PEL Pensamiento Educativo. Revista de Investigación Educacional Latinoamericana
2016, 53(2), 1-16

Pontificia Universidad Católica de Chile
Facultad de Educación

Students' Schooling Paths and Ability Grouping in Chilean High Schools: An Analysis of Students' Academic Heterogeneity within Schools´

Trayectorias escolares de los estudiantes y agrupamiento al interior del aula en los colegios chilenos de enseñanza media. Análisis de la heterogeneidad académica al interior de las escuelas

Ernesto Treviño[1], Cristóbal Villalobos[1], Constanza Vielma[3], Carla Hernández[1] & Juan Pablo Valenzuela[2]

[1]Centro de Estudios de Políticas y Prácticas en Educación, Pontificia Universidad Católica de Chile
[2]Centro de Investigación Avanzada en Educación, Universidad de Chile
[3]Centro de Políticas Comparadas en Educación, Universidad Diego Portales

Abstract

This article describes the configuration of academic heterogeneity in Chilean secondary schools, with a special emphasis on understanding the processes of ability grouping and their relationship with the academic progress of students (schooling paths). The results show that the secondary schools analyzed—those that start in 9th grade and have two or more classrooms in this grade—use multiple ways to organize academic heterogeneity, starting with initial grouping at the beginning of secondary education and continuing throughout all the grades of this educational level, especially for low achieving and low socioeconomic status students. This reveals that schools implement a range of mechanisms to manage academic diversity throughout secondary education, which is complemented by decisions and dynamics of school choice, also impacting on academic heterogeneity within schools. This evidence raises a number of questions and potential public policy actions, which are discussed in the concluding section.

***Keywords*:** ability grouping, schooling paths, secondary schools, academic heterogeneity

Post to:
Ernesto Treviño
Centro de Estudios de Políticas y Prácticas en Educación, Pontificia Universidad Católica de Chile
Avda. Vicuña Mackenna 4860, Macul, Santiago, Chile.
E-mail: ernesto.trevino@uc.cl
The authors are thankful for the financial backing provided by the Fund for Educational Research and Development [Fondo de Investigación y Desarrollo en Educación, FONIDE] F711296, part of the Chilean Ministry of Education.

© 2016 PEL, http://www.pensamientoeducativo.org - http://www.pel.cl

ISSN: 0719-0409 DDI: 203.262, Santiago, Chile
doi: 10.7764/PEL.53.2.2016.5

Resumen

El presente artículo describe la configuración de la heterogeneidad académica en las escuelas chilenas, buscando entender principalmente los procesos de agrupamiento por habilidad de los estudiantes y la forma en que se relacionan con sus trayectorias académicas (cambios de curso, cambio de escuela y repitencia) en la enseñanza media. Los resultados muestran que en las escuelas secundarias analizadas —aquellas que comienzan en primero medio y que tienen más de un curso en este nivel educativo— existen múltiples modos en los que se organiza la heterogeneidad académica, siendo este un proceso continuo, que no se agota en el agrupamiento inicial sino que continúa a través de distintas vías y mecanismos durante toda la educación secundaria, especialmente para los estudiantes de menor desempeño académico y de entornos desfavorecidos. Esto permite constatar que las escuelas implementan mecanismos diversos para enfrentar la diversidad a través de todo el ciclo de educación media, lo que se ve complementado por las decisiones y dinámicas propias de elección de escuela, que también inciden en la configuración de la heterogeneidad académica al interior de las escuelas. Esta evidencia genera una serie de preguntas y potenciales acciones de política pública, las cuales se discuten en la sección de conclusiones.

***Palabras clave*:** segregación académica, trayectorias educativas, educación media, heterogeneidad académica

Children's cognitive development and academic development possibilities are influenced by multiple factors, including genetic elements (Jensen, 1968), but mostly by aspects of their political, economic, social, and cultural environment (Shonkoff & Phillips, 2000). Some of the most important aspects are those that involve family income (Jadue, 1997; White, 1982), the neighborhood where children grow up (McCulloch & Joshi, 2001), and their parents' educational level (Davis-Kean, 2005; Duncan & Brooks-Gunn, 2007; Valin, 2011). In this regard, the reproductivist theories of the school (Bourdieu & Passeron, 1964; Metzaros, 2009) have asserted that socioeconomic and cultural elements tend to be fundamental in the production and reproduction of educational gaps between different social sectors, especially within the context of the universalization and growing expansion of the educational system.

This context of change imposes a new framework for understanding the meaning and objective of educational systems (Etxeberria, 2004), which strongly emphasizes the growing heterogeneity of students, thus generating new challenges for the systems, institutions, and participants involved in education. From the point of view of the school system, aspects such as *tracking* (or schooling paths), parents' choices, or selection mechanisms influence the dynamics of academic heterogeneity (Dupriez, 2010). With respect to schools, it is clear that they have a certain range of actions for addressing this heterogeneity, which includes several strategies: grouping students by ability among or within classrooms, removing students or placing them in other schools, or constructing differentiated schooling paths or trajectories. All of these methods have been identified as heterogeneity management strategies (Dupriez, 2010; Mons, 2007; Rumberger & Larson, 1998). The form and intensity of these heterogeneity management strategies have been studied internationally, although no consensus has been reached regarding the effects of such mechanisms on students' academic development (Galand, 2009). Despite its importance, this subject has been scarcely researched in Latin America and in Chile.

Considering the above, the present study describes the frequency of use of several practices for managing academic heterogeneity applied in Chilean schools over the last years, examining their association with students' schooling paths in secondary education. In addition, school and student characteristics linked to academic heterogeneity management and schooling paths are analyzed, which yields information about the configuration and dynamics of heterogeneity present in schools that start in ninth grade (the first year of secondary education).

The present article comprises four sections. The first section refers to the background of the study, and provides conceptual elements for understanding the configuration of academic heterogeneity, with a special emphasis on two aspects: ability grouping among classes (inside the school) and students' schooling paths. The second section details the used research methodology, based on the quantitative analysis of secondary data. The third section describes the results obtained, discussing the configuration of heterogeneity in the institutions studied and its relationship with school and student characteristics.

Finally, the fourth section advances some conclusions intended to connect the results obtained with the discussion on educational quality and equity.

Background

The idea of studying the management of heterogeneity in schools was first introduced by Nathalie Mons (2007). By means of an analysis of the new educational policies implemented in France, the author identifies four mechanisms or models for managing heterogeneity in educational systems. These models are: (a) the *separation model*, based on ability grouping and the early selection of students according to their academic performance among different school types, (b) the *«a la carte» integration model*, which prioritizes grouping in the classroom upon the basis of student ability and performance in various disciplines, (c) the *uniform integration model*, in which all students are exposed to the same conditions, with grade retention being the only method for addressing the cases of low-performing students, and (d) the *individualized integration model*, in which differentiation and individualized or small-group teaching strategies are employed to allow students to acquire the same contents at a similar pace. Afterwards, other researchers (Dupriez, Dumay, & Vause, 2008) used these typologies to analyze the results of the countries where the PISA tests were administered in 2003. They concluded that the *separation models*, that is, those which group students by ability at an early stage, tend to produce the most inequitable results and provide the worst prospects of improvement for low-performing students, whereas the non-uniform integrationist models (*a la carte* and *individualized*) offer the best opportunities for weaker students. These results provide a general framework for understanding two aspects that influence the configuration of academic heterogeneity in schools: (a) the organization of ability grouping among classrooms and (b) students' schooling paths in the educational system.

Ability grouping

Ability grouping can be defined as a school's decision to place students with similar academic skills in the same class (Letendre, Hofer, & Shimizu, 2003), in general, with the aim of generating teaching processes that match students' needs. The logic of this mechanism is based on industrial organization theories, according to which highly varied or very complex environments make it necessary to identify uniform segments than can be managed effectively (Dupriez, 2010).

Thus, ability grouping is regarded as a mechanism intended to organize the students who attend a given school in a way that increases teaching effectiveness. International evidence, collected throughout more than thirty years of research, has shown that grouping has several negative consequences, such as the segregation of social minorities (Vanderhart, 2006), the construction of discriminatory social hierarchies based on academic performance low motivation to learn among the most disadvantaged groups (Braddock & Slavin, 1995), the under-utilization of activities or materials that foster student interest, and low teacher expectations regarding the classes with the most disadvantaged students (Boaler, Wiliam, & Brown, 2000; Eder, 1981). In addition, studies that analyze both the cognitive and social effects of ability grouping in school show that it can have persistent negative effects on students' long-term academic achievement and social skills, and may also shape parents' and teachers' expectations about their potential performance (Pallas, Enwistle, Alexander, & Slutka, 1994).

However, evidence concerning this process is not homogeneous. A meta-analysis conducted in the early 1990s (Slavin, 1990) revealed no significant differences between the academic performance of US secondary school students who were grouped by ability and that of others who were placed in heterogeneous classrooms. Nevertheless, some studies (Hallinan & Kubitschek, 1999) have shown positive effects associated with grouping, especially in high-performing groups. In general, these studies assess interventions that provide focused support for teachers, which generates a teaching environment that differs from the regular functioning of school systems and casts doubt on their effectiveness as a general mechanism for managing heterogeneity (Duflo, Dupas, & Kremer, 2008; Walsemann & Bell, 2010).

In Chile, evidence concerning grouping is almost non-existent. On the one hand, the data included in the 2009 PISA report indicates that, according to school principals, 30% of Chilean schools apply ability grouping in all subjects, which ranks the country among the top four in terms of this indicator.

On the other hand, a recent study carried out by Treviño, Valenzuela, and Villalobos (2014) reveals that grouping is more frequent in secondary education than in primary education, being present in nearly 50% of schools with two or more classes per grade in secondary education, and that it generates negative effects on these schools' efficiency and equity.

Schooling paths

Unlike ability grouping, schooling paths result from internal and external actions conducted by the school. On the one hand, the dynamics of school choice, the decisions made by families, and the structure of the educational system generate shifts in students' paths which are unconnected to the school. On the other hand, schools can promote actions such as grade retention, the placement of students in other classes, or expulsion in order to generate forced transformations in students' schooling paths.

Terigi (2007) provides a useful definition for distinguishing between different path types. For this author, it is possible to differentiate between regular and non-regular paths. In the former, the student remains in the educational system attending an age-appropriate grade and learns the contents necessary for his/her development, whereas in the latter the student is over-aged, repeats a grade, or drops out of the system. On a broader level, Rumberger (2003) defines non-regular paths as all non-promotional changes that students experience in their school years and which are not regarded as beneficial, such as being placed in a different class or school. In the present study, the second definition will be adopted.

In Chile, the analysis of schooling paths has mostly been limited to the analysis of school completion, either from the perspective of permanence or dropout, mainly identifying external and internal factors that could explain this process. Some of the most relevant internal factors in school retention are attendance and school coexistence (Espíndola & León, 2002), while the main extra-school factors include students' socioeconomic status and family context (Santos, 2009). Chile's school retention rate is one of the highest in Latin America. Nevertheless, a study by Espínola, Balladares, Claro, and Valencia (2011) showed that only 71.1% of students who entered secondary education in 2005 completed their studies in 2009, which reflects large gaps in education completion at this level.

In addition, there is a set of national and international evidence that has focused on the magnitude, reasons, and effects of the various components of schooling paths; however, unlike the present article, these studies have normally been centered on a specific process and not on the whole range of aspects assessed.

The first relevant aspect in the development of schooling paths is transferring a student to a different school. This action can have multiple causes (individual or family reasons, or circumstances connected with the student's original or target school) which require that the student be placed in a new school (Rumberger, 2003). Caused by the structure of the system, families, or the school, having to attend a different educational center can be regarded as a disruption of the student's regular schooling path. A number of studies conducted in English-speaking countries have examined the effect of transferring to another school, revealing that it has a negative impact on academic outcomes (Felner, Primavera, & Cauce, 1981; Rumberger, 2003), especially due to the interruption of the educational cycle and the disruption of social ties that it is believed to cause (Grigg, 2012). Similar evidence has been found in Chile, where Zamora (2011) and Sanclemente (2008) show that switching schools frequently is negatively associated with student academic performance. Likewise, Román & Perticará (2012) and Larroulet (2011) have shown that this mechanism is more often experienced by the more disadvantaged socioeconomic groups, which is consistent with international evidence (Glick, Yabiku, & Bates, 2008). This finding establishes the phenomenon of switching schools as a problem associated with the right to education (Rumberger & Larson, 1998) rather than as a process leading to the generation of new educational opportunities (Larroulet, 2011).

A second aspect linked with schooling paths is being placed in another class. Conceptually, we will define this as any transferal undergone by a student during his/her schooling path. There are several possible reasons for being assigned to another class. First, it can be the product of a student's choice of a specialization during the last years of secondary school. This is the case in Chile, where students promoted from tenth to eleventh grade must select either a technical-professional curriculum (with a

number of possible educational alternatives) or a scientific-humanistic one. However, this change can also be regarded as an improvement mechanism or an adjustment of the initial grouping made when students are first enrolled in a school (Jacob & Tieben, 2009), which constitutes a mass process intended to homogenize the classroom. It is also possible, unlike in the previous case, for placement in another class to be used to generate more heterogeneity in the classroom and thus encourage mixing processes during lessons (Cifuentes, Torrego & Siles, 2012). Lastly, placement in a different class may occur due to specific circumstances (family, pedagogical, curricular, disciplinary) which are not as part of a deliberate strategy implemented by the school to modify classroom heterogeneity levels. A classic study of the subject (Rosenbaum, 1976) states that, in American secondary education, class switching tends to be done «downwards», that is, in order to place the student in a lower ability class; here, the situation is regarded as a «struggle» between the student and his/her peers to stay in the more advantaged group, thus privileging classroom homogeneity above heterogeneity mechanisms. Other authors (Lucas, 1999) have challenged this idea, but more recent evidence (Rumberger & Larson, 1998) has shown that, beyond the frequency and direction of class switching, this action can have negative consequences on student dropout.

Lastly, grade retention has been studied as an action that generates changes in schooling paths. Generically, grade retention is the strategy of keeping a student in the same grade during the following academic year. Several effects have been observed in connection with this experience. While seminal international studies (Jackson, 1975) suggested that grade retention could be somewhat beneficial to students, most of the research carried out during the last decades has revealed the negative effects of this practice. In this regard, a meta-analysis (Jimerson, 2001) showed that nearly 80% of the studies conducted between 1970 and 2000 in the United States have found evidence that grade retention has no positive effects on student development. In addition, research has emphasized the many negative effects of this practice on school attendance, higher education, and an active working life (Roderick, 1994; Walberg, Reynolds, & Wang, 2004). In Chile and Latin America, recent studies (Treviño, Fraser, Meyer, Morawietz, Inostroza & Naranjo, 2015; Valenzuela, Allende, Sevilla & Egaña, 2013) have shown that academic performance does not increase after students repeat a year.

Methodology

In order to describe the frequency and the relationships associated with the configuration of heterogeneity in secondary education, the present article provides a quantitative analysis of data from 2008 to 2012. Multiple sources of information were used. On the one hand, information obtained from the General Information System [Sistema General de Información, SIGE] was used, especially that on the student's final grades, class, and school during the period examined. Complementarily, and in order to obtain socioeconomic information about the students and their schools, two elements were used: the School Vulnerability Index (Índice de Vulnerabilidad Escolar, IVE) in the case of the schools and the Complementary Questionnaire for the SIMCE test in the case of the students, which provides (self-reported) information about a number of social and economic aspects. Using this information, an operationalization was performed in order to observe the two main elements associated with academic heterogeneity in schools: ability grouping among classes and the variety of students' schooling paths.

In order to study the presence of academic grouping processes, the strategy advanced by Clotfelter, Ladd & Vigdor (2006) was selected, which involves the use of a chi-squared test (χ^2) to compare distributions among classrooms belonging to the same school and level considering several academic variables —in our case, grade quintiles and percentage of students who repeat a grade— under the null hypothesis that the distribution of such characteristics will not differ significantly among classes[1]. Thus, if the null hypothesis is rejected, the school will be considered to perform ability grouping among different classes (Clotfelter et al., 2006). A possible limitation of this methodology is that it does not identify the effect produced by the grouping of other school-related effects (differences in teachers and in schooling paths, among others). In order to address this issue, the sample was restricted to those schools that start in ninth grade —so as to observe the grouping effect in connection with previous academic characteristics and factors external to the school analyzed— and that have more than one class per grade.[2]

[1] In order to increase the robustness of the study, a 99% confidence level was determined in the administration of the test.

[2] Considering the results of preliminary studies (Treviño, Valenzuela & Villalobos, 2014), it is possible to observe that the level of inter-class grouping is higher in secondary education than in primary education.

In addition, in order to analyze the students' schooling paths, four dichotomous variables were created to identify those who: (a) switch schools at least once in secondary education, (b) are transferred to another class at least once in secondary education, (c) repeat a grade at least once in secondary education, and (d) drop out of secondary education. Students who had experienced at least one of these circumstances were regarded as having a *non-regular path*, while those who remained in a single school and class and who were regularly promoted were regarded as having a *regular path*. It must be stressed that the occurrence of such experiences does not only depend on decisions made by the school; instead, they are caused by a complex network of individual, family, social, and school factors (Espíndola & León, 2002), with only a part of these actions (for example, grade retention or expulsion) being fully attributable to school decisions.

In order to analyze the students' socioeconomic and academic characteristics, distribution quintiles were constructed considering: (a) performance before secondary education, based on the student's grade point average in eighth grade, (b) performance in secondary education, measured by generating a ranking with the student's relative position according to his/her grades at the end of each academic year, and (c) socioeconomic characteristics, measured by constructing an index based on principal components analysis, using three variables included in the complementary SIMCE survey[3]: mother's educational level, father's educational level, and per capita household income.

Results

The universe of schools providing secondary education in Chile in 2009 comprised 3,141 institutions. The sub-group of schools included in this study includes all those which start in ninth grade and have more than one class per grade (which makes it possible to study grouping among classes), and amounts to 670 institutions, with 135,389 students in total; that is, 13.7% of the total number of secondary school students that year. In general, comparing this group with more than one class per grade with the rest of the secondary education institutions reveals that the analyzed group has more students, fewer private schools, and more technical-professional schools. Table 1 displays this situation, which is in line with the results of preliminary studies (Treviño, Valenzuela & Villalobos, 2014).

Table 1
Characteristics of the sample compared with the rest of the secondary schools with more than one class per grade (2009)

Variable	Sub-sample (N = 670)	Other schools (N = 1.833)
Number of students (ave.)	700	482
Vulnerability index (ave.)	0.74	0.66
Municipal (%)	58	33
Subsidized private (%)	32	52
Private (%)	0	11
Delegated administration (%)	10	4
Technical-professional (%)	42	25
Scientific-humanistic (%)	49	75

Source: compiled by authors based on SIGE 2009 data.

In order to understand the configuration of heterogeneity in the schools studied, the following section includes information about ability grouping, schooling paths, and the relationship between these two processes, which provides an overview of the dynamics of the production of heterogeneity in Chilean secondary education.

[3] The use of the complementary questionnaire for parents included in the SIMCE and the principal components methodology is in line with prior studies on educational equity (Valenzuela, Bellei, & De Los Ríos, 2014; Mizala & Torche, 2012). Evidently, the use of these data entails some limitations (especially, a large proportion of missing data), which means that the results obtained must be interpreted with caution.

Ability grouping in secondary education

The chi-squared test (χ^2), applied in ninth grade using the final average grades obtained in eighth grade as comparison criterion, revealed that 52% of schools (N = 349) reject the null hypothesis, which means that there exist significant differences in class distribution and that, therefore, internal grouping processes may be occurring. This result is similar to that obtained by Treviño, Valenzuela & Villalobos (2014). However, analyzing school characteristics linked with grouping shows that municipal and scientific-humanistic schools with the largest number of students are more likely to implement this type of organization, as shown in Table 2.

Table 2
School characteristics by ability grouping (2009)

Variable	Grouping (N = 349)	No grouping (N = 321)
Number of students (ave.)	787	604
Vulnerability index (ave.)	75.7	73
Municipal (%)	71.9	42.7
Subsidized private (%)	22.9	41.4
Delegated administration (%)	5.2	15.9
Technical-professional (%)	35	50.2
Scientific-humanistic (%)	51.5	45.8
Vocational (%)	13.5	4

Source: compiled by authors based on SIGE and 2009 performance / IVE-SINAE 2009.

This association may be related to the very organization and composition of the school system. Considering that it displays high levels of socioeconomic segregation (Valenzuela, Bellei, & De los Ríos, 2014), especially in private schools and in elite parts of the system (Villalobos & Valenzuela, 2012), it is possible to imagine that schools which serve larger numbers of vulnerable students and which do not conduct selection processes use internal segregation more intensively. On the other hand, and following Vanderhart (2006), the relationship between segregation and number of students may also be due to the school's need to manage a high degree of heterogeneity by assigning students to different classes.

The question to be addressed, then, concerns the grouping process in the following years of secondary education, after the initial grouping process. In order to answer this question, the same test was applied following the 2009-2012 cohorts. As a requisite for identifying some type of regrouping (that is, the mass rearrangement of students among classes), at least 10% of students had to be transferred from one class to another in the same school.[4] This ensured that the modifications not only involved individual students but instead constituted a mass re-assignment of students among classes. The results, presented in Table 3, show that grouping is a dynamic process in the subset of schools analyzed which is not limited to initial selection, but which instead becomes more pervasive over the years in many schools. 37.3% of the schools rearrange their students academically in tenth grade and 21.3% do so systematically in each year of secondary education.

[4] It is important to understand the conceptual difference between regrouping and placement in a different class, incorporated as an element in schooling trajectories. Whereas regrouping is a classroom-level assessment, assignment to a different class concerns each student individually. However, both concepts are linked because regrouping is a generalized rearrangement of students, which involves a change in the path of the whole set of students who are placed in a different classroom. In order to avoid possible confusions, the analyses presented in the rest of the study only focus on the initial ability grouping done by schools which, for obvious reasons, does not include the classroom switching variable, thus preventing the duplication of regrouping and classroom switching phenomena in the analysis.

Table 3*
Ability grouping in secondary education (2009 - 2012)

Ability grouping	Frequency	Percentage
No groping at any point in the cycle	252	38.3
Grouping in all years of the cycle (9th, 10th, 11th, and 12th grade)	140	21.3
Grouping in 9th and 10th grade, but not in 11th or 12th grade	105	16
Grouping in 9th grade, but not in 10th, 11th, or 12th grade	74	11.3
Grouping in 11th and 12th grade, but not in 9th or 10th grade	33	5
Grouping in 10th, 11th, and 12th grade, but not in 9th grade	11	1.7
Grouping in 9th, 10th, and 12th grade, but not in 11th grade	10	1.5
Grouping in 10th grade, but not in 9th, 11th, or 12th grade	8	1.2
Grouping in 9th, 11th, and 12th grade, but not in 10th grade	7	1.1
Grouping in 9th, 10th, and 11th grade, but not in 12th grade	6	0.9
Grouping in 10th and 12th grade, but not in 9th or 11th grade	4	0.6
Grouping in 12th grade, but not in 9th, 10th, or 11th grade	4	0.6
Grouping in 9th and 12th grade, but not in 10th or 11th grade	2	0.3
Grouping in 10th and 11th grade, but not in 9th or 12th grade	1	0.2
Total	657**	100

Source: compiled by authors based on SIGE and 2008-2012 performance.
* Note: grouping at the beginning of the secondary education cycle and in subsequent years was calculated for each year upon the basis of the index detailed in the methodology section, derived from the student distribution in each class according to their grades and SIMCE scores. However, for regrouping to be identified in later years, the additional condition was set that at least 10% of students had to be placed in other classes.
** In the regrouping analysis, 13 cases were missing due to the closure of some schools or the absence of some of the variables necessary to perform the calculations.

As can be observed, the strategies adopted by the schools are quite diverse and are not limited to an initial assignment of students (in ninth grade); in fact, students are grouped together or separated in the following years. In this regard, we can highlight that 16% of the schools, after applying ability grouping in ninth and tenth grade, stop using it in subsequent years. This may reflect a change in the organization of the classes established in response to academic or work-related orientations (for example, a differentiation between technical-professional and scientific-humanistic classes, or between humanistic, scientific, and mathematical classes). Even though the data are not sufficient for establishing causality, it is also possible to suppose that, during these years, a large portion of the reassigning done is related to the students' choice of a specialization (both in technical-professional and scientific-humanistic education); therefore, it cannot be identified as a direct and planned effect of the schools' actions, even though they can implement policies for the selection of specialization paths based on students' previous academic performance.

Schooling paths in secondary school

A second aspect to consider in the configuration of academic heterogeneity concerns the different elements that make up the students' schooling paths. In order to analyze these aspects, the students were classed depending on whether they had a regular or irregular path in secondary education. For the 2009-2012 period, the results showed that only 14% of the students belonging to the chosen subgroup had a regular path, that is, remaining in the same school and not repeating a grade or dropping out of secondary education. In contrast, irregular paths are very frequent, representing 86% of the students included in the sample. In this category, several students are transferred to a different class at some point in the educational cycle (more than half of the initial cohort); in addition, many students drop out of the system.

Table 4
Schooling paths of the cohort during the secondary education cycle (2009-2012)

Type of path		Frequency	Percentage of total
Regular path		18,789	13.9
Irregular path		116,600*	86.1
	Switched schools at least once	27,394	20.2
	Transferred to another class at least once	68,898	50.9
	Repeated a grade at least once	33,425	24.7
	Dropped out of the system	46,587	34.4

* This is the total number of students who experienced some type of circumstance that altered their regular trajectory in secondary education. The percentages were calculated using the total population examined (135,389 students). Since a student can experience more than one of the actions included in non-regular paths during their education, these categories are not mutually exclusive and the percentages surpass 100%. Source: compiled by authors based on SIGE and 2008-2012 performance.

Even though the results show that non-regular schooling paths are very frequent, it is important to point out that they are not equally widespread throughout the educational cycle. In order to analyze this distribution, Table 5 presents the variations of the different actions associated with irregular paths in each of the transitions of the cohort examined during secondary education.

Table 5
*Distribution of students in irregular paths by transition in the secondary education cycle (2009- 2012)**

	9th to 10th grade (2009-2010)		10th to 11th grade (2010-2011)		11th to 12th grade (2011-2012)	
	Freq.	%	Freq.	%	Freq.	%
Switched schools	13,416	11.17	6,174	6.95	3,540	3.87
Transferred to another class	20,545	19.25	52,189	53.71	12,201	13.89
Repeated at least one grade	11,780	11.04	8,054	8.29	7,408	8.44
Dropped out of the system	15,236	11.25	16,806	13.98	14,545	14.07

Source: compiled by authors based on SIGE and 2008-2012 performance.
* The percentages are not mutually exclusive because they were independently calculated.

The results included in Table 5 provide interesting elements for analysis. Firstly, they show that the frequencies of both grade retention and school mobility are higher at the start of the cycle and become progressively lower in eleventh and twelfth grade. Several hypotheses could account for these changes. On the one hand, schools may carry out these actions intentionally in order to refine the grouping done or as an alternative grouping method, thus allowing them to reorganize students inside the school (by means of grade retention) or outside of it (through expulsion). Nevertheless, especially in the case of school mobility, this transformation may not be an action conducted directly by the school; instead, it could be related to parental preferences, who may choose not to change their children's paths in the last years of the cycle.

In addition, it can also be observed that the percentage of students placed in a different classroom is quite high in all transitions, but it is especially relevant between tenth and eleventh grade. This situation, as previously noted, could be related to the students' choice of a specialization or a technical program.[5] Finally, it is interesting to note that the percentage of dropouts increases as the educational cycle progresses, and amounts to 14% in the transition between eleventh and twelfth grade. According to Espínola et al.

[5] In the transition from tenth to eleventh grade, 60.1% of the technical-professional education students were placed in a different class, compared with 49.5% of the students enrolled in scientific-humanistic education.

(2011), this shows that completion becomes harder as students age, that many of them lose motivation in their studies and that, in addition, as the authors point out, schools do not generate effective devices to ensure students' permanence in the system.

Relationship between grouping and differentiated schooling paths

After separately analyzing the two aspects associated with the configuration of academic heterogeneity in schools, it is relevant to examine the relationship between these elements. Are these phenomena complementary, opposite, or simply parallel? A first way of answering this question consists in observing the students' schooling paths, differentiating the schools that conduct initial grouping from those that do not, as shown in Table 6. Broadly, results show small differences between the groups, which suggest that grouping does not necessarily guarantee greater levels of stability in students' paths; instead, both processes may converge in the configuration of the dynamics of academic heterogeneity.

Table 6
Schooling paths by ability grouping usage

Type of path		Initial grouping (N = 80,016)	No initial grouping (N = 55,373)
Regular path		13.8	14.0
Irregular paths		86.2	86.0
	Switched schools at least once	19.5	21.3
	Transferred to another class at least once	50.6	51.3
	Repeated a grade at least once	20.0	15.9
	Dropped out of the system	37.3	30.2

Source: compiled by authors based on SIGE and 2008-2012 performance.

The above notwithstanding, there exist some specific differences in the distribution of actions linked with irregular schooling paths, such as grade retention and dropout, which are more frequent in the schools that arrange or group students by ability (grades). This stands in contrast with the literature (Dupriez et al., 2008; Mons, 2007; Walberg et al., 2004), which states that schools that use initial student arrangement strategies at the start of the cycle have fewer reasons for employing heterogeneity management strategies such as grade retention or expulsion.

A relevant aspect for explaining these data concerns the characteristics of the students who experience these strategies, because this could indicate whether such strategies (initial grouping and differentiated paths) entail some degree of inequity. In order to study this aspect, Table 7 shows this relationship by arranging students into socioeconomic quintiles. As it is possible to observe, regular paths increase as the students' socioeconomic status improves (Rumberger, 2003), but there are no relevant differences in terms of initial grouping. However, these differences are rather marginal and do not constitute a relevant change between students attending schools that implement grouping in comparison with those that do not.

Table 7
Configuration of heterogeneity and socioeconomic quintile (%)

Schooling path		Initial grouping	Quintile, by students' socioeconomic level*				
			I	II	III	IV	V
Regular path		Grouping	19.0	19.5	20.2	22.1	23.4
		No grouping	18.2	17.8	17.0	18.3	20.9
		Total	18.7	18.8	18.8	20.4	22.3
	Switched schools	Grouping	12.0	14.4	15.0	16.6	19.8
		No grouping	13.8	14.2	15.2	16.4	19.4
		Total	12.5	14.3	15.1	16.5	19.6
	Transferred to another class	Grouping	62.8	60.6	59.7	56.9	52.0
		No grouping	62.6	63.4	63.9	61.6	54,8
		Total	62.7	61.8	61.6	59.1	53.3
Irregular path	Repeated at least one grade	Grouping	10.5	10.6	9.9	10.3	12.0
		No grouping	9.9	9.4	9.5	8.8	8.3
		Total	10.3	10.1	9.7	9.7	10.3
	Dropped out of the system	Grouping	20	18.7	18.3	17.1	18
		No grouping	16.6	14.9	15.1	13.9	16.3
		Total	18.7	17.1	16.8	15.6	17.2

Source: compiled by authors based on SIGE, 2008-2012 performance, and 10th grade SIMCE (2010).
* Total N = 74,733, approximate N per quintile = 14,950.

In addition, it is important to mention that students with a higher SES are more likely to switch schools. This could be explained with reference to the fact that lower socioeconomic status families have a more limited budget and less room for choice (Flores & Carrasco, 2013), which results in a smaller range of possible schools for a student to attend during secondary education. This is consistent with previous studies conducted in Chile (Román & Perticará, 2012), which show that students who attend municipal schools —with higher average rates of vulnerability— have lower school mobility rates. Both elements are believed to indicate the existence of links between schooling path types and students' socioeconomic status.

Lastly, it is possible to analyze the relationship between the two aspects connected with school heterogeneity and the students' prior academic variables. This is important because, as shown by the existing data and literature (Treviño et al., 2014), initial grouping is regarded as a fundamentally academic mechanism, which mostly takes into account students' previous grades. The results of this exercise are presented in Table 8. As can be observed, in the case of previous performance, both initial grouping and differentiated schooling paths are more extensively present in lower-performing students, which reflects the existence processes marked by inequity in the school system. As can be observed, regular paths, however scarce, are 20% more frequent in schools from the top quintile compared with those from the bottom quintile. In addition, this difference is more marked in schools that group their students at the beginning of the educational cycle, where it reaches 25%.

Table 8
Configuration of heterogeneity and academic quintile in eighth grade (%)

Schooling path		Initial grouping	Quintile, by students' grades				
			I	II	III	IV	V
Regular path		Grouping	6.0	10.2	15.1	21.2	31.3
		No grouping	9.2	13.1	15.1	17.4	21.1
		Total	7.2	11.4	15.1	19.5	26.6
Irregular path	Switched schools	Grouping	25	22.8	20.6	17.6	14.1
		No grouping	29.8	25.5	23	18.6	13.1
		Total	26.8	23.9	21.6	18	13.7
	Transferred to another class	Grouping	49.4	53.8	55.8	55.5	51.6
		No grouping	42.3	49.2	53.8	58.9	62.9
		Total	46.8	51.9	55	57.1	56.9
	Repeated at least one grade	Grouping	38.3	27.5	18.9	10.9	6.3
		No grouping	32.1	22.2	15.3	10.1	7.1
		Total	36.1	25.4	17.4	10.5	6.5
	Dropped out of the system	Grouping	60.3	42.8	33.3	25.3	16.9
		No grouping	47.8	32.9	26.4	20.9	16.1
		Total	55.1	38.7	30.5	23.5	16.5

Source: compiled by authors based on SIGE and 2008-2012 performance.

Another relevant aspect concerns the dropout rates observed. As can be inferred from the results, belonging to a low-performing quintile entails a high dropout risk. However, this risk is much greater in schools that employ grouping, especially for quintiles I, II, and III. Also, moving to another school is a very frequent action in the institutions analyzed. The data show only small differences between students attending schools that apply initial grouping and those that do not, which indicates that grouping is not a criterion linked with placement in a different class. This is in line with the situation outlined by Lucas (1999), who notes that, in an ability grouping context, being placed in a specific group does not determine permanence in that group during the whole cycle. This is especially relevant for intermediate ability groups, because they are harder to classify (Jacob & Tieben, 2009) and therefore display higher path mobility rates during secondary education, mostly via placement in other classrooms. Likewise, it is clear that grade retention is much higher for the quintiles with lower previous performance, but this link is much stronger in schools that apply grouping at the start of the educational cycle compared with those that do not. Finally, dropouts become more likely as prior academic performance decreases. However, this relationship is also clearer in schools that apply initial ability grouping.

Despite their differences, these results on the whole suggest that the presence of grouping and differentiated schooling paths has a greater effect on students with weaker academic skills and lower-SES students. This situation makes it possible to infer that, in general, both elements produce or reproduce existing academic differences among students.

Discussion and conclusions

In general, the Chilean secondary education centers analyzed —those which start in ninth grade and have more than one class per grade— display intensive and diversified processes that affect the level of academic heterogeneity of their students within the school. Although this idea must be weighed carefully (because the study focuses only on a subset of the total number of schools in the country), it may imply that the configuration of heterogeneity must be regarded as a dynamic and constant process that is not limited to initial separation or grouping, especially for the lowest-performing students or those who are socioeconomically vulnerable (Galand, 2009). In this regard, the high rates of school mobility observed —possibly linked with expulsion in the case of the more disadvantaged students or the search for new opportunities in the case of higher-SES students—, as well as the high levels of placement in different classrooms, grade retention, and dropout, should be regarded as a critical factor in the generation of integral educational processes for students.

These conclusions are relevant because they make it possible to incorporate an element that is not highlighted in studies on internal segregation: the fact that academic grouping is not limited to the distribution of students among classes at the start of the academic cycle, because schools use complementary mechanisms to address and configure their students' heterogeneity throughout the rest of the educational cycle.

Likewise, it is possible to stress the existence of previously unidentified costs derived from the application of initial grouping or sorting mechanisms associated with students' schooling paths. As the study revealed, lower-performing students display higher dropout and grade retention rates when they attend schools that employ grouping at the start of the cycle than when they attend schools that do not apply grouping at this level, which provides relevant information regarding the potential effects of grouping on the schooling process as a whole.

In this regard, the evidence presented in this article concerning the predominance of non-regular paths among more vulnerable students —considering the major negative consequences that actions associated with irregular paths are believed to have on academic achievement— highlights the necessity of a more thorough study of the configuration of heterogeneity in schools and its impact on the equity of the Chilean educational system. Thus far, educational research has followed separate paths: on the one hand, research on educational segregation, focusing on the distribution among schools of students belonging to different SES groups (Bellei, 2013) and, on the other, the analysis of students' schooling paths (Rumberger & Larson, 1998; Sanclemente, 2008; Zamora, 2011). However, our study reveals that both elements are connected and develop as a continuous process intended to address the structural heterogeneity of school systems.

Notwithstanding the above, it must be stressed that the configuration of heterogeneity displays some clear trends in schools and students. On the one hand, the use of ability grouping is more likely in certain schools; specifically, those which serve larger numbers of students, are administered by a municipality, and provide scientific-humanistic education. On the other hand, non-regular paths are more likely for students with lower previous performance and lower SES and for those who attend schools that apply initial ability grouping. This may support the notion that it is a school's makeup and functioning environment that leads it to privileging certain heterogeneity management mechanisms above others. This thesis, nevertheless, requires mode in-depth study and poses a challenge for future research.

The original article was received on April 10th, 2016
The revised article was received on June 24th, 2016
The article was accepted on July 1st, 2016

References

Bellei, C. (2013). El estudio de la segregación socioeconómica y académica de la educación chilena. *Estudios Pedagógicos, 39*(1), 325-345. DOI: 10.4067/S0718-07052013000100019.

Boaler, J., Wiliam, D., & Brown, M. (2000). Students' experiences of ability grouping: Disaffection, polarisation and the construction of failure. *British Educational Research Journal, 26*(5), 631 - 648. DOI: 10.1080/713651583.

Bourdieu, P. y Passeron, J.-C. (1964). *Los herederos. Los estudiantes y la cultura*. Buenos Aires: Siglo Veintinuo Ediciones.

Braddock, J., & Slavin, R. (1995). Why ability grouping must end: Achieving excellence and equity in American education. En H. Pool, & J. Page (Eds.), *Beyond tracking: Finding success in inclusive schools* (pp. 7-20). Bloomington, Indiana: Phi Delta Kapa Educational Foundation.

Cifuentes, A., Torrego, L. y Siles, G. (2012). Presencia del streaming, mixture e inclusión en los centros educativos españoles de primaria y secundaria. Resultados de la encuesta nacional del proyecto I+D, MIXSTRIN. *Revista Interuniversitaria de Formación de Profesorado, 26*(1), 89-104.

Clotfelter, C., Ladd, H., & Vigdor, J. (2006). Teacher-student matching and the assessment of teacher effectiveness. *The Journal of Human Recourses, 41*(4), 778-820. DOI: 10.3368/jhr.XLI.4.778.

Davis-Kean, L. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology, 19*(2), 294-304. DOI: 10.1037/0893-3200.19.2.294.

Duflo, E., Dupas, P., & Kremer, M. (2011). Peer effects, teacher incentives, and the impact of tracking: Evidence from a randomized evaluation in Kenya. *American Economic Review, 101*(5), 1739-1774. DOI: 10.1257/aer.101.5.1739.

Duncan, G., & Brooks-Gunn, J. (2007). *Consequences of growing up poor*. Nueva York: Russell Sage Foundation.

Dupriez, V. (2010). *Methods of grouping learners at school*. (Vol. 93). París: UNESCO: International Institute for Educational Planning.

Dupriez, V., Dumay, X., & Vause, A. (2008). How do school systems manage pupils' heterogeneity? *Comparative Educational Review, 52*(2), 245 - 273. DOI: 10.1086/528764

Eder, D. (1981). Ability grouping as a self-fulfilling prophecy: A micro-analysis of teacher-student interaction. *Sociology of Education, 54*(3), 151-162. DOI: 10.2307/2112327.

Espíndola, E. & León, A. (2002). La deserción escolar en América Latina: un tema prioritario para la agenda regional. *Revista Iberoamericana de Educación*, *30*, 39-63.

Espínola, V., Balladares, J., Claro, J. y Valencia, E. (2011). *Mapa de la efectividad de la educación media en Chile: factores de gestión asociados a la completación de estudios secundarios.* Santiago, Chile: Fondo de Investigación y Desarrollo en Educación (FONIDE), Mineduc.

Etxeberria, X. (2004). *Sociedades multiculturales*. Bilbao: Alboan/Mensajero.

Felner, R., Primavera, J., & Cauce, A. (1981). The impact of school transitions: A focus for preventive efforts. *American Journal of Community Psychology, 9*(4), 449-459. DOI: 10.1007/BF00918175.

Flores, C., & Carrasco, A. (2013). *Preferencias de los padres, libertad de elección y segregación*. Documento de Referencia. Santiago, Chile: Espacio Público.

Galand, B. (2009). *Hétérogénéité des élèves et apprentissages: quelle place pour les pratiques d'enseignement?* Retrieved from https://halshs.archives-ouvertes.fr/halshs-00561564/document

Glick, J., Yabiku, S., & Bates, L. (2008). *Instability and student achievement: Understanding the importance of school mobility, residential change and family disruption.* Trabajo presentado en la American Sociological Association Annual Meeting, Boston, Massachusetts, Estados Unidos.

Grigg, J. (2012). School enrollment changes and student achievement growth: A case study in educational disruption and continuity. *Sociology of Education, 85*(4), 388-404. DOI: 10.1177/0038040712441374.

Hallinan, M. (1990). The effects of ability grouping in secondary schools: A response to Slavin's best-evidence synthesis. *Review of Educational Research, 60*(3), 501-504.

Hallinan, M., & Kubitschek, W. (1999). Curriculum differentiation and high school achievement. *Social Psychology of Education, 3*(1), 41-62.

Jackson, G. B. (1975). The research evidence on the effects of grade retention. *Review of Educational Research, 45*(4), 613-635.

Jacob, M., & Tieben, N. (2009). Social selectivity of track mobility in secondary schools. *European Societies, 11*(5), 747-773. DOI: 10.1080/14616690802588066.

Jadue, G. (1997). Factores ambientales que afectan el rendimiento escolar de los niños provenientes de familias de bajo nivel socioeconómico y cultural. *Estudios Pedagógicos, 23*, 75-80. DOI: 10.4067/S0718-07051997000100007.

Jensen, A. R. (1968). Patterns of mental ability and socioeconomic status. *Procedure National Academy of Science in United States of America, 60*(4), 1330-1337.

Jimerson, S. (2001). Meta-analysis of grade retention research: Implications for practice in the 21st century. *School Psychology Review*, *30*(3), 420-437. DOI:

Larroulet, C. (2011). *Análisis de la movilidad escolar en Chile.* (Tesis de magíster). Pontifica Universidad Católica de Chile, Santiago, Chile.

Letendre, G., Hofer, B., & Shimizu, H. (2003). What is tracking? Cultural expectations in the United States, Germany and Japan. *American Educational Research Journal, 40*(1), 43-89. DOI: 10.3102/00028312040001043.

Lucas, S. (1999). *Tracking inequality: Stratification and mobility in American high schools*. Nueva York: Teachers Collegue Publisher.

McCulloch, A., & Joshi, H. (2001). Neighborhood and family influences on the cognitive ability of children in the British national child development study. *Social Science Medicine, 53*(5), 579-591. DOI: 10.1016/S0277-9536(00)00362-2.

Metzaros, I. (2009). *La educación más allá del capital*. Buenos Aires: Clacso.

Mizala, A., & Torche, F. (2012). Bringing the schools back in: The stratification of educational achievement in the Chilean voucher system. *International Journal of Educational Development, 32*(1), 132-144. DOI: 10.1016/j.ijedudev.2010.09.004.

Mons, N. (2007). *Les nouvelles politiques éducatives. La France fait-elle les bons choix?* París: Presses universitaires de France.

Pallas, A., Enwistle, D., Alexander, K., & Slutka, F. (1994). Ability-group effects: Instructional, social or institutional? *Sociology of Education, 67*(1), 27-46. DOI:

Roderick, M. (1994). Grade retention and school dropout: Investigating the association. *American Educational Research Journal, 31*(4), 729-759. DOI: 0.3102/00028312031004729

Román, M., & Perticará, M. (2012). Student mobility in low quality schools: Segmentation among the most vulnerable students. *Estudios de Economía, 39*(2), 159-177.

Rosenbaum, J. (1976). *Making inequality: The hidden curriculum of high school tracking*. Nueva York: John Wiley & Sons.

Rumberger, R. (2003). The causes and consequences of student mobility. *Journal of Negro Education, 72*(1), 6-20. DOI: 10.2307/3211287.

Rumberger, R., & Larson, K. (1998). Student mobility and the increased risk of high school dropout. *American Journal of Education*, *107*(1), 1-35. DOI: 10.1086/444201.

Sanclemente, M. (2008). *Nomadismo escolar en el sistema educacional chileno (2003-2007).* (Tesis de magíster). Universidad Alberto Hurtado-Georgetown University, Santiago, Chile.

Santos, H. (2009). *Dinámica de la deserción escolar en Chile*. Documento de Trabajo. Santiago, Chile: Centro de Políticas Comparadas en Educación. Universidad Diego Portales.

Shonkoff, J. P., & Phillips, D. A. (2000). From neurons to neighborhoods. The science of early childhood development. *Journal of The Academy of Child & Adolescent Psychiatry*, *41*(5), 625-626.

Slavin, R. (1990). Ability grouping in secondary schools: A response to Hallinan. *Review of Educational Research, 60*(3), 505-507.

Terigi, F. (2007). *Los desafíos que plantean las trayectorias escolares*. Fundación Santillana II. Retrieved from www.es.mza.infd.edu.ar/sitio/upload/desafios__de_flavia_terigi.pdf

Treviño, E., Fraser, P., Meyer, A., Morawietz, L., Inostroza, P. y Naranjo, E. (2015). *Factores asociados al aprendizaje*. Santiago, Chile: Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación, Unesco-Santiago.

Treviño, E., Valenzuela, J. P. y Villalobos, C. (2014). *Segregación académica y socioeconómica al interior de la escuela. Análisis de su magnitud, evolución y principales factores explicativos*. Retrieved from www.sgdce.mineduc.cl/descargar.php?id_doc=201604111620280

Valenzuela, J. P., Allende, C., Sevilla, A. y Egaña, P. (2013). *La (ina)movilidad del desempeño educativo de los estudiantes chilenos: realidad, oportunidades y desafíos*. Retrieved from www.centroestudios.mineduc.cl/tp_enlaces/portales/.../uploadImg/
.../LIbroFONIDE_6.pdf

Valenzuela, J. P., Bellei, C., & De los Ríos, D. (2014). Socioeconomic school segregation in a market-oriented educational system. The case of Chile. *Journal of Education Policy, 29*(2), 217-241. DOI: 10.1080/02680939.2013.806995.

Valin, A. (2011). *Financiamiento compartido y desempeño escolar en Chile.* Santiago, Chile: Pontificia Universidad Católica de Chile.

Vanderhart, P. (2006). Why do some schools group by ability? Some evidence from the NAEP. *American Journal of Economics and Sociology, 65*(2), 435-462. DOI: 10.1111/j.1536-7150.2006.00458.x.

Villalobos, C. y Valenzuela, J. P. (2012). Polarización y cohesión social del sistema escolar chileno. *Revista de Análisis Económico, 27*(2), 145-172. DOI: 10.4067/S0718-88702012000200005.

Walberg, H., Reynolds, A., & Wang, M. (2004). *Can unlike students learn together?: Grade retention, tracking and grouping*. Chicago: IAP: Information Age Publishing Inc.

Walsemann, K., & Bell, B. (2010). Integrated schools, segregated curriculum: effects of within-school segregation on adolescent health behaviors and educational aspirations. *American Journal of Public Health*, *100*(9), 1687-1695. DOI: 10.2105/AJPH.2009.179424.

White, K. (1982). The relation between socioeconomic status and educational achievement. *Psychological Bulletin, 91*, 461-481. DOI: 10.1037/0033-2909.91.3.461.

Zamora, G. (2011). Movilidad escolar en Chile. Análisis de las implicancias para la calidad y equidad de la educación. *Estudios Pedagógicos, 37*(1), 53-69. DOI: 10.4067/S0718-07052011000100003.