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Retention and science performance in Portugal as evidenced by PISA

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Abstract

Problem Statement: The question of academic retention has emerged as a powerful discourse in educational policy in Portugal. International assessment programs, such as the Program for International Student Assessment (PISA), have fueled the controversy, and retention rates are sometimes implicated as an underlying cause for the generally poor performance observed. **Purpose of Study:** The data from PISA 2006 provide an opportunity to examine this question with a large sample of 15-year-old students. We report associations between retention and science performance, an analysis of the characteristics of retained students, and a hierarchical linear model of the effect of retention on performance, controlling for economic-social-cultural status (ESCS). **Research Methods:** The 2006 PISA sample in Portugal consisted of 5109 students in 173 schools, all between the ages of 15 years 3 months and 16 years 2 months. Missing data resulted in 5013 usable cases for this study. Since PISA has no single variable to indicate a student's status as "retained at least once" or "never retained", the first step was to operationalize retention with the available data. Mean analyses were based on 80 weighted replicas of 5 plausible values of science performance and its sub-domains. **Findings:** Portugal is among the PISA participants with highest retention. Only 4 (of 57) PISA participants revealed a higher proportion of the age-based sample attending the 7th grade. Students who were retained at least one year differ systematically, on several social dimensions, from those not retained. The retained are more likely to be boys, immigrants, in public schools, from small towns and villages, and of lesser economic means. Mean performance in science is directly associated with the number of student retentions (though this is confounded with other variables). Being retained is a more powerful predictor of science performance than is ESCS. **Conclusions:** Retention practices in Portugal are outside de norms of other OECD countries. Neither curriculum nor teaching practice seem implicated in the poor science results observed in Portugal. Low performance is a partial artifact of age-based sampling coupled with high retention.

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Keywords: Retention; science; secondary education; Portugal; PISA

1. Introduction

The Program for International Student Assessment (PISA), sponsored by the Organization for Economic Cooperation and Development (OECD), seeks to analyze the capacity of students from different countries to put their knowledge into practice in real life situations (Organisation for Economic Co-operation and Development [OECD], 2009a, 2009b). This Large-Scale Assessment seeks to improve the functioning of education systems and, consequently, student learning (OECD, 2007; Rutkowski, Gonzalez, Jonca, & von Davier, 2010). A detailed description of the program appears in the manuals of the OECD (OECD, 2007, 2009b) as well as in the scientific literature (Bybee, McCrae, & Laurie, 2009, Rutkowski et al., 2010). PISA uses a literacy approach to assess how

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students, 15 to 16 years of age, can use the skills of reading, math and science in the understanding and interpretation of phenomena that they might meet on a day-to-day basis. Every three years, all these areas are evaluated, and each year one of the areas is selected for a more profound analysis. In the 2006 stage, the area of science was emphasized (OECD, 2007, 2009a, 2009b). The countries participating in PISA 2006 included 30 OECD members and 27 partners.

The results achieved in Portugal have generated controversy. In other countries, PISA outcomes have been described in the media in negative and catastrophic tones (Mons & Pons, 2009). The same has been true in Portugal. In order to explain the weak results, the official response from the Ministry of Education has frequently focused on the role of academic retention and its influence on mean scores ("Escola de Sintra dispensada", 2009). Ministry officials have also pointed to the large number of students who were attending school at the level of grade 7 or 8, and who, therefore, had never been exposed to curricular knowledge assessed by PISA ("Ministério atribui", 2007).

1.1. Retention

Retention policies are rooted in the growth of schools during the industrial revolution, associated trends in immigration, and the development of intelligence tests (Frey, 2005). By *retention* we refer to the situation where a student remains at the same level of education for an additional year instead of advancing to a higher level with age peers (Brophy, 2006). (In this context, terms such as *recovery*, *repetition* and *failure* are frequently employed. In this paper, we prefer the term *retention* since it only refers to the act of be retained, without making judgments about the causes, the justice or even how the extra time will be used). Retention is often associated with academic failure, although it may be the result of prolonged illness, intermittent absences, or even the desire of a student (or parents) to repeat a year to better prepare for a particular purpose (e. g., improve scores on tests for access to higher education). Types of retention are characterized by their voluntary or involuntary nature, as well as by who initiates the process: the student, family, or school. In this article we will focus on non-voluntary retention imposed by the school that occurs before grade 10.

Brophy (2006) and Penfield (2010) report some typical arguments for and against a policy of retention. Proponents of retention describe it as a valid remedial action that gives students the opportunity to develop skills necessary for success in the more demanding curriculum of the following school year. They also refer to its motivational role in conveying high expectations to the students. They also say that retention leads to more academically homogeneous groups of students, and consider this a desirable result. Another advantage of a retention policy is that, since it is based on academic merit, it puts all students on equal footing and is therefore a truly democratic process.

In methodological terms, advocates often point to studies that compare two groups: retained students versus their peers in the same school year. Such studies usually give rise to results showing some short-term performance advantages. Usually, after a year, retained students are able to improve their academic standing within the group (Hong & Raudenbush, 2005; Rebelo, 2009). Thus, advocates come to the conclusion that retention has distinct advantages. Penfield (2010) describes how these arguments have given rise, in the United States, to a movement that led to retention based on the results of standardized tests.

Opponents of retention point to two types of studies: (a) longitudinal studies and (b) studies that compare retained students on the one hand, and their age-peers (instead of peers in the same academic year), on the other. Longitudinal studies tend to show that retained students do not benefit in performance and may suffer deficits with respect to socio-emotional and self-esteem variables, relationships with peers and attitudes relating to school (Hong & Raudenbush, 2005; Jimerson, 2001; Rebelo, 2009, Xia & Kirby, 2009). While there is evidence that there may be short-term benefits from retention, these benefits generally disappear by the time a student reaches the 6th grade. (Jimerson, Carlson, Rotert, Egeland, & Stroufe, 1997; Karweit, 1999, Xia & Kirby, 2009). In a study at the kindergarten level, Hong and Raudenbush (2005) concluded that children who were retained learn less than they would have, had they advanced with their age-peers. With regards to the issue of school abandonment, Holmes (2006) takes the unequivocal position that the scientific literature is unanimous in linking retention to dropping out of school.

Opponents also point to literature that questions the social equality of retention policies. They argue that retention policies are not based on academic merit only; there are a number of other variables that determine whether a student will or will not be retained (Xia & Kirby, 2009). In an international study of retention rates, Eisenmon (1997) concluded that there is an association between retention rates and types of educational systems. In particular, a high retention rate is associated with educational systems that emphasize universal education, but at a low level. In