The secondary school careers of Freinet-educated students in Flanders

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Abstract

In Flanders, there has been a steady increase in the amount of students attending a method school during primary education. This could have effects on the secondary school careers of these students. In this study we compare the secondary school careers of students educated in Freinet schools with students educated in traditional primary schools. More concretely, we investigated the chosen school tracks in the third and fifth year of secondary school, as well as possible educational delay. To study this, we made use of a large-scale longitudinal dataset, namely the 'School Careers in Primary Education' project (Dutch acronym 'SiBO'). The data were analyzed using propensity score analysis, contingency tables, and multinomial regression. The results show that pupils who attended Freinet primary schools are significantly more likely to end up in artistic secondary education (KSO) by the fifth year of secondary school. For the other study tracks, we did not identify meaningful differences between the two groups.

Keywords: Freinet education; school careers; propensity score analysis; longitudinal data; long-term educational outcomes

1 Introduction

Over the past fifty years, method schools have been steadily gaining popularity in Flanders, the Dutch-speaking region of Belgium that constitutionally affords a great degree of liberty in educational choice to its residents. These schools tend to be critical of traditional teacher-centered and cognitive assessment-oriented educational methods, and favor instead methods that center around the interests and holistic development of the child. The most predominant type of method school in Flanders is Freinet, a French pedagogy that champions egalitarian, democratic, and cooperative modes of child-centered education.

Freinet schools account for more than half of the method primary schools in Flanders, but have rarely been systematically assessed in terms of their educational effectiveness. This is particularly true in terms of assessing their educational outcomes at the secondary level of education. In this study, the educational progress and secondary school track selection of children who were educated in Freinet primary schools will be compared with those of children who completed traditional primary education in Flanders. In doing so, it is hoped that this study can contribute to the dearth of research on long-term school effectiveness as well as begin to answer the question of whether Freinet education has a lasting effect on secondary school outcomes.

2 Literature Review

2.1 Education in Flanders

Flemish educational freedom

Education in Flanders, which begins at age two and a half and is compulsory from age six to age eighteen, is constitutionally defined by the principles of "free school choice" and "educational freedom." These fundamentals provide a large degree of autonomy both to parents selecting a school and to the educational networks that create them. Each school is free to determine its mission, pedagogical project, and teaching methods independently, and parents have free range in selecting the school that best matches their educational goals for their children (Verhoeven & Verbeeck, 1999). This educational landscape provides the opportunity for a uniquely broad range of publicly-funded schooling options.

Freinet education

Among the many state-sanctioned schooling options, schools with alternative pedagogies have been steadily gaining in popularity in Flanders since the 1960s. Collectively branded as New Educational models, these schools developed as a response against the "authoritarian, performance-oriented, overly intellectual and repressive educational project" (De Coster, Simon, & Depaepe, 2009, p. 646). These alternative schools, or method schools, as they are alternately referred to, encompass many different types such as Freinet, Montessori, Waldorf, and Steiner, each which differ in their emphases and pedagogical visions. Generally speaking, method schools forgo traditional knowledge-based and teacher-dominated forms of education and instead seek to create an educational experience that centers on and adapts to the unique interests and experiences of the child. Underlying this alternate approach is the conviction that children learn most effectively when they are personally interested in and motivated for a given topic or project (Sliwka, 2008). Method primary school attendance in Flanders experienced a 17% increase between the school years 2011-2012 and 2016-2017, resulting in 27,387 Flemish students attending method primary schools (Vancaeneghem, 2016). Despite the growing popularity of these alternate schools, little is known about their long-term educational outcomes.

By far the largest group within method education, and the focus of the present study, is Freinet education, which accounts for more than half of the method schools in Flanders (De Coster, Simon, & Depaepe, 2009), with 12,413 students in Freinet Primary schools in 2016 (Vancaeneghem, 2016). Freinet schools derive their methods from the ideas of Celestin Freinet, a twentieth century French educator who championed democratically-oriented experiential education (Temple & Rodero, 1995). Within this pedagogical vision, children are viewed as being of the same nature as adults, and must be given autonomy whenever possible to make their own decisions about their educational pursuits. In this context, teachers act not as authority figures but as facilitators and guides, helping to form learning experiences based on the interests of the children. The immediate natural and human environments of the children's lives serve as the starting point for class discussions, individual and group text compositions, and creative project work (Legrand, 1993). This child-centered emphasis extends to the governance of the Freinet classes and schools, as the students participate in class and school councils to formulate behavioral guidelines and decide school policy.

Within Freinet education there is an additional emphasis on the social aspect of education, with collaborative project work often taking the place of individual projects and assessments. Students engage in self-assessment rather than be subjected to grades and individual exams, as grades were viewed by Freinet as merely a means of measuring adult appreciation of a child's work (Freinet, 1979). Teacher reports are often qualitative in nature and narrative in form, highlighting student attributes such as curiosity, initiative, and creativity alongside traditional academic benchmarks (Sliwka, 2008).

Secondary tracking in Flanders

After following six years of primary school from ages six to twelve, Flemish adolescents enter secondary education for the following six years. As in primary education, secondary students are free to choose the school they will attend. Secondary school is comprised of three different stages of two years each. The first stage consists of a core curriculum that is offered to all students, with a general "A" track option pursued by the majority of the students and a remedial/pre-vocational "B" track option. In the third year of secondary school, students must choose one of four tracking options: general academic (ASO), technical (TSO), artistic (KSO) or vocational (BSO) education. Each track differs in its curricular emphases and in the future prospects for which it prepares students. ASO emphasizes broad theoretical training and provides a basis for higher education, while TSO focuses more on technical theoretical subjects and prepares students for professional work or higher education. KSO emphasizes active practice alongside general development and can also

lead to professional work or higher education, whereas BSO mainly focuses on specific occupation-related skills and rarely leads to higher education (Verhoeven & Verbeeck, 1999; Vlaamse Regering, 2013). The third stage of secondary school consists of more specific curricular options within the track chosen by the student in the second stage.

Although the tracks differ in curricular emphases and student outcomes, changing tracks is possible through the end of the second stage, and doing so is not uncommon (Verhoeven & Verbeeck, 1999; Vlaamse Regering, 2013). According to the Flemish Ministry of Education, the percentage of students in each track at the beginning of the second stage is as follows: 45 percent in ASO, 30 percent in TSO, two percent in KSO, and 23 percent in BSO. By the end of the third cycle, the percentage of students following ASO decreases to 36 percent of the student population, while the technical and vocational track each increase, to 33 percent and 29 percent, respectively, and the artistic track (KSO) remains constant at two percent (Pinxten et al., 2012). These numbers underlie what is known as the "cascade phenomenon," in which students are pushed towards choosing what are broadly viewed as the more difficult or socially desirable educational tracks (ASO>TSO/KSO>BSO) with the intent of keeping as many future educational options open as possible. If students are unable to meet the requirements of a more challenging track, they descend to a "lower" option in the hierarchy (Pinxten et al., 2012). Although moving to a more academically demanding track is theoretically possible, it is rarely done in practice.

2.2 School track choice

Educational effectiveness research has tended to focus on educational outcomes within the same phase of schooling, and has only seldom investigated the long-term, or continuing, effects of schools (Creemers, Kyriakides, & Sammons, 2010). Furthermore, although educational effectiveness research has typically focused on student achievement outcomes such as standardized math and language assessment scores, this focus has been criticized as too narrow (Luyten, Visscher, & Witziers, 2005). A tracked educational system such as the one in Flanders provides the opportunity for assessing school track selection and persistence as alternate long-term educational outcomes. As secondary school track choice has implications for postsecondary study and work opportunities, it is strongly linked to the broadly-held educational goal of preparing individuals for the labor market, and is hence an outcome worthy of analysis in educational effectiveness research.

Numerous studies have been undertaken to explain and predict school track choice on the basis of both school-level and student-level factors. Although there is broad consensus that a constellation of factors at both levels inform this choice behavior, several variables have emerged as more predictive than others. Generally speaking, student-level variables were found to have a greater effect on track choice than school-level variables (Luyten, 2004; Pinxten et al., 2012; Pustjens, Van de Gaer, Van Damme, & Onghena, 2008; Vanwynsberghe, Vanlaar, Van Damme, & De Fraine, 2017), although none of the studies included pedagogical factors such as instructional methods or educational philosophy in their models.

At the student-level, by far the largest predictors of choosing the academic track in secondary education are prior achievement (Vanwynsberghe et al., 2017; Pinxten et al., 2012; Lüdemann & Schwerdt, 2013; Luyten, 2004; Pustjens et al., 2008) and parental education level (Chesters, 2015; Dustmann, 2004). Students with higher academic outcomes at the primary school level tend to choose the academic study track more frequently, as do students from families with higher average parental education attainment. Students with a higher socioeconomic status were also found to hold higher educational positions in years two and four of secondary school (Vanwynsberghe et al., 2017). Factors such as immigration background (Lüdemann & Schwerdt, 2013) and family composition (Heilbig, 2012) have also been investigated, but any initial differences found between groups based on these variables were eliminated when the researchers controlled for student academic achievement, level of parental

education, and socioeconomic status. Additionally, these same variables seem to determine whether students will repeat coursework or transition to a "lower" track when faced with academic difficulty: students with more highly educated parents (Kloosterman & De Graaf, 2010) have been found to opt for non-promotion over track switching when they fail to meet the requirements of their initially chosen tracks. Further, minority ethnicity has been shown to play a role in secondary school trajectory: Kloosterman and Graaf (2010) found that children of immigrants in the Netherlands are more likely to choose non-promotion over track demotion when their school results were not satisfactory, and Hustinx (2002) found that Dutch ethnic minorities were able to maintain a higher educational level from the onset of secondary education compared to their native demographically matched peers.

A fewer number of studies has investigated the effect of school or class differences on secondary school careers. Variance in student educational track choice and trajectory has been found to be attributable to school-level predictors, albeit to a lesser degree than student-level variables (Luyten, 2004; Pinxten et al., 2012; Pustjens et al., 2008; Vanwynsberghe et al., 2017). Differences between classes within schools do not seem to play a role in secondary educational track choice. Vanwynsberghe et al. (2017) found that math effectiveness at the primary school level plays a small but significant positive role in determining secondary school track position, with higher math effectiveness predicting the more academically oriented tracks, and that this effect does not decrease between years two and four of secondary school. Pustjens et al. (2008) analyzed Flemish data to determine the impact of primary school and class on the student educational track choice in the first two years of secondary school and found that almost 25 percent of the gross variance in initial track selection was situated at the level of the primary school. After the first two years of secondary education, the variance in educational track choice attributable to primary school was reduced to less than two percent, which suggested that secondary schools were able to compensate for primary school differences. Similarly, Luyten (2004) found that primary schools in the Netherlands accounted for eleven percent of the variance in start position at the beginning of secondary school and that their lasting effect was reduced to just over one percent by the fourth year of secondary school. Pinxten et al. (2012) found that student-level predictors such as prior achievement and occupational interests accounted for the majority of variance in school track choice in the first year of secondary education. The school-level variables average socioeconomic status, gender composition, and average achievement level, however, also contributed to the variance in school track choice. Their contribution was less than that of the student-level predictors, but was large enough to lead them to conclude that schools also have an influence over this decision.

In light of the present inquiry, previous studies do not provide enough information to predict whether pedagogical differences at the school level will influence secondary school educational track pathways. They do, however, highlight the importance of controlling for student-level variables such as prior achievement, socioeconomic status, parental educational background, and ethnic origin in order to isolate any possible effect of pedagogy on school track outcomes. Because primary schools have been found to play a role in affecting secondary school track choice, it is relevant to explore whether the pedagogical method of schools contributes to this effect.

2.3 Outcomes of method education

Freinet educational outcomes

Despite its growing popularity in Flanders and elsewhere, educational outcomes of Freinet education have rarely been studied, particularly not in isolation from other alternative school types such as Steiner and Montessori. Furthermore, the studies that have been undertaken have mostly focused on student outcomes from kindergarten and early primary school, and have not examined any lasting effect that alternative primary education may have on outcomes in secondary or higher education. Perhaps most relevant to the present research, De Bilde (2012) grouped Flem-

ish Freinet and Steiner/Waldorf students together and found a persistent lag in their mathematical ability in comparison to traditionally- educated peers. She found that the average student educated in an alternative Flemish school would need an extra five months of math education to catch up to an identical student in a traditional Flemish school. The same study revealed no significant difference regarding reading fluency or comprehension between traditionally and alternatively educated students.

Alternative educational method effects

Specific methods and pedagogical emphases that are popular within Freinet and other alternative educational approaches have been more widely studied. Results in these studies have yielded mixed results. For instance, Van der Wal and Waslander (2007) found no evidence of a trade-off between secondary schools trying to develop both traditional (academic) and non-traditional (civic, social, and self-concept) educational outcomes; in fact, the correlations between the two types were strongly positive. One group of researchers (Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008) found that a focus on socio-emotional quality in primary school positively and significantly related to reading and math achievement. Another group, however, found some evidence of a trade-off among younger children, as didactic preschool and kindergarten programs produced students with better reading achievement but tended to be associated with a negative social climate, whereas preschools and kindergartens with a child-centered focus yielded poorer academic performance but a more positive social environment. The children in the child-centered programs, however, rated their abilities higher, expected to succeed more, and selected a higher level of task difficulty than children in didactic programs (Stipek, Feiler, Daniels, & Milburn, 1995).

2.4 School choice

Which families choose alternative schools?

Research has yielded several generalizable trends among parents who opt for alternative schools for their children instead of the local mainstream schools. A finding with broad consensus across this line of inquiry is that parents who choose non-mainstream schooling options tend to be better informed about the available schooling options in general, and being better informed corresponds with a higher level of parental education (Azmat & Garcia Montalvo, 2013; Fleming, Cowen, Witte, & Wolf, 2015; Martinez, Thomas, & Kemerer, 1994). The social networks of parents were found in several studies to be the primary source of information about schooling options in general as well as information about specific alternative schools (Fleming et al., 2015; Olmedo Reinoso & Santa Cruz Grau, 2011; Viaene, 1993). Parents often choose schools that are comprised of families with socio-cultural characteristics, values, and ambitions that match closely those of their own families. This choice behavior occurs both because the parents are specifically looking for schools that espouse their preferred socio-cultural traits (Olmedo Reinoso & Santa Cruz Grau, 2011) and because the priority given by many families to school proximity. It ensures that alternative schools, like their mainstream counterparts, are primarily composed of students from the neighborhoods in which they are situated (Burgess, Greaves, & Vignoles, 2014; Jacobs, 2013).

Who chooses Freinet education?

These trends from school choice in general have been confirmed among parents who choose for Freinet education in Flanders as well. Freinet parents are more highly educated than both the general population (De Bilde, Van Damme, Lamote, & De Fraine, 2013; Viaene, 1993) and the parents from other method schools (Viaene, 1993). They also are more likely to have jobs that require a higher skill level than these two comparison groups, with professions concentrated in medicine, senior management, and the socio-cultural sector (Viaene, 1993). As with the group of parents who opt for non-mainstream schools generally, the majority of method school parents in Flanders came into contact with information about their chosen school through their network of friends and family (Viaene, 1993).

2.5 Current study

Given the differences in pedagogical emphasis in Freinet and traditional schools, and the lack of research investigating long-term effects of these differences, it is both interesting and relevant to compare long-term educational outcomes of the two groups of students. Although the Freinet schools educate a relatively small portion of students in any given year, their cumulative impact is large over time, especially given their recent increase in enrollment. As the effectiveness of a primary school has measurable implications on educational outcomes in subsequent phases of education (Goldstein & Sammons, 1997), it is important and necessary to establish the effectiveness of Freinet schools by assessing their long-term educational outcomes.

One long-term outcome, and the focus of the current study, is comparing the secondary school pathways of Freinet students with those of their traditionally educated peers. The first research question of the current study is, "What, if any, are the differences in secondary school track positions of students educated in Freinet and traditional primary schools in year 3 and year 5 of secondary education?" We will first use raw data to compare the school track choices of the Freinet and traditionally educated students, and then control for baseline student characteristics because of the evidence that Freinet schools draw from a different population of students than traditional schools. Our second research question is, "Are Freinet-educated students able to complete secondary school at the same rate as traditional students?" To answer this, we will compare the average number of school years completed by the two groups of students over a five-year time span. Finally, our third research question is, "Is the 'cascade phenomenon' more or less pronounced among Freinet students than among traditional students?" In other words, are Freinet students more or less likely to stay in their initially chosen secondary track than traditional students, particularly when the academic track is initially chosen? This could give some evidence as to whether Freinet schools sufficiently prepare their students for academic work in traditional pedagogical environments. Furthermore, we will explore whether there are differences in the track types chosen by the two groups of students when switching secondary tracks.

We expect to observe that the Freinet group will consist of students with higher socioeconomic status and with more highly educated parents than the traditional school population, and we hypothesize that these individual background differences will result in a higher concentration in the academic ASO track of Freinet-educated students in the raw data. After controlling for these individual differences, we hypothesize that we will observe less prevalence in the ASO track by the Freinet students, based on previous research indicating a deficit in mathematical skills among children educated in method primary schools (De Bilde, 2012), and research indicating a predictive relationship between primary school math effectiveness and secondary school track (Vanwynsberghe et al., 2017). We expect that the Freinet students may be more subject to delay in their educational progress because of this mathematical deficit, and we also predict that the "cascade phenomenon" of switching to a less academic track may be more pronounced among Freinet students.

3 Method

3.1 Participants

To address the research objectives, this study utilizes data from the large scale longitudinal SiBO dataset (Maes, Ghesquiére, Onghena, & Van Damme, 2002). The SiBO project followed a group of approximately 9,500 students throughout their primary education careers in Flanders (Belgium) from 2002 until 2011, and it includes information gathered at the beginning of the project regarding math and language aptitude, gender, socioeconomic status, ethnicity, and home environment indicators. Additionally, as the students have now completed secondary education, the dataset includes the students' school track positions in the first five years of secondary school.

Only children who completed the entirety of their primary school education in either Freinet or traditional schools were included in the sample group; students who received both types of education were excluded from the analysis, as well as children for whom the school attended in any of the primary years was unknown. Furthermore, students were excluded from the study if they were missing information on their educational positions in the third and fifth year of secondary schools, as these data were used in the outcome analysis. Finally, students were excluded from the study if they were in special education at any measurement point in primary or secondary school, as the majority of these students hailed from traditional primary schools but likely did not end up in special education because of pedagogical factors.

The final sample consisted of 5,076 students, of which 4,891 children attended traditional primary schools for the duration of their primary education, and 185 children were educated exclusively in Freinet primary schools. The traditionally educated group functions as the control group in this study, while the group educated in Freinet schools will be referred to henceforth as the treatment group. All of the selected students were educated at traditional secondary schools. For a table comparing the covariate means of the sample group with those of students from the full SiBO dataset, refer to Appendix 1.

3.2 Data analysis

The problem of comparability in observational studies

In randomized control trials, treatment assignment is random and is therefore independent from the outcome. In observational studies, however, this condition does not hold, as subjects within the treatment group often differ in systematic ways from those in the control group (Rosenbaum & Rubin, 1983). These systematic differences can confound the true effect of the treatment, rendering bias in comparisons made between the outcomes of the treatment and control groups. In comparing treatment and control groups within observational studies, then, it is crucial to account for the between-group differences (Austin, 2011).

Propensity score weighting

One method of accounting for initial differences between treatment and control subjects is through calculating propensity scores to weigh individual subjects on basis of pretreatment characteristics. This process is done with the goal of creating balanced matched groups based on these weights, which can then be reasonably compared on the basis of an outcome variable. In the propensity score model, the probability of treatment is calculated as a function of measured pretreatment covariates (Rosenbaum & Rubin, 1983). This probability is referred to as the propensity score, and it is calculated to create matched groups among the treatment and control subjects that are balanced in terms of the measured covariate distributions. In this way, the treatment variable is made more independent from the baseline covariates, and unbiased treatment effects can be estimated directly based on selected outcomes (Pattanayak, Rubin, & Zell, 2011).

In this study, the propensity score represented the probability of attending a Freinet primary school. This score was calculated on the basis of fourteen covariates (see Table 1). Only variables that were measured before students began primary school were included, as they may have otherwise been affected by the treatment. Variables that have been identified in the literature as affecting treatment assignment and/or outcome were included as covariates.

Missing value imputation

The proportion of missing data among the covariates in the initial sample ranged from zero to 22 percent (M=11 percent). Missing values were imputed using chained equations, which used up to ten iterations to produce five separate datasets that introduced plausible covariate values in place of the missing ones. These missing covariate values were derived using predictive mean matching. PMM samples observed values from complete cases within the dataset that are close to the value predicted for the missing case by the imputation model. In this way, the plausibility of the imputed values is ensured (Van Buuren, 2012). Using multiple imputed datasets accounts for the uncertainty of the imputation

Table 1
Description of Covariates Included in Propensity Model

Variable	Description	Instrument
Socioeconomic Status	Score computed by means of confirmatory factor analysis based on seven indicators: (1) Highest diploma father, (2) Highest diploma mother, (3) Employment status father, (4) Employment status mother, (5) Occupational level father, (6) Occupational level mother, and (7) Income	PQ
Gender	Gender of child	PQ
Birth Year	Year in which child was born	PQ
Birth Month	Month in which child was born	PQ
Average Parental Education Level	Average of the highest education level obtained by each of the parents (Five levels: (1) No diploma or primary school diploma, (2) Lower secondary school diploma, (3) Higher secondary school diploma, (4) Higher education outside of university diploma, (5) University diploma)	PQ
Ethnicity	Ethnic background (Four categories: Turkey/the Maghreb, other Non-Western European, Western European, Belgian)	PQ
Home Language	Language spoken at home (Three categories: Dutch, Dutch and another language, only another language)	PQ
Math Ability	Mathematics test administered at the end of preschool	ST
Language Ability	Language test administered at the end of preschool	ST
Extra Care	Evaluation of the level of educational support services needed by student	TE
Family Involvement	Rating of the level of involvement of the family in the child's development and school activities	TE
Family Contact with School	Rating of level of contact and involvement with the school by child's parents	TE
Home Environment	Rating of support for the child in his/her home environment	TE
Cultural Gap	Rating of degree of cultural gap between home culture and school culture	TE

PQ = Parental Questionnaire; ST = Student Test; TE = Teacher Evaluation

process, as imputed covariate values vary across the datasets in accordance with the level of confidence in their predicted values (Van Buuren & Groothuis-Oudshoorn, 2011). The imputed values were inspected visually to ensure that their distribution was comparable to those in the observed data. Subsequent analyses were performed on all five datasets and results were pooled using Rubin's rules (Rubin, 1987).

Selection of specifications

In the current study, the propensity score matching procedure was implemented using full matching, which was chosen because of its ability to retain all comparison individuals (Harder, Stuart, & Anthony, 2010). In full matching, matched sets are formed on the basis of similar propensity scores that pair at least one treated individual with a variable amount of comparison individuals on the basis of their similar propensity scores.

After the matched sets are formed, the treated subjects are given the weight of one, while the comparison subjects within each set are given a weight equal to the number of treated individuals in the set divided by the number of comparison individuals in the set. Meaningful comparisons can then be made between the two groups by incorporating the weights into the outcome analysis.

Analysis of balance

Once the matching procedure was specified and implemented, balance between the two groups was ensured by checking the similarity of the groups' covariate distributions by analyzing the standardized means difference, or standardized bias, of each covariate within each dataset. A standardized bias of less than 0.25 generally indicates that a covariate is sufficiently balanced (Harder, Start, & Anthony, 2010), and was thus the decision criterion utilized in checking covariate balance in the current study. Once balance was ensured, it became possible to compare the weighted outcomes of the two groups without additional parametric adjustment (Ho, Imai, King, & Stuart, 2007).

Outcome analysis

To address our first research question, contingency tables were created to calculate the frequencies of traditional and Freinet students within the different secondary school tracks at two different points in secondary education. The first measurement point occurred midway through the school year 2011-2012, during which most students entered third grade of secondary school and made their initial study track selections. The second measurement point took place midway through the 2013-2014 school year, five years after most of the students completed primary school and two years after they made their initial secondary study track selection. Pearson's chi squared test was used to determine whether a significant relationship existed between primary school type and study track choice at each of the chosen measurement moments. Likelihood ratios were calculated for each study track within the treatment and control groups at each measurement moment, and effect sizes were calculated using odds ratios based on these likelihood ratios.

In the initial analysis, the students were entered into the model without weights to determine the raw frequencies of educational progress and school track selection among the treatment and control groups at the two measurement points. In a second analysis, students were entered into the model along with the weights calculated on the basis of their propensity scores. As there were five imputed datasets, this step was repeated on each dataset for a total of five times at each measurement point, and the weighted outcomes were averaged to create two contingency tables, one with the outcomes from the 2011-12 school year, and one from the 2013-14 school year.

Additional analysis was performed on the year 5 weighted outcomes using a series of multinomial logistic regression models, with ASO as the reference category. This was done with the intent of answering the question of whether any significant treatment effects remained when the covariates were also modeled as predictors. The treatment was first entered into the model as the lone predictor of school track choice. In the second model, the covariates were reintroduced as predictors along with their weights, increasing the robustness of the analysis. The increased variance from use of the five datasets was accounted for by use of pooling formulas from Rubin's Rules (Rubin, 1987; see Figure 1), and 95 percent confidence intervals for the average sample odds ratio were constructed on the basis of this increased variance.

To address the second research question addressing years of education attained among Freinet and traditional students, the mean

number of grades completed in secondary education by the two matched groups of students was compared in each of the first five years of secondary school. Finally, to answer the third research question regarding the 'cascade phenomenon,' movement between school tracks was calculated as a relative percentage of a given track choice frequency in year 5 of secondary school as compared to year 3.

$$Var_{within} = \frac{\sum_{i=1}^{M} SE^2{}_i}{M}$$

$$Var_{between} = \frac{\sum_{i=1}^{M} (\beta_i - \bar{\beta})^2}{M-1}$$

$$Var_{total} = Var_{within} + Var_{between} + \frac{Var_{between}}{M}$$

Figure 1. Variance Pooling Formulas, Rubin's Rules (Rubin, 1987)

4 Results

First, the initial covariate imbalance and subsequent balance from the propensity score adjustment procedure will be described. Second, the school track outcomes of the two groups after they had been matched and individually weighted on the basis of their propensity scores will be reported (for the unweighted results, see Appendix 2). Third, the results of the multinomial regression analysis with the covariates included as predictors of school track choice will be described. Fourth, the average secondary school grade attainment per year among the matched groups will be reported. Finally, the movement between tracks between the third and fifth year of secondary school will be explored.

4.1 Covariate balancing

Before the propensity score matching procedure, several of the covariates of which have been shown in the literature to influence the outcome were demonstrably imbalanced between the Freinet and traditional students (see Table 2). As predicted by the literature, the Freinet student group had a higher average parental education level and higher average socioeconomic status than the comparison group; these two variables were the covariates with the largest imbalance between the two groups. In addition, the Freinet students demonstrated higher initial math and language ability at the onset of primary education, and they came from families who were more involved in their schooling.

The full matching procedure on the selected students improved the balance across all covariates considerably, with each achieving a standardized means difference of less than 0.25 across the five datasets. This ensured that the treatment and control group were matched successfully, and could be compared based on the outcome variable when modeled along with their assigned weights.

4.2 School track positions among the matched groups

In regards to our first research question regarding the school track selection of the Freinet and traditional groups, a significant effect was found of primary school type on secondary school track selection in both year 3 and year 5 ($\chi^2(5) = 24.12$, $p = .00021$ at year 3 and $\chi^2(3) = 24.04$, $p = .00002$ at year 5; see Tables 3 and 4, respectively). By year 5, the Freinet students were distributed 59.0 percent in the ASO track, 8.5 percent in the BSO track, 10.3 percent in the KSO track, and 22.2 percent in the TSO track. Their matched traditionally educated peers were distributed with 57.6 percent in the ASO track, 13.9 percent in the BSO track, 3.7 percent in the KSO track, and 24.8 percent in the TSO track. Only the TSO and KSO study tracks, however, showed statistically significant differences between the treatment and control group in year 3 of secondary school, and only the KSO track remained significant by year 5.

In year 3, the Freinet students were more likely than their matched traditional peers to still be in the A stream characteristic of the first two grades of secondary education (*OR*=1.43). They were slightly more likely to be in the ASO track (*OR*= 1.18), more than half as likely to be in the BSO track (*OR*= 0.61), over three times as likely to be in the KSO track (*OR*=3.32), and roughly half as likely to be in the TSO track (*OR*=0.48). By year 5, the Freinet students were almost exactly as likely to be in the ASO track as their traditionally educated peers (*OR*= 1.06),

Table 2
Covariate Mean and Standard Deviation Values Before Propensity Score Balancing

Covariate	Traditional Students (n=4891)	Freinet Students (n=185)
Socioeconomic Status	0.08 (±.73) (n=4881)	0.57 (±.54) (n=185)
Gender	49.8% female, 50.1% male (n=4891)	55.6% female, 44.4% male (n=185)
Age at time of Ability Tests	5 years, 8 months (±4 months) (n=4891)	5 years, 8 months (±4 months) (n=185)
Average Parental Education Level	3.18 (±.99) (n=4317)	3.98 (±.81) (n=175)
Ethnic Origin	79% Belgian, 4.5% Western European, 6% Non-Western European, 10.6% Turkey/Maghreb (n=4303)	90% Belgian, 4.6% Western European, 2.9% Non-Western European, 1.7% Turkey/ Maghreb (n=174)
Home Language	72.7% Dutch only, 15.4% Dutch mixed, 11.9% No Dutch (n= 5017)	83% Dutch only, 13.4% Dutch mixed 3.2% No Dutch (n=186)
Math Ability	55.28 (±8.34) (n=4089)	59.05 (±6.75) (n=180)
Language Ability	53.39 (±7.51) (n=4092)	55.77 (±6.70) (n=177)
Extra Care	2.94 (±1.40) (n=3852)	2.73 (±1.39) (n=157)
Family Involvement	4.81 (±1.02) (n=3794)	5.20 (±.86) (n=156)
Family Contact with School	4.50 (±1.13) (n=3819)	5.09 (±.99) (n=157)
Home Environment	4.66 (±1.01) (n=3844)	5.15 (±.83) (n=157)
Cultural Gap	1.98 (±1.37) (n=3864)	1.56 (±1.04) (n=158)

only slightly less likely to be in the TSO track (*OR*= 0.86), and just over half as likely to be in the BSO track (*OR*= 0.58). They were, however, almost three times as likely to have chosen the KSO track by year 5 of secondary school (*OR*= 2.99).

4.3 Multinomial regression outcomes

Next, multinomial regression analyses were conducted to ascertain that the significant treatment effect observed in the contingency model held up when primary school type was entered as a predictor along with the other

Table 3
Weighted Contingency Table: School Track Positions
School Year 2011-12 (Year 3 of Secondary School)

School Type		A	B	ASO	BSO	KSO	TSO	Total
Freinet	Count	27	4	123	7.8	9	14	184.8
	Expected Value	20.0	6.8	116.2	12.3	3.0	26.5	
	Row Percent	14.6%	2.2%	66.6%	4.2%	4.9%	7.6%	
	Chi Square Contribution	2.45	1.13	0.4	1.64	11.73	5.88	
	Standard Residual	1.57	-1.06	0.63	-1.28	3.43	-2.43	
Traditional	Count	515	179.2	3026.2	325.4	73.2	703.6	4822.6
	Expected Value	522.0	176.4	3033.0	320.9	79.2	691.1	
	Row Percent	10.7%	3.7%	62.8%	6.7%	1.5%	14.6%	
	Chi Square Contribution	0.09	0.04	0.02	0.06	0.45	0.23	
	Standard Residual	-0.31	0.21	-0.12	0.25	-0.67	0.48	

χ^2= 24.1239 Degrees of Freedom = 5 p = 0.00021

Table 4
Weighted Contingency Table: School Track Positions
School Year 2013-14 (Year 5 of Secondary School)

School Type		ASO	BSO	KSO	TSO	Total
Freinet	Count	109.2	15.8	19	41	185
	Expected Value	106.7	25.4	7.3	45.7	
	Row Percent	59.0%	8.5%	10.3%	22.2%	
	Chi Square Contribution	0.06	3.61	19.01	0.47	
	Standard Residual	0.24	-1.90	4.36	-0.69	
Traditional	Count	2779.2	671	177.4	1194.6	4822.2
	Expected Value	2781.7	661.4	189.1	1189.9	
	Row Percent	57.6%	13.9%	3.7%	24.8%	
	Chi Square Contribution	0.01	0.14	0.73	0.02	
	Standard Residual	-0.05	0.37	-0.85	0.14	

χ^2 = 24.03881 Degrees of Freedom = 3 p = .00002

covariates. Although the propensity score matching procedure considerably improved balance in the covariate values between the treatment and control groups, a small degree of imbalance remained across datasets. We were interested to find out if the same odds were demonstrated with the covariates incorporated in the model.

In the multinomial logistic regression analysis, primary school type significantly

Table 5
Multinomial Logistic Regression Output: School Track Positions School Year 2013-14 (Year 5 of Secondary School)

Reference Category: ASO	Coefficient	Sig	Log Odds	Odds Ratio	Confidence Intervals (95%)
Model 1					
KSO vs. ASO	Intercept	***	-2.80		
	Freinet Primary Education	***	1.10	2.99	(2.57, 3.49)
BSO vs. ASO	Intercept	***	1.42	0.64	(0.55, 0.74)
	Freinet Primary Education		0.50		
TSO vs. ASO	Intercept	***	-0.86	0.88	(0.79, 0.99)
	Freinet Primary Education		0.12		

McFadden's R^2= 0.1075

*Note: Significance tests were based on the Wald test. *p<.05; **p<.01; ***p<.001.*

All covariate variables were z standardized before included in the analyses.

Table 6
Multinomial Logistic Regression Output: School Track Positions School Year 2013-14 (Year 5 of Secondary School)

Reference Category: ASO	Coefficient	Sig	Log Odds	Odds Ratio	Confidence Intervals (95%)
Model 2					
KSO vs. ASO	Intercept	***	-2.70		
	Freinet Primary Education	***	1.10	3.01	(2.53, 3.57)
	Gender: Female	**	0.85	2.31	(1.67, 3.20)
	Birth Year	**	0.45	1.56	(1.41, 1.74)
	Birth Month		-0.13	0.88	(0.75, 1.04)
	Socioeconomic Status	*	-1.10	0.33	(0.18, 0.60)
	Avg. Parental Education		0.44	1.56	(0.95, 2.56)
	Ethnicity: Non-Belgian		-0.84	0.43	(0.12, 1.52)
	Home Language:				
	Mixed Dutch & Other		-0.25	0.78	(0.32, 1.87)
	No Dutch		-1.48	0.23	(0.04, 1.43)
	Math Ability	***	-0.80	0.45	(0.35, 0.59)
	Language Ability		0.10	1.11	(1.05, 1.17)
	Extra Care		0.01	1.01	(0.87, 1.17)
	Family Involvement		-0.08	0.92	(0.56, 1.52)
	Family Contact w/School		0.27	1.30	(1.15, 1.44)
	Home Environment		0.25	1.28	(0.90, 1.83)
	Cultural Gap		0.19	1.21	(0.96, 1.53)
BSO vs. ASO	Intercept	**	0.07		
	Freinet Primary Education		-0.64	0.53	(0.26, 0.80)
	Gender: Female	***	-0.54	0.58	(0.40, 0.69)

Continues on next page

Table 6 (continuation)

Reference Category: ASO	Coefficient	Sig	Log Odds	Odds Ratio	Confidence Intervals (95%)
	Birth Year	***	0.71	2.02	(1.98, 2.07)
	Birth Month	***	-0.37	0.69	(0.68, 0.70)
	Socioeconomic Status	***	-1.21	0.30	(0.27, 0.32)
	Avg. Parental Education	***	-0.64	0.53	(0.46, 0.60)
	Ethnicity: Non-Belgian		-0.18	0.83	(0.48, 1.43)
	Home Language:				
	Mixed Dutch & Other	***	-0.96	0.38	(0.30, 0.48)
	No Dutch	***	-1.80	0.17	(0.12, 0.22)
	Math Ability	***	-1.01	0.36	(0.35, 0.38)
	Language Ability	***	-0.31	0.73	(0.71, 0.75)
	Extra Care	***	0.58	1.78	(1.76, 1.81)
	Family Involvement		-0.25	0.78	(0.73, 0.84)
	Family Contact w/School		0.002	1.00	(0.90, 1.12)
	Home Environment		0.08	1.09	(0.90, 1.30)
	Cultural Gap		-0.26	0.77	(0.62, 0.89)
TSO vs. ASO	Intercept	***	0.69		
	Freinet Primary Education		-0.30	0.74	(0.65, 0.84)
	Gender: Female	***	-0.44	0.65	(0.62, 0.68)
	Birth Year	***	0.24	1.27	(1.26, 1.30)
	Birth Month		-0.09	0.91	(0.90, 0.92)
	Socioeconomic Status		-0.46	0.63	(0.56, 0.72)
	Avg. Parental Education	***	-0.56	0.57	(0.49, 0.66)
	Ethnicity: Non-Belgian		-0.24	0.79	(0.52, 1.19)
	Home Language:				
	Mixed Dutch & Other	**	-0.66	0.52	(0.47, 0.57)
	No Dutch	***	-0.85	0.42	(0.37, 0.51)
	Math Ability	***	-0.64	0.53	(0.51, 0.54)
	Language Ability	*	-0.18	0.83	(0.82, 0.85)
	Extra Care	**	0.25	1.29	(1.26, 1.32)
	Family Involvement		-0.09	0.92	(0.86, 0.98)
	Family Contact w/School		0.02	1.02	(0.97, 1.06)
	Home Environment		0.03	1.03	(0.91, 1.17)
	Cultural Gap		-0.09	0.91	(0.85, 0.98)

McFadden's R^2= 0.3310

*Note: Significance tests were based on the Wald test. *p<.05; **p<.01; ***p<.001.*

All covariate variables were z standardized before included in the analyses.

predicted KSO track choice in fifth grade in both the treatment-only and the covariate-added models to a similar degree (see Tables 5 and 6, respectively). In the sample population, the treatment group was almost three times as likely as the control group to choose the KSO track in reference to the ASO track in both models. Incorporating the additional variance from the five datasets, using Rubin's rule, the true odds indicated that it is strongly possible that the predictive relationship also exists among all students and not just the sample population.

4.4 Grade levels attained by Freinet and traditional students

Answering our second research question, we found very little difference in educational attainment between the Freinet and traditional students when using the covariate balancing weights to calculate the mean values for number of completed secondary grades per school year (see Table 7). The Freinet students had completed less secondary school than the traditional students by a statistically insignificant amount in each of the first three years of secondary school. By year 4, however, we found no differences between the groups, and in year 5, Freinet students completed slightly more years compared to traditional students, Both groups began secondary school with a slight average educational delay that increased slightly over time. None of the differences between the two groups were statistically significant.

Table 7
Mean Number of Completed Secondary Grades by years of Secondary School in study, weighted

	Freinet	Traditional	P Value
Year 1	0.88	0.89	0.46
Year 2	1.84	1.87	0.34
Year 3	2.81	2.83	0.61
Year 4	3.80	3.80	0.95
Year 5	4.78	4.76	0.68

4.5 Movement between tracks

To address our third research question about whether the 'cascade phenomenon' exists to a greater extent among Freinet than among traditional students, we examined the relative percentages of the school track frequencies in year 5 compared to year 3 of secondary school (see Table 8). In the weighted model, both the treatment and control groups experienced a decrease in the ASO track from years 3 to 5, with the traditional students showing an eight percent drop in ASO pursuit, and the Freinet students showing an eleven percent decrease. Both groups more than doubled their share in the BSO track from years three to five, with the Freinet group showing a 100% increase and the control group showing a 106% increase between the two measurement points. The traditional group showed a higher rate of movement into the KSO track, at a 142% increase in place of the Freinet group's 111%, while the Freinet group moved at a much higher rate into the TSO track, at a 193% increase compared to the traditional group's 70%.

5 Discussion

5.1 Secondary track choice by students educated in Freinet primary schools

Based on the results of this study, it can be concluded that students educated in Freinet primary schools complete their school trajectories through year 5 of secondary school at a rate comparable to their traditionally educated peers. It can also be concluded that these students choose the artistic KSO track significantly more frequently than students educated in traditional primary schools. The Freinet students initially opt significantly less for the TSO track in year 3 of secondary school than their traditionally-educated peers, but they change into the TSO track at a higher rate than the traditional students and end up with a share in the TSO track that is not significantly different from that of the comparison group. The slightly higher rate of ASO track selection and slightly lower rate of BSO track selection by the Freinet- educated sample group is not statistically significant. Our hypothesis that matched Freinet students would be less prevalent in the ASO track was not confirmed.

Table 8
Movement between Study Tracks, Weighted Model

School Type		ASO	BSO	KSO	TSO
Freinet	2011-12	123	8	9	14
	2013-14	109	16	19	41
	Rate of Change	-11%	+100%	+111%	+193%
Traditional	2011-12	3026.2	325.4	73.2	703.6
	2013-14	2779.2	671	177.4	1194.6
	Rate of Change	-8%	+106%	+142%	+70%

5.2 Educational attainment and the cascade phenomenon

This study indicates that, compared to traditionally educated peers who are similar with regards to pre-primary characteristics, Freinet students progress through secondary school at the same rate. Our hypothesis that they would be more subject to delay in their educational progress was not confirmed by the data. We also did not confirm our expectation that the Freinet students are more subject to the 'cascade phenomenon' than their matched peers. Although Freinet students show a slightly higher rate of movement away from the academically-oriented ASO tracks towards other track options, they also initially choose ASO more frequently than traditional students. Both groups end up with a similar percentage of students in the ASO track in year 5 of secondary school, which is a preliminary indicator that students from Freinet primary schools are as able as their traditionally-educated peers at undertaking academic studies in secondary education despite the comparative lack of classical didactic instruction and formal evaluation in the Freinet schools.

5.3 Freinet students and the KSO track

The finding of the larger number of Freinet students in the KSO track can be discussed from multiple angles. We will discuss features of Freinet education that may encourage pursuit of artistic secondary studies, and then we will explore the alternate possibility of computational deficits among Freinet students as an explanatory mechanism.

A first and most plausible explanation for our findings is that Freinet values and/or pedagogical methods in some way encourage students towards a higher rate of KSO pursuit. Students from educational environments such as Freinet schools that place as much importance on attributes such as creativity alongside traditional academic outcomes may give more priority to these outcomes and choose a school track that would emphasize them as well. A core assumption of Freinet education is that educational content should stem from the interests of the students. Having been inculcated with this assumption from the onset of their educational careers, artistically interested Freinet students may be more naturally primed to select the KSO track than similar traditional students, who may give more weight to other considerations. Relatedly, the collaborative project work and portfolio-based assessments typical of Freinet education may make Freinet-educated students feel more at home in the environment of artistic secondary education. Furthermore, KSO track is a minority school track, chosen at a rate far below the more mainstream options. Students from Freinet schools have already chosen a minority educational option at the primary level, so they may be more likely than traditional students to also consider a minority option in secondary school.

An alternate explanation for the higher rate of Freinet students in artistic secondary education is that these students experience computational deficits and are thus more drawn to school tracks requiring less mathematical ability. Standardized math tests were taken during the fifth year following secon-

Table 9
Standardized Math Scores by Primary School Type, Year 5 of Secondary School

	Freinet (n=130)	**Traditional (n=3032)**	
	Mean (Stan. Dev.)	Mean (Stan. Dev.)	Pr(>F)
Math Score 2013-14 Weighted	0.27 (0.81)	0.41 (0.84)	0.09
Preschool Math Ability Weighted	0.35 (0.87)	0.38 (0.93)	0.70

Table 10
Z-Standardized Math Score Means and Standard Deviations by School Track, Year 5 of Secondary School

School Track	**Math Score 2013-14**
ASO	0.62 (0.72)
TSO	-0.09 (0.71)
KSO	-0.11 (0.68)
BSO	-0.87 (0.63)

dary education by students in the SiBO study who attended secondary schools with ten or more SiBO students (Vanwynsberghe & Van Damme, 2014). These students included sixty-two percent of the students from our sample (n=3162), of which 130 were from the Freinet-educated group (70% of our Freinet sample group) and 3032 were from the traditionally educated group (62% of our traditional sample group). Although the two groups indicated similar preschool math ability when using the weights from our propensity score model, the Freinet students indeed lagged behind the traditionally educated students in math achievement in year 5 of secondary school (see Table 9).

Whether the higher pursuit of the KSO track by the Freinet students can be explained by this demonstrated mathematical deficit, however, is debatable. The higher proportion of Freinet students in the KSO track is mostly relative to the TSO track (in year 3 of secondary school) and the BSO track (in year 5 of secondary school), which are similar (TSO) and much lower (BSO) than the KSO track in average computational ability (see Table 10). Further undermining this explanation, pursuit of the most mathematically demanding ASO track is similar among the traditional and Freinet students. Although the lower math achievement of the Freinet students is perhaps worthy of a discussion of its own, it does not seem to explain the higher concentration of Freinet students in the KSO track.

Students from the SiBO study who only partially attended Freinet education (not included in our study) are more like the traditional students in their rates of ASO, TSO, and BSO track selection, yet they also choose the KSO track at a higher rate than the exclusively traditionally-educated students (see Appendix 3.2-3). Their rate of KSO selection is not as high as the exclusively Freinet-educated students, but it is nonetheless interesting especially because the group seems to be drawn from a different family background than the exclusively Freinet students (see Appendix 3.1). This lends weight to the argument that there is something inherent in Freinet education that encourages artistic secondary studies.

5.4 Limitations and further research

A drawback of this study is that it does not include information about the final educational positions of the students, as this information was not available at the time of the study. Knowledge of the students' final school tracks and year of degree attainment would lend better insight into the educational pathways of

Freinet students than what is offered by the current study. Particularly, stronger conclusions regarding the "cascade phenomenon" could be drawn with the knowledge of the students' final degree attainment.

Additionally, it must be reiterated that this is an observational study, and as such the sample group is not as randomized as one would find in an experimental setting. Efforts were made to control for confounding variables through the use of propensity score matching techniques, but it is possible that unmeasured disruptive differences between the two groups of students remain.

Finally, although this study reported significant findings regarding the choice of the KSO school track by Freinet-educated students, these findings were based on a small group of students (n=9 in year 3 of secondary school, and n=19 in year 5). Future research directions may include analysis on the school track choices of a larger group of Freinet-educated students. With a larger group, multilevel analysis could also be performed, which would allow for school-level effects to be better isolated from individual differences. Qualitative research exploring the individual narratives behind secondary school track decisions could lend additional insight into the question of whether Freinet primary education plays a role in influencing this outcome.

5.5 Conclusion

Educational pathways are one long-term student outcome among many that can be at least partially affected by schooling decisions at the primary level. As Freinet education, and method education in general, gains popularity and represents a larger share of Flanders' educational offerings, it is important that Freinet educational outcomes are understood through studies such as this one.

Despite the noted limitations of this study, it has contributed a long-term perspective to the body of educational effectiveness research as well as provided substantial preliminary insight into the educational pathways of Freinet-educated students in Flanders. The study has shown that Freinet-educated students are more likely than similar students from traditional schools to choose the artistic KSO track by year 5 of secondary school. Perhaps more importantly, it has also demonstrated that Freinet students are as likely to be in the academic ASO track by this measurement point, and that they complete the first five years of secondary school at a rate similar to traditional students. These findings have implications for parents choosing Freinet primary schools for their children, as they have reason to not be concerned about Freinet pedagogical features such the lack of classical instruction and formal assessment impacting their children's ability to progress through secondary school at a normal rate and to pursue academic studies, if they wish to do so.

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Samenvatting

De Secundaire Schoolloopbanen van Freinet Studenten in Vlaanderen

In Vlaanderen volgen steeds meer leerlingen basisonderwijs op een methodeschool. Dat zou gevolgen kunnen hebben voor de secundaire schoolloopbaan van deze leerlingen. In deze studie vergeleken we de secundaire schoolloopbanen van leerlingen die Freinetonderwijs volgden met leerlingen die traditioneel basisonderwijs volgden. Meer concreet onderzochten we bij beide groepen de gekozen onderwijsvorm in het derde en vijfde jaar van het secundair onderwijs, alsook eventuele onderwijsvertraging. Er werd gebruik gemaakt van de data van een grootschalig, longitudinaal onderzoek in Vlaanderen, namelijk het project 'Schoolloopbanen in het basisonderwijs' (SiBO). De gegevens werden geanalyseerd met behulp van propensityscore analyse, contingentie tabellen en multinomiale regressie. Uit de resultaten blijkt dat leerlingen uit het Freinetonderwijs in het vijfde jaar aanzienlijk meer kans hebben om in het kunst secundair onderwijs (KSO) terecht te komen. Voor andere onderwijsvormen stelden we geen betekenisvolle verschillen vast tussen de twee groepen.

Kernwoorden: Freinetonderwijs, schoolloopbanen, propensityscore analyse, longitudinale data, langetermijnuitkomsten van onderwijs

Appendix 1
Covariate Mean and Standard Deviation Values, Full Sample and Study Sample

Covariate	Full Sample (n=9510)	Study Sample Group (n= 5076)
Socioeconomic Status	0.00(±0.76) (n=8299)	0.098 (±0.73) (n=5066)
Gender	48.8% female, 50.6% male (n=9450)	50.1% female, 49.9% male (n=5076)
Age at time of Ability Tests	5 years, 10 months (±9.0 months) (n=9422)	5 years, 8 months (±5.6 months) (n=5076)
Parental Education	3.16 (±1.0) (n=6312)	3.21 (±0.1) (n=4492)
Ethnic Origin	76.8% Belgian, 5.2% W. European, 7.5% Non-W. Eur., 10.5% Turkey/ Maghreb (n=6036)	79.7% Belgian, 4.6% W. European, 5.9% Non-W. Eur., 9.8% Turkey/ Maghreb (n=4314)
Home Language	68.6% Dutch only, 15.5% Dutch mixed, 15.9% No Dutch (n=8075)	73.3% Dutch only, 15.4% Dutch mixed, 11.3% No Dutch (n=4978)
Math Ability	54.61 (±8.74) (n=5858)	55.44 (±8.30) (n=4253)
Language Ability	53.06 (±7.81) (n=5871)	53.49 (±7.49) (n=4269)
Extra Care	3.11 (±1.48) (n=5561)	2.93 (±1.40) (n=4009)
Family Involvement	4.71 (±1.10) (n=5461)	4.83 (± 1.01) (n=3950)
Family Contact with School	4.42 (±1.20) (n=5498)	4.52 (±1.13) (n=3976)
Home Environment	4.58 (±1.09) (n=5530)	4.68 (±1.01) (n=4001)
Cultural Gap	2.09 (±1.46) (n=5569)	1.96 (±1.37) (n=4022)

Appendix 2.1
Mean Number of Completed Secondary Grades by year in Secondary School, Unweighted

	Freinet	Traditional	P Value
Year 1	0.88	0.83	0.0796
Year 2	1.85	1.79	0.0650
Year 3	2.83	2.75	0.0304
Year 4	3.80	3.69	0.0028
Year 5	4.78	4.63	0.0004

Appendix 2.2
Unweighted Contingency Table: School Track Positions
School Year 2011-12 (Year 3 of Secondary School)

School Type		A	B	ASO	BSO	KSO	TSO	Total
Freinet	Count	27	4	123	8	9	14	185
	Expected Value	27.1	15.5	81.5	24.8	3.0	33.6	
	Row Percent	14.6%	2.2%	66.5%	4.3%	4.9%	7.6%	
	Chi Square Contribution	0.00	8.52	21.14	10.98	12.39	11.47	
	Standard Residual	-0.02	-2.92	4.60	-3.31	3.52	-3.41	
Traditional	Count	716	421	2113	660	72	909	4891
	Expected Value	715.9	409.5	2154.5	643.7	78.0	889.36	
	Row Percent	14.6%	8.6%	43.0%	13.5%	1.5%	18.6%	
	Chi Square Contribution	0.00	0.32	0.80	0.42	0.47	0.43	
	Standard Residual	0.01	0.57	-0.89	0.64	-0.69	0.66	

χ^2 = 66.93348 *Degrees of Freedom = 5* *p = 4.448155e-13*

Appendix 2.3
Unweighted Contingency Table: School Track Positions
School Year 2013-14 (Year 5 of Secondary School

School Type		ASO	BSO	KSO	TSO	Total
Freinet	Count	109	16	19	41	185
	Expected Value	72.3	51.4	5.1	56.2	
	Row Percent	58.9%	8.6%	10.3%	22.2%	
	Chi Square Contribution	18.62	24.37	38.33	4.13	
	Standard Residual	4.38	-4.94	6.19	-2.03	
Traditional	Count	1875	1394	120	1502	4891
	Expected Value	1911.7	1358.6	133.9	1486.8	
	Row Percent	38.3%	28.5%	2.5%	30.7%	
	Chi Square Contribution	0.70	0.92	1.45	0.16	
	Standard Residual	-0.84	0.96	-1.20	0.40	

χ^2 = 88.67356 *Degrees of Freedom = 3* *p = 4.221196e-19*

Appendix 2.4
Movement between Study Tracks, Unweighted Model

School Type		ASO	BSO	KSO	TSO
Freinet	2011-12	123	8	9	14
	2013-14	109	16	19	41
	Rate of Change	-11%	+100%	+111%	+193%
Traditional	2011-12	2113	660	72	909
	2013-14	1875	1394	120	1502
	Rate of Change	-11%	+111%	+67%	+65%

Appendix 3.1
Covariate mean values of students who exclusively and partially attended Freinet primary school

Covariate	**Freinet Students (in sample; n=185)**	**Partial Freinet Students (not in sample; n=247)**
Socioeconomic Status	0.57 (±.54) (n=185)	0.32 (±.70) (n=247)
Gender	55.6% female, 44.4% male (n=185)	47.8% female, 52.2% male (n=247)
Age at time of Ability Tests	5 years, 8 months (±4 months) (n=185)	5 years, 10 months (±7 months) (n=247)
Average Parental Education Level	3.98 (±.81) (n=175)	3.51 (±1.1) (n=135)
Ethnicity	90% Belgian, 4.6% Western European, 2.9% Non-Western European, 1.7% Turkey/ Maghreb (n=174)	78.9% Belgian, 10.9% Western European 5.5% Non-Western European, 4.7% Turkey Maghreb (n=128)
Home Language	83% Dutch only, 13.4% Dutch mixed, 3.2% No Dutch (n=186)	80.5% Dutch only, 14.9% Dutch mixed, 4.6% No Dutch (n=195)
Math Ability	59.05 (±6.75) (n=180)	56.26 (±8.03) (n=135)
Language Ability	55.77 (±6.70) (n=177)	53.75 (±8.03) (n=135)
Extra Care	2.73 (±1.39) (n=157)	3.03 (±1.41) (n=236)
Family Involvement	5.20 (±.86) (n=156)	4.62 (±1.12) (n=229)
Family Contact with School	5.09 (±.99) (n=157)	4.37 (±1.14) (n=233)
Home Environment	5.15 (±.83) (n=157)	4.50 (±1.07) (n=233)
Cultural Gap	1.56 (±1.04) (n=158)	2.15 (±1.35) (n=247)

Appendix 3.2

Unweighted Contingency Table: School Track Positions of Students who Partially and Exclusively attended Freinet Primary School School Year 2011-12 (Year 3 of Secondary School)

Student Type		A	B	ASO	BSO	KSO	TSO	Total
Partial Freinet	Count	65	25	83	37	9	28	247
	Expected Value	52.6	16.6	117.8	25.7	10.3	24.0	
	Row Percent	26.3%	10.1%	33.6%	15.0%	3.6%	11.3%	
	Chi Square Contribution	2.92	4.28	10.27	4.94	0.16	0.66	
	Standard Residual	1.71	-2.07	-3.21	2.22	-0.40	0.81	
Total Freinet	Count	27	4	123	8	9	14	185
	Expected Value	39.4	12.4	88.2	19.3	7.7	18.0	
	Row Percent	14.6%	2.2%	66.5%	4.3%	4.9%	7.6%	
	Chi Square Contribution	3.90	5.71	13.71	6.59	0.22	0.88	
	Standard Residual	-1.96	-2.39	3.70	-2.57	0.465	-0.94	

χ^2 = 66.93348 Degrees of Freedom = 5 p = 4.448155e-13

Appendix 3.3

Unweighted Contingency Table: School Track Positions of Students who Partially and Exclusively attended Freinet Primary School School Year 2013-14 (Year 5 of Secondary School)

Student Type		ASO	BSO	KSO	TSO	Total
Partial Freinet	Count	87	81	17	62	247
	Expected Value	112.1	55.5	20.6	58.9	
	Row Percent	35.2%	32.8%	6.9%	25.1%	
	Chi Square Contribution	5.606	11.761	0.624	0.164	
	Standard Residual	-2.37	-3.43	-0.79	0.41	
Total Freinet	Count	109	16	19	41	185
	Expected Value	83.9	41.5	15.4	44.1	
	Row Percent	58.9%	8.6%	10.3%	22.2%	
	Chi Square Contribution	7.485	15.702	0.833	0.219	
	Standard Residual	2.74	-3.96	0.93	-0.47	

χ^2 = 42.39381 Degrees of Freedom = 3 p = 3.31e-09