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Does intensive coaching reduce school dropout? Evidence from a randomized experiment

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ABSTRACT

School dropout is an important social and economic problem. This paper investigates the effect of an intensive coaching program aimed at reducing school dropout rates among students aged 16–20. Students received support and guidance with their study activities, personal problems and internships in firms. The coaching program lasted one or two years. Students were randomly assigned to the coaching program. We find that one year of coaching reduced school dropout rates by more than 40% from 17 to 10 percentage points. The second year of coaching further reduced school dropout by 1 percentage point. The program is most effective for students with a high ex-ante probability of dropping out, such as students no longer obliged to be in formal education, male students, and students not living with both parents. Cost-benefit analysis suggests that one year of coaching is likely to yield a net social gain.

1. Introduction

Dropping out of school is an important social and economic problem in many countries. A large literature documents the benefits of education, for instance higher wages (Card, 1999; Harmon, Oosterbeek, & Walker, 2003; Heckman, Stixrud, & Uruza, 2006), better health (Lleras-Muney, 2005; Oreopoulos, 2007), less participation in crime (Lochner & Moretti, 2004; Machin, Marie, & Vujic, 2012), and a higher intergenerational transfer of human capital (Oreopoulos et al., 2006). However, in many countries the proportion of students that do not finish their education remains high, in particular their secondary education (OECD, 2012). Not completing their education will reduce the future prospects of students, especially for students with a low level of completed education, and might induce costs for society at large. The problem of school dropout is not new; schools and policy makers have long been concerned with high dropout rates and have actively searched for interventions or programs to increase graduation rates. In the recent literature two approaches aimed at reducing school dropout seem most promising. First, financial incentives for students (e.g. Dearden, Emmerson, Frayne, & Meghir, 2009) or conditional cash transfers (e.g. Attenasio et al., 2010; Schultz, 2004) have been shown to reduce school dropout or to increase enrolment. The second approach, which is the focus of this paper, is to use coaches that give intensive personal attention and support to students at risk.

Intensive coaching or mentoring programs appear to be able to reduce school dropout rates and/or improve educational progress and attainment among adolescents. For instance, positive results have been reported from the Big Brothers/Big Sisters program (Grossman & Tierney, 1998; Herrera et al., 2007), Sponsor-A-Scholar program (Johnson, 1999), the Check-and-Connect program

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(Sinclair, Christenson, Evelo, & Hurley, 1998; Sinclair, Christenson, & Thurlow, 2005), the Quantum Opportunities Program (Rodríguez-Planas, 2012a; Schirm, Stuart, & McKie, 2006[1]) and the Pathways to Education program (Oreopoulos, Brown, & Lavecchia, 2014). In addition, an evaluation of twenty dropout prevention programs in the United States showed promising results of programs characterized by an intensive and personal approach in smaller groups (Dynarski, Gleason, Rangarajan, & Wood, 1998). Carneiro and Heckman (2003) review a number of evaluations of dropout prevention programs in the United States. They conclude that sustained interventions targeted at adolescents still enrolled in school can positively impact learning and subsequent employment and earnings, but that interventions targeted at dropouts seem less successful. The National Guard Youth ChalleNGe Program, which includes a mentoring program, also appears to be effective (Millenky, Bloom, & Dillon, 2010). Bettinger and Baker (2013) find positive effects of the Inside-Track coaching program for college students on the probability of staying in college.

Our paper focuses on an intensive coaching program aimed at reducing school dropout of students aged between 16 and 20 in secondary (vocational) education in the Netherlands. The coaching program included a range of preventive activities such as working on study skills (e.g., planning and organizing), counseling in case of personal problems and contacts with parents. The coaches had extensive educational experience and were highly trained. They monitored the students closely through intake sessions, home visits, observations of behavior and attendance in class and visits during internships. Students received support and guidance with their study activities, with internships in firms, and with personal problems. On average one fulltime coach was assigned to a class of twenty students. Students within five vocational courses were randomly assigned to classes that received the coaching program and to classes that received care as usual. The random assignment of students enables us to identify the causal effect of the program. Our study focuses on two cohorts of students. The first cohort received two years of coaching whereas the second cohort received one year of coaching.

Our main finding is that the intensive coaching program has a large effect on school dropout. One year of coaching reduces the school dropout rate by more than 40%, that is, from 17% to 10%. The estimated effect after two years of coaching is slightly larger. We find larger effects for students with a higher ex-ante probability of school dropout: male students, students not living with both parents, and students above the compulsory school-leaving age. Tentative cost-benefit calculations suggest that one year of intensive coaching yields a net social gain whereas two years of coaching probably does not. The internal rate of return of one year of coaching is calculated at 6.9%, whereas that of two years of coaching is calculated at 3.7%. Targeting the program toward student with a high ex-ante probability of dropping out and toward the first year of the vocational course is expected to improve the cost-effectiveness of the program.

[1] Rodríguez-Planas (2012a) found modest average long-term effects of the Quantum Opportunity Program on educational outcomes, with shorter-term effects being more impressive.

Our paper contributes to the literature on school dropout prevention interventions in secondary education by adding rigorous evidence about a high quality intervention that seems widely applicable. The coaching program investigated in this study shares several elements with mentoring programs studied in the literature, such as assignment of a coach/mentor with a strong personal and supportive approach, and a focus on student–coach interactions and activities for students still enrolled in school. However, the high quality and intensity of the program, as indicated by the educational experience and level of educational attainment of the coaches, the student/coach ratio, the full-time availability of a coach, and the broad range of interventions, seem different from previous rigorous courses. In addition, the context, timing and target group of this program is also different. While previous courses mainly studied interventions at middle or high school level, this program focused on students with an average age of 18 years starting in intermediate post-secondary vocational education. These students had just made a transition toward a new vocational course. The target group of students was the general population of students, whereas previous courses mostly focused on students with disadvantaged or lower socioeconomic backgrounds.[2] The target group of students in the Dutch program includes students both under and above the statutory school-leaving age. This enables a comparison of program effects by compulsory schooling status. In addition, most courses have investigated US programs whereas this study has a European context.

This paper proceeds as follows. Section 2 gives a description of the coaching program. Section 3 presents the setup of the experiment. Section 4 presents the empirical strategy, whilst Section 5 describes the data. Section 6 shows the effects of one year in the program on school dropout, followed in Section 7 by the effects of two years of coaching on school dropout and degree completion. Section 8 presents the tentative cost-benefit analyses of one and two years of intensive coaching. Section 9 concludes and gives a brief discussion of the main results. Appendix A provides further information about the Dutch context and the background of the experiment. Appendix B gives summary statistics for the first of two cohorts, whereas Appendix C provides more details on the cost-benefit analyses.

2. The coaching program

The coaching program consisted of various types of interventions, both preventive and after students dropped out from a particular vocational program (i.e. 'curative' interventions). The following preventive interventions were part of the coaching program:

- Intake sessions with all students aimed at getting to know each other, detecting personal and/or educational problems and to make follow-up arrangements

[2] The average school dropout rates are lower in our experiment than in previous mentoring courses in the 'care-as-usual' situation. For instance, the school dropout rates in the US Quantum Opportunities Program were about 50% and in the Education Maintenance Allowance control areas 36%, whereas the dropout rate in the Dutch coaching experiment was less than 20%.

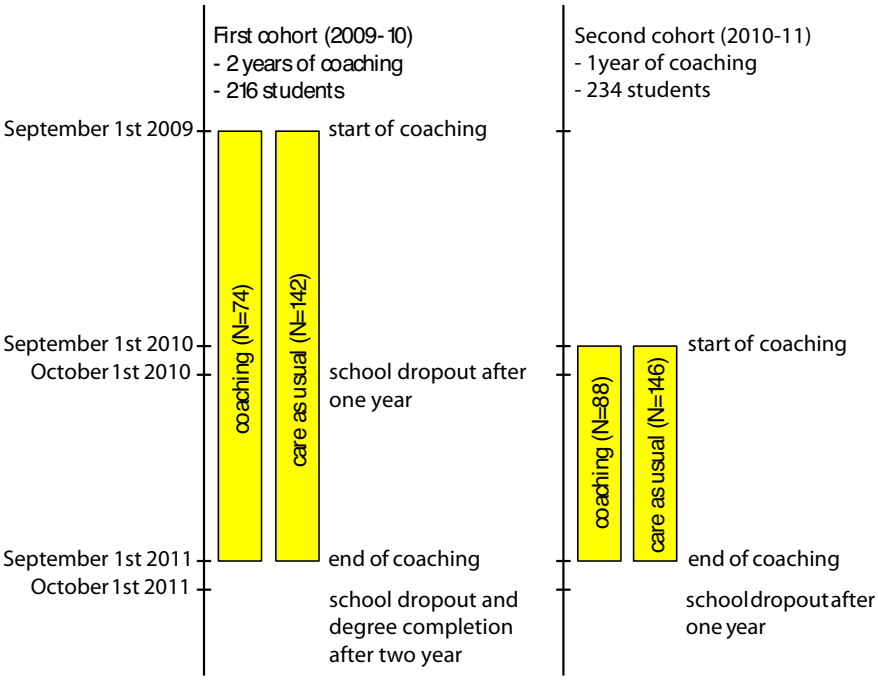

Fig. 1. Design of coaching experiment, outcome measures and measurement moments.

for various tracks. Different guidance tracks were initiated, for example with respect to dyslexia, fear of failure, social skills, self-confidence, or study skills. Coaches also gave guidance in case of financial problems or problems with housing.

- A home visit in the first month of the new educational program in order to get to know the parents or guardians and reduce the 'social distance' between home and school. Later on contacts with parents or guardians were possible if needed.
- Instruction on and help with study planning and organization with a focus on stimulating self-reliance.
- The coaches regularly attended lessons to observe the students and to give them study support if needed after the lessons. The coaches informed other school teams regularly in formal team meetings and helped other coaches by sharing successful initiatives.
- The coaches visited the students at their internship/apprenticeship with the aim of observing problems with work or social skills, and if needed initiate extra training for improving these skills. The coaches also played an active role in obtaining a good match between the student and the company at which the internship took place;
- In case of absence from school the coach immediately contacted the student and/or parents to discuss the reasons for not attending classes. If needed, the coaches implemented action plans to prevent further absence from school.

The 'curative' interventions were used when it was likely that the student would dropout from the particular vocational course. These actions aimed to guide the student to another vocational course by setting up an intensive track to help them choose the right course. This track consisted of talks, testing, guidance to another vocational course and checking whether the student had been accepted and actually started in the new vocational course. All the above interventions were carried out by two part-time coaches per class, adding up to one full-time equivalent available per class. This is equal to 40 h per week. Only one experimental group had one full-time coach instead of two part-time coaches. The coaches had on average 18 years of experience in education, of which 8 years at the school where the experiment took place. All coaches except one had obtained a higher education degree. Almost 60% of the coaches were teachers before they started their job as a coach in the experiment.

A local project coordinator had the task of implementing the assignment of students to classes and of communicating the 'rules' of the experiment in the participating courses, of organizing data collection and delivery, and of monitoring the experiment. This coordinator also organized regular meetings in which coaches could discuss cases with each other, and in which particular themes were addressed aimed at improving the expertise of the coaches. These meetings ensured that the coaches worked with the same vision and set of interventions across the different vocational courses.

The coaching experiment was funded by the Dutch Ministry of Education at a total intervention cost of € 720,000. These costs consisted of € 60,000 per full-time equivalent of coaching per class per year, or € 3000 per student per year.

3. Design of the coaching experiment

The experiment focused on students in Dutch intermediate post-secondary vocational education aged 16–20. Fig. 1 shows the timing and design of the coaching experiment.

The experiment took place in a school for intermediate post-secondary vocational education in Arnhem, a medium-sized city in the Netherlands. The experiment started in the school year 2009–2010 with a first cohort of students receiving two years of coaching. The nominal duration of the educational program was also two years. The first cohort was followed by a second cohort receiving one year of coaching. In total 450 students participated in the experiment. The experiment was implemented at level 2 of intermediate vocational education, which is equal to ISCED level 3. Appendix A provides more information on the context of the experiment.

Students were randomly assigned to an experimental or a control group. The experimental classes were offered the intensive coaching program provided by a full-time equivalent of coaching per class (in most cases two part-time coaches per class), whereas the control classes received 'care as usual'. It should be noted that the program was not compulsory; students could receive the support of the coach but participation in the various activities was not compulsory. The 'care as usual' consisted mainly of a dropout desk that advises students after they have dropped out. Five vocational courses participated in the experiment: health care, hairdressing, cooking, security and sales. Average degree completion rates of the participating courses were similar to national average completion rates of these subjects.

The complete list of applicants of the five vocational courses was used for the random assignment of individual students within each course. In total 23 classes participated in the experiment: eight classes received the experimental treatment and fifteen classes received 'care as usual'. Applicants were randomly assigned to classes within each of the five course types. One class within every vocational course was then randomly assigned intensive coaching, the other class or classes (depending on the total number of classes) received care as usual. The selection of one treatment class per vocational program per cohort was due to budget constraints. The randomization was carried out just before the start of the school year. At that time students were not informed about the project and the assignment to classes. The program was announced to students in the treatment classes and parents just after the start of the school year. The students in the control classes were not informed about the coaching program. The timing of the announcement implies that the coaching program could not have affected the choice of course. This was also the case for the second cohort, since the decision to extend the experiment with a second cohort has been made very late (i.e. in the summer of 2010). This implies that it is unlikely that the introduction of the coaching program for a second cohort could have been affected students or their parents in their choices. Students in both cohorts have not been moved between classes after the randomization took place, which was in line with our instructions.

4. Empirical strategy

For investigating the impact of the coaching program on school dropout rates we estimate OLS regressions of the following form:

$$\text{DROPOUT}_{ics} = \beta_0 + \beta_1 \,\text{Coaching}_{cs} + \beta_2 X_{ics} + \beta_3 \,\text{Cohort} + \alpha_s + \varepsilon_{ics} \quad (1)$$

where DROPOUT_{ics} is a binary variable which takes the value 1 if student i from class c of vocational course s dropped out and 0 otherwise, Coaching_{cs} is a dummy variable indicating whether class c in vocational course s received the offer of the coaching program, X_{ics} is a vector of observable characteristics of the student,[3] Cohort is a dummy indicating the student cohort, α_s is a fixed effect for the vocational course and ε_{ics} is an error term. The coefficient β_1 can be interpreted as the causal effect of the program on school dropout because the treatment was randomly assigned among the students.

As in any experimental or quasi-experimental design there are deviations from the ideal experimental design that might bias the estimated effects. A first concern is that not all applicants that were assigned to a treatment or control group actually started the vocational course they applied for. This could bias our estimates if the decision to actually start could be affected by the treatment status. However, due to the design of the experiment this is not possible. Students were informed about the coaching program only after the start of the school year so the decision not to start in the course they had applied for was made before the announcement of the coaching program. The non-starting of students can be considered as an example of sample selection within an experimental setting. Lee (2002, 2009) has introduced an approach for obtaining sharp lower and upper bounds for average treatment effects in the presence of sampling bias within such a setting. This approach is based on the assumption that all individuals in the control group would also be observed in the treatment group if their treatment status would change (the monotonicity assumption). Hence, the treatment assignment can only affect sample selection in one direction. If this assumption holds we might observe more individuals in the treatment group but sharp lower and upper bounds can be obtained by trimming the treatment group with the proportion of excess individuals. In our setting this seems a weak assumption because the starting decision was made before the information about the treatment assignment became available. Hence, it is highly likely that the individuals in the control group would also have started their study if they had been assigned to the treatment group. Lee (2009) shows that in the case of continuous outcomes upper bounds are obtained after trimming the lower tail of the outcome distribution; lower bounds are obtained by trimming the upper tail of the outcome distribution. Lee (2002) derives bounds in the case of binary outcomes without covariates. To assess the possible bias due to non-starting we have calculated lower and upper bound estimates of the treatment effect following Lee (2002). For obtaining estimates for the models with covariates we use the conditional means for the treatment and control group instead of the unconditional means as in Lee (2002). The standard errors are based on the analytic standard errors provided in Lee (2009). It should be noted that this issue of non-starting differs from the more standard issue of non-compliance. Individuals who did not start in the course they applied for did not receive the offer of the coaching treatment and did not refuse this offer, as is the case of non-compliance. As a result we do not

[3] The sample mean by cohort has been imputed for the few students with missing values on certain covariates and a dummy 'missing' has been set to 1.

observe their performance in their vocational course during this experiment. Therefore, we cannot address the issue of non-starting with the usual instrumental variable approach that estimates intention-to-treat or treatment-on-the-treated effects.

The second concern in our experimental design is spillover effects from students in the experimental groups to students in the control groups. We expect that these spillovers are unlikely because experimental and control groups had their own schedule and interactions among students took place mostly within their class and not across classes. In addition, we expect that spillovers, if any, from the experimental to the control group students would probably reduce the probability of dropout for students in the control group (i.e. positive spillovers). In that case our estimates should be considered as lower bounds of the true effects.

Our data consist of two cohorts of students that have received the coaching program or not. The first cohort received two years of coaching, the second cohort received one year of coaching. We will separately analyze the effects of one year of coaching and the effects of two years of coaching.

5. Data description

The data come from four sources. Data on school dropout and previous highest attained education have been collected from a national database called BRON that includes information on the school careers of all Dutch students. Data on dropout from a particular vocational course and on certain student background characteristics are collected from the school's central administration. In addition, data were used from intake tests among applicants taken before the start of the school year. We also used data from a student survey that was carried out just after the start of the school year, for instance on the degree of self-reported personal problems in several domains.

5.1. Dependent variables

The main dependent variables are school dropout, switching to another vocational course and having obtained a so-called 'start qualification'. School dropout, our main dependent variable, is defined as having left education without having obtained a so-called start qualification. A start qualification is comparable to having finished a degree at ISCED level 3, and is considered to be the minimum necessary qualification level for successful entry to the labor market in the Netherlands. The national student database BRON registers whether a student is in education every year on the first of October. The database contains relevant information about the school, the study level and particular vocational course of the student. School dropout is a dummy variable that has been taken from this database. This variable is also used in the national, regional and school statistics on school dropout that are produced by the Ministry of Education. School dropout is only measured once a year by comparing the situation at the first of October of a given year with the situation of the same student one year before. This implies that we do not know the exact timing of school dropout during the school year. Switching to another vocational course is defined as having left the education program in which the student started without having graduated for that course and subsequently being enrolled in another vocational course at the time of measurement (first of October). Having obtained a 'start qualification' is measured two years after the start. This time span corresponds to the nominal duration of two years at level 2 of intermediate post-secondary vocational education, which is the level at which the experiment took place.

5.2. Covariates

As covariates in our regression analyses we employ a rich set of student background characteristics and information about the personal situation and cognitive level of the students at the start of the experiment. Student background characteristics are gender, a dummy stating whether the student was born in the Netherlands or not, highest previous attained education (containing six categories) and age at the start of the experiment. From the age variable we also derive a dummy variable indicating whether the student is legally obliged to be in formal education until the end of the first year of the experiment. Every student under the age of 18 who has not yet obtained a start qualification has to go to school and be enrolled in a study that leads to a start qualification. Information about the cognitive level of the student is obtained from intake tests from the start of the school year. These intake tests consist of tests in numerical and verbal skills. Both types of skills are measured on a scale of 1–5. Two indicators provide relevant information about the personal situation of the students. The first is a dummy variable indicating whether the student lives with both parents or not. The other indicator is a dummy indicating whether the student has personal problems to some degree in at least one of the following four areas that may hinder them in their educational program: financial situation, contacts with police and/or justice, housing, and family and friends. This information is self-reported from a survey that was carried out just after the start of the experiment among all participating students. This student survey also yields a dummy variable indicating whether the student decided early or late (before or after 1 July) to enroll in the particular vocational course.

Table 1 shows the number of students that participated in the experiment by treatment status for the pooled sample and, separately, by cohort. The total list of applicants of the five participating courses in the experiment consisted of 503 students. Approximately 10% of all students did not start the vocational course they applied for. Most of these 'non-starters' chose a different vocational course within the same school or at another school. The proportion of starters in the participating courses is somewhat larger in the treated groups than in the control groups but the difference is statistically not significant. We have addressed the possible bias due to non-starting in Section 4.

Table 2 presents sample means by treatment status for the five vocational courses that participate in the experiment. The sample consists of students who actually started the vocational courses they applied for. The table shows that in all five courses the treatment and control groups are quite similar on a broad range of student characteristics. Only two out of sixty differences in average characteristics within the five participating courses are statistically significant. Hence,

Table 1
Applicants and starters in participating courses by assignment status.

	Control group	Treatment group	Total
(A) Pooled sample (2 cohorts)			
Applicants	327	176	503
Starters (% of applicants)	288 (88%)	162 (92%)	450 (89%)
(B) First cohort (2009–10 cohort)			
Applicants	166	81	247
Starters (% of applicants)	142 (86%)	74 (91%)	216 (87%)
(C) Second cohort (2010–11 cohort)			
Applicants	161	95	256
Starters (% of applicants)	146 (91%)	88 (93%)	234 (91%)

the randomization produced similar groups within each vocational course and cohort. For the pooled sample we find no statistically significant differences in student characteristics after controlling for vocational course and cohort (within which randomization took place).

The lower part of Table 2 gives a first impression of the effect of the treatment on school dropout and switching to other courses after one year. We observe that 17% of the students in the control group dropped out of school whereas 7% of the students in the treatment group dropped out. The difference in the proportion of students that switched to another vocational course is quite small (21% versus 19%).

6. The effect after one year of coaching

The estimated effects of one year of coaching are shown in Table 3. Panel A shows the estimated effects on school dropout. The estimates are based on linear probability models in which school dropout is regressed on coaching using different sets of control variables. Estimates from non-linear models are very similar to the estimates shown in Table 4. Column (1) controls for cohort and vocational course, column (2) also controls for socioeconomic and personal characteristics, and column (3) includes controls for previous schooling and cognitive skills. Columns (4) and (5) show the results for the first or second cohort respectively. Standard errors have been corrected for clustering at the class level. Panel B distinguishes between switching to another vocational course and school drop-out, and shows the marginal effects of one year of coaching. The estimates are based on multinomial logit models using the same specifications as in panel A.

The estimates in columns (1)–(3) of panel A show that one year of coaching reduces the probability of school dropout between 7.1 and 9.6% points including controls lower the estimated effect toward 7.1% points. From a base level of 17% this corresponds to a reduction of more than 40%. The estimation sample consists of students who started in their courses. A concern with the pooling of the data in columns (1)–(3) may be that the first cohort was offered a program of two years and the second cohort a program of one year. In addition, effects may differ between cohorts because of a difference in experience with running the program. Therefore, we have also estimated the effects for the two cohorts separately. Results are shown in columns (4) and (5). The estimated effects on school dropout turn out to be robust to cohort, but slightly larger for the second cohort.

As mentioned in the previous sections, this sample deviates from the original assignment sample due to students who did not start; 12% of the students in the control group and 8% in the treatment group did not start (Table 1). The estimate of the treatment effect might be biased due to the higher proportion of students in the control group who did not start. Because non-starting differs from non-compliance, we cannot apply an instrumental variable approach (see Section 4). To assess this possible bias we calculated bounds of the treatment effect based on Lee (2002, 2009).[4] For the first model of Table 3 we find a lower bound of the treatment effect of 0.093 (0.024), and an upper bound of 0.138 (0.057). For the model of column (3) with all covariates the lower bound estimate is 0.067 (0.020) and the upper bound is 0.112 (0.056). It should be noted that bias due to non-starting is unlikely because the coaching program was announced after the students had made their decision to start or not in the specific vocational course.

The coaching program includes both preventive action, aimed at reducing school dropout, and curative actions, aimed at guiding students to other courses when it was likely that the students would drop out of their current course. To analyze the importance of these two types of action we further investigated whether coaching not only has an effect on school dropout but also on switching to other courses. We have estimated multinomial logit models in which the dependent variable has three categories: same vocational course, switching to another vocational course and school dropout. Panel B of Table 3 shows the marginal effects of one year of coaching; the category 'same vocational course' is the reference category. The multinomial logit estimates show that one year of coaching reduces school dropout with 7% points but has no effect on switching to other vocational courses. Hence, the estimates in panels A and B consistently show that coaching significantly reduces school dropout. The results also indicate that the coaching program is successful in preventing school dropout but not successful with respect to the curative actions aimed at guiding potential dropouts toward other courses. An explanation for the latter finding might be that the 'care as usual' received by the control group mainly consists of curative actions. These might have the same effects as the coaching program.

6.1. Heterogeneous effects of one year of coaching on school dropout

The effect of coaching may differ among subgroups of students. We investigated this issue by interacting the treatment

[4] The trimming proportion is 4%, which equals the difference in non-starting between the treatment and control group.

Table 2
Sample statistics of treatment and control groups by vocational course and for pooled sample.

	(1) Health care (nursing)			(2) Hair dressing		
	Control	Treated	*p*-value [a]	Control	Treated	*p*-value [a]
Background characteristics						
1. Male	0.09	0.08	*0.72*	0.13	0.02	*0.05*
2. Age (in years)	18.7	18.8	*0.88*	17.9	17.7	*0.64*
3. Obliged to be in formal education [b]	0.33	0.37	*0.70*	0.50	0.61	*0.25*
4. Born in the Netherlands	0.90	0.90	*0.88*	0.92	0.89	*0.72*
5. Living with both parents	0.50	0.42	*0.43*	0.50	0.64	*0.15*
6. Having problems in at least one of the following areas: finance, police and justice, family and friends, or living/housing situation	0.45	0.30	*0.13*	0.37	0.41	*0.92*
7. Score on verbal skills at intake test (1–5)	3.2	3.2	*0.98*	3.2	3.5	*0.12*
8. Score on numeric skills at intake test (1–5)	2.8	2.7	*0.44*	3.1	2.9	*0.26*
9. Highest previous attained degree (1–6)	2.4	2.4	*1.00*	2.4	2.4	*0.84*
10. Already obtained a start qualification before the start	0.02	0.03	*0.68*	0.08	0.04	*0.35*
11. Late study choice (July or later)	0.28	0.29	*0.91*	0.18	0.27	*0.21*
12. Average class size (of started students)	19.2	19.0	*0.61*	19.8	23.0	*0.27*
Outcome variables (after one year)						
13.a. School dropout [c]	0.18	0.08	*0.08*	0.16	0.07	*0.14*
13.b. Switch to another study	0.22	0.18	*0.66*	0.25	0.22	*0.57*
13.c. Still in same study	0.60	0.74	*0.17*	0.59	0.72	*0.16*
Number of classes	6	2	8	5	2	7
Number of observations	115	38	153	99	46	145

	(3) Cook and catering			(4) Security [d]		
	Control	Treated	*p*-value [a]	Control	Treated	*p*-value
Student characteristics						
1. Male	0.86	0.87	*0.95*	0.81	0.79	*0.88*
2. Age (in years)	17.8	17.6	*0.55*	18.6	18.0	*0.23*
3. Obliged to be in formal education [b]	0.57	0.50	*0.49*	0.33	0.46	*0.40*
4. Born in the Netherlands	1.00	0.95	*0.17*	0.95	0.96	*0.93*
5. Living with both parents	0.83	0.71	*0.17*	0.38	0.54	*0.30*
6. Having problems in at least one of the following areas: finance, police and justice, family and friends, or living/housing situation	0.31	0.50	*0.12*	0.67	0.48	*0.22*
7. Score on verbal skills at intake test (1–5)	3.4	3.8	*0.14*	4.0	3.8	*0.21*
8. Score on numeric skills at intake test (1–5)	3.9	3.9	*0.68*	3.6	3.6	*0.97*
9. Highest previous attained degree (1–6)	2.5	2.3	*0.49*	2.6	2.6	*0.96*
10. Already obtained a start qualification before the start	0.08	0.03	*0.33*	0.05	0.00	*0.33*
11. Late study choice (July or later)	0.25	0.18	*0.52*	0.24	0.26	*0.87*
12. Average class size (of started students)	18.5	19.0	*0.33*	21.0	24.0	
Outcome variables (after one year)						
13.a. School dropout [c]	0.11	0.03	*0.15*	0.33	0.13	*0.10*
13.b. Switch to another study	0.16	0.21	*0.63*	0.00	0.08	*0.18*
13.c. Still in same study	0.73	0.76	*0.87*	0.67	0.79	*0.83*
Number of classes	2	2	4	1	1	2
Observations	37	38	75	21	24	45

	(5) Sales [d]			All courses pooled		
	Control	Treated	*p*-value [a]	Control	Treated	*p*-value [e]
Student characteristics						
1. Male	0.75	0.75	*1.00*	0.29	0.42	*0.23*
2. Age (in years)	17.7	17.5	*0.54*	18.3	18.0	*0.39*
3. Obliged to be in formal education [b]	0.56	0.81	*0.14*	0.43	0.52	*0.17*
4. Born in the Netherlands	0.73	0.94	*0.14*	0.91	0.92	*0.91*
5. Living with both parents	0.75	0.50	*0.15*	0.55	0.58	*0.90*
6. Having problems in at least one of the following areas: finance, police and justice, family and friends, or living/housing situation	0.27	0.19	*0.61*	0.41	0.39	*0.63*
7. Score on verbal skills at intake test (1–5)	2.7	2.8	*0.83*	3.3	3.5	*0.19*
8. Score on numeric skills at intake test (1–5)	3.1	2.9	*0.42*	3.1	3.2	*0.39*
9. Highest previous attained degree (1–6)	1.7	2.4	*0.05*	2.4	2.4	*0.54*
10. Already obtained a start qualification before the start of the experiment	0.00	0.07	*0.33*	0.05	0.03	*0.31*
11. Late study choice (July or later)	0.40	0.50	*0.60*	0.25	0.28	*0.51*
12. Average class size (of started students)	16.0	16.0		19.2	20.3	*0.02*
Outcome variables (after one year)						
13.a.School dropout [c]	0.00	0.06	*0.33*	0.17	0.07	*0.00*
13.b. Switch to another study	0.38	0.25	*0.46*	0.21	0.19	*0.54*
13.c. Still in same study	0.63	0.69	*0.72*	0.62	0.74	*0.19*
Number of classes	1	1	2	15	8	23
Observations	16	16	32	288	162	450

[a] Controlling for cohort.
[b] All students under 16 are obliged to go to school in any case. Students of 16 and 17 are obliged to be enrolled in formal education if they have not completed a degree that counts as a 'start qualification' (i.e. ISCED level 3 or higher).
[c] School dropout is defined as having left education without having obtained a start qualification (i.e. ISCED level 3 or higher).
[d] Security (second cohort) and sales (first cohort) have only been sampled in one cohort.
[e] Controlling for cohort and vocational course.

Table 3
Estimates of the effect after one year on school dropout.

	(1)	(2)	(3)	(4)	(5)
Panel A: Linear probability models					
Coaching on school dropout	−0.096***	−0.073***	−0.071***	−0.065**	−0.082***
	(0.023)	(0.021)	(0.018)	(0.028)	(0.022)
Panel B: Multinomial logit model (reference category = 'same study')					
Coaching on school dropout	−0.097***	−0.075***	−0.072***	−0.076***	−0.087***
	(0.019)	(0.019)	(0.018)	(0.024)	(0.027)
Coaching on switching	−0.012	−0.014	−0.017	−0.025	−0.008
	(0.042)	(0.041)	(0.040)	(0.049)	(0.053)
Sample	Pooled	Pooled	Pooled	Cohort 1	Cohort 2
Controls					
Cohort and vocational course	Yes	Yes	Yes	Yes	Yes
Socioeconomic and personal factors	No	Yes	Yes	Yes	Yes
Previous education and cognitive skills	No	No	Yes	Yes	Yes
Observations	450	450	450	216	234

Notes: Column one controls for cohort and type of study. Column (2) also includes controls for gender, born in the Netherlands, compulsory education status, living with both parents, timing of study choice, having problems. Column (3) also includes highest level of education attained, verbal and numeric skills. Panel B shows marginal effects from multinomial logit models. Standard errors corrected for clustering at the class level in parentheses.
*Effects are significant at a 10% significance level.
**Effects are significant at a 5% significance level.
***Effects are significant at a 1% significance level.

variable with specific covariates. Table 4 shows the estimated effect for specific subgroups using the full sample of students. For instance, row (1a) shows the treatment effect for males and row (1b) shows the difference in the treatment effect between males and females. We observe that the treatment effect for male students is larger than for females. The difference in the treatment effect is 6 percentage points, which is nearly statistically significant (p-value of 0.13). In addition, we find that the treatment effect is 7 percentage points larger for students that are no longer obliged to be in formal education (see row 2b). Moreover, the treatment effect appears to be 8 percentage points larger for students who are not living with their parents (see row 3b). This difference is again nearly statistically significant (p-value of 0.13). These results suggest that the treatment effect is larger for subgroups with a higher ex-ante probability of dropping out of school as can be observed in the last column of Table 4. Hence, coaching seems more effective for groups with a relatively large probability of dropping out. We further investigated this by estimating a probit regression that predicts the probability of dropping out of school as a function of individual covariates, vocational course, and cohort. This regression is estimated on the control sample only and is used to generate ex-ante school dropout probabilities for both treated and non-treated students. The fitted probabilities are used to split the sample into two subgroups of roughly equal size, one with a relatively low probability of dropping out of school, and one with a relatively high probability (top half). Students in the top half have an average ex-ante school dropout probability of 28%, whereas students in the bottom half have an ex-ante school dropout probability of 3%. Next, we constructed a dummy variable that distinguishes students in the bottom half of the school dropout probability distribution from students in the top half and estimated the effect of the interaction of this variable with the treatment. Row (4a) shows that the treatment effect for students with a high ex-ante dropout probability is approximately 13 percentage points.

Table 4
Heterogeneous effects of one year of coaching on school dropout by different student characteristics, pooled sample of both cohorts.

	Coefficient	Dropout in control group for relevant subgroup
1.By gender		
1.a. Male	−0.111***	0.238
	(0.037)	
1.b. Interaction term treatment * female	0.063	0.137
	(0.040)	
2. By compulsory schooling status		
2.a. No longer obliged to stay in formal education	−0.107***	0.227
	(0.030)	
2.b. Interaction term treatment * obliged to stay in formal education	0.071*	0.089
	(0.040)	
3. By living situation		
3.a. Not living with both parents	−0.107**	0.236
	(0.041)	
3.b. Interaction term treatment * living with both parents	0.082	0.067
	(0.052)	
4. By ex-ante probability of school dropout		
4.a. High predicted school dropout probability (top half)	−0.129***	0.278
	(0.035)	
4.b. Interaction term treatment * low predicted dropout probability (bottom half)	0.114**	0.032
	(0.044)	

Notes: The estimates are derived from regressions including a treatment dummy and an interaction term for the denoted subgroup with the treatment dummy. All models include the complete set of covariates as in column (3) of Table 3. Standard errors are corrected for clustering at the class level.
*** Effects are significant at a 1% significance level.
** Effects are significant at a 5% significance level.
* Effects are significant at a 10% significance level.

The estimate of the interaction effect (see row 4b) shows that the treatment is much less effective for students with a low ex-ante dropout probability, the difference in the estimated effect is statistically significant. This finding is consistent with Rodríguez-Planas (2012b), who finds that the Quantum-Opportunity Program is 'extremely successful' in improving educational and behavioral outcomes for those most at risk.[5] Our results suggest that the efficiency of the coaching program may be improved by targeting the coaching interventions on groups with a higher ex-ante probability of dropping out.

Recent research suggests that the development of boys is more sensitive to unstable home environments. For instance, Bertrand and Pan (2013) find that disruptive behavior of boys is associated with one parent families. We find a similar pattern in our data. We observe that for students not living with both parents school dropout occurs much more often among male students than among female students (i.e. 43% versus 17%). In this group male students report twice more often having problems with police and drugs than female students, and one third more often financial problems and problems with housing. Reporting (one of) these problems is associated with a higher probability of school dropout. Moreover, for this group we find that coaching is much more effective for male students than for female students. The estimated effect is −0.29 (with a standard error of 0.12) for male students versus −0.04 (with a standard error of 0.05) for female students. Coaches reported that they had put a lot of effort into helping students to resolve personal problems, such as financial problems and problems with housing (or in guiding them to the appropriate organizations that could help them). This may have had a positive impact on the decision to stay in school, particularly among the group of boys not living with both parents, of which a relatively large proportion reported these problems.

7. Effects after two years on school dropout and start qualifications

The first cohort received two years of coaching. This allows us to compare the effect after two years of coaching to the effect after one year of coaching for the same sample of students. In addition, we can investigate the effect of coaching on obtaining a start qualification. For obtaining this qualification a student has to complete all elements of the study with a nominal duration of successfully. The table in Appendix B shows that treatment and control groups of the first cohort are quite similar. Regarding the outcome variables we observe that two years after the start the treatment group is less likely to dropout and more likely to obtain a start qualification.

Table 5 shows the estimated effects after one year and after two years of coaching for the first cohort that participated in the experiment. We find that after one year of coaching the effect on school dropout was statistically significant and points at a reduction of school dropout by 6.5 percentage points. The effect after two years of coaching is 7.3 percentage points, which is statistically significant as well. This estimate suggests a reduction in dropout from 22% to 14%. Hence, the estimated effect increases by approximately 1 percentage point in the second year.

Unfortunately, the second year of coaching was not randomly assigned in our experimental design; we cannot compare the effects after two years of treatment group that was assigned to one year of coaching with a treatment group that was assigned to two years of coaching. This implies that the evidence on the relative effectiveness of the first and second years of coaching should be considered as indicative and not as conclusive. If we assume that the gains from the first year of coaching are not lost in the second year then our findings suggest that of the gain in reducing school dropout comes from the first year of coaching. Two further observations seem to support this indication. First, national dropout figures show that most school dropout takes place in the first study year.[6] Second, many coaches have reported that the coaching capacity for the second year was (too) high, particularly since the original treatment groups had been reduced by on average a quarter after one year due to either switching to other courses or school dropout.

The estimated effect of coaching on having obtained a start qualification two years after the start is quite similar to the estimated effects on school dropout but statistically insignificant (p-value 0.14). The point estimate would imply an increase in start qualification attainment share from 49% to 56% due to two years of being offered intensive coaching. It is likely that the insignificance of the effect on obtaining a start qualification can be explained by the timing of the second data collection. These data were collected after two years, which is exactly the nominal duration of the program and only the best students graduate within these two years. Hence, it is somewhat early to evaluate the effects of coaching on educational attainment since only half of the students in our population manage to obtain a start qualification within two years.

7.1. Heterogeneous treatment effects

We also investigated heterogeneous treatment effects for the models that regress obtaining a start qualification (i.e. graduating from the two-year vocational program) on coaching. The estimates show that coaching has a strong and significant effect on the probability of having obtained a start qualification for students no longer obliged to be in formal education of 0.163 (0.063). This finding suggests that coaching has increased the probability of obtaining a start qualification among this group from 42% to 58%. The estimated effect for the subgroup of students obliged to stay in formal education is zero. A regression with an interaction term for treatment group and not obliged to be in formal education produces an effect estimate of 0.21 (0.05). This larger effect for the group not obliged to stay in education is in line with the larger effect on dropout reduction we found in Table 4. Descriptive statistics show that the share of students

[5] Rodríguez-Planas (2012b) identifies students most at risk as the students in the top-half of the predicted drug use distribution. High school graduation increased by 20% for this group and college enrollment increased by 28% due to QOP.

[6] See the national website on school dropout prevention of the Dutch Ministry of education: http://www.aanvalopschooluitval.nl/beleid/beleidsthemas/van-vmbo-naar-mbo.

Table 5
OLS estimates of the effect of two years of coaching on school dropout and having obtained a start qualification, first cohort (starting in study year 2009–10).

Outcome variable	School dropout (1)	Start qualification (2)
1(a) One year of coaching	−0.065** (0.027)	
1(b) Two years of coaching	−0.073** (0.022)	0.063 (0.040)
Observations	216	216

Notes: All models include the full set of covariates as in column (3) of Table 4. Standard errors are corrected for clustering at the class level.
** Significant at a 5% significance level.

obtaining a start qualification within two years is around 60% among both coached and non-coached students that are obliged to be in formal education.

8. Cost-benefit analysis

To assess the possible impact of the coaching program on societal welfare we have performed a tentative cost-benefit analysis. The details of this analysis are shown in Appendix C. The cost-benefit calculations suggest that the internal rate of return (IRR) of one year of coaching is 6.9% and the IRR of two years of coaching is 3.7%. To put these estimates into perspective, Angrist and Lavy (2009) estimated an internal rate of return of 8.6% for a program offering financial incentives for high school students in Israel upon passing high school matriculation exams. They find a higher rate of return mainly because of the much lower average cost of their program per student. Cost-benefit calculations of the Education Maintenance Allowance program in the UK also point at a net social gain (see Dearden et al., 2009).[7] In sum, our cost-benefit analyses for the Dutch coaching program suggest that one year of coaching is likely to generate a net social gain. However, two years of coaching may not generate a net social gain. It should be noted that the program may well have other gains to society which have been linked to dropout reduction but are not taken into account in our cost-benefit analyses, such as reducing crime. On the other hand, it is not yet clear whether the assumed wage increases will occur for students in our study who are affected by the coaching program in terms of not dropping out and instead obtained a start qualification.

9. Conclusions and discussion

This paper has investigated the effect of an intensive coaching program in secondary education using data from a randomized experiment. The coaching program can be characterized as a high quality/high intensity program because of the educational experience and training of the coaches, the student/coach ratio and the broad range of interventions that were applied for supporting the students. One year of intensive coaching reduces the probability of dropping out of school from 17% to 10%, that is, a reduction of more than 40%.[8] One additional year of coaching reduces the dropout rate by a further 1 percentage point. These findings suggest that the second year of coaching adds little to the total reduction in school dropout; most of the gain of the coaching program seems to be generated in the first year of coaching. A cost-benefit analysis shows that the internal rate of return of one year of coaching is 6.9% and of two years of coaching is 3.7%. Hence, only the first year of coaching seems cost-effective. The coaching program did not have an effect on the decision of students to switch to other vocational courses. These findings suggest that the 'preventive elements' of the program worked well, but that the interventions aimed at keeping students in the education system once they had dropped out from a particular study have been no more successful than the interventions in the care-as-usual situation.

An investigation of heterogeneous treatment effects shows large differences between subgroups. The estimated effects are larger for male students, students no longer obliged to be in formal education, and students not living with both parents. Moreover, the effects are much larger for boys not living with their parents than for girls not living with their parents. This is consistent with recent research that shows that the development of boys is more sensitive to unstable home environments. The groups for which we find large effects of the program have a relatively large ex-ante probability of dropping out of school. The information to identify groups with a high ex-ante probability can be collected relatively easy and can be used to target the program on students most likely to be helped by the coaching program. A more targeted approach of the coaching program on those students being most vulnerable to school dropout will likely improve the cost effectiveness of the coaching approach.

The coaching program that we evaluated consists of multiple interventions. In our experimental setup we cannot distinguish which intervention is most important. However, surveys among students, coaches and staff of the coaching program may provide some indications about this. Surveys among students of the first cohort (response of 133 students) show that personal guidance was valued highest (6.2 at a scale of 1–10), whereas home visits by the coach were valued lowest (5.2). In between are group activities with the coach (6.1) and visit(s) at the internship of the student (5.6). More than half of students states that the most important value added of the coach lies in involvement with study progress,

[7] The required return to break even is estimated by Dearden et al. (2009) at 7.7%, whereas research for the UK shows that the returns from staying on in post-compulsory education are 11% for males and 18% for females.

[8] This average effect size compares favorably to for instance the dropout reduction of 13% found by Dearden et al. for the Education Maintenance Program in the UK (see Dearden et al., 2009).

about a quarter claims it lies in involvement with the students personal living situation, and about one out of five claims it lies in interference with the student's internship. Surveys among coaches point at 1-on-1 conversations with the students being valued highest in terms of the contribution to dropout prevention (8.5 at a scale of 1 to 10), whereas group activities were valued lowest (6.8). In between are monitoring absence and dropout (7.6), visit at internship (7.4), home visits (7.3), and after-care in case of dropout (7.2). The program management in a self-evaluation together with the coaches state that the three most valuable interventions have been (in descending order): working on study skills (planning and organizing; focus on self-reliance); counselling on personal problems of students (social-emotional; referring to internal and external assistance); contact with parents.

For assessing the potential impact of the program it seems important to note that the coaching program was implemented in a period with a strong policy focus on reducing school dropout rates. In this period two nationwide policies aimed at reducing school dropout rates were also introduced in the Netherlands. First, students below the age of 18 and without a start qualification (i.e. ISCED level 3) were obliged to stay in formal education.[9] Second, financial incentives for schools to reduce school dropout rates were introduced. Schools could receive additional funds if they succeeded in reducing school dropout rates compared to a base level of school dropout. Hence, the new policies stimulated both students and schools to reduce dropout. If these policies have been successful they might have reduced the effect of the coaching program studied in this paper. A final factor that may have affected the effectiveness of the coaching program is the relative high unemployment at the time of the experiment. Between 2008 and 2010 youth unemployment increased from 8.4% to 11.7%. This may have created additional incentives for all students in the treatment as well as in the control groups to stay in school, in line with empirical findings about the positive relationship between youth unemployment and school enrolment (Card & Lemieux, 2000; Clark, 2011; Meschi, Swaffield, & Vignoles, 2011; Rice, 1999; Rivkin, 1995). These contextual factors might have limited the effectiveness of the program.

Not only the particular policy and economic context may have affected the effectiveness of the program, but also the particular target group of students aged 16–25 within intermediate post-secondary vocational education. Another particular feature is that the program was targeted at a group that had just made the transition from secondary to post-secondary education. It has been well documented that this is a phase in which the risk of dropping out is eminent, since it may be hard for students to make the right choice for a new study program and a new school out of many options, students often have to change study and travel routines, and students have to get used to new classmates and teachers at their new schools, etc.[10] The coaching program attempted to address several of difficulties that students encountered after this transition phase.

A further issue is to which extent the results of this experiment will also hold for other schools and other geographical areas. We note that the experiment took place in a school with a student population that is rather representative for the Dutch context (see also Table A1). The school had a rather average school dropout rate ranking 17th highest out of 42 institutions offering intermediate vocational education. Moreover, the vocational programs that we study are offered all over the country. Finally, early school leaving in the Netherlands is concentrated in intermediate vocational education (75% of all early school leaving), which is the level of education in which the experiment took place. This probably suggests that our findings are generalizable to other schools and other geographical areas as well. It is difficult to assess whether our findings would also hold for younger students or for students in academic tracks. School dropout is much less of a problem among students younger than 16 years and in academic tracks. It seems also likely that students in academic tracks will be quite different from students in vocational tracks.

The main finding of this study is that the coaching program has substantially reduced school dropout rates. Therefore, we conclude that intensive coaching can be a successful instrument for reducing school dropout, especially among students with a high ex-ante probability of dropping out.

Table A1
ROC Rijnijssel (i.e. institution where the experiment took place) versus all institutions offering intermediate vocational education in the Netherlands (*source*: www.aanvalopschooluitval.nl, figures for school year 2010–2011).

	ROC Rijnijssel	All institutions offering intermediate post-secondary vocational education
Dropout		
% of dropouts	9.4	8.4
% of dropouts at level 2	15.9	14.7
Student characteristics		
Male (%)	53	53
Dutch (%	77	76
Living in poverty accumulation area (%)	19	12
Domains of vocational courses offered		
Economic	37	35
Technical	22	27
Care and health	38	31
Agriculture	0	6
Combination	3	2
Economic	37	35
Institution size		
Average number of students	9512	10,039

Appendix A. School dropout in the Netherlands and policy context of the coaching experiment

The Netherlands had almost 40,000 new school dropouts (or early school leavers) in the school year 2010–11 (*source*:

[9] The school leaving age used to be 16 and it did not matter whether or not a start qualification had been obtained.

[10] Behavioral barriers within and after the transition phase from secondary to post-secondary education have been well documented in Lavecchia, Liu, and Oreopoulos (2014) and Ross, White, Wright, and Knapp (2013).

www.aanvalopschooluitval.nl). The official definition of an early school leaver is a student aged 12–22 that is (i) in education on the first of October (start of the school year), (ii) not in education one year later, and (iii) has not obtained a so-called 'start qualification' in the meanwhile. A start qualification is equal to a degree of upper secondary education or of intermediate post-secondary vocational education of at least level two (i.e. ISCED level 3 or higher). School dropout is largely concentrated in intermediate post-secondary vocational education (MBO), which has 75% of all school dropouts and which has a little less than 500,000 students. Within MBO, 40% of all school dropouts are enrolled at level two. This is the level at which the coaching program took place. Thirty percent of all new school dropouts in the Netherlands drop out from level two. Official study duration at level two is two years and completing this level yields a start qualification. The national average school dropout rate at level two was 13% in school year 2010–11, that is, one out of every seven students at this level leaves education without a start qualification every year. See https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Netherlands:Overview for a schematic overview of the Dutch education system. The coaching experiment has been carried out in "MBO Basisberoepsopleiding", which is the same as level two.

The target of the current national action program against dropout "Aanval op de Uitval" is to reduce the yearly number of school dropouts to 25,000 by 2014–2015.[11] Total (yearly) public expenditures on Dutch dropout policy have been estimated to be around 400 million Euro in 2011 (Ecorys, 2009). An important part of this budget has been invested through regional covenants with a contact municipality and schools for secondary general education as well as vocational education within each region. The covenants describe targets for the subsequent years for each of the 39 regions which add up to the national dropout reduction target. Part of the provided funds are provided unconditionally, another part of the budget is paid to the schools conditional on reaching preset targets for dropout reduction. This implies that there is in part a financial incentive to the schools to reduce school dropout. Schools and regions have full autonomy over their choice of anti-dropout measures.

The coaching experiment took place at ROC Rijnijssel, a large school for intermediate post-secondary vocational education. The school is located in Arnhem, a medium-sized city belonging to the 30 largest cities in the Netherlands. The school had a little less than 10,000 participants in school year 2010–11 of which 9.4% dropped out of education without a start qualification. ROC Rijnijssel had the 17th highest dropout rate out of 42 institutions offering intermediate post-secondary vocational education in the Netherlands. Table A1 shows that the school at which the experiment took place is rather average as well in terms of student characteristics, domains of vocational courses offered and size of institution. The share of students living in a poverty accumulation area is somewhat higher than average though at ROC Rijnijssel (19% versus 12%).

In 2009 the Dutch Ministry of Education was actively looking for opportunities to gain more (convincing) evidence on promising dropout interventions and invited institutions that offered intermediate post-secondary vocational education to see whether they would be willing to participate in a randomized dropout prevention experiment. ROC Rijnijssel in Arnhem was interested in an experiment. They were thinking about expanding an intensive coaching setting from MBO level 1 to level 2. Experiences with this intensive coaching setting at level 1 had been satisfying and it was felt that this approach contributed to dropout prevention, though convincing evidence was lacking. The school agreed to participate in a randomized experiment at level 2.

Appendix B. Descriptive statistics of first cohort, starting in school year 2009–10, having received two years of coaching

Characteristic	All courses pooled		
	Control	Treated	*p*-value[a]
Student characteristics			
1. Male	0.23	0.38	*0.51*
2. Age (in years)	18.2	17.9	*0.76*
3. Obliged to stay in formal education[b]	0.45	0.61	*0.29*
4. Born in the Netherlands	0.88	0.93	*0.19*
5. Living with both parents	0.57	0.62	*0.76*
6. Having problems in at least one of the following areas: finance, police and justice, family and friends, or living/housing situation	0.48	0.35	*0.11*
7. Score on verbal skills at intake test (1–5)	3.2	3.3	*0.37*
8. Score on numeric skills at intake test (1–5)	3.1	3.2	*0.19*
9. Highest previous attained degree (1–6)	2.3	2.2	*0.96*
10. Already obtained a start qualification at the start of the experiment	0.05	0.13	*0.14*
11. Late choice (July or later)	0.27	0.28	*0.82*
12. Average class size (of started students)	20.9	20.7	*0.30*
Outcome variables (after one year)			
13.a School dropout[c]	0.12	0.04	*0.06*
13.b Switch to another study	0.26	0.23	*0.43*
13.c Still in same study	0.63	0.73	*0.19*
Outcome variables (after two years)			
14.a. School dropout[c]	0.22	0.12	*0.06*
14.b. Obtained 'start qualification'[d]	0.49	0.60	*0.11*
Number of classes	8	4	12
Observations	142	74	216

Notes: A missing value on the background characteristics is limited to maximum 6% of the pooled sample.

[a] Controlling for cohort and vocational course.

[b] All students under 16 are obliged to go to school. Students of 16 and 17 are obliged to stay in education if they have not completed a degree that counts as a start qualification (i.e. ISCED level 3 or higher).

[c] School dropout is defined as having left education without having obtained a start qualification.

[d] A start qualification is equal to ISCED level 3 (or higher).

[11] The target in European perspective is based on another measure of school dropout. This is the share of students aged 18–24 with only lower secondary education at best and not in education or training. The EU 2020 target for the Netherlands to which the Dutch government has committed itself is 8%. The 2010 rate was 9.1% down from 15.1% in 2000. The EU-27 average rate was 13.5% in 2010, down from 17.6% in 2000. (*source*: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/577&format=HTML&aged=0&language=EN&guiLanguage=en).

Appendix C. Cost-benefit analysis

We started with the calculation of the rate of return of a program of one year of coaching. The costs of one year of coaching amount to 3000 euro per treated student (i.e. 60k euro for a FTE equivalent of coaching per group divided by 20 students per group). The returns per year are calculated making the following assumptions: we use average annual earnings of workers without a start qualification as a base (25,265 euro);[12] we use the effect estimate of (minus) 7.1 percentage points of the effect on school dropout after one year as a proxy for the definitive effect on school dropout; we assume this 7% of the treated population not becoming a school dropout due to coaching receives two extra years of schooling,[13] each year yielding a rate of return of 10%;[14] public as well as private costs of these two extra years of schooling for 7% of the treated population are taken into consideration. These costs consist of around 5k euro public contribution and 1k euro private contribution per study year per student in intermediate post-secondary vocational education.

The yearly return can then be calculated as follows: $25{,}265 * 0.10 * 2 * 0.071 = 353$ euro per year. These returns are assumed to start occurring in the fifth year after the coaching started (to take into account extra study duration and the time to labor market entry) and are assumed to be maintained for 42 years.[15] Bringing these costs and benefits all together yields an internal rate of return of one year of coaching of 6.9%. At the advised discount rate of 5.5% (see Ministry of Finance, 2009) one year of coaching would then yield a positive net present value of 18k euro per coached group (at an initial investment of 60k euro per group). To put it differently, we would need a sustained effect of at least 5.5% point less school dropout in order for one year of intensive coaching to break even at a discount rate of 5.5%.

The estimated internal rate of return of two subsequent years of coaching is 3.7%, which implies a net social loss at the advised discount rate of 5.5%. This estimate is based on (i) the effect estimate of two years of coaching of −7.3% point on school dropout (based on the first cohort sample), (ii) € 6000 of initial investments in coaching per treated student (i.e. two years of €3000 euro), and (iii) for the rest on the same assumptions as above. To put it differently, we would need an effect of 10% points less school dropout in order to break even with the two year coaching program at its current costs (and at the advised discount rate of 5.5%).

[12] This is a weighted average of wage income of three different subgroups varying by their distance to a start qualification (and thus by their completed years of education), the weights corresponding to relative occurrence of these subgroups in our sample. Wage figures are taken from Arbeidsmarktpanel 2009 (Statistics Netherlands). We used average yearly wage income of workers aged 20–64.

[13] The reasoning for using two years is as follows. The distance to a start qualification of the group without a start qualification in terms of years of completed education is one year for the group with MBO level 1, two years for the subgroups with completed secondary vocational education, and six years for the subgroup with just primary education. The shares of these subgroups in the sample without a start qualification at the start are 10, 77 and 13% respectively. This would imply the average distance to a start qualification in terms of completed years of education is 2.4 years in our sample. Furthermore, a start qualification gives access to higher levels of intermediate vocational education (whereas this access is not granted without a start qualification), such that the definitive difference in years of completed education among students managing to obtain a start qualification and those that do not is probably even larger than two years. Nevertheless we use a conservative assumption of two years of additional education linked to those students not becoming a school dropout due to coaching.

[14] OECD (2012) shows that people (aged 25–64) having attained less than upper secondary education earn 19% less than people having attained upper secondary education in the Netherlands. The average earnings difference in OECD is 24% between these two groups. This earnings difference increased somewhat in the last decade (up from 20% in 2000), despite a rather strong decline in the share of people having attained less than upper secondary education (from 36% to 26%). This suggests that relative demand for people with below upper secondary education (relative to those with upper secondary education) has fallen. These earning differences need not represent the causal effects of obtaining an upper secondary level, but come close to other courses which have used credible designs to detect the returns to education (see e.g. Card, 1999; Heckman et al., 2006 for reviews of this literature).

[15] Average age at start of the experiment is 18. Official pension age was 65 at the time of the experiment but is agreed to go up to 67 by 2025. We assume benefits of higher educational attainment will continue up to the age of 65.

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