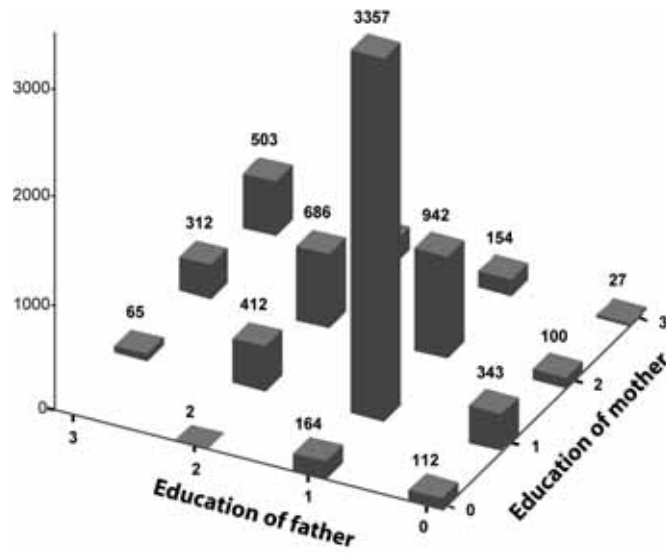1998 Sample of Conscripts

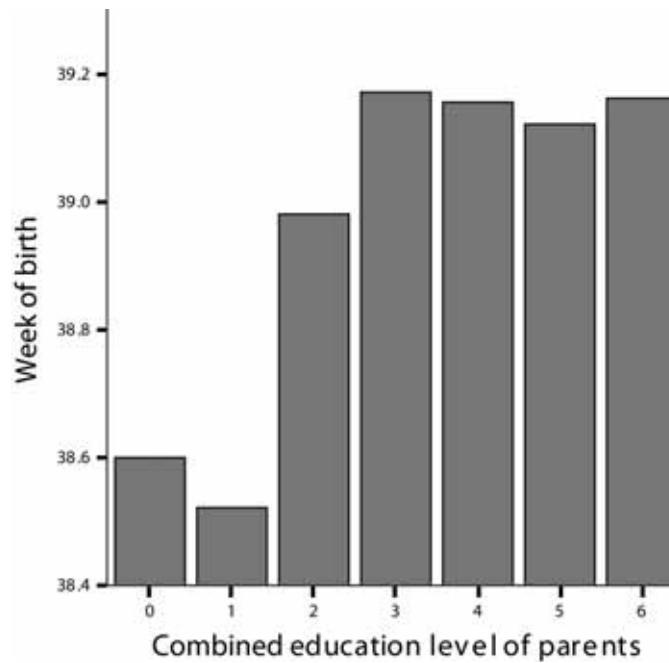Figure 26.8. **Week of Birth in Relation to the Combined Education Level of Parents**

Figure 26.9. **Height at Birth in Relation to the Combined Education Level of Parents**
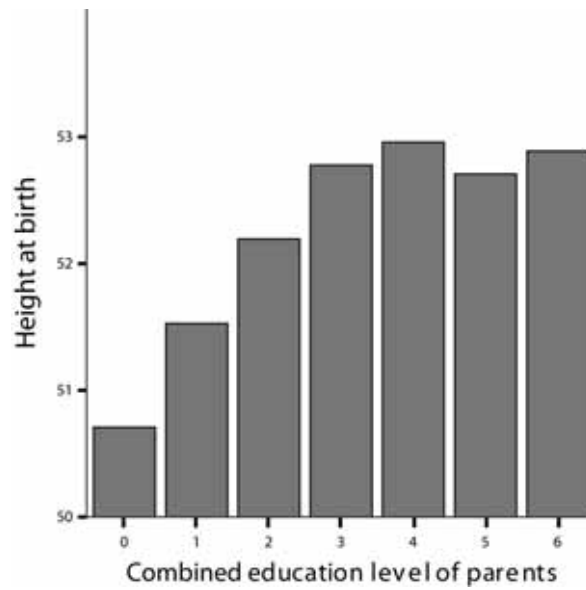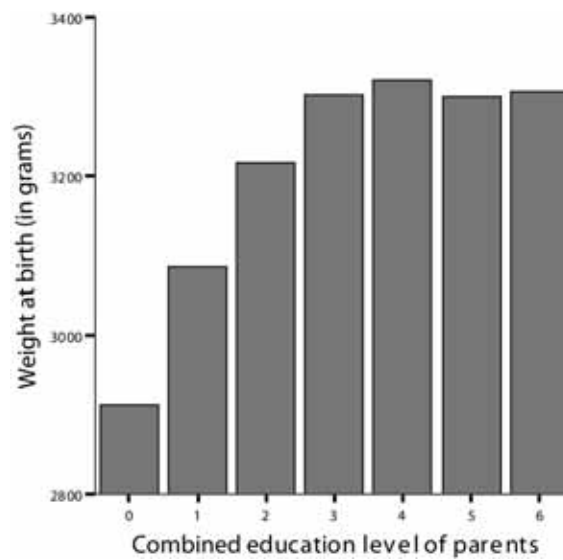1998 Sample of Conscripts

Figure 26.10. **Birth Weight in Relation to the Combined Educational Level of Parents**
1998 Sample of Conscripts

and weight (Figure 26.10) than those raised in higher socio-economic status groups (where CELP is 3 or more). In the later group of families there is no detectable relation between socio-economic status on one side and height or weight at birth or length of pregnancy on the other side. The biggest group – 47% of the families, where CELP is 2 – lies in these respects between the lower (0-1) and higher (3-5) CELP groups.

The relationships documented in Figures 26.8, 26.9 and 26.10[26.5] may be due to such things as the lifestyles of the parents including their nutrition and general health prior to giving birth. Or they may be, at least in part, due to genetic characteristics.

At the age of 18, the relationship between the socio-economic status of the parents and the respondent's height is even stronger then it was at birth (Figure 26.11).

Figure 26.11. **Height of Son at Age 18 in Relation to CELP**
1998 Sample of Conscripts
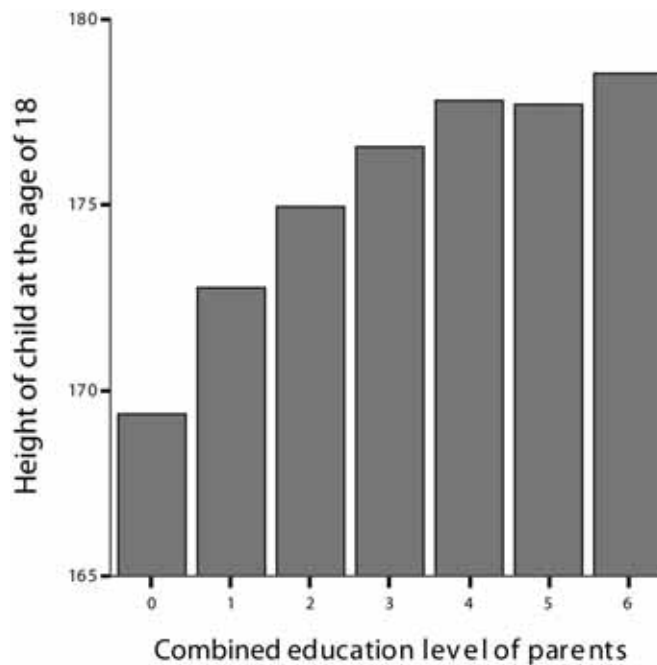
2. Childhood effects

In this section we enumerate a number of factors that – through the environment, and habits of the family, but also through the own choices of the child – amplify the effects of socio-economic status:

- Area of Residence of the respondent
- Number of books in the family
- Having a computer in the family
- Nutritional habits
- Other habits like smoking, number of times the respondent takes a shower or brushes his teeth.

Rather than suggesting that these variables are all in a causal relation to the educational level of the parents, they point to the conclusion that there is a very wide range of interdependent circumstances and behaviours that recursively strengthen the effect of each other and are all strongly related to CELP, and so possibly socio-economic status.

Area of residence

Figure 26.12 shows the percentages of respondents residing in different types of settlement. This is a good sample of the total Hungarian population. In both the sample and the nation, most of the population live in smaller settlements.

Figure 26.12. **Distribution of the Residence of the 1988 Sample of Conscripts**
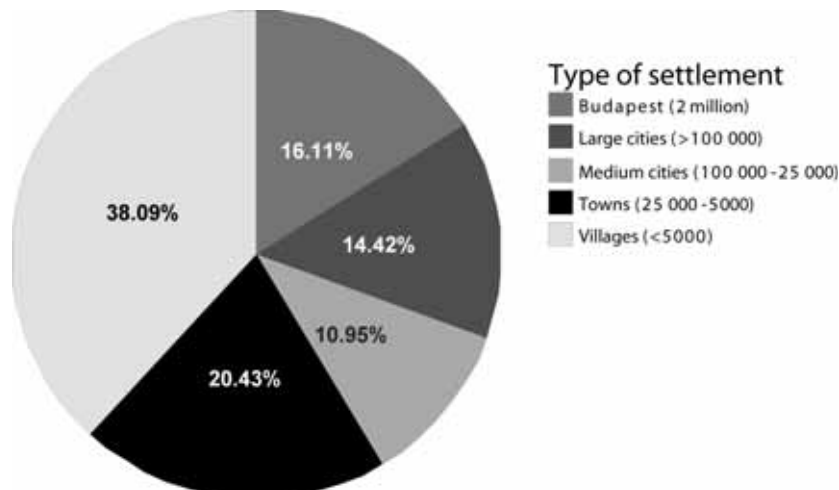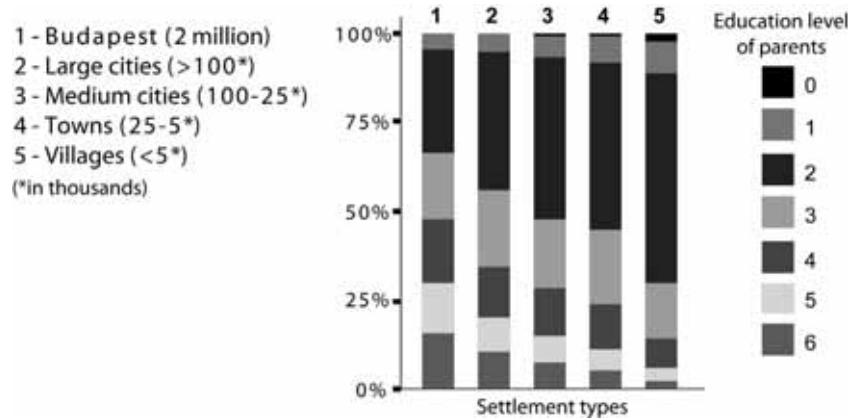
Figure 26.13. **Education Level Of Parents in Different Settlement Types**
1998 Sample of Conscripts

1 - Budapest (2 million)
2 - Large cities (>100*)
3 - Medium cities (100-25*)
4 - Towns (25-5*)
5 - Villages (<5*)
(*in thousands)

The educational level of the parents varies between the types of settlement (Figure 26.13): respondents who have parents having higher educational levels tend to live in larger settlements.

Number of books in the family

Many studies have shown that the relationship between children's school performance and the "cultural goods" in the family is even stronger than that with "monetary goods".

Figure 26.14 illustrates that, in our sample, the number of books in the family increases steadily with the combined educational level of the parents. (The category with the question mark is made up of respondents who – due to ambiguity in the instructions – entered 0 as the category number. Since this category did not exist in the questionnaire we believe that – like those in the next category – these respondents were indicating that there were no books in their homes.)

No wonder that in Hungary the reading achievement of children from high SES families is far better than that of children from low SES families – and that this difference is much bigger than in most other countries.[26.6]

Having a computer in the family

Computer literacy can be a passport to many future jobs and opportunities. Having a computer in the family probably increases the chances that a

Figure 26.14. **Number of Books in the Family in Relation to the Combined Education Level of the Parents**
1998 Sample of Conscripts
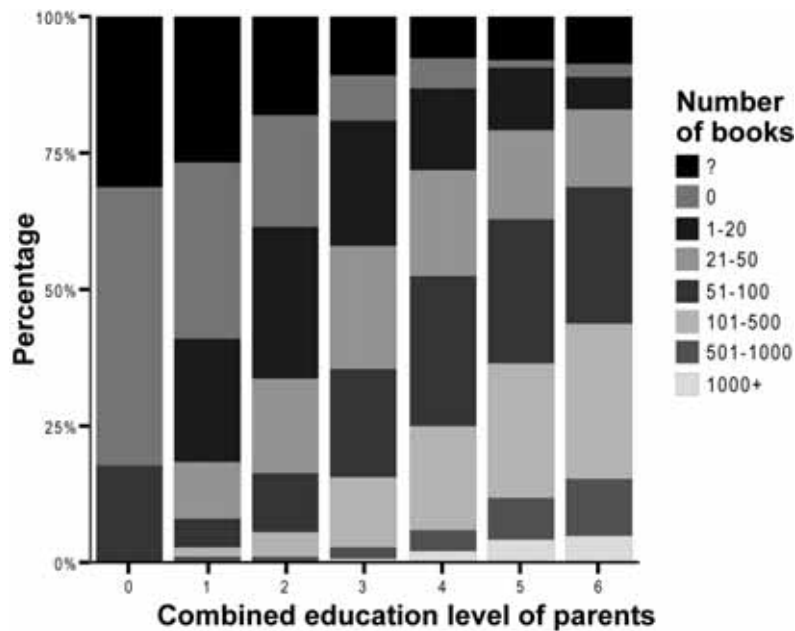
young person will have a useful knowledge of computers by the time he leaves school. As might be expected, the chances of finding a computer in a household depends heavily on the socio-economic status of the family (Figure 26.15).

Nutritional habits

Respondents indicated the frequency with which they consumed 19 different types of food. Out of these data we created nutrition habit factors by studying the relationships between the consumptions of these products. We named the three nutritional habit factors we identified as Fast food, Healthy food and Fat food (Table 26.1).

As expected, nutritional habits vary between respondents coming from different socio-economic backgrounds (Figure 26.16):

- there is a positive correlation between SES and the frequency of Healthy food consumption – respondents from low Socio-Economic backgrounds eat little Healthy food, while those from high SES backgrounds eat significantly more,

Figure 26.15. **Having a Computer in the Family Depends on CELP**
1998 Sample of Conscripts

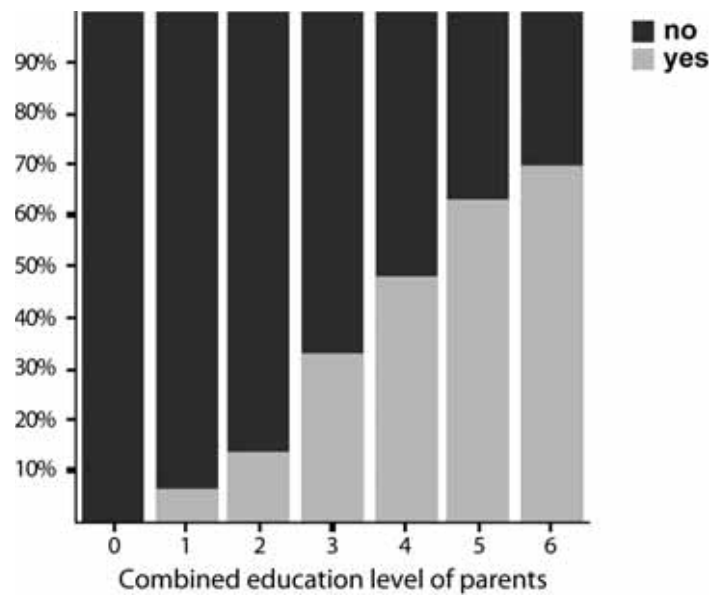**Table 26.1. Factor Loadings on the Three Factors of Different Types of Food Consumption** (only absolute values larger than 0.15 appear)

	Fast food	Healthy food	Fat food
Hamburger, Hot-Dog	.80		
Cola	.70		
Chips	.76		
Vegetables (raw)		.76	
Fruits		.74	
Milk, cheese, quark		.67	
Bacon			.82
Bread and dripping			.83

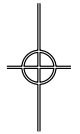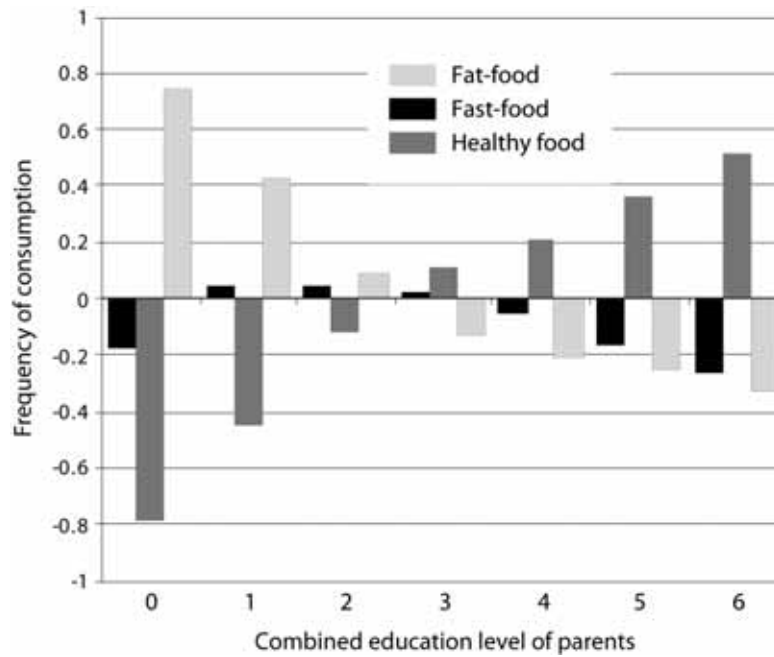Figure 26.16. **Nutrition Habits and Socio-Economic Status**
1998 Sample of Conscripts

- there is a negative correlation between SES and the frequency of Fat-food consumption – respondents from low SES backgrounds eat a lot of Fat-food, while those from high socio-economic backgrounds eat less,
- respondents from both very low and very high SES backgrounds eat Fast food more frequently than those in between.

3. Habits, education, and intelligence (at age 18)

HABITS

Childhood environment can have a long-lasting effect.[26.7] Below we will see that the habits and attitudes of our 18 year olds were closely related to the SES of their families (in the following low SES = CELP 0-2, high SES = CELP 3-6).

Drinking

Drunkenness is less common among 18 year olds coming from low CELP families than those from high CELP families (Figure 26.17).

Drugs

Although those from High SES backgrounds were more likely to disapprove of trying cannabis (Figure 26.18), there was no difference in the frequency of regular use.

Figure 26.17. **Socio-Economic Status and Overdrinking (i.e. Have you been drunk in the last month?)** 1998 Sample of Conscripts
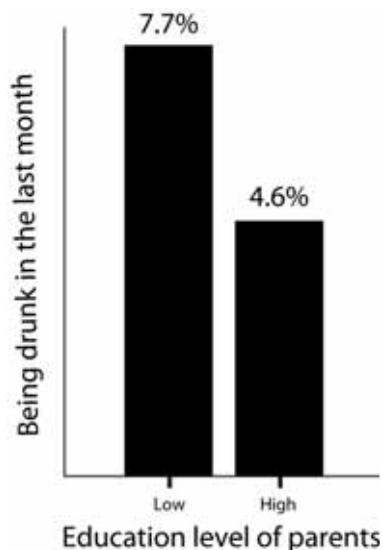
Figure 26.18. **Socio-Economic Status and Drugs (i.e. Do you disapprove trying cannabis?)** 1998 Sample of Conscripts
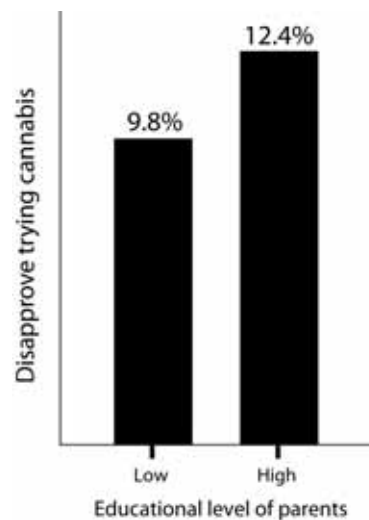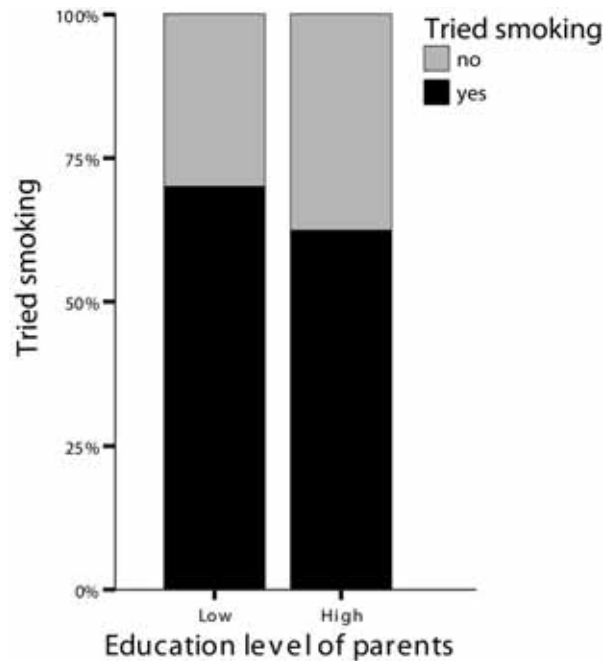
Figure 26.19. **Smoking and Socio-Economic Status**
(i.e. Have you *ever* tried smoking?)
1998 Sample of Conscripts

Smoking

Low SES background is somewhat associated with smoking.

EDUCATION

The *highest* education the conscript obtained by the time of the conscription at the age of 18 was strongly related to CELP (Figure 26.20).

Practically the only respondents who could not finish elementary school by the time of conscription (18 years of age) were those whose parents' combined educational level was 2 or less.

The highest proportion having attended vocational school were those whose parents had a combined educational score of 2. Thus it seems that vocational school is possibly too demanding for youngsters coming from 0 and 1 backgrounds but is less and less attractive to those whose parents had combined scores of 3+.

The percentage of respondents who had completed secondary school by the time they were 18 steadily increases with the combined

Figure 26.20. **The Highest Education of the Conscript in Relation to the Combined Educational Level of the Parents**
1998 Sample of Conscripts
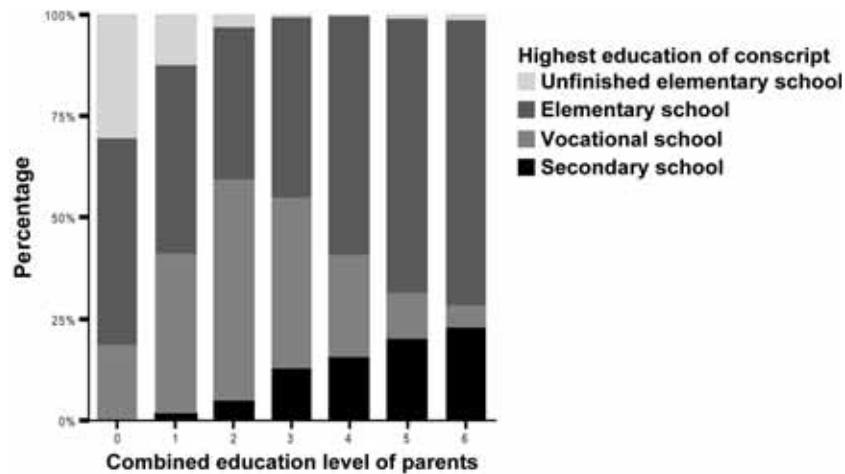
educational level of their parents. Where only one parent had finished elementary school the respondent had a less than a tenth of the chance (2% as opposed to 23%) of getting into secondary school than those whose parents both had higher education. In fact, we were shocked to find that, in families where neither of the parents had finished elementary school (more than 100 cases) not one of the respondents had completed secondary school – which is virtually the only way to get into university – by the age of 18.

INTELLIGENCE

Distribution and validity of the *Raven Standard Progressive Matrices Plus* data.

Although the lower tail of the distribution was more curtailed than we expected, there was no major distortion in the distribution and the average score of the sample was exactly the same as in the representative sample of 18 year olds in Romania (Figure 26.21).

To compensate for intentional faking of low scores (see the chapters in this book authored by Kim McKinzey), we omitted all scores that were more than 4 standard deviations below the mean. In practice this meant a raw score of 6 or below. Even by answering at random a respondent would normally get a score of about 7. By doing this we excluded 0.2

Figure 26.21. *Standard Progressive Matrices Plus*
Hungarian Standardisation among 18 year Old Conscripts
Distribution of raw scores
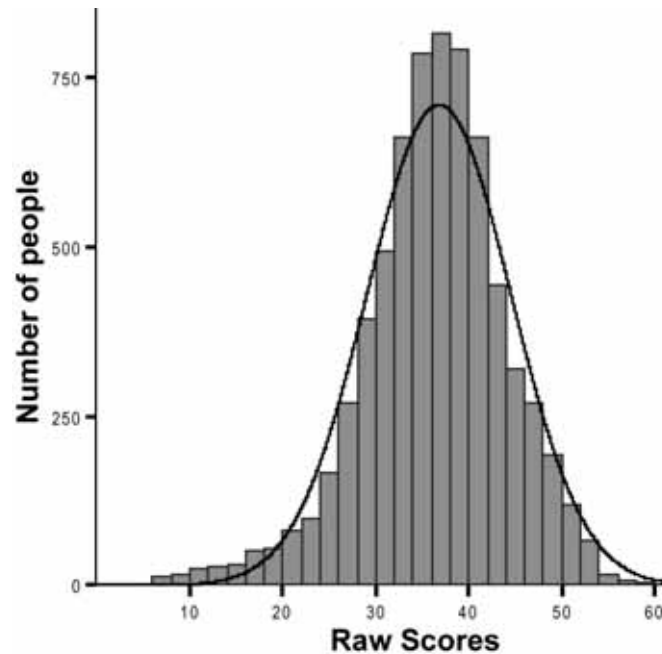
percent of our sample. Altogether we believe that this exclusion did not significantly change the properties of the sample.

The average of the resulting distribution was 36.8; its standard deviation was 7.7. The maximum score in the sample was 60 – the highest possible score in the test. Scores below 6 were treated as missing data.

Socio-Economic Status and SPM+ score

A large body of literature exists on the relationship between SES and RPM scores.

However, we must begin with a warning regarding overinterpretation of differences between groups. It must always be borne in mind that there are huge individual differences within each group.

More than half a century ago, Anastasi noted in his *Differential Psychology* that, since the assessment of the American soldiers' intelligence during the first world war, the relationship between intelligence

and SES is the best documented fact in psychology.[26.8] In the 40's a study with 80 thousand respondents demonstrated that there are significant differences in the intelligence of people having different jobs (e.g. accountants, teachers vs. workers, farmers). In America, also in the 40's, the intelligence of kindergarten age children coming from highly educated families were 20 points (more than 1 SD) higher than those whose parents were workers, and this difference was about the same at age 18.

We will not enter here into the debate about heredity vs. environmental effects[26.9] but simply want to state that large-scale Hungarian studies – being part of international evaluations – show that in our country the achievement differences in cognitive tasks (e.g. tasks with inductive thinking, mathematical problems) between children coming from different SES families are especially big.[26.10] According to the PISA – 2000 study[26.11], carried out in 32 countries with 250 thousand students, the students coming from first quartile SES families have twice as big chance to have their school achievements in the lowest 25 percentile, than their schoolmates. And among all the countries in this study the achievement differences attributed to SES were the biggest in Hungary.

In the course of the present study we have already mentioned several differences between different SES groups, but none of these were as profound as the differences in intelligence. Figure 26.22 shows how the average score on SPM+ increases with the combined education level of parents.

While in families in which neither of the parents completed elementary school respondents' average score on the SPM+ was 28, in families where both parents had higher education, the average score was 43 – 2 Standard Deviations higher.

In fact, as Figure 26.23 shows, there is very little overlap between the scores of respondents from the highest and lowest educational backgrounds.

We can examine the relationship between SPM+ scores and combined educational level of parents' (shown in Fig. 26.22) in more detail by looking at the effect that the educational level of each parent separately has on SPM+ performance (Figure 26.24).

Figure 26.24 shows that SPM+ scores increase with the educational level of either parent. However, the most dramatic increase occurs among those whose father did not complete elementary school. It is also interesting to note that, so far as SPM+ score is concerned, those whose parents have a university or college education have only a small advantage over those whose parents have only secondary education.

Figure 26.22. *Standard Progressive Matrices Plus*
SPM+ Scores as a Function of Parental Education
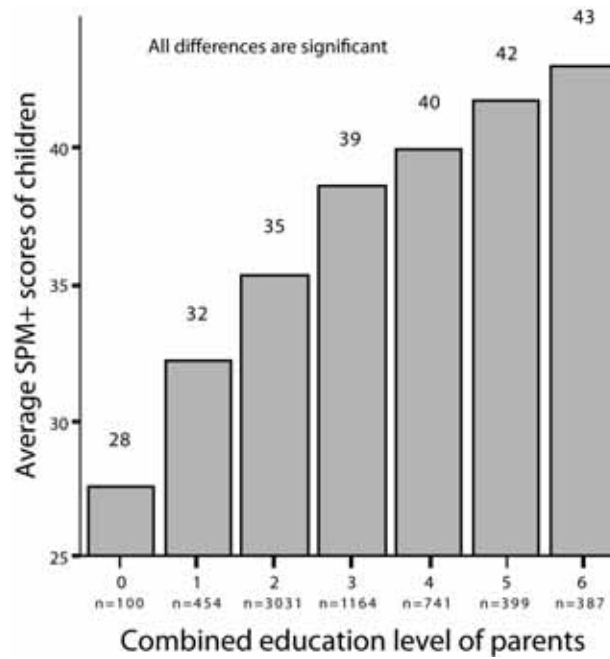Hungarian Standardisation among 18 year Old Conscripts

Figure 26.23. *Standard Progressive Matrices Plus*
**SPM+ Scores of Conscripts with Very Low and Very High
Socio-Economical Background**
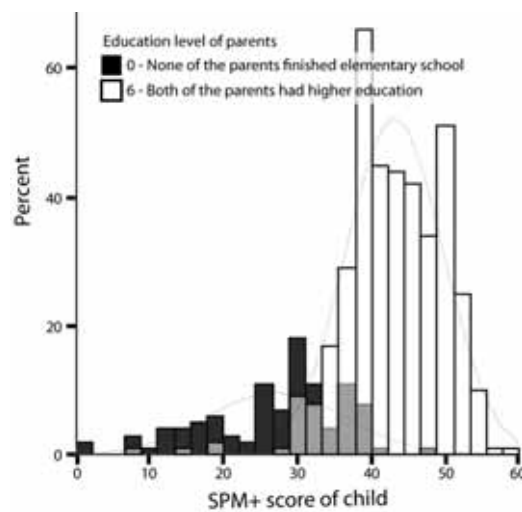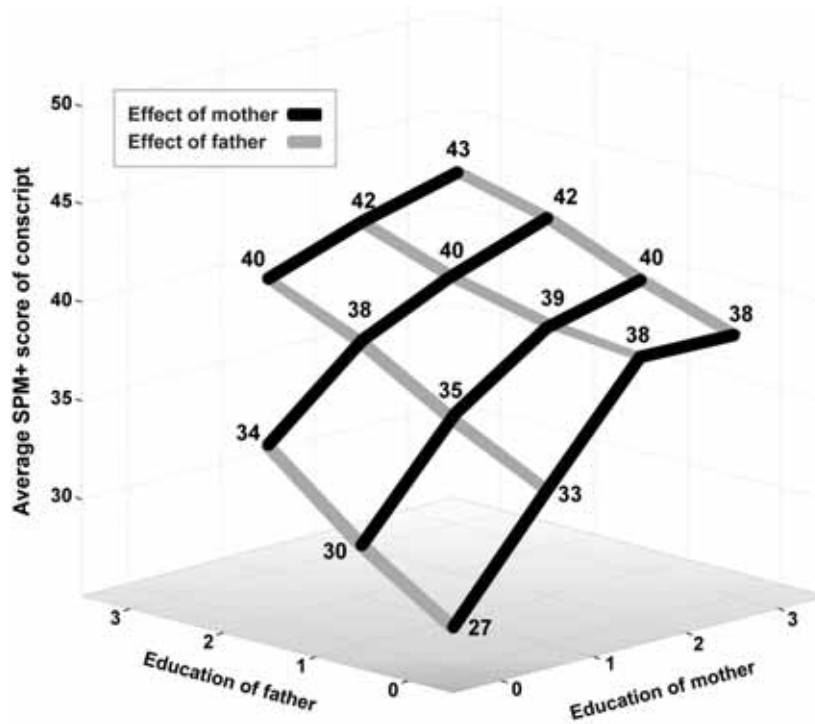Hungarian standardisation among 18 year old conscripts

Figure 26.24. *Standard Progressive Matrices Plus*
Scores of Conscripts in Relation to the Educational Levels of Both Parents
Hungarian standardisation among 18 year old conscripts

Schooling and intelligence

Many studies have shown that educated people are more intelligent, so it is not surprising that, in our study, those who finished elementary school have higher SPM+ scores than those who did not and that those who finished secondary school have, on average, higher scores than those who only finished elementary school. More surprising is that those who attended a two year vocational school had average scores lower than of those who did not study anything after elementary school (Figure 26.25). Of course we do not know whether only young people of lower ability selected vocational school or if this type of school has a bad effect on the cognitive ability of the students. But, in either case, it is bad news for a country which badly needs able people in these important vocations.

Figure 26.25. *Standard Progressive Matrices Plus*
Distribution of Scores According to the Educational Level of Conscript
Hungarian standardisation among 18 year old conscripts
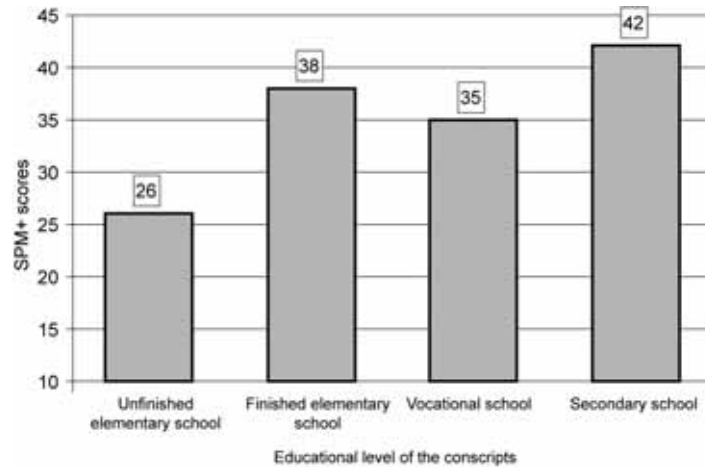
Intentional distortion

In reality, the relationship between socio-economic status and RPM score is probably even more pronounced than would seem to be the case from because, as we will now show, there is an indication that some of those from higher socio-economic backgrounds deliberately faked low SPM+ scores.

To investigate this possibility we categorised the raw scores into 15 categories ranging from a mean of 7 to 58. In each of these 15 groups we calculated the ratio of families from high and low socio-economic status backgrounds. As can be seen from Fig. 26.26, the percentage of respondents coming from families with high socio-economic status steadily increases with the SPM+ performance of the son – except in the two extreme categories. There is a much lower proportion of respondents from high socio-economic status backgrounds among those who performed extremely well on SPM+ than there "should" be. And far more respondents from well situated families get poor SPM+ results than would be predicted from the rest of the distribution. Our explanation of these discrepancies is that a number of respondents from high socio-economic status background deliberately faked low scores. (We may note in passing, however, that this distortion probably has little effect on the overall results reported in this chapter since the number of respondents in

Figure 26.26. *Standard Progressive Matrices Plus*
**Ratio of High/Low Socio-Economic Background Among Conscripts
with Different Performance on SPM+**
Hungarian standardisation among 18 year old conscripts
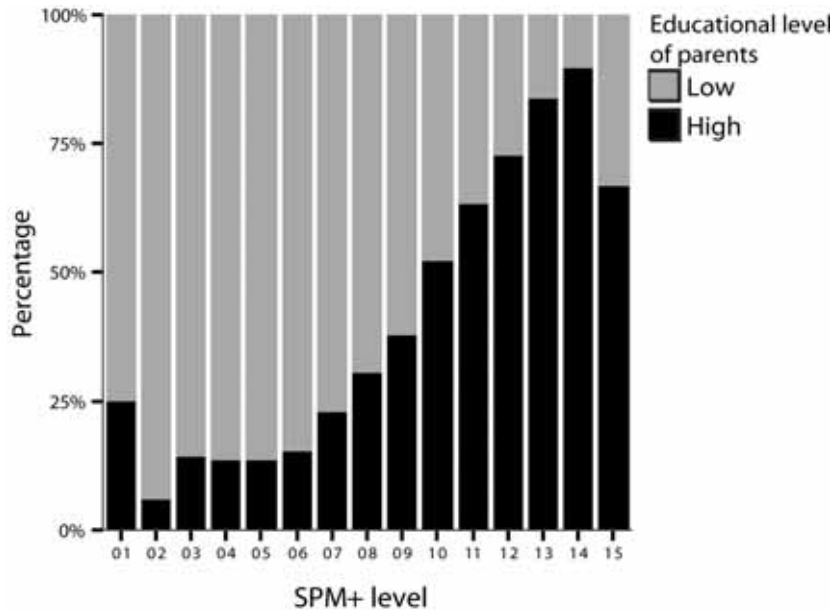
the two extreme groups put together is less than 0.5 percent of the total sample, i.e. 24 people altogether.)

These faked low scores stem from the commonly held belief that an extremely low intelligence test score could lead to excusal from military service (as from the death penalty for murder in the US Chapter 24).

### Fitness for military service

It is interesting to note as an aside that there is a significant relationship between socio-economic status and fitness for military service. Respondents with very low socio-economic status proved to be significantly less fit for military service than the others.

As we have seen, socio-economic status is closely related to some sort of mental fitness as measured by the SPM+. The fact that this increase in mental fitness does not translate into fitness for military service (it generally stays the same above level 1) suggests that some respondents from higher socio-economic status backgrounds successfully avoided being drafted into the army (Figure 26.27).

Figure 26.27. **Fitness for Military Service as a Function of the Combined Educational Level of the Parents**
1998 Sample of Conscripts
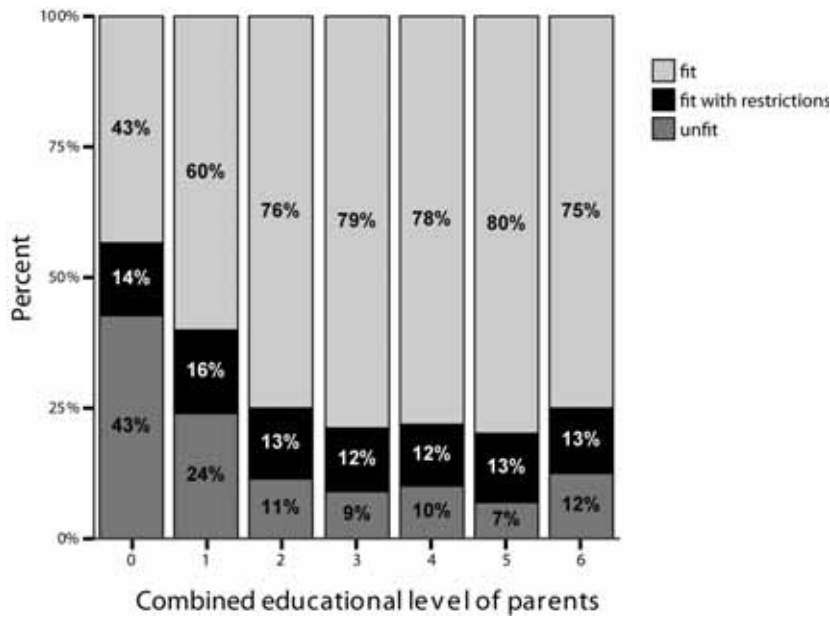
Concluding remarks

Looking at the various data gathered in 1998 from a representative sample of Hungarian male 18 years olds as a whole, we can see that the effects of differences between the socioeconomic status of the parents (at least as indicated by combined educational level) show up in all manner of ways ranging from birth height and weight to mental capacity and schooling.

Several earlier studies have shown that parents' SES determines the future of Hungarian children much more strongly than is the case in many other countries. So it seems urgent to provide those young people who came from families of lower socio-economic status with a fair chance to develop their full potentials. Schools have a responsibility in this task, but they cannot solve it alone (although it is also true that most of them don't even try to work toward this goal). It would seem that, in Hungary, which became a "market economy" less than 20 years ago, the rich are getting richer and the poor poorer whatever the lip-service politicians pay to "social equality".

We do not have a solution at hand, but we do think that every individual can do something. Every individual is a unique world, with a special life-history, personality, knowledge and ability pattern. Environment affects what we will become, but personal freedom and responsibility also have a crucial significance. It is difficult to break out from the cage of SES. In order to help people to realize their full potential, we have to work toward a society which will provide a humane environment for its members, a country where everybody has a fair chance to get proper schooling, where family life is much more then a collective struggle for life, and where schools are places where people go because they learn there something significant, and because they like to go there.

Notes

1. It may be noted that it was precisely because the military systems of many countries had tested birth cohort after birth cohort of young people entering military service on the RPM over very many years that Flynn (1987) was able to assemble the data that enabled him to demonstrate so convincingly the international intergenerational increase in scores that now bears his name.

   Flynn, J. R. (1987). Massive gains in 14 nations: What IQ tests really measure. *Psych. Bulletin,* 101, 171-191.

2. Joubert, K., Gyenis, Gy. (2001): *State of Health and Physical Development of 18 year old conscripts I.* Kutatási jelentések (Research Reports) 70., Népességtudományi Intézet (Demographic Research Institute), Budapest.

3. Károly Fazekas, Júlia Varga (eds.) (2005): *The Hungarian Labour Market Review and Analysis,* Institute of Economics HAS - Hungarian Enployment Foundation. Gábor Kézdi: Education and Earnings pp 31-37.

4. See also: Ceci, S.J., Williams, W.M. (1997): Schooling, intelligence and income. *The American Psychologist,* 52, 1051-1058.

5. Joubert, K. (1983): *Birth weight and birth length standards on basis of data of infants born alive in 1973-78.* Research Reports of the Demographic Research Institute, 12.

   Joubert, K., Darvay, S., Ágfalvi, R. (1996): Growth and development curves for a nation-wide longitudinal growth study of Hungarian children. In: Bodzsár, B. É., Susanne, C. (Eds.): *Studies in Human Biology.* Eötvös University Press, Budapest, 147-156.
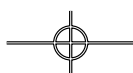
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9. We mention some studies, almost by chance:

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