Are Courses Chosen to Reduce Skill-Deficiencies? An Experimental Approach*

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Abstract

We report findings of an experiment about training participation in which we investigate (1) the deliberateness of the choice for courses and (2) whether the chosen courses are aimed at reducing skill-deficiencies. In a survey we evaluated the levels and requirements for six different skills of 3,357 workers 1.5 years after graduation. Six months later we perform an experiment in which the respondents hypothetically are asked by their employers to participate in a program of three courses. The respondents have the option to exchange these courses for three other courses. The basic idea is that people will consider the default as an advise about what would be a reasonable choice. The actual choice will be based on a combination of this implicit information and the perceptions in the mind of the respondent. Randomizing the default package of courses, we can identify the deliberateness of their choice. We find that people choose courses in the default package significantly more often, especially when the default course matches their skill-deficiencies. Interestingly, we find however that when workers make their own choice, they generally do not choose courses with which they can reduce their skill-shortages. Our estimates therefore suggest that participation in courses that reduce skill deficiencies only occurs when individual perceptions about the usefulness of the course is reinforced by the advice of the manager. This suggests that managers and training specialists can have an important role in an efficient development of workers' human capital. Relating choice behavior to personal characteristics, we find also that people with more hedonic life-styles choose less often to reduce their skill-deficiencies.

Keywords: Human capital investment, Training, Default
JEL codes: J24, J31, I2

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1 Introduction

How do workers act in situations where they are offered courses to reduce on-the-job skill-deficiencies? The aim of this research is to analyze this question using an experimental approach in which we ask workers to choose courses from a fixed set of options. The main advantage of the experiment is that we avoid the usual endogeneity problems concerning the decision to participate in training.

We ask 3,357 young workers to consider a situation in which they are offered by their firm a package of three training courses. They can choose to accept these courses or to exchange them for courses from a menu of three alternatives. The set of courses they have to pick three options from, are courses in a foreign language, management, stress management, team work, computer skills and efficient working. From an earlier survey we have collected information about the perceived skill deficiencies of the subjects in fields related to the courses offered.

The idea of the paper is that people consider the default option as an implicit advise about what is a reasonable choice. The combination of randomized default packages and survey information about perceived deficiencies, allows us to identify how the actual choices are related to this implicit advise and to the perceptions about the usefulness of the courses in the mind of the respondent. First, we find that workers on average have a strong propensity to choose the default courses, and thus many workers do not seem to make a deliberate choice. Second, we find that the probability to accept the default is related to the skill-deficiency of the respondent in the field of the training that is offered. A default offer therefore seems to reinforce the individual perception of skill-needs. Thirdly, we find however that when workers choose their own courses from the menu, they do not choose courses with which they can reduce skill-shortages. Our estimates therefore suggest that managers and training specialists can have an important role in an efficient development of workers' human capital. Relating choice behavior to personal characteristics, we find, fourthly, that workers who value career perspectives more and who have lower discount rates, have a higher probability to choose a course that meet their skill deficiencies, when offered as a default. Other personal characteristics such as self-confidence increase the probability of making a deliberate choice, but this choice is not more related to the skill-needs of the respondent.

Many authors have investigated the discriminatory factors that determine whether

or not people participate in courses. Shields (1998) shows that participation in training differs substantially between workers. Colquitt, LePine, and Noe (2000) show that psychological factors such as anxiety and locus of control influence to a large extent whether people invest in human capital and Eraut (2000) shows that self-confidence is an important factor that stimulates course participation at work. We instead analyze the impact of these factors on the quality of the choices made conditional on participation in training. E.g. Field (2000) and Sargant and Aldridge (2002) have pointed out that course participation crucially depends on whether people face impediments or stimuli for course participation. Such impediments may be of practical or financial nature. This paper adds to this literature that stimulating training participation does not necessarily imply that people will choose the most profitable courses.

The analysis of the effect of training on the reduction of on-the-job skill-deficiencies is related to the effects of training on productivity and wages as discussed by among many others Conti (2005) and Parent (1999). Frazis and Loewenstein (2005) show that the returns to training are very heterogeneous. This paper shows that differences in the effective choice of courses – related to both personal characteristics and environmental circumstances – can contribute to this heterogeneity.

The analysis is also related to literature about defaults. In recent literature the idea that defaults may influence decisions is used in analyses related to organ donation decisions (Johnson and Goldstein 2003, Abadie and Gay 2004), car insurances (Johnson, Hershey, Meszaros, and Kunreuther 1993), car purchases (Park, Yun, and MacInnis 2000), consent with e-mail marketing (Johnson, Bellman, and Lohnse 2002) and pensions with 401(k) saving (Choi, Laibson, Madrian, and Metrick 2005), yet no attempt has thus far been made to introduce this notion in the human capital literature.

Section 2 is concerned with a description of the data and the set-up of the experiment. Section 3 discusses the estimation method. Section 4 reports the results. Section 5 shows some robustness checks and section 6 concludes.

2 Data and the experiment

To analyze the empirical relevance of these ideas, we use two data sets. The first is the Fall 2004 Research Center for Education and the Labor Market school leaver survey. In the

survey, workers are interviewed 1.5 years after they graduated from professional college (HBO) or university. They are asked to indicate the level of their skills with respect to a comprehensive set of aspects. In addition they are asked which level of skills is required in their jobs with respect to these aspects. We use the difference between the skills a person indicates to be required for the job and the skills he indicates to posses as a measure for the skill deficiency. If the measure is negative or zero, a person has no skill-deficiency. Table 1 gives the exact wording of the question and indicates the 6 skills we will use to analyze our hypotheses: working well under pressure; applying ICT; communicating in foreign languages; drawing on other people's capabilities; working productively with other people; and working in accordance with a budget.

– Table 1 –

Table 2 indicates that approximately 55% of the respondents have skill-deficiencies regarding at least one of the selected skills.

– Table 2 –

We are interested in the propensity of respondents to choose courses related to their skill-deficiency. To avoid the risk of respondents checking their choices with the level of the skill-deficiency for internal consistency, we approached the respondents of the 2004 survey again in the spring of 2005.

Respondents were approached by e-mail to fill out a questionnaire called "Dealing with difficult choices" on the internet. In the mail, we explained that the aim of the research is to increase understanding of how young people deal with difficult decisions, especially those related to educational choices. We explained that knowledge about these processes is of great societal and scientific importance since e.g. 20% of all graduates indicate that they regret their educational choice. To stimulate participation and deliberate answers, we offered the respondents upon completion of the questionnaire a profile about their personal style to deal with choices.

Because they filled out the survey on the internet, we were able to keep track of the time the respondent needed to complete the survey. On average they needed 39.9 minutes to complete it. Due to different routings some people needed more time than others. 94.2% of the respondents needed between 15 minutes and 2 hours. To reduce

the chance of having respondents who do not fill out the survey seriously, we excluded the respondents if they needed less than 15 minutes (0.8%) or more than 2 hours (4.3%). After this, 3,357 respondents remained.

In this survey, we included a hypothetical offer of courses with an experimental set-up. The courses offered and the alternatives are courses related to selected aspects from the 2004 list of aspects. The skills asked in the 2004 survey often were too general in nature to offer as a course to the graduates. We therefore offered specific courses related to these general skills. Table 3 shows which course we propose for each skill.

– Table 3 –

The hypothetical offer reads as follows:

> Suppose your work has a new settlement in which everyone can participate during working hours in the following courses, the expenses of which are fully covered by the employer: English, Computer skills, Stress Management. However, it is also possible to exchange one or more courses. The alternatives are Management skills, Team work, Efficient working. Do you choose the suggested set of courses or do you want to exchange?

Note that we phrased this question in such a way that there are no financial or time-related restrictions to the employee.

To reduce the probability of having selected three popular courses by chance, we randomized the offered courses. We offered a first group of respondents courses in English, Stress management and Efficient working, with the alternative choices Computer use, Working in a team and Management. A second group was offered English, Computer use and Stress management, with the alternatives Efficient working, Working in a team and Management. And a third group was offered Efficient working, Working in a team and Management, with the alternatives English, Computer use and Stress management.

The respondents first had to indicate whether they want to choose the offered package or whether they want to exchange courses. If they want to exchange they had to indicate which courses to delete and which to add.

We find that 33% takes the default package, while 67% exchanges courses for other courses. Choosing the default saves the respondent some time. One potential critique

therefore is that respondents might choose the default to faster complete the survey. We checked whether the default was chosen more often by respondents who took less time to complete the survey. We find however the opposite: respondents who choose the default take on average more time to complete the survey. This might indicate that those who take a lot of time in each question are more hesitant when it comes to choosing. We find this relationship between choosing the default and responding slower in the survey for all 8 parts in the survey. The possibility that people who need more time to answer questions become more easily impatient further on in the survey and might therefore rush through the survey is therefore not supported by the evidence.

In table 4, we show that some courses are more popular than others. English and computer courses are selected least often. This is in line with what we expected: respondents have had ample opportunities at school and in college to invest in these two courses, so their deficiencies are lowest. This is also indicated by the average deficiency, which is lowest for English and computer skills. Note that in general people are skill abundant in all skills. Robustness checks which we perform later show similar results if we analyze positive skill-deficiencies only. The table shows furthermore that most people indicate that they need more skills related to stress management, management and efficient working.

– Table 4 –

The way choices are made might differ between people, so we relate this choice behavior to the personal characteristics of the individuals. We will analyze the relations of the choices with (1) reasons why people chose the courses, (2) attitudes they have regarding work and (3) with the following psychological characteristics: the discount rate, capacity to imagine the future, locus of control, self-confidence, anxiety and risk aversion. Besides this we will look at the relation with cognitive skills. We chose to investigate these psychological factors because in the literature (Colquitt, LePine, and Noe 2000) it is shown that these factors are important for choosing to participate in training. We will analyze whether these factors are also important for the quality of the choice for courses.

First, after they chose the courses, respondents indicated how applicable the following statements were about the choice for the courses on a 5 point scale: I chose courses which I thought were most fun, I chose courses that I can learn a lot from, I chose courses in areas which I am good at, I chose courses that cost less time and effort, I did not really

know what to choose.

Secondly, they indicated how applicable the following statements regarding their work attitudes were to them on a 5-point scale: Job-security, Social status, Possibility to learn, High income, Challenge, Career perspectives, Enough leisure time, Societal benefit, Possibility to combine work and family duties. Table 5 gives some descriptives for the statements.

– Table 5 –

The discount rate is measured by the question:

> Suppose you win a 10-day holiday trip worth 2000 euros to an interesting destination. To spread participation, you are asked if you can delay your trip with three years in exchange for a longer vacation. How many days should you be offered in addition to accept the offer in 3 years?

We find that 95% of the respondents filled out between 0 and 30 days. On average people answered 12.0 days (st.dev. 9.3). This corresponds to a discount rate of 27.9%. Compared with a discount rate at a bank this average discount rate is therefore very high. In the literature (Frederick, Loewenstein, and O'Donogue 2002) it is known that the discount rate is strongly influenced by anchoring effects but that some people consistently score higher or lower on these measures. We validated the discount rate with a measure which is used often in psychology (Rachlin, Raineri, and Cross 1991). The measure uses trade-offs between amounts of money now and amounts of future money to elicit discount rates. These measures correlate highly with our discount rate measure and if we use this measure instead, we find similar results.

The capacity to imagine the future is measured by 6 statements about the image one has about the future (e.g. "I can imagine well what my next job will look like") and the experiences one has had about the past ("My life is now like I thought it would be 3 years ago").

Locus of control indicates to what extent people think success or failure depends on their own actions. It is measured by 3 statements such as "Most people do not realize to what extent their lives are determined by coincidences."

Self-confidence is measured by 3 statements such as "I think I have sufficient reason to be proud of myself."

Anxiety indicates to what extent people are afraid of things they do not have experience with. It is measured by 3 statements such as "I often think back about unpleasant experiences."

Risk aversion is measured by offering the respondents one amount of money they can get for sure or a higher amount of money with a chance of getting it and a chance of not getting it. We asked 6 questions in which we varied the amounts of money and the chance of getting the money. To deduce information most efficiently, we used follow-up questions. For instance, we started with the question: "What would you choose: 800 Euros, or 50% chance on nothing, 50% chance on 2000 Euros." If the respondent chose 800 Euros, he would get the question: What would you choose: 800 Euros, or 50% chance on nothing, 50% chance on 2400 Euros. A respondent who chose 2000 Euros in the first question would get the question: What would you choose: 800 Euros, or 50% chance on nothing, 50% chance on 1600 Euros.

Cognitive skills are measured by 8 questions taken from Frederick (2005). An example of these questions is

> Together, a ball and a cap cost 1.10 Euros. The ball costs 1.00 Euros more than the cap. How much does the cap cost?

Frederick (2005) shows that scores on this Cognitive Reflection Test are correlated with SAT-scores and scores on several other IQ tests and with the ability to make choices. We find significant correlations between the average number of correctly answered questions and high school grades for nearly all subjects taught in high school and with the average college grade. This indicates that the measure for cognitive skills plausibly reflects some general type of cognitive skills.

The comprehensive list of the questions measuring these personal characteristics is shown in table 6.

– Table 6 –

3 Method

We use a ranked-order logit regression. This is a system of the following simultaneously estimated equations:

$$
\begin{aligned}
Y_E &= \alpha_1 * E + \alpha_2 * D_{iE} + \alpha_3 * SD_{iE} + \alpha_4 * X_{iE} + \alpha_5 * (SD * D)_{iE} + \varepsilon_{iE} \\
Y_{EW} &= \beta_1 * EW + \alpha_2 * D_{iEW} + \alpha_3 * SD_{iEW} + \alpha_4 * X_{iEW} + \alpha_5 * (SD * D)_{iEW} \\
&\quad + \varepsilon_{iEW} \\
Y_{TW} &= \gamma_1 * TW + \alpha_2 * D_{iTW} + \alpha_3 * SD_{iTW} + \alpha_4 * X_{iTW} + \alpha_5 * (SD * D)_{iTW} \\
&\quad + \varepsilon_{iTW} \\
Y_{MT} &= \delta_1 * Mt + \alpha_2 * D_{iMT} + \alpha_3 * SD_{iMT} + \alpha_4 * X_{iMT} + \alpha_5 * (SD * D)_{iMT} \\
&\quad + \varepsilon_{iMT} \\
Y_C &= \zeta_1 * C + \alpha_2 * D_{iC} + \alpha_3 * SD_{iC} + \alpha_4 * X_{iC} + \alpha_5 * (SD * D)_{iC} + \varepsilon_{iC} \\
Y_{SM} &= \eta_1 * SM + \alpha_2 * D_{iSM} + \alpha_3 * SD_{iSM} + \alpha_4 * X_{iSM} + \alpha_5 * (SD * D)_{iSM} \\
&\quad + \varepsilon_{iSM}
\end{aligned}
$$

in which Y is a latent variable describing the preference for a course (estimated by a dummy variable describing the choice for the course), E stands for English, EW for efficient working, TW for team work, MT for management, C for computer, and SM for stress management. D_{iE} is a dummy for whether English is the default for individual i, SD_{iE} is the skill-deficiency of person i in English. X which includes interactions between individual characteristics and course characteristics. To estimate whether for courses for which the respondent has a the effect of being offered in the default package is larger we include a cross effect of the skill-deficiency and the default: $(SD * D)$.

The three courses with the highest Y are chosen. Note first that by having the same parameters per variable for the different courses, we assume that the effect of the variables on the preference for the course will be the same across courses. Secondly, because we are measuring within person differences, we do not include separate individual characteristics but only interactions of these characteristics with the variables of interest.

4 Results

Table 7 shows the main results of our analysis. First we just include the default and the skill-deficiency variable in a regression. We find that people choose to reduce their skill-deficiencies and that their choice is largely driven by the default option. Since a skill-deficiency is defined as the difference of the skills possessed and the skills required we separate this variable in these two components. We find that people invest less in the skills they already have more of and more in skills they still need at their jobs. Interestingly, the coefficient of the former is about double the size of the latter. This might indicate that people are investing more in general skills than in job-specific skills.

However, if we include the interaction of the skill-deficiency in the regression to analyze whether courses offered by default are coincidentally the same courses as the ones in which the respondent has the skill-deficiency, we find that the effect of the skill-deficiency is completely taken over by the interaction variable. Therefore, workers generally do not have the propensity to choose courses with which they can reduce job related skill-shortages. However, workers choose courses which reduce their skill-deficiency more often if these courses are in the default package. Our estimates therefore suggest that managers and training specialists can have an important role in an efficient development of workers' human capital. If we separate the skill-deficiency in own skills and required skills, we find similarly that the interaction term with the default is significant for both own skills and required skills, while the separate variables own skills and required skills are no longer significant.

– Table 7 –

In table 8, we show different variants of the interactions of the default and the deficiency and the answers to the personal characteristics. The table shows that people who think it is important to learn at their jobs choose the default less often. However, they do not choose to reduce their skill-deficiencies more. Those who choose courses that require less time and effort and those who did not know which courses to choose, choose the default more often. People who choose the course because they did not know what to choose, choose courses that are less related to their skill-deficiencies.

People who value job-security and enough leisure time more, are more influenced by the default option, while those who value a high salary or challenge in their jobs choose

the default less often. Regarding the skill-deficiency we do not find any significant effects. However, when we analyze the interaction we find that people who value social status or a high salary choose to reduce their skill-deficiency less often if it is offered to them by default. However, those who value career perspectives invest more in their deficiencies if it is offered to them by default. Apparently, the latter group has a long-term focus while the former has a shorter time horizon.

Next to this, people with more cognitive abilities, more self-confidence and less risk-averse people choose the default less often. We find that people with high discount rates invest less in skill-deficiencies if they are offered to them by default.

If we include all variables simultaneously, most of these relations are robust.

– Table 8 –

The relations between these characteristics and the choice for the default or the skill-deficiency reduction are plausible. At the minimum, this may serve as a validation of the methodology we followed to measure the investment decisions. Next to this, we may conclude from these findings that people with more hedonic preferences are less inclined to invest in courses that reduce their skill-deficiencies.

5 Robustness

Concerning the skills we offer courses in, many respondents have more skills than they need in their jobs. Therefore, the results may only apply to those who have abundant skills. As a robustness check we truncated the skill-deficiency at zero. This implies that if people were skill abundant, we recoded them to be skill sufficient. Table 9 shows that the default and the interaction effect remain significant. We see also that there is a small positive effect of the deficiency itself. The results therefore remain similar.

– Table 9 –

For the average skill people invest in their deficiencies, but an interesting question is whether this also holds for the separate skills. Table 10 reports the findings for the separate skills. We find for all skills that the default is chosen more often. English and efficient working skills are also chosen if the deficiency is larger. People choose courses

related to English, stress management and computer skills to reduce their skill-deficiencies if these courses are offered to them by default.

– Table 10 –

Another concern could be that selection bias drives the results. People who are less ambitious may self-select into jobs which require less work. They therefore may have less deficiencies and are less required to invest in their skill-needs. Our coefficients could therefore be biased. We find that people who indicate that the educational level their employer required is lower than the level they attained have significantly less skill deficiencies and also invest less in their deficiencies. However, when we separate the group that has a lower job than their educational level and the group that has a job at their educational level, we find that both groups invest significantly in their deficiencies if this is offered to them by default. Moreover, the choices in both groups are driven by the default option to a significant extent.

– Table 11 –

Finally, we analyze whether the courses we offered are perceived by the respondents as related to the skills. In table 12 we show that with the exception of computer skills and management, the deficiency of a specific skill guides to a much larger extent the choice for the skill than deficiencies in other skills. People therefore seem to be able to distinguish most courses.

– Table 12 –

6 Conclusions

The aim of this paper is to analyze whether people choose courses to reduce work-related skill-deficiencies or whether their choices are driven by other motives. To control for differences with respect to opportunities to participate in courses, we use an experiment in which graduates hypothetically have to choose courses. They either accept a randomly designed (default) package of courses or exchange courses from the package with other randomly assigned courses. We relate their choices to an earlier survey in which they

were asked to rate their skill-level and the required skill-level at their jobs with respect to the aspects. We find that, in general, people do not seem to choose courses to reduce their skill-deficiencies. However, workers choose courses which reduce their skill-deficiency more often if these courses are in the default package. Our estimates therefore suggest that managers and training specialists can have an important role in an efficient development of workers' human capital. Relating choice behavior to personal characteristics, we find that people with more hedonic life-styles (e.g. people with higher time discount rates, who value leisure time more) choose less often to reduce their skill-deficiencies.

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Table 1
Skill deficiency question

Below are aspects that could be of importance in your job. Rate for each of these aspects:		
	The required level in your job Average<>Excellent	Your own level Average<>Excellent
Working well under pressure	1 2 3 4 5	1 2 3 4 5
Applying ICT	1 2 3 4 5	1 2 3 4 5
Communicating in foreign languages	1 2 3 4 5	1 2 3 4 5
Draw on other people's capabilities	1 2 3 4 5	1 2 3 4 5
Working productively with other people	1 2 3 4 5	1 2 3 4 5
Working in accordance with budget, planning or guide lines	1 2 3 4 5	1 2 3 4 5

Source: Research Centre for Education and the Labour Market 2004 graduate survey.

Table 2
Respondents with skill deficiency in at least one of the selected courses

	%
Skill deficiency[1]	55.4
No skill deficiency	44.5
Total	100

Source: Research Centre for Education and the Labour Market 2004 graduate survey.

1 A skill deficiency is defined as the difference between the self-assessed required level of skills on the job and the self-assessed own level of skills. We regarded 6 skills: Working well under pressure, Applying ICT, Communicating in foreign languages, Drawing on other people's capabilities, Working productively with other people, Working in accordance with budget, planning or guide lines. In this table, we define the person to be skill deficient if the difference was positive in at least one of these 6 skills (so the person has a deficiency in a skill).

Table 3
The specific courses offered related to the skills

Skill[1]	Course[2]
Working well under pressure	Stress Management
Applying ICT	Computer
Communicating in foreign languages	English
Draw on other people's capabilities	Management
Working productively with other people	Team Work
Working in acc. with budget, planning or directions	Efficient working

Source: Research Centre for Education and the Labour Market 2004 graduate survey and 2005 supplement.

1 Question asked in the 2004 survey to analyze the required and own level of skills.
2 Translation of the skill into the specific course offered in the 2005 supplement.

Table 4
Choosing courses when offered[1]

	Does not choose course	Chooses course	Total	Average Skill Def[2]	% Deficiency[3]
	%	%	%		%
English	60.7	39.3	100	-0.81	10.1
Efficient work	28.3	71.7	100	-0.16	21.5
Team work	53.5	46.5	100	-0.17	12.3
Management	29.2	70.8	100	-0.10	22.2
Computer	81.7	18.3	100	-0.39	12.1
Stress Management	46.6	53.4	100	-0.05	22.9

Source: Research Centre for Education and the Labour Market 2004 graduate survey and 2005 supplement.

1 The experiment to measure the choice for courses reads as follows: Suppose your work has a new settlement in which everyone can participate during working hours in the following courses, the expenses of which are fully covered by the employer: English, Computer skills, Stress Management. However, it is also possible to exchange one or more courses. The alternatives are Management skills, Team work, Efficient working. Do you choose the suggested set of courses or do you want to exchange? We randomized the offered courses and alternatives. We report in this table which courses are chosen most often.
2 A skill deficiency is defined as the difference between the self-assessed required level of skills on the job and the self-assessed own level of skills. We regarded 6 skills: Working well under pressure, Applying ICT, Communicating in foreign languages, Drawing on other people's capabilities, Working productively with other people, Working in accordance with budget, planning or guide lines.
3 Percentage of the respondents who are skill deficient in this skill.

Table 5
Reasons to choose courses and work attitudes

	Totally not relevant/ unimportant				Very relevant/ important	Total	Mean[1]
	%	%	%	%	%	%	
Reasons participation							
I chose courses which I thought were most fun	5.3	15.2	23.6	42.8	13.2	100	3.43
I chose courses that I can learn a lot from	0.7	1.1	5.6	49.6	42.9	100	4.33
I chose courses in areas which I am good at	12.6	36.8	33.1	14.9	2.6	100	2.58
I chose courses that cost less time and effort	43.5	40.4	12.5	3.1	0.5	100	1.77
I did not really know what to choose	56.6	22.4	14.2	5.1	1.7	100	1.73
Work Attitudes							
Job-security	0.8	5.0	14.7	47.3	32.2	100	4.05
Social Status	5.8	18.0	31.2	36.2	8.8	100	3.24
Possibility to learn	0.6	1.4	9.0	47.2	41.9	100	4.28
High Income	1.7	9.2	33.0	46.4	9.8	100	3.53
Challenge	0.3	0.3	4.4	39.9	55.1	100	4.49
Careerperspective	1.2	5.5	19.8	45.5	28.1	100	3.94
Enough leisure time	0.4	3.5	15.3	46.4	34.4	100	4.11
Societal use	2.9	9.4	22.9	42.1	22.6	100	3.72
Combine work and family	4.5	8.9	20.7	38.0	27.8	100	3.76

Source: Research Centre for Education and the Labour Market 2005 graduate survey supplement.

1 This is the mean score on the questions the answer categories of which range from 1 to 5.

Table 6
Variables to measure individual characteristics

Psychological variables		*Mean answer on 7-point scale (1=totally do not agree, 7=totally agree)*	*St.dev.*
Imagination of the future	*Mean answer on indicator used*[1]	1.57	0.79
	I can imagine well what my next job will look like	4.10	
	My life now is very different from what I thought three years ago	4.09	
	I see clearly what I can expect of the coming year	4.47	
	Last year has turned out very different from what I expected on beforehand	3.91	
	If I have to make an important decision, I form an elaborate image of the consequences of the decision	5.38	
	If I have taken an important decision, the outcome usually is inline with the image I had on beforehand.	5.05	
Locus of control	*Mean answer on indicator used*	1.44	0.82
	Set backs are usually due to mistakes people make	3.77	
	Most people do not realize to what extent their life is determined by coincidences	4.26	
	Whether I reach targets that I have in my life is not a matter of luck	4.80	
Anxiety	*Mean answer on indicator used*	3.86	1.07
	I often think about unpleasant events in the past	3.57	
	I often tend to check whether I did everything right	4.96	
	I think it is scary to go to places I have never been to	3.03	
Self-image	*Mean answer on indicator used*	-0.49	1.01
	My opinions about myself seem to change regularly	3.28	
	In general I have a clear idea about who and what I am	5.38	
	I often doubt about decisions because I do not know exactly what I want	3.58	
Self-confidence	*Mean answer on indicator used*	-0.51	1.11
	I tend to think someone else is better than I am	3.83	
	I think I have enough reason to be proud of myself	5.38	
	The difference between who I am and what I want is large	3.09	
		% Respondents answering question correctly	
Cognitive skills	*Mean answer on indicator used*	3.29	2.24
	Together, a ball and a cap cost 1.10 Euros. The ball costs 1.00 Euros more than the cap. How much does the cap cost?	22.3	
	If you toss a fair coin twice, how large is the chance that 'Head' comes up at least once?	12.3	
	If 5 machines need 5 minutes to produce 5 things, how long do 100 machines need to make 100 things?	36.7	
	Two cars are approaching each other in the same lane. Car A drives at a speed of 120 km/h. Car B at 60 km/h. How large is the distance between these two cars one minute before they collide?	48.2	
	In a lake there is a patch of lily pads. Every day the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the	52.4	

	lake?	
	If Timo drinks a bottle of water in 6 days and Esther takes 12 days to finish a bottle, how long does it take before they finish one bottle together?	41.7
	If three salesmen can pack six toys in half an hour, how many salesmen would one need to pack 20 toys in one hour	70.3
	At a match, Bart comes in at the 15th place and at the 15th last place. How many people participated at the match?	44.9

Source: Research Centre for Education and the Labour Market 2005 graduate survey supplement.

1 The indicator we used in our analysis is the mean value of the underlying variables. Note that the mean of the indicator can differ strongly from the mean of the underlying variables because negatively phrased statements were subtracted instead of added.

Table 7
The default, skill deficiency and the choice for courses

	Coef	Std. Error		Coef	Std. Error		Coef	Std. Error		Coef	Std. Error	
Default[1]	1.019	0.030	***	1.019	0.030	***	1.054	0.030	***	1.446	0.132	***
Skill Deficiency[2]	0.116	0.016	***				0.022	0.024				
Own level[3]				-0.191	0.022	***				-0.046	0.033	
Required level[4]				0.087	0.017	***				0.009	0.025	
Default* Skill Deficiency							0.147	0.027	***			
Default* own level										-0.229	0.038	***
Default* required level										0.122	0.028	***
Dummies per course included	yes			yes			yes			yes		

* = 10%, **=5%, ***=1%.
Source: Research Centre for Education and the Labour Market 2005 graduate survey supplement.

1 The experiment to measure the choice for courses reads as follows: Suppose your work has a new settlement in which everyone can participate during working hours in the following courses, the expenses of which are fully covered by the employer: English, Computer skills, Stress Management. However, it is also possible to exchange one or more courses. The alternatives are Management skills, Team work, Efficient working. Do you choose the suggested set of courses or do you want to exchange? We randomized the offered courses and alternatives. We analyze the effect of having a specific course offered to a person by default on the choice for this course.
2 A skill deficiency is defined as the difference between the self-assessed required level of skills on the job and the self-assessed own level of skills. We regarded 6 skills: Working well under pressure, Applying ICT, Communicating in foreign languages, Drawing on other people's capabilities, Working productively with other people, Working in accordance with budget, planning or guide lines.
3 This is the self-assessed own level of skills.
4 This is the self-assessed required level of skills on the job.

Table 8
Psychological characteristics, aspects related to work, questions regarding course choice and the choice for the default and skill deficiency

	Coef	St. dev.		Coef	St. dev.		Coef	St. dev.		Coef	St. dev.	
Default[1]	1.733	0.234	***	1.534	0.287	***	0.967	0.147	***	1.349	0.382	***
Gap[2]	0.241	0.220		-0.255	0.242		0.113	0.130		0.218	0.334	
Default*gap	-0.230	0.248		0.309	0.276		0.223	0.155		-0.109	0.376	
Reason choose courses												
Default												
Default*choose course for fun[3]	0.012	0.026								0.000	0.026	
Default*choose course to learn[4]	-0.304	0.043	***							-0.325	0.044	***
Default* choose course because one is good[5]	0.027	0.029								0.023	0.030	
Default*choose courses which cost least time[6]	0.077	0.036	**							0.068	0.037	*
Default*did not know what to choose[7]	0.240	0.029	***							0.204	0.030	***
Skill deficiency												
Gap*choose course for fun	-0.018	0.022								-0.012	0.023	
Gap*choose course to learn	0.021	0.040								0.033	0.041	
Gap*choose course because one is good	-0.031	0.026								-0.026	0.026	
Gap*choose courses which cost least time	-0.028	0.032								-0.022	0.033	
Gap*did not know what to choose	-0.077	0.027	***							-0.063	0.028	**
*Default*Skill deficiency*												
Default*Gap*choose course for fun	-0.021	0.026								-0.029	0.027	
Default*Gap*choose course to learn	0.071	0.045								0.055	0.047	
Default* Gap*choose course because one is good	0.013	0.030								0.003	0.031	
Default* Gap*choose courses which cost least time	0.033	0.037								0.021	0.039	
Default* Gap*did not know what to choose	0.037	0.031								0.024	0.032	
Work related aspects												
Default												
Default*Importance autonomy[8]				-0.047	0.033					-0.001	0.034	
Default*Importance job-security[9]				0.125	0.033	***				0.105	0.035	***
Default*Importance social status[10]				-0.001	0.027					-0.018	0.028	
Default*Importance possibility to learn[11]				-0.005	0.040					0.063	0.041	
Default*Importance high salary[12]				-0.147	0.035	***				-0.129	0.036	***
Default*Importance challenge[13]				-0.171	0.048	***				-0.027	0.049	
Default*Importance career perspectives[14]				0.032	0.020					0.044	0.021	**
Default*Importance enough leisure time[15]				0.058	0.034	*				0.065	0.035	*
Default*Importance societal use[16]				0.036	0.028					0.013	0.029	
Default*Importance combining work and family tasks[17]				0.008	0.027					-0.003	0.028	

Skill deficiency									
Gap*Importance autonomy	0.040	0.029					0.046	0.030	
Gap*Importance job-security	0.002	0.028					0.001	0.029	
Gap*Importance social status	0.028	0.025					0.028	0.025	
Gap*Importance possibility to learn	0.031	0.034					0.018	0.034	
Gap*Importance high salary	0.051	0.032					0.046	0.033	
Gap*Importance challenge	0.008	0.041					-0.027	0.042	
Gap*Importance career perspectives	-0.019	0.031					-0.022	0.032	
Gap*Importance enough leasure time	-0.024	0.030					-0.040	0.031	
Gap*Importance societal use	-0.030	0.025					-0.026	0.025	
Gap*Importance combining work and family tasks	-0.010	0.023					0.001	0.024	
*Default*Skill deficiency*									
Default*Gap*Importance autonomy	-0.032	0.033					-0.029	0.034	
Default*Gap*Importance job-security	0.030	0.033					0.019	0.035	
Default*Gap*Importance social status	-0.052	0.028	*				-0.046	0.030	
Default*Gap*Importance possibility to learn	0.000	0.040					0.014	0.041	
Default*Gap*Importance high salary	-0.075	0.037	**				-0.066	0.038	*
Default*Gap*Importance challenge	-0.024	0.048					0.018	0.050	
Default*Gap*Importance career perspectives	0.089	0.036	**				0.083	0.037	**
Default*Gap*Importance enough leisure time	-0.018	0.035					0.014	0.036	
Default*Gap*Importance societal use	0.024	0.029					0.019	0.030	
Default*Gap*Importance combining work and family tasks	0.003	0.027					-0.018	0.028	
Individual characteristics									
Default									
Default*Cognitive skills[18]				-0.052	0.012	***	-0.040	0.012	***
Default*Locus of control[19]				-0.024	0.032		0.009	0.032	
Default*Anxiety[20]				0.053	0.027	*	0.033	0.029	
Default*Self-Image[21]				-0.017	0.035		-0.002	0.036	
Default*Self-confidence[22]				-0.131	0.032	***	-0.118	0.033	***
Default*Discount rate[23]				-0.113	0.160		-0.106	0.164	
Default*Imagination[24]				-0.054	0.035		-0.034	0.036	
Default*Risk Aversion[25]				0.002	0.001	***	0.001	0.001	**
Skill deficiency									
Gap*Cognitive skills				0.010	0.011		0.004	0.011	
Gap*Locus of control				0.019	0.028		0.002	0.028	
Gap*Anxiety				-0.031	0.025		-0.035	0.026	
Gap*Self-Image				0.008	0.030		-0.002	0.030	
Gap*Self-confidence				-0.034	0.028		-0.034	0.029	
Gap*Discount rate				0.037	0.137		0.071	0.141	
Gap*Imagination				-0.013	0.032		-0.022	0.032	
Gap*Risk Aversion				-0.001	0.001		0.000	0.001	
*Default*Skill deficiency*									

Default*gap*Cognitive skills							-0.021	0.012	*	-0.018	0.013	
Default*gap*Locus of control							-0.029	0.033		-0.037	0.033	
Default*gap*Anxiety							0.052	0.028	*	0.057	0.030	*
Default*gap*Self-image							-0.015	0.034		-0.016	0.035	
Default*gap*Self-confidence							0.048	0.033		0.060	0.033	*
Default*gap*Discount rate							-0.498	0.161	***	-0.588	0.167	***
Default*gap*Imagination							0.032	0.037		0.038	0.038	
Default*gap*Risk Aversion							0.000	0.001		-0.001	0.001	
Dummy for set 1[26]	-1.371	0.047	***	-1.374	0.047	***	-1.372	0.047	***	-1.408	0.049	***
Dummy for set 2[27]	-1.030	0.044	***	-1.028	0.044	***	-1.032	0.044	***	-1.055	0.045	***
Dummy for set 3[28]	-1.882	0.053	***	-1.927	0.060	***	-1.884	0.053	***	-1.973	0.062	***
Dummy for set 4[29]	-0.714	0.041	***	-0.704	0.041	***	-0.708	0.041	***	-0.733	0.042	***
Dummy for set 5[30]	-0.493	0.043	***	-0.491	0.043	***	-0.497	0.043	***	-0.521	0.044	***

* = 10%, **=5%, ***=1%.
Source: Research Centre for Education and the Labour Market 2005 graduate survey supplement.

1 The experiment to measure the choice for courses reads as follows: Suppose your work has a new settlement in which everyone can participate during working hours in the following courses, the expenses of which are fully covered by the employer: English, Computer skills, Stress Management. However, it is also possible to exchange one or more courses. The alternatives are Management skills, Team work, Efficient working. Do you choose the suggested set of courses or do you want to exchange? We randomized the offered courses and alternatives. We analyze the effect of having a specific course offered to a person by default on the choice for this course.
2 A skill deficiency is defined as the difference between the self-assessed required level of skills on the job and the self-assessed own level of skills. We regarded 6 skills: Working well under pressure, Applying ICT, Communicating in foreign languages, Drawing on other people's capabilities, Working productively with other people, Working in accordance with budget, planning or guide lines.
3 On a 1-5 scale how much do you agree with the statement: I chose courses which I thought were most fun
4 On a 1-5 scale how much do you agree with the statement: I chose courses that I can learn a lot from
5 On a 1-5 scale how much do you agree with the statement: I chose courses in areas which I am good at
6 On a 1-5 scale how much do you agree with the statement: I chose courses that cost less time and effort
7 On a 1-5 scale how much do you agree with the statement: I did not really know what to choose
8 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Autonomy
9 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Job-security
10 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Social Status
11 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Possibility to learn
12 Indicate how important this aspect is to you personally in your job on a 1-5 scale: High Income
13 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Challenge
14 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Careerperspective
15 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Enough leisure time
16 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Societal use
17 Indicate how important this aspect is to you personally in your job on a 1-5 scale: Combine work and family
18. Cognitive skills is defined by the amount of correct answers to 8 questions taken from Frederick (2005). An example is 'Together, a ball and a cap cost 1.10 Euros. The ball costs 1.00 Euros more than the cap. How much does the cap cost?'.
19. Locus of control is defined by the average answer to the statements: 1. Set backs are usually due to mistakes people make, 2. Most people do not realize to what extent their life is determined by coincidences (-), 3. Whether I reach targets that I have in my life is not a matter of luck. These statements were asked on a 7 point scale. We recoded the statements indicated with (-). This is done similarly to the statements below.
20 Anxiety is defined by the average answer to the statements: 1. I often think about unpleasant events in the past, 2. I often tend to check whether I did everything right, 3. I think it is scary to go to places I have never been to.
21. Self-image is defined by the average answer to the statements: 1. My opinions about myself seem to change regularly (-), 2. In general I have a clear idea about who and what I am, 3. I often doubt about decisions because I do not know exactly what I want (-).
22. Self confidence is defined by the average answer to the statements: 1. I tend to think someone else is better than I am (-), 2. I think I have enough reason to be proud of myself, 3. The difference between who I am and what I want is large (-).
23. The discount rate which is measured by the following subjective question: Suppose you win a 10-day holiday trip to an interesting destination. To spread participation, you are asked if you can delay your trip with three years in exchange for a longer vacation. How many days should you be offered in addition to accept the offer in 3 years? We truncated our measure at 50 days and calculate the annual discount rate as ((10+days)/10)^(1/3)-1.
24. The average answer to the statements: 1. I can imagine well what my next job will look like, 2. My life now is totally different from what I expected it to be 3 years age (-). 3. I clearly see what I can expect the coming year, 4. The last year has been quite different from what I expected (-), 5. If I have to make an important decision, I make an elaborate image of the consequences of the decision, 6. If I have made an important decision, the outcome usually resembles the image I had on beforehand to a large extent. The answer categories varied between 1. Do not agree at all….7. Agree totally. We recoded the answers to the questions indicated with (-) to get positive scales.
25. Risk aversion is measured by offering the respondents one amount of money they can get for sure or a higher amount of money with a chance of getting it and a chance of not getting it. We asked 6 questions in which we varied the amounts of money and the chance of getting the money. To deduce information most efficiently, we used follow-up questions. For instance, we started with the question: What would you choose: 800 Euros, or 50% chance on nothing, 50% chance on 2000 Euros. If the respondent chose 800 Euros, he would get the question: What would you choose: 800 Euros, or 50% chance on nothing, 50% chance on 2400 Euros. A respondent who chose 2000 Euros in the first question would get the question: What would you choose: 800 Euros, or 50% chance on nothing, 50% chance on 1600 Euros.
26. Dummy for the first set of courses: English.

27. Dummy for the second set of courses: stress management.
28. Dummy for the third set of courses: computer skills.
29. Dummy for the fourth set of courses: team work.
30. Dummy for the fifth set of courses: efficient working.

Table 9
Default, skill deficiency and the choice for the course, when skill deficiencies are truncated at zero[1 2 3]

	Coef	Std. Error	
Default	1.003	0.030	***
Skill Deficiency	0.070	0.038	*
Default*Skill deficiency	0.132	0.045	***
Dummies per course included	yes		

* = 10%, **=5%, ***=1%.
Source: Research Centre for Education and the Labour Market 2005 graduate survey supplement.

1 The experiment to measure the choice for courses reads as follows: Suppose your work has a new settlement in which everyone can participate during working hours in the following courses, the expenses of which are fully covered by the employer: English, Computer skills, Stress Management. However, it is also possible to exchange one or more courses. The alternatives are Management skills, Team work, Efficient working. Do you choose the suggested set of courses or do you want to exchange? We randomized the offered courses and alternatives. We analyze the effect of having a specific course offered to a person by default on the choice for this course.
2 A skill deficiency is defined as the difference between the self-assessed required level of skills on the job and the self-assessed own level of skills. We regarded 6 skills: Working well under pressure, Applying ICT, Communicating in foreign languages, Drawing on other people's capabilities, Working productively with other people, Working in accordance with budget, planning or guide lines.
3 We truncated the skill deficiencies at zero.

Table 10
Default, skill deficiency and the choice for the course, per course

	Coef	Std. Error	
English			
Default	0.348	0.023	***
Skill Deficiency	0.023	0.014	*
Default*Skill deficiency	0.028	0.016	*
Dummies per course included	yes		
Stress Management			
Default	0.483	0.019	***
Skill Deficiency	0.024	0.017	
Default*Skill deficiency	0.047	0.020	**
Dummies per course included	yes		
Computer skills			
Default	0.174	0.017	***
Skill Deficiency	-0.009	0.008	
Default*Skill deficiency	0.052	0.016	***
Dummies per course included	yes		
Team work			
Default	0.489	0.019	***
Skill Deficiency	0.018	0.012	
Default*Skill deficiency	0.003	0.023	
Dummies per course included	yes		
Efficient working			
Default	0.226	0.018	***
Skill Deficiency	0.031	0.014	**
Default*Skill deficiency	-0.021	0.017	
Dummies per course included	yes		
Management			
Default	0.255	0.018	***
Skill Deficiency	-0.046	0.010	***
Default*Skill deficiency	0.051	0.020	**
Dummies per course included	yes		

* = 10%, **=5%, ***=1%.
Source: Research Centre for Education and the Labour Market 2005 graduate survey supplement.

1 The experiment to measure the choice for courses reads as follows: Suppose your work has a new settlement in which everyone can participate during working hours in the following courses, the expenses of which are fully covered by the employer: English, Computer skills, Stress Management. However, it is also possible to exchange one or more courses. The alternatives are Management skills, Team work, Efficient working. Do you choose the suggested set of courses or do you want to exchange? We randomized the offered courses and alternatives. We analyze the effect of having a specific course offered to a person by default on the choice for this course.
2 A skill deficiency is defined as the difference between the self-assessed required level of skills on the job and the self-assessed own level of skills. We regarded 6 skills: Working well under pressure, Applying ICT, Communicating in foreign languages, Drawing on other people's capabilities, Working productively with other people, Working in accordance with budget, planning or guide lines.

Table 11
The choice for courses by workers in jobs below and at their educational level[1] [2]

	Coef	Std. Error	
Job below educational level[3]			
Default	0.307	0.015	***
Skill Deficiency	0.003	0.008	
Default*skill deficiency	0.028	0.011	***
Dummies per course included	yes		
Job at least at educational level			
Default	0.340	0.009	***
Skill Deficiency	-0.006	0.007	
Default*skill deficiency	0.055	0.009	***
Dummies per course included	yes		

* = 10%, **=5%, ***=1%.
Source: Research Centre for Education and the Labour Market 2005 graduate survey supplement.

1 The experiment to measure the choice for courses reads as follows: Suppose your work has a new settlement in which everyone can participate during working hours in the following courses, the expenses of which are fully covered by the employer: English, Computer skills, Stress Management. However, it is also possible to exchange one or more courses. The alternatives are Management skills, Team work, Efficient working. Do you choose the suggested set of courses or do you want to exchange? We randomized the offered courses and alternatives. We analyze the effect of having a specific course offered to a person by default on the choice for this course.
2 A skill deficiency is defined as the difference between the self-assessed required level of skills on the job and the self-assessed own level of skills. We regarded 6 skills: Working well under pressure, Applying ICT, Communicating in foreign languages, Drawing on other people's capabilities, Working productively with other people, Working in accordance with budget, planning or guide lines.
3 The question reads: Which educational level was at least required by your employer for the job you do? With the levels of education as answer categories. We selected in the first regression the once who indicated to have jobs below their level of education and for the second regression the ones who indicated to have jobs at or above their level.

Table 12
The choice for courses and skill deficiencies of other courses[1 2]

	Coef	Std. Error	
Choice for English			
Skill deficiency English	0.038	0.008	***
Skill deficiency Stress Management	0.014	0.011	
Skill deficiency Computer skills	0.008	0.010	
Skill deficiency Team work	0.012	0.013	
Skill deficiency Efficient working	-0.017	0.010	
Skill deficiency Management	-0.012	0.012	
Choice for Stress Management			
Skill deficiency English	-0.013	0.008	
Skill deficiency Stress Management	0.070	0.012	***
Skill deficiency Computer skills	0.010	0.010	
Skill deficiency Team work	-0.006	0.014	
Skill deficiency Efficient working	-0.011	0.011	
Skill deficiency Management	0.000	0.012	
Choice for Computer skills			
Skill deficiency English	0.000	0.006	
Skill deficiency Stress Management	0.006	0.009	
Skill deficiency Computer skills	0.009	0.008	
Skill deficiency Team work	-0.014	0.011	
Skill deficiency Efficient working	-0.004	0.008	
Skill deficiency Management	-0.005	0.009	
Choice for Team work			
Skill deficiency English	-0.002	0.008	
Skill deficiency Stress Management	-0.021	0.012	*
Skill deficiency Computer skills	-0.017	0.011	
Skill deficiency Team work	0.026	0.014	*
Skill deficiency Efficient working	0.011	0.011	
Skill deficiency Management	0.004	0.012	
Choice for Efficient working			
Skill deficiency English	-0.015	0.007	**
Skill deficiency Stress Management	-0.005	0.011	
Skill deficiency Computer skills	0.001	0.009	
Skill deficiency Team work	-0.007	0.012	
Skill deficiency Efficient working	0.017	0.010	*
Skill deficiency Management	0.015	0.011	
Choice for Management			
Skill deficiency English	-0.009	0.007	
Skill deficiency Stress Management	-0.065	0.011	***
Skill deficiency Computer skills	-0.011	0.009	
Skill deficiency Team work	-0.011	0.012	
Skill deficiency Efficient working	0.003	0.010	
Skill deficiency Management	-0.002	0.011	

* = 10%, **=5%, ***=1%.
Source: Research Centre for Education and the Labour Market 2005 graduate survey supplement.

1 The experiment to measure the choice for courses reads as follows: Suppose your work has a new settlement in which everyone can participate during working hours in the following courses, the expenses of which are fully covered by the employer: English, Computer skills, Stress Management. However, it is also possible to exchange one or more courses. The alternatives are Management skills, Team work, Efficient working. Do you choose the suggested set of courses or do you want to exchange? We randomized the offered courses and alternatives. We analyze the effect of having a specific course offered to a person by default on the choice for this course.
2 A skill deficiency is defined as the difference between the self-assessed required level of skills on the job and the self-assessed own level of skills. We regarded 6 skills: Working well under pressure, Applying ICT, Communicating in foreign languages, Drawing on other people's capabilities, Working productively with other people, Working in accordance with budget, planning or guide lines.